Kenai Fjords National Park

National Park Service
U.S. Department of the Interior

Resource Management News

Summer 2008

Kayaks on the beach in front of Aialik Bay Ranger Station, September 2007.

Summer is a busy season in Kenai Fjords National Park. The snow melts, bears emerge from their dens; work sites become accessible; and park staff, partners, and visitors arrive.

Resource Management programs at the park focus on: assessing environmental conditions and monitoring for changes; protecting cultural resources such as archeological and historical features; providing for visitor experiences while maintaining natural processes; and encouraging best management practices for resource protection and visitor enjoyment.

These efforts can be separated into four main groups: cultural resources, natural resources, inventory and monitoring, and integrated science. Cultural resources focus on the activities and people of the past and present. Natural resources include the icefield, coastline, water, rocks, soil, flora, and fauna. Inventory & Monitoring is part of a National Park Service effort to understand and track condition of the park's natural resources—and includes work done by park staff, partners, and the Service's Southwest Alaska Network (SWAN). Integrated science projects are focused efforts that span these other three groupings, and typically emphasize documenting the impacts park management actions and visitors have on park resources.

We hope you enjoy reading about these many projects and look forward to seeing you in the field!

Contents

Administrative History

Kenai Fjords National Park has been in existence for over 25 years and it is time to document our history. An administrative history describes how a park was conceived and established, as well as how it has been managed since establishment. Ted Catton of Environmental History Workshop has been selected to author this two year project, beginning in 2008.

The First Kenai Fjords Staff, 1981. From right: Park Technician John Morris, Administrative Technician Joan Alley, Park Technician Debra Sturdevant, and Superintendent Dave Moore.

The administrative history will highlight subjects relevant to the development and administration of the Park. Topics may include:

- geographic and historical overview
- establishment of the park
- administration
- land ownership issues
- planning
- development of visitor facilities and public use
- interpretation
- cultural and natural resource management

Research materials and supporting documentation for this project will most likely be gathered from the park's administrative records, the Alaska Regional Office, the National Archives – Alaska Region, the National Park Service's History Division, Office of Legislation and the Harpers Ferry Center in the Washington DC area. Additionally, interviews will be conducted with current and former employees and associates to provide insights to the park's development.

Targeting present and future park staff as its primary audience, this administrative history will be an ideal tool to assist in planning the future of Kenai Fjords National Park. Look for it in December of 2009.

Archeological Surveys of the Nuka Bay Area

In 2007 Dr. Aron L. Crowell of the Arctic Studies Center, National Museum of Natural History, Smithsonian Institution conducted an archeological survey and site testing of the Nuka Bay and lower McCarty Fjord areas of Kenai Fjords National Park.

The project's objectives included a systematic survey to examine all shoreline within the study area, the production of maps, radiocarbon age estimates, test pit data, site condition assessments, artifact samples, and faunal samples for both new sites and previously identified locations.

The survey crew examined 60 miles of shoreline within Nuka Bay including Yalik Bay, Beauty Bay and North Arm, as well as lower McCarty Fjord and Nuka Passage. Six new sites were identified, increasing known settlement in the Nuka Bay area and supporting the concept that this area was attractive because of its resource diversity and abundance. Based on artifact types, all sites appear to date to the last 1000 years or less, a time period that spans the Medieval Warm Period and Little Ice Age.

The survey produced two interesting preliminary details.

- The absence of 19th century Russian/American trade goods at one previously known site was a major surprise, since this site had been interpreted as the location of the historic village of Yalik. Oral traditions and historical references to Yalik may therefore refer to a different site, possibly one in Aialik Bay.
- Large triangular blades for whaling harpoons were found at two different sites suggesting possible evidence for umiak whaling as described in Birket-Smith's ethnography of the Prince William Sound Chugach.

All fieldwork goals were achieved and the entire study area was surveyed. Analysis of artifacts and faunal remains, radiocarbon dating, and reporting are being conducted with an expected completion date of June 2008.

Crowell, Aron L. *Archeology Project Report*. National Park Service, 2007.

Forest Kvasnikoff, Mark Luttrell, Ann Ghicadus, and Justin Malchoff excavating a test pit. Survey crew photograph, 2007.

