United States Department of the Interior

U.S. FISH AND WILDLIFE SERVICE
Kodiak National Wildlife Refuge
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Federal Subsistence Activity Report
Kodiak National Wildlife Refuge, September 2017 – January 2018

Subsistence Permit Summary

Federal subsistence regulations afford opportunity for rural residents of the Kodiak area to harvest Roosevelt elk, Sitka black-tailed deer, and brown bear on Kodiak Refuge lands. Harvest opportunity for bear is restricted to residents of selected village communities. In complement, federal subsistence regulations afford opportunity to harvest fish and shellfish. Regarding the latter, most fish permittees target sockeye and coho salmon in inshore marine waters under jurisdiction of Alaska Maritime Refuge. Federal subsistence permits can be obtained at the Kodiak Refuge headquarters and, in the case of deer, at some villages. Permittees are required to carry their Federal subsistence permits, current state licenses, harvest tickets, and locking tags (bear) while hunting.

Table 1. Federal subsistence permits issued and reported harvest (#), Kodiak area , 2009-2017 regulatory years.

Species	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18[2]
Bear	6(1)	7(1)	5(2)	2(0)	4(0)	3(0)	6(3)	3(0)	2(0)
Deer[1]	56(38)	67(42)	70(52)	20(11)	46(21)	48(39)	39(51)	50(66)	66(7)
Elk	5(0)	8(1)	6(0)	2(0)	5(2)	9(1)	4(2)	6(0)	7(1)
Fish				2(0)	8(36)	20(117)	19(63)	51(241)	55(380)

[1]Multiple deer eligible to be harvested per permit.
[2]Preliminary total permits issued and reported harvest.

Brown Bear

Population Assessment

In cooperation with the Alaska Department of Fish and Game (ADF&G), Kodiak National Wildlife Refuge biologists carried out an intensive aerial survey during May 2017 estimating brown bear density using standardized methods within an area encompassing the Red Lake, Akalura Lake and parts of Fraser Lake basins. Analyses estimated a density of 190 independent brown bears/1,000km^2. This density is within the acceptable range, 175 – 263 independent bears/1,000km^2, prescribed for the southwestern Kodiak Island region. This was the first time this area was surveyed so we cannot estimate trends at this time.

Brown Bear Stream Surveys

The Refuge has systematically monitored composition of the bear population in southwestern Kodiak Island over 30 years between 1985 and 2017. The dataset comprises observations acquired during low-level aerial surveys of a suite of six streams where bears congregated to feed on sockeye salmon or chum salmon between early July and mid-August. We analyzed data collected since 1985 by partitioning the dataset by time period (1985-2005; 2008-2012; 2013-2017) to highlight apparent changes in composition. Composition during the period 1985-2005 averaged 47% singles, 17% maternal females, 24% older cubs (i.e., >1 yr), and 11% cubs of the year (i.e. <1 yr). The period 2008-2012 showed a marked decline in the proportion of family groups within the population, indicating a period decrease in recruitment. The change in composition during 2008 – 2012 may have been due to lower availability of sockeye salmon and berries during the same period. We are currently investigating this pattern in cooperation with partners at ADF&G and Oregon State University. The period 2013-2017 indicated a return to levels observed during the earlier period where family groups comprised over 50% of the population.

