



Resource Management 2020



Confluence of Katmai River and Mageik Creek from slopes of Observation Mountain
NPS D. Betchkal

National Park staff working in Katmai National Park and Preserve, Aniakchak National Monument and Preserve, and the Alagnak Wild River spend time in the field to study, inventory, and monitor cultural and natural resources.

The cultural resource program involves archeology and anthropology and focuses on the history of human occupation in the region. The natural resource program studies biological and physical resources, such as wildlife, fish, plants, wilderness, and backcountry resources.

This addition of our Resource newsletter primarily includes project results and updates from work completed in 2019. We are unsure of how the COVID-19 pandemic will affect our ability to complete scheduled field work in summer 2020.

Look for project and research updates on our website (www.nps.gov/katm), Facebook page, and through the [explore.org](https://www.explore.org) Katmai bear cams.

Research Permits

In addition to work conducted by NPS staff, external researchers come to the parklands to conduct a wide array of studies. The diversity of work helps to answer local management questions as well as those of greater interest to science. The parks are a vibrant, living laboratory.

Katmai Acoustic Inventory Report Published

Since 1918, Katmai's wild and unforgiving landscapes have been celebrated for their solitude. By way of contrast, isolation has drawn public attention to the park's transportation network since the early 1960's (Nagle 2013). The experience of natural quiet is a rare and privileged resource in our fast-paced world. Accordingly, interpretation of the park's establishing legislation suggests that natural soundscapes contribute fundamentally to making Katmai the unique place that it is (NPS 2009).

Conducted 2015 – 2017, the Katmai acoustic inventory project recorded soundscapes at fifteen locations across the park and preserve. Each recorder ran continuously for about thirty days. The data provide a thorough, contemporary look at the footprint of Katmai's transportation network in backcountry areas beyond portals. For example, the map on the following page shows the median noise-free interval (i.e., the typical length of time between when one motorized noise event stops to when the next starts.) Hallo Bay and Crosswinds Lake have very dense transportation, and rank among the most impacted backcountry sites in Alaskan parks.

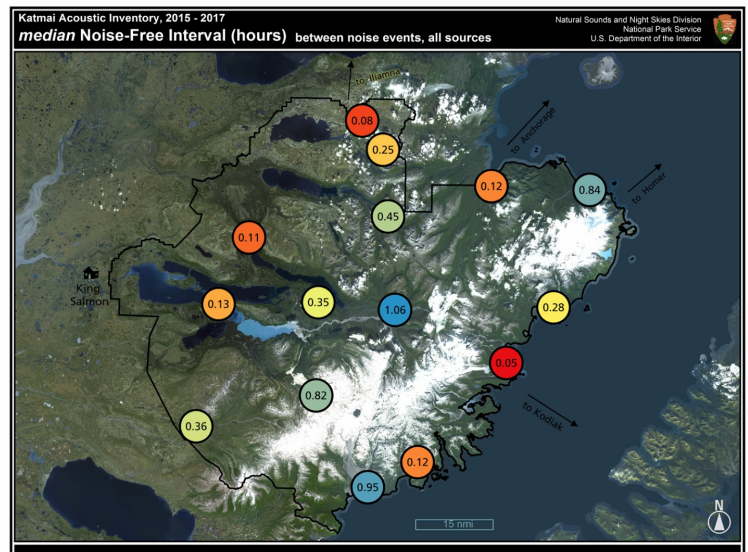
Katmai Acoustic Inventory continued

The project also resulted in numerous wildlife observations documented as audio recordings. Over 100+ recordings of birds have been submitted to the citizen science archive Xeno-Canto.

Download a full copy of the acoustic inventory report from the NPS website

<https://irma.nps.gov/Datastore/Reference/Profile/2271979>

left figure: Katmai Acoustic Inventory, 2015-2017 median noise-free interval (hours) between noise events, all sources



Wilderness Visitor Study: Understanding Visitors' Desired Social and Natural Conditions-- Project Update



A researcher from Kansas State University speaks with packrafters at Funnel Creek

During the summer of 2019, researchers from Clemson University and Kansas State University conducted the second phase of a two-phase investigation focused on the experiences of visitors to backcountry and wilderness areas at Katmai National Park and Preserve (KATM). Visitation has increased at KATM and park managers continually strive to address important visitor use and impact issues.

