Species Management Report and Plan ADF&G/DWC/SMR&P–2026–7

Elk Management Report and Plan, Game Management Unit 8:

Report Period 1 July 2018–30 June 2023, and
Plan Period 1 July 2023–30 June 2028

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Alaska Department of Fish and Game Division of Wildlife Conservation

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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 Jeff Selinger, Management Coordinator for Region II for the Division of Wildlife Conservation.

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Cover Photo: Radiocollared female Roosevelt elk on Afognak Island, Alaska. ©2014 ADF&G. Photo by Nathan Svoboda.

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Purpose of this Report

This report provides a record of survey and inventory management activities for Roosevelt elk (*Cervus elaphus roosevelti*) in Game Management Unit 8 for the 5 regulatory years 2018–2022 and plans for survey and inventory management activities in the next 5 regulatory years, 2023–2027. A regulatory year (RY) begins 1 July and ends 30 June (e.g., RY20 = 1 July 2020–30 June 2021). 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 elk management report of survey and inventory activities that was previously produced every 3 years.

I. RY18–RY22 Management Report

Management Area

Unit 8 (5,097 mi^2) is located in the Kodiak Archipelago in the Gulf of Alaska (Fig. 1). It encompasses all islands southeast of the centerline of Shelikof Strait, including Kodiak, Afognak, Whale, Raspberry, Shuyak, Spruce, Marmot, Sitkalidak, Amook, Uganik, and Chirikof islands, along with the Trinity Islands, Semidi Islands, Barren Islands, and other adjacent islands. It also includes all seaward waters and lands within 3 mi of these coastlines. The archipelago is approximately 177 mi long and 50 mi wide, consisting of a rugged, fjord-carved landscape with elevations ranging from sea level to approximately 4,500 ft. It has a wet maritime climate, with minimal seasonal temperature variation and abundant precipitation. Vegetation composition varies throughout the archipelago and is highly influenced by past glaciation.

The archipelago comprises 3 primary ecological regions: the Sitka spruce region, the central ecological region, and the southern ecological region (Fleming and Spencer 2006). The Sitka spruce region covers northeastern Kodiak Island and includes Afognak and Shuyak islands. The lower elevations in this region mostly feature Sitka spruce (*Picea sitchensis*) with a dominant understory of salmonberry (*Rubus spectabilis*), devil's club (*Echinopanax horridum*), cow parsnip (*Heracleum lanatum*), ferns (*Athrium* spp.), high-bush blueberry (*Vaccinium ovalifolium*), and dispersed pockets of elderberry (*Sambucus racemosa*). Other plant communities in this region include forb-grass meadows containing willow (*Salix* spp.), birch (*Betula kenaica*), and alder (*Alnus crispa sinuata*).

Much of Kodiak Island is classified as part of the central ecological region, which is characterized by rugged, mountainous topography with steep ravines, deep valleys, and fast-moving glacial streams and rivers. Bands of deciduous forests consisting of willow, birch, cottonwood, and alder can be found in lowland areas along rivers and streams. Similar to the Sitka spruce region, much of the landscape in the central ecological region is covered by salmonberry, ferns, cow parsnip, blueberry, fireweed (*Epilobium angustifolium*), and various grass and forb assemblages. At higher elevations, plant communities include alpine forb

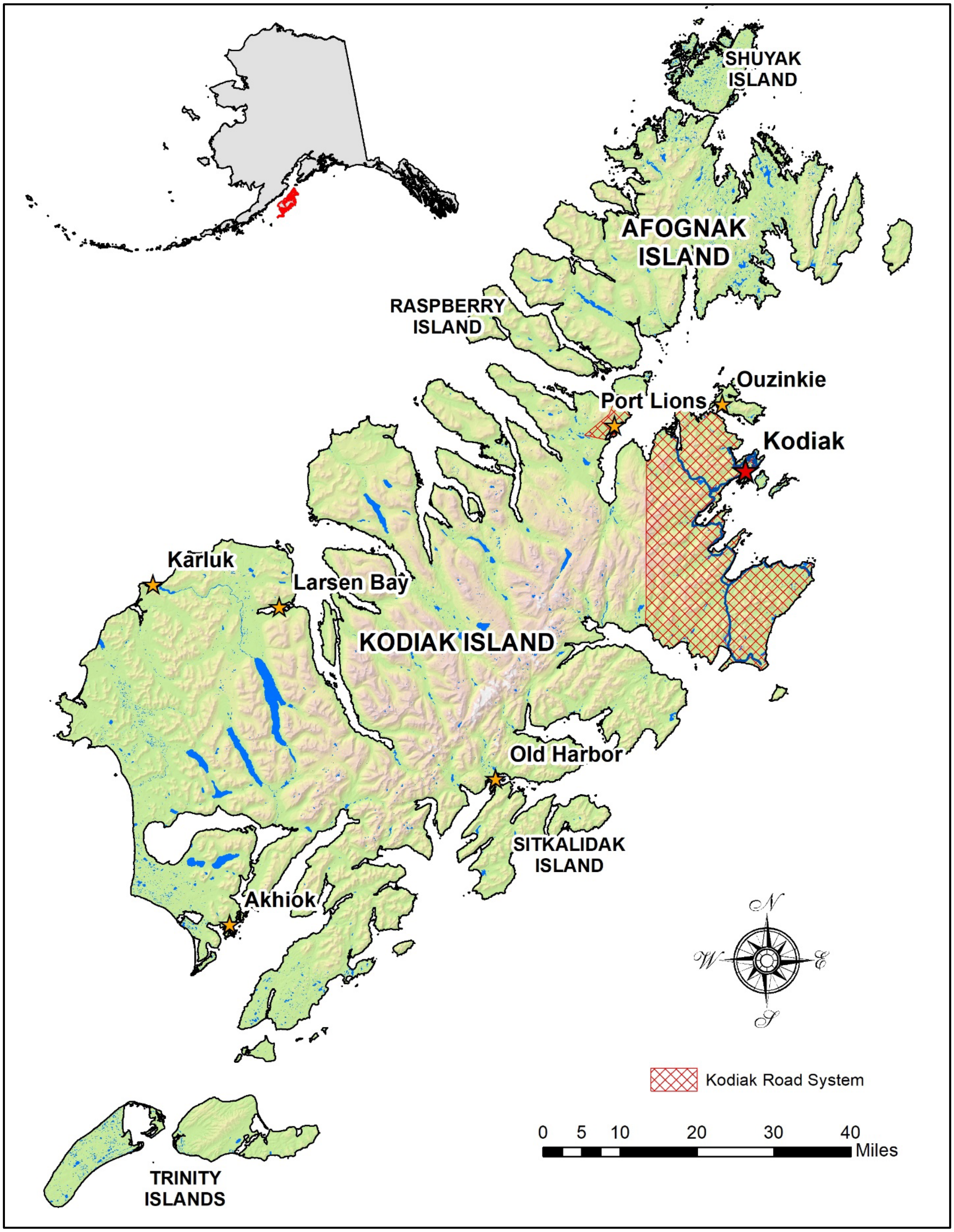

Figure 1. A map of Unit 8, Kodiak Archipelago, Alaska, regulatory years 2018–2022.

meadows and alpine tundra. Alpine forb meadows are made up of sedges (*Carex* spp.), lupine (*Lupinus nootkatensis*), and Indian paintbrush (*Caltilleja unalaschcensis*). In contrast, the alpine tundra contains crowberry (*Empetrum nigrum*), partridgefoot (*Luetkea pectinata*), alpine blueberry (*Vaccinium uliginosum*), various lichens (e.g., *Cladina* spp. and *Cetraria* spp.), and dwarf shrubs (Fleming and Spencer 2006).

