

## Brown Bear Management Report and Plan, Game Management Unit 9:

Report Period 1 July 2014–30 June 2019, and  
Plan Period 1 July 2019–30 June 2024

**David W. Crowley**



2023



## **Brown Bear Management Report and Plan, Game Management Unit 9:**

Report Period 1 July 2014–30 June 2019, and  
Plan Period 1 July 2019–30 June 2024

**PREPARED BY:**

David W. Crowley  
Area Wildlife Biologist (retired)

**APPROVED BY:**

Todd R. Rinaldi  
Management Coordinator

**REVIEWED BY:**

Amy Vande Voort  
Area Wildlife Biologist

Evelyn Lichwa  
Assistant Area Wildlife Biologist

**PUBLISHED BY:**

Sky M. Guritz  
Technical Reports Editor

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Alaska Department of Fish and Game  
Division of Wildlife Conservation  
PO Box 115526  
Juneau, AK 99811-5526



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This species management report and plan was reviewed and approved for publication by Todd A. Rinaldi, Management Coordinator for the Division of Wildlife Conservation.

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**Cover Photo:** Brown bears fishing at Brooks Falls, Katmai National Park and Preserve. Evelyn Lichwa ©2022.

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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 Game Management Unit 9 for the 5 regulatory years 2014–2018 and plans for survey and inventory management activities in the next 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 report more efficiently 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

Unit 9 (33,600 mi<sup>2</sup>) consists of the Alaska Peninsula of Southwest Alaska, bounded in the north by the drainages of Lake Clark (Unit 9B) and Tuxedni Bay on Cook Inlet (Unit 9A), on the west by the Kvichak River drainage and Bering Sea, and extending southwest to Isanotski Strait near Cold Bay and Izembek National Wild Refuge (Unit 9D; Fig. 1). Mountains of the Aleutian Range extend down the Pacific coast of the peninsula providing cool, maritime conditions, alpine tundra, heavy precipitation, high winds, and active volcanoes. Boreal forest occurs over much of the northern and central portions of Unit 9 at lower elevations, and coastal plains of rolling tundra extend down the eastern slope of the peninsula along the Bering Sea. Many of the rivers originating in Unit 9 are spawning habitat for anadromous salmon returning through Bristol Bay. Most of the Alaska Peninsula is considered brown bear habitat, except for alpine rock, ash, and ice terrain above 2,000 feet in elevation. Bear density tends to trend upward from Units 9A and 9B in the north to Unit 9D in the southwest, a linear distance of over 500 miles and 5 degrees of north latitude.

### Summary of Status, Trend, Management Activities, and History of Brown Bears in Unit 9

Crowley and Peterson (2015) provided an historical perspective of brown bear harvest and population size in Unit 9. Most bears are harvested during biennial (every other year) registration hunts held during odd-numbered regulatory years which were first implemented in RY76 to control harvest. Resident hunters are allowed additional hunting opportunity in near-village and subsistence hunts. Unit 9 bear harvest peaked in RY99 when over 700 bears were taken and has been declining since then.





**Figure 1. Map showing Game Management Unit (GMU) 9 boundaries with indicators of controlled use areas (numbered black circles) as found in the Alaska Hunting Regulations, Alaska Peninsula.**



Over the last 50 years there have been multiple estimates of bear abundance and density. Composition studies have also been conducted in Unit 9 by multiple agencies, most of which are scattered in gray literature such as agency reports. Estimation of bear abundance and density occurred in many areas of Unit 9 and Unimak Island between 1989 and 2009 (Table 1). Density estimates ranged from 36 bears/1,000 km<sup>2</sup> in the Lake Clark drainage in Unit 9B to 551 bears/1,000 km<sup>2</sup> in an unharvested coastal portion of Katmai National Park (KATM) in Unit 9C.

Early efforts at abundance estimation used capture–mark–resight (CMR) techniques in Units 9E and 9C (Table 1). In the 2000s the development of double count distance sampling (DCDS) and mark–recapture distance sampling (MRDS) techniques were underway (Table 1). Although the MRDS survey was expensive, about \$200,000 in the early 2000s, they were similar in cost to multi-year CMR projects occurring at a fraction of the scale, required little or no extrapolation to the subunit level, and allowed estimation of harvest rate at the same scale as the survey.

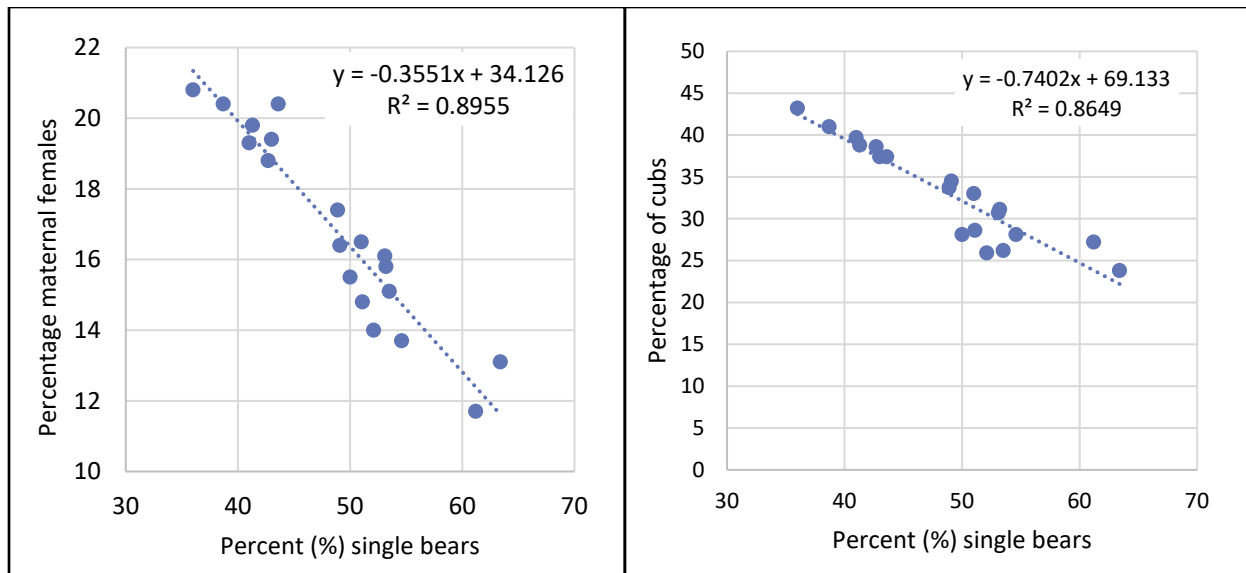
ADF&G biometricians reanalyzed data sets from Units 9A, 9C, 9D, and 10 several times as more refined models were developed. Having abundance estimates allowed the calculation of harvest rates within uniform coding units (UCUs) of the study areas using harvest data from years that estimates were able to be calculated. The results suggest a relatively low harvest rate in Unit 9 despite record high harvests that occurred during the late 1990s and early 2000s (Table 1). The higher harvest rate reported in 1989 was for a limited portion of Unit 9E (1,215 km<sup>2</sup>).

