

Brown Bear Management Report and Plan, Game Management Unit 4:

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

Stephen W. Bethune



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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 approved for publication by Richard Nelson, Management Coordinator for Region I for the Division of Wildlife Conservation.

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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 Unit 4 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., RY18 = 1 July 2018–30 June 2019). This report is produced primarily to provide agency staff with data and analysis to help guide and record its own 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 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 4 encompasses Admiralty, Baranof, Chichagof (ABCs), and adjacent islands (Fig. 1). It is divided into 4 major geographical or island units for management purposes: Admiralty Island, Baranof and Kruzof islands, Northeast (NE) Chichagof Island, and the Remainder of Chichagof Island (Fig. 2). There is also a Northeast Chichagof Controlled Use Area that is separate from the area used for management purposes. The total Unit 4 area includes approximately 5,820 square miles of land and more than 5,000 miles of shoreline.

Approximately 90% of the land in the unit is within the Tongass National Forest. Sitka, located on Baranof Island, is the largest community in the unit, with approximately 8,500 residents. Other communities include Port Alexander (~50 residents) and Baranof Warm Springs (<10) on Baranof Island; Hoonah (~800), Pelican (~85), Elfin Cove (~20), and Tenakee Springs (~125) on Chichagof Island; and Angoon (~450) on Admiralty Island (U.S. Census Bureau 2021).

Unit 4 has 4 federally protected wilderness areas. The West Chichagof–Yakobi Wilderness was Alaska’s first federally designated wilderness area. It encompasses 265,286 acres and includes most of Yakobi Island and the entire west side of Chichagof Island as well as numerous smaller associated islands. The 965,255-acre Kootznoowoo Wilderness includes Admiralty Island except the Mansfield Peninsula and Alaska Native corporation lands near the village of Angoon. The South Baranof Wilderness is 319,568 acres and encompasses much of the south half of Baranof Island. The fourth designated wilderness is the Pleasant/Lemesurier/Inian Islands Wilderness; these 23,151 acres are situated in Icy Strait between the north end of Chichagof Island and Glacier Bay National Park to the north.

Unit 4 has a maritime climate with moderate summer and winter temperatures and high precipitation (U.S. Climate Data 2020). Fahrenheit temperatures range from the middle 30s in the winter to low 60s in the summer. Rainfall in Sitka averages approximately 85 inches per year, but totals are highly variable from year to year and within the unit. For example, Little Port Walter on the southeast coast of Baranof Island, one of the rainiest places in North America, recorded 216 inches of rainfall in 2019 (National Oceanic and Atmospheric Administration

[NOAA] 2020). Sitka averages 33 inches of snow annually, but annual snowfall is highly variable across the unit and from year to year. In some years deep and persistent snow can accumulate at sea level in the northern and eastern portions of Unit 4.



Figure 1. Map of Game Management Unit 4, Alaska.

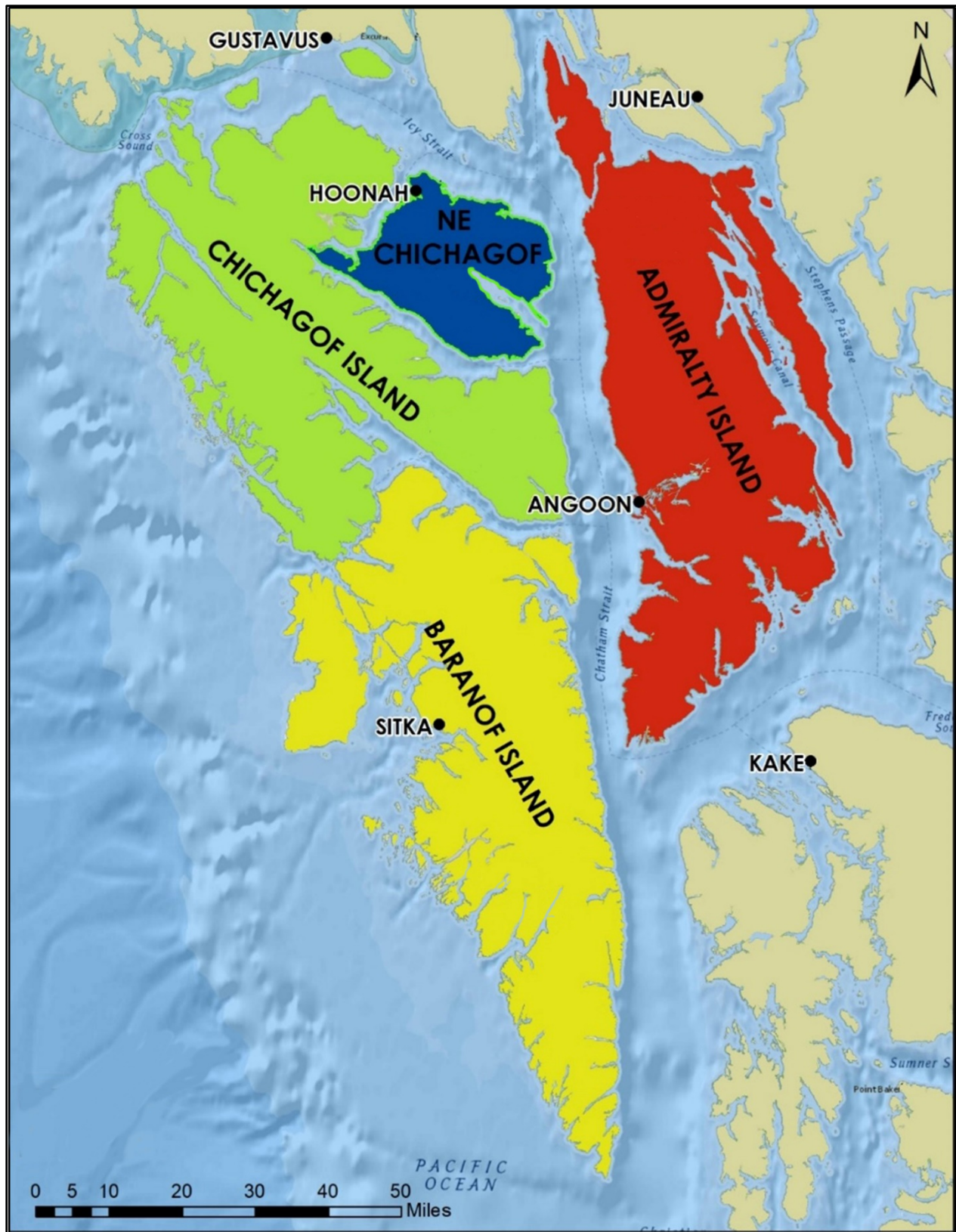


Figure 2. Map showing the four basic administrative unit areas used for brown bear management within Game Management Unit 4, Alaska.

The landscape of Unit 4 is characterized by steep and rugged terrain, with mountains, fjords, old-growth forests, wetlands, estuaries, muskegs, and short swift rivers. Elevation within Unit 4 ranges from sea level to 5,328 feet. Old-growth coniferous forests intermixed with western hemlock (*Tsuga heterophylla*), Sitka spruce (*Picea sitchensis*), western red cedar (*Thuja plicata*) and Alaska yellow-cedar (*Callitropsis nootkatensis*) are the predominant vegetative communities occurring at low-to-moderate elevations (<1,500 ft). Mixed-conifer muskeg and deciduous riparian forests are also common. Mountain hemlock (*Tsuga mertensiana*) dominated forest makes up a subalpine, timberline band between 1,500- and 2,500-foot elevation. Natural disturbance to the forest occurs via windthrow events, avalanches, and landslides.

Unit 4 is isolated from the mainland of Southeast Alaska and supports a limited diversity of land mammals, including Sitka black-tailed deer (*Odocoileus hemionus sitkensis*) and mountain goats (*Oreamnos americanus*), which are the only other large land-based mammals.

Summary of Status, Trend, Management Activities, and History of Brown Bears in Unit 4

Unit 4 brown bears are genetically distinct from mainland populations of brown bears in Southeast (Heaton et al. 1996; Talbot and Shields 1996). Admiralty and Chichagof island bears were studied extensively from the early 1980s to the mid-2000s (Schoen and Beier 1990, Titus and Beier 1993, Flynn et al. 2007). These studies, particularly population density estimates have largely shaped our current harvest management strategies for Unit 4.

In the early part of the twentieth century, market hunting for brown bear hides was a common activity, as were appeals to eliminate brown bears entirely. Although extreme points of view still exist, support for conservation and sustainability are the hallmark of modern brown bear management.

The department began requiring brown bear sealing in 1961. Beginning in 1989, registration hunts were developed to help better manage a growing interest in hunting the unit's brown bears. Prior to 1989, hunters were required only to have a hunting license and a big game metal-locking tag to hunt Unit 4 bears.

