



The Novarupta

The official newspaper of
Katmai National Park and Preserve
Aniakchak National Monument and Preserve
Alagnak Wild River

Issue number 1

NPS/ROY WOOD



Crater Lake fills Mount Katmai's (6,476 ft/1,974 m) caldera, formed by the collapse of the mountain's peak during the 1912 Novarupta eruption.

Novarupta and the Valley of Ten Thousand Smokes

THE LARGEST VOLCANIC ERUPTION OF THE TWENTIETH century took place in Southwest Alaska on June 6, 1912. The eruption of Novarupta could be heard as far away as Juneau, Alaska, and the ash cloud that swept to the south plunged the island of Kodiak into three days of darkness. Novarupta released over six cubic miles of ash, covering over 40 square miles of a nearby mountain valley to depths of up to 700 feet, and was ten times more powerful than the 1980 Mount St. Helens eruption in Washington.

After the eruption, botanist Dr. Robert F. Griggs led several National Geographic expeditions up the Katmai River valley from Kodiak. On his second expedition, in 1916, Griggs and his team discovered the steaming "Valley of Ten Thousand Smokes," which they named for the thousands of active fumaroles (vents from which volcanic gases and steam escape) they found there.

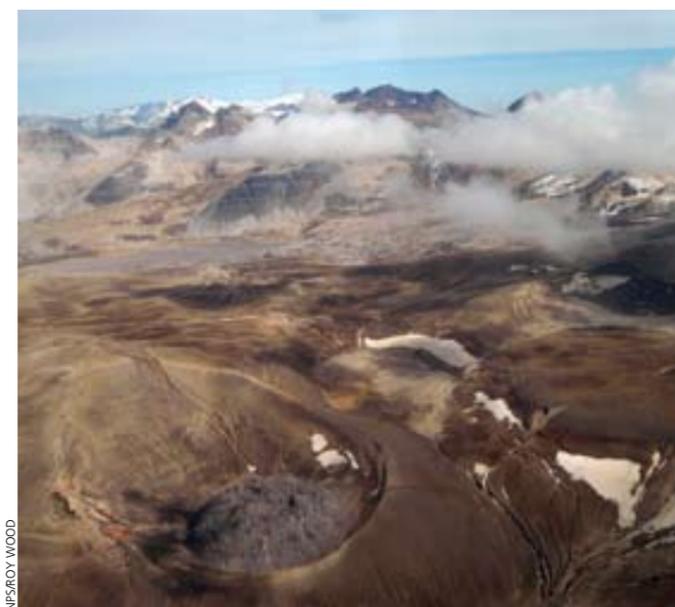
Convinced they had found a spectacle greater than the geysers of Yellowstone, Dr. Griggs and his team lobbied President Woodrow Wilson to preserve the area, and in 1918 Katmai National Monument was created. After several boundary adjustments, Katmai is now a 4.7 million acre national park and preserve, which encompasses the Valley of Ten Thousand Smokes and other ecosystems and cultural landscapes critical to the life cycle and lifestyle of Southwest Alaska.

In the 1950s, scientists concluded that Dr. Griggs' original belief that Mount Katmai erupted was only partially true. The materials that had been building up inside the mountain were actually released through a new, nearby vent aptly named "Novarupta," or "new eruption." The empty magma chamber beneath Mount Katmai could not support the overlying 1,000 or so feet of mountain peak; it collapsed inward, forming a spectacular, lake-filled caldera.

While the many fumaroles Griggs encountered no longer "smoke," the Valley of Ten Thousand Smokes is still an amazing place to confront the awesome forces changing our Earth. Today, visitors can experience the valley's power by traveling the 23-mile road from Brooks Camp to the Three Forks overlook cabin on a daily bus tour operated by the concessioner and the National Park Service (NPS) in the summer months (*see page 4 for more info*).

To learn more about the eruption's human stories, ask for a free copy of *Witness*, or download it—click on "History & Culture" from the Katmai website homepage at:

www.nps.gov/katm



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KODIAK HISTORICAL SOCIETY

Top: Valley of Ten Thousand Smokes today showing Novarupta Volcano, the source of the great 1912 eruption, and Mount Griggs in the distance.

Bottom: Displaced Katmai residents aboard the U.S. Revenue Cutter *Manning*, returning to the Alaska Peninsula from Kodiak to establish a new village (now Perryville).

Welcome to Katmai Country

Welcome to Katmai National Park and Preserve, Aniakchak National Monument and Preserve, and the Alagnak Wild River. In these nearly five million acres of remote country, you will discover ancient lands that are home to abundant wildlife, a diverse range of habitats, and spectacular scenery. The Valley of Ten Thousand Smokes is a graphic reminder of the awesome power of our changing Earth.

These areas, along with the Becharof and Alaska Peninsula National Wildlife Refuges managed by the U.S. Fish and Wildlife Service, offer wilderness, solace, recreation, and a livelihood for Native Alaskans and commercial fishermen of the area. Villages on the Alaska Peninsula are divided between two boroughs—Bristol Bay Borough and Lake and Peninsula Borough.

If your goal is to view the brown bears of Brooks River, please note that past patterns show peak bear use of the area in July and September. Bears do visit the Brooks River in June and August, but with less frequency and in fewer numbers. Refer to the bear viewing calendar on page 3 for more information, and be aware that when bear numbers at Brooks Camp are low, bear viewing opportunities at other locations in Katmai may be superb.

Katmai, Aniakchak and the Alagnak are among nearly 400 national park units across the nation, ranging from vast wilderness areas to historical sites in urban centers. National parks exist so that special places saved by the American people can be experienced by future generations. The Alaska Peninsula is home to many premier nationally protected parklands. Enjoy them. Respect them. Protect them. And "Experience your America."

Ralph Moore
Superintendent

What's Inside: Bear Viewing...3-4

Katmai's vast wilderness supports a high number of very large brown bears. As bear populations around the world and in North America decline, Katmai provides some of the few remaining unaltered habitats for these amazing creatures.



Alagnak...6

The headwaters of the Alagnak Wild River lie within the rugged Aleutian Range of neighboring Katmai National Park and Preserve. Meandering west toward Bristol Bay and the Bering Sea, the Alagnak traverses the beautiful Alaska Peninsula, providing unparalleled opportunities to experience the unique wilderness, wildlife, and cultural heritage of Southwest Alaska.

Aniakchak...7

A stark reminder of the Alaska Peninsula's location in the volcanically active "Ring of Fire," Aniakchak National Monument and Preserve boasts one of the finest examples of a dry caldera in the world. Six miles wide and 2,500-foot deep, Aniakchak Caldera is the result of the collapse of a 7,000-foot mountain during a massive eruption about 3,500 years ago.

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National Park Service
U.S. Department of the Interior

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

Katmai was declared a national monument in 1918; Aniakchak in 1978. The Alaska National Interest Lands Conservation Act of 1980 established the Alagnak Wild River, while Katmai and Aniakchak were expanded to include national preserve areas; Katmai was also redesignated a national park. Together, these parklands encompass nearly five million acres of pristine wilderness and cultural landscape managed by the National Park Service.

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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.

Getting Here, Getting Around: Quick Tips for Visiting Three of the Most Remote National Park Units

Katmai

National Park and Preserve
Visitors may begin their journey to Katmai National Park and Preserve in Anchorage, Alaska where commercial air carriers provide regular service to King Salmon, Alaska. King Salmon serves as the administrative headquarters for Katmai, the Alagnak, Aniakchak, and the Alaska Peninsula and Becharof National Wildlife Refuges, and it is from here that many day trips and extended visits into these areas begin.

Air taxi flights from King Salmon to Brooks Camp and other locations throughout Katmai National Park and Preserve on float-equipped planes are available from a variety of local operators.

Alternatively, visitors may gain direct access to Katmai, including coastal areas and Brooks Camp, via air taxis from nearby Alaska towns and villages such as Iliamna, Homer, or Kodiak.

A 23 mile (37 km) unpaved road connects Brooks Camp to the famed Valley of Ten Thousand Smokes which, under normal conditions, is accessible daily by bus, daily, June 1–September 17. For reservations, contact Katmailand, Inc. at 1-800-544-0551 or www.katmailand.com.



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Aniakchak

National Monument and Preserve
Extreme remoteness—450 roadless miles (724 km) southwest of Anchorage—and notoriously bad weather make access to Aniakchak National Monument and Preserve unpredictable. Drop-offs and/or pick-ups may be significantly delayed. Chartered air taxi services are available, however, from King Salmon and other nearby towns and villages. Boats can reach Aniakchak from villages along the Pacific Ocean coastline.

Rafters contemplating running the Aniakchak River from inside the volcano to the sea should be experienced and/or coordinate with local or nationwide guiding and outfitting services.

The National Park Service maintains no facilities or trails within Aniakchak. Hiking and backpacking conditions may be best on the cinder cones and ash-covered surfaces of the caldera floor.

Left: A male brown bear pursues a female along the trail to Brooks Falls at Brooks Camp in Katmai National Park.

Center: The jewel-like waters of Surprise Lake await the rare visitor to Aniakchak Caldera.

Right: Sockeye salmon abound in the Alagnak Wild River—increasingly becoming one of the most popular fishing destinations in Southwest Alaska.



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Alagnak

Wild River
Adjacent to Katmai's northwest boundary, air taxi to the Alagnak Wild River can be chartered from King Salmon, Iliamna, Soldotna, Homer, Anchorage, and other towns and villages.

Guided rafting and/or equipment for unguided raft trips on the Alagnak are provided by several companies in and around the river (see *box below*). Trips generally start at Nonvianuk Lake or Kukaklek Lake in Katmai National Preserve. Pick-up locations and dates should be coordinated with the transporter.



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Visitor Services

Numerous companies—approximately 132 in and around Katmai, 17 serving Aniakchak, and 40 in and around the Alagnak—provide a variety of commercial visitor services, including transportation, guided day use, guided multi-day use, overnight accommodations and food service. A complete list of services is available on the parks' respective websites.

Essential Information

Dates and Hours of Operation

The National Park Service imposes no operating hours or seasonal restrictions for visitor use of Katmai, Aniakchak, and the Alagnak. Access to and movement within the parklands may be limited or restricted at any time, however, depending on prevailing weather, security, and/or resource conditions and concerns. Many services such as lodges and air taxis operate seasonally. Call ahead for availability.

National Park Service and concessioner-operated facilities at Brooks Camp, in Katmai National Park, are open from June 1 to September 17.

Fees and Reservations

There are no entrance fees associated with public use of Katmai, Aniakchak, and the Alagnak.

Reservations and visitor use fees are required for camping in Brooks Campground and must be made by telephone or online prior to arrival at Brooks Camp (see *page 4 for more camping info*). Reservations also apply for public use of Fure's Cabin at the northeast corner of the Bay of Islands on Naknek Lake. Contact National Park Service headquarters in King Salmon for availability and reservations.

Bears

This is bear country! All parklands on the Alaska Peninsula contain substantial populations of brown bears. It is critical that visitors know how to behave around bears (*consult pages 3–5 for more info*). Upon arrival, visitors to Brooks Camp are required to participate in a brief, mandatory "Bear Etiquette" training course at the Brooks Camp Visitor Center.

Food Storage

All food, beverages, garbage, equipment used to cook or store food, and/or any odorous item must be properly stored in a bear resistant container (BRC) (see *pages 4–5 for more info*). Public food caches are available at Brooks Camp.

Camping

Within 1.5 miles (2.4 km) of Brooks Camp (i.e., the Brooks Camp Developed Area), camping is only allowed at Brooks Camp Campground. Camping is permitted elsewhere within Katmai, and on any public lands within Aniakchak and the Alagnak (see *pages 4–5 for more info*).

Sportfishing

Fishing in Katmai, Aniakchak, and the Alagnak is subject to Alaska Department of Fish and Game (ADF&G) regulations and restrictions. Alaska state fishing licenses are required. For more fishing information and specific Brooks Camp regulations, ask a park ranger or visit the ADF&G website at www.adfg.state.ak.us/.

Hunting and Firearms

Sport hunting is permitted in the *preserve areas* only of Katmai National Park and Preserve and Aniakchak National Monument and Preserve. Only *non-guided* sport hunting is allowed in the Alagnak Wild River corridor. In all other areas, sport hunting is prohibited. All hunting activities require a license and are subject to Alaska Department of Fish and Game (ADF&G) regulations and restrictions. Visit the ADF&G website at <http://www.adfg.state.ak.us/> for more information. Firearms are permitted in the Alagnak Wild River corridor and the preserve areas of Katmai and Aniakchak.

Pets

Pets are not allowed within 1.5 miles (2.4 km) of Brooks Camp (i.e., the Brooks Camp Developed Area). In other areas, pets must be kept on a leash at all times.

Weather

Even during summer, visitors to the Alaska Peninsula should be prepared for cool and stormy conditions with frequent strong winds. Skies are clear about 20 percent of days. In general, visitors to the Aniakchak area should expect significantly cooler, stormier, and windier conditions. Wherever you travel, remain aware of the dangers and treatments for hypothermia and be equipped with clothing and shelter appropriate for any eventuality.

Visitor Centers

The Brooks Camp Visitor Center, open June 1–September 17, is the point of entry for all visitors to Brooks Camp. A park ranger is on duty to provide information, campground check-in, and backcountry planning. An Alaska Natural History Association (ANHA) bookstore offers books, maps, and other Katmai-related items.

Located next door to the King Salmon Airport, the King Salmon Visitor Center (KSVC) provides information on the many federal public lands of Southwest Alaska in general, and the Bristol Bay area in particular. A large collection of films is available for viewing and the ANHA bookstore sells maps, charts, videos, posters, clothing and more. Contact KSVC at 907-246-4250.

King Salmon, Alaska Weather

Month	Average High	Average Low	Average Precip.
January	22.8°F (-5.1°C)	8.0°F (-13.3°C)	1.03" (26.2 mm)
February	23.8°F (-4.6°C)	7.4°F (-13.7°C)	.72" (18.3 mm)
March	32.0°F (0°C)	15.1°F (-9.4°C)	.79" (20.1 mm)
April	41.3°F (5.2°C)	24.9°F (-3.9°C)	.94" (22.9 mm)
May	52.1°F (11.2°C)	34.8°F (1.6°C)	1.35" (34.3 mm)
June	59.5°F (15.3°C)	42.2°F (5.7°C)	1.70" (43.2 mm)
July	63.8°F (17.7°C)	47.5°F (8.6°C)	2.15" (54.6 mm)
August	62.2°F (16.8°C)	47.4°F (8.6°C)	2.89" (73.4 mm)
September	54.9°F (12.7°C)	40.3°F (4.6°C)	2.81" (71.4 mm)
October	40.5°F (4.7°C)	26.0°F (-3.3°C)	2.10" (53.3 mm)
November	30.5°F (-0.8°C)	15.9°F (-8.9°C)	1.54" (39.1 mm)
December	25.1°F (-3.8°C)	9.3°F (-12.6°C)	1.39" (35.3 mm)

Keeping Bears Wild: Prevention and Preservation

THE TERM “FOOD-CONDITIONED” HAS BEEN applied to the complex process in which bears learn to seek food from humans or from human sources. Unfortunately, wherever bears and people share common resources, like at Brooks Camp in Katmai National Park, there is a serious risk of developing food-conditioned bears. While it is difficult to change the behavior of a wild bear, *we do* have the choice to behave responsibly—for the benefit of both species.



