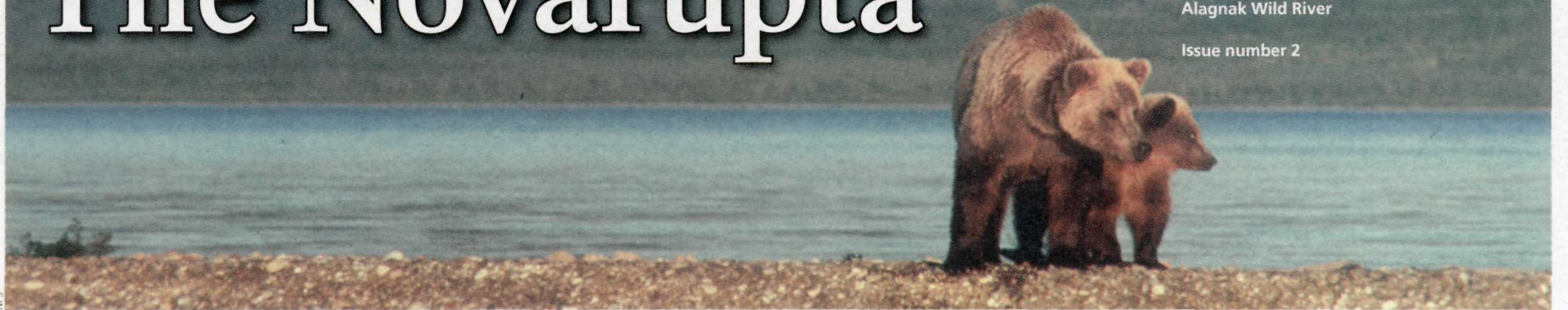




The Novarupta

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

Issue number 2



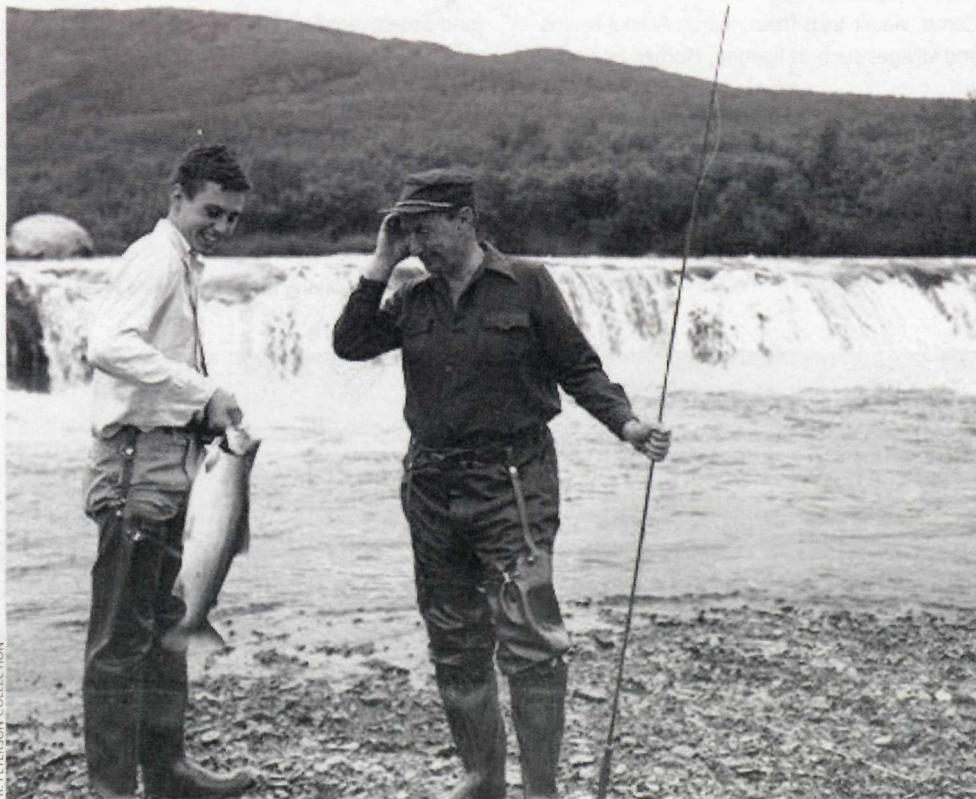
The Dynamic Alaska Peninsula

THE ALASKA PENINSULA IS A transition zone in many ways. Just west of Katmai National Park is the westernmost extent of the boreal forest in southern Alaska. In contrast, Brooks Camp (~25 miles east of King Salmon) is shrouded in mature stands of white spruce, birch, and cottonwood. Beyond the forest, arctic tundra extends south from its northern strongholds to dominate the peninsula along the Bering Sea coast. The Katmai region is a mixing ground between two herds of caribou whose annual migrations cover hundreds of miles per year.

During the past 250 years, Native Alaskans have felt the impacts from the invasion of Russian and American cultures and the upheaval brought by a cataclysmic volcanic eruption. The volcanoes of the Aleutian Range, like the dense Katmai Group, continue to erupt and alter the land every year. Even the seemingly ever-present brown bear is using the Brooks River in ever greater numbers.

In many ways we are just beginning to understand this land of transition. Long term monitoring studies on bears (p. 10), glaciers (p. 12), and watersheds (p. 12) plus baseline data studies on birds (p. 6), insect outbreaks (p. 13), salmon genetics (p. 14), and new archaeological studies (p.11) are just beginning to provide researchers and park managers with the information necessary to understand the complexities of this land.

Throughout this edition of the Novarupta, you can read about some of these efforts to care for and understand this land of transition. A visit to the wild lands and waters of Katmai, the Alagnak, or Aniakchak is an invitation to explore the resources and issues that make this land a unique, special, and dynamic place.



Top: Former Illinois Governor and U.N. Ambassador Adlai Stevenson (center) fishes Brooks Falls, July 1954.

Bottom: "Fishing" Brooks Falls, July 2008.

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 important parts of our heritage can be experienced by future generations. The Alaska Peninsula is home to many premier nationally protected areas. Enjoy them. Learn from them. Respect them and protect them. Above all, take time to experience these incredible places, and let them stir your soul.

Ralph Moore
Superintendent

What's Inside: Bear Viewing...3

Katmai's vast wilderness supports a high number of 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...5

The Alagnak River traverses the beautiful Alaska Peninsula, providing unparalleled opportunities to experience the unique wilderness, wildlife, and cultural heritage of Southwest Alaska.



Aniakchak...6

At six miles wide and 2,500 feet deep, Aniakchak Caldera is the result of the collapse of a 7,000-foot mountain during a massive eruption about 3,500 years ago. Aniakchak National Monument and Preserve boasts one of the finest examples of a dry caldera in the world.



Planning Your Trip...2, 4 (Backcountry)

Park Neighbors...7

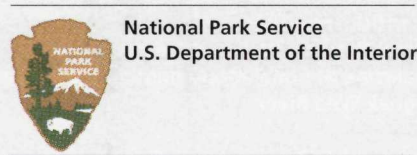
Brooks Camp...8-9 (Map)

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Valley of Ten Thousand Smokes...16

Getting Here, Getting Around:

Quick Tips for Visiting Three of the Most Remote National Park Units



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 lands encompass nearly five million acres of pristine wilderness and cultural landscape managed by the National Park Service.

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Katmai

National Park and Preserve
Most visitors 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, June 1–September 17. For reservations, contact Katmailand, Inc. at 1-800-544-0551 or www.katmailand.com.



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: Brown bear at Brooks Falls, Katmai National Park.

Center: Caribou, Aniakchak National Monument and Preserve.

Right: Camping along the Alagnak Wild River.



Alagnak

Wild River
Adjacent to Katmai's northwest boundary, air taxis 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.

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 park lands 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.

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

Fees and Reservations

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

Reservations and fees are required for camping in Brooks Campground and must be made by telephone or online prior to arrival at Brooks Camp (see pages 4 and 8 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 Fure's Cabin availability and reservations.

Bears

This is bear country! All park lands on the Alaska Peninsula contain substantial populations of brown bears. It is critical that visitors know how to behave around bears (consult pages 3–4 and 9 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, 8-9 for more info). Public food caches are available at Brooks Camp.

Camping

Within 1.5 miles (2.4 km) of Brooks Falls (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.

Sport Fishing

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 River 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 regulations and restrictions. Firearms are permitted in the Alagnak Wild River corridor and the Katmai and Aniakchak preserve areas.

Pets

Pets are not allowed within 1.5 miles (2.4 km) of Brooks Falls (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. Clear skies occur 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 Geographic Association (AGA) 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 AGA bookstore sells maps, charts, videos, posters, clothing and more. Contact KSVC at 907-246-4250.

Weather Information for King Salmon, Alaska			
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.

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 must 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. This ensures your own safety, the safety of 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 before 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.



Uninhibited access to wild food resources reinforces appropriate bear behavior.

