

Brown Bear Management Report and Plan, Game Management Units 25A, 25B, 25D, 26B, and 26C:

Report Period 1 July 2014–30 June 2019, and

Plan Period 1 July 2019–30 June 2024

Elizabeth A. Lenart



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Species management reports and plans provide information about species that are hunted or trapped and management actions, goals, recommendations for those species, and plans for data collection. Detailed information is prepared for each species every 5 years by the area management biologist for game management units in their areas, who also develops a plan for data collection and species management for the next 5 years. This type of report is not produced for species that are not managed for hunting or trapping or for areas where there is no current or anticipated activity. Unit reports are reviewed and approved for publication by regional management coordinators and are available to the public via the Alaska Department of Fish and Game's public website.

This species management report and plan was reviewed and approved for publication by Doreen Parker McNeill, Management Coordinator for the Division of Wildlife Conservation.

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Cover Photo: 2014 ADF&G. Brown bear skull from Unit 26B. Photo by Elizabeth Lenart.

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Purpose of this Report

This report provides a record of survey and inventory management activities for brown bear (*Ursus arctos*) in Units 25A, 25B, 25D, 26B, and 26C for the 5 regulatory years 2014–2018 and plans for survey and inventory management activities in the following 5 regulatory years, 2019–2023. 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 more efficiently report on trends and to describe potential changes in data collection activities over the next 5 years. It replaces the brown bear management report of survey and inventory activities that was previously produced every 2 years.

I. RY14–RY18 Management Report

Management Area

The management area includes Units 25A, 25B, 25D, 26B, and 26C (73,755 mi²) which encompasses the Upper Yukon River drainage and eastern North Slope of the Brooks Range (Fig. 1). Brown bears, also referred to as grizzly bears in Interior Alaska, are widely distributed in Northeast Alaska in Units 25A, 25B, 25D, 26B, and 26C. Densities are generally highest in the foothills and mountains of the Brooks Range, and lowest on the coastal plain of the North Slope and the Yukon Flats. Riparian habitats are extensively used in Units 26B and 26C. Brown bears are also known to concentrate near salmon spawning areas on the lower Sheenjek River in Unit 25A.

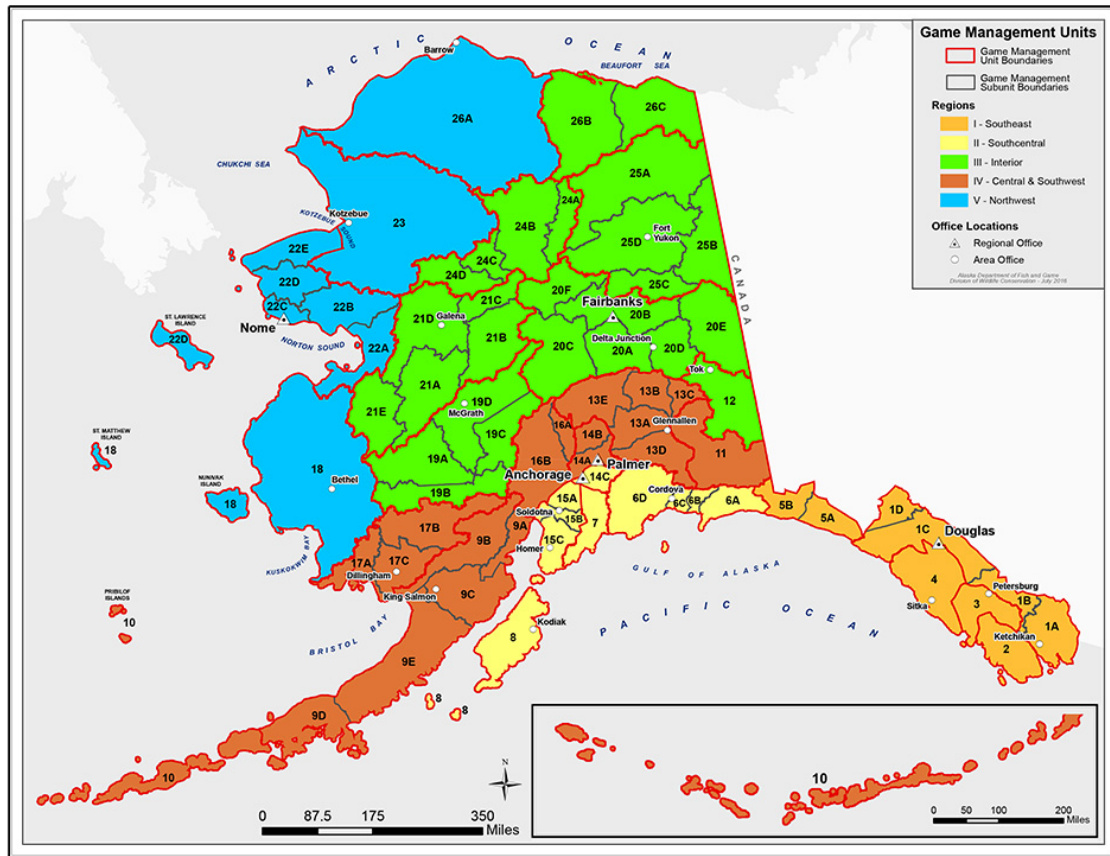


Figure 1. Game Management Units in Alaska, including Units 25A, 25B, 25D, 26B and 26C.

Summary of Status, Trend, Management Activities, and History of Brown Bear in Units 25A, 25B, 25D, 26B, and 26C

A decline in bear numbers occurred during the 1960s, resulting primarily from aircraft-supported guided hunters, defense of life and property (DLP) kills, and other harvest associated with early oil and gas exploration (Shideler and Hechtel 2000). As a result, in regulatory year (RY) 1971, Units 26B and 26C were closed to brown bear hunting. By RY77, all brown bear hunters in Units 25A, 26B, and 26C were required to obtain drawing permits. Regulations were gradually liberalized as populations recovered. During the mid-1990s, some restrictions in Unit 26B were implemented to maintain a sustainable harvest. In Unit 25D, more liberal brown bear hunting regulations were implemented beginning in RY98 to provide for additional hunting opportunity.

Brown bear predation on muskoxen in Units 26B and 26C was documented in the 1980s (Reynolds et al. 2002) with an apparent increase in predation by bears noted during the early 2000s (Reynolds et al. 2002). During 2007–2011, ADF&G research staff determined that brown bear predation on adult and calf muskoxen in Unit 26B was the most common cause of mortality where a cause could be identified. To reduce brown bear predation on muskoxen in Unit 26B, in RY10 the Alaska Board of Game liberalized the brown bear hunting seasons and permit requirements by emergency order for RY10 and RY11 (Lenart 2015a). In January 2012, the board approved the Unit 26B Muskox Recovery Plan (5 AAC 92.126). This plan included use of

department-authorized personnel to lethally remove brown bears identified as a threat to or that had killed muskoxen in Unit 26B (Alaska Department of Fish and Game 2012). The board expedited 5 AAC 92.126, which went into effect in spring 2012 (RY11), when lethal brown bear removal was implemented. In addition, brown bear hunting regulations were modified in spring 2012 to align with the Unit 26B Muskox Recovery Plan (Lenart 2015b).

The results of predation control on brown bears in Unit 26B for the first 2 calendar years (2012 and 2013) were summarized in unpublished memoranda by E. Lenart and J. Caikoski (Wildlife Biologists, ADF&G, Unit 26B Muskox Recovery Program–Field Activities Summary 2012, 16 November 2012, Fairbanks; Unit 26B Muskox Recovery Program–Field Activities Summary 2013, 19 December 2013, Fairbanks).