NPS/SH. MALTBY

Uninhibited access to wild food resources reinforces appropriate bear behavior.

It is unusual for a bear to approach people in order to obtain food or “steal” a fish from an angler. Typically, a bear first becomes habituated to the close proximity of people. Once comfortable in the vicinity of sloppy or careless human behavior, however, bears may be confronted with situations conducive to food-conditioning. Studies have shown dramatic changes in a bear’s behavior following its first discovery of a splashing fish at the end of an angler’s line. Bears subsequently paid much more attention to human anglers as potential food sources, sometimes even approaching them directly.

Bears become a threat to humans after obtaining food (including fish) from visitors. Such “easy meals” serve as reinforcement for a bear to approach humans. They may become bold, approach closely, and force a person to retreat rapidly. For this reason, visitors should not carry food or any other odorous item around Brooks Camp. Rather, store them in bear resistant containers (BRCs) or any of the available public food caches at all times. If a bear approaches you while fishing, remove your line from the water immediately and slowly move to a safer location. Know how to break or cut your line and be prepared to do so should a bear draw near while you have a fish in play. In doing so, you’ll ensure your own safety, other visitors’, and that of the bears as well.

There are basically three ways to eliminate undesirable bear behavior:

Withhold Reinforcement: Carry no food, beverage (except water) or odorous items around Brooks Camp. Don’t fish in the vicinity of bears and stop fishing whenever bears approach closer than 50 yards (~46 m).

Reinforce Alternative Behavior: Spectacular salmon runs provide an abundance of alternative reinforcement to hungry bears. Bears do not need us to feed them.

Punish the Behavior: This is the least desirable way to eliminate any behavior. It is difficult to do successfully and can lead to unpredictable consequences. Further, the punishment must be applied repeatedly and consistently to be effective.

Rangers may try to punish undesirable bear behavior by firing plastic bullets and/or fire-cracker shells at or near them. A bear could potentially respond aggressively to people nearby, and almost certainly will run from the area. Either response presents risks to human safety. Consequently, rangers punish or haze bears only when necessary and only after clearing the area of people.

Why not just kill a “problem” bear? The State of Alaska and federal law provide for the protection and preservation of wildlife. Killing bears because a human taught them to “steal” food does not conform to the letter or spirit of the law. It is an alternative only under extreme circumstances.

Clearly, bears that learn to steal fish from anglers present the National Park Service with a very complex problem. Sportfishing is one of the primary reasons people visit Katmai, Aniakchak, and the Alagnak. The protection and preservation of wild bear populations is also a primary mission for the NPS. You are the solution. Do not let bears learn that humans are an easy source of food. The future of Katmai’s brown bears is in your hands.

Where the Wild Things Are: A Bear Viewing Calendar

Location (bears eating...)	June	July	August	September
Brooks Camp (salmon)	🐾	🐾🐾🐾	🐾	🐾🐾🐾
Hallo Bay (vegetation; clams)	🐾🐾🐾	🐾🐾	🐾🐾	🐾🐾
Geographic Harbor (salmon)	🐾	🐾🐾	🐾🐾🐾	🐾
Swikshak Lagoon (vegetation)	🐾🐾🐾	🐾	🐾	🐾
Moraine Creek/ Funnel Creek (salmon)	🐾	🐾🐾	🐾🐾🐾	🐾

🐾 = Few Bears; 🐾🐾 = Some Bears; 🐾🐾🐾 = Many Bears

Too Close for Comfort

Avoid Close Encounters

If you see a bear that is unaware of you and/or far away, back away slowly and quietly while observing the bear’s behavior.

Do Not Approach

The minimum distance from any bear is 50 yards (46 m), or as otherwise directed by National Park Service personnel. Avoid actions that interfere with bear movement or foraging activities. Please check with a park ranger if you’re unsure about a situation.

Remain Calm

A bear may approach closely or rear up on its hind legs to identify you. Back away slowly, moving diagonally out of its path. You may need to leave a trail temporarily to allow a bear to pass. If a bear follows you, stop and hold your ground. If a bear continues to approach, make noise, wave your arms, and try to appear as large as possible.

Don’t Run

Running may encourage a bear to pursue you. Bears can run faster than 30 mph (50 km/hr). You cannot outrun them. If you are charged, try to appear non-threatening. Stand your ground and speak to the bear in a calm voice. Bears sometimes come within a few feet of people before veering off.



NPS COLLECTION

If A Bear Makes Contact, Play Dead

Fall to the ground on your stomach with your legs apart. Lock your hands behind your neck to protect your neck and face. If you do get rolled over, keep rolling until you’re face down again. Stay quietly in this position until the bear has left the area. If the attack continues long after you have assumed the protective position, fight back vigorously.

Nature Photography Ethics

WE ENCOURAGE YOU TO ENJOY KATMAI’S WILDLIFE, BUT WE ask that you do it with respect and care. National parks are symbols of our wild heritage. The forethought of past generations has given us the special places we enjoy today. Help protect and preserve the natural wonders of Katmai, Aniakchak, and the Alagnak for the future by maintaining standards of ethical photography—it’s up to each of us.

The North American Nature Photography Association (NANPA) encourages adherence to the following Principles of Ethical Field Practices:

Environmental: Knowledge of Subject and Places

- Learn patterns of animal behavior. Do not interfere with animal life cycles.
- Do not distress wildlife or their habitat. Respect the routine needs of animals.
- Use appropriate lenses to photograph wild animals. If an animal shows stress, move back and use a longer lens.
- Acquaint yourself with the fragility of the ecosystem. Stay on trails that are intended to lessen impact.

Social: Knowledge of Rules and Laws

- When appropriate, inform managers or authorities of your presence and purpose. Help minimize cumulative impacts and maintain safety.
- Learn the laws and rules of the location. If minimum distances exist for approaching wildlife, follow them.
- In the absence of management authority, use good judgement. Treat the wildlife, plants, and places as if you were their guest.
- Prepare yourself and your equipment for unexpected events. Avoid exposing yourself and others to preventable mishaps.

Individual: Expertise and Responsibilities

- Treat others courteously. Ask before joining others already shooting in an area.
- Tactfully inform others if you observe them engaging in inappropriate/harmful behavior. Many people unknowingly endanger themselves and animals.
- Report inappropriate behavior to proper authorities. Don’t argue with those who don’t care; report them.
- Be a good role model, both as a photographer and as a citizen. Educate others by your actions; enhance their understanding.



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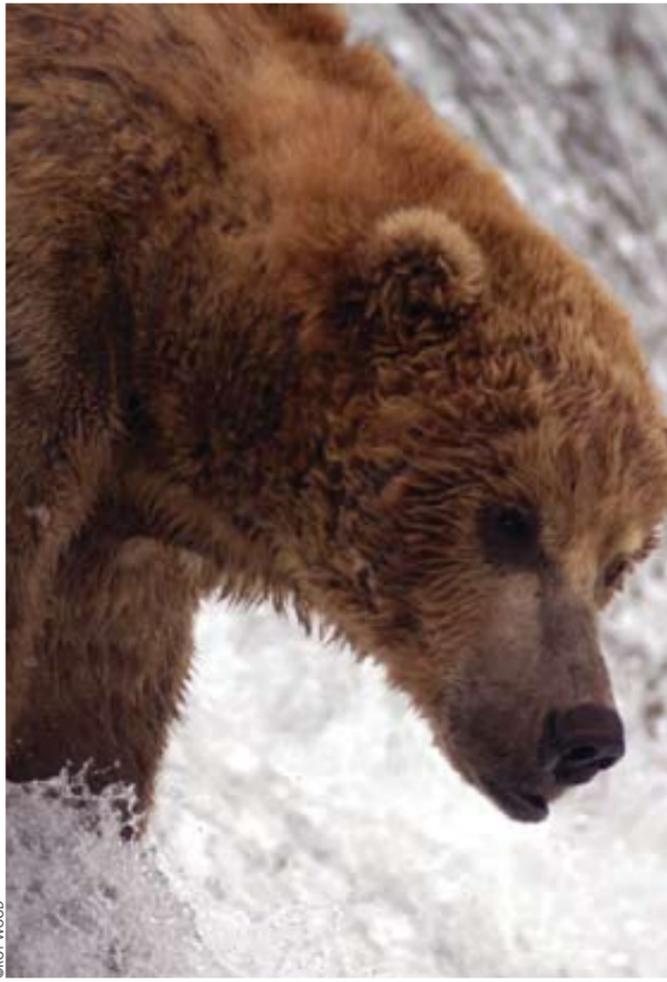
Welcome to Brooks Camp, Katmai National Park!

BROOKS CAMP ATTRACTS VISITORS OF ALL KINDS TO FISH IN a world-class rainbow trout river, to view brown bears congregating during the annual sockeye salmon run, and to learn about the long human history of the area. Also a starting point for backcountry adventures, daily naturalist-led/concessioner-operated bus tours from Brooks Camp provide easy access to the geologic splendors of the Valley of Ten Thousand Smokes, site of the largest volcanic eruption of the last century.

Brooks Camp is situated at the mouth of the Brooks River, along the banks of Naknek Lake (the largest lake within any unit of the National Park System). From June 1 to September 17, the National Park Service operates a visitor center, ranger station, campground, and auditorium with daily visitor programs. Also during this time, the park concessioner, Katmailand, Inc., provides additional services and amenities, including meals and lodging at Brooks Lodge.

Bear viewing at Brooks Camp is generally best in July and September, and there may be very few or no bears present in June and August. All visitors are required to begin their stay by checking in at the visitor center for a mandatory bear orientation and safety talk outlining park regulations and proper behavior around bears (specific rules apply to bear viewing activities at Brooks Camp).

Three bear viewing platforms provide safe and ideally situated opportunities for observing bear behavior. The Lower River platform is located just across the bridge over Brooks River. An additional .9 mile (1.4 km) of trail (one-way) gives access to the Brooks Falls and Riffles platforms. While most trails, restrooms, and facilities at Brooks Camp are wheelchair accessible, trails are unpaved and frequently muddy. Visitors should be prepared to leave the trail in order to avoid a bear.



Brooks Camp is renowned for its bear-viewing opportunities. Scenes like the one above, captured at Brooks Falls, are not uncommon, and attract amateur and professional photographers alike from around the world.



This reconstructed semi-subterranean house, or barabara, can be seen daily on the Cultural Walk.

Home to Humans for Millennia

ON JUNE 6, 1912 A VOLCANIC ERUPTION shook the Aleutian Range at the northern end of the Alaska Peninsula. The Mount Katmai/Novarupta eruption, which formed the Valley of Ten Thousand Smokes, was awe-inspiring and terrifying for witnesses. It was also instrumental in making Katmai National Park and Preserve what it is today. But it was by no means unprecedented. Seven major eruptions in the Katmai area have been recorded in historic times, and

Continued on page 15

Brooks Camp Activities

Visitor Center

Open June 1 through September 17, all visitors to Brooks Camp must check-in at the visitor center upon arrival for a brief bear orientation program. A ranger is on duty to provide information, campground check-in, and backcountry planning. A bookstore is also available offering books, maps, and other Katmai-related items.

Cultural Walk

A park ranger/naturalist leads this short .25 mile (0.4 km) walk providing information about the human history of Brooks River Archeological District and National Historic Landmark, including archeological studies and traditional Alaska Native uses of plants and animals. The walk lasts about an hour and leads to a reconstructed prehistoric Native dwelling.

Valley of Ten Thousand Smokes

A park ranger/naturalist accompanies this scenic bus ride through some of Katmai's spectacular backcountry. After lunch at Three Forks, overlooking the Valley of Ten Thousand Smokes, visitors may take the optional, ranger-led hike into the valley. The hike is three miles (4.8 km) round-trip, with an 800 feet (244 m) elevation change. Sturdy boots, water, and extra warm clothes are recommended. Total trip time is 7–8 hours. Inquire at Brooks Lodge for reservations, or contact Katmailand, Inc. at 1-800-544-0551 or www.katmailand.com.

Evening Slide Show Programs

Presented by a park ranger/naturalist or special guest speaker in the Brooks Camp Auditorium, daily interpretive programs offer information and unique perspectives on Katmai's special features, history, and wildlife. Inquire at the visitor center for times and topics.

Dumpling Mountain Hike

This moderately strenuous hike climbs 800 feet (244 m) over 1.5 miles (2.4 km) (one-way) to an overlook above Brooks Camp with expansive views of Naknek Lake. Rain gear, water, and sturdy hiking boots or shoes are recommended. The trailhead is located in the Brooks Camp Campground.



Brooks Camp Campground

A Unique Setting

The only developed campground in Katmai National Park and Preserve is located at Brooks Camp. At this site in 1950, Katmai's first park ranger, William Nancarrow, constructed a two-room tent frame and a food cache, comprising the first significant National Park Service presence in the park.

Given its primitive facilities, wildlife viewing opportunities, and location on the Naknek Lake beach with stunning views of Mt. Katolinat, Brooks Camp Campground is considered by many to be one of the top campgrounds in North America.

Due to its unique setting, the campground is specially managed to minimize human–bear conflicts. For their own safety, and for the continued health of resident brown bears and their habitat, campers must take precautions to reduce odors from food, garbage, and/or anything else that could appeal to a bear's strong sense of smell.

Campfires

Campfires are allowed in the three designated fire rings near each cooking shelter. Only dead and downed wood may be collected for use as fuel for campfires.

Cooking

All cooking must take place within one of the three shared cooking shelters. (As a safety precaution, campers arriving by air with portable camp stoves should bring empty fuel bottles and purchase fuel at the Brooks Lodge Trading Post.) Wash dishes and cooking utensils at the water spigot near the food storage cache. Cooking over open fires is not permitted.

