

Mountain Goat 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

Nathan J. Svoboda

William R. Dunker



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PREPARED BY:

Nathan J. Svoboda
Area Wildlife Biologist

William R. Dunker
Assistant Area Wildlife Biologist

APPROVED BY:

Jeff Selinger
Management Coordinator

PUBLISHED BY:

June. C. Younkings
Publications Coordinator

Susan G. Erben
Technical Reports Editor (retired)

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



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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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Purpose of this Report

This report provides a record of survey and inventory management activities for mountain goat (*Oreamnos americanus*) in Game Management Unit 8 for the 5 regulatory years 2018–2023 and plans for survey and inventory management activities in the next 5 regulatory years, 2023–2028. 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 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 mountain goat management report of survey and inventory activities that was previously produced every 3 years.

I. RY18–RY22 Management Report

Management Area

Game Management Unit 8 (5,097 mi², Fig. 1) is located in the Kodiak Archipelago in the Gulf of Alaska. It encompasses all islands southeast of the centerline of Shelikof Strait, including Kodiak, Afognak, Whale, Raspberry, Shuyak, Spruce, Marmot, Sitkalidak, Amook, Uganik, and Chirikof, the Trinity, Semidi, and Barren islands, other adjacent islands, and all seaward waters and lands within 3 miles of these coastlines. The archipelago is approximately 177 miles long and 50 miles wide, with a rugged, fjord-carved landscape and elevations ranging from sea level to approximately 4,500 feet. The archipelago has a wet maritime climate with little seasonal temperature variation and abundant precipitation. Vegetation composition varies throughout the archipelago and is strongly influenced by past glaciation.

There are 3 primary ecological regions comprising the archipelago: the Sitka spruce region, the central ecological region, and the southern ecological region (Fleming and Spencer 2004). The Sitka spruce region encompasses northeastern Kodiak Island and includes the Afognak and Shuyak islands. The lower elevations in this region are comprised primarily of Sitka spruce (*Picea stichensis*), with a dominant understory of salmonberry (*Rubus spectabilis*), devil’s club (*Echinopanax horridum*), cow parsnip (*Heracleum lanatum*), ferns (*Athyrium* 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 sinuate*; Fleming and Spencer 2004).

Much of Kodiak Island is classified as the central ecological region and is dominated by rugged, mountainous topography with steep ravines, deep valleys, and fast-moving glacial streams and rivers. Bands of deciduous forests, composed of willow, birch, cottonwood, and alder, occur in lowland areas along rivers and streams. Similar to the Sitka spruce region, salmonberry, ferns, cow parsnip, blueberry, and fireweed (*Epilobium angustifolium*) cover much of the landscape, along with various grass and forb assemblages. At higher elevations, plant communities include alpine forb meadows and alpine tundra. Alpine forb meadows consist of sedges (*Carex* spp.), lupine (*Lupinus nootkatensis*), and Indian paintbrush (*Castilleja unalaschensis*), whereas alpine

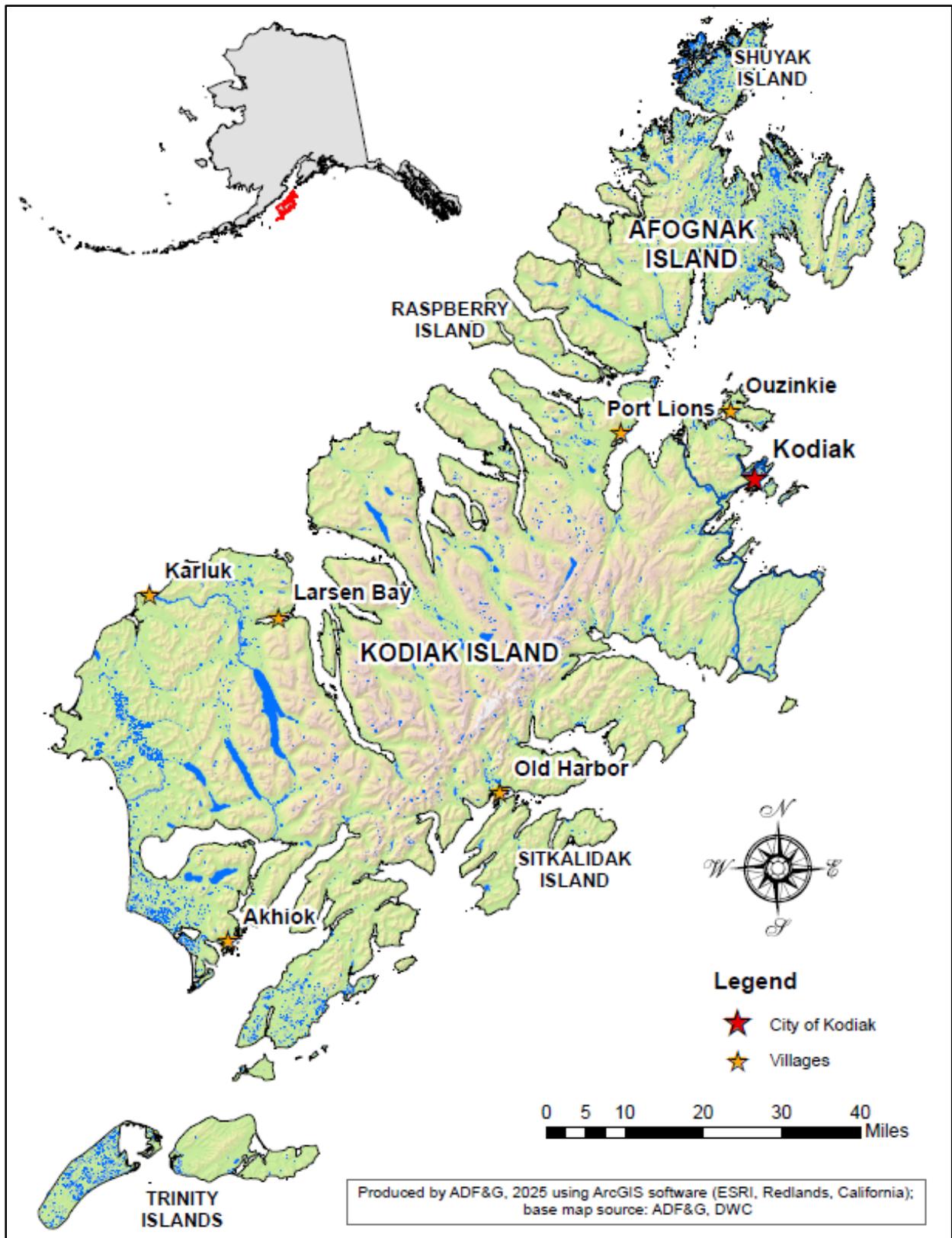


Figure 1. A map of Game Management Unit 8, Kodiak Archipelago, Alaska.

tundra consists of crowberry (*Empetrum nigrum*), partridgefoot (*Luetkea pectinata*), alpine blueberry (*Vaccinium uliginosum*), various lichens (*Cladina* spp., *Cetraria* spp.), and dwarf shrubs (Fleming and Spencer 2004).

The southern ecological region encompasses the glacial refugium and subarctic heathlands (Fleming and Spencer 2004). It includes crowberry, dwarf willow (*Salix* spp.), fireweed, blueberry, cranberry (*Vaccinium vitis-idaea*), goldenrod (*Solidago lepida*), Labrador tea (*Ledum palustre*), kinnikinnick (*Arctostaphylos uva-ursi*), and various forbs and mosses (Fleming and Spencer 2004).

The Kodiak Road System Management Area is located within Unit 8. It includes only portions of the main island, comprising that portion of Kodiak Island north of a line from the head of Settler 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, from Mount Ellison Peak to Pokati Point at Whale Passage, that portion of Kodiak Island east of a line from the mouth of Sallery Creek to the mouth of Elbow Creek, and adjacent small islands in Chiniak Bay.

Summary of Status, Trend, Management Activities, and History of Mountain Goat in Unit 8

The Unit 8 mountain goat population originated from 11 females and 8 males relocated from the Kenai Peninsula to the Hidden Basin area on Kodiak Island in 1952 and 1953 (Hoffman 1953). One pregnant female died shortly after introduction, leaving 18 individuals (10 females, 8 males) successfully introduced (Hoffman 1953). In 1964, 26 goats (13 adults, 13 kids) were observed in the Hidden Basin area (Hensel and Berns 1966). By 1968, when the first hunting season opened, 71 goats (57 adults, 14 kids) were observed (Hensel and Berns 1970). Mountain goat hunting permits have been issued annually since 1968. To promote population growth, permits were initially limited through a restricted draw hunt in a limited area. As the population expanded, the number of permits available each year and the areas opened to hunting fluctuated; managers adjusted harvest strategies to reflect management objectives, population trends, and goat movements. Since establishment, mountain goat numbers on Kodiak Island have ranged from 4 observed in 1957 (Hensel and Berns 1966) to an estimated 3,500 in 2017.