Site Assessments

Lands comprising Kenai Fjords National Park have a long history of human use. Since the Park's establishment in 1980, numerous archeological and historic sites have been identified and recorded along the fjord's shores and within the Nuka and Resurrection Valleys. Many of these sites retain valuable prehistoric and/or historic evidence of the lives of Native Alaskan and European inhabitants. As custodians of these Alaska Native village and camp sites, cabin ruins and mining camps, the park is committed to their preservation and protection.

Beginning in 2006, Kenai Fjords' resource management team and the Alaska Regional Office cultural resource staff teamed up to perform condition assessments of all Kenai Fjords' cultural sites. Once a site assessment is completed, the site is placed on a monitoring schedule to guarantee even the most remote site will be revisited consistently.

The park's coastal rangers have played an integral part in the monitoring process. During the busy summer months when the Park's coasts host a growing number of visitors, the rangers regularly visit these sensitive cultural sites to ensure they remain undisturbed and in good condition. Site monitoring of archeological and historical sites will continue during the 2008 season.

Park Ranger Jim Ireland, Student Conservation Association Intern Lisa Gordon, and Alaska Regional Office Historian Logan Hovis evaluate site conditions at an abandoned mine in Kenai Fjords National Park in summer 2007.

Coastal Campsite Monitoring

Over the past few decades, more and more sea kayakers and other backcountry visitors have been flocking to the coast of Kenai Fjords National Park, filling popular campsites like Abra Cove, Pedersen Lagoon, and Quicksand Cove night after summer night. Although the park is comprised of over 400 miles of spectacular coastline, most of the coast is characterized by steep, rocky headlands, cliffs, and boulder beaches that are virtually inaccessible to boaters and campers. As a result, opportunities for camping are limited to only about 60 sheltered sand/gravel beaches scattered along the length of the park from Nuka Bay to Bear Glacier. About half of these potential campsites are located in the more remote southern end of the park, the outer coast and Nuka Bay, and consequently receive very little overnight use. As a result, nearly all backcountry camping is concentrated at about 30 sites located in Aialik Bay and Northwestern Lagoon.

Biological Science Technicians Heather Wetherbee (left) and Christina Kriedeman compare campsite monitoring field notes.

These same areas also contain sensitive cultural and natural resources, including salmon spawning streams, ground-nesting marine birds, coastal sedge meadows, bald eagle nests, and archaeological sites.

Periodic surveys of selected sites revealed impacts to park resources and the visitor experience, including fire rings, charred wood, cut stumps, root exposure, vegetation trampling, trash, human waste, soil erosion, campsite proliferation, increased human-wildlife interactions, and social trails. In 2007, park staff completed a rapid assessment of campsite impacts at 55 landing beaches between Nuka and Aialik Bays. Campsite impacts were substantially more prevalent and persistent in Northwestern Lagoon and Aialik Bay where extensive vegetation trampling, bare ground, social trails, and tree damage were documented.

In 2008, the park will collaborate with Dr. Christopher Monz, a Recreation Ecologist from Utah State University, to refine the park's campsite monitoring protocols, analyze 20 years of monitoring data, hold a campsite monitoring workshop, and conduct a detailed assessment of heavily used campsites in Aialik Bay. Refinement of protocols and development of effective data analysis tools will allow park managers to better understand how backcountry visitor use affects natural and cultural resources and the quality of the visitor experience in the fjords. The campsite monitoring program is a critical tool for achieving the management goal of maintaining coastal habitats in their natural condition while providing a high quality backcountry visitor experience.

Black Oystercatcher Research – Science & Learning in National Parks

Black oystercatchers are large shorebirds that forage exclusively on intertidal animals such as mussels and limpets, and are found along rocky shorelines from Alaska to Baja California. They were impacted by the 1989 Exxon Valdez oil spill, and though they are now listed as "recovered" from the spill, they are still considered a species of concern in the U.S. and Canada due to their small population size and sensitivity to human disturbance. Black oystercatchers are solitary, ground-nesters that use many of the same gravel beaches where visitors enjoy camping. Increasing use of the Kenai Fjords coast by sea kayakers and other recreationists, has raised concerns about the status of black oystercatchers in the park. From 1999-2005, the park conducted a detailed study of the factors influencing black oystercatcher nesting behavior and reproductive success at 39 breeding territories in Aialik Bay and Northwestern Lagoon. Annual productivity of black oystercatchers in the park was found to be low but was not strongly affected by existing levels and patterns of recreational disturbance.