Electrified Fence

In 2000, Brooks Camp Campground was enclosed within an electric fence to deter bears from entering the campsites. The fence is NOT a bear barrier, although once "shocked," bears do tend to avoid any subsequent contact with such fences.



Food and Gear Storage

All food, refuse, and any other odorous items (e.g., toothpaste, deodorant, etc.) should be stored in the centrally located food cache which also contains a trash receptacle. In order to prevent curious bears from investigating, please store gear you're not using in the gear storage cache adjacent to the food cache. A fireproof locker is available for storage of all flammable materials, such as stove fuel, flares, etc.

Toilets

The campground contains two vault toilets/out-houses.

Campground Reservations

Brooks Camp Campground is open June 1–September 17. Reservations are required, and must be made via telephone or online. During the month of July, campsites may be reserved for a maximum of seven nights, cumulatively. To make reservations and pay the \$8.00 per person/per night campground fee, please visit www.recreation.gov or call 877-444-6777 (from the United States), 518-885-3639 (international). Telephone and internet access are unavailable at Brooks Camp, so campground reservations must be made prior to your arrival.



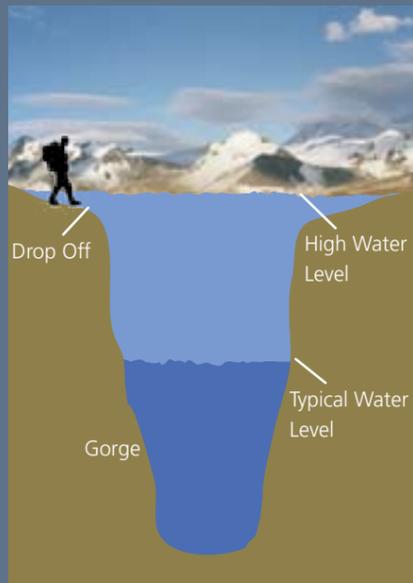
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River Lethe in the Valley of Ten Thousand Smokes, Katmai National Park.

River Crossings

River crossings in this region cannot be approached using traditional techniques. Due to the suspended volcanic ash in the water, it is often impossible to judge water depths visually. Many of the rivers in the Valley of Ten Thousand Smokes are actually narrow gorges as deep as 100 feet in places. Streams, creeks, and rivers change constantly as ash sloughs off canyon walls and erosion alters the channels. If you cannot find a safe crossing and/or you are unfamiliar with valley rivers, you should not attempt to cross. You may need to wait a day or longer until lower water levels permit safe crossing. Follow these tips for safe crossing:

- Watch the water's surface and cross where you see small ripples (not waves), indicating shallow water.
- Cross early in the morning.
- Release your belt and straps so you can drop your pack.
- Wear shoes—don't cross in socks or barefoot.
- Allow yourself a retreat; don't commit to one route.



Safety Concerns

Visitors to Aniakchak, the Alagnak, and Katmai's backcountry have access to millions of acres of designated wilderness and limitless possibilities for adventure and exploration. With these opportunities come greater responsibilities for the safety of your group, yourself, wildlife, and the land. Planning ahead will help ensure your safety and enjoyment and that of future visitors.

The following safety concerns are of particular importance to backcountry/wilderness users:

Weather

Weather in all areas of the Alaska Peninsula can be both sudden and severe. Be prepared for extreme conditions at all times of the year and have the wisdom to alter, delay, or abandon your travel plans if current conditions or the forecast appear ominous.

Hypothermia

Hypothermia is the critical lowering of the body's core temperature and is signaled by these symptoms: shivering, numbness, slurred speech, loss of coordination, drowsiness and exhaustion. Avoid hypothermia by eating plenty of high-calorie foods, drinking plenty of water, and staying dry. Layer clothing appropriately for your level of activity to minimize sweating.

Bears

This is bear country! All parklands on the Alaska Peninsula contain substantial populations of brown bears. It is critical that visitors know how to behave around bears. Avoid close encounters by remaining aware of your surroundings at all times. Store food and refuse properly, and do not approach within 50 yards (46 m) of a bear (consult page 3 for more info).

Savonoski Loop

Brooks Camp is the point of departure for the Savonoski Loop, an 80 mile (129 km) backcountry canoe or kayak trip. Paddlers begin heading northwest, following the north arm of Naknek Lake to Bay of Islands. Near historic Fure's Cabin, a two mile (3.2 km) portage leads to Grosvenor Lake. Paddlers then continue across the lake, down Grosvenor River, along the Savonoski River to the Iliuk Arm of Naknek Lake, and finally back to Brooks Camp. The trip generally takes four to ten days (or more) to complete, depending on weather conditions and paddlers' experience.

Just as throughout Katmai, bears are common along the Savonoski Loop. Paddlers should exercise the same Leave No Trace and bear

etiquette skills as used on dry land, including the use of BRCs for storing food, garbage, and other odorous items. Paddlers are advised to avoid camping on the Savonoski River, as it is particularly popular with bears.

Equipment rentals, outfitters, and guides may be available locally. Contact the King Salmon Visitor Center (see page 2 for more info). The Map Store at USGS specializes in appropriate maps and charts (see "Maps" above).

Limited public use of Fure's Cabin in Bay of Islands is available by permit. Contact Katmai National Park and Preserve headquarters in King Salmon to check availability and begin the permitting process.

Backcountry Travel

Permits

While permits are not required for backcountry travel or camping, users are encouraged to submit a Backcountry Planner, available free-of-charge at the Brooks Camp and King Salmon visitor centers.

Maps

Maps are available from ANHA-partnered The Map Store at USGS: 1-877-786-7047. The Brooks Camp and King Salmon visitor centers (see page 2) maintain a limited stock only.

Camping

With the exception of Brooks Camp Campground, all camping within Katmai National Park and Preserve must occur at least 1.5 miles (2.4 km) from Brooks Camp. Camping is allowed anywhere on public lands within Aniakchak National Monument and Preserve and Alagnak Wild River. Campsites must be relocated at least 2 miles (3.2 km) after 14 consecutive days in one location. When choosing a campsite, follow Leave No Trace guidelines to minimize your impact on the park environment.

Food, trash, and all odorous items must be carried and stored in a bear-resistant container (BRC). A limited supply of BRCs are available free for checkout at the Brooks Camp and King Salmon visitor centers. Hanging food is not encouraged as trees of appropriate height may not be available.

The Leave No Trace Principles

Leave No Trace is a national and international program designed to assist outdoor enthusiasts with their decisions about how to reduce their impacts when they hike, camp, picnic, snowshoe, run, bike, hunt, paddle, ride horses, fish, ski or climb. The program strives to educate all those who enjoy the outdoors about the nature of their recreational impacts as well as techniques to prevent and minimize such impacts. Leave No Trace is best understood as an educational and ethical program, not as a set of rules and regulations.

Leave No Trace information is rooted in scientific studies and common sense. The message is framed under seven Leave No Trace Principles:

1. Plan Ahead and Prepare
2. Travel and Camp on Durable Surfaces
3. Dispose of Waste Properly
4. Leave What You Find
5. Minimize Campfire Impacts
6. Respect Wildlife
7. Be Considerate of Other Visitors



This copyrighted information has been reprinted with permission from the Leave No Trace Center for Outdoor Ethics. For more information or materials, please visit www.LNT.org or call 303-442-8222.

Attention Campers on Katmai's Coast:

To ensure bears' free access to prime feeding sites and prevent bear/visitor conflicts while providing for overnight camping in the area, camping within the core Hallo Bay Meadows will be restricted from May 15th through July 15th (for more information, see the Superintendent's Compendium on Katmai's website at: www.nps.gov/katm/parkmgmt/lawsandpolicies.htm).



The 80 mile (129 km) Savonoski Loop. This map is not suitable for navigational purposes.

Alagnak: A Wild River for Future Generations

VISITORS TO THE ALAGNAK WILD RIVER experience a wilderness of captivating landscapes, abundant wildlife, and cultural heritage. Meandering down the braided river, you may discover a proud bald eagle perched atop a spruce tree in the boreal forest, gaze at a moose browsing above the river bank in the wet sedge tundra, or perhaps encounter a brown bear feasting upon spawning salmon, a critical link in the Alagnak River ecosystem. The diversity of life found along the river corridor also includes osprey, beaver, river otter, rainbow trout, and a variety of vegetation such as spruce, willows and many types of berry bushes.

For centuries people have lived along the Alagnak and depended on the rich natural resources for survival. Today, Alaska Natives from nearby villages own land along the river and still depend on the area for subsistence hunting and fishing. The Alagnak's wildlife and Class I–III rapids offer an exciting trip for many boaters, and the abundant fish make the river the most popular destination for sport fishing in Southwest Alaska.

In order to protect the Alagnak's free-flowing characteristics, striking scenery, diverse wildlife, and cultural history, the upper 67 miles were designated a Wild River in 1980 by the Alaska National Interest Lands Conservation Act (ANILCA) under the provisions of the 1968 National Wild and Scenic Rivers Act. As one of Alaska's 25 congressionally designated rivers comprising the National Wild and Scenic Rivers System (NWSRS), the river is part of 3,210 miles of protected wild, scenic and recreational rivers in Alaska. A unit of the National Park System, the Alagnak Wild River is admin-

istered by neighboring Katmai National Park and Preserve, headquartered in King Salmon, Alaska. The National Park Service manages approximately 83 percent of the river within the Alagnak Wild River corridor; the remaining 17 percent of the lands within the corridor are privately owned by Alaska Natives.

To ensure the continued enjoyment and protection of the river's resources, the National Park Service is preparing a comprehensive river corridor plan to address resource management issues and to make explicit management objectives for the Alagnak Wild River. This multi-year project involves the collection of information related to subsistence, fisheries, wildlife, vegetation, water quality, hydrology, visitor use, and other biological and sociological data from which informed management decisions can then be made. The planning process is and will continue to be a collaborative effort involving the state government, a wide variety of federal agencies, Alaska Native groups, tribal governments, local governments, private organizations, and landowners which have an interest in the management of the Alagnak Wild River and the preservation of its resources.

You are invited to discover the magnificent splendor of this riparian wilderness. Please assist us in protecting the Alagnak Wild River and its unique ecosystem by practicing "Leave No Trace Principles" of outdoor ethics (*see page 5 for more info*). We welcome any thoughts you wish to share related to your experience on the river, along with your ideas concerning its management.



The braided Alagnak Wild River is also known as the "Branch River" to many local residents.

People and the Alagnak River

THE ALAGNAK IN PREHISTORIC TIMES was indeed a productive place to live—home to a substantial population of people thriving on the river's bounty. An archeological survey conducted in 1997 revealed that people have lived along the Alagnak for the past 8,000 years. Some early inhabitants lived in settlements with as few as 4 dwellings, while others resided in larger villages with as many as 69 houses. From more recent times, the remains of an early historic village provide evidence of a community whose members cached their food in the ground, attended a Russian Orthodox church, and buried their loved ones in a cemetery. Today, Alaska Natives call this site *Alagnag'lug*, and the rich cultural history of the area is well remembered by the people of nearby villages.

Alaska Natives continue to own land along the Alagnak, practicing traditional subsistence activities. As you enjoy the river, remember those who came before and respect the special cultural heritage of the area. Please do not disturb archeological sites, leave artifacts where you find them, and do not camp or trespass on private property.

To learn more about the people who live and have lived along the Alagnak, ask for a free copy of the cultural history guide, or download it from the Alagnak website at: www.nps.gov/alag/historyculture/

A Subsistence Lifestyle

The meaning of Alagnak is "making mistakes" or "going the wrong way." As Mrs. Gust, a resident of Levelock said, "The channel is always changing, causing mistakes and getting lost." Younger local people call the Alagnak the Branch River because of the branching nature of the river. Alagnag'lug (which is diminutive for teasing cousins) and Locknuk are places people used to live along the Alagnak. The descendants have since moved to Kokhanok, Igiugig and Newhalen. Many people still return to the area for subsistence purposes.

People have traditionally caught birds and gathered eggs, sourdock, wild celery and fiddlehead ferns along the Alagnak. In the summer camps, fish are gathered for smoking, salting, canning, and freezing for the winter. When dogs were used as the major mode of transportation, fish was stored for them, too. Long ago, fish was stored in underground pits and was used to make fermented fish heads, a delicacy. In the fall season, salmon berries, blackberries, blueberries and cranberries are gathered and stored for winter. Also wild game such as caribou and moose are caught. After they have consumed berries, bears are ready to eat. In the late fall, whitefish are harvested and stored for the winter. In the winter, smelt, trout and grayling are caught by ice fishing. Trapping is still done to provide fur for hats, mittens, coats and household use such as throw rugs and furniture coverings.

Martha (Olympic) Crow



Fishing the Alagnak

Commercial Fishing

The large salmon runs in Bristol Bay are subject to a carefully managed commercial harvest prior to their arrival in individual rivers including the Alagnak. The Alaska Department of Fish and Game allows commercial fishing only when there are enough fish to ensure sufficient population numbers for successful spawning, subsistence, and sport fishing.

Sportfishing

The Alagnak's extraordinary rainbow trout, char, grayling, and abundant salmon are some of the most attractive sport fish in the world, and the river has become the most popular fly-in fishing location in all of Southwest Alaska. Although the fishing is exceptional, these prized sport fish are still vulnerable to overfishing. The Alaska Department of Fish and Game (ADF&G) carefully monitors the populations to ensure that the present regulations maintain the long-term

stability of the Alagnak sport fishery. Visitors intending to fish should become familiar with these regulations.

Catch and Release

Fishing for rainbow trout on the Alagnak is catch-and-release only. Many anglers fishing for other species also use catch-and-release techniques as encouraged by the National Park Service and the Alaska Department of Fish and Game. Proper catch-and-release technique requires the angler to land the fish as quickly as possible to avoid over-taxing it, keep the fish in the water at all times, handle the fish gently with wet hands, and release the fish without delay. Adherence to these simple guidelines will increase the survival rate of the fish and provide continued angling opportunities for others. The National Park Service additionally encourages use of barbless hooks.



Salmon drying on a traditional rack.



NPS/JOE MILLER

Vent Mountain in Aniakchak Caldera, Aniakchak National Monument.

Aniakchak National Monument and Preserve

ANIAKCHAK LIES 450 MILES SOUTH OF Anchorage on the roadless Alaska Peninsula. Because of its remote location and notoriously bad weather, Aniakchak is one of the least visited units of the National Park System. For the traveler that overcomes its logistical challenges, however, the monument's extraordinary landscapes make it a truly unique place to experience.