Management Direction

A maximum sustainable yield (MSY) approach was used in establishing goals and objectives for managing brown bear in Units 25A, 25B, 26B, and 26C. Despite the implementation of 5 AAC 92.126, which authorized the lethal removal of brown bears that had threatened or killed muskoxen, an MSY approach was still used in Unit 26B.

Management goals and objectives for moose populations were considered in establishing goals and objectives for brown bear in Unit 25D in accordance with the Yukon Flats Cooperative Moose Management Plan (ADF&G 2002) and Alaska’s intensive management law for moose in Unit 25D (5 AAC 92.108).

EXISTING WILDLIFE MANAGEMENT PLANS

Goals and objectives for brown bear management in Units 25A, 25B, 25D, 26B, and 26C are included in the 2015 brown bear management survey and inventory report for Units 25A, 25B, 25D, 26B, and 26C (Lenart 2015a).

GOALS

- G1. Protect, maintain, and enhance brown bear populations and habitat in concert with other components of the ecosystem.
- G2. Provide the opportunity to hunt brown bears under aesthetically pleasing conditions in the eastern Brooks Range.
- G3. Provide the greatest sustained opportunity to participate in hunting brown bears in the Upper Yukon and Porcupine drainages.
- G4. Provide maximum opportunity to participate in hunting brown bears in Unit 25D.

CODIFIED OBJECTIVES

Amounts Reasonably Necessary for Subsistence Uses

There was a positive customary and traditional use finding by the Alaska Board of Game for brown bears in Unit 25D (5 AAC 99.025); however, the amounts reasonably necessary for subsistence (ANS) was not established by the board due to lack of data.

Intensive Management

None.

Nonintensive Management Predator Control Plans

A Muskoxen Recovery Area was established in Unit 26B under 5 AAC 92.126 which authorized ADF&G staff to conduct selective, lethal removal of brown bears (up to 20 brown bears annually) that have been identified as a threat to or having killed muskoxen to allow the recovery of the muskoxen population in Unit 26B, which was effective from 15 March 2012–30 June 2018.

MANAGEMENT OBJECTIVES

M1. In Units 25A, 25B, and 26C, manage for a 3-year mean annual human-caused brown bear mortality of $\leq 8\%$ of brown bears ≥ 2 -years old, of which no more than 40% in each unit are female.

M2. In Unit 25D, manage for a temporary reduction in brown bear numbers and predation on moose. After moose populations increase to desired levels, reduce bear harvests to allow the bear population to recover.

M3. Reduce brown bear predation on muskoxen in Unit 26B.

M4. Maintain an estimated population of 200–320 bears (midpoint = 265) in Unit 26B.

M5. In Unit 26B, manage for a 3-year mean annual human-caused brown bear mortality of $\leq 8\%$ of brown bears ≥ 2 -years old, of which no more than 40% are female.

MANAGEMENT ACTIVITIES

1. Population Status and Trend

ACTIVITY 1.1. Estimate brown bear populations in Units 25A, 25B, and 25D combined; and Units 26B and 26C separately (M1, M2, M4, M5).

Data Needs

Population estimates were needed to determine harvest rates to manage the hunting of bears for maximum sustained yield.

Methods

Units 25A, 25B, 25D, and 26C—Brown bear population estimates for Units 25A, 25B, 25D, and 26C were based on extrapolations from studies conducted in similar habitats in the 1970s and 1980s either in portions of the eastern Brooks Range in Units 26B and 25A (3,600 mi²; Reynolds 1976), Unit 26C (Reynolds and Garner 1987), or the western Brooks Range in Unit 26A (Reynolds and Hechtel 1984, Reynolds 1992). In 1993, population estimates were adjusted slightly from the original extrapolated estimates based on better technology to calculate the area of bear habitat and increased knowledge of bear densities in certain types of bear habitat (R. O. Stephenson, Wildlife Biologist, ADF&G, Brown Bear Population Estimates Memorandum 27 April 1993, Fairbanks; S. Miller, Wildlife Biologist, ADF&G, 1993 Statewide Brown Bear Population Estimate Memorandum 9 June 1993, Anchorage; H. Reynolds and G. Carroll, Wildlife Biologists, ADF&G, Grizzly Bear Population Estimate, Unit 26 Memorandum 27 July 1993; Miller 1993). The memoranda cited above provide estimated bear densities for the units, but these memoranda do not provide methods on how the numbers were derived from extrapolated studies or surveys. Therefore, it is likely impossible to replicate how these estimates were derived. In these memoranda, estimates were also referred to as a “best guess”. Because no population surveys have been conducted in these units, and bear habitat has likely not changed significantly, these extrapolated estimates were used for estimated population sizes for Units 25A, 25B, 25D, and 26C for RY14–RY18.

Units 26B—During 2000, 2001, and 2003, a double-count line transect method aerial survey (Becker and Quang 2009) was conducted to obtain a density estimate for high quality bear habitat (mostly the foothills and mountains) in a 20,536 km² (7,929 mi²) area in eastern Unit 26A, Unit 26B, and western Unit 26C (Fig. 2). In addition, a pilot study was conducted in 1999 that included a portion of the study area which was north of the study area (mostly coastal plain), but because few bears were observed, this portion was eliminated for the 2000, 2001, and 2003 surveys. For detailed methods, see Reynolds et al. 2004. In 2016, an ADF&G biometrician reanalyzed the 2000–2003 survey data. For detailed methods, see H. Reynolds, wildlife biologist, ADF&G, Fairbanks, unpublished poster presented at the 24th International Conference on Bear Research & Management (IBA), 12–16 June 2016; and Becker and Christ 2015.

To estimate the bear population size in Unit 26B, the density estimate for the study area described above was applied to the Unit 26B portion of the study area (10,192 km², 3,935 mi², Fig. 2). A 95% confidence interval was calculated for this estimate as described by Reynolds et al. 2016 (H. V. Reynolds, wildlife biologist, ADF&G, Fairbanks, unpublished poster presented at the 24th International Conference on Bear Research & Management (IBA), 12–16 June 2016) and Becker and Christ 2015.

To estimate brown bear abundance in the remainder of Unit 26B north of the study area (25,506 km², 9,848 mi²) and elevation >4,000 feet (4,487 km², 1,733 mi², Fig. 2), data from a portion of the 1999 pilot study area (7,555 km², 2,917 mi²) was used and density was estimated using the 15% best fit model (H. Reynolds, wildlife biologist, ADF&G, Fairbanks, personal communication); however, no statistical bounds were calculated and exact methods on how this density estimate was calculated are not available. Note that the data from the 1999 study area were from bear observations north of the 2000–2003 study area boundary where only 2 bear groups were observed (H. Reynolds, wildlife biologist, ADF&G, Fairbanks, personal

communication). In addition, these data were not reanalyzed in 2016 and likely represent a conservative estimate.