The southern ecological region encompasses the glacial refugium and subarctic heathlands. It consists of crowberry, dwarf willow (*Salix* spp.), fireweed, blueberry, cranberry (*Vaccinium vitis-idaea*), goldenrod (*Solidago lepida*), Labrador tea (*Ledum palustre*), kinnikinnik (*Arctostaphylos uva-ursi*), and various forbs and mosses (Fleming and Spencer 2006).

The Kodiak Road System Management Area is contained within Unit 8. This management area includes portions of Kodiak Island north of a line from the head of Settlers Cove (including Peregrebni Point) to Crescent Lake (57°52′N, 152°08′W), east of a line from the outlet of Crescent Lake to Mount Ellison Peak, and from Mount Ellison Peak to Pokati Point at Whale Passage. It also includes the portion of Kodiak Island east of a line from the mouth of Saltery Creek to the mouth of Elbow Creek, as well as adjacent small islands in Chiniak Bay.

Summary of Status, Trend, Management Activities, and History of Roosevelt elk in Unit 8

On 29 June 1925, the Alaska territorial governor approved a program to transplant Roosevelt elk to the Kodiak–Afognak island group (Paul 2009). In late August 1928, through a goat-elk exchange program with the State of Washington, 8 elk calves (3 males and 5 females) were captured in Ho Valley on the Olympic Peninsula. These calves were shipped from Port Angeles, Washington, to Kodiak Island, Alaska. Upon arrival, the calves spent their first year at the U.S. Agricultural Experiment Station at Kalsin Bay on Kodiak Island. Due to grazing concerns from local ranchers, elk were removed from the Kalsin Bay Experiment Station and released near Litnik Bay on Afognak Island in the spring of 1929 (Troyer 1960). In the spring of 1930, 5 calves were reported on the island, and in 1933, the Alaska Game Commission reported 30 or more elk, suggesting a flourishing population (Burris and McKnight 1973). An estimate in September 1934 placed the population at 50 to 60 animals, and a 1937 commission report estimated 100 elk that January (Burris and McKnight 1973). On 3 December 1948, 162 elk were observed during an aerial survey, and the total population was estimated to be at least 212 (Batchelor 1965).

The elk population had exceeded 200 animals by 1948, in part due to protection by local residents, sufficient habitat, and minimal predation (Van Daele and Crye 2012). In the early 1950s, the Afognak elk population was estimated to be 300 animals, and in 1951, 2 elk were observed on nearby Raspberry Island. The first elk hunt on Afognak Island occurred in 1950, resulting in a harvest of 27 bulls (Elkins and Nelson 1954). The season was closed in 1951 but resumed in 1952 and 1953. Following a season closure in 1954, a 15-day bull-only elk season was opened on Afognak Island in 1955, and hunting has been allowed annually since then. The season length increased to 20 days in 1957, then increased by an additional 31 days in 1958. In 1959, the first either-sex hunt was initiated. The population continued to grow, reaching an estimated 1,100 animals by 1961 (Batchelor 1965).

As the elk population grew, hunting seasons and bag limits were liberalized. In 1963, a 153-day season was established with a bag limit of 2 elk in the Tonki Cape area. By 1965, the population was estimated at 1,200–1,500 elk across 9 separate herds on Afognak Island and 1 herd on Raspberry Island. Despite the 153-day season and a 2-elk bag limit, elk harvest on Afognak Island was modest. In contrast, excessive harvest of the highly accessible Raspberry Island herd prompted managers to close the hunting season on Raspberry Island in 1968 (Alexander 1968). A series of severe winters with heavy snow accumulation ending in 1972 caused extensive mortality and reduced calf production and survival on both islands (Alexander 1973), reducing the population to around 450 animals (Burris and McKnight 1973). Hunting permits were reduced islandwide to allow the population to recover.

Management strategies were strongly influenced by population size, hunter access, and herd vulnerability. Drawing and registration permit hunts, with harvest quotas regulated by emergency order closures, characterized management strategies for the most accessible herds of southwestern Afognak Island and Raspberry Island from the mid-1970s to the late 1980s. The initiation of commercial logging in 1977 marked a new management era, with increased vulnerability of elk to hunting because of logging road access and loss of cover (Van Daele and Crye 2012). By the mid-1980s, shorter seasons were imposed in east-central Afognak Island where logging was concentrated. The herd recovered to a high of 1,400 elk by the late 1980s and remained relatively stable through the 1990s, with minor fluctuations correlated with winter severity (Van Daele and Crye 2012).

Beginning with the 1993 season, the road-accessible eastern and central portions of Afognak Island were merged with the southwestern portion of the island to form a single management area. This area was regulated by staggered drawing permit hunts, followed by a registration hunt. North Afognak was included in the registration hunt, while elk on Raspberry Island were subject to staggered drawing hunts. The winter of 1998–1999 severely impacted ungulate populations throughout the archipelago, and elk herds on western Afognak and Raspberry islands declined (Van Daele 2000). As a result of winter mortality, the Unit 8 elk population fell below the management objective of 1,000 elk, where it remained until 2017–2018, when aerial survey estimates reached 1,000 elk across 8 herds. Surveys conducted in 2019, 2020, and 2021 indicated the population remained around 1,000 elk. In 2022, a photo documentation component was added to the survey, allowing biologists to count elk post-hoc using photographs taken during survey flights. The addition of photo documentation enabled greater accuracy and more reliable counts, resulting in an estimate of 1,200 elk in 2022.

Starting in RY03, Afognak Island was divided into 3 drawing hunt areas, while Raspberry Island remained a separate drawing hunt area. Hunt areas on Afognak Island were designed to address concerns associated with access fees on private lands, decreased bull and calf percentages, and unclear hunt boundaries (Van Daele and Crye 2012). This hunt management strategy has continued through this reporting period (RY18–RY22).

