Brown Bear Management Report and Plan, Game Management Unit 1:

Report Period 1 July 2014–30 June 2019, and

Plan Period 1 July 2019–30 June 2024

Roy Churchwell

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Alaska Department of Fish and Game Division of Wildlife Conservation

Species Management Report and Plan ADF&G/DWC/SMR&P-2021-10

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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 Richard Nelson, Management Coordinator for the Division of Wildlife Conservation.

Species management reports and plans are available via the Alaska Department of Fish and Game's public website (www.adfg.alaska.gov) or by contacting Alaska Department of Fish and Game's Division of Wildlife Conservation, PO Box 115526, Juneau, AK 99811-5526; phone: (907) 465-4190; email: dfg.dwc.publications@alaska.gov. The report may also be accessed through most libraries, via interlibrary loan from the Alaska State Library or the Alaska Resources Library and Information Services (www.arlis.org).

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Cover Photo: Brown bear fishing in coastal waters. ©2006 ADF&G. Photo by Mark Emery.

Contents

List of Figures

List of Tables

Purpose of this Report

This report provides a record of survey and inventory management activities for brown bear (*Ursus arctos*) in Unit 1 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

Game Management Unit 1 includes mainland Southeast Alaska from Dixon Entrance north to Cape Fairweather (Fig. 1). Several islands are in the Unit, including those islands east of Clarence Strait from Dixon Entrance to Caamano Point, and most of the islands in Stephens Passage and Lynn Canal north of Taku Inlet. The largest community within Unit 1 is Juneau with a population of 32,000 people (U.S. Census Bureau 2020). Other communities include Haines, Klukwan, Skagway, Gustavus, Ketchikan, Metlakatla, and Hyder. The unit is over 18,500 mi^2 (47,915 km^2) and 400 miles (644 km) from north to south. The economy of the area is based on tourism, fishing, logging, and mining. The 2 largest towns in Unit 1 are Juneau and Ketchikan, and both are within nonsubsistence areas (5ACC 99.015(a)(1) and (2)). The largest land designation is the Tongass National Forest, which includes the Endicott River Wilderness (98,700 acres), Tracy Arm-Fords Terror Wilderness (653,200 acres), and Misty Fjords National Monument (2,142,000 acres; USFS [n.d.]). Misty Fjords National Monument was declared by Jimmy Carter under the Antiquities Act, and the wilderness areas were designated as a provision of the Alaska National Interest Lands Conservation Act (ANILCA) legislation in 1980. The other large land management unit is Glacier Bay National Park which was established in 1925 (NPS [n.d.]). Most of its 3.3 million acres lie within Unit 1C. Unit 1D is an outlier in land ownership within Unit 1 with a mix of Haines Borough, state, and Bureau of Land Management lands.

Much of the Unit 1 mainland is comprised of glaciers, but between the icefields and the coast are upland alpine areas, alder (*Alnus* spp.) covered slopes, and coniferous rainforest. Berry species are important to brown bears including blueberry (*Vaccinium* spp.), salmonberry (*Rubus spectabilis*), and devil's club (*Oplopanax horridus*) that are common in forests, whereas blueberry, crowberry (*Empetrum nigrum*), and cranberry (*Vaccinium* spp.) are common in alpine habitat. Most of the low gradient streams and rivers support spawning salmon from late summer

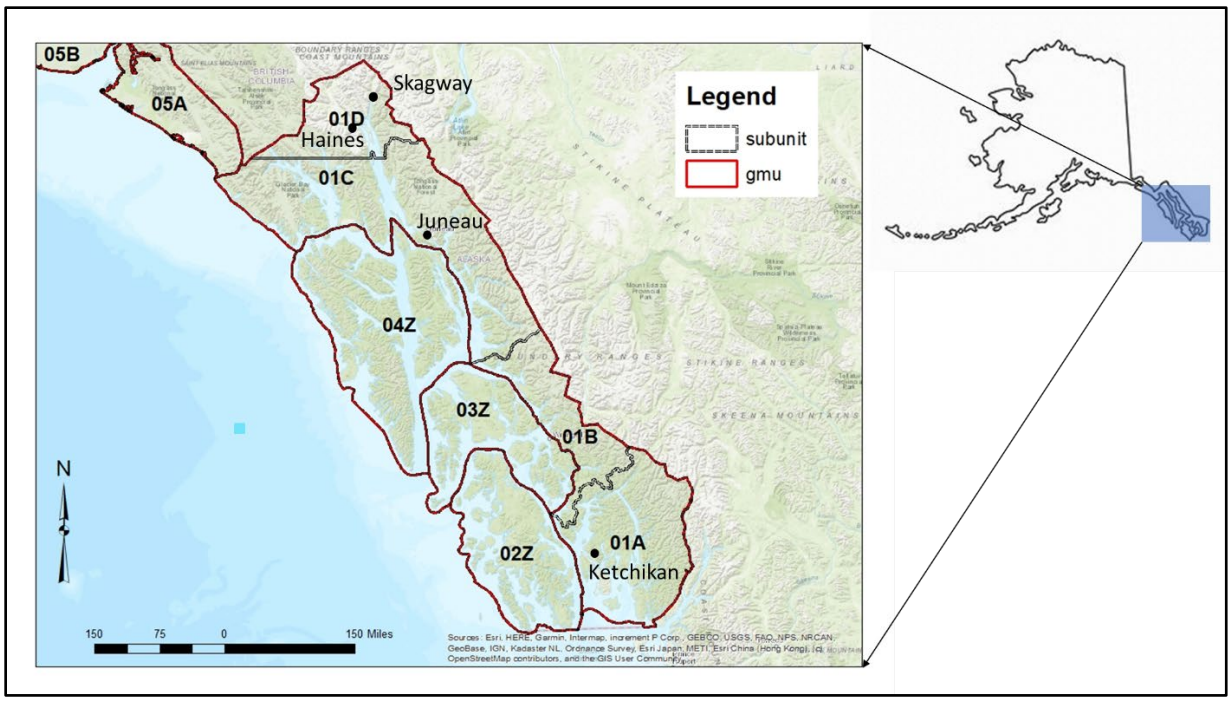

Figure 1. Map of Game Management Unit (GMU) 1 including Units (subunits) 1A, 1B, 1C, and 1D, Southeast Alaska.