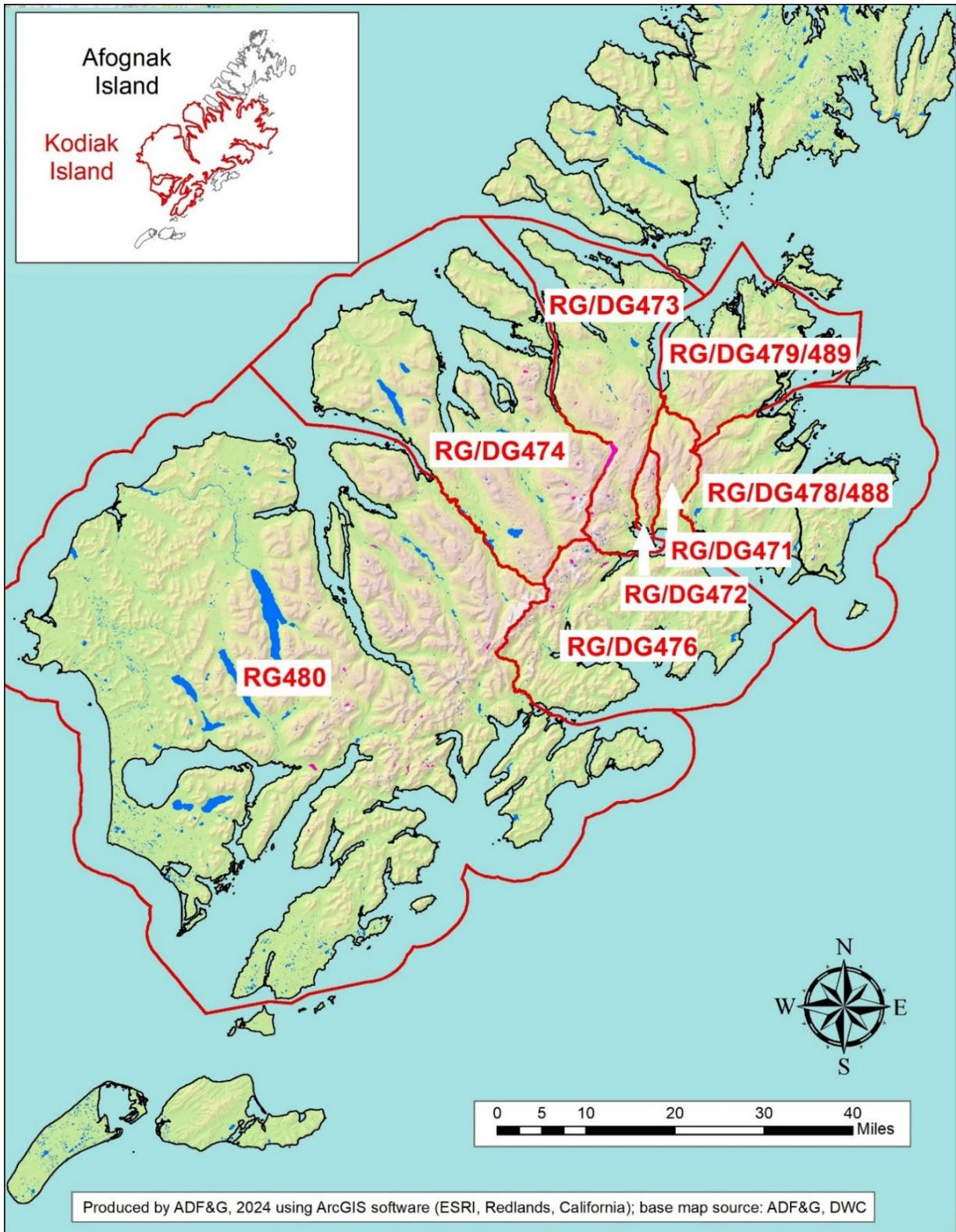
From the late 1960s through the 1970s, mountain goat harvest was kept minimal to encourage colonization. Permits were allocated through a registration or drawing system, with a harvest quota of up to 15 goats. During the 1980s, the population increased to more than 400 animals, with distribution extending to the southern end of Kodiak Island (Van Daele and Crye 2012). As numbers increased, the permit allocation process switched from a drawing system to a registration system in 1984 and 1985. In 1985, a Tier II (subsistence) area was also added, providing subsistence harvest opportunities to qualified residents. However, these changes raised concerns among local ADF&G wildlife staff about harvest. Smith and Van Daele (1986) reported that numerous inexperienced goat hunters went afield that year, resulting in increased hunter densities, reduced selectivity, herd shooting (not targeting an individual goat), and wanton waste. During the 1985 hunting season, a number of emergency orders were issued for specific areas when harvest goals were reached. In 1986, the drawing system was reestablished and remained in place through the 1990s.

Throughout the 1990s, mountain goat populations continued to grow, and the management scheme remained conservative. Populations were closely monitored, and permits were adjusted accordingly. Much of the southern portion of Kodiak Island, which had been closed to facilitate colonization, was opened to limited hunting in 1991. A new hunt area (DG478) near the Kodiak road system opened to hunting in 1995. By 1999, the population had increased to nearly 900 goats and was believed to occupy all available goat habitats on the island (Van Daele and Crye 2002). In 2001, hunt area boundaries were modified to include all of Kodiak Island and Uganik Island; a new hunt area (DG479, North Road System) was also created on the Kodiak road system.

In 2000, the Federal Subsistence Regional Advisory Council considered a proposal to list Kodiak Island goats as a “customary and traditional” resource and to open Kodiak National Wildlife Refuge to subsistence goat hunting via registration permit. In 2002, a joint working group (the Kodiak Fish and Game Advisory Committee and the federal subsistence Kodiak-Aleutian Regional Advisory Council) was formed to explore ways to meet the subsistence needs of rural residents while retaining state harvest management. The U.S. Fish and Wildlife Service (USFWS) contracted with ADF&G’s Division of Subsistence to determine historic harvest patterns of Kodiak mountain goats (Williams 2003). In March 2003, the Alaska Board of Game approved a proposal submitted by the working group that increased the maximum number of drawing permits from 250 to 500 and established village-based registration hunts following the conclusion of the drawing hunt season, if an allowable surplus of goats existed. This prompted the Federal Subsistence Board to forgo actions that would have created a subsistence goat hunt on refuge lands.

Based on data from comprehensive aerial surveys in 2007–2008, goat population estimates on Kodiak Island neared 2,000 animals. Expansion of goat populations into nearly all available habitats around the island increased hunter opportunity. In March 2009, the Board of Game adopted a proposal that expanded hunting opportunities for residents and nonresidents by combining hunt areas 475 and 477 to form registration hunt area 480 (Fig. 2). The creation of this registration hunt area eliminated drawing permits in the southern portion of the island and allowed registration hunts throughout both the drawing and registration hunting seasons. Aerial surveys conducted in 2011–2012 identified approximately 2,500 goats on the island and warranted a harvest increase in certain areas.

In response to continued growth in the central and southern portions of Kodiak Island, a subcommittee of the Kodiak Advisory Committee proposed changes to Kodiak’s mountain goat harvest regulations in hunt area 480 in 2012. The subcommittee included ADF&G and Kodiak National Wildlife Refuge biologists, the Kodiak Fish and Game Advisory Committee, members of the federal Subsistence Regional Advisory Council, and members of the public. In an effort to increase hunter opportunities, the subcommittee generated a harvest regulation change proposal that was adopted by the Kodiak Advisory Committee, supported by state and federal wildlife managers, and submitted to the Board of Game. The Board of Game approved a modified version of the proposal that increased the annual bag limit in RG480 from 1 to 2 goats and extended the season closing date from 20 December to 20 March. These regulatory changes took effect on 1 July 2013.



Note: RG and RG/DG numbers represent hunt areas.

Figure 2. A map of Kodiak Island mountain goat hunt areas, regulatory years 2018–2022, Unit 8, Kodiak Island, Alaska.

