



RESOURCE MANAGEMENT NEWS

Summer 2011



A late summer view from the top of the Harding Icefield Trail reveals the equilibrium line of Exit Glacier. Melting is occurring along the gray areas of exposed ice while accumulation is prevailing over the white areas, where the previous year's snow remains through the summer to eventually become new ice.

Spring brings sun, rain, snow, wind, and waves; and everything in between. It is also the time of year when people and wildlife begin returning to the Kenai Peninsula, having migrated to warmer climes for the winter. As spring marches into summer, the richness of life on the Kenai Peninsula is obvious.

The impacts of climate change however, do not always follow such a clear progression. Research from 2001-2007 showed consistent duration of snow cover and growing season for southwest Alaska. In contrast, flooding of Exit Glacier Road from Exit Creek, with attendant road closures, occurred earlier in July and August a time of heavy visitation. In previous years flooding typically occurred in September and October as visitation tapered off.

Climate change scenario planning is one tool the park is using to envision current and (potential) future conditions. Feasibility planning for a multi-modal trail

from the Seward Highway to Exit Glacier is another tool and an example of how the park is striving to work sustainably in the community. Of more immediate concern however, are the projects outlined in this newsletter. From seabirds to invasive species, glaciers, visitor perceptions, traditional activities, and soundscapes; not a day goes by that we don't marvel at the diverse and dynamic resources which the park manages.

These are all examples of how important climate is in Kenai Fjords National Park, with climate change being an issue the park is actively working to understand and prepare for.

We look forward to reuniting with friends, colleagues, and visitors in 2011. Again this year we are pleased to say we had a difficult time choosing from the many ongoing projects to highlight. We hope you enjoy reading about our work and look forward to seeing you in the field!

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Natural Resources

Bear Management

Bears are common throughout Kenai Fjords National Park, and the opportunity to see one 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. This presents 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 this plan 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



NPS firearms specialist Scott Taylor trains the KEFJ Bear Response Team how to effectively use aversive conditioning rounds for bear management.

of bears. All park employees, cooperators, and commercial operators assist in bear management in countless ways; from keeping a clean camp to helping educate staff and visitors.

Primary responsibility for bear management in the park lies with Visitor and Resource Protection (VRP) and Resource Management (RM) teams. The Bear Incident Response Team consists of trained 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.

Review of 2010 Bear Activity

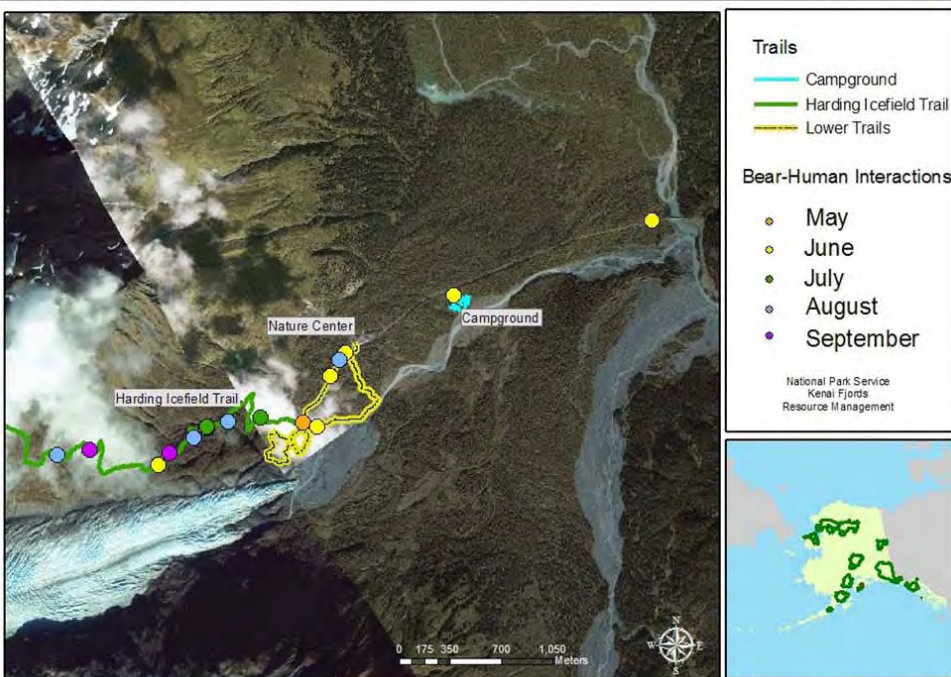
We received 24 reports of bear-human encounters and incidents in Kenai Fjords National Park between May 29th and September 15th, 2010. We classified 20 of the interactions as 'encounters' defined as "when a person and bear(s) are mutually aware of one another." Most encounters occurred in the Exit Glacier area and most involved black bears.