Unit 4 is primarily located within the Tongass National Forest and forest lands are managed by the U.S. Forest Service (USFS) for multiple uses. Large-scale industrial logging, both on federal and private lands, has resulted in extensive long-term habitat alteration. Logging and associated road building affect bear distribution and densities. To mitigate this, the northeast (NE) portion of Chichagof Island has been designated as a controlled use area (CUA) prohibiting the use of motorized land vehicles to assist with brown bear hunting. This CUA (Fig. 3) helps maintain hunting opportunity while minimizing the risk of overharvest due to the accessibility afforded by the logging road system (Young 1991, Titus and Beier 1992).

Brown bears have a customary and traditional use finding under both state and federal regulations. All residents of Unit 4 are federally qualified rural residents and are eligible to hunt brown bears under federal subsistence regulations. Federal managers defer brown bear management to the State of Alaska sport registration hunts. Under federal law, qualified rural hunters may sell brown bear parts, including hides, claws, skulls, teeth, and bones, from bears

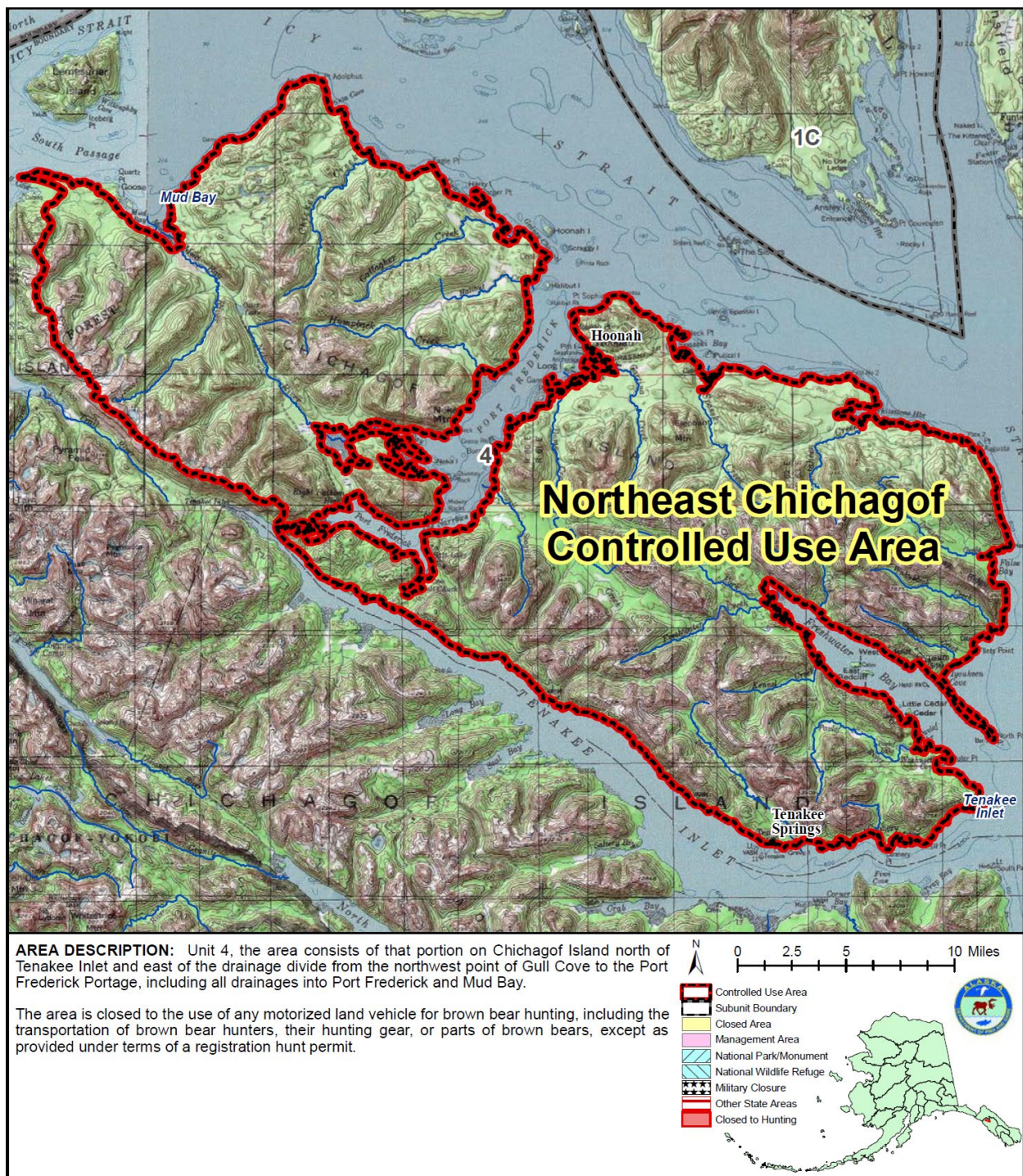


Figure 3. Northeast Chichagof Controlled Use Area (CUA), Alaska. Note that the area of this CUA is different than the Northeast Chichagof Island area used for management purposes.

taken in Unit 4, which is contrary to state law that prohibits these practices. Subsistence brown bear hunters are also required to salvage the meat for human consumption, but sport hunters are required to salvage only the hide and skull. The dual authority of federal and state management

of wildlife can be confusing to the public and has denied state wildlife managers the use of management options available for non-federal lands.

Increased human use through high numbers of guides and nonresident hunters, a growing tourism industry, increasing harvests, crowding, and land management practices (mainly mining and logging) worried managers about impacts to brown bear populations and led to creation of the Unit 4 Brown Bear Management Team (BBMT, ADF&G 1998). The BBMT was made up of 15 members nominated by organizations that represented both consumptive and non-consumptive user groups. The goal of the team was to review brown bear management issues and human activities that were affecting bears. The team developed a comprehensive management strategy called the “Southeast Alaska Unit 4 brown bear management strategy” (BBMS, ADF&G 2000). Despite the diversity of the group, members were able to preserve the overriding goal – *the continued abundance and health of a world class brown bear population unclouded by politics and personal agendas*. The BBMS largely drives current brown bear management.

Big game guides on USFS lands are required to obtain special use permits to operate. In 1998, the USFS initiated the Shoreline Guide/Outfitter Environmental Impact Statement (EIS) to evaluate the appropriate levels of commercial use on the Tongass National Forest (U.S. Department of Agriculture [USDA] 2004). That effort was re-evaluated with the 2017 Record of Decision for Shoreline II EIS which sought to better align outfitter and guide allocations with the Tongass Land and Resource Management Plan (USDA 2016). Shoreline II authorized up to 80,305 guide service days annually and incorporates measures for an adaptive management strategy.

Guiding nonresident hunters on lands outside the Tongass was not considered in the BBMS. Currently one guide in Unit 4 is operating on Native Corporation lands. This has caused some controversy within the guide community as hunts on private land have the potential to reduce allocations on Forest Service lands so that nonresident hunt numbers stay within the BBMS recommendation. To date this has not been an issue; however, ADF&G will continue to monitor and provide recommendations if the number of guides operating outside of Tongass lands increases.

There are 3 Unit 4 specified areas that are closed to brown bear hunting for the purpose of providing bear viewing opportunities. These include the Seymour Canal Closed Area on eastern Admiralty Island that encompasses the Stan Price State Wildlife Sanctuary and the Pack Creek bear viewing area, the Salt Lake Closed Area near Angoon in Mitchell Bay on Southwest Admiralty Island, and the Port Althorp Closed Area on Northern Chichagof Island near Elfin Cove.

Sitka has a captive bear facility, Fortress of the Bear (FOB), which has held bears for public exhibition since 2007. FOB caters mostly to summer cruise ship passengers and provides an opportunity for visitors to view bears in a zoo-like setting. FOB currently houses 5 brown bears and 3 black bears.

Management Direction

EXISTING WILDLIFE MANAGEMENT PLANS

- Southeast Alaska Unit 4 Brown Bear Management Strategy (Unit 4 Brown Bear Management Team 2000).

GOALS

1. Promote the long-term conservation and health of Game Management Unit 4 brown bear populations and their habitats.
2. Provide for a broad spectrum of public enjoyment and uses, both hunting and non-hunting, of Unit 4 brown bears that is sustainable.
3. Improve communication among the public and agencies involved in brown bear management.

CODIFIED OBJECTIVES

Amounts Reasonably Necessary for Subsistence Uses

In 1985 the Alaska Board of Game (BOG) made a positive finding for customary and traditional use of brown bears in Unit 4. That finding was re-adopted in 1992 during a consistency review. At that 1992 meeting the BOG set the amount necessary for subsistence at 5–10 bears annually (5AAC 99.025(3)).

