



# United States Department of the Interior



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

### Fisheries

*Please note that results of salmon counts presented below were provided by the Alaska Department of Fish and Game (ADF&G).*

#### Western Area

Subsistence users from Karluk and Larsen Bay were fairly successful in 2018. Strong returns of early-run sockeye salmon were reported and escapement goals met for both Karluk River and Ayakulik River. Escapement of early-run sockeye totaled 198,877 fish in the Karluk and 189,008 fish in the Ayakulik. Also noteworthy was escapement of 61,732 early-run sockeye salmon to Upper Station, which is above the 2009-2017 average returns (42,395).

The Chinook salmon returns to Karluk and Ayakulik Rivers did not meet their respective lower escapement goals. Karluk recorded 3,150 Chinook salmon returning to the system and Ayakulik recorded 2,149 Chinook salmon returning.

#### Northern Area

Litnik escapement totaled 17,601 (escapement goal 20,000 to 50,000 fish), and Buskin River escapement totaled 4,274 (escapement goal 5,000 to 8,000 fish). Subsistence users from Kodiak, Port Lions and Ouzinkie routinely targeted these runs in federal marine areas adjacent to Afognak "Litnik" River and Buskin River, but due to their poor returns they were unable to harvest any sockeye salmon from these areas.

#### Akalura Creek Salmon Escapement Monitoring

We counted adult sockeye salmon returning to Akalura Lake for a fourth consecutive year. Monitoring was initiated on July 2 and will conclude September 30. Field methods include a combination of automated timelapse photography and video to document salmon passing over panels mounted over the stream substrate. In the office, time-lapse photos are reviewed, fish are enumerated, and video is used to calibrate time-lapse counts. The last estimated returns for Akalura were in 2016 (30,7990 ± 7,990) but we are in the process of obtaining an estimate for 2017 later this fall.

## Brown Bear

### Population Assessments

In cooperation with the Alaska Department of Fish and Game (ADF&G), Kodiak National Wildlife Refuge biologists carried out a high quality intensive aerial survey during 22-26 May 2018 estimating brown bear density using standardized methods within the Sturgeon River survey area in southwest Kodiak. Analyses estimated a density of 115 independent (not including cubs) brown bears/1,000km<sup>2</sup> compared to an estimated 231 independent bears/1,000km<sup>2</sup> in 2007.

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. Unfortunately, this year we were unable to carry out the survey due to a heavy flight schedule and a shortage of pilots, aircraft, and unfavorable weather.

### Bear-Berry Monitoring

The Refuge monitored phenology and abundance of selected berry species important to brown bear in 2018. Summary results will be presented to the Council at its winter meeting. In contrast to 2017, all monitored berry species produced fruit and served as a food source for bears and people in 2018.



**Figure 1.** Catie Thow, Biological Technician, and Paul Larson, Biological Aid, collect data on the abundance of blueberry (*Vaccinium ovalifolium*) fruit. (Nadia Sherman/USFWS)

### Brown Bear Research

William Leacock, Wildlife Biologist for the Refuge, in cooperation with Will Deacy, a Post-Doctoral Scholar at Oregon State University, Jonathon Armstrong (Professor, OSU), and colleagues at the University of Idaho, are currently analyzing data collected from 2008-2015 and building predictive models for management purposes.

Leacock and colleagues have recently published a number of papers in scientific journals including:

- Phenological tracking associated with increased salmon consumption by brown bears.* Deacy, W. W., J. A. Erlenbach, W. B. Leacock, J. A. Stanford, C. T. Robbins, and J. B. Armstrong. 2018. Phenological tracking associated with increased salmon consumption by brown bears. *Scientific Reports* 8:11008.
- Body size and lean mass of brown bears across and within four diverse ecosystems.* 2018. G. V. Hilderbrand, D. D. Gustine, B. A. Mangipane, K. Joly, W. Leacock, L. S. Mangipane, J. Erlenbach, M. S. Sorum, M. D. Cameron, J. L. Belant & T. Cambier. *Journal of Zoology* 305: 1-10.
- Plasticity in physiological condition of female brown bears across diverse ecosystems.* 2018. Grant V. Hilderbrand, David D. Gustine, Buck Mangipane, Kyle Joly, William Leacock, Lindsey Mangipane, Joy Erlenbach, Mathew S. Sorum, Matthew D. Cameron, Jerrold L. Belant, Troy Cambier. *Polar Biology* 41:773–780.

The paper “Nested resource waves: phenological variation within salmon populations influences landscape-level patterns of brown bear activity” by W. Deacy, W. B. Leacock, J. A. Stanford and J. B. Armstrong has been submitted and is in review at a scientific journal.

### Northern Sea Otter

The Service’s Marine Mammal Division provided the following hunter harvest data for the Kodiak Area.

**Table 1.** Native Alaska hunter harvest of northern sea otter by village community and calendar year in Kodiak Archipelago, 2015-2018<sup>1</sup>.

