

STATE
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PARKS®

July 2009

LAKE CLARK NATIONAL PARK AND PRESERVE

A Resource Assessment



National Parks Conservation Association®
Protecting Our National Parks for Future Generations®

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Center for State of the Parks®

More than a century ago, Congress established Yellowstone as the world's first national park. That single act was the beginning of a remarkable and ongoing effort to protect this nation's natural, historical, and cultural heritage.

Today, Americans are learning that national park designation alone cannot provide full resource protection. Many parks are compromised by development of adjacent lands, air and water pollution, invasive plants and animals, and rapid increases in motorized recreation. Park officials often lack adequate information on the status of and trends in conditions of critical resources.

The National Parks Conservation Association initiated the State of the Parks program in 2000 to assess the condition of natural and cultural resources in the parks, and determine how well equipped the National Park Service is to protect the parks—its stewardship capacity. The goal is to provide information that will help policymakers, the public, and the National Park Service improve conditions in national parks, celebrate successes as models for other parks, and ensure a lasting legacy for future generations.

For more information about the methodology and research used in preparing this report and to learn more about the Center for State of the Parks, visit www.npca.org/stateoftheparks or contact: NPCA, Center for State of the Parks, P.O. Box 737, Fort Collins, CO 80522; phone: 970.493.2545; email: stateoftheparks@npca.org.

Since 1919, the National Parks Conservation Association has been the leading voice of the American people in protecting and enhancing our National Park System. NPCA, its members, and partners work together to protect the park system and preserve our nation's natural, historical, and cultural heritage for generations to come.

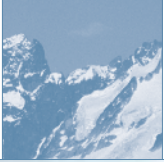
- * More than 325,000 members
- * Twenty-four regional and field offices
- * More than 120,000 activists

A special note of appreciation goes to those whose generous grants and donations made this report possible: MSST Foundation, Ben and Ruth Hammett, Lee and Marty Talbot, and anonymous donors.

Paddlers enjoy the splendor of Kontrashibuna Lake, nestled in the rugged Chigmit Mountains within Lake Clark National Park and Preserve. Photo courtesy of Dan Oberlatz.

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REPORT SUMMARY



Lake Clark National Park and Preserve is a microcosm of Alaska. Much of what gives the state its bold and independent character—its history, people, geology, and animal life—is found within the park and preserve’s boundaries. Its 4 million acres stretch from rugged, glaciated mountain peaks in the north and east to the shores of Lake Clark, from the coastal plains of Cook Inlet in the east to tundra plains in the west.

Lake Clark is an isolated place. With no roads entering the park, and no major port or bay into which cruise ships can enter, Lake Clark National Park and Preserve receives only several thousand visitors per year. Small-plane services called “air taxis” make daily flights carrying visitors, residents, mail, and freight to the communities and villages in and around the park. The park’s remoteness and its distance from population centers and sources of pollu-

Lake Clark National Park and Preserve’s 4 million acres encompass rugged mountains, glacial ice, placid lakes, coastal beaches and salt marshes, active volcanoes, dense forests, alpine tundra, and more.

Lake Clark National Park and Preserve's central feature and namesake, pictured here, is a spawning destination for a portion of the largest wild sockeye salmon run in the world.



MELISSA BLAIR / NATIONAL PARKS CONSERVATION ASSOCIATION

tion help to keep its ecosystems wholly functioning and make it an excellent place to study local and regional trends, such as wildlife migration patterns and the effects of global climate change and deposition of air pollution from distant sources.

Congress passed the Alaska National Interest Lands Conservation Act (ANILCA) in 1980, ensuring that a significant portion of Alaska's fully functioning ecosystems would remain as such. Lake Clark National Park and Preserve was established that same year to protect the spectacular landscapes and pristine water necessary to protect Bristol Bay sockeye salmon and wildlife that symbolize the untamed nature of Alaska, including brown bears, wolves, and caribou. The park also provides opportunities for subsistence uses (e.g., hunting, fishing, berry picking, wood cutting) by local rural residents. Six resident zone communities—nearby populations permitted to use park resources for subsistence—are identified for Lake Clark National

Park and Preserve: Lime Village, Port Alsworth, Nondalton, Iliamna, Newhalen, and Pedro Bay.

Lake Clark National Park and Preserve hosts an incredible diversity of ecosystems and is an integral component of the Bristol Bay watershed ecosystem. Centered upon an active earthquake fault, two crustal plates are colliding there, pushing up the Alaska Range and Chigmit Mountains that form the alpine spine of the park. A narrow coastal band along Cook Inlet supports rich salt marshes that nurture bears for several weeks in the spring before spawning salmon pulse up the rivers. On the western front of the mountains, large, glacially carved lakes reach out from the mountains between subarctic ridges. The park's central feature and namesake, Lake Clark, is a freshwater spawning destination for a portion of the largest wild sockeye salmon run in the world. Further north, the boreal ecosystem reaches south along the Kuskokwin headwaters. Ecological disturbance regimes occur on a landscape scale and are ongoing. The North Pacific and Arctic climate

systems push back and forth over the park's terrain, depositing copious snows that feed unnumbered and unnamed glaciers. Glaciers give rise to dynamic river systems and fluctuating lake levels. Earthquakes are frequent, and two active volcanoes in the park, plus several more nearby, erupt on a decadal scale. Vegetation communities are in constant succession, and wildlife, birds, and fish migrate or shift habitat use patterns to keep up with the dynamic environment. The park supports nearly intact predator/prey relationships. Encroaching human activities and the impacts of global climate change are recent and often unpredictable factors that have the capacity to alter natural ecosystem functions in Lake Clark.

Human history and its inextricable ties to the landscape are interpreted at Lake Clark—the bountiful salmon fishery of Bristol Bay, the Telaquana Trail, and the life of one of the park's most beloved former residents, naturalist Dick Proenneke, who lived in a lakeside, hand-built cabin from 1968 to 1998, documenting his simple wilderness lifestyle ethic in journals and home videos. Archaeological camp sites dating from 10,000 to 1,000 years old, Dena'ina Athabascan sites at Kijik (a national historic landmark), and the historic cabins of Euro-American hunters, trappers, and prospectors are evidence of people who used the area before park establishment. The park also boasts an impressive museum collection that includes herbarium and mammal specimens, Proenneke's journals, thousands of historic photographs, and more than 6,000 archaeological artifacts.

Although the park and preserve sees few visitors, the potential for negative visitor impacts exists, particularly at popular campsites. Brown bear populations are also susceptible to negative impacts from visitors. These animals congregate at streams and coastal salt marshes to forage on seasonally abundant food sources, such as sedge and salmon. Several areas along the Cook Inlet coast, including Silver Salmon

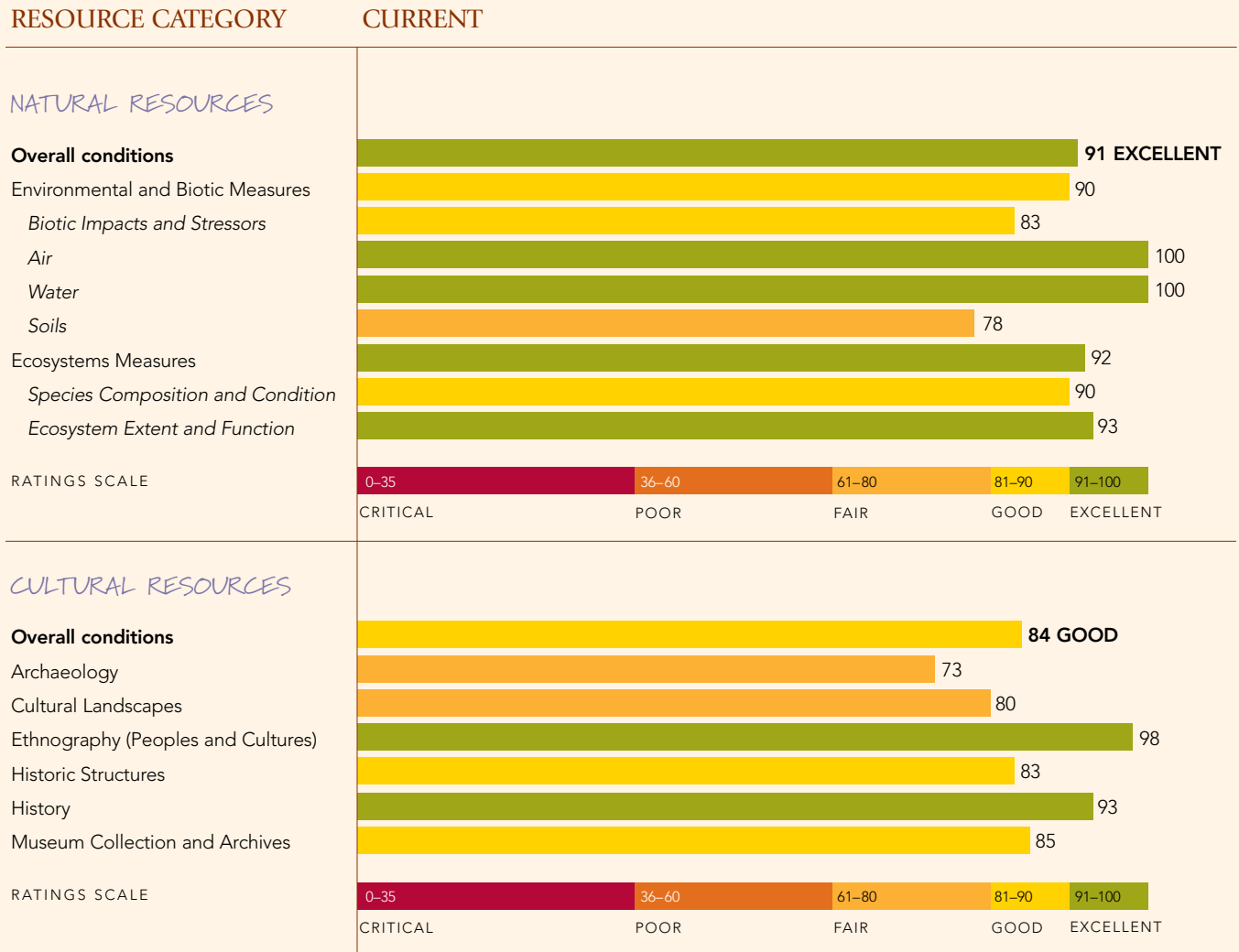
Creek, Chinitna Bay, and Shelter Creek, are popular with visitors who arrive to view bears; these areas see more than 50 percent of all park visitors. The Great Alaska Adventure Lodge has operated a bear-viewing camp situated on a private inholding since 1997, and visitation at that coastal salt marsh increased from 30 people in 1995 to more than 550 in recent years. Three other coastal marshes in the park show similar increases in visitor activity, with local residents on both sides of Cook Inlet strongly promoting bear viewing as an economic resource. As brown bear viewing increases, the Park Service needs to continue to proactively work with bear-viewing guides to ensure that viewing activities do not encroach upon critical bear habitat or change bear behavior. Toward this end, the park began to offer a best practices and guide training program in 2007.

