



# RESOURCE MANAGEMENT NEWS

## Summer 2012

Black bears can be seen foraging for freshly sprouted green vegetation along the coast of Kenai Fjords National Park during the early summer months. As the season progresses, their diet may include salmon, berries and insects.

Kenai Fjords National Park (KEFJ) was established on December 2, 1980 by the passing of the Alaska National Interest Lands Conservation Act (ANILCA). The enabling legislation within ANILCA, identifying the purposes for which KEFJ was set aside as a national park, is surprisingly brief considering the park encompasses an area of over 600,000 acres and a diversity of natural and cultural resources. However, the following short paragraph is a beautiful combination of broad statements and specific detail that reflects the careful thought with which the words must have been designed.

According to ANILCA section 201(5), KEFJ “will be managed for the following purposes, among others: 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.”

Park managers return to this language regularly when making decisions to remind themselves of our greater purpose and mission. In Resource Management, we refer to our enabling legislation when

developing project ideas, reviewing scientific research proposals, and assessing the potential impacts of management decisions; we build partnerships to assist us in these efforts.

The projects outlined in this newsletter reflect our dedication to the park’s mission to support the integrity of the fjords environment. Our invasive species program continues to preserve intact plant communities while a new project investigating contaminant loads in peregrine falcons and bald eagles will help protect our breeding birds. Studies evaluating changes in glaciers, stream hydrology, seabird populations, and intertidal communities help us determine the health and status of the resources we have been entrusted to maintain unimpaired. Efforts to record traditional activities and uses for native plants, ensures that we acknowledge the role humans have had in shaping the Kenai Fjords environment.

We prepared this newsletter for the first time without the help of our friend and colleague Fritz Klasner who moved to Hawaii in January. Fritz’s enthusiasm for this newsletter was instrumental in establishing it as an annual product that has improved in quality and content each year. As we head into summer, we miss his competence, skill, and dedication to

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the resources of KEFJ. Fortunately, Fritz leaves behind a great staff and well developed partnerships that will help ensure a successful field season. We hope you enjoy reading about our work and look forward to seeing you in the field!

# Natural Resources

## Bear Management

Bears are common throughout Kenai Fjords National Park, and the opportunity to see a bear in its natural habitat is often a highlight for visitors and staff alike. This experience, however, may increase the potential for conflict between humans and bears and may 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 together with management actions such as hazing and aversive conditioning of bears.

### 2011 Bear Activity

We received 24 reports of bear-human interactions in the park from May to September of 2011.

We classified five of these interactions as 'incidents' and 19 as 'encounters'. 'Incidents' are when a bear acts aggressively whereas an 'encounter' is when a person and bear are simply mutually aware of one another.

Park employees, cooperators, and

The probable cases of bear-human incidents at KEFJ in 2011.

Probable Cause	No. of Incidents
Habituated/Tolerant	1
Defense of Cubs	1
Abandoned Food	1
Surprise Encounter	1
Curious/Unknown Attraction	1



Black bear tracks traverse Exit Glacier Road in September, 2011.

commercial operators assist in bear management in many ways including helping **educate staff and visitors**, keeping a **clean camp**, and demonstrating **safe hiking**.

Primary responsibility for bear management in the park lies with *Visitor and Resource Protection (VRP)* and

*Resource Management (RM)* teams. The *Bear 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.

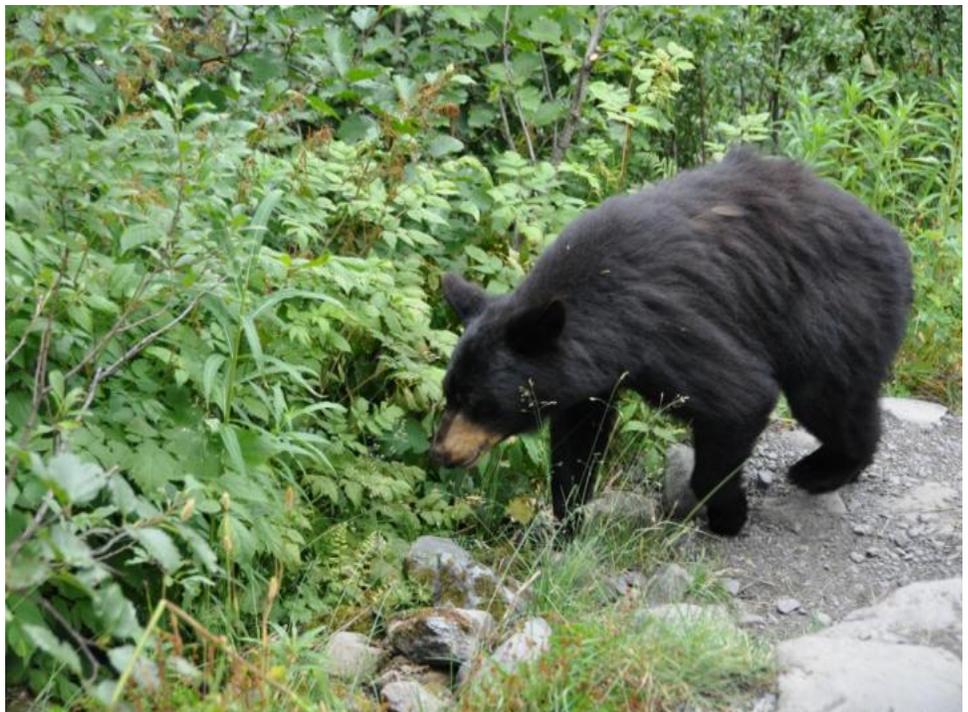
### Be 'Bear Smart'

Employees and visitors can improve their understanding of bear behavior and avoid negative interactions.