One of the many vibrant reminders of Alaska's location in the volcanically active "Ring of Fire," Aniakchak is home to an imposing caldera: a six-mile wide, 2,500 foot deep crater formed by the collapse of a 7,000 foot mountain during a massive eruption about

3,500 years ago. Subsequent eruptions have created the small cinder cones, lava flows and explosion pits that dot the caldera floor.

It appears that at one time the caldera was filled to a substantial depth with water, creating a deep lake similar to Crater Lake in Oregon. Some of the volcanic events seem

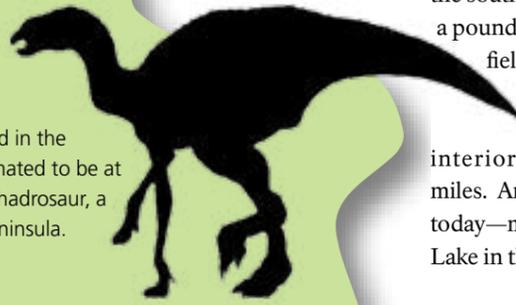
to have taken place underwater in the lake-filled area. Eventually, a weaker portion of the rim collapsed, and the resulting outflow cut through 1,500 feet of fossil-bearing sedimentary and volcanic layers to create "The Gates" through which the Aniakchak River now exits the Caldera. Turquoise-colored

and 2.5 miles long, Surprise Lake is all that remains of the once larger lake.

Aniakchak's most recent eruption occurred in early May 1931. Explosions from the eruption were heard 200 miles away. At the village of Chignik Bay, 45 miles to the southwest, ash fall was reported to be a pound per hour for each square foot. A field of floating pumice five miles in diameter was observed in Bristol Bay. Ash was carried as far away as interior Alaska, a distance of over 700 miles. Aniakchak is still volcanically active today—mineral springs that feed Surprise Lake in the caldera are as warm as 70°F.

Dinosaur!

A recent paleontological study of Aniakchak resulted in the documentation of a fossilized hadrosaur track, estimated to be at least 150 million years old. This is the first sign of a hadrosaur, a duck-billed, plant-eating dinosaur, on the Alaska Peninsula.



Paradise Found and Lost: The Explorations of "Glacier Priest" Father Bernard Hubbard

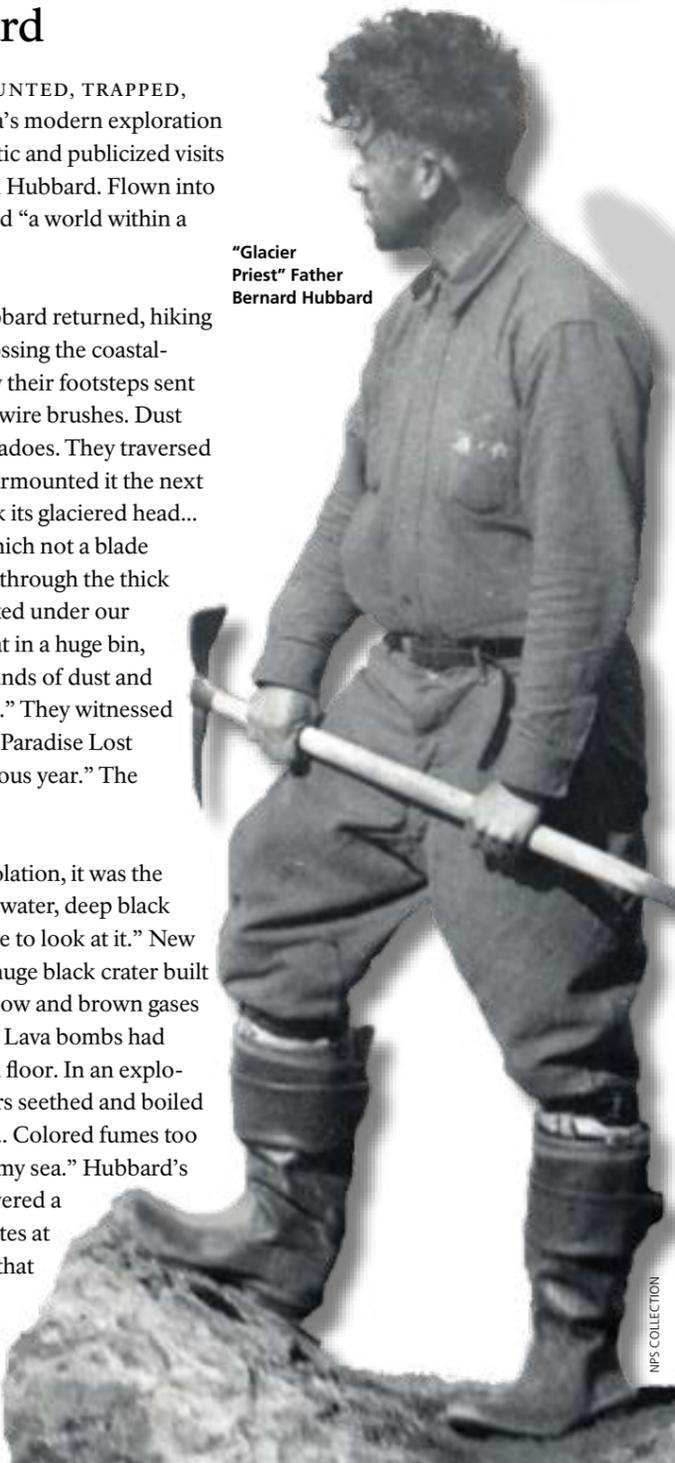
PREHISTORIC AND HISTORIC PEOPLES HUNTED, TRAPPED, and fished the Aniakchak area, but the caldera's modern exploration began just over 70 years ago. The most dramatic and publicized visits were those of "Glacier Priest" Father Bernard Hubbard. Flown into Aniakchak's caldera itself in 1930, he witnessed "a world within a mountain" and called it "Paradise Found."

Aniakchak erupted again a year later and Hubbard returned, hiking from Kujulik Bay with three companions. Crossing the coastal-barrier mountains and Aniakchak River valley their footsteps sent up clouds of ash that made their hair feel like wire brushes. Dust whirlwinds everywhere raised miniature tornadoes. They traversed 30 miles to the caldera rim the first day and surmounted it the next morning. "Black were its snowfields and black its glaciated head... We were going through a valley of death in which not a blade of grass or a flower or a bunch of moss broke through the thick covering of deposited ash. Black cinders clinked under our feet and slid away. It was like walking on wheat in a huge bin, and equally difficult." Here, too, were whirlwinds of dust and smoke, creating a "vision of hell in Aniakchak." They witnessed a bird being overcome by lethal gases. It was "Paradise Lost after having lived in Paradise Found the previous year." The reaction was silence.

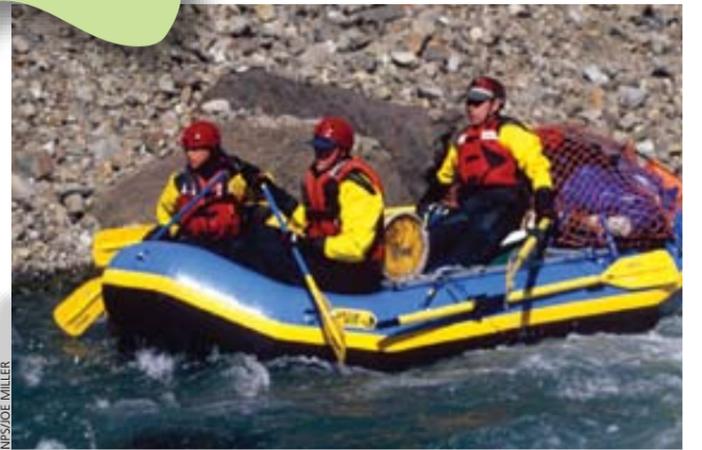
This Aniakchak was "the abomination of desolation, it was the prelude of hell. Black walls, black floor, black water, deep black holes and black vents; it fairly agonized the eye to look at it." New sights since 1930 greeted them: "There was a huge black crater built out from the wall, and from its black maw yellow and brown gases were pouring, and clouds of escaping steam." Lava bombs had made living room-sized craters on the caldera floor. In an explosion pit, like a huge paint pot, "Yellow sulphurs seethed and boiled around the edge of broken blocks of red lava... Colored fumes too heavy to rise rolled about like waves on a stormy sea." Hubbard's party stuck a glass tube in the ground and lowered a thermometer 8 inches. "It burst in three minutes at 200° centigrade!" They verified a new theory that chlorine gas can be found in volcanoes.

Later, the party climbed to the new subcrater's steaming rim: "We stood awestricken on the edge," wrote the priest, "looking, like Dantes, into a real inferno."

"Glacier Priest" Father Bernard Hubbard



NPS COLLECTION



Rafters negotiate car-sized boulders in The Gates of the Aniakchak Wild River.

Through "The Gates:" Rafting the Aniakchak Wild River

Congress designated the Aniakchak a national wild river in 1980. Its spectacular resources make rafting the Aniakchak a rewarding experience. From Surprise Lake, the river flows a peaceful mile (1.6 km) to The Gates. The river moves swiftly through this narrow gorge in the caldera wall, and large rocks demand precise maneuvering. A gradient of 75 feet per mile (14.2 m/km) makes this section challenging. After a more gentle 10 miles (16.1 km) comes the confluence with Hidden Creek, and the river is again filled with car-sized boulders, abrupt bends, and a narrow bed requiring extreme caution. After 5 more miles (8 km), the river slows to meander toward the Pacific Ocean and the seals, sea otters, bald eagles, and sea birds of Aniakchak Bay.

Are you contemplating the trip? The Aniakchak River presents a challenge to even the most experienced river runners. Only a few parties float the river each year, mostly in July. A commercial guidebook says: "The weather on Aniakchak is severe; life-threatening conditions can develop rapidly. Extremely violent winds in the caldera, particularly near 'The Gates,' can shred tents and prevent air rescue." A hefty budget and pre-tested skills and gear are absolutely necessary. Dry suits are recommended; life jackets are required. Inflatable rafts 12–13 feet (4 m) long with rowing platforms are most popular. And, be sure to bring lots of repair materials! Maps and charts can be obtained from The Map Store at USGS at 1-877-786-7047, or the King Salmon Visitor Center (be sure to call ahead for availability—see page 2 for contact info). Limited supplies may be available in larger Bristol Bay communities.

Total float time: 3–4 days from Surprise Lake to the bay. Plan on delays getting in and, especially, delays getting out. The Aniakchak is a dynamic landscape; river conditions may change rapidly in a very short period of time. Contact the National Park Service in King Salmon for the latest information, but always be prepared for the unexpected!

Good Neighbors: Alaska Peninsula Map

National Park Service



On August 25, 1916, President Woodrow Wilson signed the “Organic Act,” creating the National Park Service (NPS). Today, the service remains firmly rooted in the ideals and goals of this founding legislation, caring for the special places saved by the American people so that all may experience our heritage.

The American system of national parks was the first of its kind in the world. Today, it comprises 390 areas covering more than 84 million acres in 49 States, the District of Columbia, American Samoa, Guam, Puerto Rico, Saipan, and the Virgin Islands—areas of such national significance that they justify special recognition and protection in accordance with various acts of Congress.

Alaska is home to 15 NPS units and two affiliated areas, totalling 54 million acres—about two-thirds of the acreage in the entire National Park System—and including 33 million acres of Congressionally designated wilderness.

For more information:

Katmai National Park and Preserve
Aniakchak National Monument and Preserve
Alagnak Wild River
P.O. Box 7
King Salmon, AK 99613
ph: 907-246-3305
fax: 907-246-2116

Katmai National Park and Preserve

Katmai National Monument was created in 1918 to preserve the famed Valley of Ten Thousand Smokes, a spectacular 40 square mile, 100 to 700 foot deep ash flow deposited by Novarupta Volcano. A National Park & Preserve since 1980, Katmai is still famous for volcanoes, but also for

brown bears, pristine waterways with abundant fish, remote wilderness, and a rugged coastline.

Contact Katmai National Park and Preserve on the web at www.nps.gov/katm, or click “Contact Us” from the homepage to send an email.

Aniakchak National Monument and Preserve

Given its remote location and notoriously bad weather, Aniakchak is one of the least visited units of the National Park System. A vibrant reminder of Alaska’s location in the volcanically active “Ring of Fire,” the monument is home to an impressive six-mile (10 km) wide, 2,500 foot (762 m)

deep caldera formed during a massive eruption 3,500 years ago.

Contact Aniakchak National Monument and Preserve on the web at www.nps.gov/ania, or click “Contact Us” from the homepage to send an email.

Alagnak Wild River

The headwaters of the Alagnak Wild River lie within the rugged Aleutian Range of neighboring Katmai National Park and Preserve. Meandering west towards Bristol Bay and the Bering Sea, the Alagnak traverses the beautiful Alaska Peninsula, providing an unparalleled opportunity to experi-

ence the unique wilderness, wildlife, and cultural heritage of Southwest Alaska.

Contact Alagnak Wild River on the web at www.nps.gov/alag, or click “Contact Us” from the homepage to send an email.

U.S. Fish and Wildlife Service



The U.S. Fish and Wildlife Service (USFWS) is the primary federal agency designated charged to conserve and manage the nation’s fish and wildlife. The agency protects over 800 species of migratory birds, more than 600 endangered plant and animals species, and over 50 fish species.

The USFWS administers the National Wildlife Refuge System—the world’s largest and most comprehensive collection of lands set aside specifically to manage and protect wildlife. President Theodore Roosevelt designated the first refuge in Florida in 1903. Today, more than 545 refuges totaling over 96 million acres have been set aside.

Alaska’s wildlife refuges are special places that protect our wildlife legacy for future generations. In these vast tracts of untouched wilderness, great herds of caribou traverse rolling plains, brown bears gorge on spawning salmon, wolves howl in the distance, and moose browse through countless thickets. This intense and beautiful scenery can only be experienced in Alaska.

It’s difficult to imagine the immense size of the wildlife refuges in Alaska. The 16 refuges total over 82 million acres and account for about 85% of all lands in the National Wildlife Refuge System.

With the passage of the Alaska National Interest Lands Conservation Act (ANILCA) in 1980, Congress established the Alaska Peninsula and Becharof Refuges for the conservation of fish and wildlife and their habitats, subsistence use by local residents, the fulfillment of international treaties concerning fish and wildlife, and watershed protection.

For more information:

Alaska Peninsula National Wildlife Refuge
Becharof National Wildlife Refuge
P.O. Box 277 MS 545
King Salmon, AK 99613
ph: 907-246-3339
fax: 907-246-6696

Alaska Peninsula National Wildlife Refuge

A land of towering mountains, active volcanoes, misty fjords, steep cliffs, deep bays and long beaches, the Alaska Peninsula National Wildlife Refuge stretches nearly 340 miles along the Alaska Peninsula and encompass about 4.3 million acres. Elevations range from sea level to the summit of Mount Veniaminof at 8,225 feet (2,507 m).

