

**Alaska Department of Fish and Game  
Wildlife Restoration Grant**

**GRANT NUMBER:** AKW-19

**PROJECT NUMBER:** 5.0

**PROJECT TITLE:** Mountain Goat Population Dynamics on Baranof Island

**PERIOD OF PERFORMANCE:** 1 July 2016–30 June 2020

**PERFORMANCE YEAR:** 1 July 2018–30 June 2019

**REPORT DUE DATE:** 1 September 2019

**PRINCIPAL INVESTIGATOR:** Kevin S. White

**COOPERATORS:** US Forest Service (Sitka Ranger District)

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**I. PROGRESS ON PROJECT OBJECTIVES DURING PERFORMANCE YEAR**

**JOB/ACTIVITY 1:** Capture and radio-collar mountain goats on Baranof Island.

**Accomplishments:**

During August 2016, we captured and deployed GPS radio-collars on 4 mountain goats on Baranof Island to satisfy specific requirements for this project. Additional animals were captured during summer 2017 using helicopter darting methods, in conjunction with mountain goat capture activities being conducted as part of a separate project. Following capture, we collected biological samples (i. e. blood, tissue, fecal pellets, hair) and recorded morphological characteristics. Biological samples will later be analyzed for this (i.e. microhistological diet analyses for summer habitat assessment) and other related projects (i.e. genetics, health/disease assessment).

**JOB/ACTIVITY 2:** Conduct aerial surveys to estimate population size on Baranof Island.

**Accomplishments:**

We conducted 3 aerial surveys during September 2018 encompassing the entirety of mountain goat summer habitat on Baranof Island. During surveys, data were collected and used to estimate mountain goat population size using mark-resight methods. During aerial surveys we observed 1223 mountain goats (1020 adults, 239 kids, 19.0% kids, 568 groups; Table 1). We observed 21 of the 29 radio-marked mountain goats (72%) resulting in a Chapman mark-resight population estimate of  $1668 \pm 349$  mountain goats on Baranof Island.

**JOB/ACTIVITY 3:** Conduct aerial surveys to monitor fecundity and survival on radio- collared mountain goats on Baranof Island.

**Accomplishments:**

We conducted 3 aerial telemetry surveys during May-July 2019 to determine fecundity of radio-marked mountain goats on Baranof Island. In addition, during July 2017- June 2018, we conducted 9 aerial surveys to assess mountain goat survival status. Survival and reproductive data were analyzed to derive vital rate estimates. During the June 2018-May 2019 biological year, 2 (1 male, 1 female) of the 31 mountain goats monitored (18 males, 13 females) died, resulting in an annual survival estimate of  $0.93 \pm 0.05$ , an estimate statistically similar to the long-term average ( $0.88 \pm 0.02$ ,  $n = 231$  mountain goat years). During the May –June 2019 parturition period we observed 5 of 10 radio-marked adult female mountain goats with kids at heel ( $0.50 \pm 0.16$ ), an estimate statistically comparable to the long-term average ( $0.60 \pm 0.05$ ,  $n = 96$ ).

**JOB/ACTIVITY 4:** Develop resource selection models for mountain goats on Baranof Island.

**Accomplishments:**

Mountain goat GPS location data collected via radio-collars during July 2018 – June 2019 were downloaded and archived in computer databases. We did not conduct resource selection data analyses; such analyses will be conducted once GPS data collection activities are completed (i.e. 2020).

**JOB/ACTIVITY 5:** Conduct summer mountain goat habitat field surveys on Baranof Island.

**Accomplishments:**

During June-July 2018, we visited 5 alpine sites (MF Kelp, Glacial River, Goat Lake, Mt. Edgumbe and Harbor Mtn.) and collected 17 mountain goat samples from nine different commonly consumed forages (Table 2). All samples were sent to the Washington State University – Wildlife Nutritional Analysis Laboratory for plant chemical analyses. All samples were successfully analyzed to determine digestible energy and protein concentration (Table 2).

## **II. SUMMARY OF WORK COMPLETED ON PROJECT TO DATE.**

Since 2016, we captured and deployed GPS radiocollars on four mountain goats, as per the specifications of this project; additional mountain goats in the same project area were captured as part of a separately funded project. We have routinely (bimonthly) monitored radiocollared mountain goats via aerial telemetry to gather survival and reproductive data. In addition, we have annually conducted aerial surveys for estimating mountain goat population size. In order to characterize nutritional quality of key summer food items, we collected samples ( $n = 44$ ) from 11

plant species in nine areas. All data collected have been statistically summarized on an annual basis and used to inform mountain goat management decisions on Baranof Island.