Low harvest rates resulted from short, biennial, and extensive refugia in National Parks, McNeil River State Game Refuge and Sanctuary, and inaccessible mountain terrain. Brown bear composition surveys have been flown along streams during August since the 1960s, but it was not until the early 1980s that the techniques had evolved enough to become useful. Repeated surveys within season were necessary to accumulate enough observations in stream corridors. Diurnal flights, experienced observers, and tandem seating became standards for bear surveys.

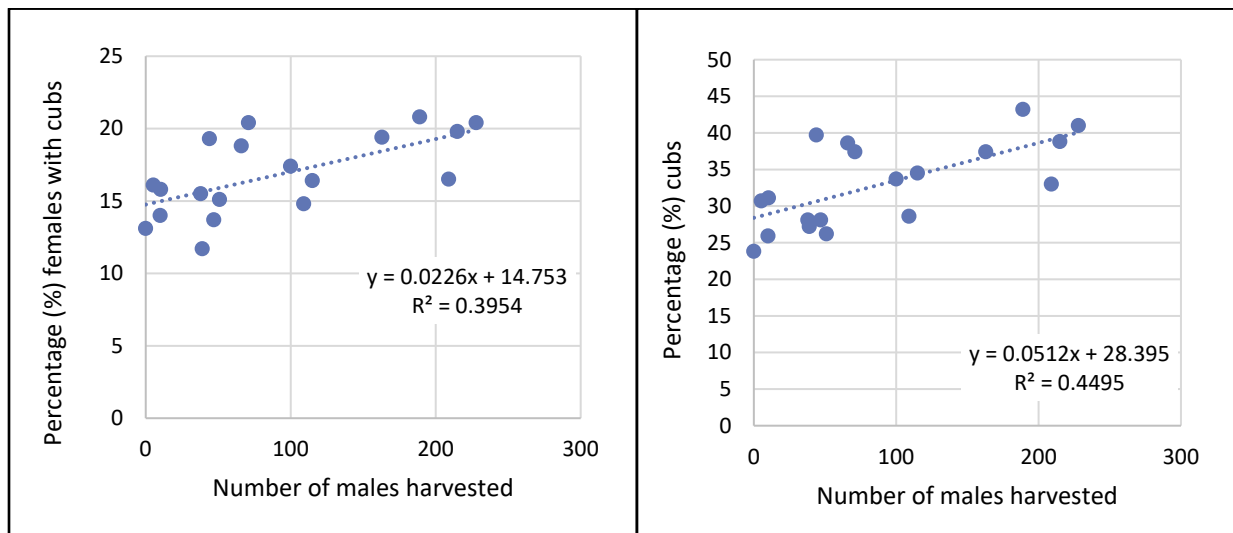
DCDS and MRDS surveys recorded bear composition along transects, as did CMR researchers for captured bears and telemetry flights (Table 2). Stream survey composition was often compared to captured and telemetered bears for survey development. Abundance and density estimates from Table 1 were used to populate harvest density and rate, and bear density in Table 2. In a preliminary manner, scatter plots were developed to identify correlations among the variables in Table 2. For example, the percentage of females with cubs was negatively related to percent single bears (they are autocorrelated) and to percent cubs (Fig. 2).

Correlation of percent male harvest, harvest density, percent large male ( $\geq 8$ -years old) harvest with indicators of productivity (i.e., cubs, and females with cubs), and with single bears provided little indication of any effect of bear harvest on composition. However, male bear harvest was positively (but weakly) correlated with percent maternal females and cubs (Fig. 3).

The only composition surveys currently being flown are in Unit 9D and Unimak Island by Izembek National Wildlife Refuge (NWR) staff. However, Becharof NWR and ADF&G staff are discussing the resurrection of the Becharof/Ugashik Lakes surveys flown 1980–1993 (Table 2) to monitor bear composition in Unit 9E.



**Figure 2. Correlation of single brown bears with females with cubs (left) and cubs (right) from Unit 9 composition surveys, 1970–2016, Alaska.**



**Figure 3. Correlation of male brown bear harvest and maternal females (left) and cubs (right) from Unit 9 composition surveys, 1970–2016, Alaska.**

Because of high bear density in Unit 9, human-bear conflicts are common in Alaska Peninsula communities. This is particularly true for the Bristol Bay Borough (Naknek and King Salmon) communities with the highest human populations, an abundance of fishing lodges, an unprotected landfill open to scavenging by bears, and the largest sockeye salmon commercial fishery in the world occurring during late June and July. Nuisance bears that attempt to or succeed in breaking into structures or otherwise become a threat to humans are killed, when appropriate, by ADF&G staff or law enforcement. Others are shot by homeowners during attempted break-ins or property destruction such as to septic systems and boats. Most seafood processors have strict policy about keeping bears from human-food sources, but a few do not