Each hunt area on Afognak Island was open for drawing hunts from 25 September to 22 October. A staggered season for drawing hunts was implemented in an effort to disperse hunting pressure, increase hunter satisfaction, and mitigate hunter conflict. The first season of each drawing hunt on Afognak Island commenced on 25 September and ended on 9 October; the second season began on 8 October and ended on 22 October. If harvest objectives for individual herds were not achieved during the drawing hunt, the area was reopened as a registration hunt. Registration hunts took place from 23 October to 30 November, or until harvest objectives for individual herds were met. When harvest objectives were reached, the registration hunt (or a portion of it) was closed by emergency order. Raspberry Island remained a drawing-hunt-only area, with 3 staggered drawing hunts occurring from 1 October to 30 November.

Management Direction

Existing Wildlife Management Plans

Guidelines for elk management were first outlined in *Alaska Wildlife Management Plans: Southwestern Alaska* (ADF&G 1976). These guidelines have been modified over time based on public comments, department recommendations, Alaska Board of Game actions, and research (e.g., survey and inventory).

Goals

- Provide ongoing and sustainable elk harvest opportunities for residents and nonresidents.
- Provide an opportunity to view, photograph, and enjoy elk in aesthetically pleasing conditions.

Codified Objectives

Amounts Reasonably Necessary for Subsistence Uses

There is a negative customary and traditional use determination for Roosevelt elk; therefore, no predetermined number of elk is necessary for subsistence uses.

Intensive Management

Roosevelt elk are not designated as an intensive management species; therefore, no intensive management objectives have been established for elk in GMU 8.

Management Objectives

The management objective for Roosevelt elk in Unit 8 is to maintain a combined minimum population of 1,200–1,500 elk on Afognak and Raspberry islands. Elk are managed to provide sport and subsistence hunting opportunities for all user groups, with emphasis on managing the Raspberry Island population for trophy-sized bulls. The department strives to manage the Raspberry Island elk herd at a maximum of 200 animals, with a minimum bull-to-cow ratio of 20:100. The Afognak Island elk population is managed through a combination of drawing and registration hunts until harvest quotas are reached; quotas vary annually based on the most recent counts for each herd. We attempt to maintain at least 2–3 active radio collars in each herd to facilitate composition counts and gather recruitment information.

MANAGEMENT ACTIVITIES

1. Population Status and Trend

ACTIVITY 1.1. Conduct aerial composition counts of each herd to estimate Roosevelt elk abundance, distribution, and calf-to-cow ratios.

Data Needs

Annual composition surveys are necessary for determining the current population status and assessing fluctuations in population trends and demographics. Maintaining consistent monitoring methods help ensure that management goals are met and allow managers to set harvest goals that maintain a healthy, viable, and sustainable elk population that meets the needs of the public. Although annual aerial composition surveys are informative for most herds, they provide limited information in some areas where elk occur. Identifying alternative survey techniques for herds in low-visibility areas (e.g., thick forest cover) would be valuable and could yield more robust information than what is currently available.

Methods

Minimum count surveys were conducted using fixed-wing aircraft with 2 experienced observers (a biologist and a pilot). Surveys focused on established elk hunt areas on Afognak and Raspberry islands and were generally performed in July and September. July surveys occurred shortly after calving and were intended to gather information on calf production (i.e., calf counts). September surveys took place during or near the rut, when bulls and cows congregate for reproductive purposes. Radiocollared elk were located through radiotelemetry, providing general location information for most herds. Although radiocollared elk provided locations of most herds to maximize the number of elk identified, a comprehensive survey of the hunt area was still conducted when weather conditions and funding allowed.

Surveys were flown at various altitudes to maximize elk sightability and identification. Once a herd (group or individual) was located, the pilot-observer team circled it until a reliable count was established and the herd was photo documented. The pilot and biologist independently counted adults and calves. When possible, observers differentiated between adult bulls and cows and reported their observations accordingly. Observers recorded a Global Positioning System (GPS) waypoint when the aircraft was directly above the herd or when the herd was perpendicular to the aircraft’s flight path. A digital photograph was taken of each group or individual to verify observations post hoc. It should be noted that vegetation can compromise detection (i.e., thick forest), and complete counts are rarely obtained for each herd.

Results and Discussion

Population Size

Aerial composition surveys indicate a growing trend in the Unit 8 elk population during RY18–RY22. The combined total elk population on Raspberry and Afognak islands was estimated at approximately 950 animals in RY21 and approximately 1,200 animals in RY22, with a 5-year (RY18–RY22) mean estimate of 1,010 elk. These estimates are similar to those derived during RY13–RY17, with approximately 950 animals in RY16 and approximately 1,000 animals in

RY17; however, they exceed the previous 5-year (RY13–RY17) mean estimate of 910 elk. During RY18–RY22, population estimates ranged from 950 to 1,200 elk (Table 1).

Table 1. Unit 8 aerial elk composition minimum counts and estimated population, Alaska, regulatory years 2008–2022.

Regulatory year	Bulls	Cows	Calves	Percent calves	Bulls:100 cows	Calves:100 cows	Total elk observed	Estimated population[a]
2008	21	334	64	15.3	6.3	19.2	419	640
2009	12	115	28	18.1	10.4	24.3	155	600
2010	16	250	65	19.6	6.4	26.0	331	610
2011	35	383	103	19.8	9.1	26.9	521	711
2012	39	321	76	17.4	12.1	23.7	436	685
2013	41	309	96	21.5	13.3	31.1	446	765
2014	36	308	30	8.0	11.7	9.7	374	885
2015	60	385	80	15.2	15.6	20.8	525	950
2016	63	380	24	5.1	16.6	6.3	467	950
2017	88	401	54	9.9	21.9	13.5	543	1,000
2018	62	601	25	3.6	10.3	4.2	688	1,000
2019[b]	19	–	–	–	–	–	287	950
2020[b]	35	–	–	–	–	–	457	950
2021	57	381	65	12.9	15.0	17.1	503	950
2022	184	552	228	23.7	33.3	41.3	964	1,200

[a] Population estimates are based on annual surveys and historical knowledge of nonsurveyed or partially surveyed areas.
[b] Survey did not include classification information for all individuals.

Until recently, elk population estimates had been below the management objective for nearly 20 years. This was likely due to multiple factors, including reduced availability of habitat and food resources, as well as high winter mortality. Harsh winters with increased snow accumulation and extended periods of cold weather likely contributed to a reduction in herd size. More recently, a relatively mild winter between RY17 and RY18, as well as mild winters during RY20–RY22, has likely resulted in increased calf recruitment and adult survival (Table 1).

Population Composition

Obtaining calf-to-cow and bull-to-cow ratios remains challenging. During aerial surveys, dense vegetation and rugged terrain can make it difficult to estimate the number of elk in dense cover. In addition, distinguishing yearling (spike) bulls in velvet from cows can also be challenging during aerial surveys. However, the recent application of photo documentation has provided greater confidence in minimum counts. In RY18–RY22, the ratio of bulls per 100 cows ranged from 10.3 in RY18 to 33.3 in RY22, with a mean of 19.5. This is almost 20% higher than the previous 5-year (RY13–RY17) mean of 15.8 bulls per 100 cows (Table 1).