**III. SIGNIFICANT DEVELOPMENT REPORTS AND/OR AMENDMENTS.**

None

**IV. PUBLICATIONS**

None.

**V. RECOMMENDATIONS FOR THIS PROJECT**

This project should be continued as described in the study plan and project statement.

**Prepared by:** Kevin White, Wildlife Biologist III

**Date:** September 1 2019

Table 1. Number of mountain goats seen during aerial surveys conducted during September 2018 on Baranof Island, AK. Results are summarized by hunt area.

Hunt Zone	Adults	Kids	Total	% kids	# grps	Hours	Marked Animals	
							Seen	Total
Annahootz	46	17	63	27.0	22	0.29		
Baranof River	6	1	7	14.3	5	0.59		
Bear Mountain	26	6	32	18.8	14	0.60	2	2
Clarence Kramer	28	9	37	24.3	20	0.57		
Clear River	37	11	48	22.9	20	0.53	2	2
Cold Storage	40	7	47	14.9	19	0.67	2	2
Duffield Peninsula	0	0	0	0.0	0	0.09		
Glacial River	70	16	86	18.6	48	0.56	2	2
Gut Bay/Hoggatt Bay	28	8	36	22.2	6	0.61		
Hogan Lake	54	16	70	22.9	32	0.78	0	1
Indian River	29	3	32	9.4	18	0.63		
Indigo Lake	5	1	6	16.7	3	0.29		
Kasnyku/Takatz	19	3	22	13.6	7	0.63		
Kelp Bay	49	12	61	19.7	29	1.02	6	8
Lake Diana	34	2	36	5.6	17	0.57		
Lake Eva	53	11	64	17.2	28	0.44	2	2
Lake Irina	0	0	0	0.0	0	0.37		
Lucky Chance	7	4	11	36.4	3	0.19		
Mt Katlian	37	11	48	22.9	29	0.44		
Nakwasina	51	7	58	12.1	20	0.60	2	3
Necker Bay	5	0	5	0.0	3	0.65		
Nelson Bay	29	8	37	21.6	18	0.79		
North Kelp	1	0	1	0.0	1	0.11		
Red Bluff Bay	66	14	80	17.5	40	0.46		
Red Bluff Bay/Hoggatt	47	12	59	20.3	27	0.65		
Rosenberg	19	8	27	29.6	6	0.27		
Saook	41	9	50	18.0	21	0.97	1	1
Slaughter Ridge	14	4	18	22.2	8	0.47	0	2
South Baranof	7	3	10	30.0	4	2.59		
Upper Benzeman	51	14	65	21.5	19	0.73		
Upper Blue Lake	26	6	32	18.8	17	0.52	0	2
Upper Katlian	60	11	71	15.5	40	0.65	2	2
Vodopod River	15	2	17	11.8	10	0.28		
Whale Bay	20	3	23	13.0	14	0.78		
Total	1020	239	1259	19.0	568	20.38	21	29

Table 2. Nutritional characteristics of alpine plants collected during June-July 2016-2018 on Baranof Island, AK.