into the fall. In the spring, bears find new grass shoots and other vegetation sprouting in coastal meadows and on mountain slopes with southern exposure. The climate is variable from north to south, but generally the south is warmer and wetter, while the north is colder, drier, and has greater snow accumulation. Average annual high temperatures for Ketchikan are 39°F in January and 65°F in August (WRCC 2020). Rainfall averages 154 inches per year. Snowfall averages 37 inches falling mostly November through March. Average annual high temperatures for Haines are 29°F in January and 64°F in August (WRCC 2020). Rainfall averages 48 inches. Snowfall averages 121 inches and falls mostly October through April.

Summary of Status, Trend, Management Activities, and History of Brown Bear in Unit 1

Southeast Alaska brown bears inhabit the islands north of Frederick Sound and the coastal mainland. Historically, brown bear harvest was highest in Game Management Unit (Unit) 1D, but more recently harvest has been highest in Unit 1A (Bethune 2015). Units 1B and 1C tend to have lower harvest than the other 2 units. Brown bears once occupied all forested habitats on the mainland portion of the unit, but urbanization of larger towns like Juneau have displaced some bears (ADF&G 1976). Since then, brown bear populations seem to be stable across Unit 1 with evidence of population increase on the Chilkat Peninsula, and Tracy and Endicott Arms south to Port Houghton (Scott 2009).

Brown bear management and regulations have a long history. For a long time, nonresident brown bear hunters have been required to employ the services of a registered big game guide or be accompanied in the field by an Alaskan resident within the second degree of kindred. Prohibition of harvesting cubs and sows with cubs was instated in 1960 and at the same time the sealing of

bears was required (Thornton 1992). The regulation limiting brown bear harvest to 1 bear every 4 years was initiated in 1968. The Board of Game approved registration permits for Unit 1 brown bear hunts in 1989 (including Unit 1C RB062 fall, and RB072 spring) and a split season with no hunting from 31 December to 15 March, which established the current season and permit structure for brown bear management (McCarthy 1991). Registration permits allowed managers more timely information inseason, and in the event that the season needed to be closed, managers had the ability to issue an Emergency Order to do so. The next development was the elimination of regulations limiting the number of guides in Southeast Alaska which managers expected to increase guided hunting pressure (Porter 2003).

In response to the lift on the limit to the number of guides in regulation, the U.S. Forest Service limited guided hunting in 2001 by requiring a special use permit for each guided client on U.S. Forest Service lands; the number of federal permits were set to reflect the mean number of permits held during the 1998 and 1999 guide seasons. This helped ensure that guided hunter harvest would be sustainable for the bear population. Because Unit 1D lands are managed by the both the Bureau of Land Management and the State of Alaska, and the area did not fall under the U.S. Forest Service permitting system, there was an initial increase in the number of guides in this unit after the U.S. Forest Service special use permits went in affect (Scott 2007).

The BOG changed the Unit 1D hunt to a draw permit in 2002, but this only lasted 1 year before the local Fish and Game Advisory Committee submitted a proposal to BOG asking to change the hunt from a draw to a registration permit because of the difficulty guides were having in booking clients under the draw system. Beginning in 2005, the Unit 1D hunts RB050 and RB051 were administered by registration permit.

Around this time, failure to report (FTR) regulations were adopted at the 2003 BOG meeting to increase reporting compliance. This regulation created a penalty of reduced hunting opportunity and a citation when hunters did not report their hunting effort and the outcome of their hunt for registration permits (Scott 2009).

In 2010 a regulation was adopted by BOG allowing the take of 1 brown bear every year for Berners Bay and registration hunts RB063 (fall) and RB073 (spring) were created to allow for this change in harvest (Bethune 2015).

Extensive research was conducted on the impacts of mining and logging on brown bears in Southeast Alaska, most of which occurred on Admiralty and Chichagof Islands (Schoen and Beier 1989, Titus and Beier 1993, Schoen et al. 1994) and the Southeast mainland (Flynn et al. 2007). This research provided density estimates for brown bears in several areas. In Unit 1A on the Unuk River, given a sampled area of 877 km^2, the density of brown bears during late summer was 51 bears/1,000 km^2 with a 95% CI 34–68 bears/1,000 km^2 (Flynn et al. 2010). Then in Unit 1B on the Bradfield Canal given a sampled area of 1,094 km^2, the density of brown bears during late summer was 44 bears/1,000 km^2 with a 95% CI 41–53 bears/1,000 km^2 (Flynn et al. 2007). In Unit 1C brown bear research focused on impacts of the Juneau Access Road that was planned to connect the Kensington Mine and then go beyond towards a future connection with Skagway (Flynn 2012). This research found, brown bear populations formed genetically distinct units between the Chilkat Peninsula, Berners Bay, and Taku River extending to Endicott Arm. Population estimates in the Berners Bay drainages over 3 years ranged from 44 to 66 bears with

a density of 33.6/1000 km^2 to 50.4/1000 km^2. There were nearly twice as many female bears in the population than male bears. Annual survival of bears in this study was 0.84 (95% CI = 0.732–0.908), and an average annual harvest of 1.4 bears were taken from this population since 1960 with an increase to 2.3 bears harvested between 2000–2009. Research that was initiated on the brown bear population in Unit 1D during this reporting period is ongoing; results from this research are not expected for several years.