Aerial survey results during RY18–RY22 indicate calf percentages ranged from a high of 23.7% in RY22 to a low of 3.6% in RY18. The previous 5-year (RY13–RY17) mean calf percentage was 12.0%, which is 1.4% lower than the most recent 5-year (RY18–RY22) mean of 13.4%. The ratio of calves per 100 cows ranged from 41.3 in RY22 to 4.2 in RY18, with a 5-year (RY18–RY22) average of 20.9. In comparison, the average ratio for RY13–RY17 was 16.3 calves per 100 cows, indicating an increase in calf production during RY18–RY22 (Table 1).

It should be noted that because it can be difficult to distinguish between spike bulls and cows during aerial surveys, survey results may overestimate cow numbers (misidentifying yearling bulls as cows), thereby underestimating the calf-to-cow ratio. Additionally, limited pilot availability and severe weather in some years prevented calf counts from being conducted in spring. As a result, calf counts had to be determined in the fall, when calves can be difficult to distinguish from adults. Consequently, calf counts in these years are likely to be underestimated, resulting in lower calf-to-cow ratios. In this reporting period, the bull-to-100-cow ratio ranged from 10.3 in RY18 to 33.3 in RY22, with a mean of 19.5 bulls per 100 cows, almost 20% higher than the previous 5-year average (RY13–RY17) of 15.8 bulls per 100 cows.

Recommendations for Activity 1.1

Continue. A more robust survey schedule should be implemented if pilots and resources are available, and the frequency of spring surveys should be increased to ensure accurate calf counts. Additionally, developing a sightability index for elk in areas with thick cover would be valuable. Ensuring that 2–3 individuals per herd are radiocollared will facilitate surveys and provide for greater accuracy of population estimates. Lastly, photo documentation should continue, as this offers greater composition accuracy and assists with classifying age groups (e.g., adult versus calf) and gender.

2. Mortality-Harvest Monitoring and Regulations

ACTIVITY 2.1. Monitor Roosevelt elk harvest and mortality through hunter harvest reports; field observations; contact with hunters, guides, and transporters; and reports of other causes of mortality.

Data Needs

Collecting and analyzing harvest data is vital for the continued and sustainable harvest of elk in Unit 8. The analysis of harvest data is necessary to ensure that managers make informed management decisions and confirm that established hunt conditions (e.g., season length, number of permits, and methods of take) are appropriate.

Methods

Elk harvest is monitored through hunt reports submitted by hunters to the department or collected during in-person reporting at the Kodiak office. Harvest reports are summarized by regulatory year and include metrics such as total harvest, hunter residency and success, transportation method, and harvest chronology.

Season and Bag Limit

Area	Season and bag limits	Hunt no.	Open seasons[a]
Unit 8, Raspberry Island	1 bull by drawing permit	DE702, DE704	1–22 Oct
	1 antlerless elk	DE706	23 Oct–30 Nov
Unit 8, Southwest Afognak, that portion of Afognak Island and adjacent islands south and west of a line from the head of Back Bay to Hatchery Peak, to the head of Malina Bay	1 bull elk by drawing permit only	DE711	25 Sep–9 Oct
	1 antlerless elk by drawing permit	DE713	8–22 Oct
	1 elk by registration permit only	RE755	23 Oct–30 Nov
Unit 8, Eastern Afognak, that portion of Afognak Island east of the main logging road (1100 road) from the Danger Bay logging camp north to its terminus at Discoverer Bay	1 elk by drawing permit only	DE721, DE723	25 Sep–22 Oct
	1 elk by registration permit only	RE755	23 Oct–30 Nov
Remainder of Unit 8	1 elk by drawing permit only	DE715, DE717	25 Sep–22 Oct
	1 elk by registration permit only	RE755	23 Oct–30 Nov

[a] Open seasons for residents and nonresidents.

Results and Discussion

Harvest by Hunters

Mean annual elk harvest during RY18–RY22 was 107 elk. It increased considerably compared to RY13–RY17, which had a mean harvest of 72 elk. Mean hunter success was 36.3% during RY18–RY22, greater than the RY13–RY17 mean of 29.3%. The number of hunters afield during RY18–RY22 averaged 291 hunters, a 16.5% increase from the RY13–RY17 mean of 243 hunters. The average percentage of bulls in the harvest for RY18–RY22 was 62.1%, above the RY13–RY17 mean of 52.5% (Table 2).

Since its inception in RY98, 21 elk have been harvested in the federal subsistence hunt; however, before RY18–RY22, only 8 elk had been harvested under subsistence regulations. Subsistence elk hunts appear to be gaining popularity, as 13 elk (7 bulls and 6 cows) were harvested during the subsistence hunt during RY18–RY22 (Table 2).

Permit Hunts

The administration of drawing and registration hunts on Raspberry and Afognak islands mostly remained unchanged during RY18–RY22. During this reporting period, over half (53.4%) of the permittees who received permits did not hunt, continuing a pattern observed during RY13–RY17 ($\bar{x}$ = 56.0%; Table 2). Registration permit hunts commenced following the drawing hunts for all hunt areas except Raspberry Island. The mean number of registration permits issued annually decreased notably from 223 during RY13–RY17 to 179 during RY18–RY22 (Table 2).

Hunter Residency and Success

Most elk hunters in RY18–RY22 (annual $\bar{x}$ = 291) were residents of Alaska (93.7%). The total number of hunters consisted of 52.2% nonlocal residents, 41.5% local residents, and 6.3% nonresidents (hunters from out of state). The mean percentage of nonresident hunters increased in RY18–RY22 (6.2%) compared to RY13–RY17 (4.2%; Table 3).

Table 2. Unit 8 elk harvest data by permit hunt, Alaska, regulatory years 2013–2022.

Hunt area and number	Regulatory year	Permits issued	Hunters afield	Successful hunters	Percent successful	Bulls	Percent bulls	Cows	Percent cows	Total harvest[a]
Raspberry Island drawing hunts (DE702–DE706)	2013	36	12	7	58.3	5	71.4	2	28.6	7
	2014	56	26	7	26.9	4	57.1	3	42.9	7
	2015	95	41	16	39.0	9	56.3	7	43.8	16
	2016	84	32	16	50.0	10	62.5	6	37.5	16
	2017	84	41	13	31.7	8	61.5	5	38.5	13
	2018	84	49	19	38.8	12	63.2	7	36.8	19
	2019	123	50	16	32.0	11	68.8	5	31.3	18
	2020	174	73	24	32.9	12	50.0	12	50.0	24
	2021	162	79	24	30.4	5	20.8	19	79.2	25
	2022	162	64	16	25.0	4	25.0	12	75.0	17
SW Afognak drawing hunts (DE711 & DE713)	2013	85	18	4	22.2	0	0.0	4	100.0	4
	2014	85	27	11	40.7	3	27.3	8	72.7	11
	2015	105	37	13	35.1	4	30.8	9	69.2	13
	2016	115	23	6	26.1	2	33.3	4	66.7	6
	2017	115	40	10	25.0	4	40.0	6	60.0	10
	2018	115	35	15	42.9	5	33.3	10	66.7	15
	2019	135	52	8	15.4	3	37.5	5	62.5	8
	2020	135	49	22	44.9	5	22.7	17	77.3	22
	2021	135	58	23	39.7	9	39.1	14	60.9	23
	2022	135	51	26	51.0	8	30.8	18	69.2	27

-continued-

Table 2. Unit 8 elk harvest data by permit hunt, Alaska, regulatory years 2013–2022, continued.