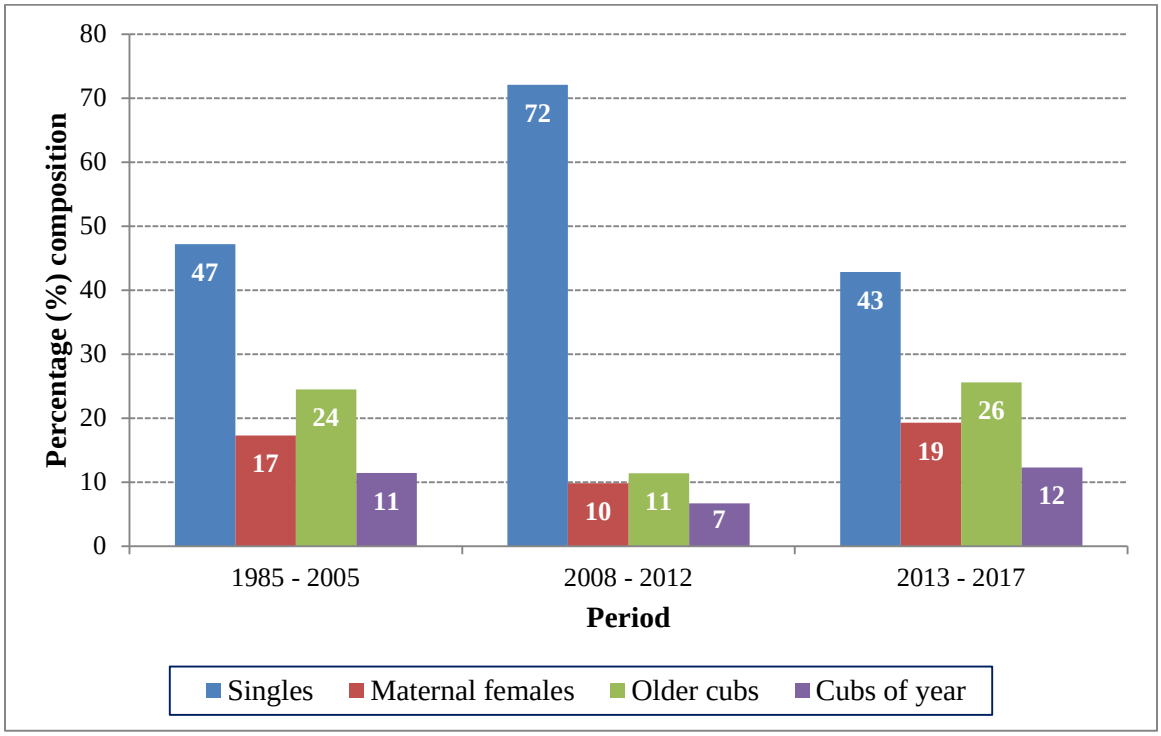

Figure 1. Composition of brown bear population in three time periods, southwestern Kodiak Island. Deviation in composition pattern during 2008 – 2012 attributed to diminished availability of sockeye salmon and berries.

Bear Mortality

Brown bear mortality from hunter harvest, Defense of Life and Property kills (DLPs), illegal kills, and other causes of mortality are routinely documented by the ADF&G in the Kodiak Archipelago. Of 265 bears harvested in combined fall 2015 and spring 2016 hunts in the Kodiak area, 146 were harvested within Refuge boundaries. These harvest levels were the highest recorded since inception of systematic harvest reporting in 1961. Composition of reported

harvest, dominated by adult male bears (e.g., 73% in Refuge) was within the ADF&G's target range.

Bear-Berry Monitoring

Following successful conclusion of 2015 – 2016 pilot study, we launched operational monitoring of berry plants important to brown bear. In 2017 we monitored phenology at 12 sites and abundance of berries and structural characteristic of berry-producing shrubs at 27 plots on Kodiak Island. Preliminary phenology results indicated that elderberry initiated flowering on June 11 at Karluk Lake—three weeks later than 2016. On plots, neither flower nor berry production was observed in elderberry, salmonberry, and oval-leaf blueberry. The salmonberry and blueberry crop failure may have been due to prolonged cold temperatures and minimal snow cover during winter 2016 – 2017. Our surveys of elderberry stands showed significant over-browsing by deer largely responsible for the elderberry crop failure. This may have had an adverse impact on bear foraging opportunities. Currently, we are processing 2017 field data and may present additional results to the Council at its September 2018 meeting. To access a copy of the pilot study report, refer to the following web link:
https://www.fws.gov/uploadedFiles/Region_7/NWRS/Zone_2/Kodiak/PDF/Report2017.4_BerryMonitoringPilotStudy_FinalReport_KodiakNWR(1).pdf

Figure 2. The inner bark of live red elderberry stems is preferred winter deer forage; however, intensive foraging usually kills stems and eliminates berry production until plants regenerate sufficiently the following year. (Bill Pyle/USFWS).

