Katmai National Park and Preserve
Aniakchak National Monument and Preserve
Alagnak Wild River

National Park Service
U.S. Department of the Interior

Resource Management News

Summer 2012 Projects

A view of Hallo Glacier from Hallo Bay on the Katmai Coast. Photo by Corey Dooley-Pfeiffer.

Each summer, 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. Summer is the time to do it: rivers are flowing, wildlife is active and study sites are accessible. With more than 4.73 million acres between the three park units, this is a busy time of year.

Resource Management falls under three main groups: cultural resources, natural resources, and inventory & monitoring. The cultural resource program focuses on the human history of this region, including archeology and anthropology. The natural resource program studies biological and physical resources, such as wildlife, fish, plants, wilderness, and backcountry resources. The third group, inventory and monitoring, is part of a National Park Service effort to understand the status of the park's significant natural resources. The Southwest Alaska Network (SWAN) Inventory and Monitoring Program cooperates with the park to conduct various surveys to understand how park resources may change over time.

We hope that you enjoy reading about the many projects occurring in these remarkable parklands. See you in the field!

Research Permits

In addition to work conducted by NPS staff, external researchers come to conduct studies. In 2011, 34 research permits were issued for work conducted in Alagnak, Aniakchak, and Katmai. Some of the projects being studied include investigations of the ongoing volcanism in the area, geological formations, climate change, fish ecology, plant health, and contaminant accumulation. 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 National Park & Preserve, Aniakchak National Monument and Preserve and Alagnak Wild River

Cultural Resource Projects

Archeology

Dr. James Dixon negotiates the recently emerged slope below an ice patch while searching for organic artifacts left by ancient caribou hunters. NPS photo by Dale Vinson.

Ice Patch Archaeology

Last summer, NPS archeologists and guest researchers expanded a project on ice patch archaeology to Katmai National Park. This project identified, surveyed, and assessed ice patches in Katmai likely to contain preserved cultural remains. Model predictions based on ice patches known to contain archeological material was used to predict ice patch locations in Katmai. The model highlighted 1,083 km^2 or 6.5% of Katmai's total area as high potential locations. Another 23 sites were identified by satellite imagery.

In August, Dr. James Dixon and Nicholas Jarman (University of New Mexico), Martin Callanan (ice patch researcher, Norwegian University of Science and Technology), and Katmai Archeologist Dale Vinson surveyed these areas as much as weather would allow. Aerial survey occurred in Katmai's western Front Range between Kulik and Battle Lake, between Kulik Lake and Lake Grosvenor, and in the Caribou Hills south of Lake Brooks. Thirteen of the 23 patches identified by satellite were over flown and 4 were surveyed on foot. Surveys were also conducted on 19 previously unidentified patches. No culturally modified materials were encountered during the surveys; however, low ice patch melt last summer may have been a factor. Field data provides a baseline for future studies of patch extent as well as a partial record of areas in Katmai that do not support permanent ice.

Archeologist Linda Chisholm draws stratigraphic profiles of the test units at Takli Island. NPS photo.

Coastal Archaeology Survey, Site Visits, and Condition Assessments of Amalik Bay

For 3 weeks last summer, 5 archeologists expanded a salvage testing project begun in 2009. The goals of this project were to salvage a cultural resource rapidly falling into the sea and to collect artifacts and animal remains from a site representative of the earliest period of intensive fishing, processing, and storage in southwest Alaska. Preliminary results suggest the occupants of this site captured Pacific cod in large numbers, and the rock-filled trench-hearths suggest these fish were dried and smoked for future consumption. Additionally, the occupants relied on birds, such as geese, ducks, and cormorants, and marine mammals, such as harbor seals and porpoises along with the occasional large-bodied whale. Analyses of collections will continue through 2012.

Restoration & Rehabilitation

Fure's cabins

Roy Fure was born in Lithuania in 1885 and came to Alaska in the early 1900s. He crafted the Bay of Islands cabin sometime between 1916 and 1926, and his American Creek cabin and sauna in 1940. Fure's greatest talents appeared in wood craftsmanship and carpentry, as well as his skill with machinery. In 2011, the shared Lake Clark and Katmai Cultural Resources Program stabilized Roy Fure's American Creek Cabin and Sauna. The Regional Historic Architect and the preservationist who stabilized the structures recognize that the level of craftsmanship is not matched by any contemporary wilderness cabin in Alaska. Fure's sense of design matches his level of craftsmanship at American Creek. The grand views looking south and west through the two expansive windows would have been stunning before the forest grew up around the cabin. The cabin's spacious layout with elevated ceilings and electric lights were also rare in wilderness Alaska during Fure's time. Fure's first home, built in the Bay of Islands on Naknek, has been fully restored and is a popular public use cabin. When Katmai's boundary expanded, Fure moved outside the park to American Creek where he put his skills and energy into constructing something that is unparalleled in architectural quality and design.