Located approximately 330 miles (547 km) south-

west of Anchorage and 55 miles (89 km) south of King Salmon, the refuge is bordered on the north by the Becharof National Wildlife Refuge and to the south is split into two sections by Aniakchak National Monument and Preserve.

Contact the Alaska Peninsula National Wildlife Refuge by email at akpeninsula@fws.gov or on the web at alaskapeninsula.fws.gov

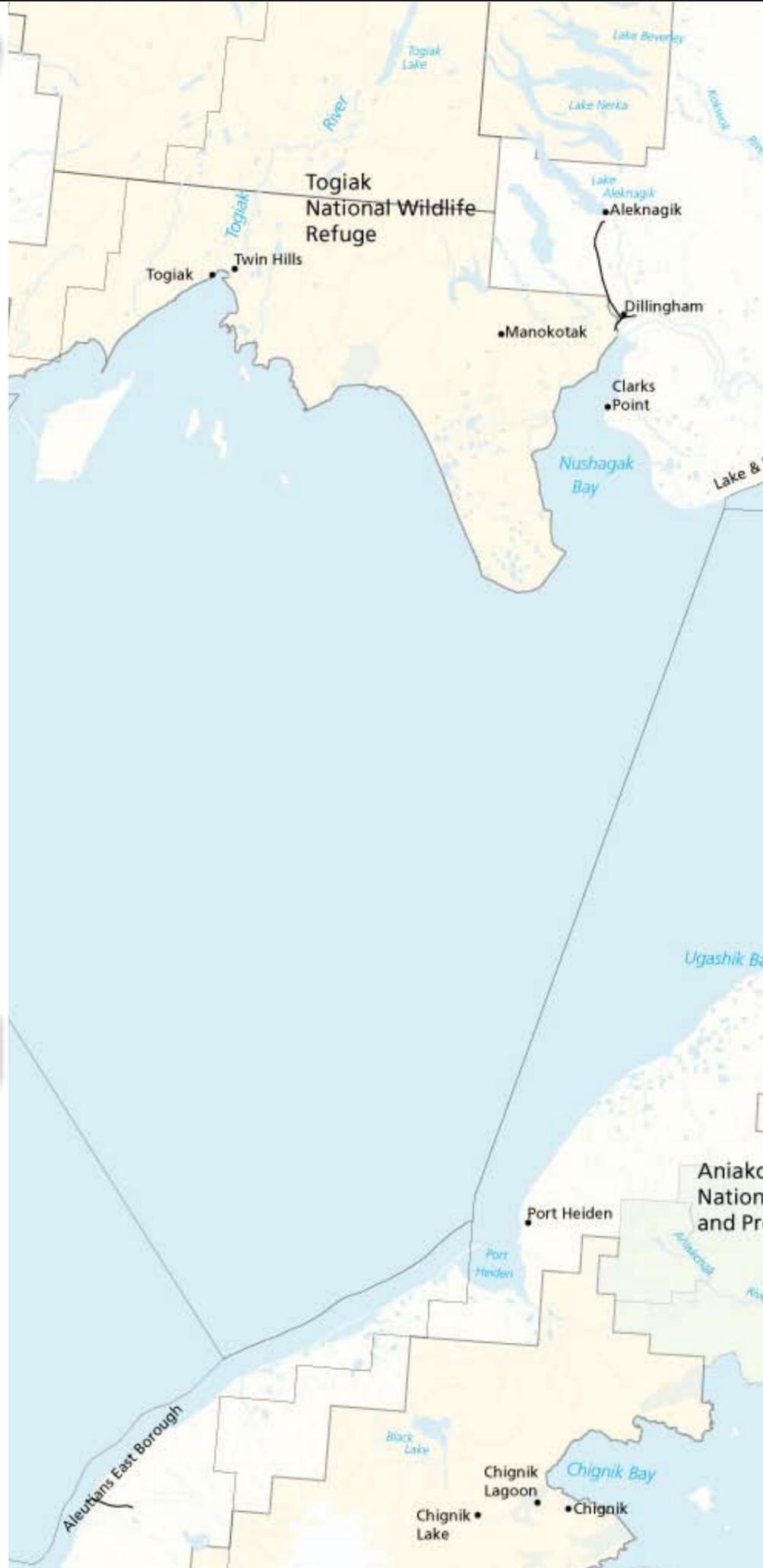
Becharof National Wildlife Refuge

The Becharof National Wildlife Refuge contains a variety of landscapes within its 1.2 million-acre boundary including rolling tundra, wetlands, glacial lakes, rivers, rugged cliffs and volcanic peaks. Land elevations range from sea level to 4,835 feet (1,474 m) at the summit of Mount Peulik.

Approximately 295 air miles (475 km) southwest of Anchorage and 10 miles (16 km) south of King

Salmon, the Becharof National Wildlife Refuge is situated between Katmai National Park and Preserve to the north and the Alaska Peninsula Refuge to the south.

Contact the Becharof National Wildlife Refuge by email at becharof@fws.gov or on the web at becharof.fws.gov



Alaska Department of Fish and Game



McNeil River State Game Sanctuary

Many of the same conditions that make Katmai National Park and Preserve such prime bear habitat are also found at McNeil River State Game Sanctuary. In fact, McNeil Falls attracts even more bears than Brooks Falls. McNeil is famous for its large brown bear population and for the opportunity it affords a small group of visitors to watch bears fishing and interacting in a natural setting.

To reduce the human impact on bear behavior at McNeil, the Alaska Department of Fish and Game (ADF&G) limits the number of visitors to 10 people per day by means of a permit lottery. Permit applications are due by March 1; a \$25 application fee is required. Winners are announced in mid-March. Each permit is issued for a four-day block of time, from June 7 through August 25.

For more information:

Alaska Department of Fish and Game
Wildlife Conservation
Attn: McNeil River State Game Sanctuary
333 Raspberry Road
Anchorage, AK 99518
ph: 907-267-2182
fax: 907-267-2433
email: mcneilinfo@fishgame.state.ak.us
web: <http://www.wildlife.alaska.gov/mcneil/>



Alaska State Boroughs



Lake and Peninsula Borough

Located southwest of Anchorage on the Alaska Peninsula, the Lake and Peninsula Borough encompasses nearly 24,000 square miles—about the size of West Virginia. Incorporated in 1989, the borough includes 17 communities with a combined population of about 1,800 people grouped in three distinct geographical areas: the Alaska Peninsula/Pacific side, the Alaska Peninsula/Bristol Bay side, and Iliamna Lake/Lake Clark area.

The topography varies from the mountainous terrain of the Aleutian Range in the east to the vast lake and marsh-dotted lowlands in the north and west. Lake Iliamna is the largest lake in Alaska and the second largest lake in the nation. Lake Clark has long been associated with extraordinary scenic beauty. Major rivers in the area provide

outstanding recreational opportunities and the largest run of sockeye salmon in the world. Commercial fishing, sportfishing and hunting, bear viewing, subsistence, recreation and tourism, and resource exploration are important economic activities that rely on the bounty of the the Lake and Peninsula Borough's landscape.

For more information:

Lake and Peninsula Borough
P.O. Box 495
King Salmon, AK 99613
ph: 907-246-3421 or 800-764-3421
fax: 907-246-6602
email: lpboro@bristolbay.com
web: www.lakeandpen.com



Bristol Bay Borough

The "Gateway to Katmai National Park & Preserve" and the "sockeye capitol of the world," Bristol Bay Borough is located 284 miles southwest of Anchorage between two of the most productive salmon rivers in Southwest Alaska.

Yupik, Athapaskan, and Sugpiat Alutiiq people jointly occupied the Bristol Bay area for thousands of years. The first salmon cannery opened on Kvichak Bay in 1890. Today, the Bristol Bay fishing industry is one of the largest and most valuable in the world. Commercial fishing and salmon processing are economic mainstays.

Naknek, South Naknek, and King Salmon have a combined population of just over 1,250 people. Naknek is the seat of the local government and

the major commercial center. King Salmon, connected to Naknek by the 15.5-mile (25 km) Alaska Peninsula Highway, serves as the transportation center and site of a former U.S. Air Force Base. South Naknek is a more traditional rural community and is not connected to the other communities in the borough by road.

For more information:

Bristol Bay Borough
P.O. Box 189
Naknek, AK 99633
ph: 907-246-4224
fax: 907-246-6633
email: admin@theborough.com
web: www.theborough.com



©ROY WOOD

What's Bruin?: Current Bear Research at Katmai



NPS COLLECTION



NPS COLLECTION

Top: Bear 424 at Brooks River as a subadult female in fall 2001.

Bottom: Bear 424 (right) with yearling cub at Brooks River in fall 2005.

Bear Genealogy and Behavior: DNA from the Brooks River Area

LONG-TERM OBSERVATIONAL monitoring of brown bears at Brooks River has produced more than a decade's worth of detailed records on river use and behavior of more than 40 known and recognizable bears. Kin relationships among these bears, however, have been inferred only from field observations. In cooperation with U.S. Geological Survey (USGS) Alaska Science Center scientists, National Park Service resource staff have initiated a project to determine the population structure of bears

at Brooks River and to infer relatedness and family structure based on molecular genetic data and field observations.

DNA is obtained from known brown bears without handling them. Rather, researchers collect hair samples left on small barbed wire snags or skin tissue samples via remote biopsy darts designed to fall to the ground after the sample is extracted. Collection of bear DNA samples will continue at Brooks River through the 2007 field season.

Monitoring Bear Use: Geographic Harbor

IN 2006, KATMAI NATIONAL PARK obtained funding through the Alaska Coastal Marine Resources Grant Program to purchase necessary equipment for a remote camera study in Geographic Harbor, along the park's southeastern coast. In the summer of 2007, these remote cameras will be deployed in the field in order to document bear use and activity patterns.

Located within Amalik Bay, the majority of visitor use at Geographic Harbor occurs from mid-July to mid-August. Each year, Geographic Harbor hosts a mid-summer pink (humpy) salmon run that attracts a large number of bears and which, in turn,

attracts human observers. Data documenting bear group composition (e.g., single adult male, subadult female, female with cubs, etc.), human visitation patterns, and patterned bear use of the landscape and its resources will be collected from within this study area.

The pilot project will focus on (1) how to best "bear-proof" remote cameras on the coast; (2) the best camera locations for efficiently monitoring both bear and human activity; and (3) assessing bear activity patterns during both peak and lull periods of visitor use.

Brooks River Area

Long-term observational monitoring of bear and human use of Brooks River will continue in 2007. Sampling includes recording use of river zones by bears at the individual level. Such detailed bear identification records have allowed researchers to recognize many bears that frequent Brooks River across study seasons and years.

The Brooks River data have shown a long-term increasing trend in bear population.

Numbers in July 2006 were down, however, likely due to the sporadic and somewhat diminished availability of salmon at Brooks Falls when compared to the year before. Approximately 64 different, independent bears were identified regularly using Brooks River during July 2006, while 59 bears were identified using the river in the fall (each seasonal count includes some individual bears recognized in previous seasons).

Estimating Katmai's Bear Population Density

The Alaska Department of Fish and Game (ADF&G) has developed an aerial double-count line-transect technique to estimate bear density within relatively large study areas. During 2004–2005, NPS resource staff worked cooperatively with ADF&G to use this technique to estimate bear density and population size in Game Management Unit (GMU) 9C, which is largely comprised of Katmai National Park and Preserve.

Within Katmai, a total of 413 bear groups (657 individuals) were sighted along the 14,400 km of transect length surveyed. Katmai bear density was estimated at 156 ± 21 bears/1,000 km² and the corresponding park population estimate was $2,183 \pm 379$ bears.



Transsects were flown along elevation contours in mountainous terrain. The transect flight line was automatically recorded using a laptop recorder connected to a GPS receiver. Three bear sightings were recorded for the transect depicted here.

NPS/TAMARA OLSON

Cultural Resource Management Projects

NPS/M. HOHNER



Abandoned Katmai Village, 1913.

Alagnak Site Added to National Register of Historic Places

AS OF JANUARY 2007, AN ARCHEOLOGICAL site on the Alagnak Wild River (known to researchers as DIL-161) has been added to the National Register of Historic Places. Authorized under the National Historic Preservation Act of 1966, “The Register” is the nation’s official list of historic properties worthy of preservation. DIL-161 joins other Katmai, Aniakchak, and Alagnak sites in this honor, including several Archeological Districts and the Aniakchak Bay Historic Landscape District. This new status reflects not only the site’s unique importance, but also the tireless efforts of National Park Service personnel.

Over several field seasons, NPS archeologists identified a large prehistoric settlement and a twentieth century historic cabin complex at DIL-161. Intensive survey and testing revealed that the site occupied 3.8 acres and contained 46 prehistoric and 7 historic features. Most of the prehistoric features were likely the remains of semi-subterranean houses. Larger features might have been community gathering places; smaller pits may have been used to store food. The large, deep houses had central hearths, where food was cooked in pottery vessels. They were probably entered by ladder through a hole in the roof. Trees are thought to have been scarce at the time, but large post holes were evidence of sturdy log construction; building such houses using imported logs worked with stone tools would have required considerable time and effort. Stone oil lamps may have helped keep the houses warm, dry, and well-lit. The thin floor deposits suggested that houses were cleaned regularly.



A rare pigmented ceramic vessel from DIL-161.

Chipped stone tools indicate that villagers hunted land mammals, such as caribou, as well as smaller animals. Intriguingly, while fishing is the primary activity along the Alagnak River today, there is little evidence of it at DIL-161. Radiocarbon dates point to site occupation between about 2,300 and 1,200 years ago—a time when other people in western Alaska began fishing intensively. Either fishing evidence has not survived—few bones were found in the acidic soils—or the site was occupied at a time of year when fishing was not the focus of activities.

Many questions remain unanswered about the people who lived at the site. Indeed, the prehistory of the Alagnak is still largely unknown to archeologists. DIL-161, however, has offered exciting details about house construction, subsistence, and village organization—an invaluable contribution to an understanding of the region.