Mary Evanof and Chief Zakar, residents of the Athabascan Dena'ina village once located at Kijik, posed for this photograph around 1910. Human history and its ties to the landscape are interpreted at Lake Clark National Park and Preserve.



NATIONAL PARK SERVICE

Note: When interpreting the scores for resource conditions, recognize that critical information upon which the ratings are based is not always available. This limits data interpretation to some extent. For Lake Clark National Park and Preserve, 68 percent of the natural resources information was available and 100 percent of the cultural resources information was available.



The findings in this report do not necessarily reflect past or current park management. Many factors that affect resource conditions are a result of both human and natural influences over long periods of time, in many cases before a park was established. The intent of the Center for State of the Parks is not to evaluate Park Service staff performance, but to document the present status of park resources and determine which actions can be taken to protect them into the future.

Today, the biggest threat to Lake Clark National Park and Preserve looms just outside its borders: an emerging industrial mining district to the southwest, anchored by the proposed Pebble Mine. Also of concern are exploration activities adjacent to the eastern side of the park that are assessing the potential viability of mining the Chuitna River coalfields and harnessing hydroelectric power resources at Chakachamna Lake.

With the exception of large private tracts of tribal lands (owned by Alaska Native Corporations), almost all lands adjacent to Lake Clark National Park and Preserve are public, managed either by the state or by the federal Bureau of Land Management. These lands are undeveloped yet largely open to resource extraction, with minimal restrictions. To date, mining activity adjacent to the park has been limited due to a lack of road access, but since 2003 intensive exploration has focused on a significant gold and copper deposit at the Pebble Mine site. If this site is ultimately developed, it could lead to additional mining development and the growth of an industrial district next to the park. The National Parks Conservation Association, along with many commercial and sport fishermen, Alaska Native tribes, and other stakeholders, oppose the large-scale industrial Pebble Mine project. The chief concern is that building and operating the largest open-pit mine in North America in the fragile headwaters of Bristol Bay—the world’s most prolific sockeye salmon fishery—will pollute the region’s abundant and interlaced surface and groundwaters and will irreparably harm the salmon spawning habitat, resident fisheries, and local economies based upon clean waters. Caribou, moose, and migratory birds may also be affected by on-going exploration activities and future developments.

In addition to dealing with threats related to the proposed Pebble Mine, park managers also grapple with a complex system for managing wildlife species hunted legally in the preserve,

due to sometimes conflicting state and federal management goals and mandates. And because of the immense size of the park and preserve, the cost associated with traveling throughout the park, and the difficulty of reaching some resources due to the need for planes or boats, some historic structures and archaeological sites are monitored infrequently. Park managers are certain that some important sites have yet to be discovered. The same challenges associated with the park’s size and remoteness of some resources also affect fish and wildlife management.

RATINGS

In recognition of the significant Bristol Bay fisheries habitat, rich history, and cultural resources protected within Lake Clark National Park and Preserve, the National Parks Conservation Association’s Center for State of the Parks conducted an assessment to determine current conditions of the park’s resources. Known **natural resources** at Lake Clark National Park and Preserve rated 91 out of a possible 100, indicating “excellent” overall condition. Only two other parks assessed by the Center for State of the Parks to date (out of more than 50 natural resource assessments) have received higher natural resources scores—Denali National Park and Preserve in Alaska and Little Bighorn Battlefield National Monument in Montana. Ratings were assigned through an evaluation of park research and monitoring data using NPCA’s Center for State of the Parks comprehensive assessment methodology (see “Appendix” on page 64).

The proposed Pebble mining district outside the park and its related infrastructure requirements pose the most urgent threat to resources—especially wild salmon habitat—threatening the park and preserve with potential surface and groundwater contamination, noise, impaired viewsheds due to dust and developments, habitat fragmentation and degradation due to roads and pipeline corri-

Nondalton, located just outside the southwest boundary of Lake Clark National Park and Preserve, is one of six resident zone communities authorized to use park resources for subsistence.



KATIE MYERS / NATIONAL PARK SERVICE

dors, changes in wildlife and waterfowl migration routes, disruption of ecosystems and wildlife and fish populations, and increased demands upon subsistence resources. Industrialization of lands adjacent to the park would fracture intact ecosystems and diminish the perception of the Lake Clark region as the epitome of wilderness.

The park's known **cultural resources** rated 84 out of a possible 100, indicating "good" overall condition. This is the highest overall cultural resources score obtained in any of the more than 60 cultural resource assessments the Center for State of the Parks has completed to date. The scores for cultural resources are based on the results of indicator questions that reflect the National Park Service's own *Cultural Resource Management Guideline* and other policies related to cultural and historical resources.

While the park prides itself on a robust cultural resource program (with staff and resources shared with Katmai National Park

and Preserve and Aniakchak National Monument and Preserve) that includes significant publications and solid ties to Native Alaskans, some important projects have not been completed. Lake Clark's cultural landscapes inventory should include the important Chulitna River-Sixmile Lake watershed (in line to be funded in 2010), and the park's museum collection needs to be completely cataloged.

Several archaeological survey, testing, and mapping projects have been conducted in Lake Clark, beginning with exploration of Tuxedni Bay in 1939. These projects have begun to illuminate the human story of the region, but despite these efforts, only about 1 percent of the park has been surveyed for archaeological resources. There is the potential that significant resources remain undiscovered. The park recently received funding for an archaeological overview and assessment that will address the next steps for the archaeology program.

KEY FINDINGS

- **Advanced, industrial mining explorations in progress on adjacent lands.**

The pursuit of extensive, untapped (but low-grade and highly reactive) deposits of gold and copper on State of Alaska mining claims, staked only 14 miles from Lake Clark National Park and Preserve's southwestern boundary, dwarfs other immediate challenges facing the Bristol Bay region and park resource managers. If built, Pebble Mine could become the largest mining project in Alaska, the largest open-pit mine in North America, and a catalyst of industrialization in the headwaters of one of the last remaining wild sockeye salmon fisheries on Earth. Since 2003, approximately 1,000 square miles of mining claims have been staked around the Pebble deposit. And in December 2008, during the final days of the Bush Administration, the Bureau of Land Management finalized a plan to open more than 1 million acres of federal public lands in the Bristol Bay watershed to mining, a move that could multiply the prospects of additional mineral deposits being developed and compound the impacts of a future mining district on lands near Lake Clark and Katmai National Parks. Predicted mining impacts at Lake Clark include degraded air and water quality (with associated impacts on fisheries), encroachment into fish and wildlife habitat, disturbance and displacement of wildlife and birds, increased competition for subsistence and/or sport resources from new residents and mine workers, and diminishment of the visitor experience (due to a loss of wilderness character).

- **Wild sockeye salmon anchor the economy, traditional lifeways, and ecosystem.**

Besides providing economic and subsistence values to the people of Alaska, salmon are the cornerstone of the Bristol Bay ecosystem. In the act of returning to freshwater rivers and lakes, such as Lake Clark, from the ocean and dying in vast numbers, the salmon transport millions of tons of nutrients from the rich marine environment to Alaska's freshwater systems and adjacent uplands.

- **Park and preserve contains the fourth-highest number of privately held acres of all national parks.**

Within Lake Clark National Park and Preserve's boundary, there are about 180,500 acres of land owned by Alaska Native Corporations and individual residents. While many private land owners are responsible stewards of park land and wildlife, park managers are challenged to proactively manage activities that could potentially occur on these private inholdings (e.g., logging, mining, and the construction of septic systems, airstrips, etc.) that could impair park resource integrity and visitor experience.

- **Game management strategies are complex and require cooperation.**

The preserve portion of Lake Clark National Park and Preserve covers 1.4 million acres and contains rich wildlife habitat. Subsistence hunting is permitted throughout the national park and preserve for qualified users. Hunting is administered in the preserve under Alaska's complex dual-agency management system in which the Park Service manages subsistence hunting and the Alaska Department of Fish and Game manages sport hunting of the same wildlife populations. The Park Service



Bear tracks left behind in these mud flats are evidence of one of the park and preserve's most charismatic wildlife species. The Park Service is mandated to preserve healthy populations of bears and other wildlife.

and Alaska Department of Fish and Game's strategies can come in conflict, particularly when the State's permitted hunting methods, means, and bag limits do not align with federal mandates to preserve healthy wildlife populations.

- **Planning in progress.** Several important management documents are in progress. The park is developing its foundation statement, which is a formal description of the park's core mission that will be used to support planning and management. It is expected to be finished in fall 2009. The park initiated an archaeological overview and assessment in early 2009. The park's administrative history is also under way and is expected to be completed in 2011; additional historical research on hunting, mining, and early Euro-American settlers would expand the park's historic themes and add richness to an already robust history program. Park staff identified a need for a wilderness/backcountry management plan and a business plan. Some of these needs will be addressed with help from a

new staff member—a recreational planner and wilderness coordinator—who also serves the Western Arctic National Parklands, which include Noatak National Preserve, Cape Krusenstern National Monument, and Kobuk Valley National Park. The park expects to receive funds in 2010 to support the wilderness/backcountry management plan.

- **Funds and staff needed.** Additional staff and funds would enhance resource protection and interpretation at Lake Clark National Park and Preserve. With a limited number of staff and travel restrictions in place, the park is hindered in its ability to monitor some of its resources, which are spread out over 4 million acres. For example, due to the sheer size of the park and the remoteness of some sites, park staff are unable to annually inspect and monitor all historic structures or conduct condition assessments at all known sites. An archaeologist and a geologist are needed along with staff to analyze data and communicate research

Industrial mining explorations are in progress on lands adjacent to Lake Clark National Park and Preserve. Development of the Pebble Mine, which would become the largest open-pit mine in North America, could spur further industrialization in the headwaters of one of the last remaining wild sockeye salmon fisheries on Earth.



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findings to colleagues and the public. More personnel are needed to serve as community liaisons in the park's ethnographic/subsistence management programs; the park expects to meet this need through a base budget increase in 2010 to support staff for the ethnography program. Retaining curatorial and archival staff at the Alaska Curatorial Center in Anchorage—where the park's museum collection and archives are stored and the park's curator is based—is important to ensure the collections continue to receive good care. A chief of interpretation and an education specialist are needed to better serve visitors and provide additional education and outreach. There is a growing need to develop a comprehensive data management system. Advances in digital data collection (photography, GIS, GPS, and other methods) generate more files than ever before, exacerbating the need for an adaptable system of data management and a concise set of collection and storage protocols. In 2008, funds from the Park Service's Centennial Initiative, a program aimed at ensuring parks are preserved as the centennial of the agency approaches, improved staffing in law enforcement, interpretation, and maintenance. Base funding requests in 2009 were approved by Congress to further support law enforcement and maintenance. Combined this funding increased the park's base budget by more than \$500,000, vastly improving the functionality of park programs.