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. Sport fishing 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 <i>(primary food)</i>	June	July	August	September
Brooks Camp <i>(salmon)</i>				
Hallo Bay <i>(vegetation, clams)</i>				
Geographic Harbor <i>(salmon)</i>				
Swikshak Lagoon <i>(vegetation)</i>				
Moraine Creek/ Funnel Creek <i>(salmon)</i>				
= 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.

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

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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 judgment. 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.

Backcountry Travel in and Around Katmai

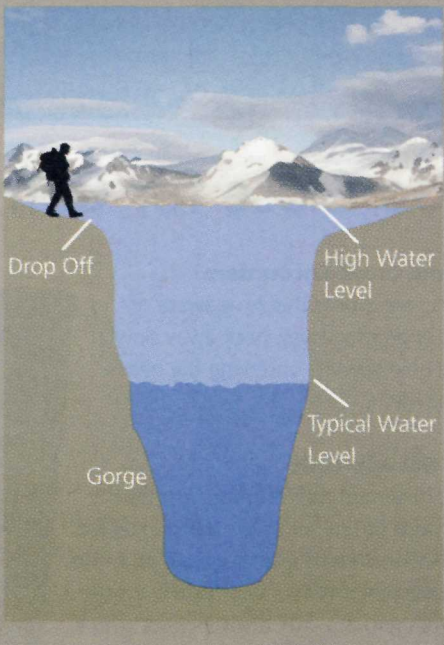


The Valley of Ten Thousand Smokes, Katmai National Park.

River Crossings in the Valley of Ten Thousand Smokes

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. 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 when runoff from glaciers is low.
- 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.



Logistics

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. In cases of emergency, Backcountry Planners give park rangers a point of reference to begin a search and rescue.

Camping

With the exception of Brooks Camp Campground, no camping is permitted within 1.5 miles (2.4 km) of Brooks Falls. Elsewhere, Katmai National Park and Preserve offers nearly unlimited camping opportunities (see *restrictions for Hallo Bay* below).

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.

Maps

Maps are available from AGA-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.

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

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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 April 1st through October 31st annually (for more information, see the Superintendent's Compendium on Katmai's website at: www.nps.gov/katmai/parkmgmt/).

Safety Concerns

Visitors to Aniakchak, the Alagnak, and Katmai's backcountry have access to millions of acres of 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 park lands 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

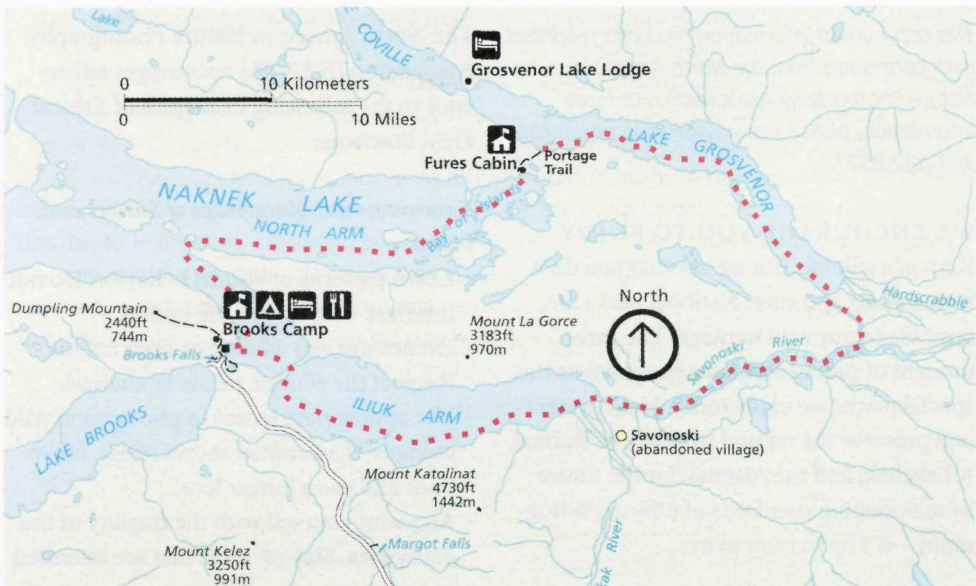
Brooks Camp is the point of departure for the Savonoski Loop, an 80 mile (129 km) backcountry canoe or kayak trip. Paddlers begin heading northwest, following the north arm of Naknek Lake to Bay of Islands. Near historic Fure's Cabin, a 1.5 mile (2.4 km) portage leads to Grosvenor Lake. Paddlers continue southeast down the lake then follow Grosvenor and Savonoski Rivers 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.

Bears are common along the Savonoski Loop. Paddlers should exercise the same Leave No Trace and bear etiquette skills as used else-

where, 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 feeding on salmon.

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.



The 80 mile (129 km) Savonoski Loop.

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 administered 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 protect the Alagnak Wild River and its unique ecosystem by practicing "Leave No Trace" ethics (*see page 4 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'llug*, 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.

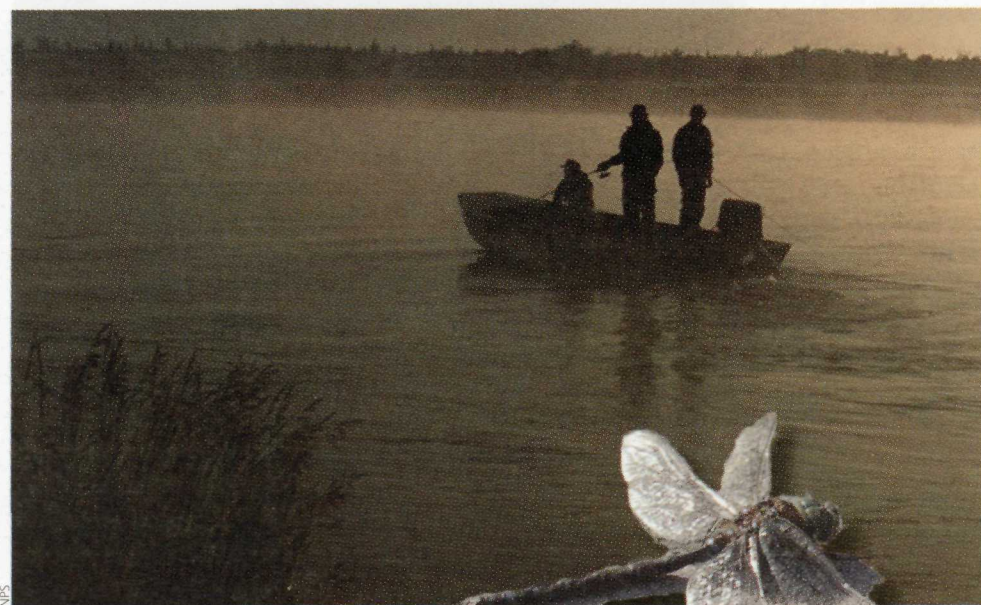
To learn more about the people who live and have lived along the Alagnak, ask for a free copy of the cultural history guide, or download it from the Alagnak website at: www.nps.gov/alag/historyculture/.

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'llug (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, sour dock, 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.

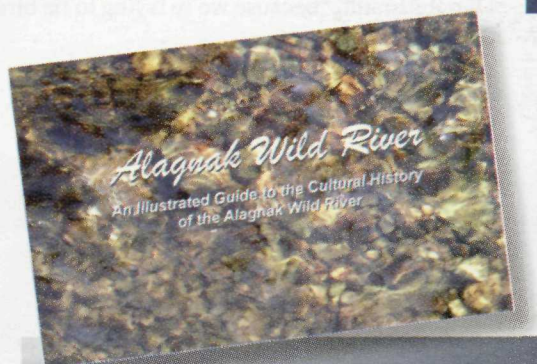
Sport Fishing

The Alagnak's 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 carefully monitors the populations to ensure that the present regulations maintain the long-term stability of the

Alagnak sport fishery. Visitors intending to fish must 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 overtaking 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.

Aniakchak National Monument and Preserve



NPS/M. FITZ

USGS Biologist Dan Ruthrauff surveying birds, Plenty Bear Creek Valley, Aniakchak National Monument.

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. At 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. Aniakchak is still volcanically active today—mineral springs that feed Surprise Lake are as warm as 70°F.

Recently, Aniakchak has become important for more than its volcanic past. A fossilized hadrosaur track, estimated to be 150 million years old, was documented several years ago and the possibility of locating more tracks and fossils remains high.



NPS/M. MILLER

Vent Mountain in the Aniakchak Caldera.

Discovering the Birds of Aniakchak

ON THE MORNING OF JUNE 4TH, 2008 I awoke to a landscape covered with snow. Although the snow was a surprise, it wasn't unusual for this part of the Alaska Peninsula. As a member of a six-person breeding bird survey of Aniakchak National Monument and Preserve, I found this place full of surprises and ripe for discovery.

The previous afternoon Dan Ruthrauff, a wildlife biologist with the US Geological Survey, and I had begun a transect of the spectacular glacially-carved valley at the head of Plenty Bear Creek. Our job: to conduct ten minute counts of birds every one-half kilometer along our route back to camp. Essentially, we stopped and attempted to record the number and behavior of every bird we saw or heard as well as the habitat they were using.