Results and Discussion

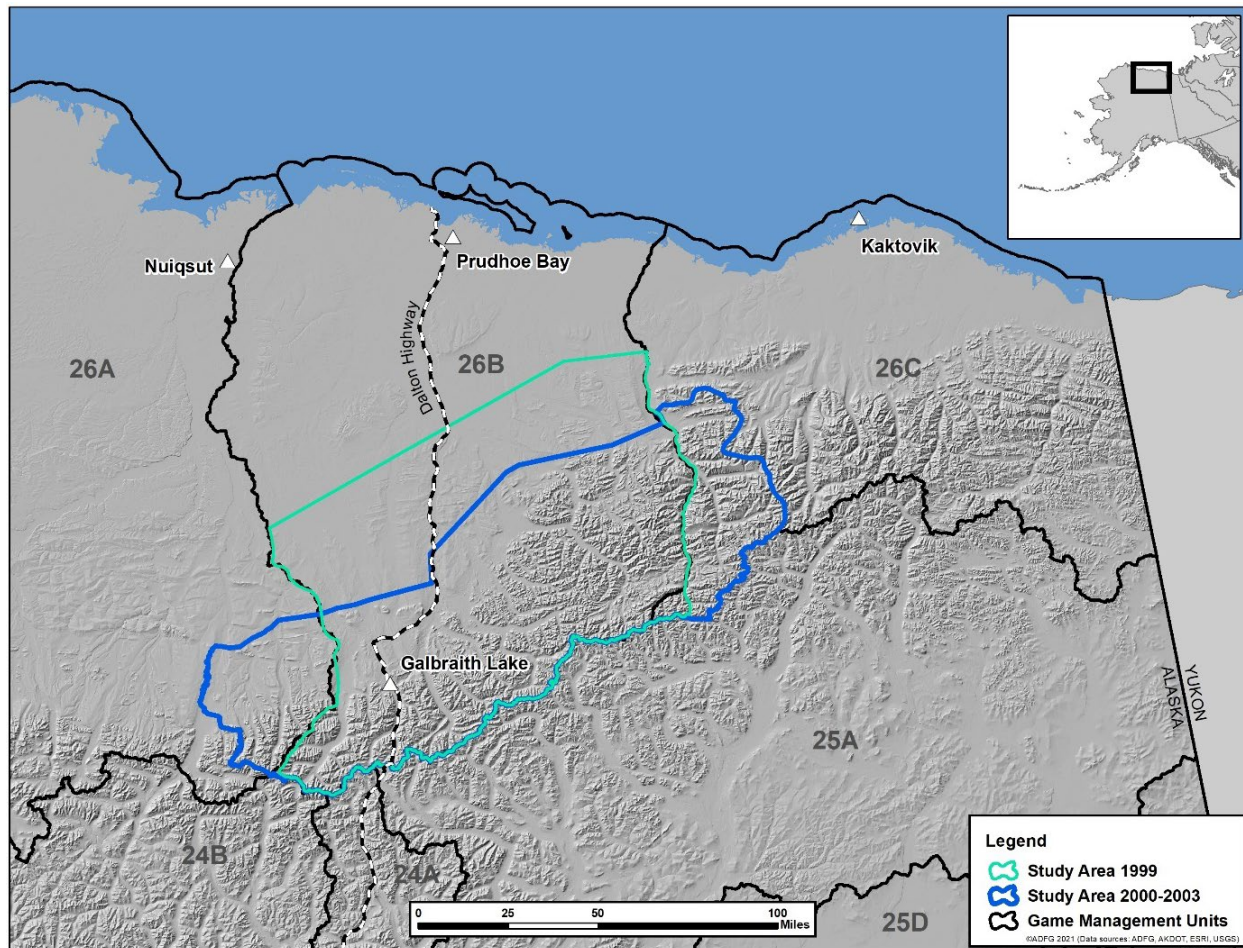
Units 25A, 25B, 25D, and 26C—The estimate of the number of brown bears during RY14–RY18 in Unit 25A was 584, in Units 25B and 25D combined it was 580, and in Unit 26C, it was 391 (Table 1). These numbers were based on extrapolations from studies conducted in the 1970s, 1980s, and early 1990s (Reynolds 1976, Reynolds and Garner 1987, Reynolds and Hechtel 1984, Reynolds 1992); and also on readjustments made to these extrapolated estimates in 1993 (R. O. Stephenson, Wildlife Biologist, ADF&G Brown Bear Population Estimates Memorandum 27 April 1993, Fairbanks; S. Miller, Wildlife Biologist, ADF&G 1993 Statewide Brown Bear Population Estimate Memorandum 9 June 1993, Anchorage; H. Reynolds and G. Carroll, Wildlife Biologists, ADF&G Grizzly Bear Population Estimate, Unit 26 Memorandum 27 July 1993; Miller 1993). As mentioned in the above methods section, these estimates reflect a “best guess”. Availability of habitat for brown bears in this area has likely not changed substantially since 1993, annual harvest was <5%, and in most years the harvest included $\leq 40\%$ females. Thus, it is likely that harvest was sustainable and bear densities remained unaffected by harvest.

Unit 26B—Based on the aerial transect surveys flown during 2000, 2001, and 2003 in eastern Unit 26A, Unit 26B, and western Unit 26C, and on the reanalysis of the data in 2016, a density of 25.01 brown bears/1,000 km² $\pm 4.49 \times 1.96$ (95% confidence interval (CI) 16.21, 33.81) was calculated in the highest quality bear habitat (mostly foothills and mountains <4,000 feet, 10,192 km², 3,935 mi²). This resulted in an estimate of 255 brown bears (95% CI 165, 345) for this portion of Unit 26B (Table 1).

A density estimate of 2.6 bears/1000 km² calculated for the portion north of the 2000–2003 study area (mostly, coastal plain and >4,000 feet) with no statistical bounds or range associated with this number resulted in an estimate of 78 bears. Note that the extrapolated value of 78 bears representing north of the study area and >4,000 feet was not based on reliable data because only 2 bear groups were observed. In addition, these data were not reanalyzed in 2016, suggesting that the number of bears estimated is likely a conservative estimate.

Based on these estimates, we estimated the Unit 26B bear population size to be between 243–423 bears, with a midpoint 333 bears (Table 1). This range is not a statistical confidence interval; we simply added the estimated 78 bears in the lower quality habitat to the upper and lower bounds of the survey estimate from the higher quality habitat to obtain this range. Although this survey was conducted many years ago, it is likely that the change in bear habitat has been small.

See Lenart 2015a for Unit 26B bear population estimates used prior to the reanalysis in 2016.



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Figure 2. Map showing the study areas for double-count line transect aerial surveys conducted in eastern Unit 26A, Unit 26B, and western Unit 26C, Alaska during 1999–2003.

Recommendations for Activity 1.1

I recommend discontinuing using 1993 bear density estimates because they are 20–40 years old. Serious consideration and discussion should be given as to whether these bear density estimates are useful for management. The 1993 estimates were based on studies conducted in the 1970s and 1980s in only some portions of the units (e.g., Units 25A and 26C). In addition, we were unable to replicate how these estimates were derived, and they were referred to as a “best guess”. It is very possible that these estimates are reasonable; but an examination, analysis, and evaluation of additional bear population studies and bear habitat should be completed to determine if it is reasonable to extrapolate to areas where no bear population survey has been conducted. The 2000–2003 survey in Unit 26B is also 20-years old. In addition, extrapolating to that portion of Unit 26B that was not surveyed was based on few data, the methods and analyses provided were in grey literature, and methods that were from peer-reviewed publications may not be repeatable.

Table 1. Units 25A, 25B, 25D, 26B, and 26C brown bear estimated densities and population size and sustainable harvest, 2014–2018, Alaska.

Unit	Area Size	Estimated ^a bears/1000 km ²	Estimated ^a bears/1000 mi ²	Estimated population size	Allowable harvest at 8%
25A	55,124 km ² , 21,300 mi ²	10.6 (8.3–12.9)	27.4 (21.5–33.5)	584 (456–713)	48
25B and 25D	69,017 km ² , 26,647 mi ²	8.4 (7.5–9.3)	22.1 (19.4–24.1)	580 (516–644)	47
26B ^b (north study area, >4,000 ft)	29,993 km ² , 11,581 mi ²	2.6	6.7	78	–
26B ^c (study area 2000–2003)	10,192 km ² , 3,935 mi ²	25.01 (95% CI 16.21–33.81)	64.29 (95% CI 41.67–86.91)	255 (95% CI 165–345)	–
26B Total ^d	40,184 km ² , 15,515 mi ²	–	–	333 (243–423)	27
26C	26,607 km ² , 10,273 mi ²	14.7 (11.7–16.2)	38.1 (30.3–42.0)	391 (312–430)	31

Note: En dash indicates data unavailable.