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!



A habituated black bear exits the trail after it travels within 10 feet of a group of hikers on the Harding Icefield Trail.

# Natural Resources

## Invasive Plant Management

This year marks the ninth 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 threat throughout Kenai Fjords National Park, but over the last eight years, many established populations of invasive plants have been reduced or eliminated.

In June of 2011, the Alaska Regional EPMT joined the KEFJ EPMT to map and chemically control the common dandelion infestation on the Exit Glacier outwash plain. Herbicide was applied by State of Alaska certified pesticide applicators using a precise, spot application. Park staff focused on the outlier populations first due to time constraints posed by the weather and the ability to cross Exit Creek safely. By controlling the infestation starting from the boundaries and working in toward the center of the population, park managers hope to reduce the infestation into a manageable population. In 2012, the EPMT plans on spending much of June spraying the rest of the population. The team will also survey populations controlled in 2011 to evaluate the effectiveness of the herbicide treatment.

During the summer of 2011, the Education and Resource Management divisions developed a new shared Invasive Plant Education Student Conservation Association (SCA) Intern position. This position was established to fill a gap in the ability of the park to provide resource based education programs for youth groups visiting the park. The intern developed an invasive plant education program paired with a field component



Southeast Alaska Guidance Association (SAGA) crew hand pulls common dandelions along Exit Glacier Road.

engaging youth in invasive plant control efforts in the park. The program did a great job of filling this educational need and in 2012 outreach will be expanded to attract more youth groups.

The EPMT will continue to work with other agencies, non-governmental organizations, and community volunteers to control invasive plant infestations outside park boundaries. The ninth annual Exit Glacier Road Weed Pull is scheduled for June 21, 2012. The park EPMT staff will also be participating in the Seward Weed Smackdown in June, working with state, federal and local volunteers to control weeds in the Seward area.

Goals for 2012 include:

- Continue to monitor, map, and treat infested sites in the Exit Glacier Area by hand pulling.
- Continue to use herbicides to spot treat the dandelion population on the outwash plain.
- Continue to inventory and monitor for invasive plants on park lands adjacent to the Pedersen Lagoon development and work with lodge



Treating common dandelion with herbicide on the Exit Glacier outwash plain.

- owners to control invasive plants identified on their land.
- Continue to control invasive plant populations in the coastal fjords.

## Colonial Seabird Surveys

In 2011, KEFJ resource staff, in cooperation with the U.S. Fish and Wildlife Service and the University of Alaska Fairbanks, began intensively monitoring select colonies as part of a three year study to identify spatial and temporal variability of colonial seabirds within the Kenai Fjords and adjacent Alaska Maritime National Wildlife Refuge area.

We conducted shoreline surveys of the KEFJ coast to identify new seabird colonies, performed whole colony counts of most historic colonies, conducted repeated counts of historic black-legged kittiwake photo plots, and established new survey plots for cormorant species (red-faced, pelagic and double-crested), black-legged kittiwakes, common murres and glaucous-winged gulls.

Results from the current survey were compiled with data from previous surveys to examine apparent changes in colony size and composition. All KEFJ colonies were counted at least once. Eight historic and two newly established black-legged kittiwake plots in the Chiswell Islands, nine newly established common murre plots, seven newly established cormorant plots and twelve newly established glaucous-winged gull plots were counted on

multiple days using the same procedure used for whole colony counts. We discovered 18 new seabird colonies (eight puffin species, four cormorant species, three mew gull and three glaucous-winged gull colonies) and failed to detect breeding activity at seven of 35 historic colonies surveyed.

Descriptive comparisons of limited count data reflect the apparent variability in colony attendance since 1976 with a general apparent increase in glaucous-winged gulls throughout the survey area. The number of kittiwakes nesting within eight historic plots in the Chiswell Islands has decreased since 2008 but is still greater than the total number breeding within the same plots in 1992. An intensive survey effort including repeated counts of plots will be employed again 2012.



Park biologists count seabirds from the M/V Serac.

# Natural Resources

## Integrating Seabird and Raptor Studies

Alaska's high latitude, coastal marine ecosystems support an assemblage of resident and migratory marine birds larger and more diverse than any similar region in the northern hemisphere. Seabirds are integral and highly visible members of marine ecosystems and are valued as indicators of healthy oceans. Feeding on these high level foragers are top-level predators, including birds of prey, which shape marine food webs through the direct and indirect effects of predation. Upper trophic level predators in marine environments can serve as indicators of change within the broader system that they occupy. Recent studies have also shown that cascading effects through complex trophic pathways can have surprising and wide-ranging causes and impacts.

While many studies have identified the environmental and biological pathways that affect seabird population dynamics, little is known about the relationship between seabirds, their avian predators, and links to environmental contaminants. Elevated concentrations of contaminants can cause acute and chronic health effects including impairment of reproduction, neurological function, and suppression of immune function in birds. Contaminants of concern in northern ecosystems include heavy metals such as mercury and Persistent Organic Pollutants (POPs) such as organochlorines. Organochlorines accumulate in fatty tissues, possibly contributing to elevated concentrations of contaminants in seabirds living in cold environments. Fat reserves act as a buffer against cold,



Eaglet in its nest on the coast of Kenai Fjords National Park.

stress, and periods of low food availability. Apex predators such as eagles and falcons may have particularly high concentrations of persistent contaminants such as organochlorines. This is due to biomagnification of the food chain; consequently, they can be used to assess the more severe potential impacts to ecosystems.