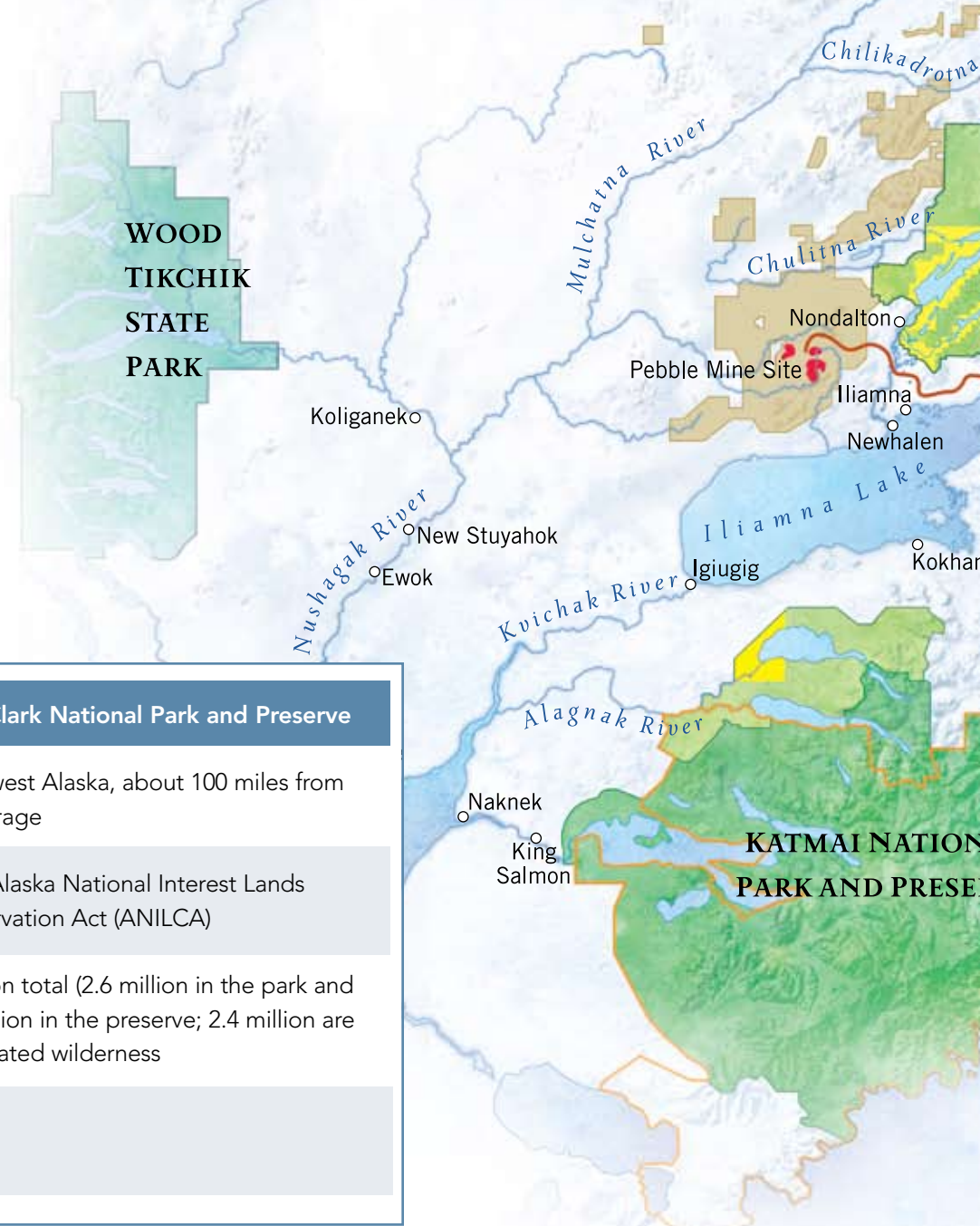
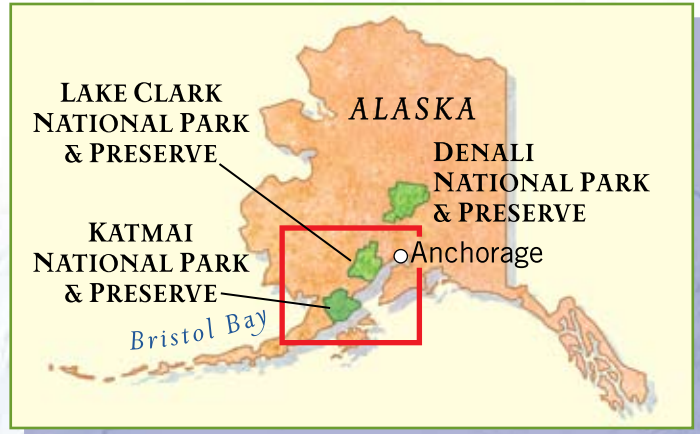
- **Archaeological overview and assessment will guide future work.** Resources that are unknown cannot be protected. The park and preserve contains highly significant and unique known archaeological resources, such as the

Athabascan sites within the Kijik National Historic Landmark district, and there is a strong likelihood that many more remain undiscovered; yet, less than 1 percent of the park (about 40,000 acres) has been surveyed at the reconnaissance level for archaeological sites (i.e., examined for surface indications of cultural remains, augmented with the limited use of soil probes and small shovel tests). A recently funded archaeological overview and assessment will serve as a vital tool for identifying, prioritizing, and planning archaeological work in the park.

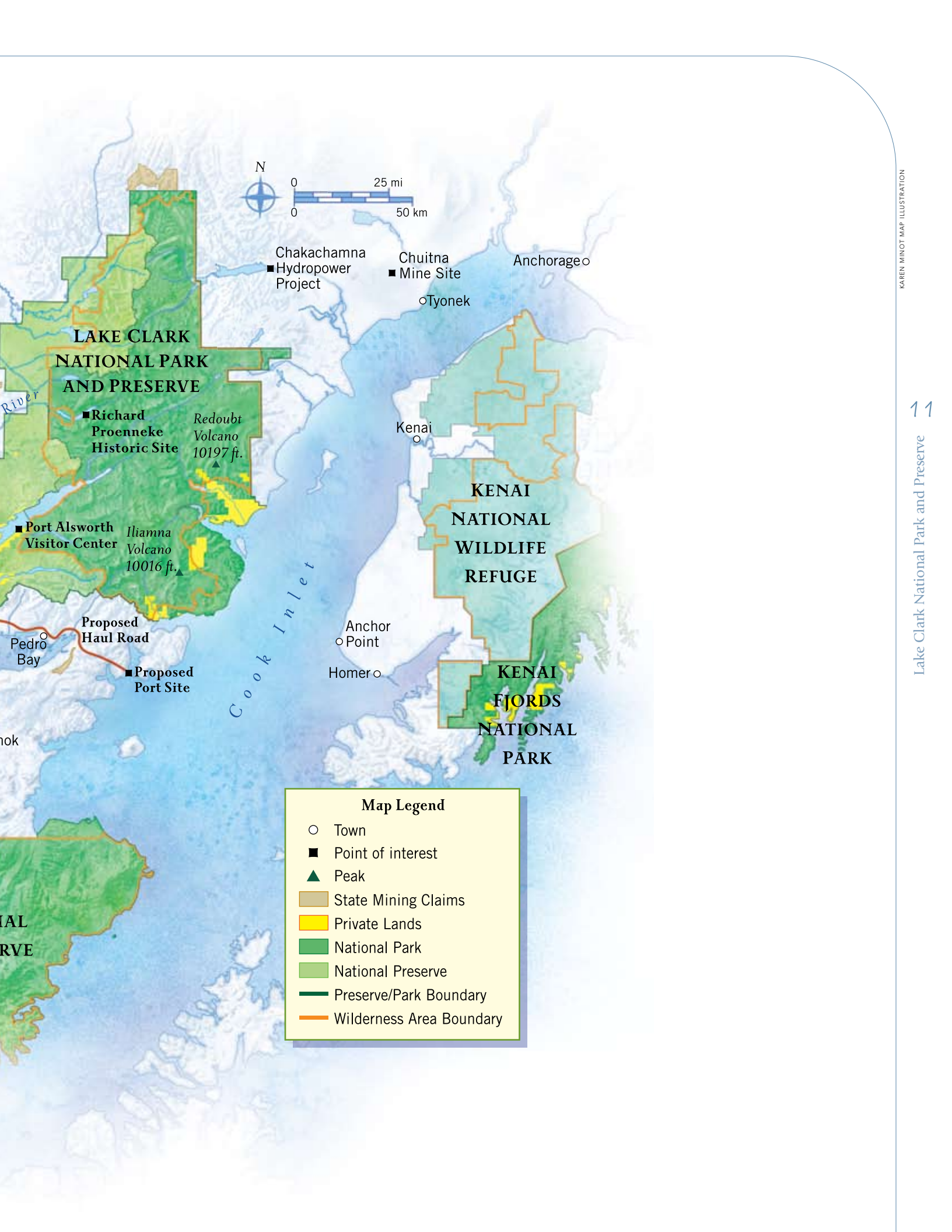
- **Cultural landscapes at risk.** Tanalian Point and the Chulitna River-Sixmile Lake watershed are two identified cultural landscapes that the park would like to document soon. These landscapes are located partly on private land within and outside the park that could potentially be sold and/or developed, diminishing the landscapes' integrity both as a cultural landscape and in an ecological sense. The Chulitna River watershed begins within the proposed Pebble Mine area; most of the watershed is located on land just north of the proposed Pebble Mine site. This watershed is the main subsistence area for the community of Nondalton, and it is the largest freshwater tributary of Lake Clark National Park, so maintaining the area's health is essential for drinking waters, salmon, and wildlife habitats. Explorations of a gold and copper deposit in the headwaters of the Chulitna is one example of a mining claim that may become far more economically feasible to develop in the Pebble mining district if access and infrastructure (roads, ports, and power) are constructed.



This lanceolate point was found by Jack Hobson, a Nondalton tribal leader. Its age has not been determined.



Park Statistics	Lake Clark National Park and Preserve
Park location	Southwest Alaska, about 100 miles from Anchorage
Park establishment	1980, Alaska National Interest Lands Conservation Act (ANILCA)
Park size (acres)	4 million total (2.6 million in the park and 1.4 million in the preserve; 2.4 million are designated wilderness)
Recreational visits (2008)	6,802



Map Legend

- Town
- Point of interest
- ▲ Peak
- State Mining Claims
- Private Lands
- National Park
- National Preserve
- Preserve/Park Boundary
- Wilderness Area Boundary



LAKE CLARK NATIONAL PARK AND PRESERVE AT A GLANCE

- **Mountains, volcanoes, and tectonic activity:**

The park includes impressive mountains, including portions of the Alaska and Aleutian Ranges and the Chigmit Mountains. The park is part of the Pacific Ocean's seismically active "Ring of Fire" and home to two active volcanoes—Mt. Iliamna and Mt. Redoubt. At 10,016 and 10,197 feet, respectively, they are the park's tallest mountains. Two more volcanoes, Mt. Spurr and Mt. Augustine, loom just outside park boundaries. The park's largest active fault line, the 134-mile Lake Clark Fault, transects the park from northeast to southwest and appears to come within 10 miles of the proposed Pebble Mine site.