The cloud ceiling was low. Rain, which began with a drizzle, eventually turned into a steady shower. Up on the barren slopes, amongst the melting snowfield and boulder scree, we easily found birds—snow buntings

and semi-palmated plovers. Although it was no surprise to find snow buntings and semi-palmated plovers in this habitat, the remoteness of Aniakchak meant that even expected species had never been thoroughly documented here.

Located about 450 miles southwest of Anchorage and inaccessible by road, Aniakchak's landscape remains wild. No systematic survey of breeding birds within its borders had ever occurred before. Data on Aniakchak's birds was sparse and usually consisted of anecdotal individual observations at random points in time, like spotting a flock of shorebirds or ducks flying overhead.

Individual observations are important, but they leave many questions unanswered. What habitats are birds using across the landscape? At what densities and diversity do they occur in different habitats? Dan and I, along with two other teams of two, were trying to answer some of these questions. By recording specific types of data, like habitat and elevation, associated with our observations of birds and their behavior, our goal was to go beyond what was already known, to confirm what was suspected, and also to discover what the birds could tell us.

"What we're trying to do is collect data in such a way to extrapolate it to areas throughout the park and even beyond the park," says Dan Ruthrauff, "because we're trying to tie birds to certain habitats" *Continued on Page 16*



USGS/D. RUTHRAUFF

Michael Fitz recording bird survey data in the Meshik River valley, Aniakchak National Monument



NPS/M. MILLER

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

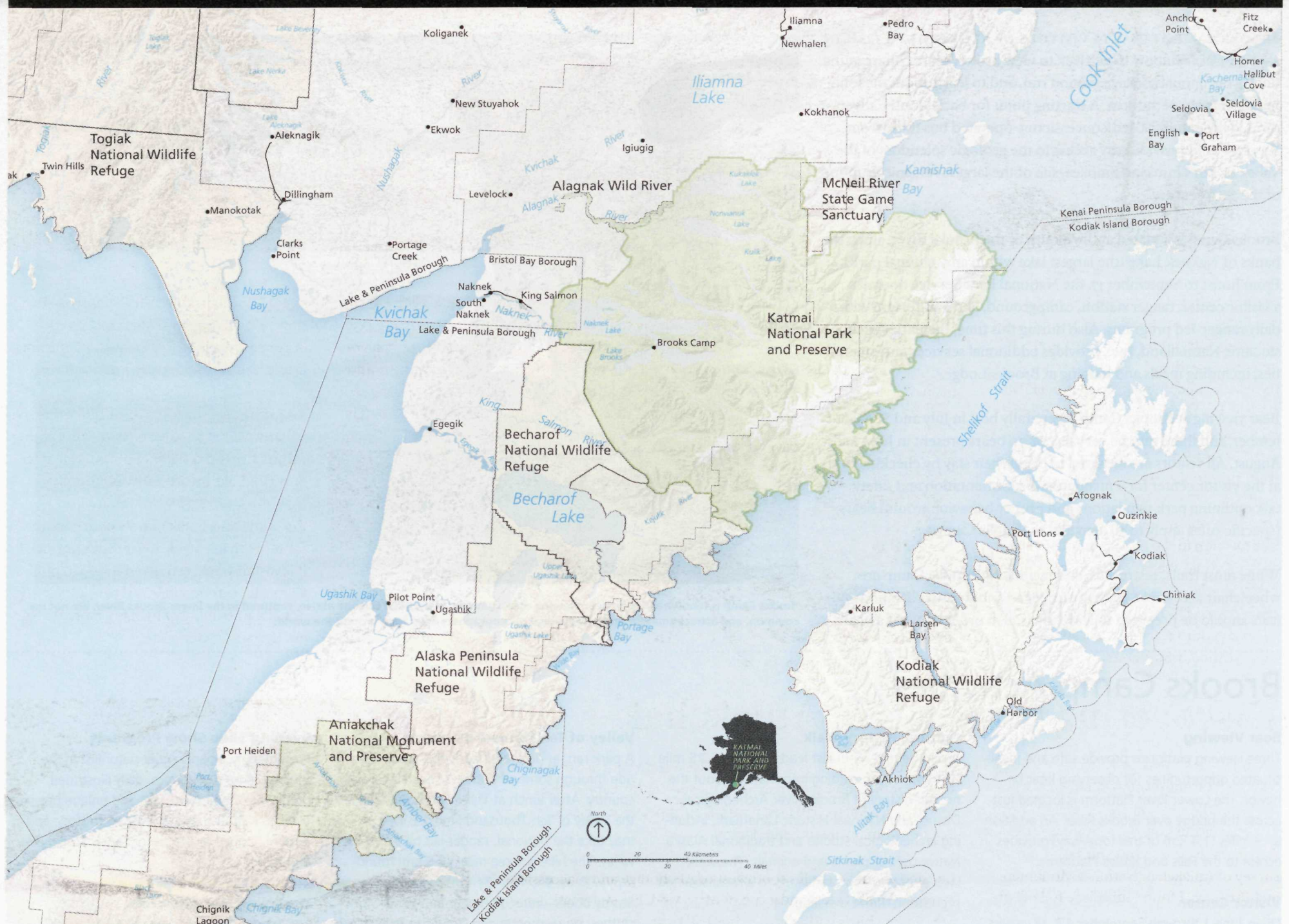
Through "The Gates" Rafting the Aniakchak Wild River

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) rafters arrive at 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, getting out. The river is dynamic; conditions 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: Northern Alaska Peninsula Map



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.

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.

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).

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
King Salmon, AK 99613
Phone: 907-246-3339
Fax: 907-246-6696
Web:
www.becharof.fws.gov
www.alaskapeninsula.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. 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.

For more information:

Alaska Department of Fish and Game
Wildlife Conservation
Attn: McNeil River State Game Sanctuary
333 Raspberry Road
Anchorage, AK 99518
Phone: 907-267-2182
Fax: 907-267-2433
Email: dfg.dwc.mcneil-info@alaska.gov
Web: www.wildlife.alaska.gov

Local 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, sport fishing and hunting, bear viewing, subsistence, recreation and tourism, and resource exploration are important economic activities that rely on the bounty of the Lake and Peninsula Borough's landscape.

For more information:

Lake and Peninsula Borough
P.O. Box 495
King Salmon, AK 99613
Phone: 907-246-3421 or 800-764-3421
Fax: 907-246-6602
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
Phone: 907-246-4224
Fax: 907-246-6633
Web: www.theborough.com

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. 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 20th century.

Brooks Camp is situated at the mouth of the Brooks River, along the banks of Naknek Lake (the largest lake within any national park). From June 1 to September 17, the National Park Service operates a visitor center, ranger station, campground, and auditorium with daily ranger-led programs. Also during this time, the park concessionaire, 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 all activities at Brooks Camp).

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 in the lower Brooks River, are not uncommon, and attract amateur and professional photographers alike from around the world.

Brooks Camp Activities

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.

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 History 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 leads 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, rain gear 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 in the Brooks Camp Auditorium, daily illustrated 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 over open fires is not permitted.

Cooking

All cooking and eating 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.

Electrified Fence

Brooks Camp Campground is enclosed within an electric fence to deter bears from entering. The fence is NOT bear proof, 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.



Campground Reservations

Brooks Camp Campground is open June 1–September 17. Reservations are required. Telephone and internet access are not available at Brooks Camp, so campground reservations must be made prior to your arrival. 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). During the month of July, campsites may be reserved for a maximum of seven nights, cumulatively. Campers arriving without a reservation, especially during July when the campground is usually full, must be prepared to backcountry camp.

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 minimum distance of 50 yards (46 meters) from any bear. In case of a close encounter, speak to the bear in a soft voice, wave your arms, and back away slowly.

Food and Gear Storage

All food, beverages (except water), fish, garbage, items used to cook or prepare food, any other odorous items, and all equipment must be properly stored. Eating and picnicking are allowed only in designated areas.

Firewood

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

Camping

Within 1.5 miles (2.4 km) of Brooks Falls (i.e., the Brooks Camp Developed Area), camping is allowed only in the Brooks Camp Campground (see page 8 for more info).

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. 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.

Accessibility

While most trails around Brooks Camp and the trail to Brooks Falls are wheelchair accessible,

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



“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.

they are unpaved and frequently muddy. Visitors should be prepared to leave the trail in order to avoid a bear.