<b>Village</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018*</b>
Afognak	0	0	17	8	0
Akhiok	4	0	0	0	0
Kodiak	66	26	111	51	7
Larsen Bay	11	15	2	4	10
Old Harbor	0	4	6	3	0
Ouzinkie	3	0	0	112	253
Port Lions	184	25	63	32	43
Total	268	70	199	210	313

<sup>1</sup>Incomplete data 2018 (harvest period ongoing).

## Migratory Birds

### Seabird Colony Surveys

In summer 2018, 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 98% of the seabird colonies around Afognak and Shuyak Islands (~ 180 of 184 colonies) at least once during the breeding season - tallying ~ 76,000 birds. We visited over half the colonies (119) 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 1.

**Table 2.** Total counts by species of the most abundant marine bird and mammal species encountered at seabird colonies surveyed from June to August, 2018 on Afognak and Shuyak Islands (\*includes repeat counts at the same colony; n = 314 counts at 194 colonies, including several additional colonies in Chiniak Bay).

<b>Species</b>	<b>Total Count Summer 2018*</b>
<i>Birds</i>	
Black-legged Kittiwake	25,115
Tufted Puffin	13,559
Glaucous-winged Gull	10,681
Pelagic Cormorant	1,818
Horned Puffin	1,663
Pigeon Guillemot	1,626
Harlequin Duck	1,559
Black Oystercatcher	1,205
Parakeet Auklet	977
<i>Mammals</i>	
Northern Sea Otter	2,188
Harbor Seal	2,010



**Figure 2.** Tufted Puffin at a colony in Seal Bay, Afognak Island on 21 August 2018 (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](https://www.fws.gov/uploadedFiles/Region_7/NWRS/Zone_2/Kodiak/PDF/Kodiak%20Seabird%20Colony%20Report%202013.pdf)

### 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 2018 breeding season we collected count data for terns at 30 of the 53 known colony sights in the archipelago and searched for new colonies. Arctic Terns were active at 26 colonies, and Aleutian Terns were observed at 13 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 60 cameras were set at 51 Aleutian Tern nests and 9 Arctic Tern nests. In addition we collected 555 acoustic (sound) recording days across 11 sites, and surveyed 152 habitat plots (at 61 Aleutian Tern nests, 11 Arctic Tern nests, six Mew Gull nests, and 74 associated random plots) at eight colonies. Tern colonies in the Kodiak Archipelago were also chosen to pilot test new methods to estimate tern abundance. Along with Aleutian Tern colonies in Yakutat and Dillingham, the Kodiak colonies were surveyed using four methods: 1) optical ground-based counts (standard method), 2) ground-based photocounts, 3) low altitude photography using unmanned aerial vehicles (UAVs), and 4) acoustic recording devices. Our ultimate goal is to improve tern colony monitoring in order to develop spatial and temporal sampling methods that will enable us to expand estimates from monitored colonies to the entire state.



**Figure 3.** Aleutian Terns nesting on the beach at the head of Kalsin Bay in July, 2018 (Robin Corcoran, USFWS).

## 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 2.** Federal subsistence permits issued and reported harvest (#), Kodiak Area, 2010-2018 regulatory years.

Species	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19 <sup>2</sup>
Bear	7(1)	5(2)	2(0)	4(0)	3(0)	6(3)	3(0)	3(1)	
Deer <sup>1</sup>	67(42)	70(52)	20(11)	46(21)	48(39)	39(51)	50(66)	66(15)	9
Elk	8(1)	6(0)	2(0)	5(2)	9(1)	4(2)	6(0)	7(1)	5
Fish			2(0)	8(36)	20(117)	19(63)	51(241)	56(560)	35

<sup>1</sup>Multiple deer eligible to be harvested per permit.

<sup>2</sup>Preliminary total permits issued.

## Education, Outreach, and Other Noteworthy Activity

This spring, Coral Chernoff led workshops for FWS seasonal employees for the Visitor Center, Salmon Camp, Youth Conservation Corp and visiting Arctic Youth Ambassadors about natural resource connections year round and subsistence way of life. We are very grateful to her for her time and generosity in sharing her knowledge and resources with us. The employees in attendance work with the general public and with youth education so it is vital for them to learn about the importance and value of these connections.

Kodiak kids found wild success in this year's Alaska Jr. Duck Stamp Contest! Art and science curriculum combine in this annual national conservation education program for students in kindergarten through high school. Kodiak students from Peterson Elementary and Ouzinkie won several prizes and honorable mentions for their beautiful bird art. This contest is open to any student from K-12th and ribbon winners were on display in the Kodiak Refuge Visitor Center during the month of May. We already have many submissions for next year's contest as well! Salmon Camp crew brought the curriculum to Akhiok, Larsen Bay and Karluk. The artwork from these students will be submitted for consideration for the coming contest with entries due in March of 2019.

William Leacock, who has served as the Refuge's bear biologist since 2006, has accepted a position as mammal biologist with Arctic National Wildlife Refuge. Over the years William forged several important research partnerships that yielded important science results. These results, conveyed in a series of technical papers, have substantially improved our understanding

of, and capacity to conserve, the iconic Kodiak brown bear. We are grateful for William's contributions!