- **Diverse wildlife:** The park's pristine waters teem with rainbow trout and grayling, but the area is especially renowned as a key component of the wild sockeye salmon fishery in Bristol Bay. The park contains critical spawning and rearing habitat for these anadromous fish. In fact, one of the park's primary purposes in its enabling legislation is to protect a portion of sockeye salmon habitat for the perpetuation of the Bristol Bay fishery. The park's forests, subarctic and alpine

tundra, coastline, and shrublands are home to a wealth of terrestrial wildlife. The Mulchatna herd of caribou, whose population exceeded 200,000 in the 1990s and is now about 36,000, use the park and preserve, as do thousands of migrating waterfowl, shorebirds, and seabirds. Brown and black bears, moose, Dall sheep, and wolves also call the park home. Marine mammals such as beluga whales, sea otters, and harbor seals may be seen from the park's shores.

- **Intact ecosystems:** Scientists consider all the parks of Alaska to exhibit intact, naturally functioning terrestrial ecosystems, thanks in part to their significant acreages and lack of adjacent land development. Lake Clark National Park and Preserve protects the same set of species that thrived there prior to the arrival of Euro-Americans. These species include wolves and brown bears, whose ranges are highly restricted outside of Alaska. The park includes one of the largest designated wilderness areas in the United States, and it is a place with naturally functioning ecosystem processes, including interactions between predators and prey, free-flowing waters, and natural

Staff from the U.S. Geological Survey's Alaska Volcano Observatory study and collect images of Mt. Redoubt, which is currently in an eruptive phase. This photo was taken April 16, 2009.





ANILCA provides for continued subsistence use by both Alaska Native and non-Native rural residents living in and near Lake Clark National Park and Preserve. Here, freshly caught fish are being prepared.

disturbance and succession of vegetation communities. The park's remoteness, lack of roads, and distance from population centers and sources of pollution support these processes and help to keep ecosystems whole.

- **Telaquana Trail:** The Telaquana Trail is a traditional Dena'ina travel corridor that extends from Lake Clark at Kijik 50 miles north to Telaquana Lake, the site of an abandoned Dena'ina village. Once a major route for social travel, trade, and hunting, the trail is now a popular back-country hiking and camping destination.
- **Richard Proenneke historic site:** The Proenneke historic site and trail complex is a symbol of the national wilderness movement and a source of inspiration sought out by visitors from around the world.
- **Archaeological resources:** The park contains hunting camps, villages, burial

sites, and ritual sites that document the known history of human adaptations to changing environments spanning 10,000 years. Kijik, a national historic landmark and an archaeological district, is the largest known grouping of Dena'ina settlements and the most complete and intact record of the last 1,000 years of Dena'ina cultural continuity and change.

- **Traditional subsistence use:** ANILCA provides for continued subsistence use by both Alaska Native and non-Native rural residents living in and near many of Alaska's federal conservation units, including Lake Clark. These subsistence rights provide rural residents with the opportunity to hunt (within seasons and bag limits), fish, and gather plant materials, such as berries, bark, and leaves for subsistence uses. For many Alaska Native residents, these activities are a continuation of a subsistence way of life based on the cultural traditions of their ancestors.

RESOURCE MANAGEMENT HIGHLIGHTS

- **Long-time staff members provide knowledge and expertise.** Within the Park Service, staff often work at many parks during their careers, sometimes spending only a few years at each one. High turnover at parks can result in a loss of institutional knowledge and difficulty developing and maintaining relationships with local stakeholders. At Lake Clark National Park and Preserve, many staff have been at the park for long periods of time, committing to both the park and the local community. This helps to ensure productive working relationships with stakeholders and the depth of knowledge necessary for good resource stewardship.
- **Publications and outreach programs outstanding.** Park staff have been proactive in educating the public about the vast cultural and natural resources at Lake Clark through publications, websites, and community outreach. Because the park is inaccessible to many travelers, the outreach program and publications are invaluable educational tools reaching audiences who might otherwise never have an opportunity to learn about the park.
- **Inholdings acquired.** The Park Service has acquired nearly two dozen inholdings (more than 10,000 acres) since the park's creation and is open to acquiring additional private parcels from willing sellers. Through these acquisitions the park has extended protection of critical sockeye spawning habitat, delicate riparian areas, lakeshores, and Cook Inlet coastline and has further preserved the park's ability to provide visitors with a wilderness experience, natural sounds, and a sense of solitude.
- **Place Names Project a success.** As part of the Place Names Project, park staff, in cooperation with linguist Dr. James Kari, work with Dena'ina elders to collect Native (Athabascan language) names and meanings for places and features within the park and throughout the region. So far, more than 2,000 place names and location meanings have been collected, largely by Dr. Kari over the past 30 years, within the immediate Lake Clark area. This information is entered into a database from which a cultural atlas and GIS maps are being produced. These resources will be used to educate local residents, especially children, about their culture, and the tools will also be used as part of the park's interpretive program. Oral histories collected as part of this project and earlier research have also provided subject matter for two books of traditional Dena'ina stories produced by the Park Service with Dr. Kari and respected Dena'ina elder Andrew Balluta. The books are available to the public at no cost.
- **Research partnerships gather natural resources information.** Since the 1990s, park staff have collaborated with the U.S. Geological Survey, U.S. Fish and Wildlife Service, Alaska Department of Fish and Game, universities, and Alaska Native entities to study genetically unique populations of sockeye salmon that originate in (and return to) the freshwater spawning grounds of Lake Clark. Studies of the salmon's migration corridors and spawning habitats have led to greater knowledge of the regional Bristol Bay fishery, aided management decisions, and become a solid foundation for examining potential resource effects

from neighboring mining endeavors. The park is part of the Southwest Alaska Inventory and Monitoring Network's program of baseline inventories of biotic resources and long-term monitoring. The "vital signs" being inventoried and monitored include climate trends, glaciers, water quality and quantity, lake ice, vegetation, sensitive habitats, wildlife (e.g., wolves, moose, bears, and bald eagles), and visitor use. The park also conducts research in cooperation with scientists from universities and other agencies on topics such as Dall sheep, wolves, interactions between humans and bears, and moose calf survival. Many other agencies contribute to baseline understandings of the park's resources, especially geologists working on volcanoes and bedrock mapping, tectonics, and surficial geology.

- **Traditional knowledge valued.** Lake Clark National Park and Preserve respects and values the traditional ecological and cultural knowledge of the region's indigenous peoples and rural residents, often incorporating their insights into management practices. Local residents have generously shared observations of wildlife and climate trends, recollections passed down from previous generations, and priceless historic photographs that have enriched the park's archives and have been used to compare landscapes over time. Lake Clark National Park and Preserve's ethnography program scored the highest of any park the Center for State of the Parks has assessed to date, due to an extensive historic and ethnographic publications collection. The Park Service engages with residents of local villages and communities and with the park's Subsistence Resource Commission—an



advisory council comprised of local area representatives, some of whom have been appointed by the governor of Alaska—to address management and use of federal subsistence resources.

As part of a research project, these salmon have been temporarily caught during their spawning migration.

ALASKA NATIONAL INTEREST LANDS CONSERVATION ACT OF 1980

The Alaska National Interest Lands Conservation Act of 1980 (ANILCA) is considered by many to be the most enlightened piece of conservation legislation in history. The act created ten new national parks, more than doubled the size of the country's national park and refuge system, and tripled the amount of land designated as wilderness. In all, more than a quarter of the land area of Alaska was affected. ANILCA was the result of 20 years of negotiation, compromise, and legislation designed to resolve the division of Alaska's public lands between the state, Alaska Natives, and the federal government.

The first attempt to divide the vast public lands in the Territory of Alaska was the Alaska Statehood Act of 1959. In granting statehood, the federal government had to ensure that the new state had a sound financial base on which to function; thus, the state was allowed to select lands from which it could exploit resources—minerals, timber, oil, and gas. Such land selection had a partial precedent in other states under the Morrill Act of 1862, which granted federal lands to states as a means of funding institutions of higher education.

As the land selection process got under way in 1959, it became clear that Alaska Natives' land claims needed resolution. In the lower 48 states, aboriginal claims to land were generally extinguished through treaty, disenfranchisement, or decimation of Native peoples long before the states were created. In the early 1960s, Alaska Native peoples were still very much present and had never relinquished their claims. At the same time, the citizenry of the rest of the United States was seen to have a claim on the land as well, since as a territory, Alaska had "belonged" to

all of the people. In 1968, the discovery of vast deposits of oil on the North Slope of Alaska—beneath land claimed by Alaska Natives as their own—spurred legislative action on the land claims issue.

In 1971, Congress passed the Alaska Native Claims Settlement Act (ANCSA), allowing Alaska Native village and regional corporations to select lands for conveyance (ownership transfer) that would settle long-standing aboriginal rights claims and help stimulate the economy of rural Alaska. This legislative recognition of aboriginal rights—though ANCSA did not recognize subsistence rights on public lands in Alaska—marked an important shift in public policy. The act also included a provision for the selection of national interest lands (e.g., national parks, refuges, forests, monuments) for the benefit of all Americans.

ANCSA set a time limit on the national interest lands provision, and legislative wrangling delayed the selection process. The State of Alaska objected to the amount of land identified for conservation and attempted to break up proposed parklands through the state land selection process by stalling action in Congress. When the ANCSA time limit ran out, it appeared that the chance to designate conservation lands would be lost. But in December 1978, President Jimmy Carter used his authority under the Antiquities Act of 1906 to create 17 national monuments in Alaska (including Lake Clark National Monument), bypassing Congress and preserving the lands chosen under the national interest lands provision. It took two more years to pass ANILCA, which redesignated Lake Clark National Monument as Lake Clark National Park and Preserve.



ANILCA created ten new national parks, more than doubled the size of the country's national park and refuge system, and tripled the amount of land designated as wilderness. The act established Lake Clark National Park and Preserve to preserve and protect natural landscapes, fish and wildlife, and historic and archaeological sites, in addition to other resources and values. Chinitna Bay is shown here.

ANILCA is a truly unique piece of legislation, establishing wilderness status for portions of the parks while also permitting subsistence and sport hunting on certain lands. Local hire provisions were specifically written into the legislation, which allow the Park Service to hire, through a special hiring authority, local people with specific local knowledge. Senator Henry Jackson of Washington, one of the principal authors of the final version of ANILCA, described it as “a lasting monument in striking a balance between development on the one hand, and preservation and conservation on the other.”

While ANILCA protected the lands and waters of what is now Lake Clark National Park and Preserve, it does not protect lands adjacent to the western boundary. These lands were conveyed to the State of Alaska at statehood and are open to mining. There are currently several proposals for significant

mining activity along the park's southern and western borders, the most troubling one being the proposed Pebble Mine—an open pit and underground operation to extract copper, gold, and molybdenum. (See “Pebble Mine a Major Threat to Resources” on page 31.) Native allotments and Alaska Native Corporation-owned lands within and adjoining park boundaries also have the potential for incompatible development and activities.