**Table 1. Bear abundance and density estimates in Unit 9, Alaska during 1989–2009.**

Year(s)	Unit	Method <sup>a</sup>	Study area <sup>b</sup>	Area km <sup>2</sup>	Abundance		Density		Harvest <sup>d</sup> rate (%)	Source
					Estimate	Range	Per 1,000 km <sup>2,c</sup>	Range		
2003	9A	DCDS	9A	5,686	693	595–791	122	105–139	4	Quang 2005 <sup>e</sup>
		DCDS	9A	7,380	703	569–837	150	122–178	3.9	Olson and Putera 2007
2003	9A	DCDS	LACL only	3,179	367	244–490	115	76–154	0.8	Quang 2005 <sup>e</sup>
		DCDS	LACL only	3,846	466	234–698	147	75–219	0.6	Olson and Putera 2007
		BDS	LACL only	4,677	410	–	88	78–100	0.7	Schmidt et al. 2017
1999–2000	9B	MRDS	Lake Clark	6,096	222	167–295	36.3	27–48	1.6	Becker 2001
2009	9B	MRDS	Lake Iliamna	9,189	492	369–657	56.5	42–76	4.8	Becker 2010
1990	9C	CMR	KATM coast	901	496	405–627	551	450–694	0.1	Sellers et al. 1999
2004–2005	9C	DCDS	9C	13,848	2,255	1,949–2,561	124	107–141	1.2	Quang 2005 <sup>e</sup>
		MRDS	9C	13,848	1950	1,593–2,389	108	89–133	1.4	Becker 2010
2004–2005	9C	DCDS	KATM P&P	14,031	2,183	1,804–2,562	156	135–174	1.1	Quang 2005 <sup>e</sup>
	9C	DCDS	KATM P&P	18,150	1,869	–	103	90–117	1.3	Schmidt et al. 2017
	9C	DCDS	KATMpr only	1,254	125	–	99.7	80–124	–	Schmidt et al. 2017
2002	9D	MRDS	9D	8,648	1,683	1,374–2,062	194.6	158–238	4.3	Becker and Crowley 2021
1989	9E	CMR	Black Lake	1,215	239	187–291	190	172–209	6.8	Miller and Sellers 1992
2002	10	MRDS	Unimak Island	2,869	317	235–427	110.4	77–143	3.2	Becker and Crowley 2021

<sup>a</sup> Methods include double count distance sampling (DCDS), Bayesian distance sampling (BDS), mark recapture distance sampling (MRDS) and capture mark resight (CMR). Biometricians have reanalyzed several of these data sets using various methods over the years. En dashes indicate no value.

<sup>b</sup> LACL= Lake Clark National Park and Preserve, KATM = Katmai National Park and Preserve, KATMpr only = preserve only.

<sup>c</sup> Per 386 miles<sup>2</sup>.

<sup>d</sup> Applicable harvest by year and within drainages (UCUs) of study area per midpoint of abundance estimate.

<sup>e</sup> P. X. Quang, 2005, unpublished report, The 2004–2005 Bear Survey of Region 9C, presented to Katmai National Park, November 2005.

**Table 2. Composition count summaries of brown bears in Unit 9 and Unimak Island, Alaska, 1970–2016.**

Year(s)	Method <sup>a</sup>	Unit: study area <sup>b</sup>	Females w/cubs (%)	COY <sup>c</sup> (%)	Older cubs (%)	Single bears (%)	Bears (n)	Surveys (n)	Harvest rate	Harvest density /1,000 km <sup>2</sup>	Bear density /1,000 km <sup>2</sup>	Sources <sup>d</sup>
2003–2004	DCDS	9A	15.5	4.1	24.0	56.4	484	683	4.0	4.8	150.0	1
1999–2000	MRDS	9B: Lake Clark	20.4	6.9	30.5	43.6	275	1,138	1.6	0.6	38.6	2
2009	MRDS	9B: Iliamna	13.7	0.8	27.3	58.2	249	1,004	4.8	2.6	56.6	2
2005–2007	SSR	9C: KATMpr	19.3	12.4	27.3	41.0	1,408	7	1.4	7.8	108.0	3, 4
1993	SSR	9C: KATMpr	11.7	9.7	17.5	61.2	103	5	–	4.9	144.0	5
1989–1991	CMR	9C: KATMco	13.1	6.5	17.3	63.4	1,426	25	0.1	0.3	551.0	5
2004–2005	MRDS	9C	16.2	5.2	24.6	53.0	674	746	1.4	2.0	108.0	12
2002	MRDS	9D	16.6	6.5	25.1	52.0	633	370	4.3	8.3	198.0	12
1976–1996	TCA	9D: INWR	18.8	19.0	19.6	42.7	1,957	18	–	12.8	198.0	7
1998–2016	TCA	9D: INWR	17.4	14.1	19.6	48.9	2,143	19	4.3	16.4	198.0	7, 6
1980–1987	SSR	9E: BE/UG	19.4	18.0	19.4	43.0	2,862	236	2.7	3.1	116.0	8, 11
1988–1993	SSR	9E: BE/UG	16.5	9.9	23.1	51.0	3,288	671	3.1	3.6	116.0	8, 11
1970–1975	CMR	9E: BL/CH	16.4	12.1	22.4	49.1	505	35	–	5.8	–	9
1988–1989	CMR	9E: BL/CH	19.8	14.0	24.8	41.3	121	6	6.8	5.2	190.0	9
1982–1992	SSR	9E: BL/CH	20.8	19.0	24.2	36.0	6,758	39	6.8	5.0	190.0	9
1994–2004	SSR	9E: BL/CH	20.4	17.1	23.9	38.7	7,642	37	–	4.7	190.0	10
1968–1996	TCA	10: Unimak Is	16.1	14.3	16.4	53.1	1,169	20	–	5.3	110.0	7
1998–2014	TCA	10: Unimak Is	15.8	11.7	19.4	53.2	1,159	19	3.2	10.4	110.0	7, 6
2002	MRDS	10: Unimak Is	19.4	19.4	18.1	43.1	160	239	3.2	3.1	110.0	13

*Note:* Long-running surveys were split or pooled based on natural breaks in data such as changes in harvest or composition parameters. Distance sampling (DS) surveys were flown in late May before leaf-out and may be biased low for maternal females and cubs of the year (COY). Stream survey replicates (SSR), capture mark resight (CMR), and trend count areas (TCA) were conducted in summer with salmon present.

<sup>a</sup> Methods are abbreviated as follows: double count distance sampling (DCDS), mark–resight distance sampling (MRDS), stream survey replicates (SSR), capture mark resight (CMR), and trend count areas (TCA).

<sup>b</sup> Study areas are abbreviated as follows: Lake Clark drainage as Lake Clark, Lake Iliamna drainage as Iliamna, Katmai Preserve only (KATMpr), Katmai Park coast (KATMco), portions of Izembek National Wildlife Refuge (INWR), eastern Becharof and Ugashik Lakes drainages (BE/UG), and Black Lake (BL) and Chignik River (CH) drainages (BL/CH).

<sup>c</sup> Cubs of the year (COY).