Roy Fure at his Bay of Islands cabin, circa 1920s–1930s. NPS photo.

Cultural Resource Projects

Paleontology

Scott Elias collecting peat samples from Little Takli Island in 2010. NPS photo.

Report on Holocene insect fossil assemblages, Little Takli Island, Katmai National Park and Preserve

A bluff on the west coast of Little Takli Island on Katmai's coast exposes approximately 2.3 meters of peat that was deposited in a small bog throughout much of the Holocene (i.e., the last 11,000 years). A column of peat at the same site where a previous excavation had taken peat for paleobotanical studies was recently collected specifically for the extraction of insect fossil remains. The aim of the study was to use the fossil insect assemblages extracted from the peat to reconstruct post glacial environments on the island, which is adjacent to another small island, Mink Island, from which significant archaeological finds have been documented. Scott E. Elias, Royal Holloway, University of London, the leading expert on the methods used to recover and identify fossil insects, recovered a minimum of 433 insects and arachnids from the samples. These include 50 insect taxa in 14 families of beetles, caddisflies, true flies, and wasps. Beetles *(Coleoptera)* were by far the most common insect order preserved in the assemblages. From 6,750 until about 5,000 years before present, the presence of coniferous bark-feeding beetles suggests the presence of conifer trees. This is difficult to understand in light of the paleobotanical evidence that indicates Little Takli Island did not support conifers at any time in the Holocene. However, the two beetle species indicative of conifers (the weevil *Sthereus quadrituberculatus* and the bark beetle *Dolurgus pumilus*) both live under the bark of conifers, so it is possible that the beetles arrived on the island onboard drift wood from trees that grew elsewhere in Alaska. There is evidence elsewhere in southern Alaska, such as the Cook Inlet region, that conifers were present during intervals of the Holocene in which little or no conifer pollen was preserved. In these circumstances the presence of conifers was detected through macrofossil remains (conifer wood or needles). Some wood was recovered from the Little Takli peat samples in this interval and it may be possible, therefore, that conifers were growing on Little Takli Island during the mid-Holocene, but that they were not producing sufficient pollen to be detected palynologically.

The climate change project

Special funding from the Climate Change and Cultural Resource Preservation Programs support an unusual study: Understanding 8,000 Years of Climate Change through Archeofaunal Analyses, SW Alaska. Archeofaunal assemblages—preserved bones and shells from archeological and paleontological sites—are important, but under-utilized repositories of unique natural and cultural resource scientific data spanning several millennia that can add significantly to our understanding of the effects of past climate change at an ecosystem level. By extension, these data can provide a measure of the degree of ecological changes likely to be experienced in the future under various climate change scenarios. Stable isotope analysis on selected ancient fish and DNA samples from sea otter bones, northern fur seals and Steller sea lions from Mink Island, in Katmai's Amalik Bay Archeological district National Historic Landmark, will contribute to this project. Preliminary results suggest that some taxa, like harbor seals and cormorants, are extremely resilient to all but the most dramatic changes in climate while other taxa, like ringed seal and eiders, are much more sensitive. This project is managed through Lake Clark National Park and conducted through a Cooperative Agreement with the Pacific Northwest Cooperative Ecosystem Studies Unit, cooperating with Western Washington University.

A typical sample of bones from a midden site. Bird bones are on the left, mammal bones are in the middle, and fish bones are on the right. Photo courtesy of Steve Denton, Burke Museum.

Cultural Resource Projects

Cultural Inventories

Panorama of a prehistoric village on the north side of the Meshik River

Chignik – Meshik Rivers Region Cultural Resource Inventory
The Park completed the 2nd year of the Chignik-Meshik Rivers Region Cultural Resource Reconnaissance Project last summer, which is focused on archeological survey and cultural resource inventory to establish the prehistory of the region affected by the Aniakchak volcano. This project is a cooperative effort between the NPS, the University of Alaska Museum of the North, and Antioch University New England. Highlights of the 2011 field work include: 7 newly recorded archeological sites (5 inside the Aniakchak National Monument and Preserve boundaries); testing of 4 previously known but under-studied sites; and 8 condition assessments. In addition to these scientific goals, project members combined with cooperating scholars from Hamline University and with volunteers from US Fish and Wildlife Service to visit community organizations and school groups in Chignik Lagoon, Chignik Lake, and Port Heiden. This multi-year project is a combined effort of the NPS, the UAF Museum, the US Fish and Wildlife Service, and various Native Corporations, Village Councils, and local landowners. Together with an emerging record of volcanism and environmental change, archaeological data will help to illustrate a comprehensive picture of human activity in the central Alaska Peninsula with emphasis on Aniakchak National Monument and Preserve. Work for this project will continue in 2012.