Brown bear hunting was prohibited in Glacier Bay National Monument (now Glacier Bay National Park) in 1924 (Thornton 1992). The park makes up the northwest portion of Unit 1C; and bears are under the management of the National Park Service within the park boundary. Bear management in the park is guided by the Bear-human Management Plan (NPS 2013).

Two bear viewing areas are found in Unit 1, the first is the Salmon River Closed Area in Unit 1A (closed to bear hunting) near Hyder, Alaska, and the second is the Lutak Road Closed Area in Unit 1D (closed to all big game hunting) in the Chilkoot State Park near Haines, Alaska (Bethune 2015).

Management Direction

Existing Wildlife Management Plans

Southeast Mainland Brown Bear Management Plan in 1976 Alaska Wildlife Management Plans (ADF&G 1976).

Goals

Provide opportunity for brown bear hunting and viewing under the sustained yield principle using the best science available to benefit the people of Alaska and conserve brown bear populations.

Codified Objectives

Amounts Reasonably Necessary for Subsistence Uses

There is a positive finding for customary and traditional use of brown bears in Units 1A, 1B, 1C and 1D which was set at the 2002 Alaska Board of Game (BOG) meeting. At the 2010 BOG meeting, the board set the amount necessary for subsistence (ANS) to 2–3 brown bears for Unit 1A outside the Ketchikan Non-subsistence Area, 1 brown bear in Unit 1B, 1 brown bear outside the Juneau nonsubsistence Area in Unit 1C, and 3–5 brown bears in Unit 1D (5 AAC 99.025(a)(3)).

Intensive Management

Not applicable.

MANAGEMENT OBJECTIVES

- Maintain an average age of harvested males of no less than 6.5 years, and a male to female harvest ratio of at least 3:2.

- Reduce the number of bears killed because of garbage and human food conditioning.

MANAGEMENT ACTIVITIES

1. Population Status and Trend

ACTIVITY 1.1. Monitor the population of brown bears in Unit 1.

Data Needs

Monitoring population status and trend is accomplished by following changes in the sex ratios, ages, and skull sizes of harvested bears. Unit 1 hunters commonly select large male brown bears for harvest. An increase in female bears in the harvest is an indicator of a decline in mature male bears in the population, signaling a decline in the overall population. Similarly, a decline in age and skull size could indicate a decline in the proportion of mature bears in the population, because hunters are harvesting younger bears with smaller skulls. Harvest metrics are considered useful in detecting a notable change in brown bear populations; however, slight changes in population might not be detectable using harvest data metrics.

Methods

Sex, age, and skull size data are collected during the brown bear sealing process. Hunters are required to keep evidence of sex naturally attached to the hide until the animal is sealed, and the sex is determined at the time of sealing through observation of a penis sheath or teats and vulva. Age is measured by counting cementum layers in a premolar tooth. Teeth are sent to Matson's Laboratory (Matson et al. 1993) each year for age analysis. Skull size is measured as the sum of the skull length (measured from the top of the occipital bone to the end of the nose/front teeth) plus the skull width (measured across the skull at the zygomatic arch).

Results and Discussion

The average female sex ratios derived from harvest data for both reporting periods were less than the management objective of 40%. The average female sex ratio for the reporting period RY14–RY18 is 34% (range = 26–39%; Table 1). This represents a decrease from the previous reporting period RY09–RY13 that was 39.2% (range = 31–52%).

The average age for a male brown bear during RY14–RY18 was 7.5 years, which is less than the previous reporting period (RY09–RY13) that was 8.4 years (Table 2). Ages in both reporting periods met the management objective for age (maintain an average age of no less than 6.5 years old). Average male bear skull size was 22.5 inches for RY14–RY18, which was similar to the previous reporting period (22.4 inches, RY09–RY13; Table 2). In Unit 1D the RY15 harvest contained some female and small bears; starting in RY16 ADF&G required hunters to watch the video "Take a Closer Look" (Yukon Renewable Resources 1990) to improve hunter's ability to determine the sex and size of bears in the field. Brown bear guides in Unit 1D also received a

Table 1. Unit 1 brown bear harvest and other mortality, regulatory years 2009–2018, Alaska.