<sup>d</sup> Sources: 1) P. X. Quang, 2005, unpublished report, The 2004–2005 Bear Survey of Region 9C, presented to Katmai National Park, November 2005 2) E. Becker, Alaska Department of Fish and Game, Anchorage, personal communication 3) Butler et al. 2007, 4) Becker 2018, 5) Sellers et al. 1999, 6) Becker and Crowley 2021, 7) S. Lowe, 2016, unpublished memorandum, Annual Brown Bear Stream Survey, U.S. Fish and Wildlife Service, Cold Bay, Alaska, 8) Becharof National Wildlife Refuge, King Salmon, personal communication, 9) Miller and Sellers 1992, 10) ADF&G files, unpublished data, King Salmon, and 11) Sellers and Miller 1991, 12) Butler 2007, 13) U.S. Fish and Wildlife Service, 2003.

take the issue seriously or address the issue at all. Large boat yards, where commercial gillnet vessels are stored side by side “on the hard” for the off season, become short-term residences for gillnetters who are maintaining their boats in the spring before the season. Food and trash attract bears into the boat yards where the dense proximity of boats, vehicles, and people preclude the use of firearms. Boat yards and seafood industrial complexes are often bordered on 3 sides by dense alder (*Alnus* spp.) along the Naknek River. This is ideal summer habitat for brown bears where pursuit of offenders is difficult and risky, especially at night when most incidents occur.

ADF&G staff annually distribute information to and meet with business owners, including fish processors and boat yard managers, to discuss bear-aware topics and encourage the use of bear deterrents such as electric fencing. Proper bear fencing is becoming more popular, especially at fishing lodges and homes with fish smokers. We set trail cameras in problem areas to identify nuisance bears and are pursuing the use of foot snares to capture problem bears alive. There is no culvert-style trap based in King Salmon because brown bears tend to avoid entering enclosure traps. Nuisance bear incidents are tracked and documented by ADF&G.

The Alaska Peninsula has become world renowned for brown bear viewing opportunities. The McNeil River State Game Sanctuary (MRS GS) and McNeil River State Game Refuge (MRS GR) in Unit 9A were created by the Alaska State Legislature primarily to provide permanent protection for brown bears and their habitats. Human use in the area is managed to maintain and enhance bear viewing opportunities in natural settings. ADF&G operates a popular limited-entry bear viewing program in the sanctuary (Griffin and Weiss 2019). Brooks Camp in Katmai National Park (Unit 9C) draws thousands of bear viewers annually to observe bears from elevated platforms and trails. Free-style bear viewing along the Pacific coast of Alaska is supported by at least 26 businesses who transport clients to see bears at Chinitna Bay (Unit 9A) and many other areas along the coast.

## **Management Direction**

The Alaska Peninsula is a premier destination for brown bear viewing and hunting, attracting visitors from around the world. The lands and waters of the Alaska Peninsula support high densities of large brown bears. Public sentiment regarding bear abundance is diverse and management goals are frequently challenged. While some people advocate for more protection of bears, others want to reduce bear abundance to enhance ungulate populations and reduce human-bear conflicts. The Alaska Board of Game (BOG, board) and the Alaska Department of Fish and Game have placed a high priority on maintaining quality hunting and viewing experiences.

## **EXISTING WILDLIFE MANAGEMENT PLANS**

Alaska wildlife management plans: Southwestern Alaska, Naknek-King Salmon Brown Bear Management Plan (1976) provided direction and goals for brown bear management and has been modified by the Board of Game regulatory actions over the years. This plan represents the current plan for brown bear management in Unit 9.



## GOALS

- Provide an opportunity to view, photograph, and enjoy wildlife.
- Provide for an optimum harvest.
- Provide the greatest sustained opportunity to participate in hunting.
- Provide an opportunity to hunt under aesthetically pleasing conditions.
- Provide an opportunity to take large animals.
- Provide an opportunity for scientific and educational study.

## CODIFIED OBJECTIVES

None.

### Amounts Reasonably Necessary for Subsistence Uses

The Board of Game (BOG) has made a positive customary and traditional use finding for brown bear in Units 9B and 9E. The amount necessary for subsistence uses (ANS) are 10–20 brown bears in Unit 9B and 10–15 brown bears in Unit 9E.

## MANAGEMENT ACTIVITIES

### Intensive Management

None.

## MANAGEMENT OBJECTIVES

Maintain a high bear density with a sex and age structure that will sustain a harvest composed of 60% males, with a total of 50 males 8-years old or older taken during the combined fall and spring seasons.

### 1. Population Status and Trend

ACTIVITY 1.1. Assess population trends through anecdotal field observations.

#### *Data Needs*

Anecdotal information, observations, and trend indicators contribute to the knowledge base of managers when making decisions in the absence of recent estimates of abundance and density.

#### *Methods*

Anecdotal information is gathered by biologists by recording bear observations during many hours of flying ungulate surveys and talking with guides, hunters, advisory committees, and other local residents.

## *Results and Discussion*

Beginning in 2013, local residents, guides, and hunters commented on the reduced number of bears observed on the Alaska Peninsula. Large bears became more difficult to find for hunters, although this was complicated by warm, stormy weather during fall hunts. In recent years department staff observed fewer bears and a dearth of large bears during ungulate surveys. Prior to this report period, a large loss of bears to natural stochastic events was suspected during the protracted winter conditions of 2012 and 2013 that extended well into spring.

Beginning in 2016 ADF&G staff observed a noticeable increase in the number of sows with multiple cubs, which has persisted through 2018. This may suggest that younger-aged cohorts are being recruited back into the population.

## *Recommendations for Activity 1.1*

Continue.

## 2. Mortality-Harvest Monitoring and Regulations

ACTIVITY 2.1. Assess the number of brown (grizzly) bears harvested by hunters and other sources of mortality that might have an impact on each population within Unit 9.

### *Data Needs*

Harvest statistics are the most commonly used indicators of brown bear harvest and population trends. Without estimates of population such as abundance, growth rate, or harvest rate, management is based largely on harvest-data indicators.

### *Methods*

Bear hunters were required to report their hunting activity including a drainage-specific location of kill. Skulls and hides of harvested bears must be salvaged and presented to ADF&G for data collection and sealing. A tooth is extracted from each skull for age analysis to determine age structure of the harvest. Many Unit 9 bears are sealed by Alaska State Troopers who make contact with hunters in guide camps. Most others are sealed in the Southcentral regional and area offices on the road system. Relatively few (<50 per regulatory year) are sealed in the King Salmon office for logistical reasons.