Intensive Management

Not applicable.

MANAGEMENT OBJECTIVES

1. Maintain an average age of harvested males of at least 6.5 years.
2. Maintain a male-to-female harvest ratio of at least 3:2.
3. Minimize the number of bears killed in defense of life or property (DLP).
4. Maintain the annual human-caused mortality of all brown bears at no more than 4% of each island's estimated population (Admiralty, Baranof, Northeast Chichagof, and the remainder of Chichagof), on a 3-year rolling average.
5. Maintain the annual human-caused mortality of females at no more than 1.5% of each island's estimated population, on a 3-year rolling average.

MANAGEMENT ACTIVITIES

1. Population Status and Trend

ACTIVITY 1.1. Monitor the population of brown bears in Unit 4.

Data Needs

Alaska Department of Fish and Game has not conducted a brown bear population estimate in Unit 4 for nearly 2 decades. Harvest strategies are linked to estimated populations from earlier studies.

Methods

Population estimates for Unit 4 used replicated capture-mark-resight techniques (Miller et. al. 1997) in 2 study areas on northern Admiralty and northeast Chichagof islands (Schoen and Beier 1990; Titus and Beier 1993, Flynn et. al. 2007). The densities obtained for north Admiralty and northeast Chichagof were extrapolated to all of Unit 4 based on what ADF&G biologists knew about habitat characteristics, predictions from a brown bear habitat capability model (Schoen et. al. 1994), anecdotal sightings from the public, and harvest data.

Results and Discussion

The historical extrapolated density estimates were 362 bears/1,000 km² (0.94/mi²) for Admiralty Island, 227 bears/1,000 km² (0.59/mi²) for Baranof Island and 275 bears/1,000 km² (0.71/mi²) for Chichagof Island. Population estimates were 1,560 bears on Admiralty; 1,045 bears on Baranof and Kruzof Islands; 1,196 bears on the remainder of Chichagof Island; and 354 bears on NE Chichagof Island. BBMS harvest guidelines were based on these population estimates until 2013 when a 2002 estimate (Flynn et. al. 2007) was determined to be more precise than the original estimate obtained from the NE Chichagof study area in 1992. This update resulted in a population estimate of 458 bears for NE Chichagof and 1,240 for the remainder of Chichagof Island (Fig. 4). The total Unit 4 brown bear population estimate, based on available data and modeling and the presumption based on harvest monitoring and anecdotal evidence that no significant population change has occurred, is 4,303 at the lower 95% confidence limit. For management purposes, the lower 95% confidence limit is used as a conservative management strategy, and the management strategy is to maintain harvest at or below 4% of the population.

Recommendation for Activity 1.1.

A more current population estimation in Unit 4 is desirable and recommended to assess populations and harvest sustainability, and to determine appropriate modifications if necessary.

2. Mortality-Harvest Monitoring and Regulations

ACTIVITY 2.1. Monitor brown bear harvest.

Data Needs

Brown bear sealing requirements began in Alaska in 1961. The data collected during sealing is used in a variety of ways to assess trends in the harvest and inform in-season management actions.

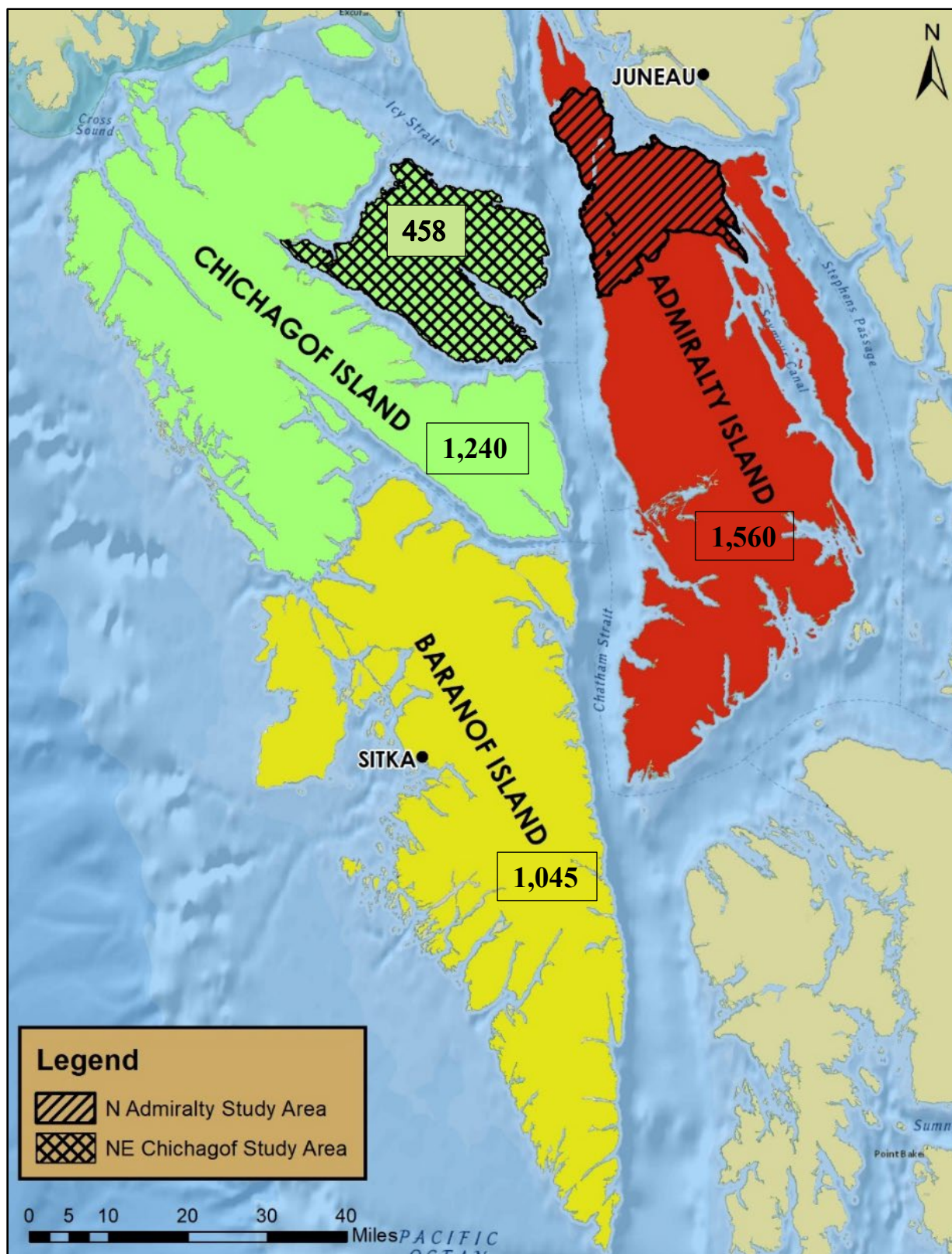


Figure 4. Map of Unit 4, Alaska, brown bear study areas and population estimates.

Methods

During sealing, ADF&G collects data on hunt effort, location, method of harvest, transportation mode, and commercial services used. Skull size is measured (length + width), sex verified, and a tooth is extracted for age analysis. A plastic locking seal is affixed to the skull and to the hide. Hunters are required to report successful hunts within 10 days of kill and sealing must occur within 30 days by ADF&G staff. These data are stored on an internal ADF&G database (WinfoNet) and summarized by regulatory year (RY).

Since 1989, hunters have been required to obtain registration permits before hunting bears in Unit 4. There are 2 hunts available for the spring season, RB088 (outside drainages, Fig. 5) and RB089 (inside drainages, Fig. 6). The fall hunt is managed under a unitwide permit, RB077.

In addition to the registration hunts, the department began issuing draw hunts for nonresidents hunting with relatives within second degree of kindred (2DK) beginning in RY16. The draw hunts mirror the registration hunts with DB077 (3 permits) in the fall and DB088 (2 permits) and DB089 (2 permits) in the spring.

Season and Bag Limit

Unit 4 Bag Limit	Resident and Nonresident Open Season
Chichagof Island south and west of a line that follows the crest of the island from Rock Point (58° N. lat., 136°21' W. long.) to Rodgers Point (57°35' N. lat., 135°33' W. long.), including Yakobi and other adjacent islands; Baranof Island south and west of a line that follows the crest of the island from Nismeni Point (57°34' N. lat., 135°25' W. long.) to the entrance of Gut Bay (56°44' N. lat., 134°38' W. long.), including the drainages into Gut Bay and including Kruzof and other adjacent islands	15 Sep–31 Dec (RB/DB077) 15 Mar–31 May (RB/DB088)
1 bear every 4 regulatory years.	
Unit 4, that portion within the Northeast Chichagof Controlled Use Area	15 Sep–31 Dec (RB/DB077) 15 Mar–20 May (RB/DB089)
1 bear every 4 regulatory years by registration permit only	
Remainder of Unit 4:	15 Sep–31 Dec (RB/DB077) 15 Mar–20 May (RB/DB089)
1 bear every 4 regulatory years.	