Ethnography

Reindeer herd at the mouth of the Gibraltar River, Iliamna (Kokhanok) Reindeer Station. Photo was taken around 1908–1909. This photo is courtesy of Mrs. Ray Schlaben.

Reindeer Herding Studies
Beginning in 2012 Dr. Patrick Platett, a cultural anthropologist from University of Alaska Fairbanks, will begin the first year of a reindeer herding study in Katmai and Aniakchak. Reindeer herding on the Alaska Peninsula resulted from a U.S. government plan to transform Alaska Native caribou hunters into reindeer herders. The first herds started around Kokhanok south of Lake Iliamna. Later, Inupiat herders from the Nome area move to the Bristol Bay coast in the area of Aniakchak Crater National Monument where some retain their cultural identity today. Researchers will work with tribal councils including Igiugig, Levelock, Kokhanok, King Salmon, Pilot Point, Port Heiden, Ugashik, and Egegik. The study will involve collecting oral histories from elders and documenting reindeer herding sites, such as camps, corrals, and handling areas.

Ongoing and New projects for 2012
There are some new and exciting projects happening this summer as part of the Cultural Resource program at Katmai, Aniakchak, and Alagnak. Highlights include:

- Participation at the 2012 Osher Lifelong Learning Institute's trip to Brooks Camp in June.
- May LIDAR surveys in and around the Brooks Camp area. This geospatial data will enhance existing GIS layers and provide detailed geomorphological data to understand natural and cultural processes that make up the Brooks Camp landscape.
- As part of the 100th anniversary of the Novarupta eruption, park staff will be involved in the America's Pompeii program, which will bring children from local villages to the park to explore the human and geologic history of the area.

Natural Resource Projects

Bear Studies

Bear 16, known as "Cinnamon" and one of Katmai's oldest known bears, takes advantage of fish remains left behind by another bear. Photo by Roy Wood.

Observational Monitoring of Bear and Human Use

Long–term observational monitoring of bear and human use of Brooks River will continue in 2012. Sampling includes recording bear use of river zones to the individual bear level. The detailed individual bear identification records that have been maintained have allowed researchers to recognize many of the bears that frequent Brooks River across study seasons and years. In 2011 there were 53 different bears identified regularly using the river during July, and 75 bears identified regularly using the river during the fall (each seasonal count includes some bears that were recognized in both seasons).

2011 was an interesting year at Brooks Falls. One of the oldest bears that we have a record of (known as Cinnamon by most of the visitors) returned. Since he was observed as a young adult in the late 1980s, he is estimated to be about 30 years old. Also, in July, a sow arrived at Brooks River with three spring cubs. She was a camp favorite as she was the only bear that showed up with multiple spring cubs. However, in late July one of her cubs was killed by one of the more dominant bears close to Brooks Falls. A few weeks later anglers witnessed one of the remaining two cubs being killed by a large male. It could not be confirmed if it was the same male that killed the first cub.

Long–term monitoring of bear and human use of the Moraine and Funnel Creek areas of the Preserve will also continue in 2012. During August, data is collected on age and sex composition of the bears in addition to data on specific areas that bears and humans use in this area. In 2011 researchers observed the highest number of bears in the area in over ten years of monitoring counting up to 33 bears that were visible at one time!

Bear activity study using time-lapse photography

From 2007 to 2009, Katmai biologists set up cameras at Geographic Harbor, a seasonal bear foraging area that experiences visitation by bear viewers and photographers, as part of a larger project to look at bear activity througout the park. Data collected allowed biologists to compare bear use to tide stage, time of day, day of year, and human activity levels. Findings show that bear activity peaked in mid-August, coinciding with the seasonal salmon run. The highest number of bears in a photo was 19, on August 30, 2007. Higher numbers of bears were recorded at low tide, when clam beds are accessible and fish are easier caught in the shallow water of the river mouth. Bear use was also observed to peak early in the morning and in the evening, with less activity observed at mid-day.

A unique aspect of this study was the ability to evaluate bear use in the presence and absence of people. Bears were not seen in numbers greater than 8 when there are more than 16 visitors present and the highest numbers of bears were observed when people were absent from the site. Further analysis corrected for changes in tide, season, and time of day found that the change in average bear numbers with increasing visitation was small, but the decrease was noticeable with increasing levels of visitation. The highest number of people counted in a photo was 29, on August 12, 2009. Long–term data collection and analysis of bear use at remote foraging sites will help Katmai identify natural and human-caused changes in bear use over time. This can then be used to adapt tourism and management activities to protect natural bear population dynamics and maintain high quality wildlife viewing experiences to the public.