### *Season and Bag Limit*

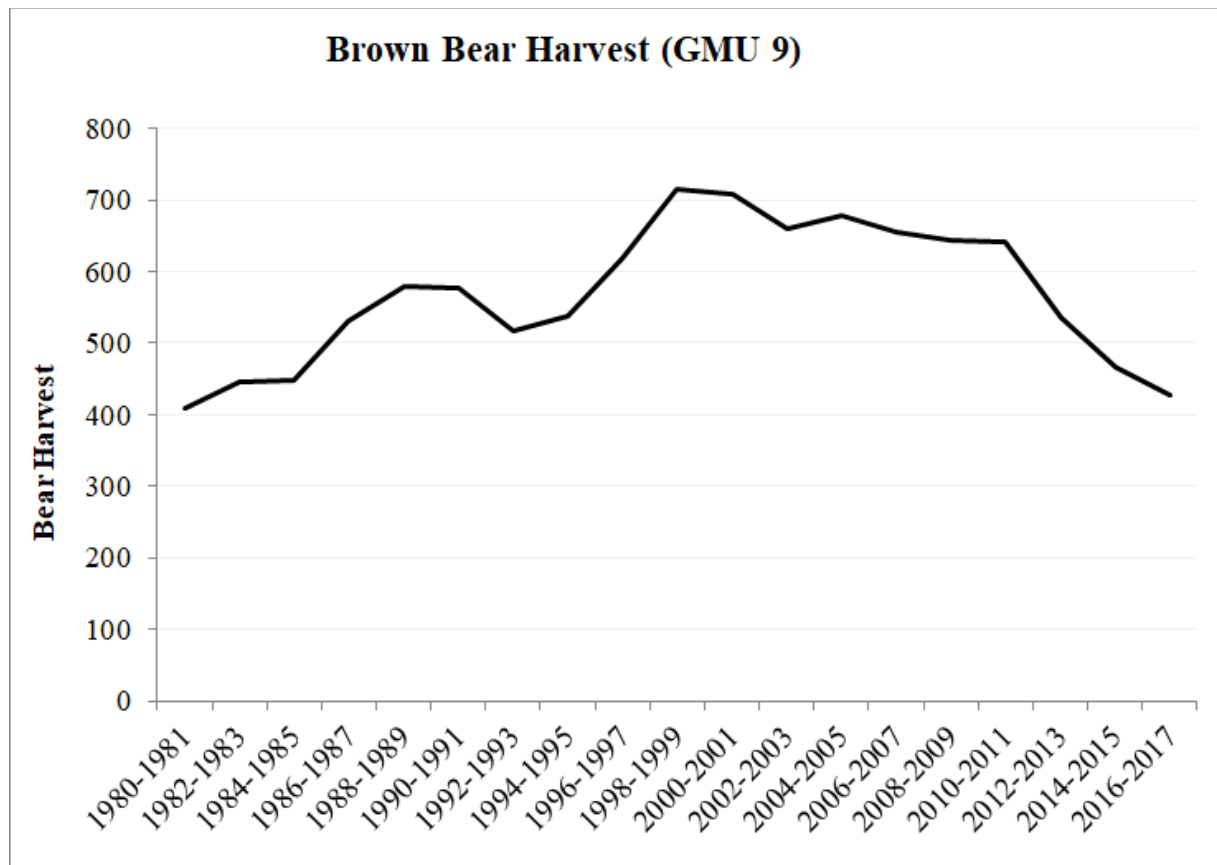
During RY12, RY16, and RY18, biennial hunts were closed. Seasons open to residents only included RB525, which is a near-village hunt and open year round; and RB502, which is a subsistence hunt open during 1 September–31 May in Unit 9B, and during 1 November–31 December in a portion of Unit 9E with a bag limit of 1 bear per regulatory year.

During RY13, RY15, and RY17 all hunts were open. The fall hunt (RB368) season in Units 9A, 9C, 9D, and 9E was 1–21 October. The spring hunt (RB370) season in Unit 9 was 10–31 May. In Unit 9B, the fall hunt RB369 season was 20 September–21 October, and the spring RB370 season was 10–31 May. The bag limit for each of these hunts was 1 bear every 4 regulatory years.