Hunt area and number	Regulatory year	Permits issued	Hunters afield	Successful hunters	Percent successful	Bulls	Percent bulls	Cows	Percent cows	Total harvest[a]
Remaining Unit 8 drawing hunts (DE715 & DE717)	2013	70	32	9	28.1	6	66.7	3	33.3	9
	2014	70	33	11	33.3	10	90.9	1	9.1	12
	2015	89	44	16	36.4	13	81.3	3	18.8	16
	2016	90	37	17	45.9	16	94.1	1	5.9	17
	2017	90	45	24	53.3	19	79.2	5	20.8	24
	2018	90	46	29	63.0	28	96.6	1	3.4	29
	2019	100	65	41	63.1	31	75.6	10	24.4	41
	2020	100	55	29	52.7	26	89.7	3	10.3	29
	2021	99	70	38	54.3	31	81.6	7	18.4	38
	2022	100	61	44	72.1	38	86.4	6	13.6	44
East Afognak drawing hunts (DE721 & DE723)	2013	70	26	6	23.1	3	50.0	3	50.0	6
	2014	70	23	7	30.4	7	100.0	0	0.0	7
	2015	79	32	6	18.8	5	83.3	1	16.7	6
	2016	79	33	11	33.3	8	72.7	3	27.3	11
	2017	80	36	11	30.6	8	72.7	3	27.3	11
	2018	80	38	7	18.4	7	100.0	0	0.0	7
	2019	80	21	2	9.5	2	100.0	0	0.0	2
	2020	80	35	11	31.4	8	72.7	3	27.3	12
	2021	70	33	6	18.2	6	100.0	0	0.0	6
	2022	70	35	7	20.0	5	71.4	2	28.6	7

-continued-

Table 2. Unit 8 elk harvest data by permit hunt, Alaska, regulatory years 2013–2022, continued.

Hunt area and number	Regulatory year	Permits issued	Hunters afield	Successful hunters	Percent successful	Bulls	Percent bulls	Cows	Percent cows	Total harvest[a]
Remainder of Unit 8 registration hunt (RE755)	2013	256	137	15	10.9	0	0.0	15	100.0	15
	2014	234	119	26	21.8	0	0.0	26	100.0	26
	2015	194	87	27	31.0	16	59.3	11	40.7	27
	2016	228	121	36	29.8	17	47.2	19	52.8	36
	2017	203	112	35	31.3	24	68.6	11	31.4	35
	2018	228	122	27	22.1	19	70.4	8	29.6	27
	2019	262	127	44	34.6	31	70.5	13	29.5	44
	2020	152	64	12	18.8	5	41.7	7	58.3	12
	2021	119	47	12	25.5	3	27.3	8	72.7	12
	2022	135	76	26	34.2	13	50.0	13	50.0	26
Total all hunts	2013	517	225	41	18.2	14	34.1	27	65.9	41
	2014	515	228	62	27.2	24	38.7	38	61.3	63
	2015	562	241	78	32.4	47	60.3	31	39.7	78
	2016	596	246	86	35.0	53	61.6	33	38.4	86
	2017	572	274	93	33.9	63	67.7	30	32.3	93
	2018	597	290	97	33.4	71	73.2	26	26.8	97
	2019	700	315	111	35.2	78	70.3	33	29.7	113
	2020	641	276	98	35.5	56	57.1	42	42.9	99
	2021	585	287	103	35.9	54	52.9	48	47.1	104
	2022	602	287	119	41.5	68	57.1	51	42.9	121

[a] Total harvest includes elk shot illegally or elk that died of unknown causes. It may not equal the sum of the number of bulls and the number of cows harvested, as the sex of some harvested animals is unknown.

Table 3. Unit 8 elk hunter residency and success, Kodiak Archipelago, Alaska, regulatory years 2013–2022.

Regulatory year	Successful: Local resident[a]	Nonlocal resident	NR[b]	Total	(%)	Unsuccessful: Local resident[a]	Nonlocal resident	NR[b]	Total	(%)	Total hunters	Total local residents[a]	Total nonlocal residents	Total NR[b]
2013	32	8	1	41	18	92	90	2	184	82	225	124	98	3
2014	36	24	2	62	27	82	80	4	166	73	228	118	104	6
2015	45	29	4	78	32	66	90	7	163	68	241	111	119	11
2016	51	28	7	86	35	67	85	8	160	65	246	118	113	15
2017	52	30	11	93	34	75	99	7	181	66	274	127	129	18
2018	50	42	5	97	33	81	104	8	193	67	290	131	146	13
2019	61	39	11	111	35	73	121	10	204	65	315	134	160	21
2020	45	50	3	98	36	75	91	12	178	64	276	120	141	15
2021	47	40	16	103	36	64	108	12	184	64	287	111	148	28
2022	49	64	6	119	41	59	101	8	168	59	287	108	165	14

[a] *Local resident* refers to a hunter who resides in Unit 8.
[b] *NR* refers to a nonresident, a hunter who is not a resident of Alaska.

On average, nonresidents had the highest success rate during RY18–RY22 compared to local residents and nonlocal residents. The annual average success rates were 42.2% for nonresidents, 41.8% for local residents, and 30.9% for nonlocal residents. Notably, the average number of nonresident elk hunters increased during RY18–RY22 compared to RY13–RY17, but the annual success rate for nonresident elk hunters remained consistent.

Harvest Chronology

In RY18–RY22, hunters were most successful during the middle of the season; 61.8% of the harvest on Afognak Island and 70.7% of the harvest on Raspberry Island took place in October (Table 4).

Transport Methods

Aircraft and boats were the primary methods of transportation for elk hunters in Unit 8 (Table 5). The use of highway vehicles is common in some areas; however, it varies depending on the level of logging activity on Afognak Island and the vehicle use policies implemented by logging companies and landowners. Tracking harvest obtained by using highway vehicles can be underrepresented because hunters occasionally record their mode of transportation as the vehicle they used to arrive on Afognak rather than the method they used during the actual hunt.