The affect of predation on the survival and population dynamics of seabirds that are experiencing population decline, is critical to their management and recovery. KEFJ is and will be investing resources in long-term monitoring of seabird and raptor populations. We have documented that monitoring these species is important: 1) due to their significance to the park; and 2) as cost effective indicators of marine ecosystem health. To truly take advantage of the power of these ongoing monitoring programs and to leverage the limited resources available for long-term monitoring, we need a better understanding of the interactions among

these top predators, specifically predator-prey dynamics and contaminant loads. During the summer of 2012, park researchers in cooperation with the U.S. Fish and Wildlife Service will investigate the predator-prey dynamics of seabirds and raptors in KEFJ.

Primary objectives of the project are to determine: 1) the relative importance of seabird species in the diet of bald eagles and peregrine falcons, 2) whether the diet of raptors varies with proximity to seabird colonies, 3) whether contaminants found in raptors varies with diet, 4) if reproductive success in raptors is associated with diet composition or contaminants and 5) how contaminant levels found in seabirds and raptors in KEFJ compares with other populations in Alaska. We anticipate using the results of this study to better interpret trends observed in long-term monitoring of seabirds and raptors in KEFJ.

## Evaluating Native Bee Response to Climate Change

Kenai Fjords National Park and 89 other national parks are participating in a nationwide effort to document the effects of climate change on native bee populations. Native bees not only face challenges from climate change, but also from the introduction of diseases, the loss of native plants from which they gather pollen and nectar, and general habitat loss.

Little is known about the status of bee populations in the United States. Furthermore, it is widely unknown which species of bees reside in many of the national parks. Kenai Fjords National Park is partnering with U.S. Geological Survey – Biological Resources Division (USGS-BRD) to collect baseline data identifying which bee species utilize the Exit Glacier Area.

Native bee surveys began during the summer of 2011 and will be completed in 2012. The bee inventory survey methods include selecting two transects; one in a site that is thought to be susceptible to the effects of climate change and one in a comparison site. A survey consists of placing colored cups five meters apart along the transect. The cups are filled with soapy water and are allowed to sit for twenty-four hours. Bees are attracted to the white, yellow, and blue colored cups, and when they enter the soapy water they are trapped. The cups are collected and the bees found in the cups are strained out with a mesh net. The collected bees are placed in sample bags and preserved in isopropyl alcohol solution. The samples are sent to the USGS-BRD lab for identification.

Eight surveys will be completed in the 2011-2012 summer season. Resource Management staff is looking forward to finding out what bee species are found in the Exit Glacier area and will share this information with park staff and the public.



Native bee collecting nectar from a salmonberry flower.

# Natural Resources

## Wildlife Observations

Kenai Fjords National Park has been documenting natural history observation data since 1980. Opportunistic observation of rare or unexpected wildlife yields valuable anecdotal data on species occurrence, relative abundance and distribution. This data also contributes to an overall understanding of the natural history of the park.

Many visitors are surprised to find out that there are no reptiles in the park, or that it is rare to see a brown bear along the park coast. Last year, we received 76 observation cards. Notable observations in the Exit Glacier area included a Canada lynx near the Resurrection River Bridge, a wolverine, and a beaver.

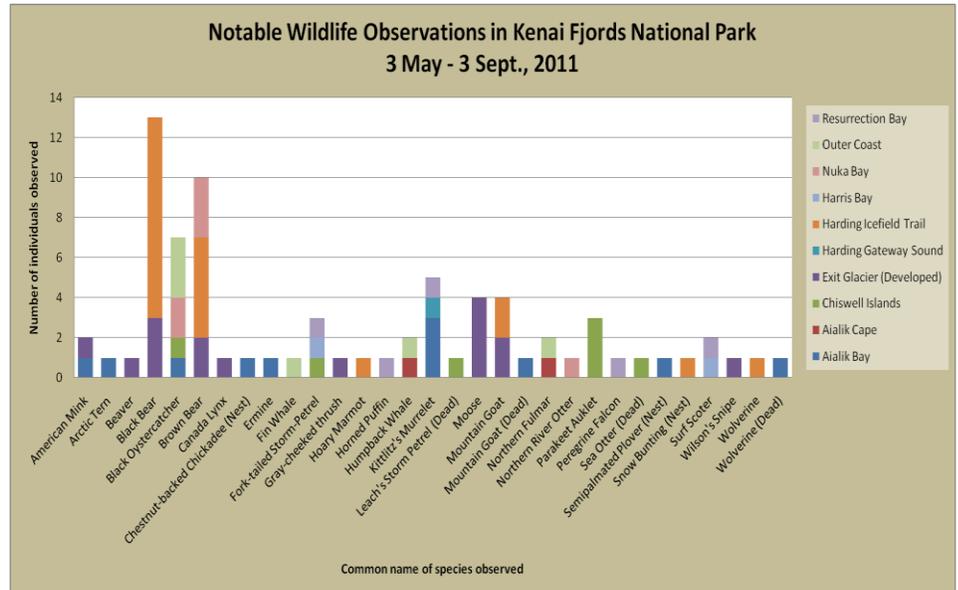
On the coast, park staff observed northern fulmars, fork-tailed storm petrel, a Leach's storm petrel, and humpback whales bubble-net feeding!