Mountain goats occupy much of the suitable goat habitat on Kodiak Island, with confirmed reports as far south as Kaguyak Bay and as far west as Halibut Bay. Mountain goat populations in the southern portion of the island are gradually increasing and should be regularly monitored. In 2013, in an effort to investigate movements, distribution patterns, and habitat use of mountain goats on Kodiak Island, ADF&G, in cooperation with the Kodiak National Wildlife Refuge, fitted 15 mountain goats (7 females, 8 males) with Global Positioning System (GPS) radio collars. Both agencies collaborated on aerial surveys to determine mountain goat herd composition, distribution, and abundance; however, nearly all the collars deployed in 2013 experienced malfunctions, resulting in very little usable data. Future efforts to collar mountain goats on Kodiak Island will be revisited as time and resources allow.

Based on comprehensive aerial surveys conducted during 2017–2018, we estimated the Kodiak mountain goat population at an all-time high of 3,500 goats islandwide. To address the continued increase in mountain goats across the island and the record number counted during 2017–2018, the Kodiak Advisory Committee proposed a series of changes to the Kodiak mountain goat regulations as a way to slow population growth and provide additional hunt opportunities. In preparation for the 2019 Board of Game meeting, the Advisory Committee generated a regulation change proposal that would lengthen the hunting season for mountain goats in registration goat hunt areas RG471 and RG479 from 15 December to 31 January. The committee also submitted a proposal to change the bag limit in RG480 from 2 mountain goats of either sex to 2 mountain goats, of which only 1 may be a male. The proposal would also extend the season closure date by 11 days (20–31 March) and reduce the reporting period to within 5 days of completion of the hunt. Both proposals were supported by state and federal wildlife managers and approved by the Board of Game. These regulatory changes went into effect on 1 July 2019.

A member of the public also submitted a proposal for the same meeting that would allow the use of muzzleloaders for mountain goat hunting in Unit 8. An amended version of the proposal was adopted by the Board of Game, creating a restricted weapons hunt along the Kodiak road system. The amended proposal allowed the use of bow and arrow only from 1 November to 15 December during the road system registration hunt (RG478 and RG479), and the use of muzzleloaders, crossbows, and bow and arrow only during the road system registration hunt (RG488 and RG489) from 16 December to 31 January. These regulatory changes also took effect on 1 July 2019.

Currently, 10 permit hunt areas are managed through drawing and registration permits (Fig. 2). Mountain goat harvest quotas are established annually for each hunt area and vary with goat abundance and distribution. If harvest quotas are not met during the drawing permit season, registration permits are made available. Hunt restrictions and guidelines are established to minimize overharvest and reduce crowded hunting areas during registration hunts. Although efforts to slow population growth have been effective, ongoing evaluations continue to assess ways to further minimize mountain goat population growth and distribution and will continue into the foreseeable future.

Management Direction

EXISTING WILDLIFE MANAGEMENT PLANS

Guidelines for mountain goat management were first outlined in Alaska Wildlife Management Plans: A Public Proposal for the Management of Alaska's Wildlife: Southwestern Alaska (ADF&G 1976) and have since been modified over time based on public comment, department recommendations, Board of Game action, research, and survey-and-inventory estimates. A record of these changes is available in our DWC species management report and plan series.

GOALS

- Provide sustained goat harvest opportunities for both residents and nonresidents.
- Maintain a robust islandwide goat population without compromising habitat quality.
- Provide opportunities for consumptive and nonconsumptive users to view, photograph, and enjoy mountain goats in aesthetically pleasing conditions.

CODIFIED OBJECTIVES

Amounts Reasonably Necessary for Subsistence Uses

There is a negative customary and traditional use determination for mountain goat in Unit 8; therefore, no predetermined number of goats is necessary for subsistence uses.

Intensive Management

Mountain goat is not designated as an intensive management species; therefore, no intensive management objectives have been established.

MANAGEMENT OBJECTIVES

Maintain a population of 3,500–4,000 mountain goats islandwide, distributed in a manner that will provide sustained hunting opportunities and has minimal long-term impact on mountain goat habitat. Incrementally increase harvest opportunities to slow population growth while still allowing sustainable hunting opportunities for residents and nonresidents.

MANAGEMENT ACTIVITIES

1. Population Status and Trend

ACTIVITY 1.1. Conduct annual aerial composition counts of each hunt area to estimate mountain goat abundance, distribution, and age ratios.

Data Needs

Annual composition surveys (i.e., minimum population counts) are necessary to determine the current population status and to assess fluctuations in population trends and demographics. Maintaining consistent monitoring methods will ensure that management goals are being met and allow managers to set sustainable harvest goals.

Methods

During RY18–RY22, DWC and USFWS staff collaborated on annual aerial survey composition counts using fixed-wing aircraft in July and August to estimate mountain goat abundance, distribution, and adult-to-kid ratios. Mountain goats in Unit 8 are ideally surveyed from late July through mid-August, when alpine snow cover has diminished, increasing sightability. Spring and fall surveys in most areas are not feasible due to increased snow accumulation, which compromises our ability to identify goats on a snow-covered landscape. Surveys were conducted from fixed-wing aircraft by 2 observers (a biologist and a pilot). Survey efforts focused on alpine habitats above the shrub line (approximately 300 meters or 328 yards above sea level) in established mountain goat hunt areas on Kodiak Island. Surveys were flown at various altitudes to maximize goat sightability and identification.

Composition counts and adult-to-kid ratios were compared between pilot and biologist observers to ensure consistency and accuracy. If discrepancies occurred, mountain goat groups were circled and recounted until consensus was reached. Observers recorded a GPS waypoint when the aircraft was directly above a group or when a group was perpendicular to the aircraft's flight path. Estimated locations were documented accordingly. It is important to note that detection during summer can be compromised because goats retreat to snowfields to avoid hot temperatures; therefore, observers were encouraged to scrutinize snowfields during surveys. To increase detection, surveys were flown in late summer, when snow accumulation was at a minimum. To reduce potential interference with hunters, surveys were targeted for completion before the start of goat hunting season. Survey methodology was standardized between agencies to reduce variability and increase consistency. Survey areas were prioritized based on management and population concerns. To obtain reliable population estimates and accurate distribution and composition information, future survey areas should be expanded to include all suitable goat areas.

Results and Discussion

Aerial composition surveys indicate a stable to slightly decreasing trend in the Unit 8 mountain goat population during RY18–RY22, compared with the previous 5-year reporting period, RY13–RY17 (Table 1). Minimum population counts during RY18–RY22 range from a low of 562 goats observed in RY21 to a high of 2,892 goats in RY22. The low number of goats counted in RY21 was partly due to a greatly restricted survey area—only about 20% of the historical goat survey area was surveyed because of pilot availability and weather restrictions. This apparent reduction or stabilization of the goat population can be attributed in part to increased harvest and decreased kid-to-adult ratios (i.e., reduced recruitment).

Summer 2018 (Regulatory Year 2018)

Cooperative survey flights with USFWS covered approximately 60% of the mountain goat range in Unit 8. Partial surveys were conducted in hunt areas 473 and 480 (Fig. 2). The estimated kid-to-adult ratio decreased from 25:100 in 2017 to 17:100 in 2018 (Table 1).

Summer 2019 (Regulatory Year 2019)

In 2019, about 85% of the goat range was surveyed. No survey was conducted in hunt area 476, and only a partial survey was conducted in hunt area 474 (Fig. 2). The kid-to-adult ratio increased from 17:100 in 2018 to 29:100 in 2019 (Table 1).

Table 1. Summer aerial survey composition counts and estimated population size within permit hunt areas, mountain goat, regulatory years 2013–2022, Unit 8, Kodiak, Alaska.

Hunt area	Regulatory year	Adults		Kids		Kids:100 adults	Total goats observed	Estimated population size ^b
		No.	Percent	No.	Percent			
All permit hunt areas	2013 ^a	1,544	78.3	429	21.7	28	1,973	2,588
	2014 ^a	1,956	77.8	557	22.2	28	2,513	2,732
	2015 ^a	777	76.7	236	23.3	30	1,013	2,732
	2016 ^a	924	82.8	192	17.2	21	1,116	3,000
	2017	2,595	79.7	659	20.3	25	3,254	3,500
	2018 ^a	1,820	85.7	304	14.3	17	2,124	3,058
	2019	1,872	77.7	536	22.3	29	2,408	2,807
	2020 ^a	1,868	78.1	525	21.9	28	2,393	2,807
	2021 ^a	456	81.1	106	18.9	23	562	2,707
	2022	2,328	80.5	560	19.4	24	2,892	2,984
DG/RG 471 Wild Creek Center Mountain	2013	28	93.3	2	6.7	7	30	80
	2014	75	74.3	26	25.7	35	101	101
	2015	90	76.3	28	23.7	31	118	118
	2016	114	83.8	22	16.2	19	136	136
	2017	111	79.9	28	20.1	25	139	139
	2018	118	90.8	12	9.2	10	130	130
	2019	100	79.4	26	20.6	26	126	126
	2020	–	–	–	–	–	–	130
	2021	–	–	–	–	–	–	130
	2022	145	75.5	47	24.5	32	192	192

-continued-

Table 1. Summer aerial survey composition counts and estimated population size within permit hunt areas, mountain goat, regulatory years 2013–2022, Unit 8, Kodiak, Alaska.