^a Density/population estimates for Units 25A, 25B, 25D, and 26C were based on extrapolations from studies done in portions of the eastern Brooks Range or in similar habitat in the western Brooks Range during the 1980s and early 1990s and readjusted in 1993 (R. O. Stephenson, ADF&G wildlife biologist, 1993 Brown bear population estimates, unpublished memorandum, 27 April 1993, Fairbanks; S. D. Miller, ADF&G wildlife biologist, statewide brown bear population estimate, unpublished memorandum, 9 June 1993, Anchorage). Although a range is presented, this range was not calculated statistically and represents a range from extrapolated studies and a “best guess”.

^b The density/population estimate for Unit 26B north of the 2000–2003 study area (mostly coastal plain) and >4,000 feet were estimated from a pilot study conducted in 1999, and no statistical bounds were associated with this estimate (Reynolds et al. 2004).

^c The density/population estimate for the portion of Unit 26B in the foothills and mountains was based on an aerial line transect method conducted during 2000–2003 (data was reanalyzed in 2016; H. V. Reynolds, wildlife biologist, ADF&G, Fairbanks, unpublished poster presented at the 24th International Conference on Bear Research & Management (IBA), 12–16 June 2016); the density estimates and ranges presented were calculated statistically and represent true statistical bounds.

^d Total Unit 26B density/population estimate range incorporates the statistical bounds from the aerial line transect conducted during 2000–2003 and adds the value of estimated number of bears from the coastal plain and elevations >4,000 feet. Thus, the Total Unit 26B density/population range was not calculated statistically.

ACTIVITY 1.2. Reduce brown bear predation on muskoxen in Unit 26B.

Data Needs

Brown bears were identified as the largest cause of mortality on adult and calf muskoxen in Unit 26B in a research study conducted during 2007–2011 (Arthur and Del Vecchio 2017). The Unit 26B muskox population had declined to approximately 200 muskoxen in 2004 and remained near 200 muskoxen for the following 13 years. The Board of Game authorized reducing brown bear predation on muskoxen during the January 2012 Board of Game meeting based on the information provided in the Operational Plan for Unit 26B Muskox Recovery, 2012–2018 (ADF&G 2012).

Methods

Brown bears that were identified as a threat to or having killed muskoxen were lethally removed from an R44 helicopter by shooting the bear with a 12-gauge shotgun. Bear carcasses were transported to a vehicle so that hides and skulls could be salvaged for educational purposes (ADF&G 2012).

Results and Discussion

No funding was provided during FY14–FY18 to intensively monitor muskox groups to identify brown bears that were either a threat to or had killed muskoxen. However, lethal removal of brown bears was still authorized through 30 June 2018 (5 AAC 92.126(b)) and ADF&G staff were prepared to lethally remove brown bears that were a threat to or had killed muskoxen while conducting routine muskoxen, caribou, and moose directed survey and inventory field activities in Unit 26B.

On 25 April 2015, we lethally removed an adult male brown bear (approximately 25-years old) that had entered a group of muskoxen near the Ribdon River and was bedded down near the group. The hide and skull were salvaged, a tooth removed for aging, and hair archived for future isotope work. The hide and skull were sealed. No other brown bears were lethally removed during RY14–RY17; the program terminated on 30 June 2018.

Recommendations for Activity 1.2.

Discontinue because the Muskox Recovery Plan was only authorized through 30 June 2018 (5 AAC 92.126).

2. Mortality-Harvest Monitoring and Regulations

ACTIVITY 2.1 Monitor harvest through brown bear sealing forms, registration permits, and drawing permits.

Data Needs

Estimates of annual harvest are important to ensure that harvest is within sustainable limits.

Methods

Reported harvest (primarily nonlocal residents and nonresidents) was obtained from bear sealing forms and registration and drawing permit reports mailed or reported online. Data collected from both types of reporting were stored in the WinfoNet harvest database.

Season and Bag Limit

Seasons and bag limits for brown bear in Units 25A, 25B, 25D, 26B, and 26C were established in regulation 5 AAC 85.020, in Title 5, Alaska Administrative Code editions 2014–2015, 2015–2016, 2016–2017, 2017–2018, and 2018–2019, and are available in the Alaska Department of Fish and Game hunting regulations numbers 54, 55, 56, 57, and 58. Additional state regulations affecting brown bear hunting include special restrictions along the Dalton Highway and can be found in 5 AAC 92.530 (7) Dalton Highway Corridor Management Area.

Results and Discussion

Harvest by Hunters

Units 25A, 25B, and 25D—In Unit 25A, 15–30 bears were reported harvested by hunters during RY14–RY18, including 4–14 females (Table 2). Reported nonhunting kills were low (Table 2), which included DLP, illegal take, research mortalities, or other known human-caused accidental mortality. The 3-year annual mean human-caused mortality (RY16–RY18) was 22 bears, including an average of 9 females annually (38%, Table 2), meeting the management objective of ≤ 48 bears of which 19 can be females.

In Units 25B and 25D, most human-caused brown bear mortality was likely not reported. During RY14–RY18, 4–12 brown bears were reported harvested and 1 brown bear was killed as a DLP (Table 3). The 3-year annual mean human-caused mortality (RY16–RY18) was 5 bears, including an average of 1 female annually. Although most bears harvested were not reported, a household survey conducted collaboratively by the Council of Athabascan Tribal Government and ADF&G, Division of Subsistence, indicated that local residents harvested 2 and 14 brown bears in RY08 and RY09, respectively, in Unit 25D (Van Lanen et al. 2012). Therefore, we likely met the management objective of ≤ 47 bears of which 19 can be females.

Units 26B and 26C—In Unit 26B, 7–24 bears were reported harvested by hunters during RY14–RY18, including 1–5 females (Table 4). Reported nonhunting kills were moderate (total of 8 bears), including 1 bear lethally removed by ADF&G staff because it was threatening muskoxen (Table 4). The 3-year annual mean human-caused mortality (RY16–RY18) was 12 bears, including an average of 3 females annually (28%, Table 4), meeting the management objective of ≤ 27 bears of which 11 can be females. Brown bear harvest was lower during RY14–RY18 (Table 4) compared to RY09–RY13 (Lenart 2015a: Table 4) because fewer Central Arctic caribou hunters were in the field.

In Unit 26C, 9–17 bears were reported harvested by hunters during RY14–RY18, including 3–7 females (Table 5). There were no reported nonhunting kills (Table 5). The 3-year annual mean human-caused mortality (RY16–RY18) was 14 bears, including an average of 5 females annually (37%, Table 5), meeting the management objective of ≤ 31 bears of which 12 can be females.

Table 2. Unit 25A brown bear human-caused mortality, regulatory years 2014–2018, Alaska.