Bear – Salmon Research

William Leacock, Wildlife Biologist for the Refuge, in cooperation with Will Deacy, a Post-Doctoral Scholar at Oregon State University, along with colleagues at the University of Idaho, are currently analyzing habitat selection of bears with data collected from 2008-2015.

Sitka Black-tailed Deer

In our August 2017 we reported significant deer mortality observed in western and northern Kodiak Island during winter 2016-2017. This general outcome has been further confirmed by hunters who reported observing fewer deer and, in response, increased effort required to harvest deer, in fall 2017. Apparently overwinter mortality was substantially less in eastern and southern Kodiak Island, as supported by combined observations of agency biologists and hunters.

Figure 3. A successful subsistence hunter posed with a deer harvested in late December. (Bill Pyle/USFWS).

Roosevelt Elk

Radio-collared elk provide a basis for ADF&G's efforts to track herd locations and to estimate herd composition and population size in late summer prior to hunting season operation. Results from the ADF&G's 2017 elk survey indicated a population size of 1,080 elk including 120 in the Waterfall herd, which summers in the vicinity of Refuge lands on Afognak Island. Post-hunt analysis indicated that 94 elk were harvested in 2017 including six animals from the Waterfall herd.

Mountain Goat

In 2017, biologists with the ADF&G and Refuge cooperatively surveyed approximately 90% of known goat summer range on Kodiak Island during August. Of the 3,254 goats counted 2,595 were adults and were 659 kids. The ADF&G issued 249 drawing permits and 1,484 registration permits. A total 95 goats was harvested by drawing hunts and 166 goats have been harvested by registration hunt as of 8 January 2018. Some additional harvest is expected in registration hunt 480 between early January and mid-March 2018 when the season closes.

Reindeer

Distribution of reindeer is restricted to southwestern Kodiak Island where suitable habitat occurs. Over the past 20 years, herd size has fluctuated between 300 and 335 animals. Preliminary analysis indicated that 32 reindeer were harvested in 2017.

Migratory Birds

Seabird Colony Surveys

In summer 2017, avian biologists and volunteers targeted seabird colonies in the archipelago last surveyed from 2008 – 2010 for re-survey. From June to August we surveyed about 80% of the seabird colonies around Kodiak Island (about 150 of 180 colonies) at least once during the breeding season, tallying about 134,000 birds. We visited half the colonies (75) more than once to get information on productivity. Analysis is ongoing but a summary of the most commonly encountered marine birds and mammals is presented in Table 2. Seabird colony surveys will continue in summer 2018 focusing on Afognak and Shuyak Islands.

Table 2. Total counts by species of the most abundant marine bird and mammal species encountered at seabird colonies surveyed from June to August, 2017 on Kodiak Island (*includes repeat counts at the same colony; n = 260 counts at 150 colonies).

Category & Species	Total Count Summer 2017*
Birds	
Black-legged kittiwake	84,625
Tufted puffin	21,125
Glaucous-winged gull	10,496
Harlequin duck	2,205
Pigeon guillemot	2,202
Horned puffin	1,474
Pelagic cormorant	1,295
Arctic tern	1,136
Blackoystercatcher	889
Mew gull	479
Mammals	
Harbor seal	2,485
Sea otter	1,273

Figure 4. Black-legged kittiwakes at colony in Amook Pass, Uyak Bay with a small chick in one nest on 13 August 2017 (Robin Corcoran/USFWS).