This research provides managers with information about visitors' perceptions that can inform decisions in an intentional and prescriptive manner.

For this phase, researchers developed an online, quantitative, questionnaire to assess visitors' preferences for conditions experienced during their visit, as informed by responses to Phase 1 (conducted in 2018). The researchers then distributed business cards with links to the questionnaire to backcountry visitors intercepted at Hallo Bay, Crosswinds Lake (Moraine/Funnel), and the King Salmon Airport. Potential respondents were encouraged to complete the survey at their earliest convenience and were sent three subsequent reminder emails.

Throughout the summer, 760 business cards were distributed, yielding 481 responses and a response rate of approximately 63%. Of this sample, 54% of users primarily participated in bear viewing during their visit and 25% primarily participated in sport fishing or angling. The large majority of respondents (75.3%) self-identified as white, with an approximately even split between males and females and average levels of income (25.9% earning >\$200,000) and education (43.2% with a graduate or professional degree) well beyond the national averages. Overall, results suggest high quality experiences among visitors to backcountry areas within KATM and conditions well above the minimum acceptable level. Further analysis is in progress, with an extensive final report forthcoming.

Brooks River Bear Monitoring

Ever since bears and people have been congregating over salmon along Brooks River, we have been able to recognize individual bears by using their physical and behavioral features. In 1988 protocols were developed to monitor brown bear behavior and abundance using individual bear identification. The abundant food resources of this area have allowed biologists to record the presence and absence of individual bears season after season and year after year using these identification techniques. This data collection has occurred regularly from 2001 to present day.

Recently, biologists have been using these data in a mark recapture framework allowing them to estimate annual survival of different age and sex groups within the local Brooks River bear population. Repeated counts of individual bears using Brooks River are also being used to estimate annual bear abundance. Biologists hope this analysis can help us understand how the bear population has been changing through time and what environmental features have been influencing those changes.

Bear Behavior by the New Brooks River Walkway

In January 2019, a new elevated walkway was built over the lower river at Brooks Camp, replacing the old floating bridge that had been in use since 1982. The walkway has changed the way people use the travel corridor and may impact bear use of the area. To help inform decisions regarding how to manage human traffic on this new walkway biologists have set up time lapse cameras to take photos of the lower river. With these photos we can compare bears' use of this primary feeding area before and after the walkway installation and investigate if these kinds of structures increase or decrease bear activity.

In 2018, we set up new cameras, matching the viewing angle to an old study to increase the sample size prior to bridge construction. In 2020, we hope to continue to take photos and refine our techniques for identifying bears in the pictures. Additionally, behavioral data is being collected and analyzed to look at factors that might be influencing bear use of the river near the new walkway. This project will run for five years to evaluate impacts to wildlife as bears become habituated to the new structure and help to determine if use of the new walkway causes bears to change their use of the lower river.



Cameras will help determine if and how bear behavior in the lower river changes as a result of the new elevated walkway. Photos: M. Griffin



The Dinosaurs of Aniakchak National Monument--Project Update



Field crew members examining one of the fossil soils found in the Chignik Formation of Aniakchak.

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In 2001 the discovery of the first dinosaur footprint occurred in Aniakchak National Monument, which was also the first record of a dinosaur in any NPS unit in Alaska. In 2002 there was the discovery of an additional two more dinosaur footprints. All three of these tracks could be attributed to duck-billed dinosaurs.

These discoveries occurred within the Cretaceous Chignik Formation, a rock unit approximately 70 million years old.

The results of paleontological work from 2016-2018 have recorded 78 track sites of fossil animals in Aniakchak, all within the same rock unit, and in 2019 the first technical paper describing this remarkable assemblage appeared in the open-access journal PLOS One (<https://doi.org/10.1371/journal.pone.0223471>). While most of the footprints can be attributed to plant-eating duck-billed dinosaurs, ranging from very young to fully mature individuals, other tracks found can be attributed to armored dinosaurs, meat-eating dinosaurs, and two kinds of fossil birds. The larger bird tracks are like the tracks previously described from Denali National Park, *Magnoavipes denaliensis*, a crane-sized bird, while the smaller bird tracks belong to a bird about the size of a modern Willet. The track size of the predatory dinosaur suggests a body size approximately 6-7 m long, about the size of *Nanuqsaurus*, the tyrannosaurid known from bones from the North Slope.