Park staff and visitors are encouraged to report unusual and notable wildlife sightings to Resource Management. Please record your observations on a Natural History Field Observation card, and turn it in to Resource Management where they will be entered into a database.

We look forward to receiving your great observations!



Fledgling snow bunting begs for food from a parent.



Humpback whales bubble net feeding in Sandy Bay.

## SNOTEL Installation

In cooperation with the Alaska Snow Survey office at the Natural Resource Conservation Service, a Snowpack Telemetry (SNOTEL) station was installed near Exit Glacier in July 2011. The Exit Glacier SNOTEL station provides automated, real-time weather data collection and availability in a consistent, efficient, and timely format.

This data, including precipitation, temperature, wind speed and direction, snow depth, soil temperature, and soil moisture, is readily accessible for park visitors and staff and is easily compiled for long term studies. This station is part of an extensive network of automated weather stations across the western U.S. and Alaska that are designed to collect snowpack and related climatic data.

Hourly weather data can be accessed at [http://ambcs.org/cgi-bin/siteCurrent.cgi?site=EXIT\\_GLACIER](http://ambcs.org/cgi-bin/siteCurrent.cgi?site=EXIT_GLACIER)

Additional ways to view the Exit Glacier data (graphs vs. tables) can be found at <http://ambcs.org/>. Links to other climate monitoring stations in Kenai Fjords and the Southwest Alaska Network of parks can be located at [http://science.nps.gov/im/units/swan/index.cfm?theme=weather\\_stations](http://science.nps.gov/im/units/swan/index.cfm?theme=weather_stations).



The Snowpack Telemetry (SNOTEL) station provides real-time weather data at Exit Glacier.

## Glacier Mass Balance

2011 was the second year of glacier mass balance research on the Harding Icefield. Glacier mass balance determines the difference between the total accumulation of snow and ice over the winter and the amount of snow and ice loss during the summer. Changes in mass balance dictate a glacier's long-term behavior in response to climate conditions. A glacier that maintains a negative balance over time is out of equilibrium and will thin and retreat. By studying mass balance we can better prepare for impacts from climate change in glacial watersheds.

NPS researchers established six sites on the Harding Icefield – four on Exit Glacier and two on the unnamed glacier (referred to as Glacier "A") located between Lowell and Skilak Glaciers. A stake (electrical conduit) up to 12 m long has been inserted into the snow and ice at each site. Researchers visit these sites each year in late April and September to record stake location, glacier surface elevation, stake height of the glacier surface, and snow depth and density.

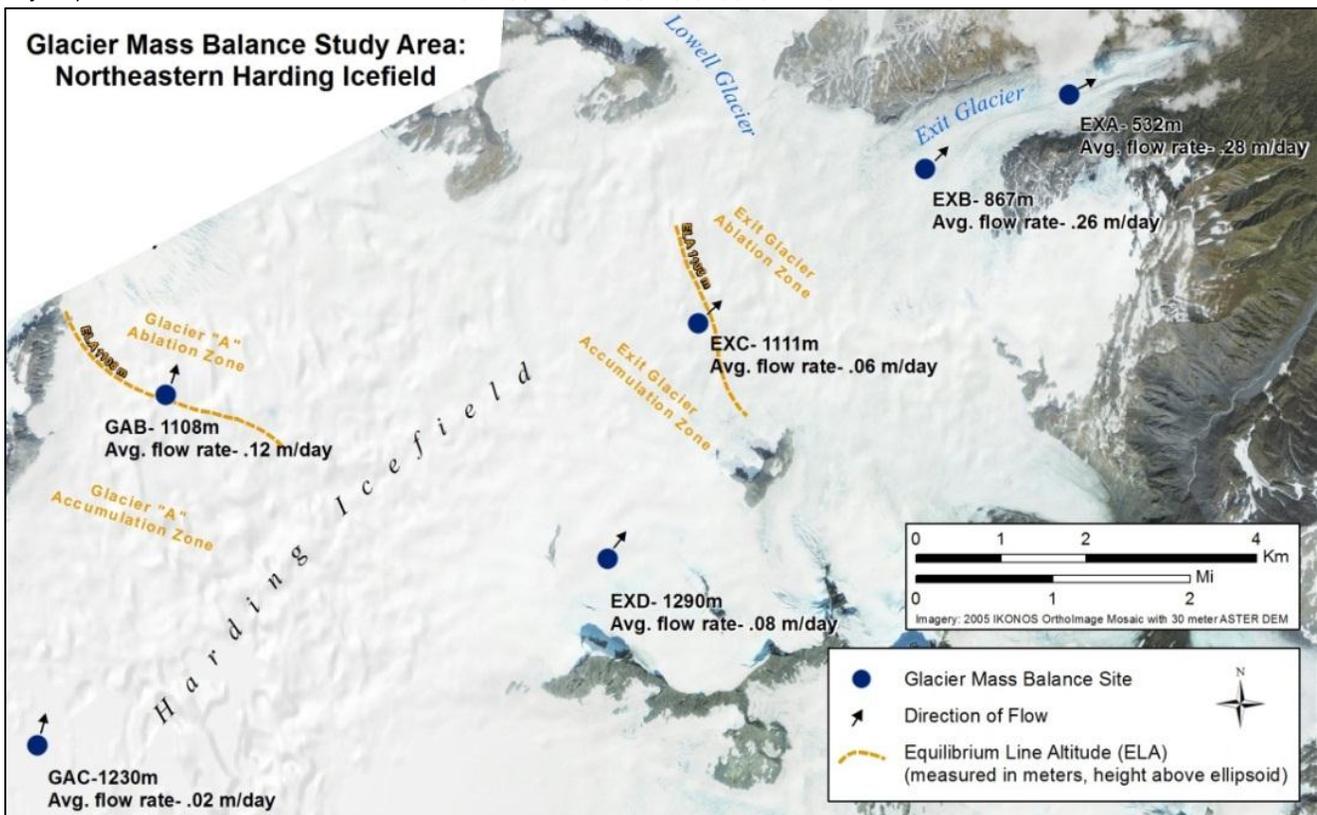
Net balance (winter balance + summer balance) is correlated to elevation and is measured in meters water equivalent (mwe). Significant ablation (up to 7 mwe/year) occurs at elevations below