Other Mortality

Documenting mortality from sources other than hunting is challenging due to the remote setting of Afognak and Raspberry islands. Predation of adult elk by brown bears undoubtedly occurs, but it is likely uncommon; however, brown bears can be efficient predators of neonatal elk (Zager and Beecham 2006). The impact of brown bear predation on elk calves is difficult to estimate, and we have not assessed predation of elk by brown bears on Afognak or Raspberry islands. Although wounding loss and illegal harvest are likely to occur, we estimate their overall impact on the population to be minimal.

Alaska Board of Game Actions and Emergency Orders

The Board of Game took no action regarding elk hunting in Unit 8 during RY18–RY22. Before each hunting season, we analyzed survey results and estimated herd sizes to derive harvest limits for each herd. These limits were set as 10–15% of the population, with modifications to accommodate population trends and the sex ratio of the harvest. When harvest limits for a herd were achieved, we issued emergency orders to close hunting in areas occupied by that herd.

Recommendations for Activity 2.1

Continuing to monitor harvest, success rates, and transportation methods will provide valuable information on hunter effort and success.

Table 4. Unit 8 chronological elk harvest listed as percentage of harvest by 10-day period, Kodiak Archipelago, Alaska, regulatory years 2013–2022.

		Harvest periods														
Area	Regulatory year	21–30 Sep	(%)	1–10 Oct	(%)	11–20 Oct	(%)	21–31 Oct	(%)	1–10 Nov	(%)	11–20 Nov	(%)	21–30 Nov	(%)	*n*[a]
Raspberry Island	2013	0	0	3	43	2	29	1	14	1	14	0	0	0	0	7
	2014	0	0	3	43	1	14	1	14	1	14	0	0	1	14	7
	2015	0	0	3	19	3	19	8	50	0	0	0	0	2	13	16
	2016	0	0	5	31	5	31	2	13	3	19	1	6	0	0	16
	2017	0	0	7	54	0	0	3	23	2	15	0	0	1	8	13
	2018	0	0	6	32	6	32	1	5	2	11	2	11	2	11	19
	2019	0	0	5	31	6	38	2	13	1	6	2	13	0	0	16
	2020	0	0	4	17	8	33	3	13	2	8	5	21	2	8	24
	2021	0	0	4	17	1	4	9	39	6	26	2	9	1	4	23
	2022	0	0	2	13	2	13	5	31	1	6	4	25	2	13	16
Afognak Island	2013	7	21	4	12	8	24	1	3	6	18	1	3	7	21	34
	2014	10	18	9	16	10	18	9	16	3	5	10	18	4	7	55
	2015	11	18	14	23	10	16	11	18	10	16	6	10	0	0	62
	2016	11	16	8	11	14	20	20	29	14	20	3	4	0	0	70
	2017	16	20	8	10	21	26	32	40	3	4	0	0	0	0	80
	2018	20	26	18	23	13	17	14	18	13	17	0	0	0	0	78
	2019	23	24	13	14	15	16	33	34	11	11	1	1	0	0	96
	2020	19	26	11	15	32	43	12	16	0	0	0	0	0	0	74
	2021	25	32	21	27	20	26	8	10	4	5	0	0	0	0	78
	2022	27	26	26	25	23	22	13	13	9	9	4	4	1	1	103

[a] Total number of harvested animals may not equal total annual harvest due to missing harvest information.

Table 5. Unit 8 elk harvest and percentage of harvest by transport method, Kodiak Archipelago, Alaska, regulatory years 2013–2022.

	Airplane		Horse		Boat		ORV[a]		Highway vehicle		Unknown		
Regulatory year	Hunters	(%)	Hunters	(%)	Hunters	(%)	Hunters	(%)	Hunters	(%)	Hunters	(%)	*n*[b]
2013	11	27	0	0	17	41	0	0	11	27	2	5	41
2014	26	41	0	0	25	40	0	0	12	19	0	0	63
2015	31	40	0	0	24	31	0	0	20	26	2	3	77
2016	27	31	0	0	33	38	3	3	22	26	1	1	86
2017	28	30	0	0	43	46	2	2	20	22	0	0	93
2018	38	40	0	0	44	46	0	0	14	15	0	0	96
2019	33	30	0	0	40	36	5	5	32	29	1	1	111
2020	36	37	0	0	43	44	3	3	15	15	1	1	98
2021	45	44	0	0	47	46	0	0	11	11	0	0	103
2022	48	40	0	0	50	42	1	1	20	17	0	0	119

[a] *ORV* refers to an off-road vehicle.
[b] Total harvest may differ slightly from actual harvest due to lack of information regarding method of transport.

3. Habitat Assessment-Enhancement

ACTIVITY 3.1. Investigate Roosevelt elk movement, distribution, space use, and resource abundance on Afognak and Raspberry islands in unharvested and harvested forest stands to identify resource attributes that are important for elk.

Data Needs

Determine seasonal and annual fluctuations in movement, distribution, and resource use by analyzing GPS locations, biological samples, land cover data, and other relevant information collected throughout Afognak and Raspberry islands. Results will inform resource needs and limiting factors (e.g., forage abundance, brown bears) that impact elk.

Methods

Long-term monitoring by the department has identified 8 elk herds on Afognak and Raspberry islands. Our experimental design involved the aerial capture and attachment of GPS radio collars to 5 adult elk (2 males and 3 females) within each herd (n = 8; 40 elk total) to identify seasonal resource selection. To assess potential impacts of brown bear predation, we also captured and collared 40 brown bears (20 males and 20 females) and monitored their seasonal movements, distribution, and resource use. Collars attempted relocations at 60-minute intervals for at least 24 months continuously.

Seasons are based on the behavior and biology of elk. They are defined as follows: winter (1 December–30 April), pre-calving and calving (1 May–30 June), summer (1 July–30 August), and rut and post-rut (1 September–30 November). We used available satellite imagery and digital forest stand harvest data from relevant Native Corporations and government agencies on Afognak Island to develop a land cover layer that includes both land cover and the year of timber harvest. Using ArcGIS (Environmental Systems Research Institute, Redlands, California, USA), we created and overlaid a grid with 0.4 ha grid cells (for computational efficiency) across the island. We then extracted resource attributes and data on elk and bear locations. For each cell, we determined land cover, whether timber harvest had occurred, and, if it was forested, age of stand using the zonal majority routine in ArcGIS (Belant et al. 2010). Also, using Patch Analyst 4.0 for ArcGIS, we calculated the distance from the center of each grid cell to the nearest road and the nearest land cover edge.

To estimate seasonal resource use by elk and brown bear, we used 3 generalized linear mixed models (GLMMs) with seasonal location data. We compared the performance of the GLMMs using Akaike's Information Criterion adjusted for small sample size (AICc) to select the most appropriate random model structure for final analyses. Each random model structure contained a different random effect variable: animal ID, year, or animal ID nested within year. GLMMs used for final analyses of seasonal elk and bear resource use included season, extent of timber harvest, time since timber harvest, land cover, and distance from nearest road and habitat edge as fixed effects; the number of animal locations during each season was included as the response variable.