LAND USE HISTORY, PARK ESTABLISHMENT, AND ADJACENT LAND USE

Humans began to use the area that is now Lake Clark National Park and Preserve at the close of the last Ice Age, as glaciers began to recede about 14,000 years ago. People migrated across the Bering Land Bridge and along its southern coast into what is now Alaska. Stone tool production sites in the northern part of the preserve are dated to 8000 BCE (Before Common Era). People of the Athabascan language group—from whom the modern Dena'ina descend—are thought by some researchers to have arrived as early as 5000 BCE from interior Alaska, settling the Cook Inlet coastal regions and lands along the park's lakes and rivers sometime after 1000 years ago. Little is known about the origins of the Athabascan people, a group related by language to the Dena'ina of southwest Alaska, the Tlingit of southeast Alaska, and the Apache and Navajo people of the southwestern continental United States.

The Dena'ina traveled extensively throughout the region now within Lake Clark National Park and Preserve, and they traded with their Aleut and Yupik neighbors. Dena'ina homes were constructed partially underground and were meant to be permanent dwellings. Fishing, hunting, and gathering edible and medicinal plants were the primary means of subsistence.

Russian fur traders arrived in Alaska in the mid-18th century. Crossing the Bering Strait from Siberia, they traveled south and east along the Aleutian Islands and the Pacific coast, establishing trading outposts and enslaving Alaskan Natives as trappers and hunters. By the 1780s, their outposts reached to Kodiak Island, at the mouth of Cook Inlet (named for Captain James Cook, who explored the inlet and Bristol Bay in 1778), and within a decade trading posts at Bristol Bay and Iliamna Lake brought commerce to the region. By the 1790s, Russia began serious efforts at settlement and colonization.

As part of this effort, Russian Orthodox priests arrived and began working to convert the Native people to Christianity, and many Russian men married Native women. Russian domination of the region continued through the first half of the 19th century, though the fur trade gradually declined and the economic focus shifted to commercial fishing.

Russia sold Alaska to the United States in 1867. In 1869, gold was discovered in Juneau and an influx of hopeful American prospectors and settlers immediately flocked to the area. The majority of white settlers remained in the coastal regions and the interior cities of Anchorage and Fairbanks.

In 1881, the United States government sent explorers and researchers to map the new District of Alaska and assess its resources. Charles Leslie McKay of the U.S. Signal Corps collected botanical specimens from the future park area for the Smithsonian Institution in 1882. In 1891, New York journalist Alfred Schanz and his party left the Nushagak trading post on Bristol Bay in the company of the post's chief, John W. Clark, who had arrived in Russian America in 1865 or 1866 and was the first permanent Euro-American settler in the Bristol Bay region. The group traveled by dogsled along the Nushagak and Mulchatna River drainages, eventually portaging overland to Lake Clark. In his report of the expedition, Schanz renamed the lake, which was called *Qiz'jeh Vena* by the Dena'ina, for his traveling companion.

At the beginning of the 20th century, Dena'ina villages were in decline on the Mulchatna and Stony Rivers and Telaquana Lake in the northwestern part of what is now the park; other villages were located at Kijik on Lake Clark and on the coast of Cook Inlet. The first permanent Euro-American settler on the shores of Lake Clark was Bristol Bay fisherman and trapper Brown Carlson, who built a cabin on the west side of the lake in 1903. As Euro-Americans moved into the area to settle and interact with the Dena'ina, unfamiliar diseases

arrived. Deadly epidemics of measles and influenza resulted in the abandonment of the Dena'ina Kijik village by 1909. Remnant groups of the Kijik and Mulchatna River bands relocated to Nondalton, and the northern bands consolidated at Lime Village on the Stony River. On the coast, most of the Dena'ina moved north to the Upper Inlet Dena'ina village at Tyonek or southwest to Old Iliamna village.

The arrival of Euro-Americans brought more than disease to the Dena'ina; settlers brought economic changes as well. While many Natives continued to rely on fishing and hunting for subsistence, new opportunities for employment arose. Commercial salmon fishing in the Bristol Bay region began in the early 1880s. By about the turn of the century some Dena'ina were employed on fishing boats or in canneries. Sportsmen and big game hunters discovered the Lake Clark region in the 1920s, employing Dena'ina hunters and trappers as guides. Airplanes first arrived on Lake Clark in 1930, making travel to and from the relatively inaccessible region easier and faster. Leon "Babe" Alsworth settled at Hardenburg Bay on Lake Clark in 1944, establishing the first air taxi service to the area and the community of Port Alsworth, just north of the Dena'ina/pro prospector settlement at Tanalian Point.

Alaska was granted statehood in 1959, when most of Alaska's lands were federally owned. With statehood came the responsibility of dividing up land between the federal government, the state, and Alaskan Natives—who had never relinquished claim to the land. Ultimately, federal lands would be administered primarily by the U.S. Forest Service, National Park Service, Bureau of Land Management, and U.S. Fish and Wildlife Service.

As the environmental movement of the 1960s began to attract adherents in the United States, people seeking a true wilderness experience ventured to Alaska to find it. Air taxis, guest lodges, and cabins sprang up around Lake Clark

to serve some of these visitors. Many became so enamored that they built cabins and established seasonal or permanent residences. Dick Proenneke was one of these individuals; through his book *One Man's Wilderness*, first published in 1973, and through documentary films produced in later decades, he touched countless armchair travelers and environmentalists with his wilderness experience and descriptions of his life on Upper Twin Lake.

In 1964, Lake Clark was first mentioned as a potential national park in the Park Service publication *Parks for America*. (Please see "Alaska National Interest Lands Conservation Act of 1980" on page 16 for a more detailed account of this act, the Alaska Natives Claims Settlement Act that preceded it, and Lake Clark's designation as part of the National Park System.)

Dick Proenneke, shown in this photo overlooking Carrither's Point, documented three decades of his life at Upper Twin Lake through journals and home movies.



NATIONAL PARK SERVICE

PARK AND PRESERVE CONTAINS FOURTH-HIGHEST NUMBER OF INHOLDINGS OF ALL NATIONAL PARKS

An inholding is a privately owned parcel of land within the boundaries of a federal conservation unit, such as a national park or preserve. Lake Clark National Park and Preserve contains about 180,500 acres of inholdings—the fourth-highest number of privately held acres of all the national parks (three other Alaska national parks have more privately held acres). The majority of private inholdings belong to Alaska Native Corporations and most are concentrated along Lake Clark and other large lakes (only 25 percent of Lake Clark’s shoreline is administered by the Park Service, and private land is held around all large lakes except Turquoise). Other significant inholdings lie near the coast.

ANILCA recognized that people have lived in Alaska for thousands of years, and this legislation provides for rural residents to continue practicing traditional, subsistence lifestyles in most of Alaska’s national parks today. ANILCA and NPCA recognize that individuals can be responsible stewards of the land and valuable constituents of

parks’ living cultural landscapes. For park visitors, opportunities to learn about people (both past and present) living in Alaska’s parks enhance the visitor experience and provide deep connections to a unique sense of place. However, park managers are challenged to proactively manage certain activities that are occurring or could occur in the future on inholdings, including logging, mining, and the construction of roads, airstrips, and commercial ventures. Industrial operations and roads fragment habitat, displace wildlife, and contribute to pollution and noise. Cook Inlet Region Incorporated and three Alaska Native village corporations own large tracts of land in the park. In 1997 they sold the timber rights to about 42,000 of their acres to a logging company that subsequently logged 700 acres. In the process of logging, the company built access and secondary roads, a dock, a wood-chipping facility, an airstrip, and a log transfer facility before ceasing operation in 2002. Some of this infrastructure remains.

Access to inholdings and to subsistence resources is ensured by ANILCA (subject to reasonable regulations), and the use of snow machines, all-terrain vehicles (ATVs), boats, and planes is regulated on federal lands. Around some inholdings, particularly near Silver Salmon Creek, park managers are concerned about the use of ATVs on unauthorized trails. These trails and their use pre-date the park. The park has begun an environmental assessment as part of an effort to manage the existing ATV trails in the Silver Salmon Creek area. The Park Service also benefits from a new access-to-inholdings process that Lake Clark staff are using to address and manage access where

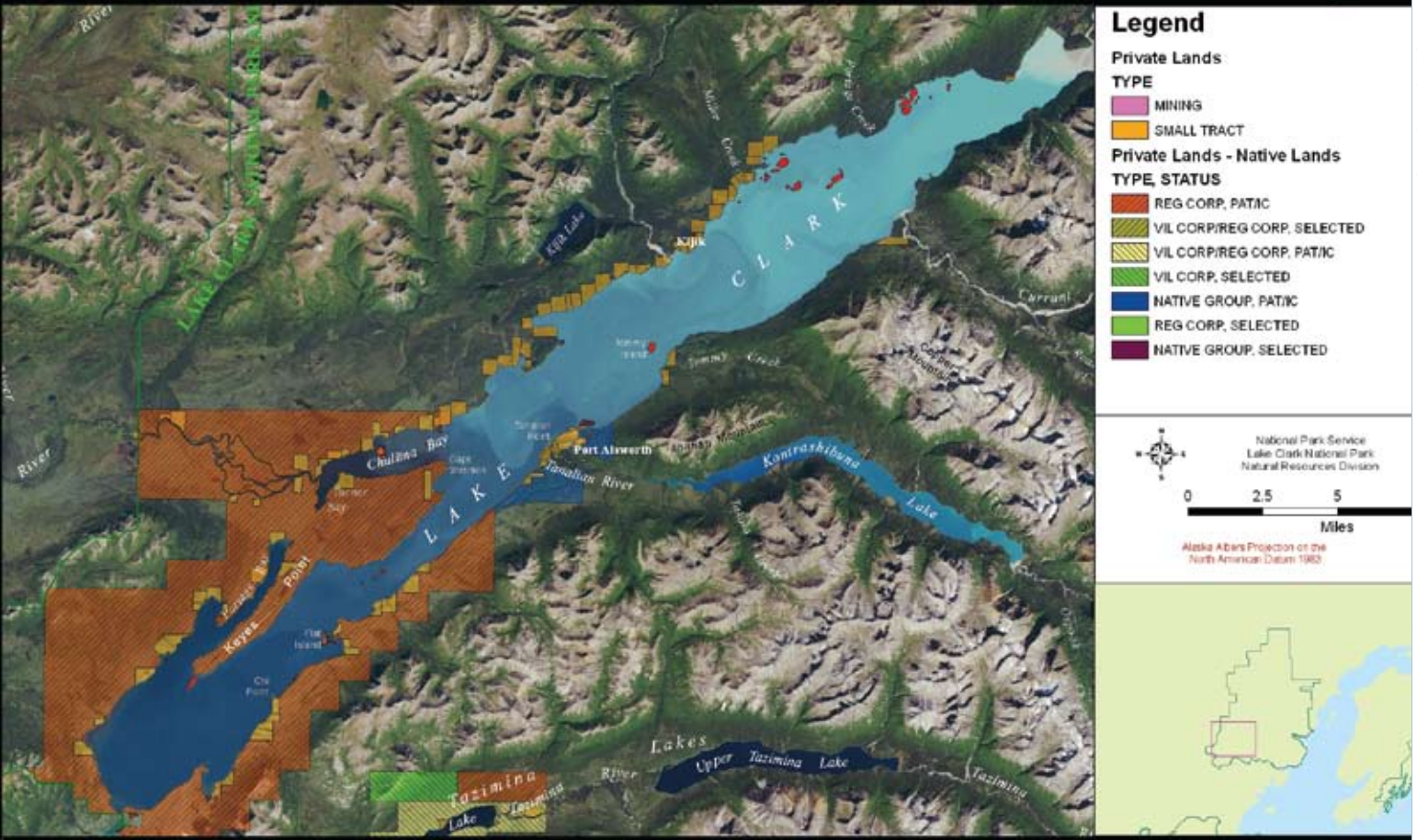
An ATV equipped with a GPS device is being used to map the trail system at Silver Salmon Creek.