The table below shows the range of net balances, ice flow rates, and spring snow pack at each site for two balance years (2010 and 2011). Balance and velocity are not reported if the stake could not be measured.

Water Year 2010						
Site	Elevation	Net Balance	Avg. Winter Snow Depth in Spring	Velocity Winter	Velocity Summer	Velocity Water Year
EXA	532 m	-6.89 mwe	376 cm	0.27 m/day	0.28 m/day	0.27 m/day
EXB	867 m	-1.23 mwe	592 cm	n/a	n/a	0.26 m/day
EXC	1111 m	+0.53 mwe	620 cm	n/a	n/a	0.06 m/day
EXD	1290 m	n/a	849 cm	n/a	n/a	n/a
Water Year 2011						
Site	Elevation	Net Balance	Avg. Winter Snow Depth in Spring	Velocity Winter	Velocity Summer	Velocity Water Year
EXA	532 m	-5.28 mwe	237 cm	0.27 m/day	0.32 m/day	0.29 m/day
EXB	867 m	-2.12 mwe	414 cm	0.24 m/day	0.27 m/day	0.25 m/day
EXC	1111 m	+0.05 mwe	490 cm	0.06 m/day	0.08 m/day	0.06 m/day
EXD	1290 m	+1.71 mwe	702 cm	0.09 m/day	0.07 m/day	0.08 m/day
GAB	1108 m	0.00 mwe	551 cm	0.12 m/day	0.12 m/day	0.12 m/day
GAC	1230 m	+1.96 mwe	590 cm	0.02 m/day	0.03 m/day	0.02 m/day

1100 m. This elevation identifies the 2011 equilibrium line altitude (ELA). Areas above the ELA are characterized by net accumulation (up to 2 mwe/year). Flow rates are also correlated to elevation: the fastest flow rates (.29 m/day) were measured closest to the terminus and the slowest flow rates were found in the

accumulation zone (<.10 m/day). Winter accumulation and summer ablation appear to be more pronounced at higher elevations on Exit Glacier when compared to the unnamed Glacier "A".



2011 was the second year that KEFJ monitored six sites on the northern end of the Harding Icefield as part of a glacier mass balance study.

# 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 2012.

## Vegetation

Vegetation staff from the Southwest Alaska Inventory and Monitoring team will be visiting Kenai Fjords National Park this summer to conduct reconnaissance fieldwork that will identify suitable long-term vegetation monitoring sites as well as provide preliminary information for a future nonvascular plant inventory. Additionally, baseline data collection on terrestrial deposition of airborne contaminants will be expanded.

*Vegetation Monitoring.* — At Kenai Fjords National Park, long-term monitoring of vegetation composition and structure has been identified as important due to its intrinsic ecological value (primary production, habitat, forage) and because vegetation is a sensitive indicator of environmental conditions. Monitoring objectives are to document trends in the structure (e.g., height and density), composition (e.g., species richness and diversity), and demography (e.g., mortality and species turnover) of selected late successional vegetation types. This year's reconnaissance fieldwork will involve identifying Sitka spruce and mountain hemlock forest areas throughout the park that would be suitable for establishing future long-term monitoring sites. This monitoring will expand on the Forest Inventory and Analysis plots (measured by the USDA Forest Service) already established within the park.

*Nonvascular Plant Inventory.* — Kenai Fjords National Park encompasses a range of habitat types, elevations, and substrates, and consequently contains a rich and diverse flora. Nonvascular plants (i.e., lichens, mosses, liverworts) are a prominent and ecologically important



SWAN staff conducting a vegetation survey in McCarty Fjord.

component of this flora, in terms of biomass, hydrologic and nutrient cycling, and sensitivity to air quality and climate change. However, no substantial nonvascular plant survey has yet occurred within the park. The objective of this year's reconnaissance fieldwork is to collect baseline data that can be used to guide a more comprehensive future inventory of the park's nonvascular plant diversity.

*Airborne Contaminant Monitoring.* — While Kenai Fjords National Park may be considered pristine, the transport and deposition of airborne contaminants has been identified as a possible threat to its terrestrial ecosystems. Recognizing the potential ecological impacts of increasing contaminant concentrations, the common moss often called stair-step moss, *Hylocomium splendens*, has been used in the park since 2008 as a passive sampler to establish baseline levels and long-term trends of metals, sulphur, and nitrogen within the park's terrestrial environment. This year's fieldwork will increase the

## Nearshore Monitoring



Biologist surveying intertidal species.