		Reported										
		Hunter kill				Nonhunting kill[a]			Total estimated kill			
Regulatory year		M (%)	F (%)	Unk	Total	M	F	Unk	M (%)	F (%)	Unk	Total
2009	Fall 2009	(62)	(38)	0	13	1	1	0	(60)	(40)	0	15
	Spring 2010	(71)	(29)	0	24	0	0	0	(71)	(29)	0	24
	Total	(68)	(32)	0	37	1	1	0	(67)	(33)	0	39
2010	Fall 2010	(33)	(67)	0	12	3	1	0	(44)	(56)	0	16
	Spring 2011	(63)	(37)	0	19	2	0	3	(58)	(29)	3	24
	Total	(52)	(48)	0	31	5	1	3	(53)	(40)	3	40
2011	Fall 2011	(45)	(55)	0	11	2	2	0	(47)	(53)	0	15
	Spring 2012	(77)	(23)	0	22	4	2	4	(66)	(22)	4	32
	Total	(67)	(33)	0	33	6	4	4	(60)	(32)	4	47
2012	Fall 2012	(82)	(18)	0	11	3	3	1	(67)	(28)	1	18
	Spring 2013	(60)	(40)	0	15	1	0	0	(63)	(37)	0	16
	Total	(69)	(31)	0	26	4	3	1	(65)	(32)	1	34
2013	Fall 2013	(40)	(60)	0	10	2	2	0	(43)	(57)	0	14
	Spring 2014	(53)	(47)	0	15	0	1	0	(50)	(50)	0	16
	Total	(48)	(52)	0	25	2	3	0	(47)	(53)	0	30
2014	Fall 2014	(29)	(71)	0	7	3	4	2	(31)	(56)	2	16
	Spring 2015	(81)	(19)	0	16	3	1	0	(80)	(20)	0	20
	Total	(65)	(35)	0	23	6	5	2	(58)	(36)	2	36
2015	Fall 2015	(33)	(67)	0	9	1	1	1	(33)	(58)	1	12
	Spring 2016	(80)	(20)	0	15	0	0	0	(80)	(20)	0	15
	Total	(63)	(37)	0	24	1	1	1	(59)	(37)	1	27
2016	Fall 2016	(78)	(22)	0	9	0	1	0	(70)	(30)	0	10
	Spring 2017	(61)	(39)	0	18	1	1	0	(60)	(40)	0	20
	Total	(67)	(33)	0	27	1	2	0	(63)	(37)	0	30
2017	Fall 2017	(46)	(54)	0	13	1	0	3	(41)	(41)	3	17
	Spring 2018	(72)	(28)	0	18	0	2	0	(65)	(35)	0	20
	Total	(61)	(39)	0	31	1	2	3	(54)	(38)	3	37
2018	Fall 2018	(42)	(58)	0	12	1	1	1	(40)	(53)	1	15
	Spring 2019	(95)	(5)	0	19	2	1	0	(91)	(9)	0	22
	Total	(74)	(26)	0	31	3	2	1	(70)	(27)	1	37

[a] Includes DLP, illegal harvest, research mortalities, natural mortalities, and other known human-caused accidental mortalities.

Table 2. Unit 1 annual mean skull size and age for male and female brown bears, regulatory years 2009–2018, Alaska.

Regulatory	Mean skull size[a]				Mean age[b]			
year	Male	*n*	Female	*n*	Male	*n*	Female	*n*
2009	22.9	25	19.5	12	8.4	24	5.9	12
2010	21.8	16	20.0	15	8.9	16	5.7	15
2011	22.5	21	20.9	11	8.5	21	12.8	11
2012	21.8	18	19.9	8	6.8	17	9.8	6
2013	23.2	12	21.3	13	9.5	12	9.2	13
2014	21.8	15	19.7	8	6.1	15	5.1	7
2015	22.5	15	19.8	9	7.1	15	5.3	9
2016	23.0	18	18.8	9	9.5	18	5.9	8
2017	22.7	19	20.4	12	7.8	16	6.0	12
2018	22.3	23	20.5	8	7.0	19	8.4	8
$\bar{x}$ [c]	22.5	18.0	19.8	9.2	7.5	16.6	6.1	8.8

[a] Skull size equal length plus zygomatic width.
[b] Determined through successful analyses of extracted premolar teeth. Some samples are not viable for aging.
[c] Average is for the last 5 years RY14–RY18.

letter informing them that continued harvest of females and smaller bears could lead to tighter hunting restrictions. Female brown bear harvest in Unit 1D declined for 1 year following this action, but since then female harvest has been higher than our management objectives.

Recommendations for Activity 1.1

Continue monitoring population status and trend using harvested bear sex ratios, ages, and skull sizes.

2. Mortality-Harvest Monitoring and Regulations

ACTIVITY 2.1. Monitor brown bear harvest through sealing records.

Data Needs

Sealing of legally harvested brown bears has been required in Alaska since 1960. Registration hunt reporting on unsuccessful hunts has been required since 2003. During sealing, data are collected for indices of trends; information is also collected on hunt location, date of harvest, method of take, transportation mode, and the use of any hunting services including a guide.

Methods

Biologists collected harvest data by sealing hides and skulls of brown bears and through registration permit reporting. At the time of sealing the location and date of harvest, method of take, transportation mode, sex, age, skull width, and skull length were recorded. Harvest must be reported within 10 days and unsuccessful hunters must report within 15 days of the end of the season. Sealing must be completed by ADF&G staff or a state-appointed sealer within 30 days of

the kill. These data were entered into an ADFG database (WinfoNet). Harvest data were summarized by regulatory year (RY), which begins 1 July and ends June 30.

