



Resource Management News

Summer 2006 Projects



Valley of Ten Thousand Smokes. Photo by J. Gavin.

Summer is the busy season for resource management staff in Katmai National Park and Preserve. Rivers are running, lakes are thawed, bears are active, and study sites are accessible. In addition to Katmai National Park and Preserve, the resource management staff also covers Aniakchak National Monument and Preserve and Alagnak Wild River. The total area for all three units is more than 4.62 million acres. A lot of area to cover, especially with no automobile access. Nearly every field project requires a boat, float plane, or wheeled plane to access study sites.

Resource Management for the three park units can be separated into three main groups: cultural resources, natural resources, and inventory & monitoring. Cultural resources revolve around past and present people. History, archeology, and anthropology are all part of cultural resource stewardship. Natural resources consist of the biological and physi-

cal resources. Biological resources include wildlife, fish, plants, invertebrates, and algae. Physical resources include volcanos, rocks, soils, and water. The third major group, inventory and monitoring, is part of a National Park Service effort to understand the status of the park's significant natural resources. For Katmai, 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 Katmai National Park and Preserve and Aniakchak National Monument and Preserve. See you in the field!

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Katmai's Cultural Resource Projects

Cultural Inventories

Historic Structure Inventory and Condition Assessment

The Katmai National Park and Preserve Historic Structures Inventory and Condition Assessment is a multi-year project whose purpose is to survey and inventory, document, evaluate historical significance, and assess the condition of historic structures reported to be in the park. Last year, twenty sites were surveyed within Katmai. The majority of these sites were cabins and caches used by twentieth century subsistence trappers, hunters, and prospectors. Field data are used to evaluate these structures with the National Register of Historic Properties criteria. From this information a multiple property determination of eligibility on structures representing trapping lifeways in the twentieth century is being written. Examples of properties within this document include Paul Chukan's Naknek Lake Cabin Complex, Chukan's Research Bay Cabin, Roy Fure's American Creek Cabin, and Hammersly's Cabin. Once determined eligible, the park will nominate these properties to the National Register of Historic Places. Portland Packer Scotty's Cabin, the Brooks Lake Laboratory (BL-3), the Brooks Camp ranger station, and the Brooks Camp boat house have all been determined eligible for and are being nominated to the National Register. Information gathered from this project is being used to recommend properties for repair and/or rehabilitation, and will also contribute to management decisions, baseline knowledge, and interpretation of the history of the area.



Late prehistoric (1400–1820 A.D.) ground slate projectile points from Brooks River Cutbank Site. Photo by B. Bundy, NPS.



The Brooks Lake Laboratory, constructed by the U.S. Bureau of Commercial Fisheries between 1941 and 1943, and used as a center for Naknek drainage fisheries research until 1967. Photo by K. Spengler.

Brooks Camp and Valley of Ten Thousand Smokes Landscape Inventories

At the end of the last glaciation, the Brooks River area was submerged under one large lake. The water gradually dropped exposing ancient shorelines, terraces and spits until the emergence of bedrock at Brooks Falls formed two lakes connected by Brooks River. The pattern of occupying newly-emerged shoreline features shows that human occupations were focused on Brooks River. The same forces that created the Brooks River landscape eroded or deeply buried some earlier sites. The archeological sites along Brooks River today are the survivors of the geological processes. The geological features, vegetation, wildlife and views of the surrounding mountains and tundra are all elements of this landscape.

A cultural landscape inventory for the Brooks River Archeological District is in progress. A cultural landscape is a spatial arrangement of cultural properties integrated by a specific theme; in this case a natural system: the Brooks River. There are 21 archeological sites in the Brooks River Archeological district which includes hundreds of surface features distributed on ancient shorelines, terraces and abandoned channels along Brooks River and the adjacent shores of Brooks and Naknek Lakes. The inventory will list the natural and cultural features that presently exist in the Brooks River vicinity and identify the contributing elements of the Brooks River landscape. Once the inventory has been completed the Cultural Resource staff will produce a Cultural Landscape report which will prescribe treatments to maintain the contributing elements of the Brooks River cultural landscape. A similar inventory will take place for the Valley of Ten Thousand Smokes Road.