Oystercatchers depend on intertidal areas for foraging habitat and typically nest immediately above this zone. Identification of these preferred habitats is critical for the long-term protection of these areas. In cooperation with the University of Alaska Fairbanks and the Chugach National Forest, the park initiated a two-year study to describe the physical and biological characteristics of black oystercatcher breeding territories in Kenai Fjords and Prince William Sound. In 2007, intertidal community composition and site characteristics such as slope, aspect, tidal width and surface complexity were measured at known oystercatcher nests and compared to random sites in order to identify those characteristics most closely associated with breeding territories. Field data collection will wrap up in June 2008, with work in Aialik Bay. Final analyses will include a detailed model for identifying potential breeding habitat within the park; allowing managers to estimate population sizes and assess the impacts of recreation and other human activities on breeding black oystercatchers in remote and unsurveyed areas of the park.

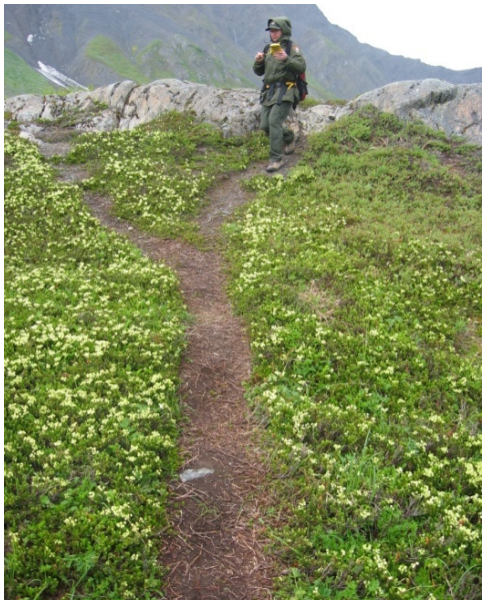
An adult black oystercatcher guards its nest in the intertidal zone.

Black oystercatcher nest and eggs.

Visitor Experience & Resource Protection (VERP)

Indicators and Standards for User Capacity

Experience has shown that with any human use, some level of impact must be accepted. The National Park Service is responsible for determining what level of impact is acceptable and what actions are needed to keep impacts within acceptable limits.



Park Ranger Heather Wetherbee documenting social trails.

The VERP framework was developed by the National Park Service to address visitor use management and carrying capacity issues. Through the VERP framework, management zones were identified with desired future conditions for the Exit Glacier Area. Indicators of social and resource conditions have been identified, and standards (minimum acceptable conditions) are being developed to identify when zone conditions are deteriorating below the desired standard.

Hikers enjoying the Harding Icefield Trail.

Six draft Indicators and Standards protocol will continue to be tested, modified and refined in 2008. These include:

- Social Trails – Harding Icefield Trail Impacts Monitoring.
- Hiker Encounters – Surveys on the Harding Icefield Trail.
- Visitor Crowding – Monitoring the number of vehicles in the parking lot at one time and relating that number to visitor crowding on the lower trails.
- Visitor Satisfaction – National Park Service Visitor Survey Card scores.
- Exotic Plants – inventories, monitoring, and control.
- Sound Monitoring – New in 2008. Develop a baseline sound monitoring protocol with the assistance of the NPS Natural Sounds Program.

Inventory & Monitoring

Because it is not economically feasible for every national park to have a full staff of scientists, units of the National Park System have been organized into 32 networks based on geographic proximity and ecological similarity, sharing staff and resources. The Southwest Alaska Network (SWAN) provides a scientific foundation for effective, long-term protection and management of natural resources. SWAN consists of Alagnak Wild River, Aniakchak National Monument & Preserve, Katmai National Park & Preserve, Kenai Fjords National Park, and Lake Clark National Park & Preserve.

During the past several years, SWAN investigators conducted biological inventories of vascular plants, small mammals, freshwater fish, and landbirds. These baseline inventories have delivered important information to managers and scientists—documenting new species of plants in our parks and uncovering major range extensions for birds and mammals. Natural ecosystems are however, dynamic and constantly changing. Effective management of these resources requires scientifically-sound information on ecosystem trends acquired through long-term monitoring of selected park resources known as *vital signs*. These vital signs can be physical, chemical, and biological elements and processes of park ecosystems that represent the overall health or condition of the park. In practice, vital signs are measurable, early warning signals that indicate changes. Staff from Kenai Fjords National Park and the Southwest Alaska Network will be working on several vital signs monitoring projects in Kenai Fjords throughout 2008, including:

- Marine Nearshore
- Climate
- Vegetation
- Water Quality.