Interior Archeological Survey Concludes

Summer 2007 will be the final field season of a long-term and extensive archeological survey of interior areas of Katmai National Park and Preserve. To date, archeologists have surveyed more than 6,500 acres and located 41 new sites. In addition, the conditions of previously known archeological sites were assessed whenever possible. In 2007 archeologists will survey the hills east of the head of Naknek River, the upland valleys at the southeast end of Murray Lake, and the Solstice Ridge area. The survey team will continue investigations at the mouth of Idavain Creek on Naknek Lake and at the confluence of Contact and Takayofu Creeks in the southwest area of the park. Archeologists will also assess the possibility of finding hunting tools left by precontact caribou hunters on ice patches in the Mount Kelez uplands.

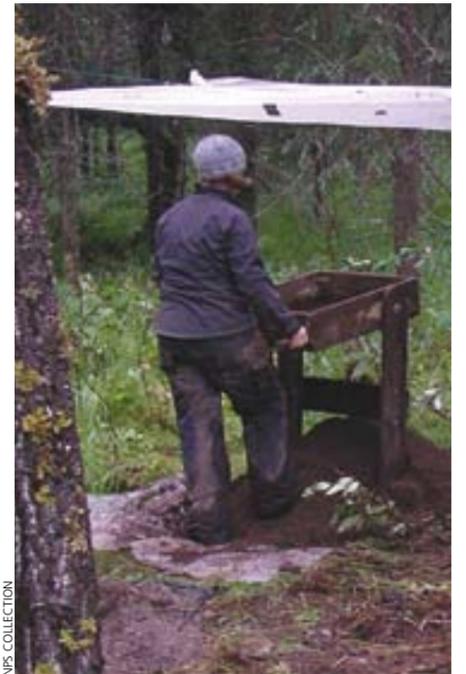
Resource Compliance: Brooks Camp Area

THE CULTURAL RESOURCES COMPLIANCE program continues to review development projects at Brooks Camp for potential effects to archeological sites. In 2006, during investigation of a proposed leach field site, archeologists identified a previously unknown prehistoric campsite. This discovery, as well as the confirmed significance of another archeological site nearby, contributed to the decision to rebuild the Brooks Camp leach field in its current location. Archeologists will monitor removal of the current leach field fill.

At “The Corner,” where the Brooks River flows into Naknek Lake, erosion of a pedestrian trail exposed the remnants of a traditional fishing camp. Their presence will require careful consideration during the planning process for proposed trail reroutes and bridge relocation in this location.

Elsewhere, monitoring of the Lake Brooks vault toilet excavation revealed archeological components possibly attributed to the 3,500 year old Arctic Small Tool tradition (ASTt). During 2007, archeologists will also work with maintenance staff to install

buried power lines for the new maintenance facility to be constructed at the Valley of Ten Thousand Smokes intersection, while avoiding sensitive archeological sites near Lake Brooks.



Archeologist assesses test pit at a proposed leach field site at Brooks Camp.

Aniakchak Archeology: Excavation at SUT-027

THE NPS SYSTEMWIDE ARCHEOLOGICAL Inventory survey of Aniakchak National Monument and Preserve (1997–2000) identified the Aniakchak Bay site (SUT-027) and evaluated its significance relative to all known sites within the park. Resource managers determined that excavation at SUT-027, one of the four largest villages known in Aniakchak, was necessary in order to recover the full range of archeological information threatened by immediate loss through erosion.

The large quantity of shell in the midden has contributed to soil conditions conducive to excellent bone preservation—both animal bones and bone and antler tools were recovered. Preserved wood planks from an erod-

ing house floor beneath the shell midden further highlighted the site’s uncommon potential for yielding valuable information. Indeed, the organic preservation, structural elements, and faunal remains hold great promise for determining cultural affiliation, subsistence patterns, and the household and social organization of the region’s prehistoric residents.

Summer 2007 will be the final season of excavations, conducted by NPS staff and Hamline University. To date, excavations have revealed at least two distinct occupations—a younger, ephemeral occupation by a Thule or Koniag related culture, and a lower component consistent with an extensive occupation, possibly a winter settlement.



Excavation of the Aniakchak Bay site, SUT-027.

Some of the chipped stone lithics from the lower component resemble artifacts found at Aleutian tradition sites to the west, while others resemble those of the Norton

tradition to the east. This may represent an amalgamation of regional characteristics rather than a clear divide between “Eskimo” and “Aleut” traditions.



Changing Perspectives: Southwest Alaska Network

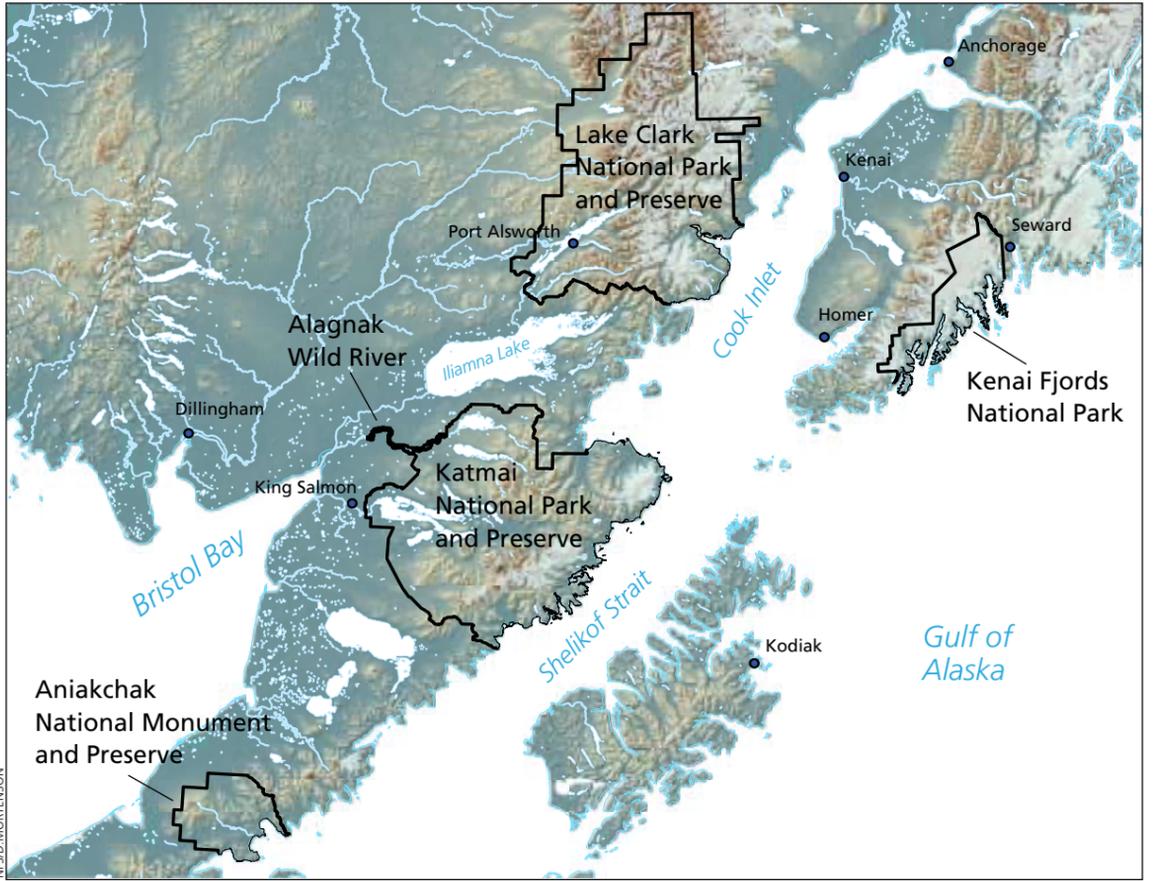
Unnamed, ash-covered glaciers scour the southeast flank of Mount Katmai (6,476 ft/2,056 km), Katmai National Park.

THE SOUTHWEST ALASKA NETWORK (SWAN) IS ONE OF 32 Inventory and Monitoring programs across the National Park System. This national strategy is an effort to assess what natural resources exist in the parks (inventory) and evaluate their present condition (monitoring). Such information is critical for the NPS to fulfill its mission—it is the scientific foundation for effective, long-term protection and management of natural resources.

SWAN comprises five Alaskan park units: Katmai National Park and Preserve, Aniakchak National Monument and Preserve, Alagnak Wild River, Lake Clark National Park and Preserve, and Kenai Fjords National Park. Collectively, they encompass 9.4 million acres (~3.8 million ha)—11.6 percent of all NPS managed land, and two percent of the Alaska landmass. Among the last remaining wilderness areas in the world, SWAN parks are large enough to allow ecological processes and biological diversity to evolve and adapt naturally.

Network parks share many common characteristics and encompass climatic conditions, geologic features, pristine ecosystems, natural biodiversity, freshwater, and marine resources equaled few places in North America. In forming this single network for inventory and monitoring purposes, project funding and management have been streamlined.

SWAN has selected specific key indicators—or “vital signs”—with which to monitor the condition of park ecosystems. The inventory and monitoring projects described in the following pages will occur in Katmai National Park and Preserve during the summer of 2007.



The five NPS units comprising the Southwest Alaska Network (SWAN) showing physiographic relief.

Monitoring Ecosystem Change: New Weather Stations Collect Climate Data

CLIMATE IS CONSIDERED TO BE THE single most important factor influencing ecosystem quality. Global models predict that climate change will be most pronounced at high latitudes. Climate data may provide insight into the causes of a variety of ecosystem changes—from changes in vegetative cover to shifts in terrestrial and aquatic plant and animal communities.

Existing weather stations in Southwest Alaska primarily support the safety and needs of the aviation community. They are typically located near towns and villages, and tend to be situated at lower elevations in broad valleys. SWAN parks exhibit extreme elevational and geographic gradients and, consequently, climate variability ranges from maritime to continental. The current array of weather stations is unable to capture this variability. Deployment of weather stations in remote coastal and mountainous locations of SWAN parks will provide more accurate data concerning local climate patterns.

Previous seasons’ fieldwork identified numerous potential weather station sites within Katmai National Park and Preserve. During the 2006 field season, on-the-ground site surveys were conducted at 9 of these sites. Alaskan climate experts evaluated the survey data and prioritized the sites for consideration. Station deployment at select sites will begin in 2007 and will include

an interior and a coastal location.

Air temperature, relative humidity, wind speed and direction, snow depth, solar radiation, and precipitation will be logged hourly at each station. Monthly and annual weather summaries will be available at the Western Regional Climatic Center web site at: www.wrcc.dri.edu/NPS.html.

Glacial Extent

Glaciers, too, are dominant features in the SWAN parks, especially Katmai, Kenai Fjords and Lake Clark. In general, Alaska’s glaciers have been retreating since the waning of the Little Ice Age (~300 years ago). Although the ice loss has occurred at varying rates since then, a variety of evidence suggests that the rate has significantly increased in recent decades. This recent, widespread glacial recession is largely responsible for the substantial landscape changes in SWAN parks that are visible today.

Because glacier systems are primarily regulated by climate fluctuations, they provide a valuable record of long-term climate change. Furthermore, glaciers act as huge ice reservoirs for freshwater storage in SWAN parks; indeed, much of the freshwater systems in the Network are currently of glacial origin. As such, the extent of glaciation in SWAN parks has been identified as an important vital sign to monitor, directly af-



SWAN personnel and precipitation tower on the Harding Icefield in Kenai Fjords National Park.

fecting the character of Network watersheds and indicative of potential shifts in aquatic communities.

Satellite imagery is recognized as a simple and effective means for documenting change in glacial extent. Landsat satellite imagery is available from the 1970s to present. This imagery has been used to map glacial extent on a decadal scale in SWAN parks. Icefields and glaciers are outlined using a combination of automated and manual methods. Geographic information system (GIS) analyses quan-

tify change in glacial extent and identify key areas of change in SWAN parks.

Just recently, Dr. Dorothy Hall of NASA’s Goddard Space Flight Center completed mapping glacial extent in Katmai. GIS analysis will continue in 2007 in order to identify significant changes in glaciation.

*Bruce Giffen
National Park Service
Southwest Alaska Network*

Southwest Alaska Network (cont.)



Recent spruce bark beetle-induced mortality, Bay of Islands, Katmai National Park (2006).

Insect Outbreaks: Things of the Past...And Present

A KEY DRIVER OF VEGETATION CHANGE at local and regional landscape levels is disturbance. SWAN scientists are interested in how human and natural disturbances interact with one another and with biological communities to produce the vegetation patterns we see in our parks today.

In the past, high latitude forests have experienced widespread mortality and/or loss of canopy cover due to insect and disease outbreaks. Spruce bark beetles and a variety of native and non-native defoliators occur at various levels within the SWAN parks. Changing land use patterns and variation in climate may affect the population dynamics of these insects and forest pathogens, potentially altering future forest structure and composition.



Co-Principal Investigator Dr. Ed Berg (left) and field assistant Matt Bowser examine spruce bark beetle damage at Lake Clark National Park and Preserve.

The current spruce bark beetle outbreak has killed approximately 86,500 acres (35,000 ha) of forest on the Alaska Peninsula. Past bark beetle outbreaks are detected by examining tree-rings and identifying growth pulses caused by beetle-related thinning of the forest. This method assumes that beetles kill large trees and spare smaller, pole-sized trees. When the smaller trees must no longer compete with the larger trees for resources (i.e., they are “released” from competition), they grow comparatively faster for a period of time (50–80 years) until the canopy recloses and competition again slows their growth. Samples from about 100 trees are required to quantitatively assess growth releases in a forest stand.

Trees are cored using a threaded steel tube that is screwed into the center of a tree. The width of each tree-ring is precisely measured (to 0.01 millimeter) with an electronic micrometer connected to a computer. These measurements generate thousands of ring widths that are analyzed statistically to identify consistent patterns of growth releases. Consistency in growth releases indicate regional forest thinning by bark beetles.

In 2005, nine forest sites were sampled in Lake Clark National Park and Preserve and on the northern shore of Lake Iliamna, where the recent outbreak has killed thousands of acres of spruce. U.S. Forest Service (USFS) aerial surveys show that the current outbreak began in 1990, peaked in 1996, and has since declined because most of the mature trees have been killed. In Katmai, the oldest trees appear to have succumbed to

beetle kill already, but biologists believe that if the stands remain stressed, further tree mortality is possible.

In 2007, three to five sites will be sampled in Katmai National Park and Preserve, focusing on mature spruce stands, dead and alive, around Naknek Lake and Lake Brooks. The tree-ring data from this project should provide insight into whether the current outbreak is similar

in scale to previous outbreaks on the Alaska Peninsula, or whether it appears to be outside the historic range of variability.

*Amy Miller
National Park Service
Southwest Alaska Network*



USGS hydrologist installing gauging station at Lake Brooks outflow, Katmai National Park.