Four bear-human 'incidents' were recorded in 2010. Incidents are bear-human interactions where the bear acts aggressively. Three incidents may have involved the same food-conditioned black bear in the Pedersen Lagoon area. The fourth incident involved a black bear that charged a visitor on the Harding Icefield Trail. The number of encounters and incidents reported in 2010 was similar to 2009.



Black bears on Exit Glacier Trail in Kenai Fjords.

2010 Bear-Human Interactions at Exit Glacier by Month



By understanding the types of bear-human interactions that occur, employees and visitors can improve their understanding of bear behavior and avoid negative interactions.

Some things to remember:

- 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 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 from a curious bear.

Visitors who encounter a bear should report it to park staff as soon as possible. We look forward to receiving your suggestions and reports of bear encounters!

Natural Resources

Exotic Plant Management

This year marks the eighth consecutive year of inventory, monitoring, and control of non-native plants using Alaska's regional Exotic Plant Management Team (EPMT) protocol. Invasive plants continue to be a concern in the Exit Glacier area along roads and trails and in outer coastal areas where backcountry visitors access beaches.

The multi-year records reveal that one particular backcountry invasive plant infestation in the Exit Glacier area is not improving with manual control methods. After careful consideration through a process in the Alaska Region Invasive Plant Management Plan, the Alaska EPMT has determined that this site is suitable for herbicide application and will be implementing this management method in summer 2011. Applications will be made by State of Alaska certified pesticide applicators using a precise, spot application.

Although invasive species continue to make their way into the park, spreading along roads and trails and where humans travel, the work at Kenai Fjords National Park continues to completely remove some populations, reduce others, and keeps some in check. Prevention is the best way to protect against invasive plant infestation, so park staff, volunteers, and visitors are educated on how to prevent the spread of invasive plants while working and recreating in the park.



Volunteer crew pulling weeds along Exit Glacier Road in the Park.



Biological Technician Deb Kurtz surveys for weeds at Pedersen Glacier upper lagoon.

During the 2010 field season, park staff, volunteers, and Southeast Alaska Guidance Association (SAGA) crews hired with American Recovery and Reinvestment Act funding pulled 2,617 pounds of weeds in the park.

For the 8th year in a row, the park sponsored a weed pull in partnership with the Resurrection Bay Conservation Alliance, the U.S. Forest Service, and the Alaska Association of Conservation Districts along Exit Glacier Road outside the park. Over 856 pounds of sweet clover, oxeye daisy, and dandelions were pulled and a new infestation of birdvetch, which has not been seen in this area before, was removed and will be monitored for re-growth during 2011.

Goals for 2011 include:

- Continue to monitor, map, and treat infested sites in the Exit Glacier area by hand pulling.
- Use herbicides to spot treat an invasive infestation that has not responded to other treatments.
- Continue to inventory and monitor for invasive plants on park lands adjacent to the Pedersen Lagoon development and work with the lodge owners to prevent the spread of invasive plants.
- Expand survey efforts in the coastal areas of the park.
- Install a boot brush and interpretive sign at the Exit Glacier Nature Center to educate visitors about how invasive plants can spread on the shoes of hikers.

Peregrine Falcon Survey

The Alaskan population of Peregrine Falcons (*Falco peregrinus*) includes falcons that nest, feed, and migrate along the coasts of the Kenai Fjords National Park and islands in the Alaska Maritime National Wildlife Refuge. Peregrine Falcons breeding in the park and refuge are highly dependent on seabird colonies, and therefore may be a good indicator of the status of local seabird populations.