Lake Archeological Surveys

Current understanding of Katmai's archeological record indicates that humans occupied this area at least as early as 8,000 years ago. However research that yielded this knowledge occurred almost entirely on the Katmai coast and the Naknek drainage, especially on the Brooks and Savonoski Rivers. In 2006, archeologists will conduct the third year of the Katmai Archeological and Historic Sites Survey. In the past two seasons, surveys have targeted the Kukaklek and Non-vianuk Lakes area in Katmai Preserve. Project archeologists have so far surveyed approximately 4,300 acres and documented 34 new archeological sites. In 2006, archeologists will focus on the Lake Coville, Lake Grosvenor and Naknek Lake areas. The information gained by the survey will be used to promote new research to update settlement patterns and cultural histories, and to advise park managers concerning cultural resources protection.

Katmai's Cultural Resource Projects

Archeology



Mink Island. Inset picture indicates clam and fish remains found at site. Both photos by J. Schaaf, NPS.

Mink Island Analyses and Landscape History

Analytical research of the collections from the Mink Island archeological site on the Katmai coast will continue this summer. These studies are important because they provide the single, most comprehensive and only long-term (7,000 years) dataset for understanding marine response to climate and environmental change. On-going multidisciplinary studies include:

- Sediment analyses, site formation processes (geoarcheology), and volcanic, landscape and sea level history
- analysis of the terrestrial and marine fish, birds and mammal remains
- identification of shellfish remains
- mitochondrial DNA analysis of four samples from burials at least 800 years old
- physical analysis (age, sex, health history) of several burials
- pollen analysis for understanding vegetation history
- artifact, radiocarbon, and living floor analyses
- stable isotope analyses of modern and ancient mollusk shells to understand the impact of climate on Alaska coastal systems
- analysis of sea otter bones using stable isotopes and mercury as tracers of paleoenvironmental change

Archeological Site Stabilization: Mink Island

The Mink Island archeological site is the cornerstone of the Amalik Bay National Archeological Landmark District on the National Register of Historic Places. This exposed and severely eroding site is the oldest known site along the Katmai coast. The well-preserved stratigraphy including occupation floors and a rich faunal record dating from 7,300 years ago to 500 years ago, will enable us to define the cultural history for the Katmai coast from these data. This summer's stabilization project would construct rock gabions by hand using local materials to protect the remaining intact living floors from storm events.

Ethnography

Katmai Coastal Village Ethnography

A special ethnographic study, Ethnohistorical Study of Katmai Coastal Villages and Village Life in the Nineteenth Century, will be completed this summer. It is based on extensive research and translation of Russian-American Company records, Alaskan Russian Church archives, Alaska Commercial Company records and other archival sources. Chapters cover earliest contacts, the nature of cultural contacts on the Katmai coast from 1790-1799, the Russian-American Company's first through third charters on the Katmai coast (1800-1820, 1821-1844, and 1844-1867), epidemics, Russian missionary work and the transition to an American economy. After the 1912 eruption, some residents of Old Savonoski Village (near Naknek Lake's Iliuk Arm) resettled on the lower Naknek River, first at New Savonoski and then at the nearby village of South Naknek (still occupied today).



A chief holding his atlatl and harpoon, South Naknek, circa 1914. Photo courtesy of San Francisco Maritime National Historical Park, Fort Mason.

Katmai's Cultural Resource Projects

Restoration & Rehabilitation



Exhibit located at Brooks Camp.

Prehistoric Dwelling Exhibit

The unique exhibit of a partially reconstructed prehistoric house at Brooks Camp and its protective enclosure will be repaired and improved this summer. In addition, a booklet will be produced for visitors that will tell the story of the archeology and prehistory of the site. The archeology includes the details of the excavations in 1967–1968 and the discovery of the artifacts and structural remains that led to the exhibit. Prehistory is the story of what we understand about the life lived 1000 years ago, drawn from what we know about the site and the regional prehistory. This “life” story includes details about the environment, food gathering and storage techniques, fishing and hunting techniques, tool, clothing, and ceramic manufacture, wood working techniques, heating and lighting technologies, trade, warfare, seasonal activities and travel/transportation.

Administrative and Bear Management History of Brooks River

An Administrative History is a key baseline management document that describes how a park was established and how it has been managed to the present day. Research for a special administrative history of the Brooks River National Historic Landmark will continue this summer. This research will include a complete description of how the Brooks River area developed, functioned and evolved to the present. It will contain complete documentation of management plans and decisions, cultural and natural resource research, staffing and funding, cooperative agreements, personnel rosters, visitation statistics, resource data and other documents and data valuable for management reference. The research will focus specifically on the history of National Park Service management of the Brooks river area with regard to the following issues: visitor interaction with bears, bear management, visitor use limits, quality of visitor experience, impacts on archeological and ethnographic values, management of facilities and support systems, operational and maintenance activities, and educational experiences.