Inventory & Monitoring – Marine Nearshore

The marine coastline of SWAN spans 1,900 kilometers in the Northern Gulf of Alaska and contains almost one-third of the marine coastline in the national park system. The marine nearshore zone is defined as that portion of the coastline that stretches from the high tide line to approximately 20-m depth. The intertidal and subtidal areas of the nearshore habitat are brackish and salt-water coastal habitats that are some of the most productive habitats in the Gulf and are highly susceptible to human disturbance. Nearshore habitats provide important feeding grounds for larger animals such as sea otter (*Enhydra lutris*) and brown bears (*Ursus arctos*) and provide nurseries for numerous marine organisms. These areas are also important recreational sites, attracting thousands of visitors every year.

SWAN is working in partnership with the US Geological Survey to develop and implement marine nearshore vital sign monitoring protocols at each of the three network parks. The protocol incorporates sampling of six vital signs: 1) marine water chemistry, 2) kelp and eelgrass, 3) marine intertidal invertebrates, 4) marine birds, 5) black oystercatcher (*Haematopus bachmani*), and 6) sea otter.

Marine water chemistry, including temperature and salinity, is critical to intertidal fauna and flora and influences both long-term and short-term fluctuations in the intertidal community. Satellite imagery is used to measure surface water temperature, turbidity, primary productivity, and flow patterns.

Kelp and eelgrass are "living habitats" that serve as a nutrient filter, provide habitat for fish, clams, urchins, and serve as a physical substrate for other invertebrates and algae. The kelps and seagrasses also provide spawning and nursery habitats for forage fish and juvenile crustaceans.

Marine intertidal invertebrates such as clams, mussels, and limpets, provide a critical prey resource for shorebirds, ducks, fish, bears, sea otters, and other predators. They are considered good biological indicators of nearshore ecosystems.

Marine birds and mammals are predators near the top of marine nearshore food webs. They are long-lived, conspicuous, abundant, widespread members of the marine ecosystem and are sensitive to change.

Black oystercatchers are long-lived; reside and rely on intertidal habitats; consume a diet dominated by mussels, limpets, and chitons; and provision chicks near nest sites for extended periods. They also use many of the same coastal habitats frequented by humans.

Sea otters dramatically change the structure and complexity of the nearshore community and are a prime example of how the highest trophic level (position in a food chain) can determine the populations of lower trophic levels. Sea otters tend to be relatively sedentary in comparison to other marine mammals; eat large amounts of food and are readily observable; may be susceptible to contaminant associated disease; and have broad public appeal.

Recording sea otter foraging behavior in Otter Cove, Kenai Fjords National Park, June 2007.

Inventory & Monitoring – 2008 Marine Nearshore Field Work

Marine nearshore vital sign monitoring includes both late-winter and summertime field work. While winter on the Kenai Fjords coast can have its challenges, and beauty, a multi-season schedule provides a much more complete picture of nearshore conditions. This year's monitoring activity includes:

Marine water chemistry—water chemistry information will be provided by other programs including the Alaska Ocean Observing System.

Kelp & eelgrass—low-tide, aerial video imagery will be used to document changes in occurrence and distribution of seagrasses along the entire length of the coastline. Underwater video will be used map spatial extent of selected seagrass communities.

Marine intertidal invertebrates—ten permanent intertidal monitoring stations (equally divided among sheltered rocky and soft sediment substrates) will be monitored.

Marine birds & mammals—abundance will be estimated from systematic boat-based shoreline surveys conducted in late-winter (March) and summer (June).

Black oystercatchers—skiff-based shoreline surveys will be conducted to estimate breeding pair density and sample nest site prey remains.

Sea otter—abundance, foraging success, and diet will be determined by direct observations.

Monitoring rocky intertidal invertebrates in Nuka Bay.

Inventory & Monitoring – Vegetation

Monitoring Vegetation Changes In The Coastal Forests of Kenai Fjords

In cooperation with the Alaska Natural Heritage Program, Southwest Alaska Network staff plan to revisit a set of existing vegetation inventory plots in Kenai Fjords National Park during the 2008 field season. A number of non-forested and forested vegetation plots were sampled 15 years ago as part of a marbled murrelet habitat study. The upcoming inventory of these existing plots will document the rate and nature of change, if any, in a range of successional coastal environments, and may be of value to biologists involved in habitat restoration and protection. In addition to the resampling of the 1993 plots, new vegetation monitoring plots will be established in the transition zone that is found between old-growth mountain hemlock stands and peat lands. Mountain hemlocks growing in peat bogs and muskegs tend to have slow-growing, stunted forms, such as those seen in the photograph. Long-term monitoring of these plots will document how peat formation and changing environmental conditions affect overall forest health.