Regulatory year	Reported								Total known kill					
	Hunter kill					Nonhunting kill ^a								
	M	F	(% F)	Unk	Total	M	F	Unk	M	(%)	F	(%)	Unk	Total
<i>2014–2015</i>														
Fall 2014	15	6	(29)	0	21	0	1	0	15	(68)	7	(32)	0	22
Spring 2015	4	1	(20)	0	5	0	0	0	4	(80)	1	(20)	0	5
Total	19	7	(27)	0	26	0	1	0	19	(70)	8	(30)	0	27
<i>2015–2016</i>														
Fall 2015	18	6	(25)	0	24	0	0	0	18	(75)	6	(25)	0	24
Spring 2016	1	2	(67)	0	3	0	0	0	1	(33)	2	(67)	0	3
Total	19	8	(30)	0	27	0	0	0	19	(70)	8	(30)	0	27
<i>2016–2017</i>														
Fall 2016	12	14	(54)	0	26	0	0	0	12	(46)	14	(54)	0	26
Spring 2017	4	0	(0)	0	4	0	0	0	4	(100)	0	(0)	0	4
Total	16	14	(47)	0	30	0	0	0	16	(53)	14	(47)	0	30
<i>2017–2018</i>														
Fall 2017	7	4	(36)	0	11	0	0	0	7	(64)	4	(36)	0	11
Spring 2018	4	0	(0)	0	4	0	0	0	4	(100)	0	(0)	0	4
Total	11	4	(27)	0	15	0	0	0	11	(73)	4	(27)	0	15
<i>2018–2019</i>														
Fall 2018	13	9	(41)	0	22	0	0	0	13	(59)	9	(41)	0	22
Spring 2019	0	0	(0)	0	0	0	0	0	0	(0)	0	(0)	0	0
Total	13	9	(41)	0	22	0	0	0	13	(59)	9	(41)	0	22

^a Includes defense of life or property (DLP) kills, illegal take, research mortalities, and other known human-caused mortality.

Table 3. Units 25B and 25D brown bear human-caused mortality, regulatory years 2014–2018, Alaska.

Regulatory year	Reported ^a									Total known kill						Total
	Hunter kill					Nonhunting kill ^b										
	M	F	(%)	Unk	Total	M	F	Unk	M	(%)	F	(%)	Unk			
2014–2015																
Fall 2014	4	3	(43)	0	7	0	1	0	4	(50)	4	(50)		8		
Spring 2015	3	2	(40)	0	5	0	0	0	3	(60)	2	(40)		5		
Total	7	5	(42)	0	12	0	1	0	7	(54)	6	(46)		13		
2015–2016																
Fall 2015	1	2	(67)	0	3	0	0	0	1	(33)	2	(67)	0	3		
Spring 2016	1	0	(0)	0	1	0	0	0	1	(100)	0	(0)	0	1		
Total	2	2	(50)	0	4	0	0	0	2	(50)	2	(50)	0	4		
2016–2017																
Fall 2016	2	0	(0)	0	2	0	0	0	2	(100)	0	(0)	0	2		
Spring 2017	1	1	(50)	0	2	0	0	0	1	(50)	1	(50)	0	2		
Total	3	1	(25)	0	4	0	0	0	3	(75)	1	(25)	0	4		
2017–2018																
Fall 2017	3	1	(25)	0	4	0	0	0	3	(75)	1	(25)	0	4		
Spring 2018	1	0	(0)	0	1	0	0	0	1	(100)	0	(0)	0	1		
Total	4	1	(20)	0	5	0	0	0	4	(80)	1	(20)	0	5		
2018–2019																
Fall 2018	4	0	(0)	0	4	0	0	0	4	(100)	0	(0)	0	4		
Spring 2019	1	2	(67)	0	3	0	0	0	1	(33)	2	(67)	0	3		
Total	5	2	(26)	0	7	0	0	0	5	(74)	2	(26)	0	7		

^a Includes sealing data.^b Includes defense of life or property (DLP) kills, illegal take, research mortalities, and other known human-caused mortality.

Table 4. Unit 26B brown bear human-caused mortality, regulatory years 2014–2018, Alaska.

Regulatory year	Reported ^a													
	Hunter kill					Nonhunting kill ^b			Total known kill					
	M	F	(%)	Unk	Total	M	F	Unk	M	(%)	F	(%)	Unk	Total
<i>2014–2015</i>														
Fall 2014	14	4	(22)	0	18	2	1	0	16	(76)	5	(24)	0	21
Spring 2015	0	0	(0)	0	0	1 ^c	0	0	1	(100)	0	(0)	0	1
Total	14	4	(22)	0	18	3	1	0	17	(77)	5	(23)	0	22
<i>2015–2016</i>														
Fall 2015	18	4	(18)	0	22	0	0	1	18	(82)	4	(18)	1	23
Spring 2016	1	1	(50)	0	2	0	0	0	1	(50)	1	(50)	0	2
Total	19	5	(21)	0	24	0	0	1	19	(79)	5	(21)	1	25
<i>2016–2017</i>														
Fall 2016	8	3	(27)	0	11	0	0	0	8	(73)	3	(27)	0	11
Spring 2017	1	0	(0)	0	1	0	0	0	1	(100)	0	(0)	0	1
Total	9	3	(25)	0	12	0	0	0	9	(75)	3	(25)	0	12
<i>2017–2018</i>														
Fall 2017	6	0	(0)	0	6	0	3 ^d	0	6	(67)	3	(33)	0	9
Spring 2018	0	1	(100)	0	1	0	0	0	0	(0)	1	(100)	0	1
Total	6	1	(14)	0	7	0	3	0	6	(60)	4	(40)	0	10
<i>2018–2019</i>														
Fall 2018	12	3	(20)	0	15	0	0	0	12	(67)	3	(20)	0	15
Spring 2019	0	0	(0)	0	0	0	0	0	0	(0)	0	(0)	0	0
Total	12	3	(20)	0	15	0	0	0	12	(80)	3	(20)	0	15

^a Includes drawing permits, registration permits, and sealing data.^b Includes defense of life or property (DLP) kills, illegal take, research mortalities, and other known human-caused mortality.^c Bear taken by ADF&G staff during predator control for the Unit 26B Muskox Recovery Program.^d In addition to 3 females taken as DLPs in Deadhorse, 2 cubs of the year were also killed with one of the females.

Table 5. Unit 26C brown bear human-caused mortality, regulatory years 2014–2018, Alaska.

Regulatory year	Reported ^a													
	Hunter kill					Nonhunting kill ^b			Total known kill					
	M	F	(% F)	Unk	Total	M	F	Unk	M	(%)	F	(%)	Unk	Total
<i>2014–2015</i>														
Fall 2014	12	4	(25)	0	16	0	0	0	12	(75)	4	(25)	0	16
Spring 2015	0	0	(0)	0	0	0	0	0	0	(0)	0	(0)	0	0
Total	12	4	(25)	0	16	0	0	0	12	(75)	4	(25)	0	16
<i>2015–2016</i>														
Fall 2015	6	5	(45)	0	11	0	0	0	6	(55)	5	(45)	0	11
Spring 2016	2	0	(0)	0	2	0	0	0	2	(100)	0	(0)	0	2
Total	8	5	(38)	0	13	0	0	0	8	(62)	5	(38)	0	13
<i>2016–2017</i>														
Fall 2016	8	7	(47)	0	15	0	0	0	8	(53)	7	(47)	0	15
Spring 2017	2	0	(0)	0	2	0	0	0	2	(100)	0	(0)	0	2
Total	10	7	(41)	0	17	0	0	0	10	(59)	7	(41)	0	17
<i>2017–2018</i>														
Fall 2017	9	6	(40)	0	15	0	0	0	9	(60)	6	(40)	0	15
Spring 2018	1	0	(0)	0	1	0	0	0	1	(100)	0	(0)	0	1
Total	10	6	(37.5)	0	16	0	0	0	10	(62.5)	6	(37.5)	0	16
<i>2018–2019</i>														
Fall 2018	5	3	(37.5)	0	8	0	0	0	5	(62.5)	3	(37.5)	0	8
Spring 2019	1	0	(0)	0	1	0	0	0	1	(100)	0	(0)	0	1
Total	6	3	(33)	0	9	0	0	0	6	(67)	3	(33)	0	9

^a Includes drawing permits, registration permits, and sealing data.^b Includes defense of life or property (DLP) kills, illegal take, research mortalities, and other known human-caused mortality.^c Bear taken by ADF&G staff during predator control for the Unit 26B Muskox Recovery Program.^d Two cubs of the year were also killed with one of the females. All 3 adults were DLPs in Deadhorse.