Pets

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

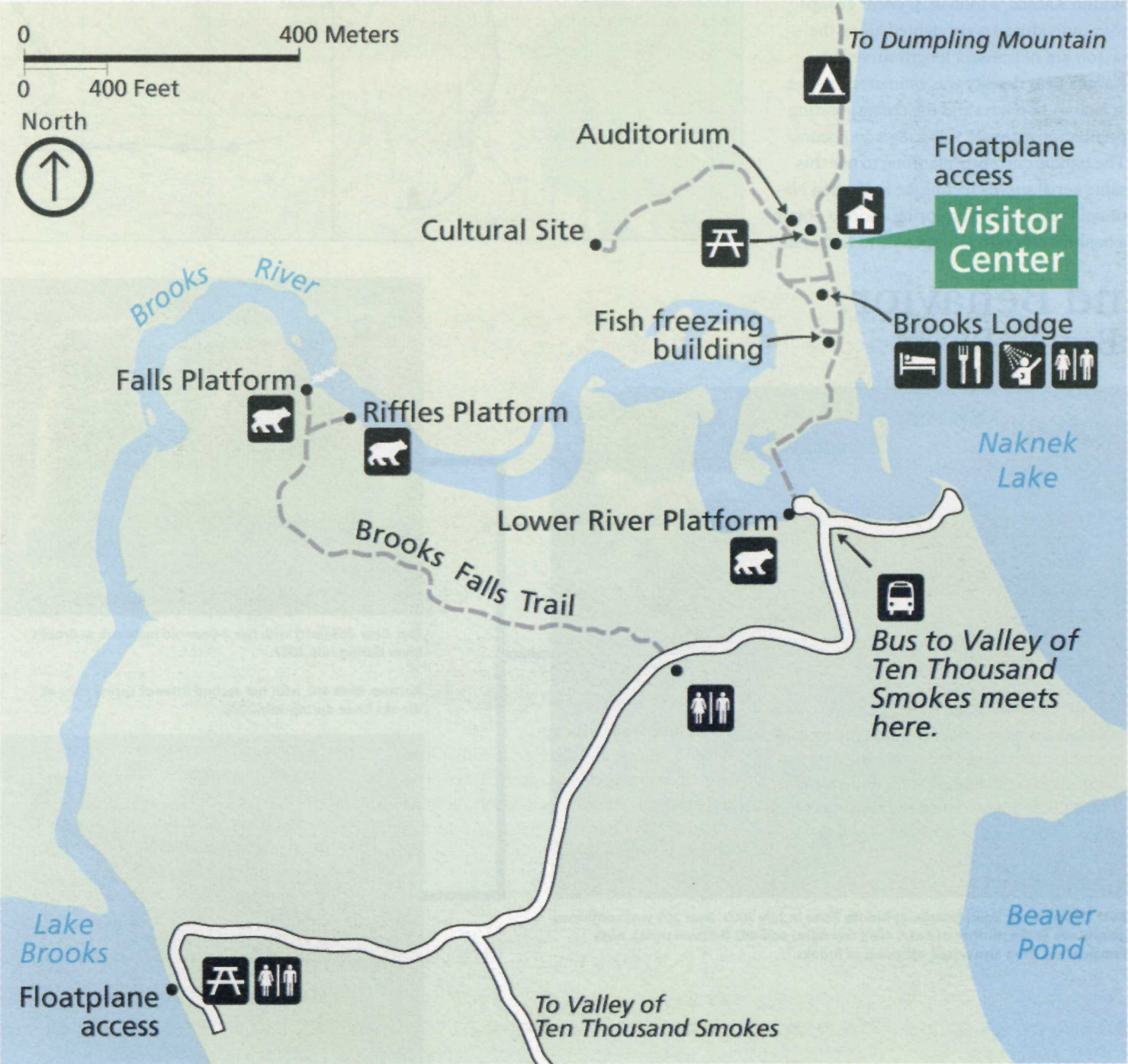
Preservation

The destruction or collection of any cultural artifacts or natural objects is prohibited.

Hunting and Firearms

Hunting and firearms are prohibited within Katmai National Park but may be permitted elsewhere (see page 2 for more info).

Brooks Camp Area Map

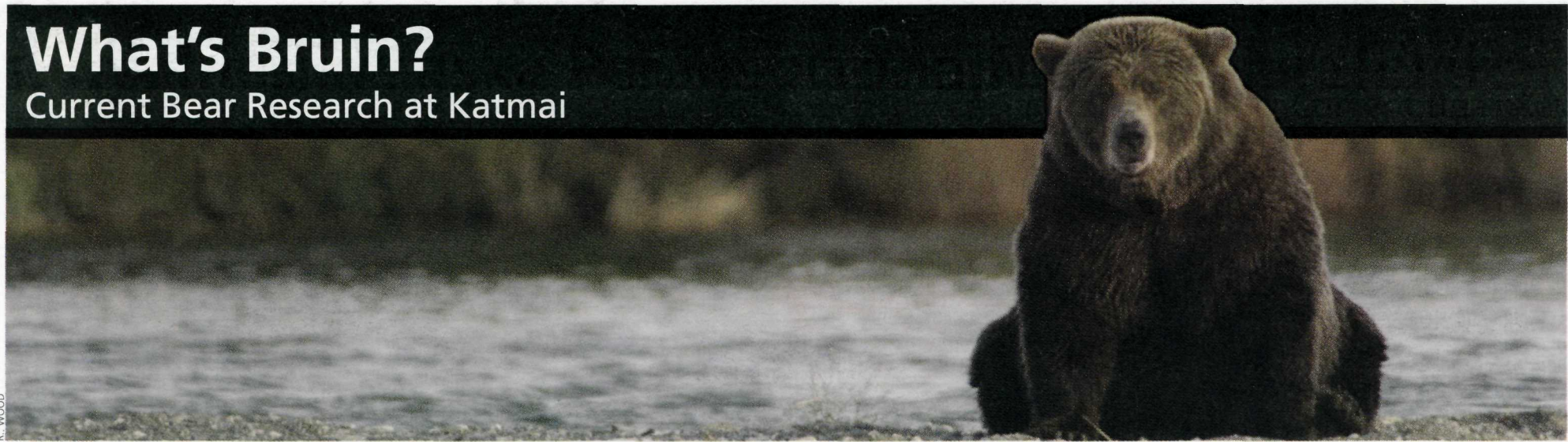


Below: Female bears with cubs are frequently seen from the Lower River Platform area in July and September.



What's Bruin?

Current Bear Research at Katmai



Bear 410, a regular along the Brooks River.

Monitoring Bears: Geographic Harbor

SPECTACULAR SCENERY AND A seasonal concentration of bears combine to make Geographic Harbor one of the most popular bear watching destinations in Katmai. In order to document bear use and activity patterns in this remote setting, biologists began a remote camera study in Geographic Harbor. In 2007-8, data documenting the number of bears, the patterns of bear use, and human visitation patterns were collected through the camera systems, and approximately 5300 photos were analyzed. Bear use patterns were significantly

different in 2008 compared to 2007. The park is planning on deploying the camera system in 2009 for additional data.

Without baseline data on bear habits and numbers, future park staff may not have the information necessary to properly manage changes in bear populations. Combined with the Brooks River bear monitoring program, the data from Geographic Harbor is one of the first steps Katmai National Park has taken to collect baseline data on bear activity and distribution on the landscape.

Brooks River Area

LONG-TERM OBSERVATIONAL monitoring of bear and human use of Brooks River will continue in 2009. More than 2,500 scheduled observation hours have been invested in collecting these data since 2001. Sampling included recording use of river zones by bears at the individual level. 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 the local bear population, especially during July. Approximately 70 different independent bears were identified regularly using Brooks River during July 2008, along with an additional 24 dependent offspring. During the fall, 52 independent bears were identified regularly using the river, along with 16 dependent offspring. Typically, another 5-10 transient bears have also been documented in each of the two monitoring periods annually.

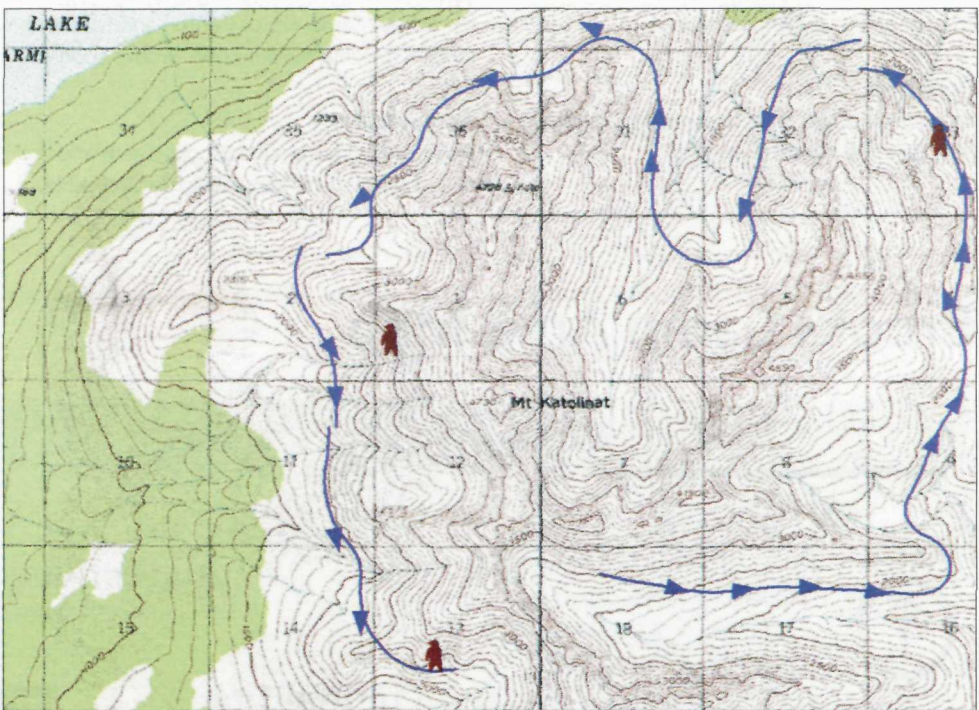
Estimating Katmai's Bear Population and Density

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, Katmai and Lake Clark resource staff worked cooperatively with ADF&G to use this technique to estimate bear density and population size in Alaska's Game Management Unit (GMU) 9C, which is largely comprised of Katmai National Park and Preserve.