A vegetation monitoring site in Kenai Fjords National Park.

Inventory & Monitoring – Water Quality

In September of 2007, staff from Kenai Fjords National Park and the Southwest Alaska Network deployed a water quality meter in Exit Creek below Exit Glacier. It was anchored on the stream bed and left unattended for three weeks.

Upon retrieval, the meter was almost completely buried in sediment and its sensors were clogged with silt and malfunctioning. This trial run provided some useful data and a valuable lesson on the challenges of water quality monitoring in glacial streams.

The water quality meter – complete with new sensors, redesigned instrument housing, and a different anchoring system – will be redeployed in Exit Creek during May or June of 2008, where it will reside for about three months.

Plans also include the installation of a water level pressure transducer in Exit Creek. This pressure transducer will continuously record stream level fluctuations in Exit Creek, information that can be used to explain patterns in water quality data and estimate stream flow. This will complement the daily Exit Creek water level measurements by park staff which are used for flood forecasting at the Alaska-Pacific River Forecast Center in Anchorage.

Southwest Alaska Network staff Jeff Shearer and Chuck Lindsay install a water quality meter in Exit Creek.

Bear Management

Bears are common throughout Kenai Fjords National Park. The opportunity to see a bear in its natural habitat contributes significantly to enjoyment of the park. This experience, however, can increase the potential for conflict between humans and bears and alter normal bear behavior. All bears are capable of injuring people or damaging property. These factors present a challenge when striving to preserve bears as a component of the ecosystem while providing for public safety.

As a management guide, the park has an Interim Bear Management Plan. The goals of the program are to:

- Provide for visitor and staff safety by minimizing bear-human conflicts.
- Minimize the effects of human activities on the distribution, abundance, and behavior of black and brown bear populations.
- Ensure opportunities for visitors to observe, understand, and appreciate black and brown bears, as a part of an intact ecosystem.

The bear management program consists of proactive measures such as food storage and education, and management actions such as hazing and aversive conditioning of bears. All park employees, cooperators, and commercial operators assist in bear management in countless ways; emptying garbage cans, giving bear talks, filling out Bear-Human Information Management System forms, and keeping a clean camp. Primary responsibility for bear management in the park lies with Interpretation & Visitor Services (IVS) and Resource Management (RM) teams. The Bear Incident Response Team consists of trained RM and IVS staff, available to respond to incidents and conduct hazing or aversive conditioning operations. They are the employees you see in the campground and along the trails monitoring bear activity and educating visitors.

By understanding the types of bear-human interactions that occur; employees and visitors can improve their understanding of bear behavior and avoid negative interactions. Common themes include:

- properly store all food in bear resistant food containers;
- be aware of bears while hiking and make noise to avoid surprise encounters;
- do not harass habituated bears by approaching too close;
- avoid camping in high use bear areas;
- keep tents, kayaks, and other gear in close proximity;
- be ready to defend your food and gear if a curious bear approaches.

Questions or bear encounters? Please contact us!

Wildlife Observations

Visitors and employees alike are encouraged to report unusual or otherwise notable wildlife sightings for documentation in the park Wildlife Observations database. Observations of rare or unexpected wildlife yield valuable data on species occurrence, relative abundance and distribution, and contribute to our overall understanding of the natural history of the park. Some species, including black-tailed deer, are expanding their range in Alaska, while others, such as the rusty blackbird appear to be declining.

The park maintains a list of known wildlife species (http://science.nature.nps.gov/im/units/swan/index.cfm?theme=inventory_species). If you observe uncommon species or unexpected activity, please fill out and submit a Natural History Field Observation card, available at both the Information Center and Nature Center. Or, send us an email describing your sighting. We always appreciate photos if you can obtain them without approaching or disturbing the animal. Last year we received over 80 reports from staff and visitors. We greatly appreciate everyone who takes the time to contribute their observations, and look forward to receiving your reports in 2008.