Permit Hunts

Drawing and registration hunts were available in Unit 26B during RY14–RY18 (Table 6).

DB987—During RY14–RY18, 4–8 DB987 permits were issued to nonresident hunters, 3–5 people hunted, and 1–4 bears were harvested annually (Table 6).

RB988—During RY14–RY18, 170–401 RB988 permits were issued to resident hunters, 68–181 people hunted, and 5–18 bears were harvested annually (Table 6).

RB989—During RY14–RY18, 12–32 RB989 permits were issued to resident hunters, 2–14 people hunted, and 0–2 bears were harvested annually (Table 6).

Hunter Residency and Success

Units 25A, 25B, and 25D—In Unit 25A, nonresidents harvested 55–68% of the total reported harvest during RY14–RY18 (Table 7).

In Units 25B and 25D combined, Alaska residents harvested 75–100% of the reported harvest during RY14–RY18 (Table 8). Generally, harvest is underreported by local residents and there were likely more brown bears harvested during the reporting period.

Units 26B and 26C—In Unit 26B, 80–89% of the reported harvest was taken by Alaska residents each year during RY14–RY18 (Table 9). Most of the reported harvest was taken by residents of Alaska because the permit system was more restrictive for nonresidents (see nonresident hunt DB987 in Table 6).

In Unit 26C, nonresidents harvested 37.5–70.0% of the total reported harvest during RY14–RY18 (Table 10).

Harvest Chronology

Units 25A, 25B, and 25D—In Unit 25A, during RY14–RY18, 35% of the brown bears were harvested in August, 48% in September, 2% in October, and 14% in the spring ($n = 119$).

In Units 25B and 25D, most harvested bears were not reported; but Van Lanen et al. 2012 indicated that bears in Unit 25D were harvested primarily in September, with the remaining harvest spread throughout May, June, July, August, and October. From the reported harvest, 12.5% were harvested in August and October, 28% in September and 47% in the spring ($n = 32$).

Units 26B and 26C—In Unit 26B, during RY14–RY18, 36% of the brown bears were harvested in August (season did not open until 25 August), 56% in September, 3% in October, and 5% in the spring ($n = 75$).

In Unit 26C, during RY14–RY18, 89% of the brown bears were harvested in August, 3% in September, and 8% in the spring ($n = 70$).

Table 6. Unit 26B brown bear harvest data by permit hunt, regulatory years 2010–2018, Alaska.

Hunt ^a	Regulatory year	Permits available	Permits issued	Number reported	Did not hunt (%)	Unsuccessful (%)	Successful (%)	Male	Female	Unk	Total harvest
DB987	2010	20	20	20	2 (10)	12 (67)	6 (33)	4	2	0	6
	2011	6	6	6	4 (67)	2 (100)	0 (0)	0	0	0	0
	2012	6	6	6	1 (17)	2 (40)	3 (60)	1	2	0	3
	2013	6	6	5	1 (20)	2 (50)	2 (50)	2	0	0	2
	2014	6	6	6	1 (17)	3 (60)	2 (40)	1	1	0	2
	2015	6	6	5	1 (20)	0 (0)	4 (100)	3	1	0	4
	2016	4	4	4	1 (25)	1 (33)	2 (67)	1	1	0	2
	2017	6	6	6	3 (50)	2 (67)	1 (33)	1	0	0	1
	2018	8	8	8	4 (50)	1 (25)	3 (75)	3	0	0	3
RB988	2011	unlimited	442	439	217 (49)	201 (91)	21 (9)	14	7	0	21
	2012	unlimited	457	454	262 (58)	179 (93)	13 (7)	10	3	0	13
	2013	unlimited	425	422	229 (54)	173 (90)	20 (10)	15	5	0	20
	2014	unlimited	401	398	217 (54)	165 (91)	16 (9)	13	3	0	16
	2015	unlimited	328	324	203 (63)	103 (85)	18 (15)	15	3	0	18
	2016	unlimited	259	257	164 (64)	84 (90)	9 (10)	8	1	0	9
	2017	unlimited	219	218	150 (69)	63 (93)	5 (7)	5	0	0	5
	2018	unlimited	170	170	100 (59)	58 (83)	12 (17)	9	3		12
RB989	2010	unlimited	38	34	24 (70)	9 (90)	1 (10)	1	0	0	1
	2011	unlimited	39	39	30 (77)	9 (100)	0 (0)	0	0	0	0
	2012	unlimited	33	33	26 (79)	5 (71)	2 (29)	2	0	0	2
	2013	unlimited	39	39	33 (85)	6 (100)	0 (0)	0	0	0	0
	2014	unlimited	22	22	15 (68)	7 (100)	0 (0)	0	0	0	0
	2015	unlimited	32	31	17 (55)	12 (86)	2 (14)	1	1	0	2
	2016	unlimited	27	27	15 (56)	11 (92)	1 (8)	1	0	0	1
	2017	unlimited	12	12	10 (83)	1 (50)	1 (50)	0	1	0	1
	2018	unlimited	21	21	17 (81)	4 (100)	0 (0)	0	0	0	0

^a DB987 was a nonresident drawing hunt for all of Unit 26B in regulatory years RY08–RY10 and RY12–RY13. In RY11, DB987 was for that portion of Unit 26B outside the registration permit hunt areas of RB988 and RB989. In RY11, RB988 and RB989 were resident and nonresident registration hunts for the central portion of Unit 26B with RB989 for the fall season and RB988 for the spring season. Note that RB988 was implemented in the spring of regulatory year 2010. In RY12 and RY13, RB988 and RB989 were resident only hunts for all of Unit 26B.

Table 7. Unit 25A residency of successful brown bear hunters, regulatory years 2010–2018, Alaska.

Regulatory year	Local resident ^a (%)	Nonlocal resident (%)	Nonresident (%)	Total successful hunters
2010	0 (0)	6 (26)	17 (74)	23
2011	1 (3)	13 (43)	16 (53)	30
2012	1 (3)	8 (27)	21 (70)	30
2013	0 (0)	8 (38)	13 (62)	21
2014	0 (0)	10 (38)	16 (62)	26
2015	1 (4)	11 (41)	15 (55)	27
2016	0 (0)	13 (43)	17 (57)	30
2017	0 (0)	6 (40)	9 (60)	15
2018	0 (0)	7 (32)	15 (68)	22

Note: Data in this table includes sealing data.

^a Includes only residents of Unit 25A.

^b Includes one unknown residency.

Table 8. Units 25B and 25D residency of successful brown bear hunters, regulatory years 2010–2018, Alaska.

Regulatory year	Local resident ^a (%)	Nonlocal resident (%)	Nonresident (%)	Total successful hunters
2010	0 (0)	2 (100)	0 (0)	2
2011	0 (0)	3 (100)	0 (0)	3
2012	0 (0)	4 (100)	0 (0)	4
2013	2 (50)	2 (50)	0 (0)	4
2014	0 (0)	9 (75)	3 (25)	12
2015	0 (0)	3 (75)	1 (25)	4
2016	0 (0)	3 (75)	1 (25)	4
2017	0 (0)	5 (100)	0 (0)	5
2018	0 (0)	6 (86)	1 (14)	7

Note: Data in this table includes sealing data.

^a Includes only residents of Units 25B and 25D.

Table 9. Unit 26B residency of successful brown bear hunters, regulatory years 2010–2018, Alaska.