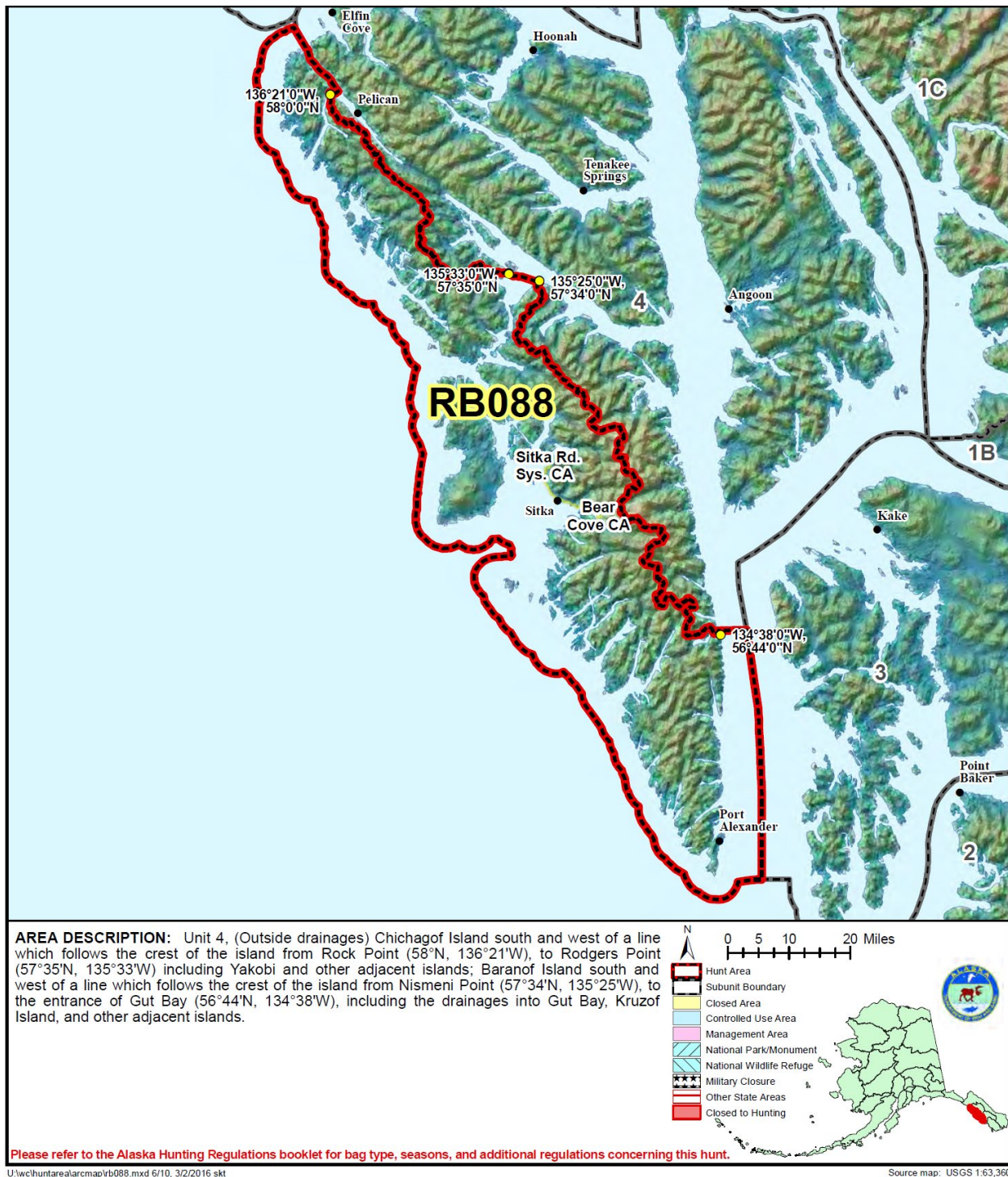


Figure 5. Unit 4 registration brown bear hunt RB088, outside drainages.

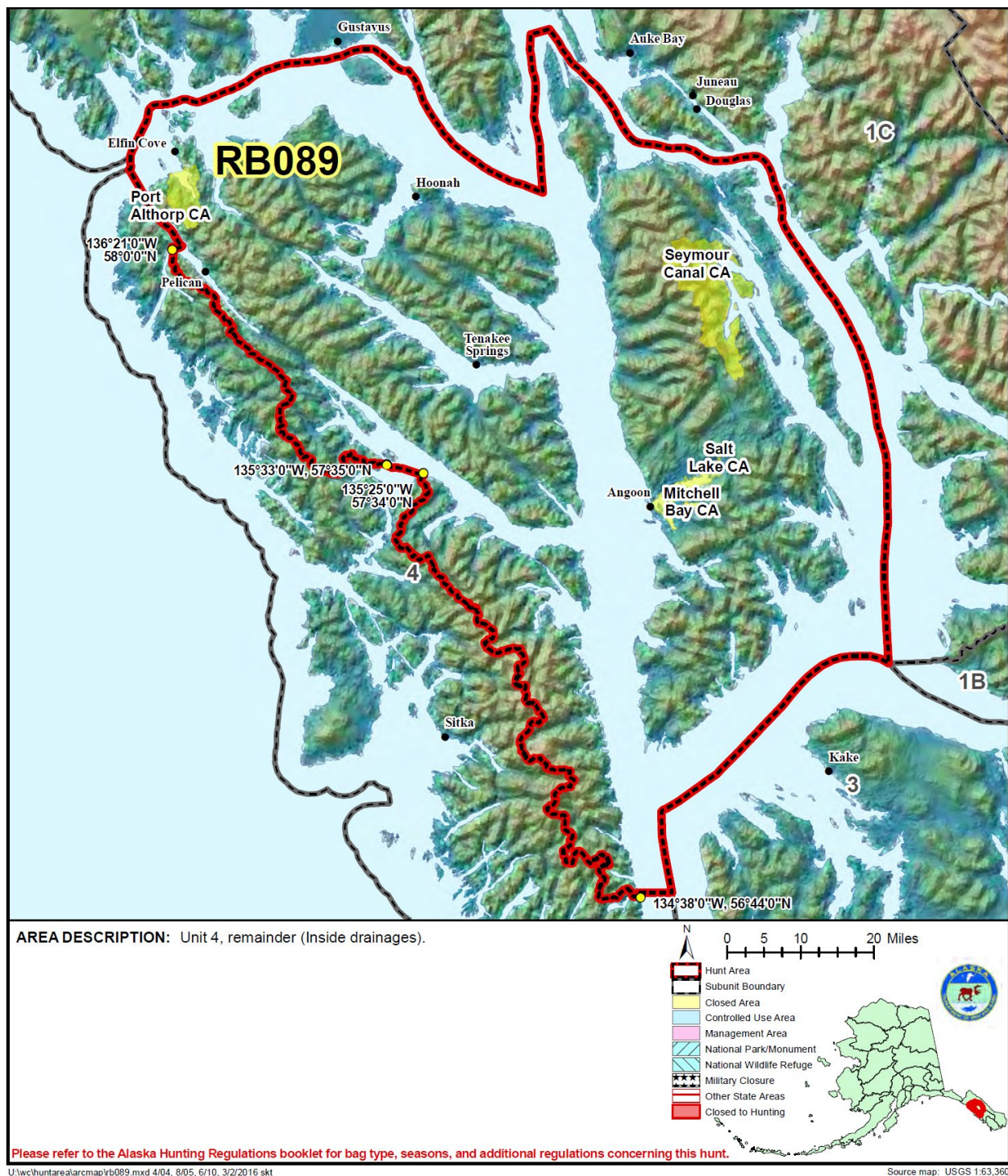


Figure 6. Unit 4, Alaska, registration brown bear hunt RB089, inside drainages.

Results and Discussion

Harvest by Hunters

Hunters harvested an average of 121 brown bears per regulatory year during this reporting period, RY14–RY18, (range 111–143). This is down from an average of 133 bears per regulatory year during the previous 5-year period (RY09–RY13, range 112–160). Males accounted for approximately 80% of the harvest, well above the management objective of at least a 3:2 male-to-female harvest ratio (Table 1).

During this reporting period, age of harvested males exceeded the management objective for average age (6.5 years) in all years and all seasons, with age averaging 9.8 years for all male bears RY14–RY18. Female bears harvested averaged 9.4 years (Table 2).

During RY14–RY18, successful hunters spent an annual average of 4.4 days in the field to harvest a bear, similar to 4.3 days during the previous reporting period (Table 2).