Watershed Wellness: Surface Hydrology and Stream Chemistry

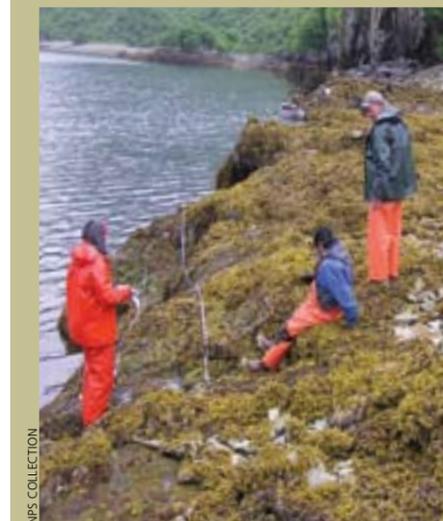
RESEARCHERS HAVE NOTED THAT climate warming is decreasing glacial coverage in SWAN parks, shortening the duration of ice cover on lakes, and increasing evaporation from water and land surfaces. These processes appear to be altering the timing and magnitude of peak river discharge and shifting lake levels which, in turn, affects stream chemistry and the availability and quality of habitats for fish and other aquatic populations. Water quality and fish populations are also directly affected by patterns of seasonal and annual flow. Stream flow and lake level measurements, then, are fundamental to understanding the biophysical characteristics of Network watersheds.

Water quality—especially temperature, specific conductance, pH, dissolved oxygen, turbidity and nutrient availability—is critical to the survival, growth and reproduction of aquatic organisms. Temperature plays an important role in physiological processes, affecting the composition of biological communities. Changes in water temperature may indicate climate change. Specific conductance reflects the ionic strength or mineralization of water. It is often a signal of the source water; a high specific conductance is representative of a strong groundwater influence. Shifts in pH can affect major anions (i.e., nitrate, sulfate) and cations (i.e., calcium, potassium), total organic carbon, trace metal concentrations, and biogeochemical processes (i.e., nitrogen fixation). In SWAN watersheds, low pH may indicate volcanic influences. Adequate dissolved

oxygen is essential for the survival of most aquatic organisms, and also affects chemical cycling. Turbidity affects visual acuity.

In 2006, SWAN began working with the U.S. Geological Survey (USGS) in Katmai to establish permanent river monitoring sites addressing these key parameters. Stream flow measurements were conducted four times between melt-out and freeze-up to characterize discharge patterns in a glacial (Naknek Lake) and non-glacial (Lake Brooks) system. During the 2007 field season, USGS will continue to collect stream discharge measurements and establish a stream flow rating curve for each site. Permanent stations will be established and stream flow and water quality data loggers will be installed and programmed to record data on an hourly basis. Because most water bodies in SWAN parks meet Alaska water quality standards, focus will be on documenting natural variability and monitoring changes from baseline conditions, possibly associated with climate warming and atmospheric deposition of contaminants. In addition, a temperature array will be established in Naknek Lake and Lake Brooks. Year-round temperatures will be recorded along a depth profile ranging from 100–300 feet (30–91 m). Data will be collected at the end of the field season, analyzed and presented in monthly and annual summaries.

*Laurel Bennet
National Park Service
Southwest Alaska Network*



SWAN scientists monitor kelp along a transect on Katmai's coast (2006).

Marine Kelp and Seagrass Monitoring

The marine coastline of SWAN parks comprises almost one-third of all marine coastline in the National Park System. These 1,180 miles (1,900 km) of coastline include intertidal and subtidal areas which are among the most productive habitats in the Gulf of Alaska. Nearshore habitats provide important feeding grounds for larger animals such as sea otters and brown bears and provide nurseries for many marine organisms. Kelp and seagrass comprise nearshore “living habitats” that serve as a nutrient filter and provide understory and ground cover for planktivorous fish, clams, urchins, and a physical substrate for algae and other invertebrates. Kelps are primary producers in the marine nearshore and, because they are located in shallow water, are especially susceptible to the adverse impacts of oil spills and other human-related activities.

In 2006, five permanent ground transects were established along the Katmai coastline for monitoring change in kelp and seagrasses on the sheltered rocky shorelines. These transects are part of a broader coastal monitoring protocol that includes invertebrate surveys. Eight additional ground stations were visited along the Aniakchak coastline to create a more comprehensive species list for kelps and seagrasses. During the 2007 field season, annual monitoring will continue at Katmai and low-level aerial photography will be tested as a technique for monitoring annual changes in coverage of canopy kelps and seagrasses.

Natural Resource Management Projects

Salmon Studies

National Park Service researchers are working to develop a better understanding of anadromous (ocean-going) and non-anadromous forms of sockeye salmon. The unique combinations of geologic activity and unparalleled salmon spawning habitat at Aniakchak and Katmai makes them ideally situated laboratories for such studies. Both volcanic and glacial disturbances can quickly and dramatically destroy or alter entire watersheds, isolating salmon populations from one another, eliminating access to traditional spawning areas, and/or creating access to potentially new spawning grounds.

Devils Desk (far right), Kukak Volcano and Hallo Glacier above Hallo Bay, Katmai National Park.



Male sockeye: beach spawning area (top) and stream spawning area (bottom).



Male kokanee: fish diet (top), and a leech diet (bottom).

Sockeye Colonization and Kokanee Genetics

FRESHWATER COLONIZATION IS AN important process in areas where volcanic activity is ongoing. Thus, at Aniakchak, National Park Service resource managers have a unique opportunity to understand the influence of volcanic landscapes on biological diversity in freshwater systems.

Sockeye Colonization

Access to Aniakchak Caldera and the freshwater systems within have only been available to sockeye since the caldera wall ruptured during a massive flood event 1,800 years ago (resulting in "The Gates" of the Aniakchak River). Today, spawning populations of sockeye occur at many locations within Aniakchak Caldera—around Surprise Lake and at the head of the Aniakchak River. Consistent spawning activity, however, also occurs in Albert Johnson Creek, a tributary to the Aniakchak River located outside the caldera. Genetic analyses were conducted

to determine whether these populations were reproductively isolated, or were one large interbreeding population spawning in multiple locations. Results to date suggest clear genetic differences between Albert Johnson Creek, Aniakchak River, and the Surprise Lake beaches—differences further reflected in the physical characteristic of sockeye at each location.

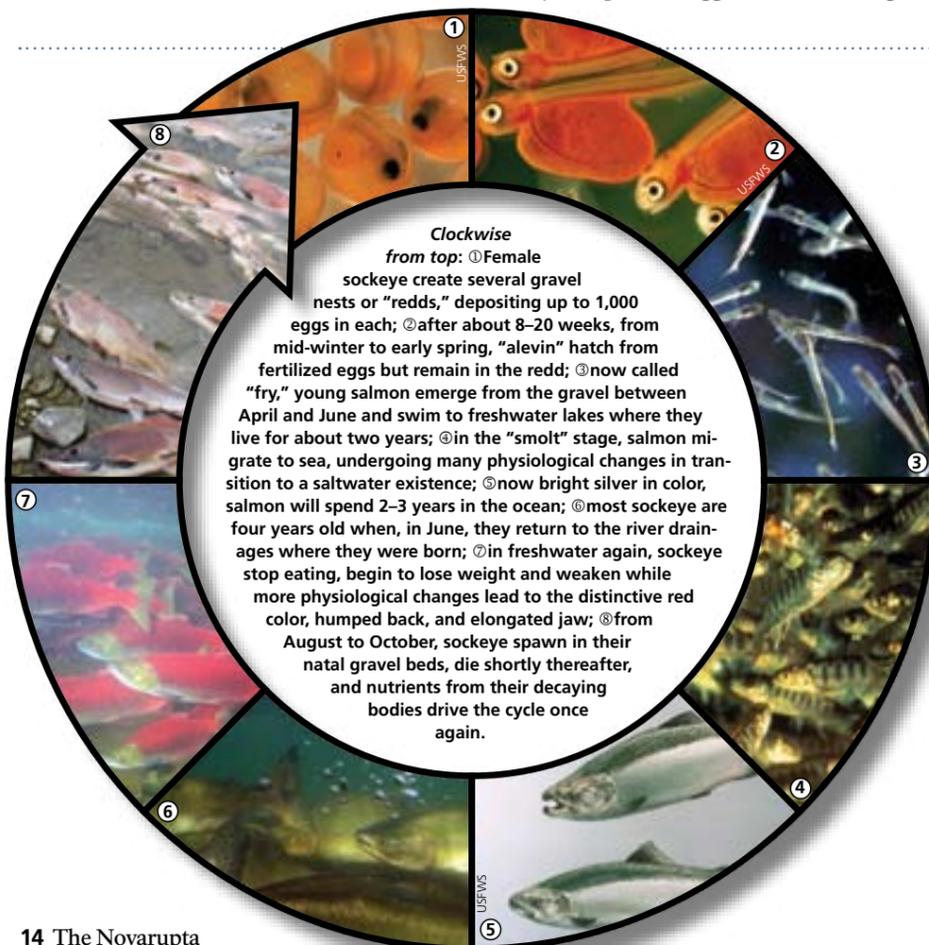
Continued fieldwork in 2007 will: (1) supplement initial genetic analyses with samples from closely located, individual beach populations within Surprise Lake to assess the potential for fine-scale genetic separation within the lake; (2) document differences in spawning time among populations; (3) monitor and evaluate overwinter incubation conditions at multiple spawning sites to examine possible relationships with spawning time; and (4) compare the eggs of females along

spawning locations to determine whether, like other physical measurements, egg size differences among populations reflect differences in spawning ground characteristics.

Kokanee Genetics

At Katmai, studies are underway to better understand the genetic and biological diversity of non-anadromous (landlocked) sockeye salmon populations. Traditionally known as kokanee, there are at least three such populations in the park, representing some of the northernmost kokanee populations on Earth. These kokanee differ substantially from other populations and from each other, especially with respect to body size—from extremely small to extremely large—and diet—from traditional zooplankton diets to leech and fish diets. They appear to have diverged from their sockeye relatives in time frames differing by thousands of years.

In the past century, glacial recession along Katmai's coast has made formerly inaccessible lakes available for sockeye colonization. Furthermore, these lakes are in close proximity to the kokanee populations of interest. In 2007, NPS resource management staff will collect genetic samples from known kokanee populations, as well as from nearby spawning sockeye—in both recently colonized and established populations. Comparative DNA analyses may shed light on the genetic and environmental triggers that lead to isolated populations of kokanee and the extent of genetic divergence that has occurred since they were established. In addition, researchers hope to learn about the colonization process and how environmental factors like climate warming may influence sockeye populations. Related fieldwork will include documentation of habitat use, spawning activity, and kokanee diet.



The Salmon Story

SOCKEYE, OR RED SALMON, ARE AT the heart of the economy, ecology, culture, recreation, history, identity, and food web of Southwest Alaska. They hold a place of high esteem among the people of Bristol Bay, both in ancient times and today. In the best commercial fishing years in recent history, the annual sockeye catch was immense—if laid out across the United States, it would reach from New York City to San Francisco, and back again as far as Phoenix. When canning was the main method of preserving red salmon, the one-pound tins packed during one season could have encircled the globe.

Salmon first appear in the evolutionary record nearly two million years ago. Since that time, they have served as a primary source of protein for animals, people, and even plants. The role of salmon in the lives of local people has always been extremely important, if not critical. With the abun-

dance of this food source, Native people refined and developed their rich and distinct cultures, inextricably tied to the land and all it provides. Traditional uses of these abundant salmon resources have received congressional recognition and protection in modern times.

Sockeye hatch each winter in freshwater lakes and streams throughout Alaska, where they feed and grow before moving downstream to the ocean. They will spend two to three years in saltwater, avoiding predatory fish and mammals, nets and fishing lines, disease and starvation.

In the ocean, they reach their maximum weight of around five to seven pounds. After a 10,000 mile journey around the North Pacific, sockeye return to freshwater in early

Continued on next page...

The Weed War at Home: Biological Pollution in the National Parks of Alaska

ALASKA'S NATIONAL PARKS ARE HOME to complex native communities of plants and animals that have developed over millions of years. The delicate natural balance within these communities is threatened by the influx of invasive plants, which are considered the second greatest threat to biodiversity after habitat loss. Invasive plants are not native to an area, display rapid growth, and spread with little or no human assistance. They are very expensive to remove and difficult to control once established. Invasive plants are a concern because they threaten the genetic integrity of native flora through hybridization, can out-compete native plant species for limited resources, and can change the structure and function of ecosystems. Establishment of invasive plants can also result in loss of habitat and food sources for native insects, birds, fish, and mammals.

In Alaska, National Park Service lands have been considered immune to the establishment of many pernicious invasive species found in the "Lower 48" states. Each year, however, Alaska's climate and isolation become less of a barrier to invasion. Warming trends, increasing development, and the rising number of park visitors are contributing to the spread of invasive plants in Alaskan parks. Fortunately, the NPS has the opportunity to head off invasive plant introduction in the state before it becomes a problem, but research and active management must begin now.



Common dandelion (*Taraxacum officinale* ssp. *officinale*)

In the summer of 2005, baseline surveys for invasive plant species were carried out in

Katmai National Park and Preserve. These surveys serve as the first source of data to be used in formulating a long-term control and monitoring plan for these species. A total of 12 invasive plant species were documented in Katmai. Many do not currently pose a serious threat because they are limited to areas of repeated anthropogenic disturbance and have not yet invaded native ecosystems. However, all of these species should be prevented from moving into more remote areas of the park through control efforts. Several species deserve special attention as high priority invaders.

Common dandelion (*Taraxacum officinale* ssp. *officinale*), ubiquitous across most of the United States, is rapidly colonizing Brooks Camp. Dandelions are capable of forming dense colonies in natural areas, suppressing and displacing native plants. With targeted control efforts in the vicinity of the lodge, visitor center, cultural site, and campground, the ability of dandelion to "hitchhike" with visitors and employees to other areas of the park may be eliminated.

Oxeye daisy (*Leucanthemum vulgare*) is rapidly spreading in many parts of Alaska—a small population was found along Lake Camp Road. This plant has the capacity to proliferate quickly along roadsides, fields, and riparian areas. Oxeye daisy is a popular ornamental plant that easily escapes cultivation, out-competing and displacing native species. Unfortunately, it is still sold in garden stores and wildflower seed mixes, even though it is listed as a prohibited weed in many states. Oxeye daisy can be controlled by hand-pulling, especially if it is caught early enough. New introductions can be prevented by using only native and non-invasive plants in flower gardens.