Regulatory year	Local resident ^a (%)	Nonlocal resident (%)	Nonresident (%)	Total successful hunters
2010	0 (0)	20 (77)	6 (23)	26
2011	0 (0)	16 (73)	6 (27)	22
2012	0 (0)	15 (83)	3 (17)	18
2013	0 (0)	20 (91)	2 (9)	22
2014	0 (0)	16 (89)	2 (11)	18
2015	0 (0)	20 (83)	4 (16)	24
2016	0 (0)	10 (83)	2 (17)	12
2017	0 (0)	6 (86)	1 (14)	7
2018	0 (0)	12 (80)	3 (20)	15

Note: Data in this table includes permit harvest and sealing data.

^a Includes only residents of Unit 26B.

Table 10. Residency of successful brown bear hunters, regulatory years 2000–2018, Unit 26C, Alaska.

Regulatory year	Local resident ^a (%)	Nonlocal resident (%)	Nonresident (%)	Total successful hunters
2010	0 (0)	3 (20)	12 (80)	15
2011	1 (7)	6 (40)	8 (53)	15
2012	0 (0)	8 (50)	8 (50)	16
2013	0 (0)	21 (72)	8 (28)	29
2014	0 (0)	10 (62.5)	6 (37.5)	16
2015	1 (8)	5 (38)	7 (54)	13
2016	1 (6)	11 (65)	5 (29)	17
2017	1 (6)	4 (25)	11 (69)	16
2018	1 (11)	0 (0)	8 (89)	9

Note: Data in this table includes sealing data.

^a Includes only residents of Unit 26C.

Transport Methods

Units 25A, 25B, and 25D—In Unit 25A, most brown bears were harvested during aircraft-supported hunts during RY14–RY18 (76%, $n = 118$). The remaining bears were harvested by hunters who accessed the area by horse (18.0%), foot (2.5%), highway vehicle (2.0%), or boat (2.5%).

In Units 25B and 25D combined, brown bear hunters ($n = 32$) reported hunting by boat (47%), aircraft (41%), 4-wheeler (3%), and highway vehicle (9%) during RY14–RY18.

Units 26B and 26C—In Unit 26B, a large proportion of brown bears were harvested during aircraft-supported hunts during RY14–RY18 (42%, $n = 76$). The remaining bears were harvested by hunters who accessed the area by boat (25%), highway vehicle (28%), 4-wheeler (3%), or foot (1%).

In Unit 26C, most brown bears were harvested during aircraft-supported hunts during RY14–RY18 (90%, $n = 70$). The remaining bears were harvested by hunters who accessed the area by boat (3%), or snowmachine (8%).

Alaska Board of Game Actions and Emergency Orders

During the March 2014 Alaska Board of Game meeting (BOG), the board adopted the establishment of black and brown bear bait stations in Unit 25D (5 AAC 92.044) with the requirement that the edible meat must be salvaged in addition to the hide and skull. No other regulatory changes were made.

During the March 2017 BOG meeting, the resident and nonresident brown bear hunting seasons were lengthened by 2 weeks in Units 25A, 25B, and 26C, resulting in a season of 25 July–30 June. A positive customary and traditional use (C&T) finding was made for brown bears in Unit 25D. An ANS was not established due to lack of data.

Recommendations for Activity 2.1

In Unit 26B, I recommend submitting a proposal to eliminate the RB988 and RB989 registration permits for residents of Alaska during the 2023 BOG meeting. Future area biologists should consider proposing to open the resident season on 20 August versus 25 August; or keeping the 25 August opening and eliminating the requirement for nonresidents to obtain a drawing permit. Brown bear harvest in Unit 26B has been low in recent years because fewer Central Arctic caribou hunters were in the field; however, an examination of data from both previous years (in Lenart 2015a) and also years following this report is warranted prior to determining the best approach to maintaining the Unit 26B management objective.

Continue to monitor harvest through brown bear sealing forms, registration permits, and drawing permits.

3. Habitat Assessment-Enhancement

None.

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

Data Recording and Archiving

Harvest data are stored on an internal database housed on a server (<http://winfonet.alaska.gov/index.cfm>, under bear sealing and harvest information).

Electronic copies of bear information can be found on Elizabeth A. Lenart's computer in H:/Brown Bear. Paper copies of information can be found in Room 110 in the file cabinet labeled "Brown Bear".

Agreements

None.

Permitting

None.

Conclusions and Management Recommendations

Units 25A, 25B, and 26C—We met the objectives in each unit to manage for a 3-year mean annual human-caused brown bear mortality of $\leq 8\%$ of the current estimated brown bear population with $\leq 40\%$ females in the harvest (RY16–RY18).

In Unit 25A, the 3-year annual mean human-caused mortality (RY16–RY18) was 22 brown bears including an average of 9 females annually (38%, Table 2) meeting the management objective of ≤ 48 brown bears in the harvest, of which 19 can be females.

In Units 25B and 25D combined, the 3-year annual mean human-caused mortality (RY16–RY18) was 5 brown bears, including an average of 1 female annually. Although we know that most harvested bears were unreported, we likely met the management objective of ≤ 47 brown bears of which 19 can be females; although the 8% harvest rate objective only applied to Unit 25B.

In Unit 26C, the 3-year annual mean human-caused mortality (RY16–RY18) was 14 bears, including an average of 5 females annually (37%, Table 5), meeting the management objective of ≤ 31 bears of which 12 can be females.

Units 25D—Most bears killed in Unit 25D were not reported; however, it is unlikely that we met the Unit 25D objective to temporarily reduce brown bear numbers and predation on moose in Unit 25D.

Units 26B—We did not meet the objective in Unit 26B to reduce brown bear predation on muskoxen because we only lethally removed 1 bear that was a threat to muskoxen in spring 2015. Funding for bear control was not provided during RY14–RY18; however, ADF&G staff was authorized to opportunistically lethally remove brown bears that had killed or threatened muskoxen in Unit 26B while conducting routine caribou, muskox, and moose directed survey and inventory activities. We did not conduct a recent bear population estimate in Unit 26B, but habitat and bear densities likely remained similar to what was observed during the early 2000s; therefore, we likely met our objective to maintain a population of 200–320 bears brown bears. The 3-year annual mean human caused mortality (RY16–RY18) was 12 bears, including an average of 3 females annually (28%, Table 4), meeting the management objective of ≤ 27 bears of which 11 can be females.

II. Project Review and RY19–RY23 Plan

Review of Management Direction

MANAGEMENT DIRECTION

A maximum sustainable yield (MSY) approach was used in establishing goals and objectives for managing brown bear in Units 25A, 25B, 25D, 26B, and 26C.

GOALS

Goals for RY19–RY23 remained similar to RY14–RY18 except they were rewritten to address the Northeast Alaska area versus separate units, and some wording was removed to provide goals that were achievable.

- G1. Maintain the brown bear population and its habitat in concert with other components of the ecosystem.
- G2. Provide the greatest sustained opportunity to hunt brown bears in Units 25A, 25B, 25D, 26B, and 26C.

CODIFIED OBJECTIVES

Amounts Reasonably Necessary for Subsistence Uses

There is a positive customary and traditional use finding by the Alaska Board of Game for brown bears in 25D (5 AAC 99.025). However, ANS was not established by the board due to lack of data.

Intensive Management

None.

MANAGEMENT OBJECTIVES

The following management objectives were eliminated:

The previous objective (M2) to manage for a temporary reduction in brown bear numbers and predation on moose in Unit 25D was eliminated because it was not feasible to accomplish this objective.

The objective (M3) to reduce brown bear predation on muskoxen in Unit 26B was eliminated because the Muskox Recovery Plan terminated in June 2018 and funding was not provided.