Season and Bag Limit

Area	Hunt	Season	Bag limit (resident and nonresident)
Unit 1A, 1B, and 1C remainder	RB062	15 September–31 December	1 bear every 4 regulatory years, except for Berners Bay drainages by registration permit only
	RB072	15 March–31 May	
Unit 1C, Berners Bay	RB063	15 September–31 December	1 bear every regulatory year by registration permit only
	RB073	15 March–31 May	
Unit 1D	RB050	15 September–31 December	1 bear every 4 regulatory years by registration permit only
	RB051	15 March–31 May	

Results and Discussion

Harvest by Hunters

Unit 1 brown bear harvest was lower this reporting period RY14–RY18 with an average annual harvest of 27 bears (range = 23–31; total = 136) compared to the previous reporting period RY09–RY13 average harvest of 30 bears (range = 25–37; total = 152; Table 3). On average during the reporting period 63.3% of the harvest occurred in the spring (Table 4), which follows a similar trend observed in the previous reporting period (62.2% spring harvest). However, it should be noted that more than 60% of the harvest in Unit 1D was in the fall and not in the spring. During this reporting period 12% of bears harvested were in Unit 1A, 15% were from Unit 1B, 35% were from Unit 1C, and 38% were from Unit 1D (Table 3). Unit 1D is the only unit with a prescribed guideline harvest level, which is 16 bears. The Unit 1D guideline harvest level was not exceeded during this reporting period. Annually, the highest harvest normally comes from Unit 1D, but during this reporting period Unit 1C had a higher harvest in RY16 (11 bears versus 10 bears, respectively) and in RY18 (14 bears versus 9 bears, respectively). In Unit 1A , the average annual bear harvest decreased from 8 in RY09–RY13 to 3 in RY14–RY18. In RY14–RY18, Unit 1D also saw a decrease from the previous 5-year period (RY09–RY13) from an average of 13 to 10 bears harvested annually. Harvest remained stable in Unit 1B with no change in average number of bears harvested annually (4 bears) between this reporting period and the last 5-year period. There was an increase in average annual harvest of brown bears in Unit 1C from RY09–RY13 (5 bears) to RY14–RY18 (9 bears).

Table 3. Unit 1 brown bear harvest by Unit, regulatory years 2009–2018, Alaska.

Regulatory year	Unit 1A Harvest[a]	Unit 1A % of Total	Unit 1B Harvest[a]	Unit 1B % of Total	Unit 1C Harvest[a]	Unit 1C % of Total	Unit 1D Harvest[a]	Unit 1D % of Total	Total harvest
2009	12	(32)	5	(14)	4	(11)	16	(43)	37
2010	5	(16)	4	(13)	5	(16)	17	(55)	31
2011	10	(31)	3	(9)	7	(21)	13	(39)	33
2012	9	(34)	3	(12)	6	(23)	8	(31)	26
2013	5	(20)	6	(24)	5	(20)	9	(36)	25
2014	1	(4)	4	(17)	8	(35)	10	(44)	23
2015	1	(4)	4	(17)	8	(33)	11	(46)	24
2016	3	(11)	3	(11)	11	(41)	10	(37)	27
2017	7	(23)	6	(19)	6	(19)	12	(39)	31
2018	4	(13)	4	(13)	14	(45)	9	(29)	31
$\bar{x}$ [b]	3	(12)	4	(15)	9	(35)	10	(38)	27

[a] Does not include DLP kills, research mortalities, illegal harvests, or other human-caused accidental mortalities.
[b] Average is for the last 5 years RY14–RY18.

Table 4. Unit 1 spring and fall brown bear harvest, regulatory years 2009–2018, Southeast Alaska.

Regulatory year	Fall Harvest	Fall Percent of total	Spring Harvest	Spring Percent of total
2009	13	(35)	24	(65)
2010	12	(39)	19	(61)
2011	11	(33)	22	(67)
2012	11	(42)	15	(58)
2013	10	(40)	15	(60)
2014	7	(30)	16	(70)
2015	9	(38)	15	(62)
2016	9	(33)	18	(67)
2017	13	(42)	18	(58)
2018	12	(39)	19	(61)
$\bar{x}$ [a]	10	(37)	17	(63)

[a] Average is for the last 5 years RY14–RY18.

Permit Hunts

The spring and fall registration hunts for Unit 1D are RB050 and RB051. The spring and fall registration hunts for Unit 1C, RB062 and RB072, also includes the rest of the southern portion of Unit 1 encompassing Units 1A and 1B. The Berners Bay fall and spring hunts, RB063 and RB073, began after BOG accepted the proposal for these hunts in 2012, with the first hunt occurring in 2013, at the end of the previous reporting period.

The annual average number of permits for RB050 (fall) and RB051 (spring) during this reporting period was 60 fall permits (RB051) and 37 spring permits (RB050), which are slightly lower than the previous 5 years with 69 fall permits and 40 spring permits (Table 5). Of the permits issued this reporting period, an annual average of 44% participated in the hunt during fall, and 46% participated in the hunt during spring. Of those who hunted during this reporting period, an annual average 28% were successful in the fall and 19% were successful in the spring. Hunters were more successful during this reporting period (21% success rate) compared to the previous period in the spring (18% success rate).

In RB062 and RB072, the annual average number of permits during this reporting period was 100 permits in the fall and 125 permits in the spring, which are lower than the previous 5 years with 124 permits in the fall and 174 permits in the spring (Table 5). Of the permits issued during this reporting period, an annual average of 19% participated in the hunt during fall and 39% participated in the spring. Then, of the folks who hunted during this reporting period, an annual average of 11% were successful in the fall and 27% were successful in the spring. Success was stable this reporting period compared to the previous period with average success in the fall at 13% and higher in the spring at 17% (RY09–RY13).

During this reporting period 8 bears were harvested in the Berners Bay hunts, RB063 and RB073. Berners Bay RB063 and RB073 hunts started in RY13 after the 2012 BOG meeting with the intent of increasing harvest opportunity for brown bear. In addition, there was likely a perception amongst the public that there would be an added benefit to moose with a decrease in moose calf predation by brown bear; however, even though the change increased the number of permits from 64 to 83, and each hunter was able to harvest 1 bear each year, harvest did not increase greatly. Harvest during this period was 1.6 bears/year, which is slightly higher compared to 1.4 bears/year between 1960 and 2008 using Unit 1C harvest from the Berners Bay area (Flynn et. al 2012). The annual average number of permits during this reporting period was 26 permits in the fall (RB063) and 48 permits in the spring (RB073). On average 29% of permit holders hunted in the fall and 20% in the spring with an average annual success of 10% in the fall and 8% in the spring.