The previous seabird colony survey report (2008-2010) can be viewed or downloaded from the refuge webpage at: https://www.fws.gov/uploadedFiles/Region_7/NWRS/Zone_2/Kodiak/PDF/Kodiak%20Seabird%20Colony%20Report%202013.pdf

Emperor Goose Harvest

As of Dec. 20, 194 permits were issued and 21 birds were harvested in the 2017 – 18 recreational sport hunt operated in the Kodiak area. Distribution of harvest was: Kodiak east, mainly Ugak and Kiiuda Bays (16); offshore of Kodiak roaded area (4); Marmot Bay (1).

Aleutian and Arctic Tern Research

In cooperation with ADF&G and other researchers, Refuge biologists continued to monitor nesting terns throughout the archipelago in hopes of determining reasons for declines in populations of both species throughout coastal Alaska. During the 2017 breeding season we collected count data for terns at 44 of the 53 known colony sights in the archipelago and searched for new colonies. Arctic terns were active at 28 colonies, and Aleutian terns were observed at 11 colonies, but we were able to confirm nesting at only five Aleutian tern colonies, and 11 Arctic tern colonies. Trail cameras were placed on the nests of Aleutian Terns and neighboring nesting seabird species to determine nest survival rates, causes of nest failure, and information on prey types being provided to chicks. A total of 19 cameras were set, including cameras at 15 active Aleutian tern nests, one abandoned Aleutian tern nest, two Arctic Tern nests, and one Mew Gull (*Larus canus*) nest. Two camera nests out of 18 survived to hatching, though we were unable to determine the fate of the chicks. Three nests were abandoned after

camera placement, and one camera failed within minutes of being set. The remaining 12 nests failed due to various predators including four by red foxes, three by black-billed magpies, two by northwestern crows, and one each by mew gulls, domestic sheep, and egging by local people (at the mew gull nest). The cameras also captured images of 149 chick provisioning events at two Aleutian tern nests with kelp greenling, Pacific sand lance, and other forage fish present in the diet. In addition to monitoring nest status, we collected habitat data at random sites and nest sites of Arctic tern, Aleutian tern, and mew gull. We found significant differences between species nesting microhabitat for various measures of vegetation height, distance between nests and the nearest vegetation, and the composition and extent of ground cover. We plan to continue this study in summer 2018 with a focus on tern colonies along the Kodiak road system, in east Sitkalidak Straits, and on Afognak and Shuyak Islands.

Figure 5. The avian research team measuring vegetation characteristics at an abandoned tern colony on Aiaktalik Island in June, 2017 (Robin Corcoran/USFWS).

Fisheries

Buskin River Salmon Passage Restoration

On January 11, 2017 the Exxon Valdez Trustee Council approved $4.5 million in funding to implement a proposal jointly prepared by the Service, ADF&G, and NOAA. Objectives of the project are restoration of fish passage via removal of 10 barriers, and via replacement of another 10 barriers (i.e., culverts) in partnership with three supportive landowners, the U.S. Coast Guard (USCG), Alaska Department of Transportation and Public Facilities, and the Natives of Kodiak. Completion of barrier removal and replacement, locally facilitated by the Kodiak Soil and Water Conservation District (KSWCD), will restore access to over six miles of upstream habitat and 53 acres of lakes in the 26 square mile Buskin River drainage. For more information contact Heather Hanson, Fish Passage Engineer, heather_hanson@fws.gov. To date the USCG has removed 9 barriers and reconstructed the stream channel in those areas. The other 11 removals and replacements are progressing with design with construction to start at one or two sites in the summer of 2018 and continue through 2020.

Figure 6. Before (left) and after (right) removal impeding fish passage in in a tributary stream of Buskin River. USCG equipment engaged in channel reconstruction. (Blythe Brown/KSWCD).