Inventory & Monitoring – Climate

2007 IN REVIEW: The Harding Icefield weather station is now in its fourth year of continuous operation. This remote automated weather station (RAWS) is located 7 miles southwest of the Exit Glacier Nature Center at a nunatak high on the Harding Icefield (4,200 feet elevation). It records temperature, wind speed and direction, relative humidity, precipitation, snow depth, and solar radiation. Current observations and summary reports can be viewed at: http://www.wrcc.dri.edu/cgi-bin/rawMAIN.pl?akAHAR

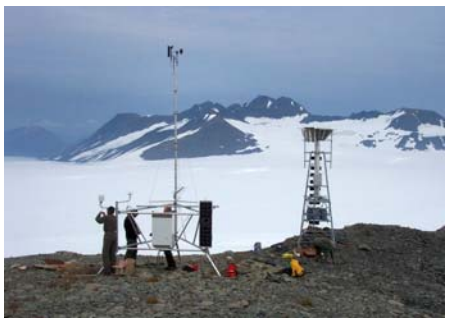
During the 2007 water year (October 1, 2006 – September 30, 2007), the following observations were documented:

- Average temperature 24.3 °F
- Maximum temperature 68.2 °F
- Minimum temperature –21.4 °F
- Average wind speed 10.3 mph
- Maximum wind speed 105.1 mph

Predominant winds are generated by storm systems in the Gulf of Alaska or high pressure systems in interior Alaska. Overall, winds at the weather station either blew from the southeast (50% of the time) or the northwest (31% of the time).

Accurate measurement of winter-time precipitation on the Harding Icefield is problematic. The weather station was deliberately placed at a windy site so that snow would not accumulate and completely bury the station.

2008 PLANS: The SWAN monitoring plan highlighted the lack of weather data collected along the Kenai Fjords National Park coastline. An environmental analysis identified up to three potential permanent weather station installations near McArthur Pass, Fire Cove, and Dinglestadt Glacier. The McArthur Pass station will be installed this summer.



The Harding Icefield Remote Automated Weather Station receives its annual site maintenance.

Seabird Colony Surveys

In 1976, the U.S. Fish & Wildlife Service and National Park Service surveyed the southern coast of the Kenai Peninsula, including what would later become Kenai Fjords National Park and the Alaska Maritime National Wildlife Refuge. Significant concentrations of breeding seabirds and marine mammals verified the exceptional wildlife values of the Kenai Fjords coast, and supported the establishment of Kenai Fjords National Park in 1980 by the Alaska National Interest Land Conservation Act. Other at-sea surveys were conducted around the time of the Exxon Valdez Oil Spill in 1989, but no systematic monitoring efforts have occurred at seabird colonies in the park over the past 30 years.

In August 2006, the National Park Service, U.S. Fish and Wildlife Service and the National Oceanic and Atmospheric Administration signed a General Agreement to increase interagency coordination in order to establish a "seamless network" of coastal refuges, reserves, parks and sanctuaries and achieve a higher level of coastal and marine resource protection through more effective interagency coordination. In July 2007, park and refuge biologists conducted a resurvey of 14 known seabird colonies in Kenai Fjords National Park from Yalik Point to Bear Glacier. Although survey effort was limited due to poor weather and limited time, relative abundance of seabirds at all colonies appears to have declined from 1976 levels. Species observed in order of abundance include:

- glaucus-winged gull,
- double-crested cormorant,
- pelagic cormorant,
- horned puffin, and
- tufted puffin.

Some seabird colonies have apparently disappeared since 1976, and three species observed previously were not encountered at park colonies in 2007: red-faced cormorant, black-legged kittiwake, and Arctic tern. Park staff will again collaborate with Refuge staff in 2008, to census colonial nesting seabirds at mainland colonies and in the Chiswell Islands. Additionally, an inventory of ground-nesting marine birds, such as Arctic tern, mew gull, herring gull, semipalmated plover, spotted sandpiper, and parasitic jaeger, will be conducted by park staff in Northwestern Lagoon. This baseline information will be used by park managers to target visitor education, monitoring, and resource protection efforts aimed at minimizing human disturbance to breeding marine birds in Kenai Fjords.