## Results and Discussion

### Harvest by Hunters

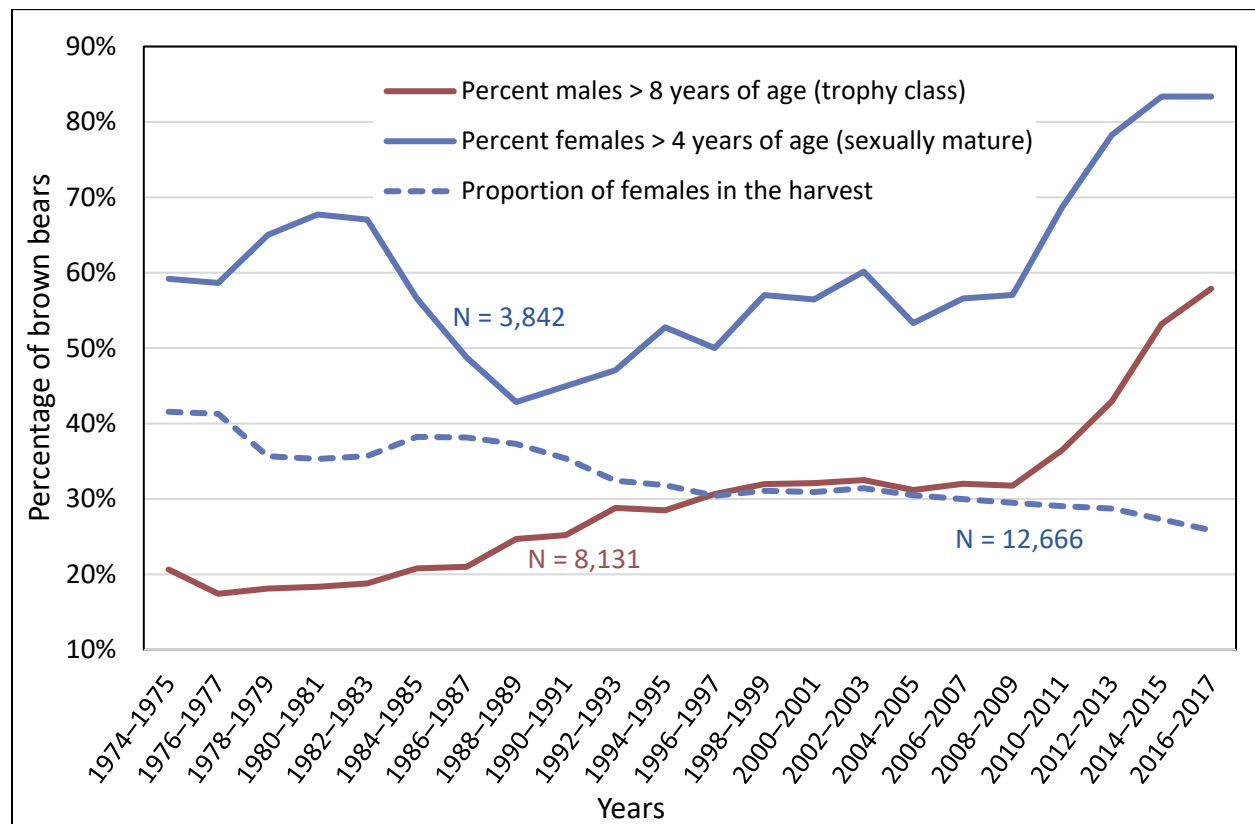
Bear harvest continued to decline during the reporting period (RY14–RY18; Fig. 4). The 2016–2017 harvest of 427 bears was the lowest on record since 1984–1985 (Fig. 4). Registration hunts were initiated in 2011 to monitor hunter participation and success. Registration permit hunts indicated a decreasing success rate from 64% to 57% during 2011 through 2017, with a concurrent 20% decline in the number of hunters participating. There was very little change in the number of days hunted per bears killed in Unit 9, ranging from 4 to 5 days since the late 1960s. However, this metric seems to be a poor indicator of hunter success and abundance trends of coastal brown bears, instead reflecting the usual hunt length (7 to 10 days) scheduled by guides and hunters taking leave from employment. The number of hunters declined by 193 (20%) from RY11 to RY17, while bear harvest declined by 30% during the same period (Fig. 4). The cost of bear hunting on the Alaska Peninsula may becoming too expensive for most nonresident hunters who are required to hire a guide; a typical hunt can cost \$30,000 for the guide service alone.



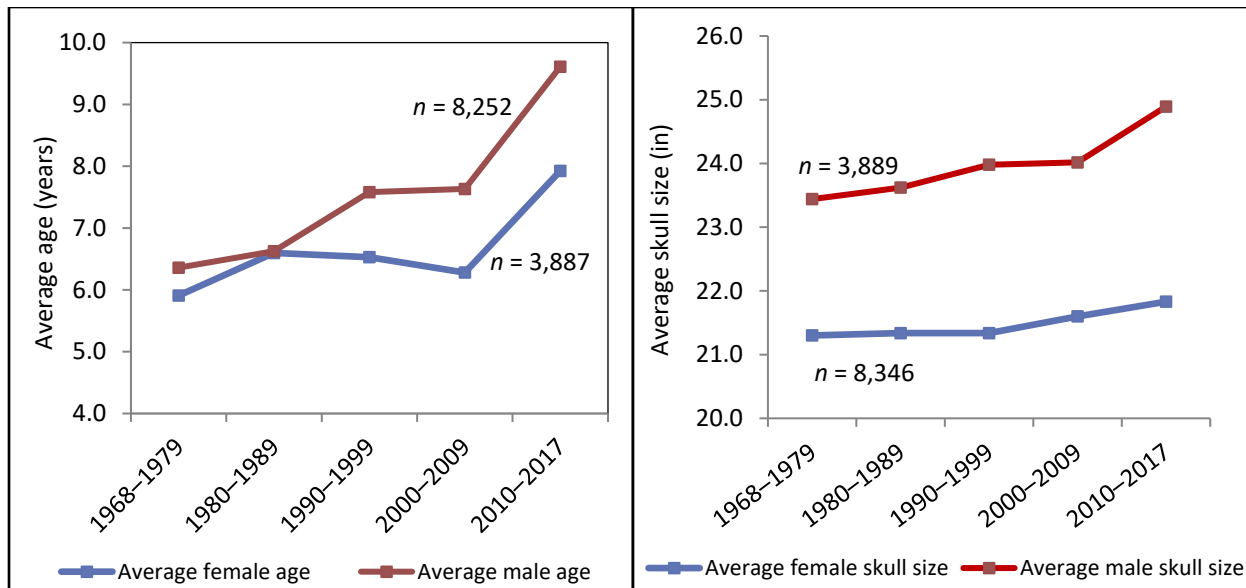
**Figure 4. Total brown bear harvest in 2-year increments from 1980–2017 in Unit 9, Alaska.**

Along with declining harvest, there were concerns related to age structure of the harvest that occurred since 2010, which included 3 biennial open seasons. Younger bears were being harvested at lower proportion while older bears increased in the harvest. Male bears older than 8

years of age are considered trophy-class brown bears in Unit 9. The proportion of males in the harvest greater than 8-years old increased from a 40-year (1968–2009) range of 20–30%, to 54% during the 2010–2017 period; an abrupt increase of 41% (Fig. 5). During 2014–2015, the proportion of these older males in the harvest had increased to 63%, doubling the long-term average. After 4 decades of remaining between 23.5 and 24.0 inches, the average male skull size increased nearly 1 inch from 23.4 to 24.9 inches during the 2010–2017 period (Fig. 6). During the previous 4 decades the proportion of adult females (i.e.,  $\geq 4$ -years-old) in the female harvest remained consistently near 50% until 2010–2017, when this proportion suddenly increased to 82% adult females in the female harvest (Fig. 5), but by RY17 declined back to 55%. Average female age pooled by decade increased by 21% from 2000–2009 to 2010–2017 (Fig. 6). Meanwhile, the proportion of females in the harvest averaged near 30% for 30 years (Fig. 5), a harvest characteristic that benefits the reproductive potential of peninsula bears. These data and information generated enough concern over cohort losses and the status of the population to recommend a season reduction to the Board of Game for Units 9C, 9D, and 9E.