Transects were flown along elevation contours in mountainous terrain. The transect

flight line was automatically recorded using a laptop recorder connected to a GPS receiver. For example, three bear sightings were recorded along the transect depicted in the map at right.

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 population estimate was $2,183 \pm 379$ bears. The park is currently planning to use this same aerial survey technique in Katmai National Preserve during spring 2009 to obtain a bear density estimate specific to that area.



Bear Genealogy and Behavior: DNA Assessment Along Brooks River

LONG-TERM OBSERVATIONAL monitoring efforts at Brooks River have produced over a decade's worth of detailed records on river use and behavior for more than 40 known and recognizable bears. However, kin relationships among these bears have been inferred only from field observations. Katmai resource staff has begun a project in cooperation with USGS Alaska Science Center scientists to determine the genetic population structure of bears at Brooks River and to infer relatedness and family structure among these bears based on molecular genetic data and field observations.

DNA was obtained from known bears by collecting hair samples left on small barbed wire snags and by collecting skin tissue samples via remote biopsy darts designed to fall to the ground after the dart extracts a sample. Collection of DNA samples from more than 80 individual bears was completed in 2007, and the analysis of samples is ongoing.



Bear 209, an older adult female, at Brooks River in July 2003. Bear 209 was confirmed genetically as the mother of Bears 403 (top right) and 402 (bottom right), both females that have also raised offspring at Brooks.



Top: Bear 403 (left) with her 2-year-old male cub at Brooks River during July 2007.

Bottom: Bear 402 with her second litter of spring cubs at Brooks River during July 2008.



Katmai's Continuing Human History



Abandoned Katmai Village, 1913.

Alagnak Site Added to National Register of Historic Places

In 2007, an archeological site on the Alagnak Wild River (known to researchers as DIL-161) was 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.

Over several field seasons, NPS archeologists identified both 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.

Chipped stone tools indicate that villagers hunted large mammals like caribou, as well as smaller animals. Despite the prominence of fishing 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 the evidence for fishing has not survived at this location—acidic forest soils destroy animal bone rapidly—or the site was occupied at a time of year when people were not fishing.

Many questions remain unanswered about the people who lived along this part of the river. Indeed, the prehistory of the Alagnak is still largely unknown to archeologists. DIL-161, however, offers exciting details about house construction, subsistence, and village organization.



A rare pigmented ceramic vessel from DIL-161.

Resource Compliance: Brooks Camp Area

Brooks Camp cultural resources compliance focuses on projects related to maintaining aging infrastructure and implementing the 1997 Brooks River Development Concept Plan. Current projects include investigations of proposed new employee housing near Brooks Lake, up-grading and replacing utility systems and designing an elevated Brooks River bridge. Resources involved in these projects include the cultural landscape encompassing the mouth of Brooks River and archeological sites under the road to Brooks Lake. Compliance for Brooks River archeological sites will focus on preventing new ground disturbance within archeological sites and designing projects to avoid archeological resources instead of mitigating disturbance. Consultation with culturally affiliated people will be a major component of compliance operations.

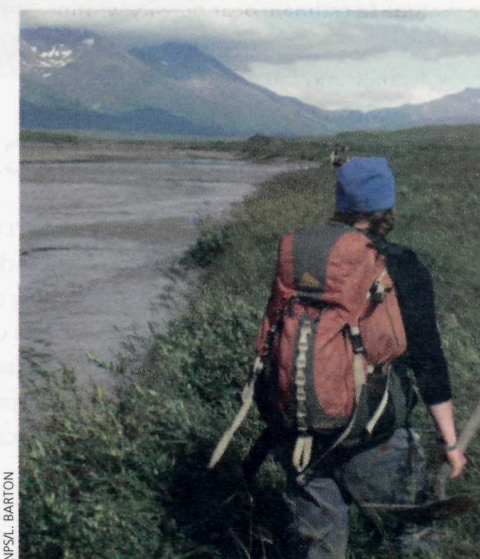
Interior Archeological Survey Concludes

From 2004 through 2007 a small team of archeologists working in Katmai National Park and Preserve's interior found 51 previously unknown archeological sites. Prior to this survey, knowledge of the prehistory of Katmai's interior was mostly limited to Brooks River, the upper Naknek River drainage and the Alagnak River. Focusing on areas accessible to important resources such as red salmon and in the past caribou, the archeologists found sites ranging from scatters of stone tool manufacturing debris to sizeable villages.

Frequent discoveries of scatters of stone tools and flakes in mountain valleys and on the shores of alpine lakes suggest temporary big game hunting camps. Discoveries include a line of upright stone markers perhaps used by hunters to drive caribou toward an alpine lake for ambush and capture. Seal bone found in a prehistoric camp on Iliuk Arm suggests that people in Katmai's interior maintained connections to the coast. Discoveries of isolated high quality stone tools and cores on remote glacial moraines reveal the extent to which prehistoric people understood the distribution of rare resources throughout the region, and attest to the importance of such knowledge to survival in

a difficult landscape.

The results of this survey help to illustrate a prehistoric land use pattern that placed permanent settlements on lakes and streams to exploit annual red salmon runs, and seasonal camps in upland areas for hunting large game. Still, vast portions of Katmai remain unstudied, providing ample opportunity for archeologists to add detail to our understanding of the past.



Archeologist Sarah Kessick surveys the south bank of Angle Creek.

Aniakchak Archeology: Excavation at South Aniakchak Bay Village

The NPS System wide Archeological Inventory survey of Aniakchak National Monument and Preserve (1997–2000) identified the South Aniakchak Bay Village (SUT-027) on the Pacific coast of the Alaska Peninsula. During the summers of 2005 and 2007, Brian Hoffman of Hamline University excavated the site with the aid of students, volunteers, Park staff, and local residents from Chignik. The excavations were necessary to recover the full range of archeological information actively threatened by coastal erosion.

At this site, animal bone, and tools made from animal bone are exceptionally well preserved. This is because prehistoric garbage dumps (called "middens") with lots of shell are conducive to good bone preservation.

Coastal sites like the South Aniakchak Bay Village can therefore reveal a history of food preferences, hunting strategies, and trade, typically unavailable from other parts of southwest Alaska. Additionally, preserved wood planks from an eroding house floor beneath the shell midden further highlight the site's uncommon potential for yielding valuable information.

Though people probably lived on the Aniakchak Coast prior to the catastrophic eruption that created the Aniakchak crater roughly 3,600 years ago, evidence for them is buried under a thick blanket of volcanic sediment. Afterwards, people re-occupied the coast in three distinct waves.

(Continued on Page 16)



An ivory maskette from the South Aniakchak Bay Village (SUT-027). The mask is broken below the nose. This piece may be unique among north Pacific archaeological discoveries.

Changing Perspectives: Southwest Alaska Network



Unnamed, ash-covered glaciers scour the southeast flank of Mount Katmai, 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 inventory existing natural resources and monitor their current and future condition. 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.

SWAN has completed biological inventories for amphibians, birds, freshwater fish, invertebrates, mammals and vascular plants. The results of these inventories are summarized in reports that are available at: science.nature.nps.gov/im/units/swan/index.cfm?theme=inventory_species.

Efforts are now focused on developing Standard Operating Procedures (SOPs) to moni-

tor a suite of vital signs in six project areas: freshwater systems, landscape dynamics and terrestrial vegetation, terrestrial animals, marine nearshore, climate and weather, and human activities. The monitoring projects presented in the following pages describe some of the work that is ongoing in Katmai National Park and Preserve.

Knife Creek Glaciers: Yesterday and Today

Right: Looking upstream near head of Knife Creek. August 8th, 1954.

Far Right: The northern Knife Creek Glaciers, seen from cutbank of North Fork Knife Creek. Fluvial processes have removed the cutbank visible on the left side of the 1954 photo. The glacier at left has retreated slightly, the glacier at right is near the same position. August 4th, 2004.