American Creek: storehouse, cabin and sauna. Photo taken in 1953.

Fure's cabins

Roy Fure's cabin and outbuildings in the Bay of Islands are listed on the National Register of Historic Places and are being maintained and preserved as historic structures. Fure's other cabin and cache in American Creek are also historically significant and are currently being nominated to the Register. Repair and restoration of these structures will begin this summer.

Roy Fure crafted the Bay of Islands cabin sometime between 1916 and 1926, and his American Creek cabin and sauna in 1940. Born in Lithuania in 1885, Fure came to Alaska in the early 1900s, making his winter home on the shores of Naknek Lake. In the Katmai area, Fure hoped to attain fortune through prospecting. Limited mining success, however, led him to rely on fishing, hunting, and trapping for the bulk of his food and monetary income. Fure also occasionally worked as a caretaker, cannery worker, and laborer in Naknek to supplement his income in the summer months. Fure's greatest talents appeared in wood craftsmanship and carpentry, as well as his skill with machinery. Fure's cabin incorporated the use of hand tools to produce high quality hand-hewn squared spruce logs with dovetail notching at the corners, and planking from split logs for the flooring and roofing. Dovetailed corners and hand-hewn roof and floor slabs show Russian or Scandinavian influence that he likely remembered from his early years in Lithuania.

Roy Fure at his Bay of Islands cabin.



Katmai's Cultural Resource Projects

Monitoring

Protection and Monitoring of Coastal Sites

The National Park Service, as the nation's leading preservation agency, is charged with ensuring that prehistoric and historic resources are in good condition. This summer park archeologists will make a special effort to monitor threatened sites on Katmai's remote and difficult-to-access coast. A rich and varied story is told by the prehistoric and historic Native Alaskan villages and camps, historic cabins, canneries, and other sites on the coast. Unfortunately, many of these suffer from erosion, animal digging, and looting. Looting is the most preventable of these, and archeologists will focus on identifying sites at risk from this illegal digging. Careful mapping of these sites will help researchers assess the extent of the damage and develop future prevention efforts.

Brooks River Cutbank

The Brooks River Cutbank site overlooks a popular fishing, bear viewing, and photographing area on Brooks River. The two meter high Cutbank was formed as the river eroded into a terrace that humans occupied as early as 3,700 years ago up until possibly as recently as 300 years ago (AD 1650). The erosion is a natural process, but has been accelerated by the number of people who walk along the top of the Cutbank and the river's edge. Park archeologists regularly monitor the site to look for newly exposed house floors, eroding graves and irreplaceable artifacts. If a discovery occurs, archeologists follow procedures for protecting the find and initiating consultation with Alaska Native organizations. Archeologists mapped the upper edge of the Cutbank in detail in 2004 for comparison if a big section of the bank slides into the river.