For each grid cell in all elk models, we included a probability estimate for brown bears based on brown bear resource use models. We included the global and null (intercept-only) models and used all combinations of model parameters to determine the best-supported model. We compared model performance using AICc. Models with AICc scores within 2 of the best-supported model were considered similarly supported (Burnham and Anderson 1998). We calculated Akaike weights (w) to measure model support and model selection uncertainty (Burnham and Anderson 1998). When appropriate, we used model averaging to estimate model parameters with 95% confidence intervals (Burnham and Anderson 1998). Additionally, we calculated pseudo R^2 values to determine the percentage of variation in elk locations explained by the best-supported models (Hardin and Hilbe 2007).

The relative use of land covers and harvested stands was assessed based on model parameter estimation. Elk high-use areas were delineated in a geographic information system and identified. Stands of mature spruce forests were identified and selected as potential set-aside areas from timber harvest. Meetings with stakeholders are planned to offer a range of options for developing a long-term management strategy that incorporates sustainable logging, responsible wildlife management, and continued opportunities for sport and subsistence hunting.

In addition to habitat and resource use modeling, we collected 30 fecal pellet groups from each of the 8 herds during 2017, 2018, 2019, and 2020. Samples were collected opportunistically from areas where elk are known to occupy. We thoroughly mixed all pellets in each pellet group in the field. Each group was placed in an individual, labeled bag, and we transported samples to our field station. We submitted all fecal pellet samples to a commercial lab for processing and plant identification following standard techniques (Anthony and Smith 1974, Holechek et al. 1982).

Fecal samples were oven-dried at 60–70 °C, ground separately with an electric grinder, and sieved using a 1 mm and 0.3 mm mesh. Contents were retrieved from the 0.3 mm sieve and treated with a 5% concentration of NaOH solution, then boiled until the samples became transparent. We cooled and rinsed samples to remove remaining NaOH. To facilitate dehydration, each sample was placed in a series of ethyl alcohol baths for 15 minutes at concentrations of 30%, 50%, 70%, 90%, and 100%. Two slides were prepared from each fecal sample. We identified plant fragments based on distinguishing features found in reference slides of potential forage plants from the same study area, as determined by microscopic examination of whole mounts. We recorded all fragments found along the central line of each slide. We combined pellet groups across different years by season and calculated the percentage frequency of occurrence of each food item to determine common forage species. Important forage identified through pellet analysis was then used to guide reforestation and planting efforts to increase suitable forage cover.

Results and Discussion

Roosevelt Elk Capture

Beginning on 11 June 2017, we captured, radiocollared, and collected samples from Roosevelt elk. We captured 43 elk (23 females and 20 males), and 42 of them were fitted with Telonics GPS radio collars (model TGW-4677) and Gulf Coast Data Concepts (model X16-mini) accelerometers. GPS devices were programmed to obtain a location every 60 minutes from the time of capture until the collar was released. All collars included a mortality mode (12-hour delay) and a CR-2A collar release mechanism programmed to drop off the animal on 1 September 2019. We attached all collars with a 2-by-2-inch piece of leather in case the drop-off mechanism malfunctioned. Leather links are designed to degrade over time (3–5 years), allowing the collar to release.

After induction, we applied ophthalmic ointment to the posterior border of the lower eyelids and blindfolded each animal to reduce visual stimulation. We then opportunistically weighed the animals using a weight tarp lifted by the helicopter and transported them to a flat open area for processing. We examined elk for capture-related injuries and treated them accordingly. When possible, we cleaned dart wounds in accordance with ADF&G dart wound cleaning protocols. We measured body temperature as soon as feasible after induction and intermittently throughout immobilization. We ocularly estimated age based on tooth wear and eruption, and we determined mean body condition scores based on palpation of soft tissue at the withers, ribs, and rump. Body condition scores ranged from 1 (emaciated) to 5 (obese) and were obtained by 2 independent observers. We documented evidence of lactation, presence of calves or adult elk, herd location, and any previous injuries. We attached 2 individually numbered plastic ear tags and attempted to identify sex and collect morphometric measurements (Table 6), as well as blood, hair, tissue, and vital signs.

Table 6. Mean ($\bar{x}$) and standard deviation (SD) of 65 captured female (*n* = 23) and male (*n* = 20) Roosevelt elk, Afognak and Raspberry islands, Alaska.

	Sex	
Estimate	Female ($\bar{x}$ ± SD)	Male ($\bar{x}$ ± SD)
Body condition[a]	3.0 ± 0.5	3.4 ± 0.6
Body length (cm)	218.0 ± 8.5	225.1 ± 15.3
Body weight (kg)	264.8 ± 51.6	319.0 ± 68.3
Chest girth (cm)	152.9 ± 7.5	159.5 ± 14.5
Front shoulder (cm)	140.5 ± 5.9	147.0 ± 8.1
Hind foot (cm)	64.8 ± 4.8	68.9 ± 3.6

[a] Body condition scores are estimated on a scale of 1 (emaciated) to 5 (obese).

Based on dental visual inspection, the average age of captured elk was 3.2 years (standard deviation [SD] = 1.1) for males and 5.8 years (SD = 2.6) for females. The estimated age range of captured elk was between 2 and 6 years for males and between 2 and 13 years for females. We applied uniquely numbered tattoos to the upper and lower inner lips and opportunistically hand-injected oxytetracycline and penicillin (3 cubic centimeters [cc] per 100 lb) intramuscularly prior to release. Additionally, we hand-injected naltrexone and atipamezole intramuscularly into the rump to antagonize the effects of carfentanil and xylazine, respectively. All elk were released at the capture location.

Brown Bear Capture

Beginning on 10 June 2017, we captured, radiocollared, and collected samples for Kodiak brown bears. We captured 79 bears (47 females and 32 males), and 73 of them were fitted with Telonics GPS radio collars (model MOD-600) and accelerometers. A similar capture protocol for elk was followed for bear with minor adjustments. We measured body temperature as soon as feasible after induction and intermittently throughout immobilization. We weighed each bear and ocularly estimated age based on tooth wear. We administered 0.4 mL of lidocaine around an upper premolar and extracted the tooth once the area became numb. We documented mean body condition scores, evidence of lactation, and presence of young or other bears. We recorded and photographed any previous injuries. We identified sex and collected morphometric measurements (Table 7), as well as blood, hair, tissue, and vitals.

Table 7. Mean ($\bar{x}$) and standard deviation (SD) of 79 captured female (*n* = 47) and male (*n* = 32) brown bears, Afognak and Raspberry Island, Alaska.