KEVIN MEYER / NATIONAL PARK SERVICE



Private Lands around Lake Clark
Lake Clark National Park and Preserve

Alaska Program
National Park Service
U.S. Department of the Interior



it has been occurring since before ANILCA without any Park Service oversight or legal recognition. Any future access requests will be reviewed under the same process.

To protect land within its boundaries, the Park Service strives to acquire strategic inholdings from willing sellers. Since 1980, the Park Service has acquired 23 tracts totaling 10,020 acres at a price of almost \$6.5 million. Land is acquired as funds are available and willing sellers are located; resource protection is the highest priority when acquisitions are considered. In addition to purchasing lands, protecting land can be accomplished in other ways. Conservation easements are cooperative agreements that can provide for continued use by the

original owner and enhanced protection of the natural and cultural resources found on the property.

Acquiring land and/or easements is expensive and time consuming, requiring strong partnerships for success. Partnering with land conservation organizations, such as The Conservation Fund and The Nature Conservancy, is an effective way to negotiate the sale of property with multiple sources of funding (in addition to federal funds).



THE LAKE CLARK NATIONAL PARK AND PRESERVE ASSESSMENT

DAN OBERLATZ

22

Lake Clark National Park and Preserve



Lake Clark National Park and Preserve's intact ecosystems draw visitors seeking a wilderness experience in a landscape of dramatic beauty. Here, a hiker takes in the view from an overlook above Twin Lakes.

NATURAL RESOURCES—ADJACENT MINING DISTRICT MOST URGENT THREAT

The assessment rated the overall condition of natural resources at Lake Clark National Park and Preserve a 91 out of 100, which ranks park resources in "excellent" condition. Unlike most biological reserves worldwide, Lake Clark National Park and Preserve's ecosystems are

intact and nearly pristine, their functions and processes maintained in their natural state. Similar to other national parks in Alaska—and remarkable compared to nearly all parks in the lower 48 states—it still contains all species present at the time of European settlement. With the exception of commercial salmon fishing downstream of park boundaries, few direct human impacts are seen, and all large-scale human impacts are due to distant sources,

such as climate change and air pollution. A potential copper and gold mining district adjacent to park lands—anchored by the proposed Pebble Mine—is the most serious threat to these unspoiled natural systems. If developed, the mining district would be within miles of both Lake Clark National Park and Preserve and Katmai National Park and Preserve, with the potential to destroy fish and wildlife habitat, pollute air and water, and increase local infrastructure and human use pressures. As infrastructure for a mining district is built, it will make increased development more feasible.

DYNAMIC LANDSCAPE BOASTS ACTIVE VOLCANOES AND EARTHQUAKE FAULTS, LAKES, COASTLINES, AND GLACIERS

Lake Clark National Park and Preserve straddles the Alaska Range in southwest Alaska, between Denali National Park and Preserve and Katmai National Park and Preserve. Its eastern edge borders the west side of Cook Inlet, extending north and west from the coastline. West of the coast, the mountains of the Aleutian and Alaska Ranges meet, forming the Chigmit Mountains, which run roughly northeast to southwest.

Lake Clark National Park and Preserve protects numerous large lakes, including the namesake Lake Clark, the sixth largest lake in Alaska. The park also encompasses the coastal waters of Cook Inlet in Tuxedni Bay (though these are under the State of Alaska’s jurisdiction) and more than 6,000 miles of rivers and streams. The Mulchatna, Tlikakila, and Chilikadrotna Rivers are granted special recognition and protection under the National Wild and Scenic Rivers Act.

The waters of Lake Clark National Park and Preserve feed two major watersheds. The Nushagak-Mulchatna watershed is fed by lakes and rivers in the north part of the park, but most of the park’s waters comprise the Kvichak watershed. These lakes and rivers flow into Lake Clark; water then enters Iliamna Lake via the

Newhalen River. Iliamna Lake subsequently flows into Bristol Bay via the Kvichak River. The Kvichak watershed is historically the world’s most productive spawning and rearing habitat for wild sockeye salmon (*Oncorhynchus nerka*); in peak years, about half the sockeye salmon caught in Bristol Bay spawn in its lakes and rivers, representing a third of the entire U.S. catch, and 16 percent of the total world catch.

The park includes 130 miles of coastline along Cook Inlet, popular for its bird rookeries, brown bear viewing, and spectacular scenery. Park Service jurisdiction is upland of mean high tide along the coast.

The Lake Clark region is tectonically active; in fact, it represents the a portion of the Pacific Ocean’s “Ring of Fire,” considered one of the most volcanically and seismically active regions in the world. The park is home to two volcanoes, Mt. Redoubt and Mt. Iliamna, and two more active volcanoes, Mt. Spurr and Mt.

Mt. Redoubt, one of two volcanoes within Lake Clark National Park and Preserve, is in an eruptive phase. This photo was taken on March 30, 2009. Up-to-date information on the eruption can be found on the Alaska Volcano Observatory’s website: www.avo.alaska.edu.



PAGE SPENCER / NATIONAL PARK SERVICE

Augustine, are just outside park boundaries. There are no documented reports of recent eruptions for Mt. Iliamna. In autumn 2008, the U.S. Geological Survey's Alaska Volcano Observatory began detecting potentially significant changes—departures from long-observed background activity—in gas emission and heat output from Mt. Redoubt, which had previously erupted in 1989 and 1966. As of this writing, the volcano is in an active eruptive phase. To find out the latest information about the eruption, visit the observatory's website: www.avo.alaska.edu. While volcanic eruptions do not regularly occur in the park, earthquakes are common. Active fault lines lie under Lake Clark National Park and Preserve; the longest is the 134-mile Lake Clark Fault, which appears to lie within 10 miles of the Pebble Mine site.

Most of the park's glaciers are found in the Chigmit Mountains, where the right combination of climatic and geographic features exists for glacier formation. At one time, glaciers pushed out onto interior plains in the foothills of the park. Once they retreated, their former beds filled with melted water and created the jewel-like lakes found there.

Salt marshes in Tuxedni Bay are replete with sedges and grasses that bears eat during the early spring.

PARK ECOSYSTEMS IN EXCELLENT CONDITION—FORESTS, TUNDRA, WETLANDS, AND LAKE SYSTEMS ARE INTACT

The Park Service's Vital Signs Monitoring Plan for the Southwest Alaska Network describes Lake Clark's ecosystems and vegetation as follows:

Coastal side

The Cook Inlet coast has a narrow fringe with coastal salt marshes in Tuxedni and Chitintna Bays and scattered marshes and lagoons along the Inlet coast. Coastal zones without marshes have long gravel beaches or bedrock cliffs rising abruptly out of Cook Inlet. The salt marshes are a rich zone of sedges and some grasses with varying tolerance to salt water flooding, and form an early spring food source for bears grazing along the beaches. Much of the Lake Clark coast appears to be rising from tectonic movements and narrow bands of young spruce are establishing themselves into the *Elymus* grass community back of the beaches. The depositional flats and lower mountainsides behind the beaches are covered with spruce forests and alder thickets. Both white and Sitka spruce grow





Shallow wetlands along the Neacola River are habitat for beavers, moose, nesting waterfowl, and bears.

along the coast, with Sitka generally south of the Johnson river, and white spruce to the north. Conifer forests have multi-aged trees with thick moss understory, devil's club, salmonberry and scattered alder. Scattered stands of spruce rise out of a sea of alder, especially around the Tuxedni coast and above the dense spruce forest. Alder thickets grow above the spruce zone, thinning out into *Calamagrostis* meadows at the upper limits. The alpine tundra zone is very narrow on the coastal side of the mountains, dominated by *Luetka* and *Empetrum* and forbs. Tundra yields to bedrock and ice.

Mountainous spine

The center of the park is primarily glacial ice and bedrock or till. Most valley glaciers are in retreat, leaving large expanses of moraines and ground till, which is slowly revegetating with mosses and lichens, fireweed and *Dryas*, willow and alder. An ecosystem of note is the expansive shallow wetlands along the Neacola River, which runs into Kenibuna and Chakachamna Lakes. The valley provides rich

habitat for beaver, moose, nesting waterfowl and bear. The wetlands are dominated by sedges and willows, and are maintained by flooding and beaver activity.

Lake side

The western side of the park is dominated by a series of large long lakes with their eastern extents in the Alaska Range, and pushing out to the terminal moraines from the most recent advances of large valley glaciers. Low ridges and subdued mountains lie between the lake systems. The northern part of the park, up by the Stony River, is boreal in character, with black spruce, muskegs, aspen and birch, and wildfire. Further south, vegetation is a mosaic of spruce and mixed spruce/birch or cottonwood forests, paper birch, low shrubs dominated by dwarf birch, dwarf shrub tundra with ericaceous shrubs, scattered wetlands and alpine tundra. Vegetation patterns are arrayed in response to soil texture and drainage patterns from a complex glacial and alluvial history.

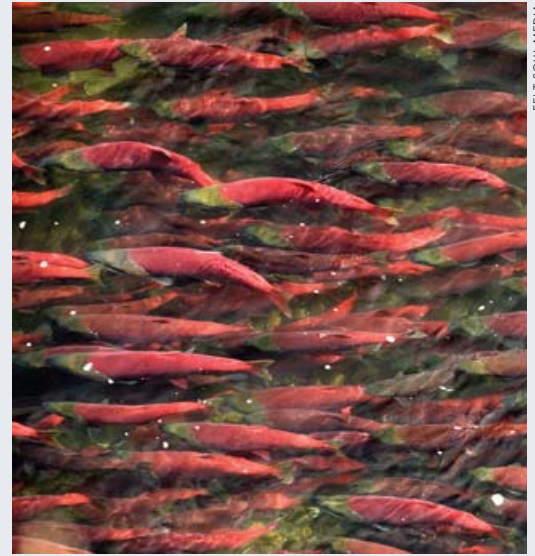
(Continues on page 27)

SOCKEYE SALMON ARE THE CORNERSTONE OF LAKE CLARK'S ECOSYSTEM

Pacific salmon runs have been devastated by changes to their ecosystems from human activities, such as logging, damming, urbanization, and mining. In the 48 contiguous United States, salmon protection efforts are largely focused on restoration of degraded habitat. In Alaska, however, many ecosystems are still relatively pristine, so efforts are focused on keeping them intact. Southwest Alaska's Bristol Bay watershed is a legendary stronghold for wild salmon and home to the world's largest commercial sockeye salmon fishery, worth an estimated \$113 million in 2008.