Facilities

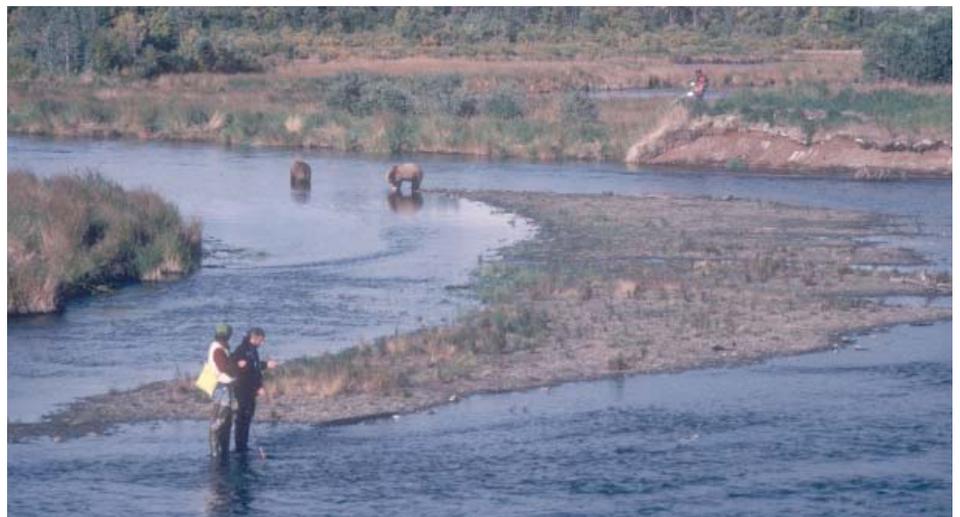
Brooks Lake Vault Toilet Installation

Katmai archeologists conducted test excavations at the location selected for a Brooks Lake vault toilet. Lodge and park managers have long wished to provide Brooks Lake visitors with a convenient vault toilet to replace the existing outhouse. Archeological considerations and the need to install the rest room at least 100' from a water source made identifying a site for the facility a complex decision. After considering a range of alternatives including constructing the vault toilet in an abandoned archeological excavation and constructing the facility above ground, park program managers agreed upon a location which appeared less likely to affect significant archeological resources near the access road and at the foot of an ancient beach ridge. Multiple test pits within the project footprint located sparse stone artifacts within layers of volcanic ash and sand. Consultation with Alaska Natives and the State Historic Preservation Office is taking place to determine if the finds are significant and the facility can be built without further fieldwork.

Visitor Use Research

For many parks, counting visitors is fairly straightforward. Visitors are counted at entrance booths, vehicles are counted along the road, and trail counters are placed near trailheads. For Katmai, Aniakchak, and the Alagnak, none of these methods apply. There are no entrance booths or roads leading into the park. Visitors come in boats, floatplanes, or wheeled planes. Visitors may either own the transportation vehicles or may have contracted transportation services. Visitors also come from different directions; visitors may have departed for the park from King Salmon, Homer, or Kodiak. Or, they may have spent the evening in a lodge outside of the park and entered the park for a day trip through lodge transportation.

These are many of the issues that the park is grappling with to understand what visitation levels are in the park. The University of Alaska at Anchorage, the Southwest Alaska Network (SWAN), and park management are collaborating on a project to delineate the best protocol for collecting this information. This project will determine existing data and specify additional types of data that need to be collected. We will test the protocols outlined by this project, refine them over the summer, and then finalize the methods to best record visitor counts. These counts include how many people were in specific park areas, the number of overnight stays, and the number of people in the park on a given day. Accurate visitor counts are a critical element for park management. Understanding visitor trends is important for park facilities, resource protection, and management plans.



Katmai's Natural Resource Projects

Bear Studies

Estimating Brown Bear Population Density

The Katmai National Park and Preserve brown bear population size was estimated in 1999 as 1,500 to 2,000 bears. This estimate was based on extrapolation from a coastal bear density estimate (550 bear per 1,000 square km) derived using a technique that required first marking a number of bears within the study area with collars, then repeatedly searching the study area to determine the number of marked bears in the population of bears observed.

Alaska Department of Fish and Game (ADFG) has developed an aerial double-count line transect census technique that does not require marking individual bears, and is designed for large study areas. Between 2003 and 2005, Katmai and Lake Clark worked in cooperation with ADFG to use this technique to estimate bear population density in Game Management Unit (GMU) 9A, which extends from coastal Lake Clark south to the Katmai National Park boundary, and GMU 9C, which is largely comprised of Katmai National Park and Preserve. Piper Super Cub aircraft were used to survey transects of fixed length along elevation contours from points randomly placed within the defined study area (straight lines were flown in areas with limited topography) below 3,000 feet. Surveys were flown in late May, after most bears had emerged from dens, but prior to significant plant leaf-out. The pilot and rear passenger independently searched for bears along the transects to produce a double-count data set.

In Katmai, between 2004 and 2005, 413 bear groups consisting of 657 bears were recorded for approximately 14,400 km of transect length. The Katmai brown bear density estimate derived from these data was 156 ± 21 bears per 1,000 square km, with a corresponding total bear population estimate of $2,183 \pm 379$ bears. The survey data are being further analyzed by the project biometricians to prepare a scientific publication that will include results from the Katmai census effort.



Bear 424 as a subadult female in fall 2001.



Yearling with Bear 424 in 2005.

Assessing Genealogy and Behavior of Bears at Brooks River through DNA Markers

Long-term monitoring of brown bears at Brooks River has produced over ten years of detailed records of river use and behavior for more than 30 known and recognizable bears that were still alive as of fall 2005. However, genealogy and relatedness among bears on Brooks River and adjacent drainages are currently unknown. Park resource staff have begun a project in cooperation with U.S. Geological Survey-Alaska Science Center scientists to: (1) refine techniques for obtaining DNA samples from free-ranging bears; (2) use molecular genetic analyses to sort individual bears, confirm/refute observational identifications, and to explore familial and lineage relationships; and (3) document relationships between foraging and resting areas, and relatedness. Project results will enable us to evaluate behavioral observations at Brooks River in light of information on parentage and kinship, and will contribute to our understanding of the effects of human activity on brown bear population structure and reproductive ecology.