NPS/G. SCHALLER



GERALD V. FROST

Monitoring Glaciers

GLACIERS 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 (~150 years ago). Although historically ice loss occurred at varying rates, current 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; indeed, much of the freshwater systems in SWAN 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 affecting 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 was used to map glacial extent on a decadal scale in SWAN parks between 1980 and 2000. Icefields and glaciers were outlined using a combination of automated and manual methods. Geographic information system (GIS) analyses were used to quantify changes in glacial extent and identify key areas of change.

Glacial extent mapping was completed for Katmai National Park and Preserve and Kenai Fjords National Park by the NASA Goddard Space Flight Center under the direction of Dr. Dorothy Hall. While decreases in glacial extent were observed in both parks, the decrease was smaller in Katmai (1.6%) than in Kenai Fjords (7.7%) over the period of 1986 - 2000. A repeat photography project conducted in 2004-05 documents many landscape changes in SWAN park units over last 50 to 100 years, including changes in glacial extent. Glacial extent mapping is currently underway for Lake Clark National Park and Preserve.

Watershed Wellness: Hydrology and Stream Chemistry

RESEARCHERS HAVE NOTED THAT CLIMATE WARMING IS decreasing glacial coverage and shortening the duration of ice cover on lakes. These processes may be altering the timing and magnitude of peak river discharge and lake levels, which affect water quality and the availability and quality of habitats for fish and other aquatic organisms. Surface hydrology and water quality are key aquatic vital signs to understand the biophysical characteristics and biogeochemical processes of Network watersheds.

Our primary focus is to document baseline water quality conditions and estimate natural variability in these pristine watersheds. SWAN has developed a prioritized tier system to monitor these vast aquatic resources. Tier 1 (high priority) aquatic resources receive the heaviest use and management concerns.

In Katmai, the Naknek Lake is a tier 1 aquatic resource. The lake outflow is currently instrumented with a level logger to monitor lake levels and discharge during the open water season. This will enable SWAN aquatic ecologists to estimate the variability in peak runoff

and seasonal lake levels. Water quality will be monitored by sampling points throughout the five basins that comprise the Naknek Lake system. Preliminary sampling indicates remarkable stability in water quality values to a depth of 50 m.

In addition two vertical temperature arrays were deployed in separate basins at depths of 100 ft and 300 ft. These temperature arrays will monitor thermocline development and long-term water temperature changes, processes that directly influence lake productivity. Vertical temperature data from Lake Clark have already revealed how seasonal air temperatures greatly affect lake temperatures from year to year.



SWAN aquatic ecologist Jeff Shearer deploys a temperature array in Naknek Lake.

NPS/C. MOORE

Southwest Alaska Network continued...

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 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. Variation in climate may affect the population dynamics of these insects and forest pathogens, potentially altering future forest structure and composition.

The current spruce bark beetle outbreak (1989-present) has killed approximately 172,500 acres of trees on the Alaska Peninsula. Katmai is currently experiencing one of the most severe infestations observed in the state. Approximately 70,000 acres are currently under attack at the west end of Naknek Lake and Lake Brooks, and to the north, around Lakes Coville and Grosvenor. Beetle activity is estimated to have increased by 300% or more over the last two years.

What is the history of previous spruce bark beetle outbreaks on the Alaska Peninsula? Are the outbreaks localized or synchronized across the landscape? Is there a relationship between climate and insect disturbance? These are a few of the questions that SWAN and research ecologists hope to answer in the next few years.

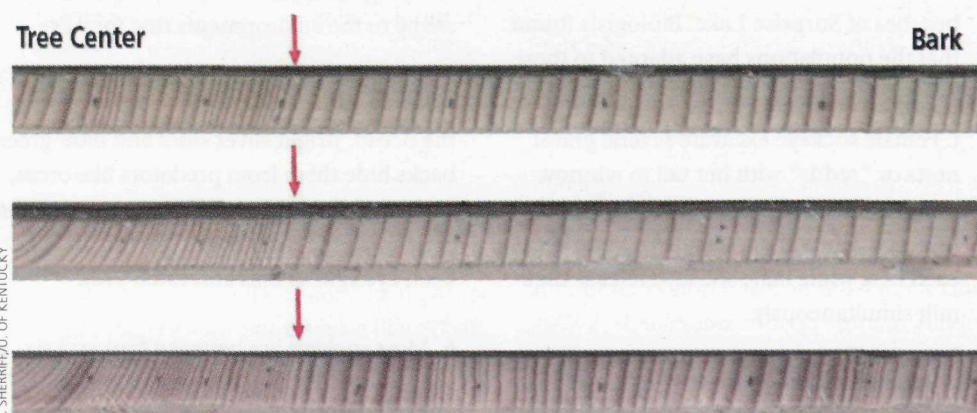
Tree-ring data are being used to reconstruct

spruce bark beetle outbreaks in Katmai and Lake Clark National Parks and Preserves over the past 200-300 years. Past bark beetle outbreaks are detected by identifying growth pulses (as evidenced by an increase in tree-ring width) caused by beetle-related thinning of the forest. This method assumes that spruce bark beetles kill large trees, leaving behind smaller pole-sized trees. When these smaller trees are "released" from competition, they grow rapidly for decades until the canopy closes again and competition for light slows their growth.

In July 2007, over 500 tree cores were collected from four sites within the Naknek Lake watershed in Katmai: one site each at Lake Brooks and along the Valley of Ten Thousand Smokes Road, and two sites in the Bay of Islands. Additional cores were collected from the Coville Lake region and Dumpling Mountain to reconstruct climate chronologies for the area.

Understanding the significance of growth releases recorded in the tree-ring chronologies for Katmai in the early 1900s is complicated by the 1912 eruption of Novarupta. A visual inspection of the tree-ring data show that growth release periods occurred at five sites in the 1910s. Most sites show a major release around 1915, which is likely related to the 1912 eruption. However, some sites show a release period initiating around 1908, suggesting that a spruce bark beetle outbreak may have been underway prior to the eruption.

The oldest trees measured were greater than 300 years old and found along the Valley of Ten Thousand Smokes Road. These trees



Spruce beetle outbreaks produce tree-thinning events that promote growth in small diameter trees. These examples from Lake Clark National Park show a release observed on tree-ring cores. The red arrows show a release in the 1910s that marks a period of enhanced growth.



Foraging by woodpeckers reveals the extent of beetle infestation in the spruce trees of Katmai.

recorded major growth releases in the 1810s and 1870s. Additional releases were identified at most sites in the 1970s-80s. These four time periods (1810s, 1870s, 1910s and 1970s-80s) are also documented as regional spruce beetle outbreaks on the Kenai Peninsula and in Lake Clark. This synchrony in releases across the Alaska and Kenai Peninsulas suggests a long history of regional spruce bark beetle outbreaks throughout south-central Alaska.

Climate reconstructions derived from the high elevation sites show a distinct growth release starting in the 1990s that is consistent with increased warming in the region. These high elevation trees are less susceptible to bark beetle outbreaks because they are slow growing and often stunted, unlike the larger diameter trees that beetles generally prefer. However, researchers suspect that climate may play a role in beetle outbreaks. Preliminary beetle-climate analyses suggest that warm winter and dry late summer conditions occurred during the decades in which

regional bark beetle outbreaks started. Dry years are known to produce stress in white spruce, which greatly increases the probability of successful bark beetle attack and reproduction.

The results of this study will help to define the range of natural variability in insect outbreaks. Sites that show little evidence of past beetle disturbance may provide information about the conditions that inhibit outbreaks, whereas sites that have already been infested may provide clues about the susceptibility of unimpacted stands. In addition, this work will provide insight into how future environmental changes may influence forest productivity, providing baseline information on current forest conditions that can help us monitor forest trends into the future.

Amy Miller
Southwest Alaska Network

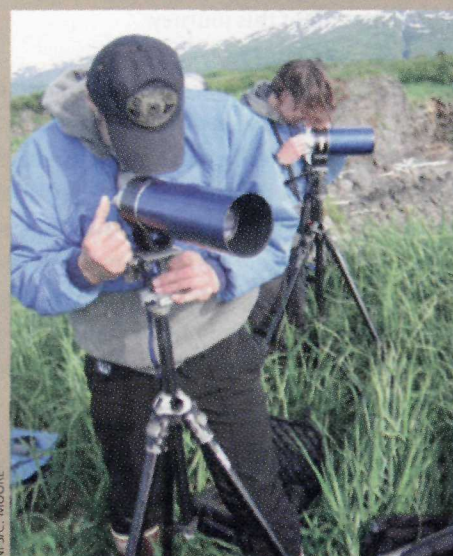
The Katmai Coast: Sea Otter Monitoring

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 nursery grounds 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. This ecosystem is highly sensitive

to environmental disturbance. Long-term monitoring will enable biologists to estimate the natural range of variability and identify changes that may adversely affect this critical ecosystem.