The park and ABR, Inc. (an environmental research firm) performed boat-based occupancy and productivity surveys for Peregrine Falcons in May and July, 2010. The main objective of this study was to identify current information on the distribution and status of the Peregrine Falcon. During the occupancy survey, researchers found 14 Peregrine Falcon territories, 11 of which were occupied by breeding pairs. Thirteen of these territories were still occupied during the productivity survey including 6 territories with observed young, 6 territories without young and 1 territory that could not be determined. The distribution of territories observed in 2010 closely matched the distribution of territories found on less intensive surveys conducted in this area in 1985 and 1999; additionally, they were in close proximity to seabird colonies.

These observations suggest that Peregrine Falcons in this area may have high nest-site fidelity and be dependent on seabird colonies as primary prey sources. Monitoring this population of Peregrine Falcons in the future could provide useful, diagnostic information on the status of this apex predator as well as help in understanding the status of seabird populations in the area.



Peregrine Falcon nest cliff in Alaska Maritime National Wildlife Refuge. This pair used an old stick nest probably built by ravens to lay their eggs in.

Natural Resources

Natural Soundscapes

In the summer and winter of 2008-2009, baseline sound data was collected with the help of the NPS Natural Sounds Program Center. In the recently completed final report, recommended management actions include routine acoustical monitoring every five years unless conditions change before then. In between the 5 year monitoring cycle, the park will use on-site listening protocols developed by the Natural Sounds Program to monitor for changes in the acoustical environment. On-site listening is a monitoring method where staff spend an hour documenting all sounds heard during the monitoring period. The percent of time that human-produced sounds are audible compared to the percent time they are not audible can be calculated and compared to baseline data. New extrinsic (human-caused) sound sources can also be identified. Changes or degradation of the soundscape will be identified and appropriate management actions will be taken to reduce human-caused sounds to a level that has been identified for each management zone in the Exit Glacier Area Management Plan Amendment.



Park Biologist conducting On-site Listening using a Palm Pilot and software developed by the NPS Natural Sounds Program.

Project Goals for 2011 include:

- Conduct on-site listening at least three times at each monitoring site selected for each management zone at Exit Glacier during both summer and winter seasons.
- Calculate percent time audible and noise free intervals at each monitoring site and compare it to baseline data.
- Develop mitigation measures to address any increases in extrinsic noise identified during monitoring.



Colonial Seabird Surveys

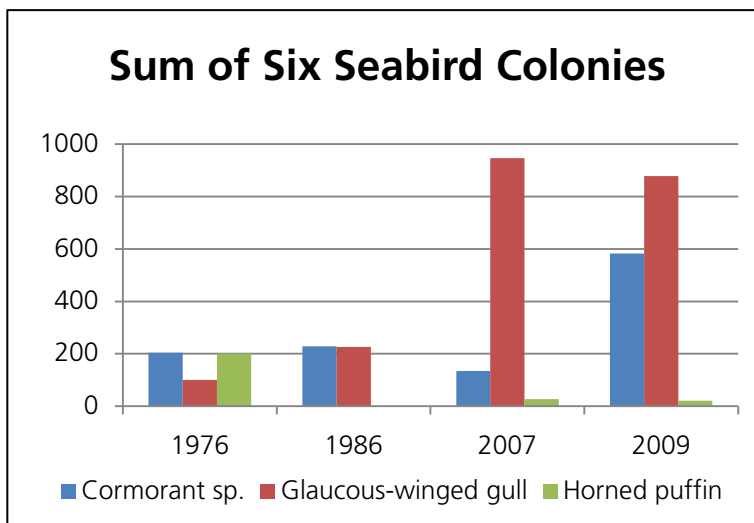
The Gulf of Alaska supports 26 species of seabirds nesting at over 700 colonies. There are 17 known colonies located within Kenai Fjords National Park with an additional 18 colonies located on islands adjacent to the park within the Alaska Maritime National Wildlife Refuge. Because seabirds are indicators of marine ecosystem functioning and are sensitive to disturbances, the park is developing ways to monitor relative abundance of seabird species.