In addition to their renewable commercial value, salmon are an integral part of Alaska Native culture and the state's thriving sport fishing industry. About 150,000 salmon are caught each year through subsistence and sport fishing—minor when compared to the tens of millions caught commercially each year. Bristol Bay's healthy, intact ecosystem supports diversity and sustainability within the salmon fishery, with genetically unique populations thriving throughout the region's freshwater resources, such as Lake Clark.

Salmon are immeasurably important as the cornerstone of the Lake Clark ecosystem. In fact, the enabling legislation for Lake Clark National Park and Preserve states that the park's primary purpose is to protect a portion of the Bristol Bay watershed for perpetuation of the wild salmon fishery. From 2000 to 2008, an estimated 170,000 to 750,000 sockeye salmon returned to the freshwater lakes and streams within the Lake Clark watershed (number varied each year), where they subsequently spawned and then died in large numbers. In so doing, they transported millions of tons of nutrients from the rich marine environment to Alaska's



FELT SOUL MEDIA

Sockeye salmon are integral to the economy of southwest Alaska, the culture of Alaska Natives, and the ecosystem as a whole.

freshwater systems and adjacent uplands. This annual nutrient influx links aquatic and terrestrial environments and increases production at all levels of the food chain. Nutrients from salmon are an important food resource for many terrestrial predators and scavengers, including bald eagles, brown and black bears, wolves, coyotes (*Canis latrans*), red fox (*Vulpes vulpes*), wolverine (*Gulo gulo*), lynx (*Lynx canadensis*), and freshwater fish such as lake trout (*Salvelinus namaycush*) and rainbow trout (*Oncorhynchus mykiss*). Bristol Bay's commercial salmon catch somewhat alters the park's natural ecosystem function by limiting the amount of nutrients that would otherwise return to the terrestrial and freshwater systems in and around Lake Clark National Park and Preserve with the return and death of the salmon.

Estimates have been made for sockeye salmon "escaping" the commercial fishing

fleet and returning to the Kvichak River watershed since the mid-1950s. Since 1955, the Alaska Department of Fish and Game has estimated the number of sockeye salmon returning to the Kvichak River watershed, with estimates ranging from 0.2 to 25 million fish, and averaging 5 million fish annually. Approximately 10 to 30 percent of the Kvichak River run migrates into Lake Clark National Park's waters, with an average of 18 to 19 percent in recent years.

The number of salmon that returned to Bristol Bay streams to spawn fell dramatically in the early 2000s for unknown reasons. Estimates indicate that just 1.8 million fish returned to the Kvichak River in 2000, 1.1 million turned in 2001, and fewer than 704,000 returned in 2002. As a result, the governor temporarily declared the region an economic disaster area, making residents eligible for state-supported economic relief such as low-interest loans. Sport fishing was closed some years, and commercial fishing in the Kvichak District was closed for several years. The drop in numbers of fish prompted concerns that climate change or other factors (e.g., ocean vessels trawling for other fish species, but also capturing salmon as by-catch) were contributing to a long-term decline. Salmon counts have been gradually recovering since the 2002 low, with 5.5 million fish in the Kvichak in 2004. The overall strength of the intact Bristol Bay ecosystem and diversity of its wild salmon stocks have been credited for the fishery's ability to rebound from factors that have affected past runs.

A 2005 vascular plant inventory identified 571 species expected to occur in the park based on existing collections, literature, biogeography, and habitat types. Of these, 80 percent have been collected and verified. No federally listed threatened or endangered plant species are found in Lake Clark National Park and Preserve, but 12 species confirmed in inventories are considered rare by the Alaska Natural Heritage Program; all but one are alpine species. The rare species include some plants that are rare in Alaska but common elsewhere in North America, such as rayless arnica (*Arnica diversifolia*), and others that are endemic to Alaska and the Yukon, such as Alaskan douglasia (*Douglasia alaskana*) and Lemmon's rockcress (*Arabis lemmonii*).

Park scientists believe that—with one recent exception—no non-native, invasive plant species exist away from developed areas in the park. The one exception is the presence of dandelions (*Taraxacum officinale*) found in a few areas along the coast of Lake Clark and on Upper Twin Lake. Park staff have removed dandelions from Upper Twin Lake, and they have begun control of those at Lake Clark; however, seed banks are long-lasting, so additional treatments may be necessary. Because most non-native specimens in the park have been found only in areas with disturbed soil, they are not expected to spread. Even so, managers are ever vigilant, as five invasive species have been found in privately owned developed areas at either Port Alsworth or Silver Salmon Creek: redroot amaranth (*Amaranthus retroflexus*), lamb's quarters (*Chenopodium album*), ox-eye daisy (*Leucanthemum vulgare*), common sheep sorrel (*Rumex acetosella*), and common chickweed (*Stellaria media*). In addition, staff recently discovered European bird cherry (*Prunus padus*) on park land in Port Alsworth. While the park's remoteness provides protection against unwanted invasive species introductions, if invasive species were able to establish, infestations might go unchecked for years before they were detected, due to the park's vast size. By that point, control would be a costly proposition.



KEVYN JALONE / NATIONAL PARK SERVICE

Watching brown bears is popular with visitors to Lake Clark National Park and Preserve. Ensuring this activity does not harm the bears and their habitat is important, so the park offers a best practices and training program for bear-viewing guides.

WILDLIFE—IMPRESSIVE LARGE MAMMALS DRAW VISITORS

Lake Clark National Park and Preserve's ecosystems harbor some of the most charismatic wildlife found in North America. A 2003 mammal inventory identified 36 species thought to exist in the park; most of these have been confirmed. No federally listed threatened or endangered species exist in the park; in fact, some species that are considered threatened or endangered in the lower 48 states (e.g., wolves and brown bears) are found in sustainable numbers in the park, due to its intact ecosystems. Because the park and preserve harbors the full complement of species that comprise a functioning ecosystem, natural predator/prey relationships can occur.

Some visitors to Lake Clark are particularly enthralled with the park's brown bears. They play the role of top predator, shaping the population dynamics of other animals in the system. Bear excrement and salmon carcasses transfer nutrients from plentiful salmon runs into terrestrial ecosystems. Without bears, the reduced nutrient input from salmon would result in an overall decline in the rate of productivity for all systems in the park. As brown bear viewing becomes an even more popular visitor activity, the Park Service needs to proactively work with bear viewing guides to ensure that viewing activities do not encroach upon critical bear habitat or change bear behavior. Toward this end, the park has had a best practices and guide training

program since 2007. In addition to brown bears, black bears (*U. americana*) use all areas of the park and preserve.

Wolves (*Canis lupus*) are another of the park's large and charismatic predators. They appear to inhabit all of the lowlands in the park, including coastal areas. The Park Service initiated a study in winter 2008-2009 that is using radio collars to track wolves. Both bears and wolves are hunted in Alaska, including within the preserve portion of Lake Clark, so accurate information on populations of these species is critical (see "Sport and Subsistence Hunting" on page 36 for more information).

Numerous moose population surveys have been conducted at Lake Clark National Park and Preserve. The moose population on the western side of the park and preserve has been gradually declining over the past decade. Moose are hunted by people for both sport and subsistence. Subsistence hunting is limited by access (aircraft is prohibited to support subsistence in the park). Most hunting in the preserve and outside the preserve occurs where access by water is possible. Many regions of the preserve are not easily accessible and contain higher concentrations of moose. Populations on the coastline of the park, separate from those in the Lake Clark drainage, are surveyed sporadically at best, but seem to be doing well based on winter observations. These populations are not hunted for sport because they are within the national park, where hunting is prohibited. Subsistence hunting on the coast is limited because there are only two subsistence households residing on the coast, and non-coastal residents are prohibited from using aircraft to access the coast.

During part of the year, Lake Clark National Preserve is normally home to the migratory Mulchatna caribou (*Rangifer tarandus*) herd. Subsistence hunters rely heavily on caribou for food. The Alaska Department of Fish and Game monitors caribou populations. Currently, the herd is estimated at 36,000 animals, down from approximately 200,000 in 1999. The cause of

the decline is unknown, but it is thought to be cyclical and related to disease and habitat conditions.

Approximately 600 Dall sheep (*Ovis dalli dalli*)—the northernmost species of wild sheep in North America—are found in the park, primarily along the west side of the Chigmit Mountains. Although Dall sheep are hunted (primarily for subsistence), they are not considered a major game species due to their inaccessibility (inhabiting high-elevation, rocky alpine areas), smaller size, and the fact that the main populations reside within the park, where there is no sport hunting.

The park is also home to relatively small carnivores (when compared to bears) such as northern river otter (*Lontra canadensis*), Canada lynx, wolverine, and American mink (*Martes americana*), all of which can be hunted or trapped in the preserve portion of Lake Clark National Park and Preserve. Six species of shrew (*Sorex* spp.) live in the park and preserve, as do 14 species of rodents, including North American porcupine (*Erethizon dorsatum*) and American beaver (*Castor canadensis*). The snowshoe hare (*Lepus americanus*) and the collared pika (*Ochotona collaris*) are also found in the park and preserve.

Marine mammals such as harbor seals (*Phoca vitulina*), beluga whales (*Delphinapterus leucas*),

Caribou are important sources of food for subsistence hunters. Estimates indicate that the size of the Mulchatna caribou herd, which inhabits Lake Clark National Preserve during part of the year, is about 36,000 animals. This is down from about 200,000 animals in 1999.



NATIONAL PARK SERVICE

Lake Clark National Park and Preserve's lakes and streams support fishes such as lake trout and arctic grayling, attracting sport fishers from around the world.

DAN OBERLATZ



and sea otters (*Enhydra lutris*) may be seen swimming offshore. Several hundred harbor seals haul out at Tuxedni Bay, Chinitna Bay, and the Johnson River each year. Because the park administers land only to mean high tide along Cook Inlet, it has no jurisdiction over marine waters (except for some influence in part of Tuxedni Bay, where the park's boundary encompasses waters administered by the State of Alaska).

Of the 189 species of birds documented or expected to occur in the park and preserve, 70 are landbirds, and many are neotropical migrants. Raptors include bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*)—both of which nest in the park—as well as other species that breed in the area: northern goshawks (*Accipiter gentilis*), northern harriers (*Circus cyaneus*), and merlins (*Falco columbarius*). The cliffs along interior lakes and rivers serve as eyries for peregrine falcons (*Falco peregrinus*).

Waterfowl use park lands for nesting and molting, and large migratory flocks rest and feed there. Sea ducks—primarily scoters (*Melanitta* spp.)—are the most abundant waterfowl on the coast, numbering more than 18,000

by mid-August. Approximately 30 pairs of trumpeter swans (*Cygnus buccinator*) nest in the park.

Seabird breeding colonies occur along Cook Inlet and its numerous bays. During spring migration, an estimated 122,000 shorebirds use intertidal mudflats in Tuxedni and Chinitna Bays. The predominant species are western sandpiper (*Calidris mauri*) and dunlin (*C. alpina*).