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

In 2012, the Exxon Valdez Oil Spill (EVOS) Trustee Council began funding an integrated, multidisciplinary five year program that supports long-term monitoring of marine conditions and resources injured by the EVOS oil spill. The program encompasses a variety of themes including environmental drivers (oceanography and plankton), the benthic marine ecosystem (intertidal invertebrates and algae, sea otter and seabirds), the pelagic marine ecosystem (whales, seabirds and forage fish) and lingering oil that may still exist in the sediments and wildlife.

The geographic range of the program stretches from Prince William Sound, across Kenai Fjords National Park to lower Cook Inlet including Kachemak Bay, all the way across to Katmai National Park and Preserve on the Alaska Peninsula. SWAN and NPS are active partners in this monitoring effort that relies on partnerships and in-kind support for success. With over 24 principle investigators from 15 different agencies (both state and federal), universities, NGOs and non-NGOs, this collaboration is sure to provide insight into the changes anticipated to occur in the marine environment within the Gulf of Alaska.

spatial extent of this important baseline dataset.

# Inventory & Monitoring

## Pedersen Lagoon Weather Station

A new weather station is operating in Aialik Bay on top of a ridge east of Pedersen Lagoon. This new station is the result of a collaborative effort between Alaska Wildland Adventures, Kenai Fjords National Park, the National Park Service Inventory and Monitoring Program, and Port Graham Native Corporation. This weather station is fully automated and is powered by a solar panel and battery reserve. Weather observations are transmitted every hour to a weather satellite and are available on the internet in near real-time at [http://www.raws.dri.edu/gi-bin/wea\\_daysum.pl?akAPED](http://www.raws.dri.edu/gi-bin/wea_daysum.pl?akAPED). Weather observations include temperature, wind speed and direction, rainfall, snow depth, relative humidity, and solar radiation.



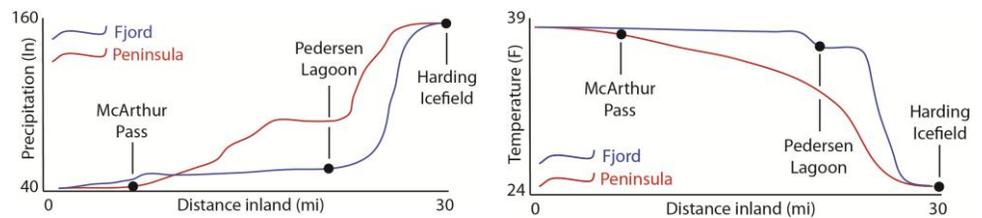
The Pedersen Lagoon weather station in Aialik Bay was installed in 2011 through a collaborative effort between Alaska Wildland Adventures, the National Park Service, and Port Graham Native Corporation.

During the first six months of operation (Aug 15, 2011 to Feb 15, 2012), the following weather conditions were documented. The warmest temperature was 70 degrees F on Aug 16 and the coldest temperature was 9 degrees F on Jan 27. The strongest wind gust blew from the northwest at 129 miles per hour on Nov 16. The most rain fall during one day occurred on Sep 6 and the daily total was 5.5 inches. Cumulative rain fall (combined with some snow melt) during the first six months of operation was 91 inches. The maximum snow depth was 35 inches on Feb 1 – although the snowpack was likely much deeper not far away from the weather station. The weather station was placed on top of a ridge in order to maximize regional climate exposure and to ensure that it would not be buried by a deep winter snowpack.

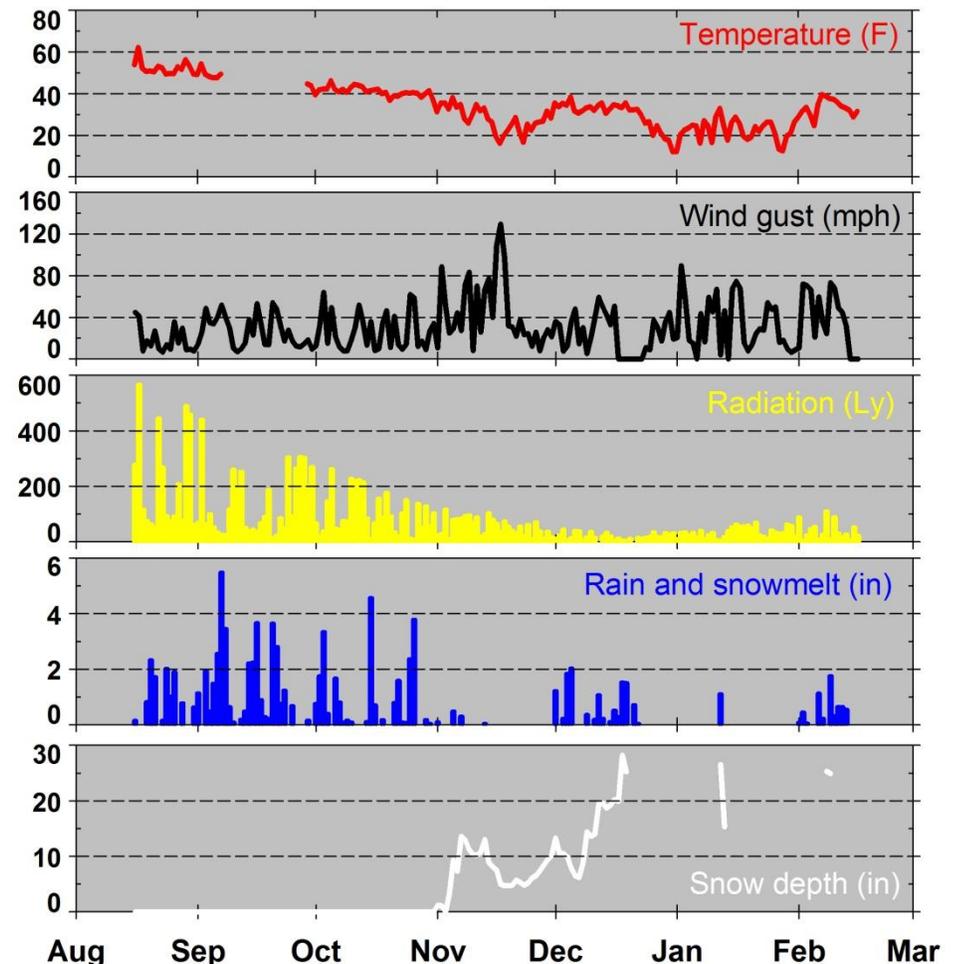
Relatively mild temperatures and abundant precipitation characterize the climate along the coastline of Kenai Fjords National Park. The Kenai Mountains rise abruptly from the ocean in the path of prevailing winds, resulting in orographic uplift and abundant rain and snow fall on the windward (southeast) side of the mountains and rain shadows on the leeward (northwest) side. The varied topography along the coastline, punctuated by fjords and peninsulas, produces strong climate gradients oriented inward from the coastline. Temperature and precipitation are much steeper in fjords than on peninsulas. There