Seabird colony surveys were first conducted along the Kenai Fjords coast in 1976 and then again in 1986. In 2007 the park and Alaska Maritime National Wildlife Refuge joined forces to more regularly survey seabird colonies. In 2010, we conducted a brief survey of select colonies in Aialik Bay and Northwestern Fjord to prepare for more intensive colonial seabird studies beginning in 2011. Weather was generally poor during the survey period and plans were adapted as the trip progressed based on weather conditions. For each colony surveyed, all adults for every species present were

counted, but since repeat counts were not completed at each colony, this data is only valid for relative abundance measurements, not population trends. Results from surveys in 2010 were compared to results from 2009, 2008, 2007, 1986, and 1976 to look for changes in colony size and composition.

We surveyed 4 colony locations in the park and 7 colony locations in the refuge in 2010. Descriptive comparisons reflect the apparent variability in colony attendance since 1976 with a general apparent increase in glaucous-winged gulls throughout the survey area. Seabird colony surveys along the Kenai Fjords coastline have been conducted sporadically, and during past survey efforts replicate counts were rarely made and direct comparisons of data to recent surveys are complicated by differing survey techniques and record keeping.

In 2011, we will begin an interagency project to identify spatial and temporal variability of colonial seabirds within this region and to standardize data collection methods.



Graph depicting the apparent summed total breeding population size of glaucous-winged gulls, horned puffins, and 3 cormorant species (red-faced cormorants, double-crested cormorants, pelagic cormorants) at 6 colonies with four years of count data (1976, 1986, 2007, 2009).

Inventory & Monitoring



Southwest Alaska Network

The Inventory and Monitoring Program is a result of the National Park Service effort to “improve park management through a greater reliance on scientific knowledge”. Kenai Fjords National Park is included in the Southwest Alaska Network Inventory and Monitoring Program, which also includes the Alagnak Wild River, Aniakchak National Monument and Preserve, Katmai National Park and Preserve, and Lake Clark National Park and Preserve. The parks included in the Southwest Alaska Network were organized based on geographic proximity and

ecological similarity. They share funding and a small professional staff, who implement an integrated long-term ecological monitoring program.

During the past several years, the Southwest Alaska Network conducted biological inventories of vascular plants, small mammals, freshwater fish, and landbirds. Effective management of resources requires information on ecosystems trends acquired through long-term monitoring of selected park resources—vital signs. Vital signs can be physical, chemical, and biological elements and processes of park ecosystems that represent the overall health or condition of the park. Staff from Kenai Fjords National Park and the Southwest Alaska Network will be working on several vital signs monitoring projects throughout 2011.

Southwest Alaska Science Symposium

In November 2011, the Southwest Alaska Network will host a symposium titled “Science in Southwest Alaska: Crossing Boundaries in a Changing Environment”. The event will take place November 2-4 in Anchorage at the Dena’ina Civic and Convention Center. Researchers will present information on long-term ecological monitoring projects in national parks and surrounding areas in southwest Alaska (Alagnak Wild River, Aniakchak National Monument and Preserve, Katmai National Park and Preserve, Kenai Fjords National Park, and Lake Clark National Park and Preserve).

We hope to see you there!

Glacier Monitoring

Glacier mass-balance studies determine the difference between the annual accumulation and loss of snow and ice. Monitoring sites consist of stakes (electrical conduit) extending from the glacier surface. The relative change in glacier surface is measured at each stake at the end of both the accumulation season (late April) and melt season (September).

Sites are distributed across a range of elevations because mass-balance varies significantly with elevation. Four stakes were established on Exit Glacier in 2009. An exceptionally deep snowpack made it difficult to find and measure the stakes in spring of 2010. These stakes were replaced in the fall of 2010 and two additional monitoring sites were established on both

Aialik Glacier and an unnamed glacier between Skilak and Lowell Glaciers. Stakes were extended mid-winter in February 2011 and will be measured again at the end of the accumulation (spring) and ablation seasons (fall). Our long-term goal is to better understand how individual glaciers and the Harding Icefield are responding to climate. This information will help the park anticipate and prepare for climate change related impacts.

Other ongoing projects include studying outburst flood hazards at Bear Glacier. Researchers from the University of Montana and will retrieve water level loggers from both Bear Glacier lagoon and a small glacially-dammed lake 16 km up-glacier. Data from these loggers will help determine the timing and water volume associated with this annual-to-biennial outburst flood.



(Above) Mass-balance stake on Exit Glacier.

(Left) Glacially-dammed lake adjacent to Bear Glacier.