**Figure 5. Proportions of trophy male and adult female brown bears harvested in Unit 9, Alaska. Harvest increased suddenly and substantially beginning in regulatory year 2011 (3-year rolling averages).**



**Figure 1. Average age (left) and skull sizes (right) of brown bears harvested in Unit 9, Alaska pooled by decade.**

Male bears represented 75–76% of the harvest during RY15 and RY17, the 2 years of the reporting period where all hunts were open in Unit 9 due to the biennial hunt structure (Table 3). This was a typical pattern of harvest which exceeded the management objective of 60% males in the harvest. Low proportion of females in the harvest is typical, especially in the spring, and is preferred as more females in the population translates to greater productivity (Fig. 5).

Average age pooled by decade in the harvest increased by 20% for male and female bears compared to the 2000–2009 decade (Fig. 6). As of RY17, however, average annual age had leveled out at 9.6 years for males and 7.9 years for females and is showing no sign of increasing further. Average skull size for both sexes increased slightly but not nearly the same magnitude as the 20% increase in average age in the harvest (Fig. 6).

During RY14–RY18 15 bears were killed by people who were not hunting (Table 3). Because illegal and nonhunting kills, including defense of life or property kills (DLP), are often unreported, nonhunting mortality is estimated at more than 50 bears.

### Permit Hunts

Fall registration hunts RB368 and RB369 had relatively low hunter success in RY15 but staged a partial recovery in RY17 (Table 4). Success rates in the 60–65% range are normal. Spring hunt RB370 was higher at 69% success in RY15. Resident hunters harvested from 6 to 16 bears per year during RY14–RY18 in RB525 near village hunts. The number of RB525 hunters declined from 72 in RY11 to an average of 29 during the RY14–RY18 period. This hunt had been designed to transform potential defense of life or property (DLP) bears into hunter harvest, which happens with a few bears each year. Hunter success in biennial hunts (RB368, RB369, and RB370) was on a declining trend from 67 in RY11, to 59% in RY13, and 57% in RY15 and RY17 (Table 4).



**Table 3. Brown bear harvest and other human caused mortality, Unit 9, Alaska, regulatory years 2014–2018.**

Regulatory year	Season	Hunter kill						Nonhunting mortality <sup>a</sup>			Total reported mortality					
		Male	(%)	Female	(%)	Unk	Total	Male	Female	Unk	Male	(%)	Female	(%)	Unk	Total
2014	Fall	2	40	3	60	0	5	1	0	0	3	50	3	50	0	6
	Spring	0	0	2	100	0	2	2	0	0	2	50	2	50	0	4
	Total	2	29	5	71	0	7	3	0	0	5	50	5	50	0	10
2015	Fall	111	58	79	42	1	191	2	1	1	113	58	80	41	2	195
	Spring	236	86	37	14	0	273	1	0	0	237	86	37	14	0	274
	Total	347	75	116	25	1	464	3	1	1	350	75	117	25	2	469
2016	Fall	4	57	3	43	0	7	1	0	0	5	63	3	38	0	8
	Spring	2	67	1	33	0	3	0	0	0	2	67	1	33	0	3
	Total	6	60	4	40	0	10	1	0	0	7	64	4	36	0	11
2017	Fall	96	58	69	42	1	166	3	0	0	99	59	69	41	1	169
	Spring	228	88	32	12	0	260	0	0	0	228	88	32	12	0	260
	Total	324	76	101	24	1	426	3	0	0	327	76	101	24	1	429
2018	Fall	9	75	3	25	0	12	2	0	0	11	79	3	21	0	14
	Spring	1	33	2	67	0	3	7	5	0	8	53	7	47	0	15
	Total	10	67	5	33	0	15	5	5	0	19	66	10	34	0	29

*Note:* Harvest is higher in 2015 and 2017 due to biennial hunts (RB368, RB369, and RB370) that are only open in fall of odd years and spring of even-numbered years in Unit 9. Harvest in 2014, 2016, and 2019 is from RB525 only, which is open each year to resident hunters.

<sup>a</sup>Includes bears killed in defense of life or property, illegally, for research, and on highways.

**Table 4. Registration permit hunt participation and success, regulatory years 2011–2018 for brown bear hunts in Unit 9, Alaska.**

Hunt ID	Season	Unit(s)	Regulatory year	Hunter status		No. total hunters	Percent success
				Unsuccessful	Successful		
RB368 (biennial)	Fall	9A, 9C, 9D, and 9E	2011	119	301	420	72%
			2012	–	–	–	–
			2013	164	200	364	55%
			2014	–	–	–	–
			2015	194	161	355	45%
			2016	–	–	–	–
			2017	135	139	274	51%
			2018	–	–	–	–
RB369 (biennial)	Fall	9B	2011	30	55	85	65%
			2012	–	–	–	–
			2013	24	43	67	64%
			2014	–	–	–	–
			2015	32	21	53	40%
			2016	–	–	–	–
			2017	21	23	44	52%
			2018	–	–	–	–
RB370 (biennial)	Spring	9	2011	141	237	378	63%
			2012	–	–	–	–
			2013	148	238	386	62%
			2014	–	–	–	–
			2015	125	275	400	69%
			2016	–	–	–	–
			2017	157	259	416	62%
			2018	–	–	–	–
RB525	Year round	9	2011	52	20	72	28%
			2012	30	15	45	33%
			2013	33	14	47	30%
			2014	16	6	22	27%
			2015	27	8	35	23%
			2016	20	9	29	31%
			2017	18	10	28	36%
			2018	15	16	31	52%

*Note:* RY11 was the first year of these registration hunts. En dashes represent years when hunts were closed due to biennial hunt structure. Six bears were harvested for subsistence under RB502 that were not included in Table 4.

## Hunter Residency and Success

Nonresidents took 83% of the bears harvested during RY14–RY18. Nonresident hunter success was 60% in the fall and 69% in the spring. Resident hunter success averaged 45% in both fall and spring. Nonresident hunters are typically more successful because they are required to have guides. Resident seasons and bag limits are the same as nonresident seasons and bag limits for the biennial hunts, but resident hunters have additional, year-round opportunity to hunt bears under RB525.

## Harvest Chronology

The majority of bear harvest occurred in October and May when biennial seasons were open in odd regulatory years (RY15 and RY17). RB525 harvest was low each year and was fairly evenly distributed between spring, summer, and fall months.