Hunt area	Regulatory year	Adults		Kids		Kids:100 adults	Total goats observed	Estimated population size ^b
		No.	Percent	No.	Percent			
DG/RG 472 Crown Mountain	2013	20	80.0	5	20.0	25	25	25
	2014	15	88.2	2	11.8	13	17	25
	2015	36	70.6	15	29.4	42	51	51
	2016	26	78.8	7	21.2	27	33	33
	2017	16	94.1	1	5.9	6	17	25
	2018	44	86.3	7	13.7	16	51	51
	2019	34	85.0	6	15.0	18	40	40
	2020	–	–	–	–	–	–	40
	2021	–	–	–	–	–	–	40
	2022	36	97.3	1	2.7	3	37	40
DG/RG 473 Hidden Basin Terror Lake	2013	39	81.3	9	18.8	23	48	50
	2014	49	80.3	12	19.7	24	61	61
	2015	22	81.5	5	18.5	23	27	40
	2016	37	84.1	7	15.9	19	44	44
	2017	60	87.0	9	13.0	15	69	69
	2018	44	93.6	3	6.4	7	47	47
	2019	65	82.3	14	17.7	22	79	79
	2020	–	–	–	–	–	–	79
	2021	–	–	–	–	–	–	79
	2022	116	76.8	35	23.2	30	151	151

-continued-

Table 1. Summer aerial survey composition counts and estimated population size within permit hunt areas, mountain goat, regulatory years 2013–2022, Unit 8, Kodiak, Alaska, continued.

Hunt area	Regulatory year	Adults		Kids		Kids:100 adults	Total goats observed	Estimated population size ^b
		No.	Percent	No.	Percent			
DG/RG 474 Uganik River	2013	–	–	–	–	–	–	250
	2014	155	72.1	60	27.9	39	215	215
	2015	–	–	–	–	–	–	215
	2016	189	82.2	41	17.8	22	230	230
	2017	237	83.2	48	16.8	20	285	285
	2018	216	88.2	29	11.8	13	245	245
	2019	177	81.6	40	18.4	23	217	245
	2020	216	80.3	53	19.7	25	269	269
	2021	–	–	–	–	–	–	269
	2022	283	85.0	50	15.0	18	333	333
DG/RG 476 Kiliuda Bay	2013	65	77.4	19	22.6	29	84	125
	2014	–	–	–	–	–	–	125
	2015	–	–	–	–	–	–	125
	2016	156	86.2	25	13.8	16	181	181
	2017	188	85.1	33	14.9	18	221	221
	2018	189	85.1	33	14.9	17	222	222
	2019	–	–	–	–	–	–	222
	2020	130	79.8	33	20.2	25	163	163
	2021	–	–	–	–	–	–	163
	2022	170	78.3	47	21.7	28	217	217

-continued-

Table 1. Summer aerial survey composition counts and estimated population size within permit hunt areas, mountain goat regulatory years 2013–2022, Unit 8, Kodiak, Alaska, continued.

Hunt area	Regulatory year	Adults		Kids		Kids:100 adults	Total goats observed	Estimated population size ^b
		No.	Percent	No.	Percent			
DG/RG 478 South Road System	2013	223	73.8	79	26.2	35	302	302
	2014	246	73.4	89	26.6	36	335	335
	2015	183	77.5	53	22.5	29	236	236
	2016	258	81.6	58	18.4	22	316	316
	2017	278	75.1	92	24.9	33	370	370
	2018	276	84.9	49	15.1	18	325	325
	2019	239	73.5	86	26.5	36	325	325
	2020	189	73.3	69	26.7	37	258	258
	2021	241	84.3	45	15.7	19	286	286
	2022	244	77.7	70	22.3	29	314	314
DG/RG 479 North Road System	2013	154	74.8	52	25.2	34	206	206
	2014	174	79.5	45	20.5	26	219	219
	2015	81	77.9	23	22.1	28	104	104
	2016	144	81.8	32	18.2	22	176	176
	2017	161	79.3	42	20.7	26	203	203
	2018	171	87.7	24	12.3	14	195	195
	2019	128	76.2	40	23.8	31	168	195
	2020	–	–	–	–	–	–	160
	2021	101	89.4	12	10.6	12	113	140
	2022	109	78.4	30	21.6	28	139	140

-continued-

Table 1. Summer aerial survey composition counts and estimated population size within permit hunt areas, mountain goat, regulatory years 2013–2022, Unit 8, Kodiak, Alaska, continued.

Hunt area	Regulatory year	Adults		Kids		Kids:100 adults	Total goats observed	Estimated population size ^b
		No.	Percent	No.	Percent			
RG 480 Southern Kodiak	2013	1,015	79.4	263	20.6	26	1,278	1,550
	2014	1,242	79.4	323	20.6	26	1,565	1,575
	2015	365	76.5	112	23.5	31	477	1,575
	2016	692	72.0	269	28.0	39	961	1,700
	2017	1,544	79.2	406	20.8	26	1,950	2,000
	2018	762	83.8	147	16.2	19	909	1,843
	2019	1,129	77.7	324	22.3	29	1,453	1,575
	2020	1,333	78.3	369	21.7	28	1,702	1,702
	2021	–	–	–	–	–	–	1,600
	2022	1,225	81.4	280	18.6	23	1,505	1,600

Note: En dashes represent years when surveys were not conducted.

^a Partial survey.

^b Population estimates are based on annual surveys and historical knowledge of both unsurveyed and partially surveyed areas.

Summer 2020 (Regulatory Year 2020)

Approximately 75% of the goat range was surveyed in 2020. No surveys were conducted in hunt areas 471, 472, 473, and 479 due to poor weather (Fig. 2). The unitwide population estimate and the estimated kid-to-adult ratio for 2020 were similar to the 2019 estimates (Table 1).

Summer 2021 (Regulatory Year 2021)

In 2021, survey efforts were compromised by hot weather, sunny conditions, and a lack of pilot availability, resulting in only about 20% of the goat range surveyed. No surveys were conducted in hunt areas 471, 472, 473, 474, and 476 (Fig. 2). Partial surveys were conducted in hunt areas 478, 479, and 480. The kid-to-adult ratio in 2021 (23:100) was slightly lower than in 2020 (28:100) and 2019 (29:100), but similar to the most recent 10-year average of 24:100 (Table 1).

Summer 2022 (Regulatory Year 2022)

In 2022, nearly the entire known occupied goat range was surveyed (Fig. 2), revealing the second-highest number of goats ever counted on Kodiak Island (Table 1).

Recommendations for Activity 1.1.

Continue with modifications. Annual aerial composition counts should continue islandwide for all mountain goat hunt areas in Unit 8. Current population estimates are derived from annual survey results combined with historical knowledge of partially surveyed or unsurveyed areas. Although this estimation approach has been used for decades and is useful for detecting trends and major population fluctuations, more accurate and robust estimates are needed. Developing and applying a sightability correction factor would improve the method by correcting for variable survey conditions and providing more accurate information to guide management decisions. The current methodology should be modified to include a sightability factor (White et al. 2016) to obtain more accurate population estimates and to account for seasonal and environmental variability.

2. Mortality-Harvest Monitoring and Regulations

Activity 2.1. Monitor annual mountain goat harvest and mortality through hunter harvest reports, field observations, and contact with hunters, guides, and transporters.

Data Needs

Collecting and analyzing harvest data is vital to the continued, sustainable harvest of mountain goats in Unit 8. The analysis of harvest data is necessary to inform management decisions and to establish hunt conditions, including season length, number of permits, and methods of take.