Sea otters play a critical role in the structure of the nearshore ecosystem. As a large consumer of invertebrates, their presence maintains a balance between invertebrate populations and the kelps upon which the herbivorous invertebrates feed. Concerns over a decline of the southwestern Alaskan stock of sea otters, which includes otters along Katmai's coast, led to a federal listing of 'threatened' in 2005. A population esti-

mate of ~7,000 otters was calculated from an aerial survey of the KATM coast flown in July 2008. Biologists are also monitoring sea otter diet through direct observations of sea otters foraging using high powered spotting scopes. Results suggest that sea otters differ in their food preference in Katmai, where clams were the preferred food choice, and Kenai where mussels made up the largest portion of their diet. Biologists also estimate sea otter density, distribution and age at death; this information will be used to model sea otter populations and monitor their recovery success.



USGS and SWAN marine biologists record sea otter foraging behavior on Katmai coast.

Studies in Salmon



Sockeye salmon migration.

National Park Service researchers are working to develop a better understanding of anadromous (oceangoing) 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.



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



Surprise Lake from Aniakchak Caldera rim.

Sockeye Colonization and Diversity

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.

Unlike many sockeye populations, Albert Johnson Creek sockeye are not associated with a lake and the juveniles rear in the creek for one year before heading to the ocean. Genetic analysis was performed to determine if Albert Johnson Creek was the source population for the colonization of Surprise Lake, as other river-type sockeye populations are thought to be impor-

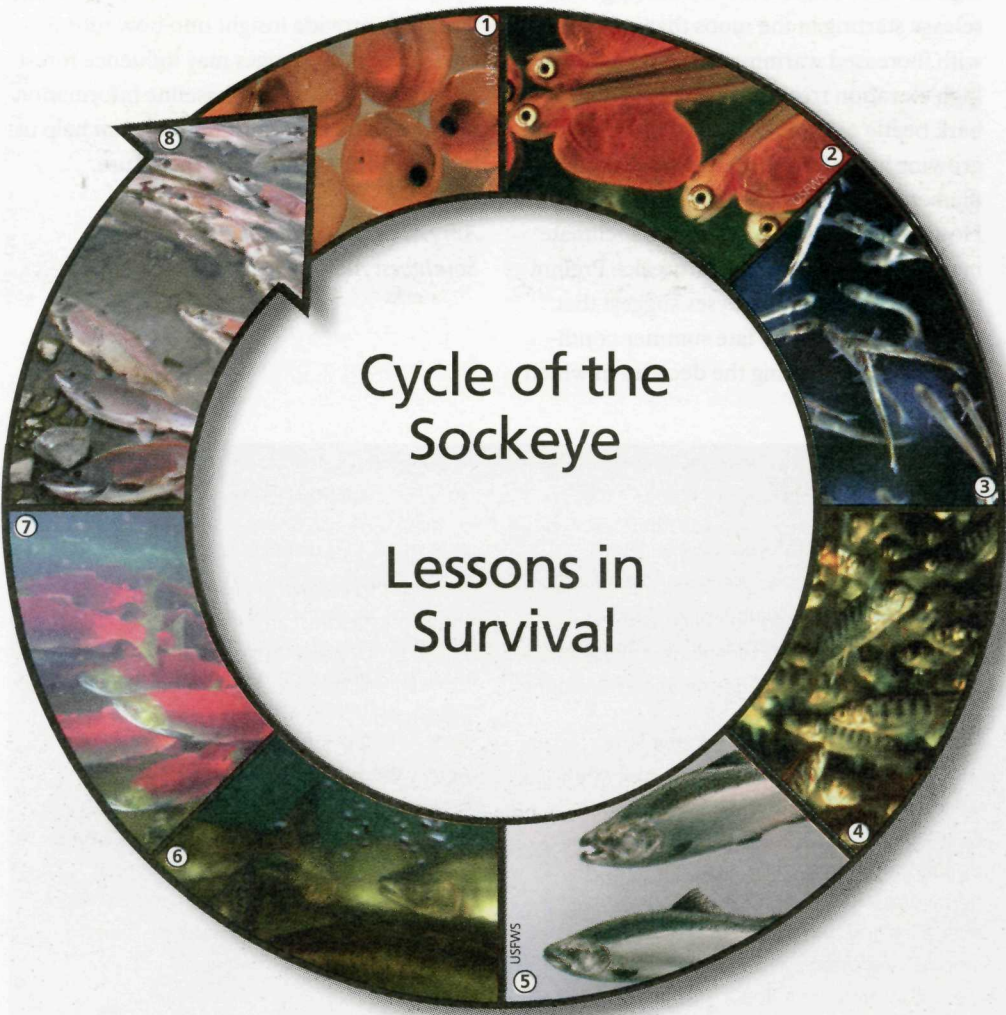
tant colonization sources. Results to date indicate that Albert Johnson Creek sockeye were not the group that colonized Surprise Lake. Instead, Black Lake of the Chignik system was a more likely colonizing source.

Further studies were conducted on the two populations within Surprise Lake. Colonization happened after the eruption that occurred 500 years ago and the populations persisted through the smaller eruption that occurred in 1931. There are two distinct spawning habitats in Surprise Lake; the outlet of the lake in Aniakchak River, and the beaches of Surprise Lake. Biologists found that the populations have adapted to these

spawning habitats in both their body depth and egg size.

Sockeye Juvenile Diversity

One reason that the Naknek Lake system produces so many returning sockeye is the pristine, large lakes. Sockeye feed in these lakes for 1-2 years before going to the ocean. However, there are also sockeye that do not feed in lakes at all, but rather rivers. Katmai National Park as well as Aniakchak National Monument and Preserve host several of these “riverine” populations. Biologists are studying the relationship of juvenile body shape to the environments that they live.



1. Female sockeye excavate several gravel nests or “redds” with her tail to winnow away sand and silt which would smother her eggs. She will deposit up to 1,000 eggs in each nest while male sockeye release their milt simultaneously.

2. After incubating “alevins” hatch in mid-winter but remain in the nest feeding on the yolk sac still attached to their bodies. They may even migrate deeper into the stream gravel for protection during this vulnerable period.

3. Young sockeye salmon emerge from the gravel as “fry” between April and June and swim to lakes where they live for about two years feeding primarily on zooplankton. Vertical stripes called parr marks help to camouflage them from predators.

4. As “smolt,” salmon imprint on their natal streams and lakes while migrating to sea, undergoing many physiological changes in transition to a saltwater existence. The salmon are preparing to enter a totally new environment, whose conditions they cannot know until they get there. Substantial changes to the kidneys and gills are required for the fish to migrate to sea.

5. Sockeye salmon will spend 2–3 years in

the ocean. Bright silver sides and blue-green backs hide them from predators like orcas, seals, and sharks. In offshore waters, salmon are among the most abundant fish and use keen eyesight to find and catch prey.

6. Most sockeye are between four and six years old when they return to the river drainages where they were born. Sockeyes may travel 60 kilometers or more each day during their long oceanic migration. Water temperature, ocean currents, day length, the earth’s magnetic field, genetics, and other factors may all determine the precise timing and pattern of this journey.

7. Upon returning to freshwater, salmon stop eating and weaken. 95-99% of spawning salmon return to the same lakes, rivers, and streams where they were born. They smell their way upstream following the odors of the water they reared in. Red pigment from sockeye salmon flesh is transferred to the skin and eggs. Their bones soften and sockeyes develop a distinctive humped back and elongated jaw.

8. Sockeye spawn in their natal gravel beds across the Alaska Peninsula during late summer and fall. They die shortly thereafter, and nutrients from their decaying bodies drive the cycle once again.

The Weed War

Biological Pollution in Alaska's National Parks

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.

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 human 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 (*highlighted in the section below*).

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 establish-

ment 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.

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 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.

Katmai's Most Wanted

Oxeye Daisy
(*Leucanthemum vulgare*)



Oxeye daisy is rapidly spreading in many parts of Alaska and a small population was found along Lake Camp Road just outside Katmai's western boundary. 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.

Oxeye daisy is a perennial plant that flowers in the second year and can spread both vegetatively and by seed. A single plant normally produces between 1300 to 4000 seeds which remain viable for more than 20 years.

Common Dandelion
(*Taraxacum officinale* ssp. *officinale* and ssp. *vulgare*)



Common dandelion, 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.

One native subspecies (ssp. *ceratophorum*) is found in the state. However, the exotic subspecies lack horns on the involucre bracts and have substantially larger heads than all native subspecies and species of Alaskan dandelions.

The other native *Taraxacum* species in Alaska, but are found primarily in undisturbed herbaceous meadows, especially in the alpine zone.

Common Plantain
(*Plantago major*)



Common plantain is now naturalized throughout the United States, but is just beginning to establish itself in the Katmai region, especially Brooks Camp. While not a noxious weed, common plantain harbors great potential to spread quickly. It has been said that plantain follows the feet of people as it prefers disturbed areas along roadsides, foot trails, and lawns.

Common plantain can be pulled with relative ease, although several weedings may be necessary to eliminate plants germinating from buried seeds and root fragments.