Hunter Residency and Success

Unit 1 harvest is divided between local resident hunters (average 49.6% for RY14–RY18), nonresident hunters (47.8%), and nonlocal resident hunters (2.6%; Table 6). This is generally the same pattern observed in the previous reporting period (RY09–RY13) with slightly lower resident harvest (42%) than nonresident harvest (53.6%); nonlocal resident harvest was 4.4%.

Harvest Chronology

Harvest was highest in May (average 62.5% RY14–RY18; Table 7), with some harvest in September (16.9%) and October (16.9%), and minimal harvest in November (2.9%), and April (0.7%). The pattern of harvest from the previous reporting period was similar with 61.8% for May, 15.1% for September, 19.1% for October, 3.3% for November, and 0.7% for April. Late season harvest typically occurs in November in Unit 1D.

Table 5. Unit 1 brown bear registration permit hunt participation and success, regulatory years 2009–2018, Southeast Alaska.

Hunt No.	Regulatory year	Permits issued[a]	Number hunted[a]	Number did not hunt[a]	Percent successful hunters[a]	Bear harvest			
						Males	Females	Unknown	Total
RB050 (Fall)									
	2009	67	29	36	(28)	6	2	0	8
	2010	70	37	33	(32)	4	8	0	12
	2011	77	41	36	(17)	2	5	0	7
	2012	75	35	40	(11)	3	1	0	4
	2013	58	30	26	(27)	4	4	0	8
	2014	63	29	34	(21)	2	4	0	6
	2015	48	22	26	(36)	2	6	0	8
	2016	54	23	31	(26)	5	1	0	6
	2017	66	30	36	(30)	5	4	0	9
	2018	68	28	40	(25)	2	5	0	7
RB051 (Spring)									
	2009	41	27	14	(30)	6	2	0	8
	2010	45	27	18	(22)	4	2	0	6
	2011	38	24	14	(25)	3	3	0	6
	2012	44	22	20	(18)	3	1	0	4
	2013	31	16	15	(6)	1	0	0	1
	2014	38	16	22	(25)	3	1	0	4
	2015	32	17	15	(18)	3	0	0	3
	2016	36	22	14	(18)	4	0	0	4
	2017	38	15	23	(20)	2	1	0	3
	2018	39	14	25	(14)	2	0	0	2
RB0622 (Fall)									
	2009	134	41	93	(15)	3	3	0	6
	2010	107	16	91	(6)	1	0	0	1
	2011	114	29	85	(14)	3	1	0	4
	2012	144	39	105	(18)	6	1	0	7
	2013	123	21	100	(10)	0	2	0	2
	2014	87	16	71	(0)	0	0	0	0
	2015	90	18	72	(6)	1	0	0	1
	2016	99	21	77	(14)	2	1	0	3
	2017	121	21	100	(19)	1	3	0	4
	2018	104	20	84	(15)	1	2	0	3
RB072 (Spring)									
	2009	190	89	100	(18)	11	5	0	16
	2010	207	95	112	(14)	8	5	0	13
	2011	180	74	105	(20)	13	2	0	15
	2012	163	72	90	(14)	6	4	0	10

-continued-

Table 5. Page 2 of 2.

Hunt No.	Regulatory year	Permits issued[a]	Number hunted[a]	Number did not hunt[a]	Percent successful hunters[a]	Bear harvest			
						Males	Females	Unknown	Total
RB072 (Spring)									
	2013	130	64	66	(20)	6	7	0	13
	2014	137	54	83	(22)	10	2	0	12
	2015	118	41	77	(22)	6	3	0	9
	2016	115	45	70	(31)	7	7	0	14
	2017	124	45	79	(33)	11	4	0	15
	2018	130	59	71	(25)	14	1	0	15
RB063 (Fall[b])									
	2013	27	7	20	(0)	0	0	0	0
	2014	29	10	19	(10)	0	1	0	1
	2015	29	7	22	(0)	0	0	0	0
	2016	22	6	15	(0)	0	0	0	0
	2017	23	7	16	(0)	0	0	0	0
	2018	28	8	20	(38)	2	1	0	3
RB073 (Spring[b])									
	2013	55	25	30	(4)	1	0	0	1
	2014	51	7	44	(0)	0	0	0	0
	2015	54	14	40	(14)	2	0	0	2
	2016	42	9	33	(0)	0	0	0	0
	2017	46	7	39	(0)	0	0	0	0
	2018	46	11	35	(18)	2	0	0	2

[a] Includes data for all GMUs included in each hunt unit.
[b] Berners Bay RB063 and RB073 hunts started in RY13 after the 2012 BOG meeting.

Table 6. Residency of successful Unit 1 brown bear hunters, regulatory years 2009–2018, Alaska.

Regulatory year	Local resident (%)	Nonlocal resident (%)	Nonresident (%)	Unknown (%)	Total successful hunters
2009	(49)	(2)	(49)	(0)	37
2010	(39)	(0)	(61)	(0)	31
2011	(48)	(4)	(48)	(0)	33
2012	(42)	(12)	(46)	(0)	26
2013	(32)	(4)	(64)	(0)	25
2014	(48)	(4)	(48)	(0)	23
2015	(46)	(0)	(54)	(0)	24
2016	(44)	(0)	(56)	(0)	27
2017	(55)	(3)	(42)	(0)	31
2018	(55)	(6)	(39)	(0)	31

Table 7. Unit 1 brown bear harvest chronology by month, regulatory years 2009–2018, Alaska.