Species	Location	Date	%CP	GE (cals/g)	DP (g/100g)	%DDM	%DE	DE (kcal/g)
<i>Athyrium filix-femina</i>	Harbor Mtn	7/17/18	14.2	4720	9.3	57.2	57.1	2.7
<i>Carex macrochaeta</i>	Bear Lake	7/5/16	16.8	4892	11.7	64.9	65.1	3.2
<i>Carex macrochaeta</i>	Gavan Hill	6/30/17	13.1	4604	8.3	74.3	74.9	3.4
<i>Carex macrochaeta</i>	Glacial River	6/25/18	16.5	4734	11.5	76.5	77.1	3.6
<i>Carex macrochaeta</i>	Goat Lake	6/24/18	16.3	4757	11.3	75.3	75.9	3.6
<i>Carex macrochaeta</i>	Harbor Mtn	7/4/16	16.4	4793	11.4	61.0	61.0	2.9
<i>Carex macrochaeta</i>	Harbor Mtn	7/17/18	12.2	4582	7.4	73.9	74.5	3.4
<i>Carex macrochaeta</i>	Lake Diana	7/5/17	16.4	4746	11.3	73.5	74.0	3.5
<i>Carex macrochaeta</i>	Lake Diana	7/6/17	20.4	4865	15.0	72.3	72.8	3.5
<i>Carex macrochaeta</i>	Mt Edgecumbe	7/13/18	13.4	4983	8.6	75.6	76.2	3.8
<i>Carex macrochaeta</i>	Mt Edgecumbe	7/13/18	17.0	4835	11.9	75.2	75.8	3.6
<i>Carex macrochaeta</i>	Starrigavan	7/3/16	15.7	4796	10.7	64.5	64.7	3.1
<i>Carex macrochaeta</i>	Verstovia	6/29/17	19.1	4683	13.9	75.5	76.1	3.5
<i>Cornus canadensis</i>	Lake Diana	7/6/17	7.7	4398	3.3	73.5	74.0	3.2
<i>Epilobium angustifolium</i>	Harbor Mtn	7/17/18	18.0	4612	12.9	78.5	79.2	3.6
<i>Epilobium angustifolium</i>	Lake Diana	7/6/17	21.1	4635	15.7	79.1	79.8	3.7
<i>Geum calthifolium</i>	Lake Diana	7/6/17	10.6	4472	6.0	76.8	77.4	3.4
<i>Juncus mertensianus</i>	Bear Lake	7/5/16	13.4	4861	8.6	60.5	60.5	2.9
<i>Juncus mertensianus</i>	Harbor Mtn	7/17/18	12.1	4809	7.4	69.2	69.6	3.3
<i>Juncus mertensianus</i>	Lake Diana	7/5/17	12.2	4872	7.4	68.9	69.2	3.4
<i>Juncus mertensianus</i>	Starrigavan	7/3/16	13.4	4787	8.6	59.7	59.6	2.9
<i>Lupinus nootkaensis</i>	Bear Lake	7/5/16	22.9	4994	17.3	68.9	69.2	3.4
<i>Lupinus nootkaensis</i>	Harbor Mtn	7/4/16	23.1	5112	17.5	65.8	66.0	3.4
<i>Lupinus nootkaensis</i>	Harbor Mtn	7/17/18	26.7	4972	20.9	76.2	76.8	3.8
<i>Lupinus nootkaensis</i>	Lake Diana	7/5/17	24.8	5040	19.2	73.2	73.7	3.7
<i>Lupinus nootkaensis</i>	Lake Diana	7/6/17	25.1	4937	19.4	74.1	74.6	3.7
<i>Lupinus nootkaensis</i>	Verstovia	6/29/17	21.8	4959	16.4	73.5	74.1	3.6
<i>Luzula parviflora</i>	MF Kelp	6/28/18	25.2	4881	19.6	71.1	71.5	3.5
<i>Nephrophyllidium crista-galli</i>	Bear Lake	7/5/16	14.9	4598	10.0	62.9	63.0	2.9
<i>Nephrophyllidium crista-galli</i>	Gavan Hill	6/30/17	19.8	4852	14.5	59.9	59.9	2.9
<i>Nephrophyllidium crista-galli</i>	Harbor Mtn	7/4/16	15.8	4685	10.8	55.8	55.6	2.6
<i>Nephrophyllidium crista-galli</i>	Harbor Mtn	7/17/18	7.6	4695	3.2	74.3	74.9	3.5
<i>Nephrophyllidium crista-galli</i>	Lake Diana	7/6/17	17.6	4765	12.5	70.2	70.6	3.3
<i>Nephrophyllidium crista-galli</i>	MF Kelp	6/28/18	18.1	4883	13.0	68.8	69.1	3.4
<i>Nephrophyllidium crista-galli</i>	Mt Edgecumbe	7/13/18	13.6	4762	8.7	76.9	77.5	3.7
<i>Nephrophyllidium crista-galli</i>	Starrigavan	7/3/16	18.1	4874	12.9	57.6	57.5	2.8
<i>Nephrophyllidium crista-galli</i>	Verstovia	6/29/17	17.9	4723	12.7	68.7	69.0	3.2
<i>Salix</i> sp.	Glacial River	6/26/18	20.2	5217	13.8	62.5	62.6	3.3
<i>Vaccinium</i> sp.	Goat Lake	6/23/18	11.4	5292	5.8	53.4	53.2	2.8
<i>Vaccinium</i> sp.	Lake Diana	7/6/17	15.9	5176	10.9	58.2	58.1	3.0
<i>Vaccinium</i> sp.	MF Kelp	6/27/18	16.9	5220	10.8	70.5	70.9	3.7
<i>Vaccinium</i> sp.	Mt Edgecumbe	7/13/18	13.4	5150	8.6	62.3	62.4	3.2
<i>Vaccinium</i> sp.	Verstovia	6/29/17	14.8	5271	9.9	51.3	51.0	2.7