Skull size is strongly correlated with age. Brown bears across Alaska reach asymptotic skull growth after 8 years of age (McDonough and Christ 2012, Hilderbrand et al. 2018). While skull size is not specifically a management objective in Unit 4, the average skull size of all males harvested during this reporting period (22.9 inches) is an indicator that hunters are selecting for older age class bears (Table 2).

During this reporting period, Unit 4 staff summarized annual brown bear mortality (both hunting and other human-caused) by regulatory year (Table 3) as well as by calendar year (Table 4). This has allowed the Sitka ADF&G area biologist to calculate annual mortality and the running 3-year average for Unit 4 as it related to guidelines in the BBMS. This is not a regulatory change. Most hunting mortality occurs in the spring and this data analysis method allows adjustments to the fall season, if necessary, to maintain harvest goals and objectives while limiting impacts to annual brown bear hunting opportunity. USFS permits hunts on a calendar year basis, so relating annual mortality to USFS hunt administration provides a coordinated approach.

During RY14–RY18, the percentages of total harvest from each of the 4 management areas within the unit were as follows: Admiralty Island–36%, Baranof and Kruzof Islands–26%, NE Chichagof Island–7%, and Remainder of Chichagof Island–31%. (Table 3).

The unitwide 3-year running mean BBMS guideline for all human-caused mortality for this period was 172 bears (Admiralty–62 bears, Baranof and adjacent Islands–42 bears, Remainder of Chichagof Island–50 bears, and NE Chichagof–18 bears; Fig. 7). During calendar years (CY) 2017–2019, 140 bears were killed annually (Table 5). The average annual female mortality during that time was less than half of the maximum allowable under the BBMS (28 compared to 65). The CY17–CY19, 3-year average for human-caused mortality was well within the BBMS guidelines for mortality (Table 5).

Table 1. Unit 4, Alaska, brown bear harvest and other mortality, regulatory years 2009–2018.

Regulatory year	Reported								Total estimated kill					
	Hunter kill				Nonhunting kill ^b									
	M	F	Unk ^a	Total	M	F	Unk	Total	M	(%)	F	(%)	Unk	Total
2009														
Fall 2009	20	10	2	32	6	6	0	12	26	(62)	16	(38)	2	44
Spring 2010	116	8	4	128	3	3	0	6	119	(91)	11	(8)	4	134
Total	136	18	6	160	9	9	0	18	145	(84)	27	(16)	6	178
2010														
Fall 2010	26	9	1	36	8	4	0	12	34	(72)	13	(28)	1	48
Spring 2011	85	20	7	112	1	0	0	1	86	(81)	20	(19)	7	113
Total	111	29	8	148	9	4	0	13	120	(78)	33	(22)	8	161
2011														
Fall 2011	9	11	1	21	4	3	1	8	13	(48)	14	(52)	2	29
Spring 2012	88	15	6	109	2	4	0	6	90	(83)	19	(17)	6	115
Total	97	26	7	130	6	7	1	14	103	(76)	33	(24)	8	144
2012														
Fall 2012	16	13	0	29	9	7	0	16	25	(56)	20	(44)	0	45
Spring 2013	74	14	0	88	4	0	0	4	78	(85)	14	(15)	0	92
Total	91	27	0	117	13	7	0	20	103	(75)	34	(25)	0	137
2013														
Fall 2013	16	7	0	23	2	5	0	7	18	(60)	12	(40)	0	30
Spring 2014	72	17	0	89	3	0	0	3	75	(82)	17	(18)	0	92
Total	87	24	0	112	5	5	0	10	93	(76)	29	(24)	0	122

Table 1. continued

Regulatory year	Reported								Total estimated kill					
	Hunter kill				Nonhunting kill									
	M	F	Unk ^a	Total	M	F	Unk ^b	Total	M	(%)	F	(%)	Unk	Total
2014														
Fall 2014	22	8	0	30	2	6	0	8	24	(63)	14	(37)	0	38
Spring 2015	62	19	0	81	1	2	1	4	63	(75)	21	(25)	1	85
Total	84	27	0	111	3	8	1	12	87	(71)	35	(29)	1	123
2015														
Fall 2015	10	11	0	21	0	5	0	5	10	(38)	16	(62)	0	26
Spring 2016	82	10	0	92	1	0	0	1	83	(89)	10	(11)	0	93
Total	92	21	0	113	1	5	0	6	93	(78)	26	(22)	0	119
2016														
Fall 2016	19	12	0	31	5	7	1	13	24	(56)	19	(44)	1	44
Spring 2017	77	11	0	88	1	1	0	2	78	(87)	12	(13)	0	90
Total	96	23	0	119	6	8	1	15	102	(77)	31	(23)	1	134
2017														
Fall 2017	23	14	0	37	10	3	0	13	33	(66)	17	(34)	0	50
Spring 2018	73	7	0	80	3	0	0	3	76	(92)	7	(8)	0	83
Total	96	21	0	117	13	3	0	16	109	(82)	24	(18)	0	133
2018														
Fall 2018	30	13	0	43	11	10	0	21	41	(64)	23	(36)	0	64
Spring 2019	90	10	0	100	0	1	0	1	90	(89)	11	(11)	0	101
Total	120	23	0	143	11	11	0	22	131	(79)	34	(21)	0	165

^a Wounding loss.^b Includes DLP, agency, illegal kills, research mortalities, vehicle collisions, and any other human-caused mortality.

Table 2. Unit 4, Alaska, successful brown bear hunter effort, mean skull size, and mean age, regulatory years 2000–2018.

Regulatory year	Successful hunter effort			Harvested brown bears							
				Mean skull size (inches)				Average age (years)			
	Total days	No. hunters	Days/ hunter	Male	<i>N</i> ^a	Female	<i>N</i> ^a	Male	<i>N</i> ^b	Female	<i>N</i> ^b
2009											
Fall 2009	132	32	4.1	21.8	19	20.6	10	7.8	19	8.6	10
Spring 2010	579	128	4.5	23.5	114	20.8	8	10.7	116	9.5	8
Total	711	160	4.4	23.3	133	20.7	18	10.3	135	9.0	18
2010											
Fall 2010	143	36	4.0	21.6	25	20.5	9	6.8	26	8.2	9
Spring 2011	468	112	4.2	23.4	84	19.6	20	10.3	83	7.1	20
Total	611	148	4.1	23.0	109	19.9	29	9.5	109	7.4	29
2011											
Fall 2011	76	21	3.6	21.3	9	19.9	11	7.6	9	7.8	11
Spring 2012	486	109	4.5	23.4	86	20.0	15	10.5	86	7.9	14
Total	562	130	4.3	23.2	95	20.0	26	10.2	95	7.9	25
2012											
Fall 2012	80	29	2.8	21.4	16	19.9	13	7.4	16	8.5	13
Spring 2013	387	88	4.4	24.0	70	20.2	12	11.8	73	8.4	14
Total	467	117	4.0	23.5	86	20.0	25	11.0	89	8.4	27
2013											
Fall 2013	66	23	2.9	21.9	16	20.0	7	8.1	16	8.7	7
Spring 2014	440	89	4.9	23.1	72	20.1	17	10.3	72	8.2	17
Total	506	112	4.5	22.9	88	20.1	24	9.9	88	8.3	24

Table 2. continued

Regulatory year	Successful hunter effort			Harvested brown bears							
				Mean skull size (inches)				Average age (years)			
	Total days	No. hunters	Days/ hunter	Male	<i>N^a</i>	Female	<i>N^a</i>	Male	<i>N^b</i>	Female	<i>N^b</i>
2014											
Fall 2014	151	30	5.0	22.0	22	21.1	8	7.3	22	10.3	8
Spring 2015	357	81	4.4	23.3	62	20.4	19	11.4	60	10.8	19
Total	508	111	4.6	23.0	84	20.6	27	10.3	82	10.7	27
2015											
Fall 2015	98	21	4.7	22.2	10	20.6	11	6.5	10	8.5	11
Spring 2016	381	92	4.1	23.2	80	20.4	9	10.1	80	7.3	10
Total	479	113	4.2	23.1	90	20.5	20	9.7	90	7.9	21
2016											
Fall 2016	112	31	3.6	22.3	19	20.6	12	8.5	19	7.8	12
Spring 2017	475	88	5.4	22.9	77	20.8	11	9.3	76	9.9	10
Total	587	119	4.9	22.8	96	20.7	23	9.1	95	8.8	22
2017											
Fall 2017	140	37	3.8	22.2	23	20.2	13	7.8	23	7.7	13
Spring 2018	360	80	4.5	23.5	73	20.4	7	11.0	72	8.1	7
Total	500	117	4.3	23.2	96	20.3	20	10.2	95	7.8	20
2018											
Fall 2018	125	43	2.9	22.5	30	21.0	13	9.0	30	11.2	13
Spring 2019	442	100	4.4	23.2	90	21.0	10	9.9	81	11.4	10
Total	567	143	4.0	23.0	120	21.0	23	9.6	111	11.3	23

^a Some damaged skulls are unable to be measured.^b Due to laboratory results, age is not obtained for all teeth collected.