In 2010 and 2011 the cameras were set up at Katmai Bay, a site that does not experience regular human use. Data analysis is ongoing, but will provide an interesting contrast to Geographic Harbor. This coming summer, expect to see the cameras at Swikshak Lagoon, a site that also attracts both bears and visitors.

Aerial Surveys in Katmai National Park and Preserve

During May 2012, an aerial bear survey will be performed to estimate the population and determine the age and sex composition of bears in Katmai. This estimate will then be compared to aerial surveys from the past to detect any changes/trends in population size and composition of bears.

Aerial stream surveys for bears were flown three different times from mid-August to late September in 2011. This was done to get a minimum count of the number of bears using the stream and shoreline areas of the preserve and see how it changes over time. There were 191 bears detected in August and only 50 detected in late September. This survey will also be done in 2012.

Natural Resource Projects

Wildlife projects

Assessing the Abundance of Moose on the Alaska Peninsula

Each year, Katmai works with the State of Alaska and the US Fish and Wildlife Service to survey for moose in November and early December as moose gather for the mating season. After December, males lose their antlers, making sex composition counts impossible. Unfortunately, weather and logistics prevented staff from conducting full surveys during the 2011 fall season. Park biologists are investigating new survey methods that will allow for data collection when snow conditions are not ideal for the traditional survey.

Moose in Katmai National Park. NPS photo.

Wolf at Brooks Camp in Katmai National Park. Photo by Roy Wood.

Katmai National Park Wolf Study

This year will be the first time that a wolf study will be performed at Katmai. This fall, in cooperation with Lake Clark National Park and Preserve and the US Fish and Wildlife Service, three wolves from known packs at Brooks Camp, Katmai Bay, and Swikshak Bay will be collared and tracked to determine pack territories, spatial use, and population densities. Hair samples will be collected and analyzed to determine the diet of each pack. It is possible that Katmai wolves depend on salmon to survive, which has been found in other wolves located on the Alaskan Peninsula in an ongoing study by the US Fish and Wildlife Service. Information gathered on the wolf ecology of the park will allow the Natural Resource team to make better management decisions.

Wildlife Sightings - tell us about them!

Each year, Katmai's biologists record wildlife sightings throughout the park. This summer, we will again be asking our visitors for help in gathering wildlife data as they travel around the park. Those on the valley tour will be asked to help count spruce grouse and hares while on their journey.

All visitors can fill out wildlife observations forms to record species that they see as they explore the park and preserve. In 2011, 279 different bird sightings were recorded with high numbers of individuals counted during fall migration. In total, 54 different species were recorded. Golden–crowned Kinglets were also discovered nesting at Brooks Camp, which had never been recorded in the area before.

Wildlife observation forms can be picked up at the Brooks Camp Visitor Center.

Avian Projects

In 2011, in cooperation with the Southwest Alaska Network Inventory and Monitoring Program, bald eagle surveys were performed in the Naknek drainage area. Thirty-three incubating nests were discovered —the largest number ever recorded for the area. Subsequent surveys showed a 62% nest success rate. Surveys will be repeated in 2012.

In early January, a Christmas Bird Count was performed at Brooks Camp. Nine species (with a total of 21 birds) were recorded.

2012 will mark an increase in avian studies at Katmai. In cooperation with the US Fish and Wildlife Service, owl surveys will occur from February to April in King Salmon and spring breeding bird and point count surveys will take place along the Valley Road and around Brooks Camp.

Bat Work at Brooks Camp

During 2011, an effort was made to determine the bat species that live in and around Brooks Camp. Based on digital recordings of bat calls made over multiple nights at multiple locations, it appears that they are little brown bats (*Myotis lucifugus*); however, this cannot be confirmed. In 2012 bats will be captured and DNA samples will be collected to confirm the identification.

July 20, 2011 was an unusual day as bats at three different locations were observed during the afternoon hours. This is not typical behavior of bats and multiple theories have been expressed on why this happened. It appears that this was a strange isolated incident as this was the only day that bats were observed out during daylight hours and there is no cause for concern.

Natural Resource Projects

Fisheries Projects

Left: Stevi collects threespine stickleback and sculpin from Naknek Lake. Right: Ella carries traps and sampling gear over the portage trail from the Bay of Islands to Grosvenor Lake. Photos courtesy of Ella Bowles.