Murrelets

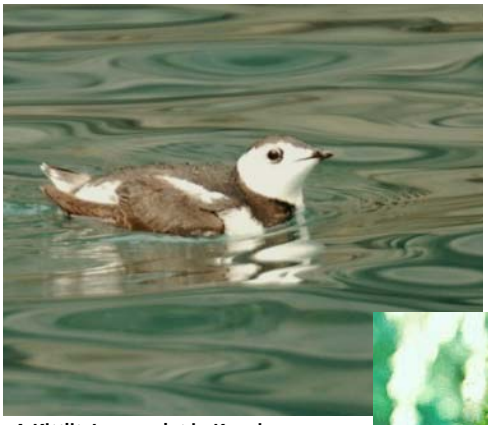
The Kittlitz's murrelet is probably the most rare and rapidly declining avian species found in Kenai Fjords National Park. They are small seabirds that forage close to tidewater glaciers or near submerged moraines, while marbled murrelets forage in a wider range of marine waters. Kittlitz's nest on glaciers or recently de-glaciated areas and marbleds nest in old growth trees or on very steep hillsides.

Under the Endangered Species Act, marbled murrelets are listed as threatened from California to Washington State, but not in Alaska. Kittlitz's occur only in Alaska and Russia and have recently been listed as a candidate species in the US. Both of these murrelets are declining significantly throughout their ranges, including within Kenai Fjords National Park. Survey data suggests that populations of Kittlitz's in the park had declined by as much as 83% between 1976 and 2002 (Van Pelt and Piatt 2003).

In 2007, the second year of a three-year study in cooperation with Dr. John Piatt (US Geological Survey), marine surveys were conducted to describe the distribution and abundance of murrelets within the park. Preliminary analysis suggests that populations of both species declined even further in 2007 when compared to 2002-2006 survey data. Despite intensive searches in 2006 and 2007, no juvenile Kittlitz's murrelets have been documented within the park in recent years. This may suggest little or no successful reproduction for this species in the park.

In 2007, a tidewater glacial ecosystem study was conducted within Aialik Bay and Northwestern Fjord to assess foraging habitat. Data on a variety of parameters, including forage fish, zooplankton, water quality and oceanographic characteristics, were collected and will be analyzed. Preliminary information indicates that herring, sandlance, and possibly capelin, are important forage species for murrelets within the fjords.

During the third and final year of this project in 2008, marine surveys will again be conducted toward a better understanding of murrelet distribution and abundance. Scientific sampling equipment on the USGS vessel M/V Gyre has been upgraded for more intensive investigation of murrelet foraging habitat in the fjords.



A Kittlitz's murrelet in Kenai Fjords National Park. M.Romano, USGS photo.

Van Pelt, T. I., and J. F. Piatt. 2003. Population status of Kittlitz's and Marbled Murrelets and surveys for other marine bird and mammal species in the Kenai Fjords area, Alaska. Annual Rep. to U.S. Fish and Wildl. Serv., USGS Science Support Proj. Alaska Science Center, Anchorage, AK.

A fledgling marbled murrelet in its nest. Photo courtesy T.Hamer.

Exotic Plant Management

Invasive plants reach National Parks in many ways; seeds and plant material are carried on human's clothing, camping gear and vehicles, animals and birds carry seeds from one location to another, or seeds are carried by the wind. Invasive plants threaten natural ecosystems by competing with native flora for resources such as light, water, and soil, and interfere with nutrient cycles and hydrologic regimes. They can alter natural plant succession as well, and establish easily in disturbed areas such as roadsides and trails, mine sites, and newly exposed glacier valleys.

The invasive plant management program at Kenai Fjords National Park begins its fifth year in 2008. The program is conducted using protocol established by the National Park Service's Exotic Plant Management Team. The locations of invasive plant populations are mapped using highly accurate GPS units and plants are removed by hand pulling. Collected data is included in a regional database which tracks the spread of invasive plants in National Parks across the state. 559 pounds of weeds were pulled in 2007 with the help of park staff and volunteers.

Tribal Civilian Community Corps volunteers pull invasive plants in the park.

Volunteers pulling invasive plants along Exit Glacier Road.

Project Goals – 2008

- Remove as many invasive plants as possible, focusing near roads and trails in the Exit Glacier area.
- Remap and monitor infested sites,
- Analyze and compare trends in size (area and plant poputations) of infested sites,
- Conduct new surveys for invasive species.

2008 Glacier Field Work

Every summer brings a variety of exciting field projects. With support from the Ocean Alaska Science & Learning Center (OASLC), for 2008 they include:

Terminus Mapping: Exit Glacier
- Each September, aerial photographs are obtained to accurately map the glacier terminus.
- Throughout the summer, staff regularly measure from a fixed location in the outwash plain to the terminus.