Table 3. Unit 4, Alaska, brown bear hunting pressure, harvest, and success rate by major geographic areas, regulatory years 2014–2018.

Hunt area	Regulatory year	No. hunters	M	(%)	F	(%)	Success rate (%)	Total harvest	Percent of estimated population
<u>NE Chichagof Island</u>									<u>458^a</u>
	2014	30	5	(100)	0	(0)	(17)	5	(1.1)
	2015	31	9	(90)	1	(10)	(32)	10	(2.2)
	2016	29	6	(75)	2	(25)	(28)	8	(1.7)
	2017	23	6	(55)	5	(45)	(48)	11	(2.4)
	2018	13	6	(100)	0	(0)	(46)	6	(1.3)
<u>Remainder of Chichagof Island</u>									<u>1,240^a</u>
	2014	88	31	(80)	8	(20)	(44)	39	(3.1)
	2015	105	29	(81)	7	(19)	(34)	36	(2.9)
	2016	111	33	(89)	4	(11)	(33)	37	(3.0)
	2017	99	27	(87)	4	(13)	(31)	31	(2.5)
	2018	89	40	(87)	6	(13)	(52)	46	(3.7)
<u>Baranof and Kruzof Islands</u>									<u>1,050^a</u>
	2014	70	13	(62)	8	(38)	(30)	21	(2.0)
	2015	74	20	(69)	9	(31)	(39)	29	(2.8)
	2016	99	24	(71)	10	(29)	(34)	34	(3.2)
	2017	79	29	(74)	10	(26)	(49)	39	(3.7)
	2018	93	29	(81)	7	(19)	(39)	36	(3.4)
<u>Admiralty Island</u>									<u>1,560^a</u>
	2014	125	35	(76)	11	(24)	(37)	46	(2.9)
	2015	117	34	(89)	4	(11)	(32)	38	(2.4)
	2016	103	33	(83)	7	(17)	(39)	40	(2.6)
	2017	78	34	(94)	2	(6)	(46)	36	(2.3)
	2018	112	45	(82)	10	(18)	(49)	55	(3.5)
<u>Unit 4 Totals</u>									<u>4,308^a</u>
	2014	313	84	(76)	27	(24)	(35)	111	(2.6)
	2015	327	92	(81)	21	(19)	(35)	113	(2.6)
	2016	342	96	(81)	23	(19)	(35)	119	(2.8)
	2017	279	96	(82)	21	(18)	(42)	117	(2.7)
	2018	307	120	(84)	23	(16)	(47)	143	(3.3)

Table 4. Unit 4, Alaska, brown bear total human caused mortality^a by major geographic areas, calendar years 2014–2019.

Hunt area	Calendar year	No. hunters	M	(%)	F	(%)	Unknown	Total mortality	% of estimated population
<u>NE Chichagof Island</u>									<u>458^b</u>
	2014		9	69	4	31	0	13	2.8
	2015		4	67	2	33	0	6	1.3
	2016		13	93	1	7	1	15	3.3
	2017		11	65	6	35	0	17	3.7
	2018		14	67	7	33	0	21	4.6
	2019		5	71	2	29	0	7	1.5
<u>Remainder of Chichagof Island</u>									<u>1,240^b</u>
	2014		28	76	9	24	0	37	3.0
	2015		28	72	11	28	0	39	3.1
	2016		32	82	7	18	0	39	3.1
	2017		33	87	5	13	0	38	3.1
	2018		33	87	5	13	0	38	3.1
	2019		29	78	8	22	0	37	3.0
<u>Baranof and Kruzof Islands</u>									<u>1,050^b</u>
	2014		23	72	9	28	0	32	3.0
	2015		10	42	14	58	0	24	2.3
	2016		28	64	16	36	0	44	4.2
	2017		34	81	8	19	0	42	4.0
	2018		29	69	13	31	0	42	4.0
	2019		27	82	6	18	0	33	3.1
<u>Admiralty Island</u>									<u>1,560^b</u>
	2014		38	81	9	19	0	47	3.0
	2015		32	78	9	22	1	41	2.6
	2016		35	90	4	10	0	39	2.5
	2017		33	77	10	23	0	43	2.8
	2018		41	89	5	11	0	46	2.9
	2019		46	84	9	16	0	55	3.5
<u>Unit 4 Totals</u>									<u>4,308^b</u>
	2014		98	76	31	24	0	129	3.0
	2015		74	67	36	33	1	111	2.6
	2016		108	79	28	21	1	137	3.2
	2017		111	79	29	21	0	140	3.2
	2018		117	80	30	20	0	147	3.4
	2019		107	81	25	19	0	132	3.1

^a Includes DLP, agency, illegal kills, research mortalities, vehicle collisions, and any other human-caused mortality.

^b Population estimate.

Table 5. Unit 4, Alaska, brown bear human-caused mortality 3-year running average compared to Brown Bear Management Strategy (BBMS) guidelines, calendar years (CY) 2017–2019.

Island	BBMS guideline mortality		CY17–CY19 3-year average	
	Total bears	Female	Total bears	Female
Admiralty	62	23	48	8
Baranof	42	16	39	9
NE Chichagof	18	7	15	5
Chichagof	50	19	38	6
Total	172	65	140	28

Permit Hunts

REGISTRATION PERMITS AND SUCCESS

Brown bear hunters in Unit 4 are required to obtain a registration permit prior to hunting. During RY14–RY18 reporting period the department issued an average of 633 registration permits per regulatory year (Table 6). This is down slightly from the previous 5-year (RY09–RY13) average of 663. Fifty-four percent of registration permits issued were for the spring seasons (RB088 and RB089), and of the spring permits nearly 70% were issued for the inside drainages (RB089). Forty-five percent of hunters who obtained a spring registration permit did not hunt. The average success rate RY14–RY18 was 35% for RB088 and 51% for RB089.

On average, the department issued 290 permits annually for the fall hunt (RB077) during this reporting period, compared to 240 permits annually during the previous 5 (RY09–RY13). Seventy percent of permittees did not hunt. Local Unit 4 hunters commonly obtain permits for a “just in case I encounter a brown bear” scenario. These hunters have no intention of specifically targeting brown bears but want a permit if they observe an exceptional trophy brown bear during fall deer hunting or in the event that they have to shoot a bear in defense of their life. Hunters who targeted brown bears in the fall reported a 51% average annual success rate during RY14–RY18 (Table 6).

DRAWING PERMITS

The department issues 7 second degree of kindred permits annually (RY16–RY19). Participation and harvest have been low (Table 7).

Hunter Residency

Nonresident hunters take most of the brown bears harvested in Unit 4. They accounted for 70% of the total sport harvest. Nonlocal residents reported 18% and local residents reported 12% of the Unit 4 harvest (Table 8).