Six other *Plantago* species are known in Alaska, 4 of which are native. Common plantain can be distinguished from these species by the presence of broad, nearly hairless leaves and more than 6 seeds per capsule.

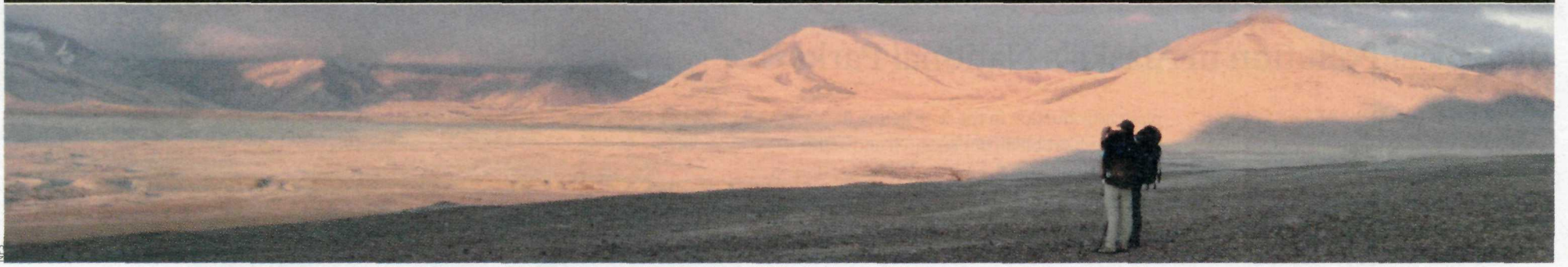
Narrowleaf Hawksbeard
(*Crepis tectorum*)



Narrowleaf hawksbeard is considered highly invasive and has been observed spreading throughout Alaska at an alarming rate. A very small population of this 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 hawksbeard 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 seedbank is exhausted.

The two native *Crepis* species in Alaska can be distinguished from the exotics by their smaller stature, often growing less than 1 foot high. Each narrowleaf hawksbeard plant is capable of producing over 49,000 seeds.

Novarupta and the Valley of Ten Thousand Smokes



Hikers often find challenge, adventure, unique geology, and surreal beauty in the Valley.

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.

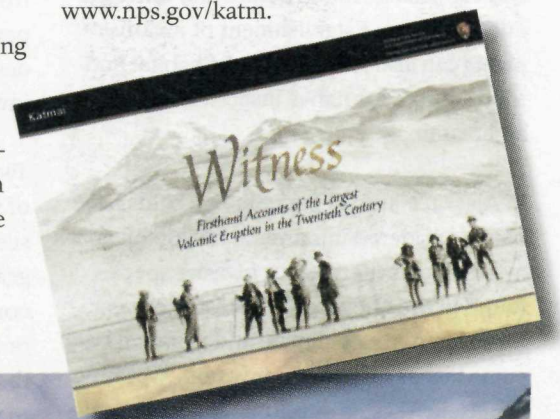
Convinced they had found a spectacle greater than the geysers of Yellowstone, Dr. Griggs and his team lobbied President Woodrow Wilson to preserve the area, and in 1918 Katmai National Monument was created. After several boundary adjustments, Katmai is now a 4.7 million acre national park and preserve, 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.

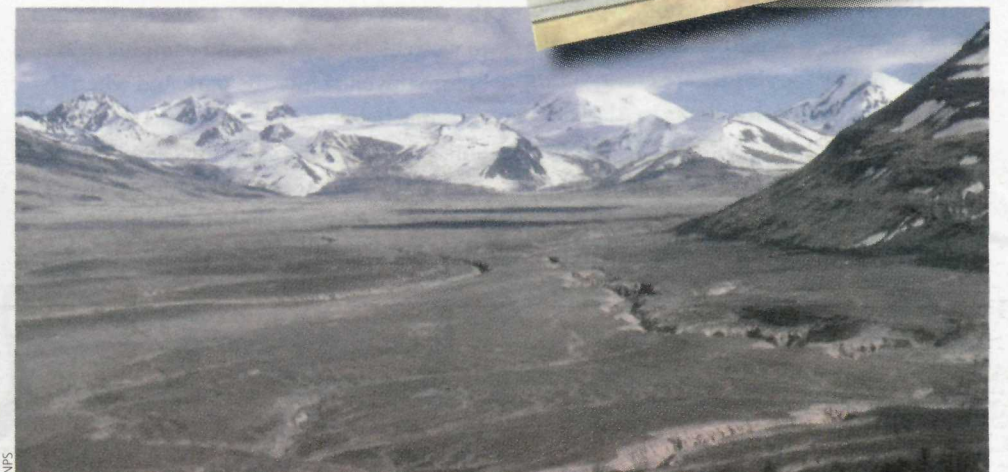
While the many fumaroles Griggs encountered no longer “smoke,” the Valley of Ten Thousand Smokes is still an amazing place to confront the awesome forces changing our Earth. Today, visitors can experience the valley’s power by traveling the 23-mile

road from Brooks Camp to the Three Forks overlook cabin on a daily bus tour (see page 8 for more info).

To learn more about the eruption’s human stories, get a free copy of *Witness*. Download it—click on “History & Culture” from the Katmai website homepage at: www.nps.gov/katm.



Robert F. Griggs on the discovery of the Valley in 1916 remarked, “The sight...was one of the most amazing vision ever beheld by mortal eye. The whole valley as far as the eye could reach was full of hundreds, no thousands—literally tens of thousands—of smokes curling up from its fissured floor.”



This view greets visitors at the end of the Valley of Ten Thousand Smokes Bus Tour.

Aniakchak Bird Survey

(Continued from Page 6)

and these habitats go beyond the park. Our scientific method allows us to have a greater frame of inference. We have stronger ability to talk about what’s going on within the park and outside the park because of our systematic approach.”

In early June, willows and alders had yet to break bud for the summer allowing for greater visibility to spot birds in thick brush. The breeding season was just heating up. Birds were very conspicuous with their song and flight displays. We attempted to cover the park’s major habitats—lowland marshes, tundra, barren ridges, shrub thickets, and meadows—as well as unique or isolated pockets of habitat like small groves of cottonwood trees which may harbor previously undetected or rare species. In total, 68 bird species were detected, including seven not previously recorded in Aniakchak: downy woodpecker, gadwall, golden eagle, hoary redpoll, horned lark, merlin, and a nesting marbled godwit—the first ever observation of an active nest for this subspecies of marbled godwit.

After that snowy night along Plenty Bear Creek, Dan and I found snow buntings flying in small loose flocks around our camp. The stormy weather during the night pushed



A male Snow Bunting in the talus of Jaw Mountain.

them down the valley and away from the rocky slopes where we had previously seen them. This wasn’t abnormal, but the observation meant that we were recording more than just numbers.

Dan and I, along with the other team members, were also recording and discovering what are in essence the patterns of bird use and dynamics across the landscape. This data will allow future researchers to expand upon what we recorded and discover significant changes that might have otherwise gone unnoticed. Given the isolation, remoteness, wildness, and dynamics of Aniakchak’s landscape, there is still much more to discover.

Michael Fitz

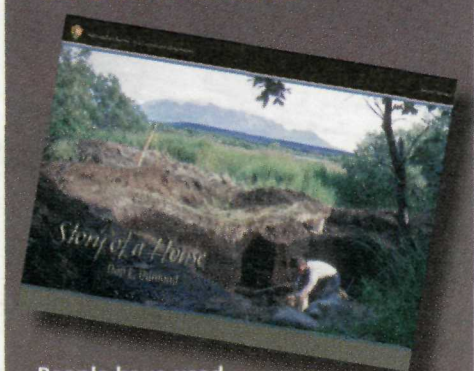
Aniakchak Archeology

(Continued from page 11)

About 1,700 years ago people and artifacts belonging to the Norton tradition arrived, perhaps coming from northwest Alaska. Here this expansion is documented by the early appearance of pottery and provides the most complete archaeological example of a Norton cultural incursion on the coast of the central Alaska Peninsula. Roughly 200 years later, another small settlement appeared at the site. Though the remains of this later settlement bear some similarity to those of surrounding and preceding peoples, they have a distinct local character.

Lastly, a large, multi-room house, similar in size and shape to those found on Kodiak Island and on the Upper Peninsula, was found immediately below the surface. Along with others found along the Aniakchak Coast, this “Koniag” style house may represent an outward expansion of Alutiiq people and culture around 300 years ago, concurrent with the rise of territoriality, political power, and conflict on Kodiak Island. Further analysis will evaluate these findings in light of related patterns of migration, trade, and socio-political expansion, placing the history of human occupation along the Aniakchak coast in its wider regional context.

New Cultural History Book Available



People have used the rich resources available in the Brooks River area for nearly 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.

In *Story of a House*, archaeologist Don Dumond illustrates this rich history by recounting the discovery, excavation, and reconstruction of a prehistoric home site along Brooks River. To follow this narrative that connects the past with the present, download *Story of a House* from the “History and Culture” page on Katmai’s website, www.nps.gov/katm.