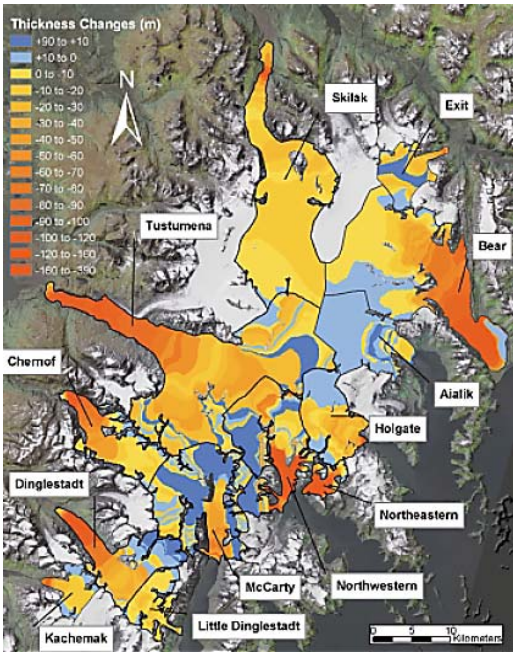
Ice Flow Monitoring: Exit Glacier Ice Flow
- A field crew will relocate a radio transceiver embedded in the ice, allowing us to calculate ice flow.

Coastal Glacier Photography
- Historic photographs will be repeated to document change in glacier extent and patterns of vegetation succession.

Mass Balance: Snow Accumulation
- Snow accumulation will be measured high up on Exit Glacier in late-April, documenting winter accumulation.

Harding Icefield Workshop
- A workshop to strategically plan for glacier and icefield monitoring will be held this fall.

Glaciers



Harding Icefield thickness changes from the 1950s to 1990s. Glacier basins are outlined in black, blue indicates areas of thickening, yellow indicates areas of moderate thinning, and red indicates areas of dramatic thinning.

Recent work by the Southwest Alaska Network identified that icefield area within the park (glaciers with a predominantly southeast orientation) decreased by 1.6% from 1986 – 2000 (Giffen and others 2007). Interestingly, total icefield area decreased by 2.2% over the same time period. This work augments measurements of change in the surface elevation of the icefield in the 1990s (Adalgeirsdottir et. al. 1998, in Valentine and others 2004); which found an overall thinning of the icefield. Dr. Adalgeirsdottir documented increased thickness on several glaciers exposed to the ocean (with a southeast orientation) rather than facing the interior Kenai Peninsula (with a northwest orientation).

Giffen and others. 2007. http://science.nature.nps.gov/im/units/swan/Libraries/Reports/GLIMS_Chapter_12_Alaska_20071221_Compressed.pdf

Valentine and others. 2004 http://www.nps.gov/akso/AKParkScience/KenaiFjordsIssue/PHYSICAL%20SCIENCE.pdf

National Park Service
U.S. Department of the Interior

Kenai Fjords National Park
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National Park Service
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This is the first annual issue of Resource Management News produced by the Resource Management team at Kenai Fjords National Park.

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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.

Kenai Fjords National Park

Kenai Fjords National Park was established on 2 December 1980 by the Alaska National Interst Lands Conservation Act (ANILCA). The park comprises approximately 670,000 acres within its legislative boundary. The National Park Service manages approximately 607,000 acres, with the remaining acreage owned and managed by the State of Alaska, Port Graham Native Corporation, and private inholders.

The park is located on the east coast of Alaska's Kenai Peninsula, thrust into the Gulf of Alaska, windward of the Kenai Mountains. Large fjords and bays cleave the coastal mountains and create a rugged coastline. A narrow slice of temperate rain forest fringes the coastline and provides a brief respite from the stark seas and expansive Harding Icefield. The icefield stretches from tidewater glaciers at sea level to broad expanses of ice and snow, interrupted only by the nunataks of the Kenai Mountains.

The park enabling legislation identifies the following purposes: "to maintain unimpaired the scenic and environmental integrity of the Harding Icefield, its outflowing glaciers, and coastal fjords and islands in their natural state; and to protect seals, sea lions, other marine mammals, and marine and other birds and to maintain their hauling and breeding areas in their natural state, free of human activity which is disruptive to their natural processes" (ANILCA sec.201(5)). Unlike most other park units added to or created in 1980, ANILCA did not allow for sport hunting or Federal susbsistence in Kenai Fjords National Park.