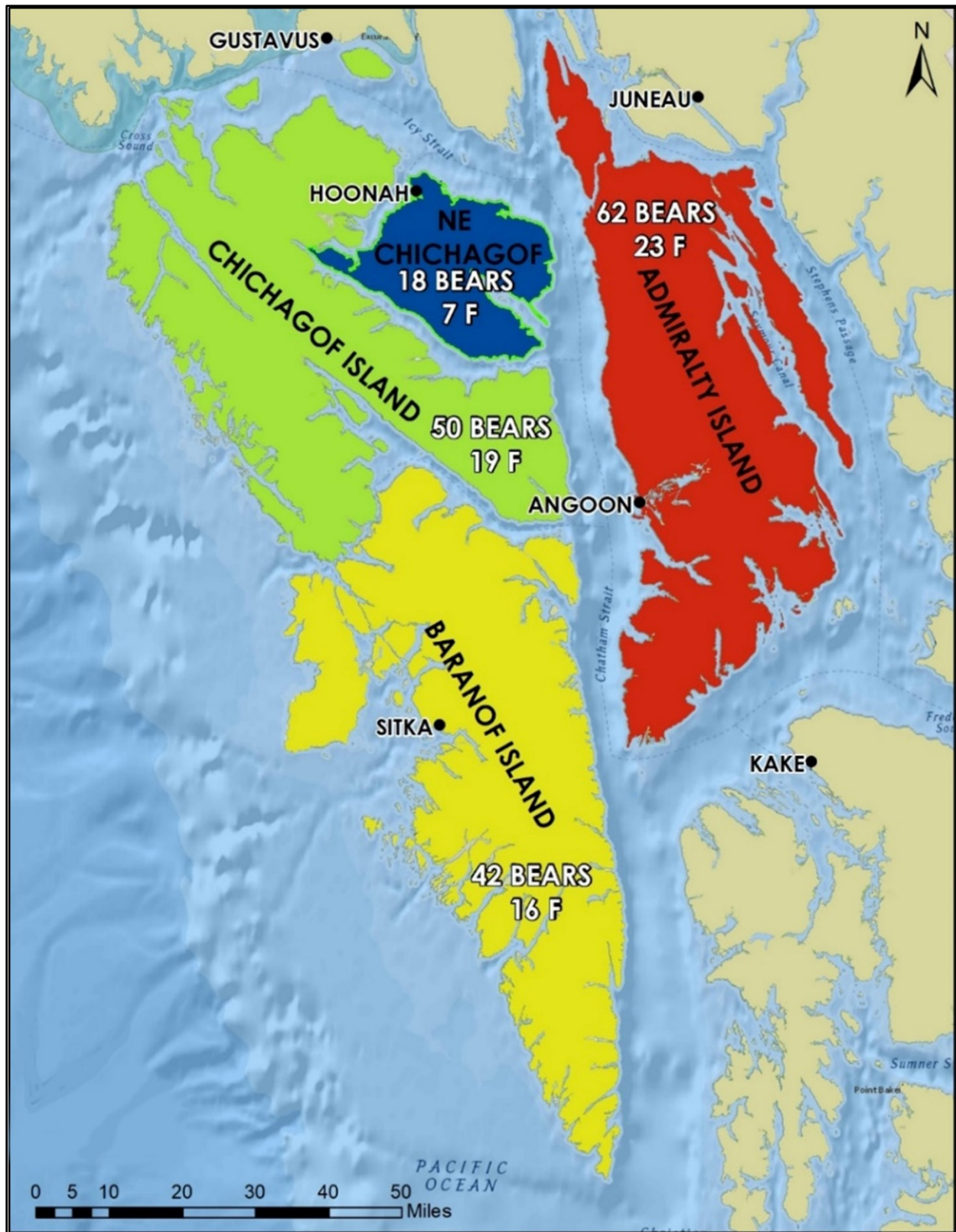


Figure 7. Unit 4, Alaska, human-caused mortality guidelines by island.

Table 6. Unit 4, Alaska, brown bear registration hunt permit summary statistics, regulatory years 2009–2018.

Regulatory year	Hunt	Permits issued	Did not hunt	Hunted	Harvest	Male	Female	Success rate (%)
<u>2009</u>	RB077	268	184	84	31	21	9	(37)
	RB088	149	92	57	23	21	2	(40)
	RB089	302	120	182	101	96	5	(55)
<u>2010</u>	RB077	258	168	90	37	28	9	(41)
	RB088	147	80	67	22	16	6	(33)
	RB089	328	135	193	90	69	21	(47)
<u>2011</u>	RB077	180	114	66	22	9	13	(33)
	RB088	135	75	60	22	16	6	(37)
	RB089	286	111	175	92	78	14	(53)
<u>2012</u>	RB077	248	173	75	29	16	13	(39)
	RB088	136	80	79	23	17	6	(29)
	RB089	248	92	91	65	56	9	(71)
<u>2013</u>	RB077	244	156	88	24	16	8	(27)
	RB088	128	68	60	10	8	2	(17)
	RB089	256	88	168	79	64	15	(47)
<u>2014</u>	RB077	271	179	92	30	22	8	(33)
	RB088	106	63	43	10	8	2	(23)
	RB089	236	94	142	71	55	16	(50)
<u>2015</u>	RB077	241	167	74	21	10	11	(28)
	RB088	112	64	48	19	17	2	(40)
	RB089	237	77	160	73	66	7	(46)
<u>2016</u>	RB077	326	227	99	31	19	12	(31)
	RB088	112	59	53	15	13	2	(28)
	RB089	224	84	140	72	64	8	(51)
<u>2017</u>	RB077	268	190	78	37	23	14	(47)
	RB088	104	58	46	16	16	0	(35)
	RB089	223	91	132	63	56	7	(48)
<u>2018</u>	RB077	342	252	90	41	28	13	(46)
	RB088	126	77	49	23	22	1	(47)
	RB089	239	107	132	76	66	10	(58)

Table 7. Unit 4 brown bear draw hunt permit summary statistics, regulatory years 2016–2018.

Regulatory year	Hunt	Permits issued	Did not hunt	Hunted	Harvest	Male	Female	Success rate (%)
2016	DB077	3	3	0	0	0	0	–
	DB088	2	1	1	0	0	0	(0)
	DB089	2	2	0	0	0	0	–
2017	DB077	3	1	2	0	0	0	(0)
	DB088	2	1	1	1	1	0	(100)
	DB089	2	2	0	0	0	0	(0)
2018	DB077	3	2	1	1	1	0	(100)
	DB088	2	1	1	1	1	0	(100)
	DB089	2	1	1	1	1	0	(100)

Table 8. Unit 4, Alaska, brown bear harvest by hunter residency, regulatory years 2014–2018.

Regulatory Year	Local Resident ^a	(%)	Nonlocal Resident ^b	(%)	Nonresident ^c	(%)	Total
2014	11	(10)	20	(18)	80	(72)	111
2015	9	(8)	20	(18)	84	(74)	113
2016	21	(18)	16	(13)	82	(69)	119
2017	11	(9)	27	(23)	79	(66)	117
2018	15	(11)	27	(18)	101	(71)	143
Average	14	(12)	22	(18)	85	(70)	121

^a Local residents live in Unit 4.

^b Alaska residents outside of Unit 4.

^c Live outside of Alaska.

Harvest Chronology

The spring season accounted for approximately 75% of the annual harvest (Table 9). May is by far the most popular month to harvest a brown bear. Most hunters prefer the spring season when weather is favorable, and bears are easier to locate on grass/sedge flats. Spring bears generally have longer hair (if not rubbed) than the fall, making for a more desirable hide (Mooney 2015). The breeding season in May also makes bears more vulnerable to hunters. There can be annual variations, but 45–55% of the spring harvest occurs during May 11–20 (Table 10).

The fall harvest is characterized by a higher percentage of females in the harvest than spring (36% vs. 13% during RY14–RY18; Table 1). Fall bear hunting usually occurs along salmon streams in thick vegetation. It is illegal to harvest sows accompanied by cubs; but by fall, some sows have separated from their cubs, which makes the sow legal for harvest.

Table 9. Unit 4, Alaska, brown bear harvest chronology by month, regulatory years (RY) 2009–2018.

RY	Sep	(%)	Oct	(%)	Nov	(%)	Apr	(%)	May	(%)	Total
2009	24	(15)	7	(4)	0	(0)	11	(7)	118	(74)	160
2010	26	(17)	7	(5)	3	(2)	7	(5)	105	(71)	148
2011	17	(13)	4	(3)	0	(0)	6	(5)	103	(79)	130
2012	22	(19)	5	(4)	2	(2)	5	(4)	83	(71)	117
2013	17	(15)	5	(4)	1 ^a	(1)	4	(4)	85	(76)	112
2014	22	(20)	6	(5)	2	(2)	6	(5)	75	(68)	111
2015	15	(13)	5	(4)	1	(1)	12	(11)	80	(71)	113
2016	17	(14)	9	(8)	5	(4)	7	(6)	81	(68)	119
2017	25	(21)	11	(10)	1	(1)	12	(10)	68	(58)	117
2018	33	(23)	9	(6)	1	(1)	7	(5)	93	(65)	143

^a December harvest.

Table 10. Unit 4, Alaska, brown bear spring harvest chronology by peak harvest periods, regulatory years 2009–2018.

Spring of:	April 21–30	(%)	May 1–10	(%)	May 11–20	(%)	May 21–31	(%)
2010	10	(8)	54	(42)	51	(40)	12	(9)
2011	6	(6)	29	(28)	57	(54)	13	(12)
2012	6	(6)	19	(18)	61	(59)	17	(17)
2013	4	(5)	19	(21)	53	(60)	12	(14)
2014	4	(5)	27	(30)	50	(57)	7	(8)
2015	5	(6)	33	(41)	34	(43)	8	(10)
2016	9	(10)	30	(34)	38	(43)	12	(13)
2017	6	(7)	23	(26)	48	(55)	10	(12)
2018	12	(15)	23	(29)	33	(41)	12	(15)
2019	6	(6)	33	(33)	44	(45)	16	(16)
Average	7	(7)	29	(30)	47	(50)	12	(13)

Note: Totals may not match other tables due to harvests prior to April 21.

Transport Methods

Nearly all brown bear harvest in Unit 4 is conducted by boat-based hunts. Between RY09 and RY18, 95% of all successful brown bear hunters used boats as their main source of transportation (Table 11).