Akalura Creek Salmon Escapement Monitoring

The 2016 estimate of sockeye salmon escapement was 30,902 ± 7,990 (95% CI), slightly lower than 2015 estimate (32,802 ± 7,336; 95% CI). The estimation was based on analysis of data concurrently collected with fixed time-lapse and video cameras. The 2017 data is presently being analyzed and will be presented to the Council at its September meeting. We are planning on continuing this project during the 2018 field season. Copies of 2015 and 2016 reports can be obtained from Kevin VanHatten, kevin_vanhatten@fws.gov.

Networked Monitoring of Salmon Habitat Temperatures

For a third year, the Refuge continued to coordinate a network of seven organizations collectively responsible for hourly monitoring of water temperature of salmon habitat in 25 lakes and 31 streams of the Kodiak Archipelago. Goals of the network are to coordinate collection of water temperature data that meets salmon management needs of cooperating organizations; meets statewide minimum data collection standards; and is publically-accessible. Our focus on monitoring water temperatures of salmon habitat reflects recognition of its prominent influence on salmon at all life cycle stages; importance of salmon to the economy and ecosystem of the archipelago; and need to provide reliable time-series data to support development of proactive approaches to management of salmon in response to climate change. Presently, network partners include the ADF&G, Alutiiq Tribe of Old Harbor, Larsen Bay Tribal Council, Kodiak Regional Aquaculture Association, Sun'aq Tribe of Kodiak, U.S. Fish and Wildlife Service, and U.S. Geological Survey.

Figure 7. Kevin Van Hatten, Refuge Fisheries Biologist, completing periodic maintenance of Akalura Creek salmon counting station. (Bill Pyle/USFWS).

Figure 8. Danny Hernandez, Refuge Biological Technician, holding automated sensors used to record hourly water temperature of Connecticut Creek, an important sockeye salmon spawning stream. (Tori Stackhouse/USFWS).

Education, Outreach, and Other Noteworthy Activity

Salmon Camp

In 2017, a total 56 participants attended two-day Summer Science and Salmon Camp hosted by Kodiak Refuge in six rural communities (Larsen Bay, Port Lions, Ouzinkie, Karluk, Akhiok, and Old Harbor).

Migratory Bird and Alutiiq Culture Workshop

On January 6th, the Refuge hosted a workshop with Alutiiq artist Coral Chernoff, in partnership with the Sun'aq Tribe's environmental department. The workshop introduced historical and present cultural uses for migratory birds, discussed subsistence and conservation values, and offered a craft activity for participants to paint their favorite bird. We are planning visits to Akhiok and Larsen Bay at the end of January for similar workshops. Funding for this activity made possible by a regional FWS grant under the Connecting People with Nature program.

Figure 9. Coral Chernoff leading the Art and Culture workshop at the Refuge Visitor Center in Kodiak. (Lisa Hupp/USFWS).

Alaska Migratory Bird Calendar Contest

The Refuge distributed 2018 Migratory Bird Calendars to all village schools, with an invitation and guidelines to submit art and literature for the 2019 calendar contest. The theme is "Birds Bouncing Back: Conservation Works." Deadline to submit to the Kodiak Refuge office is February 9th, 2018. A local community panel of judges will assemble in the spring to select submissions for the statewide contest.

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Invasive Plant Management

The Refuge runs a small but important program geared to conserve fish, wildlife, and plant resources by preventing establishment on highly invasive plants on Refuge lands, and by applying Integrated Pest Management practices to restore native species in lands and waters degraded by highly invasive species. Primary 2017 efforts were directed at management of orange hawkweed in the Camp Island vicinity and reed canarygrass in the Buskin River drainage. Regarding outreach we visited 18 sites where salmon-fishing businesses lease setnet support facilities on Refuge lands and met with 40 individuals, in part, to present and discuss invasive plant concerns.

Figure 10. Refuge and District workers control the highly invasive reed canarygrass infesting the Buskin River drainage to prevent impacts to salmon habitat and wetlands. (Lisa Hupp/USFWS).