The objective (M4) to maintain an estimated population of 200–320 bears (midpoint = 265) in Unit 26B was eliminated because it is unlikely that funding will be provided for a population

survey during the next report period; and no other demographic data is being collected to aid in determining trend.

The objective (M1) to manage for a 3-year mean annual human-caused brown bear mortality of $\leq 8\%$ of the bears ≥ 2 -years old of which no more than 45% can be females was mostly retained except that the proportion of females that can be harvested was changed from 40% to 45% because the overall number of bears harvested has been small, and each area is now listed separately:

M1. In Unit 25A, manage for a 3-year mean annual human-caused brown bear mortality of ≤ 48 bears ≥ 2 -years old of which no more than 22 is female.

M2. In Units 25B and 25D combined, manage for a 3-year mean annual human-caused brown bear mortality of ≤ 47 bears ≥ 2 -years old of which no more than 21 are female.

M3. In Unit 26B, manage for a 3-year mean annual human-caused brown bear mortality of ≤ 27 bears ≥ 2 -years old of which no more than 12 are female.

M4. In Units 26C, manage for a 3-year mean annual human-caused brown bear mortality of ≤ 31 bears ≥ 2 -years old of which no more than 14 are female.

We recognize that there are serious limitations to objectives M1–M4 because estimated population sizes may not be valid since studies that were conducted in portions of the Northeast Alaska area are outdated (20–40 years old); and in most of the Northeast Alaska area, estimates were extrapolated from studies conducted in similar habitat.

The 8% harvest rate is thought to be sustainable because in bear populations that were studied, an 8% harvest rate fell within the range of what was likely to be sustainable (McClellan et al. 2016, Brockman et al. 2020). Because Alaska state regulations (5 AAC 92.260) prohibit the take of females accompanied by cubs or yearlings, the female proportion of the population is mostly protected. McClellan et al. 2016 and Brockman et al. 2020 indicated that this protection alone may be adequate for a sustainable female harvest; however, due to the uncertainty in the population estimates and as a conservative measure, we applied a 3-year annual mean maximum of 45% of the harvest can be females.

Because of the uncertainty associated with outdated population estimates, evaluating current and future harvest sustainability based on a harvest rate (8%) is not possible. Therefore, ADF&G area management staff will rely on monitoring harvest as an index to sustainability. We reviewed the average and range of human-caused mortality over the previous 10-year period and assumed that harvest levels observed during that time period were sustainable because harvest levels were not high. We will use the allowable harvest, as calculated from outdated population estimates, and a harvest rate of 8% as an upper threshold. If on a running average 3-year interval this value is exceeded, additional evaluation or investigation may be warranted. In all units, the previous 10-year average for human-caused mortality and the proportion of females killed were below established allowable harvest levels and the proportion of harvest that was female was below 45%.

In Unit 25A, the 8% harvest rate resulted in an allowable harvest of 48 bears. During RY09–RY18, an average of 26 bears (range: 15–31) were reported taken by humans (i.e., harvest, DLP, illegal, etc.) of which an average of 36% were female.

In Units 25B and 25D, the 8% harvest rate resulted in an allowable harvest of 47 bears, and an average of 5 bears (range: 2–13) were reported taken by humans. We recognize that the reported harvest substantially underrepresents what was taken; that being said, the actual harvest was most likely less than 47 bears.

In Unit 26B, the 8% harvest rate resulted in an allowable harvest of 27 bears. During RY09–RY18, an average of 20 bears (range: 10–28) were reported taken by humans of which an average of 27% were females.

In Unit 26C, the 8% harvest rate resulted in an allowable harvest of 31 bears. During RY09–RY18, an average of 17 bears (9–31) were reported taken by humans of which an average of 36% were females.

If the 3-year annual human-caused mortality exceeds the threshold of allowable harvest in a unit, additional evaluation and examination of harvest and anecdotal data should be conducted to aid in determining if regulatory changes are warranted. However, due to the uncertainty in our population estimates, a harvest higher than the stated allowable harvest may be sustainable and this should also be considered. In years of very low harvest, if the proportion of females is >45%; it likely has no biological significance because the absolute value is small.

REVIEW OF MANAGEMENT ACTIVITIES

1. Population Status and Trend

ACTIVITY 1.1. Estimate brown bear populations in Units 25A, 25B, and 25D combined; and Units 26B and 26C separately when funding is available (M1, M2, M3, M4).

Data Needs

The population estimates that we currently use to determine allowable harvest are outdated. If determining true maximum allowable harvest is determined to be important, then population surveys in each unit would need to be conducted. Current population estimates would allow area managers to better evaluate if the current allowable harvest is sustainable and an appropriate harvest strategy. Current population estimation techniques are likely viable methods to estimate bears in Units 26B and 26C. It is unknown if these techniques are adequate to estimate populations in Units 25A, 25B, and 25D. Research to investigate the most appropriate method to estimate brown bear populations in these units may be required.

If approximating maximum allowable harvest is considered a reasonable approach, then an examination, analysis, and evaluation of bear population studies and bear habitat should be completed, and this information should be used to extrapolate, and adjust estimated bear populations in each unit.

Methods

Population surveys—Consult with area and research biologists, other agency biologists, and biometricians to determine the best method to implement a population survey in each unit based on habitat, logistics, and anticipated success.

Extrapolation—Examine, analyze, and evaluate bear population studies in similar bear habitat, and classify bear habitat in each unit. Consult with ADF&G biologists, GIS analysts, and biometricians to determine the best methods to classify bear habitat. Use this updated information to readjust current population estimates. Note that this is a similar approach to the 1993 estimated bear population technique. If additional bear population surveys in various habitats have not been conducted, then this method is not a viable option.

2. Mortality-Harvest Monitoring and Regulations

ACTIVITY 2.1. Monitor harvest through brown bear sealing forms and permit hunts (M1, M2, M3, M4).

Data Needs

Estimates of annual harvest are important to ensure that harvest is within sustainable limits.

Methods

Reported harvest (primarily nonlocal residents and nonresidents) can be obtained from both bear sealing forms and registration and drawing permit reports either mailed or reported online. Data collected from both types of reporting are stored in ADF&G's Wildlife Information Network database (WinfoNet).

Summarize reported human-caused mortality by harvest, other (e.g., DLP, research, etc.), total human-caused mortality, residency of harvest, chronology of harvest, and transport method.

Monitor 3-year mean annual human-caused brown bear mortality, and as an upper threshold, use the allowable harvest as calculated from outdated population estimates and a harvest rate of 8%. If this value is exceeded on a running average 3-year interval, additional evaluation or investigation may be warranted. In addition, monitor 10-year trends as an index to sustainability.

3. Habitat Assessment and Enhancement

None.

4. Management with Public Participation and Outreach.

ACTIVITY 4.1. Provide information to state and federal regulatory processes and the public regarding the management of brown bears.

Data Needs

In order for regulatory bodies and the public who engage in regulatory processes to understand brown bear management and biology, it is important for ADF&G staff to communicate and

coordinate with Fish and Game Advisory Committees and the Alaska Board of Game about brown bear management and biology.

Methods

DWC staff will attend meetings of Fish and Game Advisory Committees and the Alaska Board of Game to provide information about biology and management, review and analyze regulation proposals for the Alaska Board of Game, and provide advice to the public regarding brown bears.

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

None.

Data Recording and Archiving

Harvest data will be stored in WinfoNet under bear sealing and harvest information (<http://winfonet.alaska.gov/index.cfm>).

Electronic copies of bear information can be found on Elizabeth A. Lenart's computer in H:/Brown Bear. Paper copies of information will be stored in Room 110 in the file cabinet labeled "Brown Bear".

Agreements

None.

Permitting

None.

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