Methods

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

Season and Bag Limit

Goat hunting season for resident and nonresident hunters was open from 20 August to 25 October by drawing permit (DG471–DG474, DG476, and DG478–DG479) in the northern part of Kodiak Island. The bag limit in the northern hunt areas (hunt areas 471–474, 476, and 478–479; Fig. 2) was 1 goat of either sex. Following the drawing permit hunt and before RY19, a registration hunt (RG471–RG474, RG476, and RG478–RG479) was open from 1 November to 15 December in the northern hunt areas for Alaska residents only. Registration permits were available for a limited time prior to the hunting season in the villages nearest the hunt area (RG471–RG474 Port Lions, RG476 Old Harbor). Weapons were restricted to archery only in hunt areas RG478–RG479, and aircraft access was restricted to saltwater and state-maintained airports. Beginning in RY19, registration hunts RG471–RG474 and RG476 were extended from 1 November to 31 January for Alaska residents only, with permits available only in the villages nearest the hunt area. Registration hunts RG478 and RG479 remained unchanged; however, two weapons-restricted (archery, crossbow, muzzleloader only) hunts, RG488 on the South Road System and RG489 on the North Road System, were initiated and open from 16 December to 31 January for Alaska residents only. Aircraft access in these hunts remained restricted to saltwater and state-maintained airports.

The southern portion of Kodiak Island comprises registration hunt area RG480 (Fig. 2), with permits available to both residents and nonresidents. Prior to RY19, RG480 was open from 20 August to 20 March; in RY19, the season was extended to 31 March. Hunters interested in hunting in RG480 could obtain a permit throughout the season from any ADF&G office or online at www.adfg.alaska.gov. Kids and nannies with kids cannot be legally harvested in any hunt area. Nonresident hunters must hunt with a registered guide or a resident relative with a second degree of kindred for all drawing or registration goat hunts on Kodiak Island.

Results and Discussion

There are 7 drawing hunts and 10 registration hunts for mountain goats in Unit 8 (Fig. 2).

Harvest by Hunters

During RY18–RY22, the mean annual goat harvest was 127 animals for drawing hunts (Table 2) and 214 animals for registration hunts (Table 3). The mean annual harvest for drawing hunts during this period was substantially greater than the RY13–RY17 average of 89 goats (Table 2). In contrast, the mean annual harvest for registration hunts in RY18–RY22 decreased compared to the RY13–RY17 mean of 234 goats (Table 3). Increased harvest during the drawing hunt is likely due to an increase in the number of permits issued and an increase in hunter participation observed between the 2 reporting periods. The mean number of drawing permits issued during RY13–RY17 was 266, and the mean number of drawing permits issued during RY18–RY22 was 308. The mean number of hunters afield increased from 146 to 190 between the RY13–RY17 and RY18–RY22 reporting periods.

Table 2. Drawing hunt harvest data, mountain goat, regulatory years 2013–2022, Unit 8, Kodiak, Alaska.

Hunt area	Regulatory year	Permits issued	Hunters afield	Hunter success		Male goat harvest		Female goat harvest		Total harvest ^{a,b}
				No.	Percent	No.	Percent	No.	Percent	
All drawing hunts	2013	255	124	64	52	39	61	25	39	64
	2014	284	153	94	61	63	67	31	33	94
	2015	294	166	104	63	70	67	34	33	104
	2016	249	140	90	64	58	64	31	34	90
	2017	249	146	95	65	70	74	25	26	96
	2018	249	164	119	73	87	73	29	24	119
	2019	338	213	150	70	107	71	42	28	150
	2020	338	211	151	72	109	72	42	28	151
	2021	308	185	103	56	58	56	43	42	103
	2022	308	175	114	65	68	60	46	40	114
DG471 Wild Creek	2013	35	13	4	31	2	50	2	50	4
	2014	35	16	11	69	8	73	3	27	11
	2015	35	13	5	38	4	80	1	20	5
	2016	35	20	9	45	6	67	3	33	9
	2017	35	12	8	67	4	50	4	50	8
	2018	35	27	22	81	20	91	2	9	22
	2019	35	22	14	64	10	71	4	29	14
	2020	34	17	10	59	9	90	1	10	10
	2021	35	20	14	70	11	79	2	14	14
	2022	35	19	16	84	13	81	3	19	16

-continued-

Table 2. Drawing hunt harvest data, mountain goat, regulatory years 2013–2022, Unit 8, Kodiak, Alaska, continued.

Hunt area	Regulatory year	Permits issued	Hunters afield	Hunter success		Male goat harvest		Female goat harvest		Total harvest ^{a,b}
				No.	Percent	No.	Percent	No.	Percent	
DG472 Crown Mountain	2013	13	4	1	25	1	100	0	0	1
	2014	12	4	3	75	3	100	0	0	3
	2015	12	6	4	67	3	75	1	25	4
	2016	12	3	2	67	2	100	0	0	2
	2017	12	8	6	75	4	67	2	33	6
	2018	12	7	5	71	5	100	0	0	5
	2019	12	7	7	86	2	33	4	67	6
	2020	12	6	6	83	5	100	0	0	5
	2021	12	4	4	100	2	50	2	50	4
	2022	12	4	4	50	2	100	0	0	2
DG473 Hidden Basin	2013	12	4	1	25	1	100	0	0	1
	2014	12	6	5	83	4	80	1	20	5
	2015	12	8	6	75	4	67	2	33	6
	2016	12	9	6	67	5	83	1	17	6
	2017	12	10	7	70	4	57	3	43	7
	2018	12	5	5	100	4	80	0	0	5
	2019	12	7	6	86	6	100	0	0	6
	2020	12	8	8	50	3	75	1	25	4
	2021	12	9	9	33	3	100	0	0	3
	2022	12	9	9	33	3	100	0	0	3

-continued-

Table 2. Drawing hunt harvest data, mountain goat, regulatory years 2013–2022, Unit 8, Kodiak, Alaska, continued.

Hunt area	Regulatory year	Permits issued	Hunters afield	Hunter success		Male goat harvest		Female goat harvest		Total harvest ^{a,b}
				No.	Percent	No.	Percent	No.	Percent	
DG474 Uganik River	2013	40	14	9	64	2	22	7	78	9
	2014	40	24	12	50	8	67	4	33	12
	2015	50	24	17	71	10	59	7	41	17
	2016	50	25	22	88	15	68	7	32	22
	2017	50	29	20	69	19	95	1	5	20
	2018	50	35	29	83	19	66	9	31	29
	2019	70	42	27	64	21	78	5	19	27
	2020	70	40	33	83	25	76	8	24	33
	2021	70	42	21	50	13	62	8	38	21
	2022	70	36	25	69	15	60	10	40	25
DG476 Kiliuda Bay	2013	30	15	4	27	4	100	0	0	4
	2014	30	9	5	56	3	60	2	40	5
	2015	30	15	6	40	5	83	1	17	6
	2016	30	15	10	67	6	60	4	40	10
	2017	30	10	10	100	10	100	0	0	10
	2018	30	15	7	47	7	100	0	0	7
	2019	50	22	17	77	11	65	6	35	17
	2020	50	29	17	59	15	88	2	12	17
	2021	50	26	15	58	9	60	6	40	15
	2022	50	24	18	75	11	61	7	39	18

-continued-

Table 2. Drawing hunt harvest data, mountain goat, regulatory years 2013–2022, Unit 8, Kodiak, Alaska, continued.

Hunt area	Regulatory year	Permits issued	Hunters afield	Hunter success		Male goat harvest		Female goat harvest		Total harvest ^{a,b}
				No.	Percent	No.	Percent	No.	Percent	
DG478 South Road	2013	75	44	28	64	16	57	12	43	28
	2014	90	56	32	57	16	50	16	50	32
	2015	90	59	37	63	25	68	12	32	37
	2016	75	45	28	62	19	68	8	29	28
	2017	75	53	32	60	21	66	11	34	33
	2018	75	56	39	70	25	64	14	36	39
	2019	99	75	57	76	42	74	15	26	57
	2020	100	65	45	69	29	64	16	36	45
	2021	80	53	32	60	14	44	17	53	32
	2022	79	52	35	67	17	49	18	51	35
DG479 North Road	2013	50	30	17	57	13	76	4	24	17
	2014	65	38	26	68	21	81	5	19	26
	2015	65	41	29	71	19	66	10	34	29
	2016	35	23	13	57	5	38	8	62	13
	2017	35	24	12	50	8	67	4	33	12
	2018	35	19	12	63	7	58	4	33	12
	2019	60	38	23	61	15	65	8	35	23
	2020	60	46	37	80	23	62	14	38	37
	2021	49	31	14	45	6	43	8	57	14
	2022	50	31	15	48	7	47	8	53	15

^a Total harvest includes mountain goats shot illegally or goats that died of unknown causes.