Two techniques were successfully used in 2005 to collect DNA samples from free-ranging bears at Brooks River: (1) hair snares, and (2) remote biopsy darts. Sampling is expected to continue using these two methods through 2007. Hair snares were primarily a break-away neck snare design that had short lengths of barbed wire mounted within the neck snare loop. The hair snares, which were installed on heavily-used bear trails, were designed to snag fur samples before popping open as the bear moved through the snare. Each snare site was monitored by an infrared-triggered video camera so that an attempt could be made to match observational bear identification records with hair samples left in the snares. Some snares were also monitored directly by observers. Because snares were primarily installed along bear trails in brushy spots, they were unlikely to be encountered by people. Sites, however, were marked in case of human traffic by flagging the sites with caution tape. Samples were also collected remotely from some bears using biopsy darts. The darts were designed to bounce off of the target animal while retaining a small tissue sample within the biopsy needle.

Observational Monitoring of Bear and Human Use at Brooks River

Long-term observational monitoring of bear and human use of Brooks River will continue in 2006. 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.

Brooks River bear numbers showed a continued increasing trend in 2005, with 71 different bears identified regularly using the river during July, and 59 bears identified regularly using the river during the fall (each seasonal count includes some bears that were recognized in both seasons). In early July 2005, a female arrived at Brooks River with four spring cubs. However, one of the cubs disappeared by fall. This was the second female with a litter of four to frequent Brooks River in the past few years.

Katmai's Natural Resource Projects

Bears, Moose, and Fish Projects

Geographic Harbor Remote Camera Study

The density of brown bears along the Katmai coast is one of the highest recorded concentrations of bears. Geographic Harbor annually hosts a mid-summer pink salmon run which attracts a large number of bears, in turn attracting bear viewing groups. Geographic Harbor is located in Amalik Bay on the Katmai coast and has the majority of visitation occurring from mid-July to mid-August.

Katmai National Park will begin a pilot project with remote cameras in Geographic Harbor to understand visitor and bear use

patterns. Location and timing of visitors will be documented by this project, and data for bear composition (e.g. adult, subadult, female with cubs) and use patterns will be collected for the same area. These two data sets will be compared to document positive or negative visitor effects on coastal bear activity patterns. The pilot project will focus on (1) how to best bear-proof remote cameras on the coast, (2) the best locations for remote cameras to monitor both bears and humans, (3) determine human use patterns, and (4) determine bear activity patterns both during and outside visitor use hours.



Bears at Geographic Harbor. Photo by P. Hamel.



Assessing the Abundance and Distribution of Moose on the Alaska Peninsula

Moose are an important subsistence resource for the eleven villages in Game Management Units 9C and 9E on the northern Alaska Peninsula. Moose have become more important to the subsistence economy since the decline of the Northern Alaska Peninsula Caribou Herd has resulted in harvest restrictions. Determining the Alaska Peninsula moose density will provide better information for sustainable management of subsistence and sport-hunting of moose in the region.

Alaska Peninsula/Becharof National Wildlife Refuge has developed a study plan to estimate moose density on the northern Alaska Peninsula by aerial line transect sampling. The sampling involves a helicopter flying randomly-selected lines in areas of medium to high quality winter

moose habitat, with observers recording the distance to and composition of groups of moose that they observe. Katmai is participating as a cooperator in this project, which includes sampling winter moose habitat in Aniakchak and southern Katmai.

Kokanee genetics

Sockeye salmon frequently occur in land-locked, resident form (kokanee) in most of their range. However, at the northern end of their range in Alaska, kokanee populations are uncommon. In Katmai, three populations of kokanee are known. They differ substantially from other kokanee populations and from each other, especially with respect to the size of individual fish and the prey items they feed on. The lakes they are known to occur in also have different geologic histories. JoJo Lake is a small lake that was established by the recession of the Naknek Lake shoreline over time. Dakavak Lake still flows to the sea, but has an outlet that flows underground through a field of rubble that appears to have been a result of

either volcanic pumice collecting at the outlet, a large landslide, or a combination of these two factors. Devil's Cove Lake has an outlet that flows to the sea over a large waterfall that is a barrier to fish passage.