Inventory & Monitoring

Time Lapse Cameras

Remote cameras have potential for monitoring a number of environmental conditions of interest in Kenai Fjords including bird nest activity, bear activity patterns, glacier flow, phenology, snow line position, and stream dynamics. The Alaska Sea Life Center, for example, has been successfully monitoring harbor seal populations and ice-berg calving in Kenai Fjords for several years. With the help of the Southwest Alaska Network, Kenai Fjords has recently initiated a time-lapse photography effort to track glacier dynamics and phenology at Exit Glacier.

Time lapse cameras consist of high-resolution digital cameras and programmable timers that are housed in weather-resistant enclosures. Power is provided by solar panels and batteries. Photographs can be acquired at any desired interval by using a programmable timer.

Time lapse cameras have the potential to track the timing (phenology) of spring green-up and fall senescence in vegetation. While direct observation of events like budding or flowering and satellite measures of vegetation greenness

typically form the bulk of phenological observations, time lapse cameras provide a relatively inexpensive method for tracking phenology at targeted remote locations. The use of time lapse cameras also provides an opportunity for validating coarser-scale satellite derived measures.

A pilot study was implemented during 2010-2011 and cameras were installed at two locations near Exit Glacier and at four remote weather stations located in Katmai NP&P and Lake Clark NP&P. In the next few years, the Alaska Region Inventory and Monitoring program plans to install 10-20 time lapse cameras at remote weather stations in national parks located across Alaska. A camera will also be mounted on the new Exit Glacier SNOTEL station.

Data from the Exit Glacier camera may also prove to be a useful interpretive tool. The pictures can be pieced together to form a video, which may provide a clear visual depiction of the flow of the ice, the opening and closing of crevasses, and the rate of retreat.



Time lapse photography is being acquired over the course of one year at the Exit Glacier outwash plain. This is the actual field of view from the camera.



The Grouse Creek SNOTEL station is similar in design to the planned Exit Glacier station.

Weather Stations

Kenai Fjords plans to install two new weather stations in 2011. The Natural Resources Conservation Service will install a SNOwpack TELmetry (SNOTEL) station near Exit Glacier. This station will provide snowpack water content data by means of a pressure-sensing snow pillow. It will also collect data on air temperature, relative humidity, soil temperature and moisture, snow depth, solar radiation, total seasonal precipitation accumulation, and wind speed. Data will be offered near real-time at <http://www.wcc.nrcs.usda.gov/>. This new SNOTEL station will be installed adjacent to the Exit Glacier Snow Course.

Another new remote automated weather station is planned near Pedersen Lagoon in Aialik Bay. It will join the other two existing automated weather stations maintained by the Southwest Alaska Network. These stations use satellite telemetry for year-round transmission of near-real time weather conditions, which can be viewed online at <http://www.raws.dri.edu/akF>.

Weather Station Maintenance

The Southwest Alaska Network currently maintains two automated weather stations in the park. One station is located high on the Harding Icefield about seven miles southwest of the Exit Glacier Nature Center. The other is located on the coast immediately north of McArthur Pass. These weather stations are maintained yearly and sensors are calibrated or replaced. The air temperature, relative humidity sensor, rain gauge, and the wind speed sensors will be replaced in 2011.

Inventory & Monitoring

Nearshore Ecosystems

The marine coastline of the Southwest Alaska Network parks spans 1,180 miles (1,900 km) in the Northern Gulf of Alaska and contains approximately one-quarter of the marine coastline in the national park system. The marine nearshore zone stretches from the high tide line to approximately 20 m in depth (light penetration limit). The brackish and salt-water habitats of the marine nearshore zone are some of the most productive habitats in the Gulf and are highly susceptible to human disturbance. In conjunction with various partnerships, the Southwest Alaska Network is monitoring six marine nearshore vital signs at Kenai Fjords National Park involving both late-winter and summer field work. Highlights from 2010 and plans for the upcoming fifth field season (2011) are listed below.

Marine water chemistry—five temperature and salinity loggers are deployed along the park coastline, collecting data throughout the year. Data collected from the tissues of Pacific blue mussels in 2007 showed low levels of a variety of organic, metallic and hydrocarbon contaminants. Data collection and analysis for contaminants will be repeated approximately every five to seven years.