^b Total harvest may not equal the number of males and the number of females harvested due to the sex of some harvested animals being unknown.

Table 3. Registration hunt harvest data, mountain goat, regulatory years 2013–2022, Unit 8, Kodiak, Alaska.

Hunt area	Regulatory year	Permits issued	Hunters afield	Hunter success		Male goat harvest		Female goat harvest		Total harvest ^{a,b}
				No.	Percent	No.	Percent	No.	Percent	
All registration hunts	2013	1,126	515	191	37	115	60	75	39	191
	2014	1,521	654	250	38	140	56	110	44	250
	2015	1,598	665	279	42	164	59	115	41	279
	2016	1,707	623	229	37	154	67	74	32	229
	2017	1,576	527	221	42	144	65	77	35	221
	2018	1,652	598	252	42	153	61	97	38	252
	2019	1,520	489	216	44	112	52	103	48	216
	2020	1,212	546	232	42	134	58	98	42	232
	2021	1,355	500	184	37	103	56	81	44	184
	2022	1,258	423	184	43	104	57	80	43	184
RG471 Wild Creek	2013	0	0	0	0	0	0	0	0	0
	2014	0	0	0	0	0	0	0	0	0
	2015	8	3	2	67	2	100	0	0	2
	2016	7	4	0	0	0	0	0	0	0
	2017	9	3	0	0	0	0	0	0	0
	2018 ^c	–	–	–	–	–	–	–	–	–
	2019	0	0	0	0	0	0	0	0	0
	2020	3	2	2	100	2	100	0	0	2
	2021	5	3	3	100	3	100	0	0	3
	2022	2	1	1	100	0	0	1	100	1

-continued-

Table 3. Registration hunt harvest data, mountain goat, regulatory years 2013–2022, Unit 8, Kodiak, Alaska, continued.

Hunt area	Regulatory year	Permits issued	Hunters afield	Hunter success		Male goat harvest		Female goat harvest		Total harvest ^{a,b}
				No.	Percent	No.	Percent	No.	Percent	
RG472 Crown Mountain	2013	0	0	0	0	0	0	0	0	0
	2014	0	0	0	0	0	0	0	0	0
	2015	6	0	0	0	0	0	0	0	0
	2016 ^c	–	–	–	–	–	–	–	–	–
	2017 ^c	–	–	–	–	–	–	–	–	–
	2018 ^c	–	–	–	–	–	–	–	–	–
	2019 ^c	–	–	–	–	–	–	–	–	–
	2020 ^c	–	–	–	–	–	–	–	–	–
	2021	2	0	0	0	0	0	0	0	0
	2022	1	1	0	0	0	0	0	0	0
RG473 Hidden Basin	2013	7	0	0	0	0	0	0	0	0
	2014	0	0	0	0	0	0	0	0	0
	2015 ^c	–	–	–	–	–	–	–	–	–
	2016 ^c	–	–	–	–	–	–	–	–	–
	2017 ^c	–	–	–	–	–	–	–	–	–
	2018 ^c	–	–	–	–	–	–	–	–	–
	2019 ^c	–	–	–	–	–	–	–	–	–
	2020 ^c	–	–	–	–	–	–	–	–	–
	2021	3	1	0	0	0	0	0	0	0
	2022	1	0	0	0	0	0	0	0	0

-continued-

Table 3. Registration hunt harvest data, mountain goat, regulatory years 2013–2022, Unit 8, Kodiak, Alaska, continued.

Hunt area	Regulatory year	Permits issued	Hunters afield	Hunter success		Male goat harvest		Female goat harvest		Total harvest ^{a,b}
				No.	Percent	No.	Percent	No.	Percent	
RG474 Uganik River	2013	0	0	0	0	0	0	0	0	0
	2014	0	0	0	0	0	0	0	0	0
	2015	2	0	0	0	0	0	0	0	0
	2016 ^c	–	–	–	–	–	–	–	–	–
	2017	2	2	1	50	1	100	0	0	1
	2018	5	0	0	0	0	0	0	0	0
	2019	0	0	0	0	0	0	0	0	0
	2020	0	0	0	0	0	0	0	0	0
	2021	5	0	0	0	0	0	0	0	0
	2022	0	0	0	0	0	0	0	0	0
RG476 Kiliuda Bay	2013	11	6	3	50	3	100	0	0	3
	2014	19	6	2	33	0	0	2	100	2
	2015	9	7	3	43	3	100	0	0	3
	2016	19	9	3	33	3	100	0	0	3
	2017	14	6	2	33	2	100	0	0	2
	2018	20	4	0	0	0	0	0	0	0
	2019	23	5	1	20	1	100	0	0	1
	2020 ^c	–	–	–	–	–	–	–	–	–
	2021	9	1	0	0	0	0	0	0	0
	2022	11	2	1	50	0	0	1	100	1

-continued-

Table 3. Registration hunt harvest data, mountain goat, regulatory years 2013–2022, Unit 8, Kodiak, Alaska, continued.

Hunt area	Regulatory year	Permits issued	Hunters afield	Hunter success		Male goat harvest		Female goat harvest		Total harvest ^{a,b}
				No.	Percent	No.	Percent	No.	Percent	
RG478 South Road	2013	69	27	5	19	4	80	1	20	5
	2014	82	28	6	21	4	67	2	33	6
	2015 ^c	7	0	0	0	0	0	0	0	0
	2016	71	20	4	20	1	25	3	75	4
	2017	67	24	9	38	6	67	3	33	9
	2018	52	17	4	24	3	75	1	25	4
	2019 ^c	–	–	–	–	–	–	–	–	–
	2020 ^c	–	–	–	–	–	–	–	–	–
	2021	26	6	1	17	0	0	1	100	1
	2022	33	9	1	11	1	100	0	0	1
RG479 North Road	2013	71	34	7	21	1	14	6	86	7
	2014	81	31	2	6	2	100	0	0	2
	2015 ^c	–	–	–	–	–	–	–	–	–
	2016	70	21	5	24	5	100	0	0	5
	2017	63	19	5	26	4	80	1	20	5
	2018	49	8	2	25	2	100	0	0	2
	2019	58	20	5	25	2	40	3	60	5
	2020 ^c	–	–	–	–	–	–	–	–	–
	2021	30	12	3	25	1	33	2	67	3
	2022	38	12	4	33	2	50	2	50	4

-continued-

Table 3. Registration hunt harvest data, mountain goat, regulatory years 2013–2022, Unit 8, Kodiak, Alaska, continued.

Hunt area	Regulatory year	Permits issued	Hunters afield	Hunter success		Male goat harvest		Female goat harvest		Total harvest ^{a,b}
				No.	Percent	No.	Percent	No.	Percent	
RG480	2013	968	448	176	39	107	61	68	39	176
	2014	1,339	589	240	41	134	56	106	44	240
	2015	1,566	655	274	42	159	58	115	42	274
	2016	1,534	569	217	38	145	67	71	33	217
	2017	1,421	473	204	43	131	64	73	36	204
	2018	1,526	569	246	43	148	60	96	39	246
	2019	1,431	464	210	45	109	52	100	48	210
	2020	1,193	544	230	42	132	57	98	43	230
	2021	1,245	468	176	38	99	56	77	44	176
	2022	1,129	390	176	45	101	57	75	43	176
RG488 South Road ^d	2013	–	–	–	–	–	–	–	–	–
	2014	–	–	–	–	–	–	–	–	–
	2015	–	–	–	–	–	–	–	–	–
	2016	–	–	–	–	–	–	–	–	–
	2017	–	–	–	–	–	–	–	–	–
	2018	–	–	–	–	–	–	–	–	–
	2019 ^c	–	–	–	–	–	–	–	–	–
	2020 ^c	–	–	–	–	–	–	–	–	–
	2021	12	2	0	0	0	0	0	0	0
	2022	21	5	1	20	0	0	1	100	1

-continued-

Table 3. Registration hunt harvest data, mountain goat, regulatory years 2013–2022, Unit 8, Kodiak, Alaska, continued.

Hunt area	Regulatory year	Permits issued	Hunters afield	Hunter success		Male goat harvest		Female goat harvest		Total harvest ^{a,b}
				No.	Percent	No.	Percent	No.	Percent	
RG489 North Road ^d	2013	–	–	–	–	–	–	–	–	–
	2014	–	–	–	–	–	–	–	–	–
	2015	–	–	–	–	–	–	–	–	–
	2016	–	–	–	–	–	–	–	–	–
	2017	–	–	–	–	–	–	–	–	–
	2018	–	–	–	–	–	–	–	–	–
	2019 ^c	–	–	–	–	–	–	–	–	–
	2020 ^c	–	–	–	–	–	–	–	–	–
	2021	18	7	1	14	0	0	1	100	1
	2022	22	3	0	0	0	0	0	0	0

^a Total harvest includes mountain goats shot illegally or goats that died of unknown causes.