Future work will continue the study of the dinosaurs of Aniakchak with additional reconnaissance of rock exposures, examining the rich fossil plant record as well as the fossil soils. Details from these aspects of the work will provide a much better understanding of the environments, and the climate, in which these dinosaurs lived.

Monitoring for seabird die-offs in the park and community

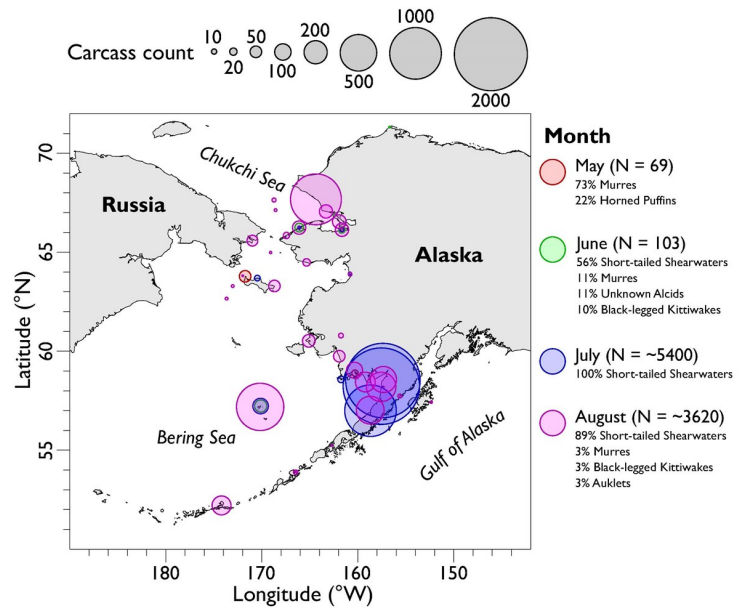
In 2019, the Bristol Bay region experienced a die-off of primarily short-tailed shearwaters beginning in late June and extending into August. Thousands of dead birds were documented including in areas like our local Naknek Beach. Short-tailed shearwaters typically feed offshore on zooplankton and it is unusual to see them close to shore. Fisherman reported that birds were acting strangely, appeared weakened, and were getting close to or caught in nets nearshore. Initial results from carcasses that were sent to U.S. Geological Survey National Wildlife Health Center indicate starvation as the cause of death.

We continue to monitor Katmai beaches in partnership with the Coastal Observation and Seabird Survey Team. Although last year the Katmai coast had relatively few dead seabirds on Hallo Bay and Swikshak beaches, a large die-off of common murres occurred between 2015 and 2016. Die-off events have occurred each year in Alaska since 2015.

We want to thank the Naknek high school science classes for helping us to monitor Naknek Beach along with community members who have reported dead birds to US Fish and Wildlife Service and National Park Service staff. For more information regarding Alaska seabird die-offs please visit:

<https://www.nps.gov/subjects/aknatureandscience/commonmurrewreck.htm>

You can report observations of sick or dead birds to US Fish and Wildlife Service by phone or email at: 1-866-527-3358 or AK_MBM@FWS.GOV



Counts of seabird mortalities across Alaska from May-August 2019. Map provided by Coastal Observation Seabird Survey Team (COASST) coast.org

If possible report the following information:

- Location, Time & Date observed
- Size of area observed (e.g. length of beach)
- Type & number of birds (count or estimate)
- Photos of sick/dead birds
- Video of unusual behavior

Katmai coastal wolf project



Above: Timelapse camera image at Swikshak Bay with a wolf carrying an otter circled in left photo and zoomed in on the right. **Below:** wolves visit a hair snare board at Swikshak and one wolf rubs on the wire leaving behind a hair sample.



As part of a coastal wolf pilot study we tested hair snare boards with chemical lure in order to collect wolf hair on the Katmai coast and along the Valley of Ten Thousand Smokes Road. Wolf hair can be analyzed to identify prey items through unique stable isotope signatures along with individual wolf genetics. We documented a couple of wolves visiting a scented site at Swikshak and one wolf rubbed on the wire attached to the board, leaving behind a hair sample (see photo). Due to its accessibility, we also tested boards along the Valley Road in August and September. Though we documented multiple wolf groups visiting the sites from trail cameras, no wolves rubbed on the snares. However, we were successful at attracting bears, which often rubbed on the boards and sometimes destroyed them. We hope that this method will continue to work on the coast in order to collect wolf hair to better understand coastal wolf diet through stable isotope analysis.