is also a regional climate gradient oriented parallel to the coastline with slightly colder temperatures and increased precipitation northeast along the coastline.

Automated weather stations collectively monitor conditions in the main climate regions of the park (coast, Harding Icefield, and inland valleys along the Resurrection and Nuka Rivers) and serve to support real-time operational needs, document weather variability and long-term climate trends, and provide reliable climate data to researchers.



Generalized precipitation (left) and temperature (right) gradients oriented from the coast inland to the Harding Icefield.



Daily weather conditions at the Pedersen Lagoon weather station (Aug 15, 2011 to Feb 15, 2012).

# Cultural Resources

## From the Archives...

In 1985, Kenai Fjords began keeping an Exit Glacier Goat Record in a green clothbound journal. As the journal notes, "This was started to help us keep track of our goat population at Exit Glacier. It will be interesting to compare visitation records with the information found in this log."

Rangers and caretakers were encouraged to record their observations twice daily throughout the year. The following entries are from Ben London and Julia Hensley:

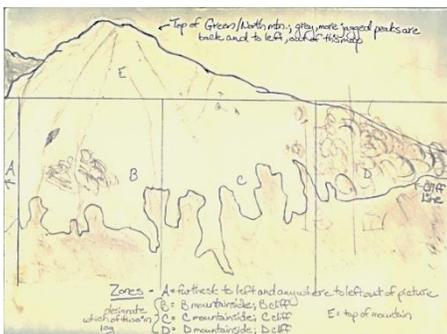
10-6-89 "No goats for many days due to big rains and wind. Visibility has been poor also. I took a walk up around the glacier face and saw 7 goats hiding in the big ravines on the southern face of the mountain. I was curious where they hid from the storms and now I know at least one place."

10-19-89 "Couldn't see a goat today to save my life! Maybe Delta had a great deal on Hawaiian fares and the goats are munching pineapples even as I write this."

11-7-89 "2 billys had a face off for about 20 minutes on an outcrop... Lots of head shaking and sparring. Larger billy drove off the smaller in the end."

12-7-89 "The mother lode! 10 beasts all total in the trees to the right. They are right at the top of the cliffs under heavy spruce cover..."

The log includes observations made between June 1985 and February 1992.

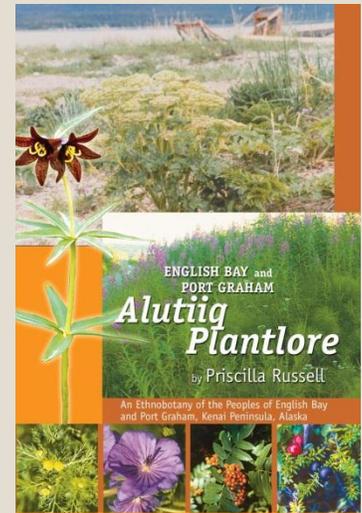


A page from the Exit Glacier Goat Record.

## Alutiiq Plantlore

In 2011, the park received emergency publication funds from Coastal Resources Advisory Council (CRAC) to purchase 835 copies of *Alutiiq Plantlore: An Ethnobotany of the Peoples of Nanwalek and Port Graham, Kenai Peninsula, Alaska* by Priscilla Russell.

This detailed documentation of Alutiiq ethnobotanical knowledge reinforces respect for the "old ways" and encourages their continuation. Last September the park facilitated the distribution of this publication to the Native Villages of Port Graham and Nanwalek, both of which maintain cultural ties to the Kenai Fjords.



Campsite on the Harding Icefield used during a 1968 crossing. Photo by Dave Spencer.