Regulatory year	Harvest periods							
	September	October	November	December	April	May	June	Total
2009	4	7	2	0	0	24	0	37
2010	5	6	1	0	1	18	0	31
2011	5	6	0	0	0	22	0	33
2012	6	4	1	0	0	15	0	26
2013	3	6	1	0	0	15	0	25
2014	3	3	1	0	0	16	0	23
2015	2	6	1	0	0	15	0	24
2016	3	5	1	0	0	18	0	27
2017	8	4	1	0	1	17	0	31
2018	7	5	0	0	0	19	0	31
$\bar{x}$ [a]	5	5	1	0.0	0	17	0	27.2

[a] Average is for the last 5 years RY14–RY18.

Transport Methods

On average, 77% of brown bear hunters used a boat as their method of transportation during RY14–RY18 (Table 8). Other methods used during this reporting period included highway vehicles (19%), off-road vehicles (1%), walking (2%), aircraft (1%), and unknown (1%). During the previous reporting period hunters used a boat (81%), highway vehicle (11%), off-road vehicle (3%), walking (2%), aircraft (3%), and unknown (1%) in their hunting efforts. Boat use decreased and highway vehicle use increased during this reporting period compared to the previous 5-year period (RY09–RY13).

Table 8. Unit 1 brown bear harvest percent by transport method, regulatory years 2009–2018, Alaska.

Regulatory year	Percentage of hunters						No. successful hunters
	Airplane	Boat	Walk	ORV	Highway vehicle	Other/ unknown	
2009	(5)	(81)	(0)	(3)	(8)	(3)	37
2010	(0)	(87)	(3)	(0)	(10)	(0)	31
2011	(0)	(85)	(3)	(3)	(9)	(0)	33
2012	(8)	(65)	(0)	(4)	(23)	(0)	26
2013	(0)	(88)	(4)	(4)	(4)	(0)	25
2014	(0)	(70)	(4)	(0)	(22)	(4)	23
2015	(0)	(75)	(0)	(0)	(25)	(0)	24
2016	(0)	(89)	(0)	(0)	(11)	(0)	27
2017	(0)	(71)	(3)	(3)	(23)	(0)	31
2018	(3)	(78)	(3)	(0)	(13)	(3)	31

Other Mortality

During this reporting period there were 31 total nonhunt mortalities in Unit 1 (Table 9). There were 12 illegal harvests, 7 defense of life or property (DLP), 6 natural or unknown deaths, 5 agency kills, and 1 from a vehicle collision. Sixty-five percent of the nonhunt mortalities were in Unit 1D, the remaining portion included 23% in Unit 1C, 6% in Unit 1B, and 6% in Unit1A. In the previous reporting period, there were a total of 38 mortalities. There were 10 illegal harvests, 14 DLPs, 7 natural or unknown deaths, 4 agency kills, and 3 from a vehicle collision. Unit 1D had 76% of the mortalities, 24% were in Unit 1C, and none were in Units 1A or 1B.

Alaska Board of Game Actions and Emergency Orders

There were no BOG actions during this reporting period. The change in allowable harvest of 1 bear every year in Berners Bay approved by BOG at the end of the last reporting period was implemented during this period. Harvest was just slightly higher during this reporting period in Berners Bay compared to harvest prior to regulation change.

No emergency orders were issued during this reporting period.

Table 9. Unit 1 brown bear nonhunt mortality, regulatory years 2009–2018, Alaska.

Regulatory year	Natural deaths	DLP[a]	Illegal harvest	Agency kills	Vehicle collision
2009	0	2	0	0	0
2010	0	2	6	1	0
2011	4	3	3	3	1
2012	2	6	0	0	0
2013	1	1	1	0	2
2014	1	4	7	1	0
2015	2	0	0	1	0
2016	0	1	0	2	0
2017	2	0	2	1	1
2018	1	2	3	0	0

[a] Defense of life or property.

Recommendations for Activity 2.1

Monitoring of brown bear harvest and mortality in Unit 1 should continue. Overall harvest is low, except in Unit 1D where the guideline harvest level has been exceeded in the past; the majority of brown bear harvest in Unit 1 typically occurs in Unit 1D. Annual Unit 1 brown bear harvest data provides the necessary information used for management of brown bear populations in the unit and are the backbone of the brown bear management plan.

3. Habitat Assessment-Enhancement

There are no habitat projects to manage brown bear habitat in Unit 1. The last assessment of brown bear habitat in Unit 1 was during the evaluation of the Juneau Access Improvements Road Corridor in Berners Bay (Flynn et al. 2012).

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

In managing brown bear in Unit 1, the largest nonharvest issues are human-bear conflict and safety issues which require the management of tourists at bear viewing areas. Human-bear conflict in residential areas focuses on the proper storage and disposal of garbage and securing small livestock such as chickens, fruit trees, gardens, and other food sources so that bears do not have access to them. To mitigate these issues, ADF&G biologists provide educational programs, advice, answers to questions, and electric fence loaner programs. In cases where bears have become a continual nuisance, have damaged property, and endangered residents, the bear was killed which was accomplished through a combined effort between ADF&G biologists and local law enforcement. In areas with both heavy tourist and bear usage, ADF&G biologists have worked together with the local land management agencies to come up with the best practices to preserve the visitor's experience while also conserving bears.