Our timelapse camera at Swikshak documented a wolf carrying a sea otter from a rocky island at low tide. This is the second observation of a wolf with an otter at Swikshak suggesting that wolves actively hunt otters from the island. The timelapse camera captured multiple instances of wolves and one bear on the island where otters haul-out. Another observation of a wolf with an otter was made on one of the islands in Hallo Bay. Data collection on wolves in Katmai will continue through 2022.

Other Natural Resources Program Updates from 2019

• National Oceanic and Atmospheric Administration (NOAA) standing stock survey

In 2019 we completed marine debris surveys on coastal beaches at Swikshak Bay, Hallo Bay, and Aniakchak National Monument.

• Backcountry Impacts Monitoring

Rangers collected backcountry impacts data locating and describing evidence of human presence in the backcountry such as fire rings, trash, obvious tent sites. Areas surveyed in 2019 included the Savonoski Loop (canoe/kayak route), American Creek corridor, and Crosswinds/Morraine-Funnel confluence area. Data was collected opportunistically in a few other locations as well.

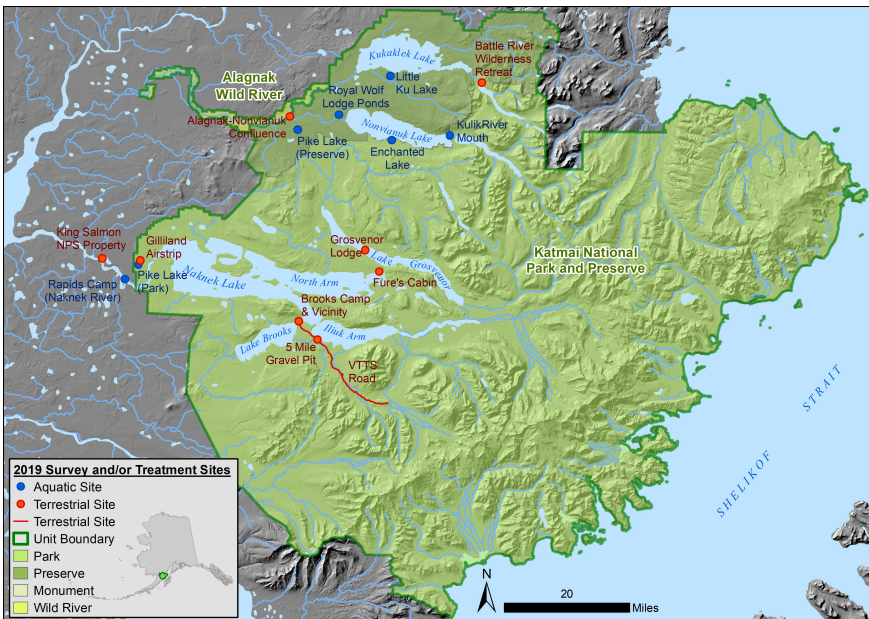
• Spatial Data Collection/GIS

High resolution orthoimagery was collected and processed for the Brooks Camp, Valley Road, and Olga Lake areas.

Rangers completed a GPS observation of the National Geodetic Survey's tidal benchmark on Takli Island in Shelikof Strait. The solution was published on the NOAA NGS Online Positioning User Service, OPUS (OPUS) and will be useful for any future sea level studies along the Katmai Coast.

• Bat monitoring

The park expanded acoustic monitoring sites in 2019 to include several coastal areas. Bats were detected over coastal waters along the Katmai coast suggesting they may forage over saltwater. We will continue to increase our understanding of bats in Katmai as the threat of white nose syndrome continues in North America.



• Invasive Plant Management

In 2019, Student Conservation Association interns and NPS staff treated terrestrial invasive plants through manual and chemical treatment at 28 known infestation sites in and near the park (see map above). Species found and treated included common dandelion, shepherd's purse, common plantain, sheep sorrel, and narrowleaf hawksbeard. Eight sites were surveyed for aquatic plants with no Elodea or other aquatic invasives found.



An acoustic monitor to detect bats was set up on the vessel used to conduct nearshore monitoring through the NPS Southwest Alaska Network. Bats were recorded over coastal waters of Katmai.

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National Park Service
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