Kokanee are not favored sportfish in Katmai because kokanee lakes are very uncommon, kokanee are found in very low densities, and in the case of the two coastal lakes, they are the smallest kokanee known...so small that they are barely larger than outmigrating smolts from most sockeye populations in Bristol Bay. However, from a conservation standpoint they are some of the most informative populations because they help us to under-

stand the process of sockeye colonization and adaptation to changing environments and are at the extreme end of kokanee range.

This summer, crews from the National Park Service and the U.S. Fish and Wildlife Service will be capturing kokanee for genetic sampling. To put these populations in their proper context, nearby sockeye populations will also be sampled. Genetic sampling consists of live capture of fish using nets or traps, followed by removal of a small portion of a rayed fin. After the sample is obtained, the fish is released. A limited number of samples may be collected for analysis of stomach contents and bony structures.

Southwest Alaska Network Projects

Inventory & Monitoring

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 in the parks (inventory) and the condition of those natural resources (monitoring). This information is critical for the National Park Service to be able to protect and manage parks.

The SWAN Inventory and Monitoring Program consists of 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 together into a single network because they shared characteristics such as marine coastal habitats and large runs of anadromous fish. By grouping five park units together into a single network for inventory and monitoring, project funding and management have been streamlined. The network has chosen specific vital signs to monitor, representing key indicators of the condition of park ecosystems. The following SWAN inventory and monitoring projects will occur in Katmai National Park and Preserve this summer.

Montane-nesting Bird Inventory

The nesting status and distribution of species such as Pacific Golden-Plover, American Golden-Plover, Surf-bird, Wandering Tattler, and Baird's, Western and Rock sandpipers is poorly known for Katmai and Aniakchak. Enough anecdotal observations have been collected to suggest that the two Alaska Peninsula parks may represent not only major breeding range extensions for most of these species but also support significant numbers of each. For one particularly little known seabird, the Kittlitz's Murrelet, a quarter of the nests found in the North American portion of its range have come from steep scree or rocky slopes of Alaska Peninsula mountains. To determine the status of montane landbirds nesting in SWAN Parks, scientists from the U.S. Geological Survey-Alaska Science Center implemented a large-scale, habitat-based inventory and monitoring program. Data generated from this inventory will provide baseline information on the distribution and abundance of birds in the region and serve as the basis for subsequent population monitoring.



Wandering tattler on nest.

Montane land bird surveys were conducted in the interior of Katmai during May and June, 2005. They deployed three, two-person crews to survey 23, 10 x 10 km plots. Within each plot, points were allocated in proportion to ecoregion type, and crews conducted a total of 382 point counts. Highlights from the 2005 field effort include possible southern breeding range extensions for Baird's Sandpipers, Surf-birds, and Wandering Tattlers, and unexpectedly high numbers of both American Golden-Plovers and Whimbrel. In early June 2006, five coastal sites at Katmai will be sampled that were previously inaccessible due to poor weather or unsafe snow conditions. Data from the surveys will be used to predict presence/absence of species by ecoregion and habitat, and to calculate park, ecoregion, and habitat-specific bird densities.

Lake Fish Monitoring

Resident lake fish were chosen for long-term monitoring because they serve an important ecological role in Katmai and other Southwestern Alaska Parks. They represent a variety of trophic levels (omnivores, insectivores, planktivores, and piscivores) and hence reflect changes that occur in the food chain. During June 2005, protocol testing of four capture methods (minnow trap, fyke net, gill net and beach seine) for sampling resident lake fish was conducted in Lake Clark and Kijik Lake in Lake Clark National Park and Preserve. Field crews captured 275 resident lake fish comprising eleven species. In summer 2006, protocol testing will continue in both Katmai and Lake Clark National Parks with a focus on Swedish variable mesh gill nets and beach seines in Naknek and Brooks Lake. Species occupancy and relative richness will be evaluated as potential vital sign metrics. A draft monitoring protocol will be completed with full implementation scheduled for 2007.