Kelp & eelgrass—in 2008 underwater video imagery was used for an initial density estimate of five different eelgrass beds. These beds were visited in 2009 and 2010 using the same underwater video techniques. The eelgrass beds will be re-visited in 2011 to observe and record any changes in eelgrass density and distribution.

Marine intertidal invertebrates—in 2011 we will complete our 5th year of sampling in rocky substrates and our third year of invertebrate sampling in soft sediment habitats. Pacific blue mussels (*Mytilus trossulus*) are also sampled annually at randomly selected sites. A variety of metrics are measured, including: invertebrate species composition, size and density, percent algae cover, and mussel size distribution and density.

Marine birds & mammals—late-winter (March) boat-based systematic shoreline surveys were conducted in 2008, the first since the Exxon Valdez oil spill in 1989. Winter surveys primarily focus on over-wintering sea ducks that use the nearshore prior to migrating to their nesting grounds. The second winter survey was completed in March 2010. The most common birds observed during this survey were Barrow's goldeneye and Harlequin ducks. The next late-winter survey is scheduled for 2013. The fourth summer (June) surveys were completed in 2010 and these summer surveys will be conducted annually.

Black oystercatchers—annual skiff-based shoreline surveys will be conducted for a fifth year in 2011. These surveys estimate breeding pair density and overall density of breeding and non-breeding black oystercatchers. Samples of nest site prey remains, that are used to provision the chicks, are also collected. Shifts in species composition of prey remains may indicate a change in the prey base available to black oystercatchers to feed their chicks.



NPS and USGS researchers surveying marine birds and mammals along the park coast.

Sea otters—are considered a 'keystone species'. Monitoring sea otters can help managers anticipate ecosystem response to population changes. Examples of the effects of sea otter population changes elsewhere in Alaska include increases in kelp cover as healthy sea otter populations eat urchins that feed on kelp. Aerial surveys showed an increase in sea otter abundance from 800 animals in 2002 to approximately 1,510 animals in 2007. The 2010 survey resulted in a population estimate of 1,320. The next aerial survey is scheduled for 2013.

Natural Resource Condition Assessment

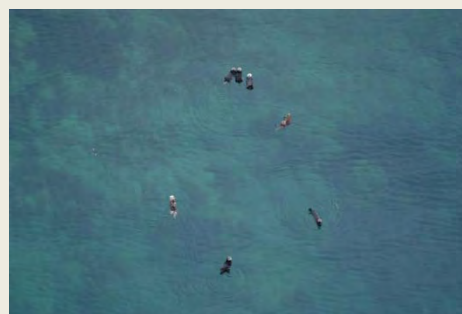
Just what is a Natural Resource Condition Assessment and how does it relate to Kenai Fjords National Park? Natural Resource Condition Assessments strive to provide credible condition reporting for a subset of important park natural resources and indicators and useful condition summaries by broader resource categories or topics.

A Condition Assessment evaluates and reports on current conditions, critical data gaps, and selected threat and stressors relative to a subset of important park natural resources and indicators. To accomplish this, existing scientific

data from a variety of sources is gathered and interpreted. Condition Assessments use a hierarchical framework and include components of: natural resource indicators, reference conditions/values, current condition reporting by indicators, and current condition summaries by broad resource categories.

This program originally produced reports titled 'Watershed Condition Assessments', and Kenai Fjords National Park completed its first watershed condition assessment in 2010. With this momentum pushing us along, the park was quickly able to complete the processes of finalizing a 'Natural Resource Condition Assessment' framework and gather requisite information. In 2011 we are progressing through the analysis and reporting stages with help from scientists at St Mary's University of Minnesota. The Natural Resource Condition Assessment program is nationally funded as will help provide a common reference framework across all National Park areas.

For more information visit:
http://www.nature.nps.gov/water/NRCondition_Assessment_Program/.



Studies such as the recent sea otter survey will be used in the assessment.

Cultural Resources

From the Archives...



Angelica lucida Collected by Bud Rice at Surprise Bay, 7-8-1983.