For the past two summer, Ella Bowles, a PhD student from the University of Calgary (UofC), Canada, has been a guest researcher at Katmai, studying adaptation in aquatic environments. She has been assisted by UofC students Matthew Morris (2010) and Stevi Vanderzwan (2011). Ella shares her insight into this project:

"While our projects in Katmai are questions about basic science, we believe that our results will be useful for understanding the biology of Katmai in particular, and will be useful for conservation efforts in the long–term. Understanding how organisms move into and adapt to new ecological resources is a central question in evolutionary biology. Adaptation is the process whereby organisms become well suited to their environment. We will study adaptive phenotypic and genomic divergence in species in lakes of different ages to understand how genetic variation enables organisms to adapt to new environments. We will focus on populations of sculpin *(Cottus spp)*, and threespine stickleback *(Gasterosteus aculeatus)*, small marine fish that colonized fresh water streams following the last ice age. This study will contribute to understanding the mechanism of adaptation, and also to an understanding of how connected marine and freshwater environments are in Katmai in particular. Stickleback are pervasive in Alaskan lakes, and using them as a biomarker to understand migration, gene flow and evolution into new habitats will be useful for other more commercially important species such as Pacific salmon."

Ella and Stevi will be returning to Katmai this summer to continue work on this project. Katmai appreciates the dedication and unique insights that our academic partners bring to their work in our parks.

Kyle Shedd, a Master's student at the University of Alaska Anchorage has been working at Katmai since 2007. He began his graduate research in 2010 in fisheries and completed his fieldwork in the park last summer. Kyle's research had two main field components:

Recent evolution of kokanee species pair

Several morphologically distinct species pairs occur across many freshwater fish taxa as a result of differences in feeding ecology and trophic life history. Such distinctions may arise from divergent selection due to food competition and niche adaptation. Sockeye salmon *(Oncorhynchus nerka)* have diverged into anadromous (ocean–going) and resident populations, known as kokanee, in many lakes throughout western North America. In this study, I examine a naturally occurring species pair of kokanee in Lake Jo–Jo that appears to have arisen within the past 200–800 years. Both types have distinct diets: one specializes on threespine stickleback, the other feeds predominantly on macro–invertebrates, such as leeches. Preliminary genetic results suggest weak, but significant levels of divergence between the two types. This divergence could be indicative of reproductive isolation and the initial stages of ecological speciation. These findings provide further evidence of the unique ways in which salmon continue to adapt in this ever–changing region.

Trophic patterns of mercury concentration at Lake Jo–Jo

Mercury is a pervasive environmental contaminant and neurotoxin in its methylated form. While naturally present as a trace element, mercury levels are a growing concern due to increasing levels of human–related emissions which can impact remote ecosystems globally through atmospheric deposition and ocean transfer (through ocean currents and migrating marine organisms, such as salmon). Mercury can also biomagnify up food webs into organisms at higher trophic levels. The goal of this project is to utilize stable isotopes of carbon and nitrogen to interpret food web patterns of mercury concentration in a freshwater lake (Jo–Jo) that lacks an influx of marine–derived mercury. This project will help determine the relative importance of different mercury sources (marine vs. non–marine) and pathways (phytoplankton–driven food webs vs. algae–driven food webs) within freshwater lakes.

Bob Peterson, Mark Woodsum and Kyle Shedd at Lake Jo–Jo. Photo courtesy of Yarrow Axford.

Prevent the spread of invasives!

Anglers are reminded that footwear with absorbent felt or other fibrous material on the soles are prohibited while sport fishing in the fresh waters of Alaska. This prohibition was adopted to reduce the potential for introduction and spread of invasive organisms, including plants, into Alaska waters.

Natural Resource Projects

Exotic Plant Management Team

Repeated manual treatments and reseeding efforts at the Brooks Camp cultural site have shifted the plant composition from primarily dandelion to mostly native species. NPS photos.

Invasive plants put the complex balance of plant and animal communities in Alaskan national parks at risk. Invasive plants are not native to an area, display rapid growth, and spread with little or no human assistance. They are a concern because they threaten the genetic integrity of native flora through hybridization, can out-compete native plant species for limited resources, and can change the structure and function of ecosystems. Establishment of invasive plants can also result in loss of habitat and food sources for native insects, birds, fish, and mammals.

Since 2005, Katmai has worked to inventory and control non–native plant species. A total of 13 invasive plant species have been documented on park lands with an additional 11 species growing on nearby lands. Many of these species are still restricted to disturbed areas, such as the trails at Brooks Camp, so the Exotic Plant Management Team (EPMT) works to control these infestations and prevent them from moving into more remote areas of the park.

Katmai remains one of the most pristine parks with regards to invasive plant species, and it hopes to retain that distinction. The EPMT conducts outreach events to raise public awareness. Prevention is another critical component to the program's success. Boot brushes have been installed at key locations to reduce the risk of seeds being transported to new areas on footwear. Heavy equipment leaving for Brooks Camp undergoes cleaning and inspection. Finally, the team vigilantly searches during the growing season for new species.

Visitor Use

Bear-viewing at Geographic Harbor. In 2011, the majority of visitors observed bears from the creek bank. Although bears were not observed resting at this location, they did use it as a travel corridor. NPS photo.