Southwest Alaska Network Projects

Inventory & Monitoring

Change in Landscape Features as Revealed by Repeat Historic Photography

Photographic monitoring provides an efficient and relatively inexpensive method for documenting landscape-level change and can greatly extend the period of change detection. A project was initiated in 2003 to assess landscape changes in Southwest Alaska Network (SWAN) parks through the use of repeat photography. Most historical photographs span the period 1895–1931 and were acquired from collections held at the National Geographic Society and Santa Clara University. By reviewing original photo captions and carefully aligning foreground and background features in historical photographs, network contractor ABR, Inc and SWAN staff are able to relocate the exact spot where the original photographer stood.

Approximately 65 photographs that were taken during National Geographic Society



Circa 1917 picture taken of Spotted Glacier along the northern coastline of Katmai National Park. Photo by R. Griggs.

expeditions to what is now Katmai National Park and Preserve were repeated in 2005. The acquisition and comparison of historical and repeated photographs will allow the development and testing of a draft protocol for repeat photography. Comparison of photographs is revealing the nature and rate at which park landscapes are changing due to processes such as glacial retreat, the elevational and geographical expansion of tree line, and the



2005 picture taken of Spotted Glacier reveals major recession. Photo by T. Jorgenson.

recovery of vegetation in areas affected by volcanism. During 2006, new photography will be acquired at Aniakchak National Monument and Preserve using two approaches: 1) 60–70 sites that have old photography will be re-photographed to establish a temporal record; and 2) new photo locations will be established to increase the spatial dimensions of the record and document landscape features of particular interest.

Marine Nearshore Monitoring

The marine coastline of Katmai, Aniakchak, and other SWAN parks spans 1,900 kilometers in the Northern Gulf of Alaska and contains almost one-third of the marine coastline in the entire National Park Service 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 oil spills and other human-related perturbations. Nearshore habitats provide important feeding grounds for larger animals such as sea otter and brown bears and provide nurseries for marine organisms. In partnership with the U.S. Geological Sur-



vey—Biological Resources Discipline Alaska Science Center, SWAN is creating and testing protocols to implement long-term monitoring in SWAN parks as part of a larger regional effort known as Gulf Ecosystem Monitoring (GEM) program developed by the Exxon Valdez Oil Spill Trustee Council.

In 2006, a pilot project for the GEM program will be carried out along the Katmai coastline. In April, a protocol will be tested for conducting beach surveys to record marine debris and collect sea otter skulls to determine age-at-

death. In late June, a ten-day boat survey will be conducted to establish ten intensive sampling sites to survey the following:

- black oystercatcher diet and nest occupancy
- sea otter number and diet on rocky shores and sand/gravel beaches
- contaminant levels in mussels
- intertidal invertebrate composition and abundance

In July, an aerial photography protocol for evaluating cover changes by canopy forming kelp, eelgrass, and other resources (e.g. vertical distribution of intertidal *Fucus* or mussel beds) will be developed and tested. Finally, a database structure will be developed and tested for use in the nearshore monitoring program. The goal of this monitoring program is to understand how marine nearshore ecosystems are changing so the park can make better decisions in managing and protecting coastal resources.



Aniakchak's Cultural Resource Projects

Archeology

Aniakchak Archeological Excavation

The National Park Service Systemwide Archeological Inventory survey of Aniakchak (1997–2000) identified the Aniakchak Bay site SUT-027 and evaluated its significance relative to all known sites within Aniakchak. The park determined that excavation or data recovery at SUT-027, one of the four largest villages known in Aniakchak, was necessary to recover the full range of significant archeological information threatened by immediate loss through erosion. The large quantity of shell at this site has resulted in excellent bone preservation in the midden, allowing the preservation of both animal bones and bone and antler tools. The discovery of preserved wood planks on an eroding house floor under the shell midden highlighted the potential to recover additional valuable information from this site. The organic preservation, structural elements, and faunal remains hold great promise in providing information concerning cultural affiliation, subsistence patterns, and household and social organization for the prehistoric residents of this region.

The final season of excavations will be completed this summer by park staff and Hamline University. The excavations to date have revealed at least two distinct occupations; a younger ephemeral occupation by a Thule or Koniag related culture and a lower component consistent with an extensive occupation, possibly a winter settlement. Some of the chipped stone lithics from the lower component resemble artifacts found at Aleutian tradition sites to the west, others resemble artifacts from Norton tradition sites to the east. This may represent an amalgamation of regional characteristics rather than a clear divide between “Eskimo” and “Aleut” traditions.



Archeological excavation in progress at Aniakchak Bay. Photo by B. Hoffman.