^b Total harvest may not equal the number of males plus the number of females harvested due to the sex of some harvested males being unknown.

^c Closed by emergency order prior to hunt.

^d Hunts RG488 and RG489 have only been administered since RY19.

The decrease in harvest during the registration hunt is presumably a reflection of the decreased number of registration permits issued and the decrease in hunter participation reported during RY18–RY22. The number of registration permits decreased from an average of 1,506 issued during RY13–RY17 to an average of 1,399 issued during RY18–RY22 (Table 3). Similarly, hunter participation decreased from a mean of 597 hunters afield during RY13–RY17 to a mean of 511 hunters afield during RY18–RY22. The decrease observed in registration hunt participation may be in response to the increased number of permits issued during the drawing hunt and the increased hunter success during drawing hunts.

On average from RY18–RY22, 23 hunters harvested 2 goats annually in registration hunt area RG480; all other successful hunters harvested 1 goat. This is a notable reduction from the previous 5-year mean (RY13–RY17), when 35 hunters harvested 2 goats in RG480. From RY13—when the 2-goat bag limit began—to RY22, 292 hunters harvested 2 goats in the registration hunt area RG480.

Hunter Residency and Success

The mean hunter success was 49% during RY18–RY22, slightly greater than the RY13–RY17 mean of 44% (Table 4). The average number of hunters afield during RY18–RY22 was 700, a notable decrease from the previous reporting period (RY13–RY17), when the average was 743. The mean number of local resident hunters participating in goat hunts decreased from 180 in RY13–RY17 to 145 in RY18–RY22. The mean number of nonlocal residents participating in goat hunts each year also decreased substantially from 472 in RY13–RY17 to 417 during RY18–RY22. By contrast, the average number of nonresident mountain goat hunters each year increased from 91 in RY13–RY17 to 138 in RY18–RY22.

Harvest Chronology

October has consistently been the preferred month for Unit 8 goat hunters (Table 5). Weather patterns, which affect hunter success and influence when hunters go into the field, largely determine the chronology of harvest.

Transport Methods

Aircraft remained the predominant transportation method used by mountain goat hunters during RY18–RY22, with 56% of hunters reporting aircraft as their primary method of transport in this reporting period (Table 6). This is similar to the previous reporting period, RY13–RY17, when 57% of hunters reported using aircraft. However, highway vehicles and off-road vehicles were the primary means of transportation for goat hunters along the road system near Kodiak City (DG/RG 478 and 479).

Other Mortality

Documenting mortality from sources other than hunting is difficult because of the remote, rugged, and inaccessible nature of goat habitat. Predation by brown bears and golden eagles undoubtedly occurs but is probably rare (Côté and Beaudoin 1997, Mollhagen et al. 1972). We suspect the low production of kids in some years is caused by severe winter weather (Bailey 1991), but it is unknown whether early postnatal mortality of kids or low initial productivity occurs. Mortality due to wounding loss and illegal harvest is estimated at 10% of the reported harvest (Van Daele and Smith 1998).

Table 4. Hunter residency and success for drawing and registration hunts, mountain goat, regulatory years 2013–2022, Unit 8, Kodiak, Alaska.

Regulatory year	Successful					Unsuccessful					Total hunters	Total local residents	Total nonlocal residents	Grand total nonresidents
	Local resident ^a	Nonlocal resident	NR ^b	Total	Percent	Local resident	Nonlocal resident	NR ^b	Total	Percent				
2013	76	147	32	255	40	126	239	19	384	60	639	202	386	51
2014	72	204	68	344	43	115	319	29	463	57	807	187	523	97
2015	87	225	71	383	46	78	333	37	448	54	831	165	558	108
2016	68	182	69	319	42	112	306	26	444	58	763	180	488	95
2017	83	153	80	316	47	81	250	26	357	53	673	164	403	106
2018	79	180	112	371	49	81	283	27	391	51	762	160	463	139
2019	66	186	114	366	52	65	235	36	336	48	702	131	421	150
2020	100	173	110	383	51	54	285	35	374	49	757	154	458	145
2021	60	128	99	287	42	83	278	36	398	58	685	143	406	135
2022	73	134	91	298	50	66	202	32	300	50	598	139	336	123

^a A local resident is a resident of Unit 8.

^b NR represents nonresidents; the column includes all hunters who are not Alaska residents.

Table 5. Percent harvest by month, mountain goat, regulatory years 2013–2022, Unit 8, Kodiak, Alaska.

Regulatory year	Percent harvest by month								Total ^a
	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	
2013	7	27	36	19	4	1	2	5	251
2014	7	26	43	15	1	2	1	5	344
2015	8	15	41	16	4	1	5	9	382
2016	9	22	43	13	4	0	2	7	318
2017	6	22	38	18	3	2	1	10	315
2018	7	28	38	10	4	2	4	7	370
2019	11	22	40	11	1	0	3	11	365
2020	10	20	41	11	1	2	3	11	383
2021	10	27	37	11	2	2	2	8	286
2022	11	32	35	7	2	0	5	7	295

^a Total harvest may differ slightly from actual harvest due to a lack of information from hunters regarding the date of harvest.

Table 6. Percentage of each transportation method used by hunters and total number of hunters, mountain goat, regulatory years 2013–2022, Unit 8, Kodiak, Alaska.

Regulatory year	Transport method percentage							Total number of hunters ^c
	Aircraft	Boat	ATV ^a	ORV ^b	Highway vehicle	Snowmachine	Unk	
2013	51	25	4	<1	15	0	2	639
2014	59	20	4	<1	14	0	<1	807
2015	59	25	4	<1	9	0	<1	831
2016	60	23	3	<1	11	0	<1	763
2017	55	26	4	<1	12	0	<1	673
2018	58	26	3	2	9	0	<1	762
2019	54	25	4	1	14	0	0	702
2020	60	25	2	<1	11	0	<1	757
2021	58	24	3	<1	12	0	<1	685
2022	52	25	5	1	15	<1	<1	598

^a ATV represents all-terrain vehicle.

^b ORV represents off-road vehicle.

^c Total harvest may differ slightly from actual harvest due to a lack of information regarding method of transport.

Alaska Board of Game Actions and Emergency Orders

For consideration at the 2019 Board of Game meeting, the Kodiak Advisory Committee proposed a series of changes to the Kodiak mountain goat regulations as a way to slow population growth and provide additional hunting opportunities. In preparation for the meeting, the advisory committee generated a regulation change proposal to lengthen the hunting season for goats in registration goat hunt areas RG471–RG479 from 15 December to 31 January. The committee also submitted a proposal to change the bag limit in RG480 from 2 goats of either sex to 2 goats, with only 1 allowed to be male. The proposal would also extend the season closure date by 11 days (20–31 March) and reduce the reporting period to within 5 days of completion of

the hunt. Both proposals were supported by state and federal wildlife managers and approved by the Board of Game. These regulatory changes went into effect on 1 July 2019.

A member of the public also submitted a proposal for the same meeting that would allow the use of muzzleloaders for goat hunting in Unit 8. An amended version of the proposal was adopted by the Board of Game, creating a restricted weapons hunt along the Kodiak Road System. The amended proposal allowed the use of bow and arrow only from 1 November to 15 December during the road system registration hunt (RG478, RG479), and the use of muzzleloaders, crossbows, and bow and arrow only from 16 December–31 January during the road system registration hunt (RG488, RG489). These regulatory changes also went into effect on 1 July 2019.

On 27 October 2020, an emergency order was issued closing the resident and nonresident hunting season in registration hunt areas RG472 (Crown Mountain), RG473 (Hidden Basin-East Terror Lake), RG476 (Kiliuda Bay), RG478 (South Road System; bow and arrow-only), and RG479 (North Road System; bow and arrow-only), as well as the archery-, crossbow-, and muzzleloader-only hunts in RG488 (South Road System) and RG489 (North Road System) on Kodiak Island.

Recommendations for Activity 2.1

Continue to monitor harvest and mortality of mountain goats in Unit 8.

3.1 Habitat Assessment-Enhancement

ADF&G is not currently conducting habitat enhancement or assessment projects for mountain goats in Unit 8.