Katmai's best bear viewing practices program

Every year, people come to Katmai from all over the world to see and photograph coastal brown bears. Katmai is home to the highest concentration of brown bears in the world and aggregations of bears at seasonal foraging areas provide opportunities to see high numbers of bears in their natural environment. Katmai's management efforts focus on maintaining healthy wildlife populations and positive and safe visitor experiences. In 2003, Katmai, in cooperation with the State of Alaska and local guides, developed a set of best practices for bear viewing along the coast to promote appropriate human activity and behavior around bears and their feeding sites. Last summer, Katmai researchers conducted field observations to see if these guidelines were being followed. Findings showed that a very high proportion of visitors follow the guidelines. In general, visitors stayed in groups, observed bears quietly from open areas, accessed sites along consistently used routes and kept their gear close at hand.

While at Geographic Harbor, researchers noted that bears were utilizing the park's recommended bear viewing site, an island in the river mouth, for resting and feeding. The majority of visitors were using another site on the river bank. The recommended viewing location has since been changed to the more popular location, an area that has less of an impact on bear feeding activities.

Marine debris watch

In March 2011, an earthquake in the Pacific Ocean created a tsunami that inundated coastal cities and villages near Sendai, Japan. As the water receded, material from land was washed into the Pacific Ocean. While most of the debris sank, some of it is floating in the Pacific and may wash up on US beaches as early as this year. If you are on the Katmai or Aniakchak coasts and see unusually large amounts of debris, or any hazardous materials that may be from the 2011 tsunami, please contact the park at (907) 246-3305. Sighting descriptions and location information can also be reported to disasterdebris@noaa.gov. Photos would also be appreciated and useful in determining the origin of the debris.

Ongoing and New projects, 2012

The Natural Resource team has a lot of great work planned for 2012. Highlights include:

- Fourth of July butterfly count.
- Aniakchak bathymetry study.
- COASST beach surveys.
- Backcountry impacts mapping.
- Time-lapse photography at Brooks River.

Southwest Alaska Network Projects

The Southwest Alaska Network (SWAN) is one of 32 Inventory and Monitoring programs across the National Park Service. This national strategy is an effort to understand what natural resources exist within the park units (inventory) and the condition of those natural resources (monitoring). A major role of the National Park Service Inventory and Monitoring (I&M) Program is to provide broad–based natural resource information necessary to make scientifically sound management decisions. The SWAN Inventory and Monitoring Program comprises five Alaskan park units: Katmai National Park and Preserve, Aniakchak National Monument and Preserve, Alagnak Wild River, Lake Clark National Park and Preserve, and Kenai Fjords National Park. These parks were grouped into a single network because they share similar ecological characteristics, such as marine coastal habitats and large runs of anadromous fish. The network has chosen specific vital signs (key biological, physical, and chemical indicators) in six resource areas for long–term monitoring to assess the condition of park ecosystems. Site visits and sampling for the following SWAN projects will occur in Katmai National Park and Preserve this summer.

Nearshore Monitoring

The black oystercatcher is one of several nearshore vital signs. Although their nests are poorly defined, adults actively protect their eggs and chicks. NPS photo.

Heather Coletti and John Maniscalco conducting marine bird and mammal surveys along the Katmai Coast, March 2012. NPS photo.

The marine coastline of Katmai, Aniakchak, and other SWAN park units spans 1,200 miles in the Northern Gulf of Alaska and includes almost one–third of the marine coastline within the entire National Park System. Intertidal and subtidal areas of the marine nearshore are some of the most productive habitats in the Gulf of Alaska and are highly susceptible to human–related disturbances. Nearshore habitats provide important feeding grounds for mammals, such as sea otter and brown bear, and provide nurseries for many marine organisms.

In 2012 the Exxon Valdez Oil Spill (EVOS) Trustee Council began funding for an integrated, multidisciplinary five year program that supports long–term monitoring of marine conditions and resources injured by the EVOS oil spill. The program encompasses a variety of themes, including environmental drivers (oceanography and plankton), the benthic marine ecosystem (intertidal invertebrates and algae, sea otter, and seabirds), the pelagic marine ecosystem (whales, seabirds, and forage fish), and lingering oil that may still exist in the sediments and wildlife. The geographic range of the program stretches from Prince William Sound, across Kenai Fjords National Park to lower Cook Inlet, including Kachemak Bay, all the way across to Katmai National Park and Preserve on the Alaska Peninsula. SWAN and the NPS are active partners in this monitoring effort that relies on partnerships and in–kind support for success. With over 24 principle investigators from 15 different agencies (both state and federal), universities, and NGOs, this collaboration is sure to provide insight into the changes anticipated to occur in the marine environment within the Gulf of Alaska.