Ethnography

Aniakchak Traditional Use and User Group Identification Study

The traditional use/user group identification study is one of the first studies conducted when park resources are thought to be traditionally associated with a contemporary ethnic group or groups. The park entered into a cooperative agreement with the University of Washington Cooperative Ecological Studies Unit for purposes of the identification and documentation of natural and cultural resources associated with traditional use of Aniakchak National Monument and Preserve by Alaska Native groups.

The study has identified historic and present-day use of park land and resources by Alaska Native groups. This study, to be completed this year, has identified specific uses of park resources by Native Alaskan communities, tracked some of the effects of such use on natural resources, and assessed effects of National Park Service operations at Aniakchak on Native Alaskan uses of lands and resources. A component of the study was to identify traditional access methods and routes, as changing transportation routes and technologies appeared to have facilitated

changing patterns of resource use within Aniakchak. The ethnographic information resulting from this research effort will help park staff better understand and consider impacts to culturally significant resources which result from proposed management actions, and to identify traditionally associated Native groups for purposes of consultation.



Woman and two children wearing Alutiiq-style ground squirrel parkas in the old village of Kanatak near Aniakchak, circa 1909. Photo courtesy of Alaska State Library.

Aniakchak's Cultural & Natural Resource Projects

Historic Resources

Aniakchak Historic Resource Study

A Historic Resource Study (HRS) is a baseline park management document and is a book-length, professional historic narrative that identifies and evaluates all of a park's cultural resources (other than archeological and ethnographic resources) within historic contexts. The Aniakchak HRS, *Beyond the Moon Crater: A New History of the Aniakchak Landscape*, will be completed and published this year. The HRS is organized first by narratives, then followed by summaries of the related historic properties and historic preservation recommendations. Known historic properties within Aniakchak include Native houses, trapping cabins, extensive trails, commercial fish traps, clam cannery remains, and a cannery bunkhouse. In addition, Russian outposts, American trade stations, trapper cabins, fox farms, reindeer corrals, a U.S. Army base, and industrial sites such as

an oil boom town and salmon canneries—all located just beyond park boundaries—are important keys to understanding how people's relationship to the resources, as well as to each other, shaped the history of this region.



Father B. Hubbard, "the Glacier Priest," overlooking Aniakchak Caldera, circa 1930. Photo courtesy of the Hubbard Photograph Collection at Santa Clara University Archives.

Cultural Inventory

Historic Structure Inventory and Condition Assessment

This year project staff will be traveling to Aniakchak National Monument and Preserve to document and assess the condition of historic structures. The project's focus is oriented toward cabins and caches used by early twentieth century trappers, fisheries and canning operations. Goals include fully documenting known and newly identified resources, assessing the condition, and evaluating the National Register eligibility of located resources.

Natural Resources

Sockeye life history in Aniakchak

The National Park Service and U.S. Geological Survey staff have been involved in a long-term study of sockeye salmon at Aniakchak. One of the park purposes as established by Congress is to study the process of succession on this volcanic landscape. A critical feature of succession at Aniakchak is the colonization by sockeye of the river and caldera, facilitating transport of marine nutrients into this nutrient-poor watershed and landscape. Knowledge of the fundamental population unit of the species also helps to facilitate management to maintain the diversity and productivity of the drainage as a whole.

Sockeye colonized Aniakchak Caldera sometime following the caldera-breaching flood event around 2000 years ago. During the time since this event, numerous eruptions within the caldera would have wiped out the fish populations within the caldera. A combination of genetic, behavioral, and morphological sampling has been used to describe the mod-



Sockeye sampling in Aniakchak. Photo by T. Hamon, NPS.

ern context for the populations within the drainage. Both morphological and genetic differences exist among populations. Work now focuses on the extent of differentiation and how colonization timing may have affected the extent of differences among populations, as well as whether these differences are related to life history differences, since some of the Aniakchak populations are river-type sockeye that do not make use of a nursery lake (an

uncommon strategy for sockeye, which are primarily distinguished by their lake-rearing phase). Sampling in the upcoming summer is targeted at better genetic sampling of some of the populations to better distinguish the level of population structure in cases where it was not clear from previous sampling, and an attempt to more thoroughly document the temporal variation in sockeye activity in some areas of the drainage.



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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

Katmai National Park was originally established as a monument to preserve the features associated with one of the most powerful volcanic explosions ever recorded. The Novarupta Volcano thunderously erupted in 1912 and created the Valley of Ten Thousand Smokes. 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. 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 that had been previously Katmai National Monument 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.