Narrowleaf hawkbeard (*Crepis tectorum*) is considered highly invasive and has been observed spreading throughout Alaska at an alarming rate. A very small population of this



Oxeye daisy (*Leucanthemum vulgare*)

species was found growing along the Valley of Ten Thousand Smokes road, and there is potential for it to spread along the entire length of the road corridor and beyond. Narrowleaf hawkbeard is very hard to control once established, although small infestations can be eliminated; it was pulled up by hand, but multiple weedings each summer will be necessary until the seed-bank is exhausted.

Two primary vectors of invasion and spread of invasive plants species exist for Katmai: seeds or plant material hitchhiking on gear and clothing and the importation of contaminated soil, gravel, nursery stock, or heavy equipment into the area. To halt the spread of seeds, visitors are encouraged to wash clothes, shoes, and camping gear before traveling into the park and when traveling between different areas of the park. Soil, gravel, and nursery stock should be obtained from weed-free sources whenever possible, and sites should be carefully monitored for weed establishment after material has been deposited. Vehicles should be washed before or upon arriving in the park, with special attention to tires, undercarriage, and any stray clumps of dried material.

When compared with parks in the Lower 48, there are relatively few infestations of exotic plants in Katmai. Fortunately, the park has fared well in its isolation and has a unique opportunity to prevent problems that have been experienced elsewhere. Collaboration of NPS staff, visitors and local residents is essential to prevent the spread of invasive plants and protect the health and heritage of the Katmai landscape.

Narrowleaf hawkbeard (*Crepis tectorum*)

Penny Bauder & Jeff Heys
National Park Service
Alaska Exotic Plant Management Team

For further information about invasive plants or to volunteer as a "weed warrior," please contact Jeff Heys of the National Park Service's Alaska Exotic Plant Management Team at 907-644-3451 or visit: www.nps.gov/akso/NatRes/EPMT/Pages/EPMT_Home.html.

Home to Humans

(Continued from page 4)

archeological and geographic evidence suggests that these powerful events occurred regularly far back into time.

In the Brooks River area, archeologists and geologists have identified ten distinct ash layers, the earliest dating to just after the end of the last ice age (~10,000 years ago). Many of these events were likely very disruptive, even catastrophic, to local communities.

Against this backdrop of natural transformations, people living in the Brooks River area also experienced cultural changes. Communities have used the rich resources available here for more than 5,000 years. When you walk along the river, you are following in the footsteps of hundreds, even thousands, of people before you. Although it seems like untouched wilderness now, the Brooks River has been a bustling hub of human activity for millennia.

Five thousand years ago, the water level in Naknek Lake was much higher (the Naknek River has gradually been cutting through the glacial moraine that dams the lake). Lake Brooks and Naknek Lake were one, and the Brooks River valley of today was a

narrow channel in the lake where caribou may have crossed. On the ancient lakeshore archeologists find the remains of campsites where craftsmen created tiny arrowheads by flickering firelight.

A thousand years later, people began building permanent houses in the area as the lake level fell. By 3,500 years ago, the water had lowered so much that the famous Brooks River falls were created. Salmon pooling below the obstacle could be easily harvested—by people or bears.

The Brooks area provided an abundance of resources, and communities became even more settled. By 2,000 years ago, they were building larger, deeper houses and manufacturing pottery.

When Russian explorers reached Katmai in the 1700s, they described villages with snug multi-room houses dug partially into the ground. At Brooks Camp, the earliest of these "palaces" date to about 500 years ago.

The Brooks Camp landscape is an archeological marvel. There are more than 900 house depressions in the immediate area,

making it one of the most densely concentrated archeological areas in North America. The Brooks River sites together have the highest known density of Arctic Small Tool tradition (ASTt) dwellings. The ASTt, which dates from about 3,800 to 3,000 years ago, is still somewhat of a mystery and is present at very few places in Alaska.

Perhaps it is unsurprising, then, that the Brooks River Archeological District is both a National Historic Landmark and is listed on the National Register of Historic Places. There are only five places in the state of Alaska that bear both designations. As such, Brooks Camp is recognized as one of the top five most important places in the state for learning about prehistory.



Incised pebble (front and back) from the Cutbank site, Brooks River Bluffs phase (1350–1800 c.e.).

Salmon Story

(Continued from page 14)

June. In general, the swim up the Naknek drainage and into the rivers and lakes of Katmai takes a few days.

Once in freshwater, these wild salmon stop eating and begin to lose weight and weaken. After returning to their natal stream or lakebed, the sockeye will spawn and then die. Their bodies are scavenged by birds, fish, and other wildlife, and their remains return to the ecosystem as nutrients. And so the annual salmon life cycle continues.

The yearly salmon migration is the basis for the healthy bear populations of Southwest Alaska. In July, bears find good fishing at Brooks Falls. Then, as the fish run subsides, they venture off in search of other, more profitable food sources. In September, bears once again appear at Brooks Camp to forage on the salmon carcasses washing downstream from the spawning grounds. It is a simple, yet extraordinarily complex, annual interaction between mammal and fish, predator and prey.



The Bear Essentials:

Visitors to Brooks Camp are required to begin their stay by checking-in at the visitor center for a brief "Bear Etiquette" training course and safety talk outlining park regulations.

Bear Safety

Do not carry food, beverages, or any other odorous items around Brooks Camp. Eat and drink only in buildings or designated picnic areas. Water is the only beverage you can consume outside of designated areas.

Put garbage in designated indoor receptacles.

Do not leave gear unattended at any time.

Be alert at all times and make noise where visibility is limited. If you encounter a bear, stop making noise once the bear is aware of you.

Maintain a distance of 50 yards from any bear. In case of close encounter, speak to the bear in a soft voice, wave your arms, and back away slowly.

Food Storage

All food, beverages, fish, garbage, equipment used to cook or store food, or any other odorous items must be properly stored.

Bear Viewing

Three viewing platforms provide safe and ideally situated opportunities for observing bear behavior. The Lower River Platform is located just across the bridge over Brooks River. An additional .9 miles (1.4 km) of trail (one-way) provides access to the Falls and Riffles Platforms.

Fishing Around Bears

When bear activity is at its peak at Brooks Camp, both bears and anglers compete for the same resources. Expect to spend much more time out of the water than in, and be prepared to give up your fishing hole to a bear at some time during your trip. It is critical that bears do not learn to associate anglers with fish.

Be aware of your surroundings—learn where bears are likely to appear or "pop-out." If possible, have someone "spot" bears for you.

Stop fishing well before a bear approaches within the designated distance of 50 yards.

The splash of a fish in play attracts bears' attention. If a bear approaches while a fish is hooked, be prepared to cut or break your line and move out of the water until the bear passes.

Fish may not be cleaned at Brooks Camp. If you plan on keeping a fish, kill it immediately, place it in a fish freezing bag (available free at the Brooks Camp Visitor Center) and take it to the fish freezing building near Brooks Lodge.

Camping

Within 1.5 miles (2.4 km) of Brooks Camp (i.e., the Brooks Camp Developed Area), camping is allowed only in the Brooks Camp Campground (see page 4 for more info).

Accessibility

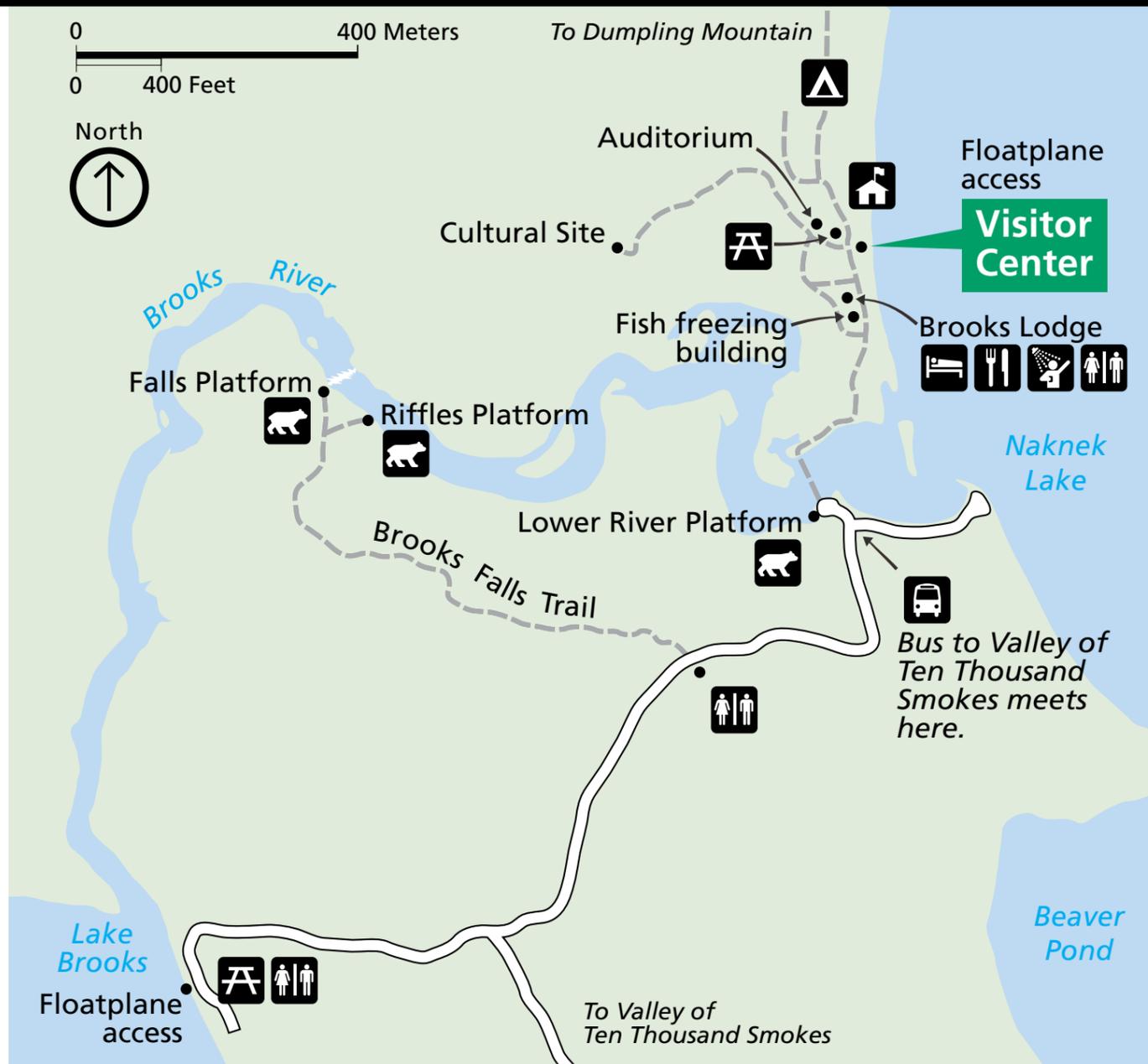
While most trails around Brooks Camp and the trail to Brooks Falls are wheelchair accessible, they are unpaved and frequently muddy. Visitors should be prepared to leave the trail in order to avoid a bear.

Hunting and Firearms

Hunting and firearms are prohibited at Brooks Camp but may be permitted elsewhere (see page 2 for more info).

Firewood

Please help protect park resources by gathering only dead and downed wood.



Pets

Pets are not allowed within 1.5 miles (2.4 km) of the Brooks Camp (i.e., the Brooks Camp Developed Area).

Preservation

Please don't remove any cultural artifacts or natural objects.

Water Conservation

Please help us in this critical effort by complying with water use guidelines posted around camp.

Interpretive Programs

Park ranger/naturalist-led activities occur daily. Inquire at the visitor center for times and availability (see page 4 for more info).

Dumpling Mountain Trail

From Brooks Camp Campground, this moderately strenuous hike climbs 800 ft. (244 m) over 1.5 miles (2.4 km) (one-way) to an overlook with expansive views of Brooks Camp and Naknek Lake. An additional 2.5 miles (4 km) of trail and 1,600 ft. (489 m) of elevation gains the summit of Dumpling Mountain.

Brooks Falls Trail

Brooks Falls is accessed via an easy, 1.2 mile (1.9 km) trail from the Brooks Camp Visitor Center.

Cultural Trail

From the Brooks Camp Visitor Center, this easy .25 mile (0.4 km) (round-trip) stroll leads to a reconstructed prehistoric house, or *barabara*.



"Bear Jam!"

Bear activity at the Lower River may delay crossing Brooks River bridge. Please be prepared to wait in windy and/or rainy conditions and allow yourself ample time to meet meal services and/or your departing flight.

Brooks Camp Distances

Miles (Kilometers)	Visitor Center	Brooks Camp Campground	Brooks River "The Corner"	Cultural Site	Lower River Platform	Falls Trail Outhouse	Falls Platform	Lake Brooks
Visitor Center	0	.3 mi (.5 km)	.2 mi (.3 km)	.1 mi (.2 km)	.3 mi (.5 km)	.6 mi (1 km)	1.2 mi (1.9 km)	1.2 mi (1.9 km)
Brooks Camp Campground	.3 mi (.5 km)	0	.4 mi (.6 km)	.4 mi (.6 km)	.6 mi (1 km)	.9 mi (1.4 km)	1.4 mi (2.3 km)	1.5 mi (2.4 km)
Brooks River "The Corner"	.2 mi (.3 km)	.4 mi (.6 km)	0	.3 mi (.5 km)	.1 mi (.2 km)	.4 mi (.6 km)	.8 mi (1.3 km)	1.1 mi (1.8 km)
Cultural Site	.1 mi (.2 km)	.4 mi (.6 km)	.3 mi (.5 km)	0	.4 mi (.6 km)	.7 mi (1.1 km)	1.3 mi (2.1 km)	1.4 mi (2.3 km)
Lower River Platform	.3 mi (.5 km)	.6 mi (1 km)	.1 mi (.2 km)	.4 mi (.6 km)	0	.3 mi (.5 km)	.9 mi (1.4 km)	1 mi (1.6 km)
Falls Trail Outhouse	.6 mi (1 km)	.9 mi (1.4 km)	.4 mi (.6 km)	.7 mi (1.1 km)	.3 mi (.5 km)	0	.6 mi (1 km)	.7 mi (1.1 km)
Falls Platform	1.2 mi (1.9 km)	1.4 mi (2.3 km)	.8 mi (1.3 km)	1.3 mi (2.1 km)	.9 mi (1.4 km)	.6 mi (1 km)	0	1.3 mi (2.1 km)
Lake Brooks	1.2 mi (1.9 km)	1.5 mi (2.4 km)	1.1 mi (1.8 km)	1.4 mi (2.3 km)	1 mi (1.6 km)	.7 mi (1.1 km)	1.3 mi (2.1 km)	0