In March 2012, the second boat–based winter marine bird survey was conducted. This biennial survey indicates that the Katmai coast is an important resource for over–wintering sea ducks, many of which have only been observed during these winter surveys. The full suite of nearshore monitoring will take place over a ten day period beginning in late June and will mark the sixth year of data collection. The suite of metrics monitored include: black oystercatcher productivity, diet and nest density, and invertebrate (clam, mussel, and limpet) density and size class as well as eelgrass bed density, seabird distribution and density and sea otter foraging success, prey size and composition. In addition to the boat–based operations, an aerial survey of sea otters will be conducted to estimate the size of the southwest stock along the Katmai Coast.

Southwest Alaska Network Projects

Vegetation Composition and Structure

Vegetation is integral to ecosystem function and element cycling and is a sensitive indicator of environmental change. In addition to their scenic qualities, these ecosystems also provide habitat and forage for moose, caribou, brown bears, and a variety of other wildlife, as well as food and materials for subsistence users.

Vegetation composition and structure are being monitored at multiple temporal and spatial scales using a variety of sampling approaches. At the community scale, ground–based vegetation plot measurements are being used to characterize stand structure, species composition, and selected environmental variables, such as soil temperature. For example, loss of tundra habitat and/or lichen cover due to shrub encroachment may be documented through a combination of plot measurements and ground photos. To date, roughly 45 monitoring plots have been established in low (0–450 m), mid (450–900 m), and high elevation (>900 m) sites in Katmai National Park and Preserve. This field season approximately 25% of the plots will be resampled over a two week period in late July through early August. To the extent possible, sampling dates coincide with when these vegetation communities are near or at their productivity peak.

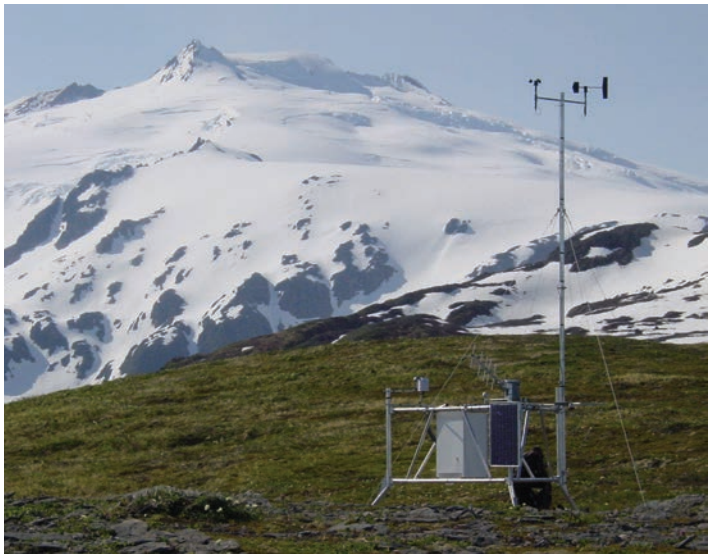
SWAN ecologists use a specially developed instrument to measure the frequency with which plant species occur along a transect established in spruce forest near Nonvianuk Lake. NPS Photo.

Weather and Climate

Climate is considered the most important factor influencing ecosystems. Because global climate models indicate that climate change and variability will be greatest at high latitudes, climate monitoring in Alaska is critical to understanding the changing conditions of park ecosystems. Potential effects in SWAN park units include a reduced snowpack, earlier lake ice break–up, warmer winters, and wetter summers. These changes may affect the distribution, abundance, growth, and productivity of plants and animals.

SWAN installed four weather stations in Katmai (Pfaff Mine, Coville, Contact Creek, and Fourpeaked) during the 2008 and 2009 field seasons. These weather stations record weather observations in locations characteristic of the diverse landscape and topography within these parks. This information will support real–time needs, identify natural variability in weather patterns and long–term climate trends, and help interpret ecosystem changes.

Weather stations are serviced annually in June when sensors are replaced based on their maintenance schedule. Each weather station is checked for stability and function as severe winters and large wildlife can take their toll on the site infrastructure and operational capacity. This summer the National Oceanic and Atmospheric Administration is scheduled to establish a US Climate Reference Network (USCRN) station at Contact Creek. The primary goal of USCRN is to provide long–term uniform temperature and precipitation observations that can be linked to long–term historical observations to help explain current and future climate change. The SWAN Contact Creek weather station will remain co–located with the USCRN for one year and then be relocated to Dumpling Mountain in 2013.



The Fourpeaked RAWS (1075 feet ASL) is located adjacent to Fourpeaked Mountain. Moist air masses are intercepted by the Aleutian Range and heavy precipitation falls on the east side of the range where high elevations and cool temperatures are conducive to the formation of glaciers, like those that flank Fourpeaked Mountain. NPS photo.