In 1983 one primary goal of the summer season was to document park resources including plants. Nuka Bay Ranger, Bud Rice, noted in his end of season report, "An intensive effort was made to collect voucher specimens and document the variety of flora in the Nuka Bay subdistrict." Rice collected and identified 113 species between June 1st and August 12th. He noted "Six range extensions were discovered for Hulten's dot maps in the reference *Flora of Alaska*. The vegetation varies from Coastal Sitka Spruce and wet Hemlock stands to rocky alpine tundra. An almost impenetrable layer of brush consisting of alder, Devil's Club, and Salmonberry occurs on midslope levels."

Rice's collection was divided between the University of Alaska at Fairbanks herbarium and the park's museum collection. The university has now scanned the their collection and made it available online. The Kenai Fjords collection, including Rice's 1983 specimens, may be viewed at: <http://arctos.database.museum/home.cfm>.

Exit Glacier Traditional Activities Project

This ongoing project serves a two-fold purpose: preservation of Seward local history for interpretive purposes through oral interviews, and working to define what constitutes traditional activities in and around Seward. Researchers Karen Brewster of the University of Alaska, Fairbanks and Rachel Mason and Don Callaway from the National Park Service Regional Office are wrapping up the interview portion, including transcription of interviews.

This year Doug Deur of Portland State University will begin to research and analyze the oral histories collected by Brewster, Mason, and Callaway. Using the recorded life histories and secondary historical data, Deur will describe the participants' activities in and around Seward with a special emphasis on the Exit Glacier area. His analysis will culminate in a report which will provide an interpretive insight into Seward's history and assist park staff with future planning. This project continues through 2013.

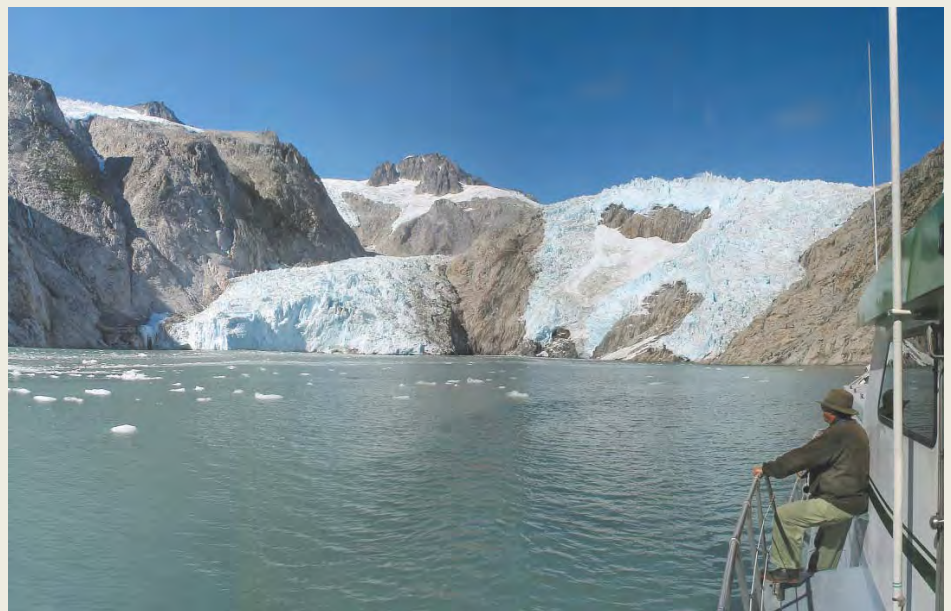


Building Exit Glacier Road. Photo: K.L. Freeman, Cooper Landing, Alaska, 1974.

Administrative History

Ted Catton, of Environmental History Workshop, completed work on *A Fragile Beauty: Kenai Fjords' Administrative History*. In addition to presenting a detailed record of the park's establishment and operation, this lengthy

document includes personnel rosters, visitation statistics, and a list of key management documents. *A Fragile Beauty* was printed and delivered to the park in October of 2010. If you'd like a copy, please contact Shannon Kovac, Cultural Resource Program Manager, 422-0541.



Park Ranger Doug Capra views Northwestern Glacier from the M/V Serac in 2004.