	Sex	
Estimate	Female ($\bar{x}$ ± SD)	Male ($\bar{x}$ ± SD)
Body condition[a]	3.1 ± 1.0	3.0 ± 0.7
Body length (cm)	188.6 ± 13.0	196.8 ± 29.2
Body weight (kg)	181.5 ± 47.9	238.7 ± 85.7
Chest girth (cm)	118.4 ± 11.4	125.3 ± 27.1
Front shoulder (cm)	101.5 ± 8.1	110.2 ± 11.7
Head circumference (cm)	68.9 ± 5.2	75.9 ± 11.3

[a] Body condition scores are estimated on a scale of 1 (emaciated) to 5 (obese).

Age was determined using cementum age analysis. Based on this analysis, the average age of captured bears is 7.5 years (SD = 5.9) for males and 9.9 (SD = 5.6) for females. The estimated age range of captured bears was between 1 and 24 years for males and between 2 and 27 years for females. We applied unique number ID tattoos to the upper and lower inside lips and opportunistically hand-injected oxytetracycline and penicillin (4 cc per 100 lb) intramuscularly prior to release. We positioned bears sternal, left the scene, and allowed them to metabolize the drug on their own to wake up naturally.

Collar Collection

During captures, we recovered 9 dropped elk collars deployed in 2016 and redeployed them on elk and bears. We closely monitored new collar locations as captures were underway and retrieved any slipped bear collars, redeploying them as needed.

Vegetation Surveys

We established 8 transects for 4 different berry species along Afognak Island's logging road system. We conducted plot-based berry count surveys on 2 salmonberry and 2 highbush blueberry transects to record the number of berries, forage availability, and density.

Numerous publications have been developed during this project. Comprehensive methodology, results, and discussion stemming from this work can be found in the following publications: Finnegan et al. (2021, 2023a, 2023b) and Schooler (2022, 2023, 2024).

Recommendations for Activity 3.1

Modify.

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

Active logging and associated road construction on Afognak Island continued throughout RY18–RY22. These activities altered elk habitat and provided greater access for hunters. Within this reporting period, cooperation with landowners and logging operators has improved tremendously, and we have been able to work together to minimize adverse impacts on wildlife and seek ways to improve elk habitat.

Data Recording and Archiving

All data, survey memos, and forms are located at the Kodiak Fish and Game office.

Agreements

ADF&G has various agreements and partnerships with local Alaska Native Corporation landowners, as well as other university, federal, and Alaska Native entities, which provide the department with access to land for surveys and capture operations. These partnerships continue to foster a strong connection among state, university, and Alaska Native organizations. They highlight the value of cooperative forest and wildlife management on public and private lands, supporting population stability and viability.

Permitting

None.

Conclusions and Management Recommendations

Survey results this reporting period indicate an increase in the elk population on both Raspberry and Afognak islands. This population increase may be partly due to the high calf-to-cow ratios (up to 41 calves per 100 cows) observed during aerial surveys. However, despite the apparent population increase, questions remain about the quantity and quality of suitable elk habitat in some areas of their distribution. Information regarding habitat suitability in certain areas of Afognak Island that have experienced long-term commercial logging has been collected, and analysis remains underway. Additionally, obtaining accurate herd estimates and sex ratios in some areas of Unit 8 remains challenging and needs further examination. Developing an appropriate sightability factor for elk on Afognak Island would be helpful and could further refine current population estimates.

II. Project Review and RY23–RY27 Plan

Review of Management Direction

MANAGEMENT DIRECTION

- Provide sustainable hunting opportunities for residents and nonresidents that support the continued harvest of Roosevelt elk.
- Assess the quality and quantity of suitable elk habitat, and work with local landowners to develop appropriate forest management plans that incorporate sustainable logging while improving elk habitat.

Goals

No change from RY18–RY22.

Codified Objectives

Amounts Reasonably Necessary for Subsistence Uses

No change from RY18–RY22.

Intensive Management

No change from RY18–RY22.

Management Objectives

No change from RY18–RY22.

Review of Management Activities

1. Population Status and Trend

ACTIVITY 1.1. Conduct aerial composition counts of each herd to estimate Roosevelt elk abundance, distribution, and calf-to-cow ratios.

Data Needs

No change from RY18–RY22.

Methods

No change from RY18–RY22; however, we will investigate the feasibility of developing a sightability factor to apply to future elk survey population estimates.

2. Mortality-Harvest Monitoring

ACTIVITY 2.1. Monitor Roosevelt elk harvest and mortality through hunter harvest reports; field observations; contact with hunters, guides, and transporters; and reports of other causes of mortality.

Data Needs

No change from RY18–RY22.

Methods

No change from RY18–RY22.

3. Habitat Assessment-Enhancement

ACTIVITY 3.1. Investigate Roosevelt elk movement, distribution, space use, and resource abundance on Afognak and Raspberry islands in unharvested and harvested forest stands to identify resource attributes that are important for elk.

Data Needs

No change from RY18–RY22.

Methods

We will discontinue the current large-scale project; however, we will continue to monitor elk movements and resource use by maintaining collars on 2–3 individuals per herd. Additionally, we will continue to identify resource attributes important to elk and work with local landowners (i.e., Alaska Native Corporations) to develop a long-term forest and habitat management strategy that incorporates sustainable logging, responsible wildlife management, and continued sport and subsistence hunting opportunities.

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

Data Recording and Archiving

All data, survey memos, and forms will be located at the Kodiak Fish and Game office.

Agreements

The various agreements and partnerships established with local Alaska Native Corporation landowners and other university, federal, and Alaska Native entities are expected to continue during RY23–RY27.

Permitting

None.

Acknowledgments

Several organizations, individuals, and groups contribute their time, funding, and resources each year to support monitoring and reporting relevant information regarding the Roosevelt elk population. Below is a list of those entities that have contributed to the monitoring and management of Roosevelt elk during this reporting period. In addition, this report incorporates, without specific attribution, descriptions and explanations written by former Unit 8 area biologists, including Dr. Larry Van Daele and Mr. Roger Smith, whose contributions we appreciate. Other volunteers and contributors include (in no specific order): Rocky Mountain Elk Foundation, Afognak Native Corporation, Natives of Kodiak, Inc., Ouzinkie Native Corporation, Koniag, Inc., Old Harbor Native Corporation, Kodiak Brown Bear Trust, Kodiak Sportsman's Lodge, Koncor Forest Products Co., John Sturgeon, Howard Valley, Alaska Wildlife Troopers, Bill Pyles, Rob Graff, Alan Jones, Keller Wattum, Jay Wattum, Christopher Ramsey, Melissa

Berns, Rick Berns, Gerry Engel, Jenell de la Peña, Tyler Petroelje, Andy Christofferson, Jonathan Larivee, Jessica Rich, Janel Day, Cameron Tenorio, Doug Dorner, Matthew Van Daele, Christina Coulter, Keith Coulter, Alyssa Hopkins, Brandon Bartleson, Natasha Hayden, Scott Yeats, Dave Hilty, and Jack Mortenson.

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