Southwest Alaska Network Projects

Brown Bears

Brown bears serve important ecological roles as top predators; specifically, they influence population dynamics of other species and transfer nutrients from spawning salmon to the terrestrial system. Alagnak Wild River, Aniakchak National Monument and Preserve, Katmai National Park and Preserve, and Lake Clark National Park and Preserve support high numbers of brown bears; densities along the coast of Katmai are the highest reported in North America. Brown bears are also an economically important resource for wildlife viewing, sport hunting, and subsistence hunting.

An aerial survey technique developed by the Alaska Department of Fish and Game was used to obtain estimates of about 2180 brown bears in Katmai during 2004–2005. To date, these are the only parkwide abundance estimates of brown bears currently available for Katmai. Due to the high cost and time demands of park–wide aerial surveys, repeat surveys are often cost prohibitive.

This spring wildlife biologists will test a new method to estimate the brown bear population by surveying bear dens, instead of bears. From late April to the middle of May, biologists plan to fly in aircraft around small areas of the park searching for muddy tracks and large holes in snow to identify dens that were used by bears during the previous winter. By assuming 1 adult bear lived in each den, the total number of bear dens should be roughly equivalent to the total number of adult bears. Because dens don't move, the mathematics needed to calculate the rate that bears emerge from dens in the spring, while also correcting for our ability to find dens, is simpler than the method used for the aerial bear counts. This means that the den surveys have the potential to reduce the amount of time biologists have to spend in planes in order to obtain information on brown bear abundance. We also plan to conduct a traditional aerial bear survey in the same location so that the two methods can be compared directly.

Many visitors travel to Katmai each year for world-class bear viewing opportunities. SWAN is assisting Katmai resource management staff with determining a method to reliably and cost effectively estimate the brown bear populations in the park and preserve. NPS photo.

Freshwater Monitoring

SWAN and Katmai staff deploy a submerged temperature array in the Iliuk Arm of Naknek Lake. These arrays record lake temperature data year round at depths ranging from 5–100 m. NPS photo.

As integrators of water, energy, nutrients, solutes, and pollutants from the landscape and atmosphere, lakes and rivers are interactive components of their environment. As such, monitoring water quality parameters (temperature, dissolved oxygen, pH, and conductivity) and surface hydrology provides an indication of watershed–level changes that may affect lake processes. Currently, SWAN park units contain some of the larger and more pristine freshwater resources in the national park system, including Naknek Lake. Despite the remote, wilderness nature of lakes and rivers within SWAN park units, these systems are subject to large–scale anthropogenic influences, such as climate change and atmospheric pollutants. These man–made influences have the potential to impact many aquatic processes that are driven by water quality, such as lake productivity and fish reproductive success.

SWAN aquatic ecologists have designed a monitoring plan to examine key physical and chemical components of lake systems in Katmai. These monitoring components are combined with other vital signs, such as surface hydrology, lake ice phenology, and glacial extent, enabling aquatic ecologists to establish a more complete picture of watershed–level dynamics that influence lake productivity.

In 2012, SWAN aquatic ecologists will conduct the annual water quality sampling in August. Each of the four basins in Nakenk Lake as well as Lake Brooks will be sampled. Lake temperature data from a series of submerged moored temperature arrays will also be retrieved and downloaded and lake levels will be monitored during the ice free period (May – October) using programmed level loggers, which are installed seasonally.

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The National Park Service cares for the special places saved by the American people so that all may experience our heritage.

Katmai National Park & Preserve, Aniakchak National Monument & Preserve, and Alagnak Wild River

2012 marks the 100th anniversary of the eruption of Novarupta, the largest eruption of the 20th century and the event that led to the creation of Katmai National Monument in 1918. Since its creation, Katmai has undergone many expansions to preserve and protect the resources within this region. In 1931, the monument was expanded to protect brown bear, moose and other wildlife. In 1942, islands within five miles of the shoreline in the Shelikof Strait were added to protect sea mammals resting on the islands. The boundary was expanded in 1969 to include all of Naknek Lake. Another 1.4 million acres were added in 1978 to the monument to protect brown bear habitat and watersheds vital to red salmon spawning. In 1980, the Alaska National Interest Lands Conservation Act (ANILCA) redesignated 3.7 million acres as Katmai National Park. ANILCA also designated 308, 000 acres as Katmai National Preserve.

Aniakchak National Monument and Preserve was established in 1978 to preserve the Aniakchak caldera and its associated landscape, including the Aniakchak River and other lakes and streams, in their natural state. It was also created to assure continuation of the natural process of biological succession; and to protect brown bears, moose, caribou, sea lions, seals, and other marine mammals, geese, swans, and other waterfowl. The area is one of the least visited areas in the National Park System because of poor weather conditions typically hindering access.

Alagnak Wild River was established in 1980 through ANILCA to preserve the free–flowing condition of the river.