## Transport Methods

Most bear hunters flew or boated to their hunting location during biennial hunts (RY13, RY15 and RY17), while near-village hunters mostly drove or walked to hunt bears (Table 5).

**Table 5. Percentage of each transportation method used by Unit 9 brown bear hunters to access their hunting location, regulatory years 2013–2017, Alaska.**

Regulatory year	Airplane	Boat	ATV <sup>a</sup>	ORV <sup>b</sup>	Highway	Foot	Other
2013	40	27	4	1	11	15	1
2014	3	—	11	—	19	67	—
2015	49	21	5	4	9	12	—
2016	2	—	—	—	45	34	19
2017	53	21	8	2	7	9	—
2018	—	3	4	—	50	40	—

<sup>a</sup> All-terrain vehicle. En dashes indicate no data.

<sup>b</sup> Off-road vehicle.

## *Other Mortality*

There were far more nuisance bear incidents last spring (2019) than normal when 12–14 bears were killed, probably because salmon runs were later than usual. A fisherman napping in a boat yard was bitten and dragged from his car in spring 2019. ADF&G believed based on trail camera photos that the biting bear was anonymously killed 2 days later with a small caliber bullet through the lungs. Homeowners shot at 2 bears in separate incidents of breaking and entering, 1 bear died on the homeowner's front steps and the other reportedly missed. Four bears were killed (3 by ADF&G and 1 by police) in 2 incidents at a careless seafood processor, which allowed bears into open dumpsters late into the evening. We dispatched a young sow that broke into an industrial area cabin where a bag of dog food and a cake had been abandoned days earlier. A sow and 2 cubs attempting to break into an elderly woman's home near a seafood industrial complex were dispatched by ADF&G. Sows with cubs and subadult bears were the most common

offenders. A few nuisance bears were taken under the RB525 (near-village) registration hunt during RY14–RY18.

#### *Alaska Board of Game Actions and Emergency Orders*

The board reduced the brown bear season in Units 9C, 9D, and 9E from 1–21 to 7–21 October and from 1–31 to 1–25 May at the March 2018 meeting, which went into effect fall of 2019.

#### *Recommendations for Activity 2.1*

Continue.

### 3. Habitat Assessment-Enhancement

There were no habitat or enhancement activities conducted for brown bear during RY14–RY18 in Unit 9.

## **NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS**

The Bristol Bay Borough has failed to comply with the conditions of their solid waste permit issued by the Alaska Department of Environmental Conservation (ADEC) regarding the attraction of wildlife to the landfill, and to comply with ADF&G regulations regarding the feeding of wildlife. An electric fence was constructed in 2010 surrounding the entire landfill footprint, but it was too large for employees to maintain against brush encroachment and the bears' ability to simply dig under it. By 2013 the fence was no longer operational, and the borough was not burying the working face of the active cell as required by ADEC (in part because employees were afraid of the bears). Bears were also attracted to the baler facility because trash was left in the building overnight and they learned to tear open the lower panels of the very large overhead doors to gain access. The borough's response was to buy a large stack of door panels to have on hand for replacements, and park heavy equipment in front of the doors. They ignored suggestions to mount electric fencing across the doors and around the building, keep the baler clean, and to protect the active cell with a portable electric fence that would be easy to maintain. ADF&G was frequently called to haze bears and in 2015 we killed a bear that had entered the building (along with a dozen others as seen on security video) the night before.

We filed a complaint with ADEC who by chance had an upcoming inspection of the landfill scheduled in 2015. The borough landfill received an unacceptable inspection rating by ADEC in part because of bear access to the landfill (S. Price, Rural Landfill Specialist, Alaska Department of Environmental Conservation, Anchorage, personal communication). Since then, ADF&G staff have collected photos and videos of bears foraging at the active cell of the landfill. Until the borough complies, we no longer respond to their bear problems. This situation may be best handled through the borough assembly.

### Data Recording and Archiving

State brown bear sealing data is stored on an internal server (<http://winfonet.alaska.gov/>).

### Agreements

None.

## Permitting

None.

## **Conclusions and Management Recommendations**

The Alaska Peninsula is a highly sought destination to view and hunt brown bears. As such, there is high interest in their population trends throughout Unit 9 by the public, hunters, and guides; to name a few. Unfortunately, brown bear populations do not lend themselves to convenient methods of monitoring trends in abundance, density, or composition. Harvest statistics are limited and a reliance solely on harvest information may prove unreliable to monitor brown bear populations in Unit 9 if the number of hunters and brown bears harvested continues to decline. More rigorous survey and inventory methods should be developed and adopted into annual survey protocols for monitoring brown bear populations in Unit 9. Until then, stream surveys on the Alaska Peninsula should be continued in collaboration with Katmai National Park and Reserve, and Becharof and Izembek National Wildlife Refuges.

## **II. Project Review and RY19–RY23 Plan**

### **Review of Management Direction**

#### **MANAGEMENT DIRECTION**

No change from RY14–RY18.

#### **GOALS**

No change from RY14–RY18.

#### **CODIFIED OBJECTIVES**

No change from RY14–RY18.

#### Amounts Reasonably Necessary for Subsistence Uses

No change from RY14–RY18.

#### Intensive Management

No change from RY14–RY18.

#### **MANAGEMENT OBJECTIVES**

No change from RY14–RY18.



## **REVIEW OF MANAGEMENT ACTIVITIES**

### **1. Population Status and Trend**

ACTIVITY 1.1. Assess population trends through anecdotal field observations.

#### *Data Needs*

No change from RY14–RY18 report.

#### *Methods*

No change from RY14–RY18 report.

### **2. Mortality-Harvest Monitoring and Regulations**

ACTIVITY 2.1. Assess the number of brown (grizzly) bears harvested by hunters and other sources of mortality that might have an impact on each population within Unit 9.

#### *Data Needs*

No change from RY14–RY18 report.

#### *Methods*

No change from RY14–RY18 report.

### **3. Habitat Assessment-Enhancement**

There are no habitat or enhancement activities planned for brown bear during RY19–RY23 in Unit 9.

## **NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS**

### **Data Recording and Archiving**

No change from RY14–RY18 report.

### **Agreements**

No change from RY14–RY18 report.

### **Permitting**

No change from RY14–RY18 report.

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