There has been no detailed analysis of goat range or carrying capacity on Kodiak Island; however, survey data suggest the population is stabilizing in the north-central portion of the island, where goats first became established. This might indicate the population is approaching carrying capacity. In recently colonized areas of southern Kodiak Island, the population is lower, but survey results indicate ongoing population growth. In 2013 and 2015, in cooperation with the Kodiak National Wildlife Refuge, ADF&G began a study to develop a survey sightability factor and investigate mountain goat resource use on Kodiak Island, with the goal of improving understanding of goat habitat requirements and the potential impact goats may have on the alpine habitat. However, due to substantial radiocollar failure, the project ended in 2016, and minimal usable information was collected. No efforts to assess habitat or carrying capacity, or to develop a sightability survey, have occurred since.

Winter severity is variable in maritime environments. At lower elevations, precipitation may fall either as rain or snow. Hjeljord (1973) observed goats on Kodiak Island at higher elevations in March during a winter when snow cover occurred at sea level; however, goats were also found at lower elevations during winters with minimal snow. Smith and Van Daele (1987) determined that winter distribution was strongly influenced by snow cover, with goats favoring southerly exposed slopes and cliff faces. The lack of a coniferous overstory at lower elevations may adversely affect goats on Kodiak during winters with high snowfall.

Because there are no current or ongoing projects investigating mountain goat habitat use and availability in Unit 8, current efforts should be modified to include an investigation of seasonal and annual resource use. This information could provide managers with valuable information about resources important to goats at different times of year. In addition, it could potentially provide insight into which areas may be vulnerable to habitat degradation if the goat population exceeds carrying capacity.

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

No nonregulatory management problems currently exist; however, the Kodiak National Wildlife Refuge has expressed some concern about the potential negative impacts of a robust goat population on sensitive alpine habitats in areas with increased goat numbers. Concerns about alpine habitat degradation are reasonable and should be further investigated.

Data Recording and Archiving

All data, survey memoranda, and forms are stored at the ADF&G's Kodiak office. Data from field surveys and capture events are digitized and entered into various office databases; all harvest information is also stored in an office database and in the department's Wildlife Information Network (WinfoNet) database system.

Agreements

In April 2002, a memorandum of agreement among ADF&G, the USFWS, and the Coast Guard regarding flight operations over Kodiak was finalized. This agreement has spurred further cooperation between the Coast Guard and ADF&G to minimize disturbances to mountain goats from helicopter flight operations. However, because this agreement is over 20 years old and many individuals in leadership positions have left, it would be advantageous to revisit it.

Permitting

No permits were required for the management of mountain goats in Unit 8 during RY18–RY22.

Conclusions and Management Recommendations

Kodiak Island is currently the most popular mountain goat hunting destination in Alaska, accounting for 45–50% of the state's harvest during RY18–RY22. The mountain goat population on northern and central Kodiak Island was mostly stable during RY18–RY22. On the southern end of the island, the goat population appears to have stabilized or slightly decreased. Based on aerial surveys in Unit 8, we estimate the goat population to be approximately 3,200–3,500 animals at the end of the RY18–RY22 reporting period.

Mountain goat harvest increased notably for drawing hunts during RY18–RY22. This increase is likely due to an increase in the number of drawing permits being issued, combined with an increase in hunter participation. In addition, Kodiak Island has the longest (8-month) goat season in Alaska, along with a 2-goat bag limit, resulting in an increasing interest and participation in goat hunting on the island. Conversations with hunters, transporters, guides, and other biologists

also suggest that Kodiak has greater access to the goat population than many other goat-hunting areas across the state, which may also impact hunter success.

Mountain goat harvest decreased for registration hunts during RY18–RY22. That is presumably a reflection of the decreased number of registration permits issued and the decrease in hunter participation in registration hunts over the 5-year reporting period.

Nonetheless, hunter success increased for both drawing and registration hunts during RY18–RY22. Hunter success for drawing permit holders increased by 6% during RY18–RY22, while hunter success for registration permit holders increased by nearly 3% compared with the previous 5-year reporting period (RY13–RY17).

With the increase in available hunt opportunities, there has been a demographic shift among mountain goat hunters on Kodiak Island. During RY13–RY17, local hunters accounted for approximately 25% of total hunters, compared with 21% during RY18–RY22. Similarly, the number of resident nonlocal hunters decreased from 63% to 59% over the same period. The number of nonresident hunters, however, increased substantially from 12% in RY13–RY17 to nearly 20% in RY18–RY22.

We have reached a pivotal point in goat management on Kodiak Island, where the population occupies much of the suitable habitat across the island yet continues to expand in some areas. We have shifted our emphasis from facilitating range expansion and increased densities to limiting population growth to a level that will provide sustainable hunting opportunities while maintaining habitat quality. The implementation of the 2-goat bag limit, the addition of a single billy harvest, and the extension of the hunting season have enhanced our ability to slow population growth and stabilize goat numbers, but we must continue to consider other possibilities if these measures are insufficient. We must continue to consider habitat quality, hunting opportunities, and goat-viewing interests along the Kodiak road system and develop socially and biologically acceptable ways to balance these potentially conflicting factors.

II. Project Review and RY23–RY27 Plan

Review of Management Direction

MANAGEMENT DIRECTION

In RY23–RY27, there will be changes to our management strategy to reflect shifts in management objectives and direction. The emphasis will shift from facilitating range expansion and increasing densities to limiting population growth.

GOALS

No change from RY18–RY22.

CODIFIED OBJECTIVES

Amounts Reasonably Necessary for Subsistence Uses

There is a negative customary and traditional use determination for mountain goats in Unit 8; therefore, there is not a predetermined number of goats for subsistence uses.

Intensive Management

Mountain goat is not designated as an intensive management species; therefore, no intensive management objectives have been established.

MANAGEMENT OBJECTIVES

Maintain a population of 3,500–4,000 mountain goats islandwide, distributed in a manner that will provide sustained hunting opportunities and have minimal long-term impact on mountain goat habitat. Incrementally increase harvest opportunities or modify hunting stipulations to slow population growth while still allowing sustainable hunting opportunities for residents and nonresidents.

REVIEW OF MANAGEMENT ACTIVITIES

1. Population Status and Trend

ACTIVITY 1.1. Conduct annual aerial composition counts of each hunt area to estimate mountain goat abundance, distribution, and age ratios. Create and apply a sightability correction factor.

Data Needs

Although the current methodology (aerial surveys) is valuable for providing an estimate of the minimum count of mountain goats in Unit 8, the development and implementation of a sightability correction factor would provide a more robust estimate that includes confidence parameters.

Methods

Collaborate with USFWS to conduct aerial survey composition counts using a fixed-wing aircraft in July and August each year to estimate mountain goat abundance, distribution, and adult-to-kid ratios. Methodology will remain standardized between agencies to reduce variability and increase consistency. To reduce potential interference with hunters, surveys will be targeted for completion prior to the start of goat hunting season.

Surveys will be conducted with 2 observers (a biologist and a pilot). Goat groups will be circled by the aircraft if discrepancies occur. Observers will record a GPS waypoint when the aircraft is directly above a group or when a group is perpendicular to the aircraft's flight path. Estimated locations will be documented accordingly.

Continue to survey alpine habitats above the shrub line (approximately 300 meters or 328 yards above sea level) in all suitable mountain goat areas, as funding allows, including the previously surveyed established mountain goat hunt areas on Kodiak Island. Survey areas will be prioritized based on management and population concerns.

Develop a more robust population estimate, including confidence intervals, using the methodology outlined by White et al. (2016) to create and apply a sightability correction factor for current and future surveys.

2. Mortality-Harvest Monitoring

ACTIVITY 2.1. Monitor annual mountain goat harvest and mortality through hunter harvest reports, field observations, and contact with hunters, guides, and transporters.

Data Needs

No change from RY18–RY22.

Methods

No change from RY18–RY22.

3. Habitat Assessment-Enhancement

Although no habitat assessment or enhancement projects are currently underway in Unit 8 for mountain goat management, efforts should be made to implement a project that investigates seasonal and annual resource use. This information would provide managers with valuable insight into resources important to goats at different times of year and into which areas may be vulnerable to habitat degradation if the goat population becomes excessive.

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

No change from RY18–RY22.

Data Recording and Archiving

All data, survey memoranda, and forms will be located at the Kodiak ADF&G office. In addition, all harvest information will be entered into ADF&G's WinfoNet database.

Agreements

A memorandum of agreement among the USFWS, ADF&G, and the Coast Guard on flight operations over Kodiak was implemented in April 2002 and remains in effect indefinitely.

Permitting

An ADF&G collection permit will be required.

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