## 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. The interview process is now complete and in 2012 the University of Alaska, Fairbanks will launch the project's web based product on Project Jukebox. The site will feature video recordings of the interviews and interactive maps.

<http://jukebox.uaf.edu/site/>

Also this year Doug Deuer of Portland State University will begin to research and analyze the oral histories collected by Karen Brewster (UAF), Rachel Mason and Don Callaway (NPS). Doug will use the recorded life histories and secondary historical data to 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. He plans to make a site visit to Kenai Fjords this year. This project continues through 2013.

# Interdisciplinary

## A Call to Action

As the National Park Service (NPS) nears its centennial in 2016, "A Call to Action" has been put forth to "prepare for the second century of stewardship and engagement".

The NPS "A Call to Action" encourages NPS employees and partners to brainstorm and implement new ideas to achieve four main themes or goals to: 1) Connect People to the Parks, 2) Advance the Education Mission, 3) Preserve America's Special Places, and 4) Enhance Professional and Organizational Excellence. More information about the NPS "A Call to Action" can be found at <http://www.nps.gov/calltoaction/>.

Since the park was established in 1980, winter access to the Exit Glacier area has been limited to dogsled, ski, snowshoe, or snowmobiles. Exit Glacier road remains the only access to the park by land and during the winter months the road is closed to vehicles. Taking these limitations into consideration, Kenai Fjords National Park has opened up the opportunity to connect more people to the park.

Beginning this winter, visitors now have the option to travel to Exit Glacier by a commercial snowcoach, operated by Adventure Sixty North. Kenai Fjords National Park will be the first park in Alaska to offer this activity.



Adventure Sixty North's Rick Brown stands with the 12-passenger snowcoach. Picture courtesy of Seward City News.

This service provides visitors with many options to enjoy the park. One such option is a scenic guided tour that takes visitors on a round trip to the Exit Glacier Nature Center and back.

The company also offers guided snowshoe tours through the Exit Glacier trail system or visitors can choose to be dropped off at various points along Exit Glacier road or the Exit Glacier Nature Center to enjoy winter

activities on their own. The snowcoach will also provide greater access to Willow public use cabin, where visitors can stay overnight and enjoy the peace and quiet unique to the winter months.

More information regarding hours of operation, cost, or additional information about the snow coach can be found at <http://www.adventure60.com/SnoCatTours.html>.



With the option of traveling to the Exit Glacier area via snowcoach, visitors may now have an easier time accessing the public use cabin or simply enjoying the view of a snow-covered Exit Glacier.

## Fond Farewell and New Faces

In the past year, we've once again seen major changes in the Resource Management program staff. **Fritz Klasner**, the Chief of Resource Management since 2010 and Natural Resource Program Manager from 2007 to 2010, moved to Hilo, Hawaii to work as the Natural Resource Program Manager for the Office of Mauna Kea Management, University of Hawaii. As Natural Resource Program Manager at KEFJ, Fritz developed our Glacier Mass Balance Monitoring Program, obtained funding and supported the installation of the new SNOTEL and Pedersen RAWS weather stations, and closed numerous mine hazards within the park. Fritz forged new and stronger partnerships with cooperators and researchers, helped create a strong and technologically savvy GIS program for the park, and improved our library program. As Chief of Natural Resources, Fritz made decisions and recommendations that reflected his dedication to the park mission and his staff.



Fritz Klasner



Deb Kurtz

One great decision he made was to hire **Deb Kurtz** as his replacement for the Natural Resource Program Manager position. Deb is a familiar face at KEFJ having worked as the seasonal Exotic Plant Management Technician for three years prior to becoming our new NR Program Manager. Deb brings a background in data management, GIS, and watershed management to her new position.

Other staff changes within RM include promoting **Christina Kriedeman** from SCEP biologist to full time Environmental Protection Specialist and hiring **Leslie Adams** in a new term Wildlife Biological Science Technician position.



Christina Kriedeman



Sharon Kim

Finally, **Sharon Kim** will be our new Chief of Resource Management starting early summer 2012. Sharon has been in resource management in the National Park Service officially since 1999 and has worked in seven southwestern and four Alaskan park units before coming to KEFJ. Most recently, she was the Chief of Resources at Montezuma Castle and Tuzigoot National Monuments.



Leslie Adams



Resource Management summer 2011 staff Raine Becker (YCC), Kathryn Ladig (physical science technician), and Jeremy Bunch (YCC) rest while viewing the nunataks within the Harding Icefield after conducting a Harding Icefield Trail hiker encounter survey.



National Park Service  
U.S. Department of the Interior

Kenai Fjords National Park  
PO Box 1727  
Seward, AK 99664

## 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/](http://www.nps.gov/history/history/online_books/williss/)

### Historical & Management Documents

- [http://www.nps.gov/history/history/park\\_histories/](http://www.nps.gov/history/history/park_histories/)

### Resource-oriented data sources

- <http://ninfo.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 fifth annual issue of Resource Management News produced by the Resource Management team at Kenai Fjords National Park.

#### Editors

Lindsey Danielson, Leslie Adams, Laura Phillips, Deb Kurtz, Elisa Weiss

#### Contributors

Leslie Adams, Heather Coletti, Shannon Kovac, Christine Kriedeman, Deb Kurtz, Chuck Lindsay, Laura Phillips

#### Comments? Write to:

Kenai Fjords National Park  
PO Box 1727  
Seward, AK 99664

KEFJ\_resource\_management@nps.gov  
907-422-0500

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.