Interdisciplinary

Perceptions of Climate Change

During the summer of 2010, researchers investigated visitors' attitudes and opinions about climate change and climate-sensitive park resources. The purpose of this project was to gain insight into visitors' awareness and concern regarding climate-influenced park resources and their beliefs in the occurrence and causation of global climate change. The project also assessed visitors' general interest in the topic of climate change, their attitudes towards the parks' current level of information provided about climate change, and potential differences between park staff and visitors' perceptions. Furthermore, researchers were interested to know if visitors' perceptions changed throughout the course of their park experience.

The research occurred in two phases. First, in-depth, one-hour interviews were conducted with seven interpretative and management staff in June and July of 2010. Commonalities across the interviews were used to assist in survey design and to understand staff perspectives regarding climate change and visitor services. Second, an on-site paper survey was administered to adult park visitors in August of 2010. Specifically, 323 visitors completed a survey prior to and after their experience at Exit Glacier (132 visitors) or on a boat tour (191 visitors). Control groups were also surveyed (102 visitors), allowing the researchers to identify and test effects of the pre-experience survey and to adjust data accordingly. In addition to numerous climate change questions regarding park resources, the survey also included demographic information, length of stay in the area, participation in other activities, past visit history to the park, and information about their participation and satisfaction with interpretive programming.

Preliminary results indicate that visitors generally believe that global climate change is occurring, and are interested in climate change, but are less certain about humans' influence on the climate. In



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addition, visitors are relatively unaware of the sensitivity of park resources to climate change, or the biophysical changes that have recently occurred at the park, such as increased vegetation growth or glacial recession.

These results highlight the need to understand visitors' perspectives and perceptions when designing interpretation or public outreach focused specifically on climate change. For example, since visitors tend to generally believe in the occurrence of climate change, but are unaware of site-specific impacts, interpretation specialists should perhaps concentrate on current or projected impacts to park resources. The forthcoming detailed results of this study may assist resource managers and interpretation specialists at Kenai Fjords when making decisions regarding climate change and the visitor experience. Studies such as this are increasingly important as managers make decisions that require information about visitors' perceptions of climate change and climate influenced resources.

Social Science

Kelly Goonan, a University of Utah graduate student, in cooperation with Kenai Fjords staff conducted research designed to identify indicators of quality for social and resource conditions in coastal backcountry areas of Kenai Fjords National Park during summer 2010. Park visitors who participated in a trip to the coast were asked to participate in a voluntary survey. Surveys were administered from July 15-August 30, yielding a total sample of 13 completed surveys.

Indicators are defined as measureable, manageable variables that serve as proxies for management objectives. Good indicators of quality are related to visitor use and are significant to the visitor experience. Based on these criteria and the preliminary results, opportunities for experiencing solitude, the scenic quality of the natural environment, wildlife-viewing opportunities, kayak/tourboat interactions, and natural soundscapes appear to be important to the quality of the visitor experience. A second phase of research will be conducted in the summer of 2011 to formulate visitor standards of quality for coastal backcountry conditions.



A group of kayakers enjoy solitude and scenery in Aialik Bay.



A late February 2011 view of the Kenai Peninsula and southwest Alaska, from the MODIS satellite.



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For More Information

The National Park Service continues to take advantage of technological advances to better manage wide-ranging, existing information sources. Kenai Fjords National Park for example, was initially designated 'Kenai Fjords National Monument' and a master plan and environmental impact statement were prepared for the monument. Such planning documents provide a window into the management history of a park. With a network of nearly 400 sites across the National Park Service, there are thousands of such documents and related data sets.

With the advent of the Southwest Alaska Inventory & Monitoring Network, parks now have scientifically documented species lists for vertebrates and vascular plants, as well as a suite of GIS data sources and tools.

Park Enabling Legislation

- <http://www4.law.cornell.edu/uscode/16/ch51.text.html>
- http://www.nps.gov/history/history/online_books/williss/

Historical & Management Documents

- http://www.nps.gov/history/history/park_histories/

Resource-oriented data sources

- <http://nrinfo.nps.gov/>

Inventory & Monitoring

- <http://science.nature.nps.gov/im/units/swan/>

Land Information

- <http://landsnet.nps.gov/>

Maps & Data of park facilities

- <http://insidemaps.nps.gov>

Park Website

- <http://www.nps.gov/kefj/>

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This is the fourth 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 December 2, 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 subsistence in Kenai Fjords National Park.