Other Mortality

Under the BBMS, the department manages brown bears by total human-caused mortality. This includes sport kills, Defense of Life and Property (DLP), agency kills, illegal kills, research

Table 11. Unit 4, Alaska, brown bear harvest and percent by transport method, regulatory years 2009–2018.

Regulatory year	Airplane (%)	Boat (%)	Walk (%)	ATV (%)	Highway vehicle (%)
2009	10 (6)	149 (93)	0 (0)	1 (1)	0 (0)
2010	2 (1)	145 (98)	0 (0)	1 (1)	0 (0)
2011	3 (2)	127 (98)	0 (0)	0 (0)	0 (0)
2012	5 (4)	107 (91)	4 (4)	0 (0)	1 (1)
2013	6 (5)	105 (94)	0 (0)	0 (0)	1 (1)
2014	3 (3)	104 (94)	3 (2)	0 (0)	1 (1)
2015	4 (3)	106 (94)	3 (3)	0 (0)	0 (0)
2016	2 (2)	109 (92)	5 (4)	1 (1)	1 (1)
2017	5 (4)	109 (93)	3 (3)	0 (0)	0 (0)
2018	1 (1)	138 (96)	3 (2)	1 (1)	0 (0)
Average	4 (3)	120 (95)	2 (2)	0 (0)	0 (0)

mortalities, vehicle collisions, and other human-caused mortality. During RY14–RY18, 14 bears/RV (range 6–22) were killed in addition to the annual sport harvest (Table 1). One of the department’s management objectives is minimizing the number of bears killed under DLP rules. Department staff conduct dozens of brown bear safety classes annually to a variety of audiences and work with local communities to reduce human-brown bear interactions due to improper garbage handling. These educational efforts have been successful in reducing DLP kills. However, public attitudes and perceptions of brown bears vary, which makes it difficult to eliminate DLPs. At times, bears do pose public safety threats and it is appropriate they are removed. Low salmon returns, or failed berry crops can heighten bear activity in communities as bears are searching for food prior to hibernation. Brown bear kills that are not related to hunting happen most frequently near Hoonah, followed by Sitka and Angoon. In the fall of 2018, 14 bears were killed near the town of Hoonah on NE Chichagof Island.

During this reporting period there was a fatal mauling of an employee of the Greens Creek Mine on northern Admiralty Island. A sow and her 2 cubs involved in the mauling were killed by authorities. This was the first fatal mauling in Unit 4 since an incident in Poison Cove on Chichagof Island in 2012.

Alaska Board of Game Actions and Emergency Orders

At its January 2015 Board of Game meeting in Juneau, the board passed proposal 11 to establish separate brown bear drawing hunts for nonresident relatives within second degree of kindred in Unit 4. This proposal accomplished a recommendation from the Unit 4 BBMS that had not been implemented to date. These hunts began in RY16.

No emergency orders were issued during this reporting period.

Recommendations for Activity 2.1.

Continue.

3. Habitat Assessment-Enhancement

There were no habitat assessment or enhancement projects conducted during this reporting period.

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

Data Recording and Archiving

Brown bear sealing data are stored on an internal database, ADF&G's Wildlife Information Network (WinfoNet).

Agreements

During this reporting period a Memorandum of Understanding (MOU) between ADF&G and the USFS (14-MU-11100500-022) went into effect in June 2014. The expiration is 30 June 2019.

Permitting

None.

Conclusions and Management Recommendations

Brown bear harvest is conservative and sustainable throughout Unit 4. The recommendations and guidelines in the BBMS are providing appropriate management. The department will monitor brown bear mortality and make recommendations or take in-season regulatory action when necessary for brown bear conservation.

Unit 4 brown bear harvest and human-caused mortality was within guidelines established in the Brown Bear Management Strategy. During this reporting period, hunters killed an average of 121 bears per regulatory year. The current 3-year running average of total human-caused mortality is 140 bears per calendar year. The current 3-year running average of total female mortality is 28 bears per calendar year. Hunters harvested 80% males during this reporting period, which is comfortably above the management objective of a 3 to 2 male to female ratio. Age of harvested bears is above management objectives.

The BBMS directs the department to manage based on a 4-island strategy. Harvests and total mortality have been within guidelines for all 4 of the major geographical areas during this reporting period.

Nonresident hunters, who must be accompanied by an Alaska registered guide, take 70% of the harvest. Under BBMS strategy guidelines, the U.S. Forest Service has currently permitted the maximum number of guides allowed to offer brown bear hunts in Unit 4; thus, the department does not anticipate significant increased harvests.

II. Project Review and RY19–RY23 Plan

Review of Management Direction

EXISTING WILDLIFE MANAGEMENT PLANS

Southeast Alaska Unit 4 Brown Bear Management Strategy (Unit 4 Brown Bear Management Team 2000).

GOALS

1. Promote the long-term conservation and health of Game Management Unit 4 brown bear populations and their habitats.
2. Provide for a broad spectrum of public enjoyment and uses both hunting and non-consumptive uses, of Unit 4 brown bears that is sustainable.
3. Improve communication among the public and agencies involved in brown bear management.

CODIFIED OBJECTIVES

Amounts Reasonably Necessary for Subsistence Uses

In 1985 the Alaska Board of Game (BOG) made a positive finding for customary and traditional use of brown bears in Unit 4. That finding was re-adopted in 1992 during a consistency review. At that 1992 meeting the BOG set the amount necessary for subsistence at 5–10 bears annually (5AAC 99.025(3)).

Intensive Management

Not applicable.

MANAGEMENT OBJECTIVES

1. Maintain an average age of harvested males of at least 6.5 years.
2. Maintain a male-to-female harvest ratio of at least 3:2.
3. Minimize the number of bears killed in defense of life or property (DLP).
4. Maintain the annual human-caused mortality of all brown bears at no more than 4% of each island's estimated population (Admiralty, Baranof, NE Chichagof, and the remainder of Chichagof), on a 3-year rolling average.
5. Maintain the annual human-caused mortality of females at no more than 1.5% of each island's estimated population, on a 3-year rolling average.

REVIEW OF MANAGEMENT ACTIVITIES

1. Population Status and Trend

ACTIVITY 1.1. Monitor the population of brown bears in Unit 4.

Data Needs

There has not been any type of formal population estimate conducted in Unit 4 for nearly 2 decades. Current harvest strategies are based on estimated populations; therefore, a modern population estimate in Unit 4 would improve management. Regional research staff (Region 1—Southeast Alaska) conducted brown bear population assessments in Yakutat (Crupi, et al. 2017) and are currently conducting research in the Haines area to identify methods for assessing population size, trends, and harvest sustainability (A. Crupi and S. Sell, ADF&G wildlife biologists, personal communication). Unit 4 should be considered for Region 1's bear research efforts and the area biologist and management staff recommend that a population estimate research study be initiated during RY19–RY23.

Methods

To be determined in conjunction with recommendations of DWC brown bear research staff.

2. Mortality-Harvest Monitoring

ACTIVITY 2.1. Monitor brown bear harvest.

Data Needs

The department will continue to monitor harvest through sealing to assess trends in the harvest and inform in-season management actions. Acceptable brown bear mortality levels are based on guidelines in the BBMS.

Methods

Harvest data are collected by sealing hides and skulls of brown bears. Staff record location and date of harvest, method of take, transportation mode, sex, coat color, skull size, and if the animal had been previously captured. Sealing must occur by ADF&G staff within 30 days of kill. These data are entered into an ADF&G database (WinfoNet). Harvest data are summarized by regulatory year (RY), which begins 1 July and ends June 30 (e.g., RY18 = 1 July 2018–30 June 2019). However, local area staff will use calendar year mortality totals to guide in-season management.

3. Habitat Assessment-Enhancement

Currently, there are no habitat projects planned to specifically manage brown bear habitat. The most positive changes would be in urban areas to deter bears from accessing garbage. Examples are installing an electric fence at a landfill or supplying a neighborhood with bear resistant trash cans. The department conducts these projects when there is community interest. There are no specific planned projects for this reporting period, but response by staff to address bear/human

issues regarding deterring and excluding bears from garbage and using secure containers will continue.

Department staff will provide comments regarding resource extraction (i.e., timber sales, proposed mine development) and review development projects with potential impacts on brown bear habitat.

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

Data Recording and Archiving

Brown bear sealing data will continue to be stored on an internal database, ADF&G's Wildlife Information Network (WinfoNet).

Agreements

During this reporting period a Memorandum of Understanding (MOU) between ADF&G and the USFS (14-MU-11100500-022) went into effect in June 2014. It expired 30 June 2019. The department will continue to work with USFS staff to get this MOU extended.

Permitting

None.

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