Data Recording and Archiving

Sealing data are archived in WinfoNet back to 1960, including scans of the original data sheets. Scans between 1978 and 1985 are incomplete or missing. Hard copies of some years, especially the most recent years, are on file in the area offices of Douglas, Petersburg, and Ketchikan.

Agreements

There are no agreements to report.

Permitting

All brown bear hunting in Unit 1 is managed using registration permits with an associated hunt report requirement.

Conclusions and Management Recommendations

The brown bear harvest during this reporting period in Unit 1 was similar to the previous reporting period with 3 fewer bears harvested. All harvest indices were met satisfying the management objectives and indicating that brown bear populations in Unit 1 are stable or maybe even increasing in some portions of Unit 1C. The new Berners Bay registration hunts (RB063 and RB073) increased the number of permits distributed, but so far have not increased brown bear harvest by much. Hunter success in the Berners area was the lowest compared to other hunt areas, at 10% in the fall and 6% in the spring. Overall, in Unit 1 there was a slight increase in resident hunters versus nonresident hunters during this reporting period compared to the previous period. Harvest chronology has been the same for at least the last 2 reporting periods. In regard to hunter transportation, there has been a slight decrease in boat use and an increase in highway vehicle use. Finally, in assessing nonharvest mortality, illegal harvest and DLPs were the most common; the majority occurring in Unit 1D.

II. Project Review and RY19–RY23 Plan

Review of Management Direction

The existing management and goals appropriately direct the management of brown bears in Unit 1. The management direction for Unit 1 ensures that brown bears will persist as part of the natural ecosystem and ensures continued hunting and viewing opportunities.

MANAGEMENT DIRECTION

GOALS

Provide opportunity for brown bear hunting and viewing under the sustained yield principle using the best science available to benefit the people of Alaska and conserve brown bear populations.

CODIFIED OBJECTIVES

Amounts Reasonably Necessary for Subsistence Uses

At the 2002 meeting, the Alaska Board of Game (BOG) made a positive finding for customary and traditional use of brown bears in Units 1A, 1B, 1C, and 1D. At the 2010 meeting, BOG set the amount necessary for subsistence (ANS) at 2–3 brown bears for Unit 1A, outside the Ketchikan Non-subsistence Area; 1 brown bear in Unit 1B, 1 brown bear outside the Juneau nonsubsistence Area in Unit 1C, and 3–5 brown bears in Unit 1D (5 AAC 99.025(a)(3)).

Intensive Management

Not applicable.

MANAGEMENT OBJECTIVES

- Maintain an average age of harvested males of no less than 6.5 years, and a male-to-female harvest ratio of at least 3:2.

- Reduce the number of bears killed because of human garbage and food conditioning.

REVIEW OF MANAGEMENT ACTIVITIES

1. Population Status and Trend

ACTIVITY 1.1. Monitor the population of brown bears in Unit 1.

Data Needs

Monitoring of population status and trend will be accomplished by following changes in harvested bear sex ratios, age, and skull sizes. Unit 1 hunters commonly select large male brown

bears for harvest. An observed increase in female harvest is an indicator of a decline in mature male bears for harvest, signaling a decline in the overall population. Similarly, a decline in harvest age and skull size could indicate a decline in the proportion of mature bears in the population (because hunters are harvesting young bears with smaller skulls). Harvest metrics are considered useful in detecting a notable change in brown bear populations; however, significant population change would be required to observe a change in these harvest data metrics.

Methods

Sex, age, and skull size data will be collected during the brown bear sealing process. Hunters are required to keep evidence of sex naturally attached to the hide until the animal is sealed and the sex will be determined at the time of sealing through observation of a penis sheath or teats and vulva. Age will be measured by counting cementum layers in a premolar tooth. These teeth will be sent to Matson's Laboratory (Matson et al. 1993) each year for analysis. Skull size will be measured as the sum of the skull length (measured from the top of the occipital bone to the end of the nose/front teeth) plus the skull width (measured across the skull at the zygomatic arch).

2. Mortality-Harvest Monitoring

ACTIVITY 2.1. Monitor brown bear harvest through sealing records.

Data Needs

Sealing of legally harvested brown bears has been required in Alaska since 1960. Registration hunt reporting on nonharvest hunts has been required since 2003. Data collected during sealing provides information to determine population indices that are currently used to monitor the health of the population. During sealing, data will be collected for indices of trends, but also information on hunt location, date of harvest, method of take, transportation mode, and the use of any services including a guide.

Methods

Authorized sealers collect harvest data by sealing hides and skulls of brown bears and through registration permit reporting. Sealers collect information on the location and date of harvest, method of take, transportation mode, sex, age, skull width, and skull length. Harvest should be reported within 10 days of kill, and sealing must be completed by an authorized ADF&G sealer on staff or a state-appointed sealer within 30 days of the kill. These data will be entered into ADF&G's Wildlife Information Network database (WinfoNet). Harvest data will be summarized by regulatory year (RY), which begins 1 July and ends June 30.

3. Habitat Assessment-Enhancement

There are currently no projects planned for brown bear habitat management in Unit 1.

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

Data Recording and Archiving

Species management reports and plans and the management operational plan for brown bear in Unit 1 are located online at: www.wildlifepublications.adfg.alaska.gov. Memoranda, data forms, and additional hard copies will be stored in the area office files in Douglas, Petersburg, and Ketchikan.

Agreements

None.

Permitting

None.

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