In addition to its famous sockeye salmon (see "Sockeye Salmon Are the Cornerstone of Lake Clark's Ecosystem" on pages 26 and 27), the park protects an estimated 45 other fish species in its myriad water bodies. Sport fishing is a major economic force in the region, with an estimated \$61 million spent in Alaska on Bristol Bay sport fishing trips in 2005. Sport fishes in the Lake Clark area include arctic char (*Salvelinus alpinus*), lake trout, arctic grayling (*Thymallus arcticus*), northern pike (*Esox lucius*), rainbow trout, and coho salmon (*O. kisutch*). In winter, local residents icefish for burbot (*Lota lota*) and whitefish (*Coregonus* spp.).

Five native amphibian species are found in Alaska, but only one—the wood frog (*Rana sylvatica*)—has been found in Lake Clark National Park and Preserve. There are no reptiles in the park.

Sand beaches and coastal mud flats both within and adjacent to the park support healthy bivalve populations. These invertebrates provide an important prey resource for many animals, including bears, sea otters, shorebirds, and ducks. The most common bivalves found in a 2006 survey were Baltic macoma (*Macoma balthica*), Pacific razor clam (*Siliqua patula*), basket cockle or Nuttall cockle (*Clinocardium nuttallii*), Alaska great-tellin (*Tellina lutea*), soft-shell clam (*Mya arenaria*), and truncate soft-shell clam (*M. truncata*).

POTENTIAL FUTURE MINING DISTRICT ON ADJACENT LANDS A MAJOR THREAT TO RESOURCES

The proposed Pebble Mine—along with its infrastructure needs and other potential mineral and energy development on surrounding lands—overshadows other threats and issues at Lake Clark National Park and Preserve. The Pebble deposit—low-grade copper, gold, and molybdenum in a highly reactive ore body—is located on State of Alaska mining claims less than 14 miles from the preserve’s western boundary. It also sits in the headwaters of Bristol Bay, the largest remaining wild sockeye salmon fishery in the world, and alongside the Pacific Ocean’s “Ring of Fire,” a volcanic and seismically active region. The mine is proposed by Pebble Limited Partnership, a joint venture of London-based Anglo American PLC and Northern Dynasty Minerals Ltd., a Canadian junior mining company.

Currently, the mine project is in its advanced exploration stage and Pebble Limited Partnership is planning for upcoming regulatory reviews and working to determine the extent of the deposit and the type of mine(s) that will be constructed. The permit process will likely begin in late 2009 or 2010 and may take several years to complete, but known details of the project design are causes for concern:

- The mine itself may employ both open-pit and underground mining techniques. An open-pit mine at Pebble West—which could be as deep as 2,000 feet—could cover two square miles. An underground mine at Pebble East may use extraction by block caving to depths of 6,000 feet. The mining process would produce millions of tons of tailings and potentially acid-generating sulfide mine waste that would be stored in two giant tailings ponds enclosed by four earthen dams, the largest measuring more than 4 miles long and 740 feet high. Water treatment facilities would operate in perpetuity—forever—to try to prevent contamination of drinking water and salmon habitat.
- A 104-mile industrial haul road between the Pebble mining district and a new proposed port on Iniskin Bay would be constructed. Freight and consumables used at the mine site would be transported along this road, which would run roughly parallel to the southern boundary of the park, coming as close as two miles. Pipelines for transporting ore concentrates would also follow the industrial road corridor.
- A new major power source would be required to create more energy than the city of Anchorage currently uses. A new natural gas generation facility on the Kenai Peninsula, which would require transmission lines being buried beneath Cook Inlet and erected along the access road, is just one option under consideration. Hydroelectric power, coal, imported fuels, or a combination of the above are also possibilities.
- Subsistence and sport resources at the park and preserve could be affected. Pebble Limited Partnership has indicated that the mine will create 1,000 permanent jobs (lasting 50-80 years), while the construction phase of the project will create 2,000 temporary jobs (2-3 years), bringing many more people to the sparsely populated region. Workers moving into the region qualify for subsistence hunting as soon as they set up a primary residence in a resident zone

community, assuming they have lived in the state for at least one year and have acquired a resident hunting license. Increased demand and pressure upon subsistence resources, particularly moose and caribou, is a significant concern for current residents and Lake Clark National Park and Preserve staff.

Preliminary permit authorizations and design plans show that a large, open-pit mine operating adjacent to park lands may not be compatible with the purposes for which the park was established, nor compatible with preserving the Bristol Bay region's natural and cultural riches.

- **Water quality and quantity:** Pebble Mine would require vast quantities of water—about 35 billion gallons annually. Water is a lubricant in ore processing, and it is mixed with pulverized ore and chemicals that separate out copper, gold, and other metals. Water will also be needed to create giant tailings ponds where waste materials will be submerged. Access by waterfowl and wildlife to these new contaminated water sources will have to be prevented. The Pebble Limited Partnership must appropriate surface or groundwater from several rivers, and build dams or embankments to hold wastewater. Groundwater in the area of the Pebble deposit flows through fractured bedrock and unconsolidated glacial deposits, and it often flows between topographically defined watersheds. There is high potential for contaminated water from tailings ponds or other sources to move into an adjacent, but uncontaminated drainage. The mining process exposes buried sulfides to the air and water, creating an acidic solution that dissolves heavy metals found in the ground. The effects of acid mine drainage

on water quality are well documented in numerous mines throughout the United States and include fish kills, significant changes in water chemistry and the composition of species able to live in the altered conditions, long-term contamination of sediments, and elevated metal concentrations in the water column and sediments. Mine drainage as well as fugitive dust stirred up by mining activities impair water quality and would have especially significant effects on Lake Clark National Park and Preserve's water bodies that are important to salmon and other aquatic and marine organisms. Salmon may have to swim through contaminated rivers to reach spawning grounds, which could affect survival and spawning success.

- **Wild salmon fisheries:** Impacts on aquatic species are directly tied to water quality and habitat destruction, as well as effects from mining roads crossing streams used by resident fish and anadromous fish such as salmon. Low-level increases of metals—in particular copper—have been shown to negatively affect the physiology (blood chemistry, swimming performance, sense of smell, etc.), and ultimately, the fitness (survival and reproduction) of fish. Pollutants leaching from tailings ponds and deposition of mining dust into water bodies are likely to occur and result in changes in pH and increased heavy metal concentrations in the water column. Erosion along the road corridor could cause increased sedimentation into waterways. Sediments can clog fishes' gills and affect their overall health and survival. They also can coat streambeds, smothering benthic organisms. Chronic turbidity issues often result in localized losses of aquatic species.

- **Wildlife:** An increase in development (haul road, pipeline corridors, new port, and other mine-related developments) and people (working and residing) in the area will increase pressure on wildlife habitats and populations, and it will increase competition for the right to hunt animals for both subsistence and sport. Development is likely to affect fish and wildlife by fragmenting habitat, disrupting natural sounds with noise, polluting air and water, and affecting normal landscape use—including migration routes—with the increased disturbance associated with the presence of people in an area that is currently sparsely inhabited. And as mentioned previously, wildlife (and waterfowl) will have to be prevented from accessing contaminated artificial water sources.

- **Air quality:** Fugitive dust from the mine site and the selection of the power source for the mining operations (natural gas, coal, etc.) may have ramifications for air quality in the mine’s vicinity. Increased levels of particulates, decreased visibility, and increased deposition of sulfur and nitrogen compounds onto vegetation, soils, and water are all possible. Also, mine tailings may be exposed to weathering and wind, leading to creation of toxic dust clouds and the problems mentioned above. The park will need to monitor air quality to identify, measure, and mitigate negative effects.

- **Subsistence:** Nondalton, a remote village with a population of fewer than 200 people, sits between the border of Lake Clark National Park and Preserve and the mining claims staked around the Pebble deposit. Jack Hobson, a Nondalton tribal leader, says that percussion caused by drill rigs and helicopter blades associated with Pebble’s

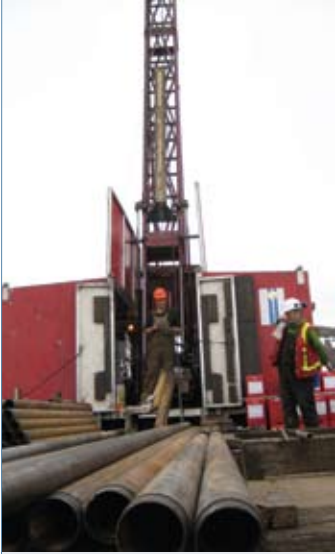
exploratory activities has already disturbed caribou migration patterns and made it increasingly challenging for village residents to practice their traditional subsistence harvests and provide food for their families. Although mining could bring some economic benefit to some community members, what is not often discussed is how this sort of development negatively affects the health of individuals and the community. Not measured by “baseline studies” are the stress, anxiety, fear, and divisiveness that emerge in nearby communities as residents attempt to cope with external events that they have not chosen or planned, and that they feel they have no control over. Superimposed on this would be permanent changes to the landscape, with which local peoples have a deep cultural bond.

- **Visitor experience and local tourism economy:** Travelers to a remote destination such as Lake Clark National Park and Preserve often expect near-pristine air, water, and land, as well as abundant wildlife. Some are fans of Dick Proenneke’s *Alone in the Wilderness* documentary film and published journals; some are in search of world-class fishing or are out to experience the heritage of

The region’s wild salmon fisheries, clean waters, abundant wildlife, clear air, subsistence culture, and tourism economy are at risk from the proposed development of Pebble Mine and an industrial mining district next to Lake Clark National Park and Preserve. Pebble Mine exploratory operations are shown here.



MELISSA BLAIR / NATIONAL PARKS CONSERVATION ASSOCIATION



One of multiple core-drilling rigs located at the proposed Pebble Mine site is shown here. Mineral samples are being collected to depths of 6,000 feet and beyond. A mining district next to Lake Clark National Park and Preserve could have extensive negative effects on Bristol Bay's clean waters and salmon habitat.

unique indigenous cultures; and some are simply drawn to majestic views of turquoise lakes and glacier-capped mountains. A mining district next to the park would undoubtedly affect opportunities for solitude and personal renewal in Lake Clark's backcountry, would significantly diminish visitors' perceptions of the park as a wilderness experience, and could weaken the region's strong tourist draw, negatively affecting the viability of local tourism and sport economies.

Pebble Limited Partnership has stated that the mine is undergoing extensive environmental review, and that it will only operate if it can do so without harming adjacent natural resources, specifically the invaluable salmon fishery. Approval of mining operations in the Lake Clark region must progress through the scrutiny of the State of Alaska's permitting process, which is now in the early stages. Budget shortfalls affecting federal land management agencies, such the Park Service, have also affected the State of Alaska's Department of Environmental Conservation, raising questions over its capability to provide sufficient oversight of a project of this scale in such sensitive habitat. A 2008 article in the *Alaska Law Review* states:

"State statutory standards are inadequate to protect fish from the Pebble Mine...none of the statutes that are administered by Department of Natural Resources (DNR) and that apply to permitting facilities related to Pebble Mine articulate clear standards for protecting fish and game, habitats, and public uses of them. [DNR is only required] to 'consider' fish, game, and recreation, rather than to protect them."

The article also quotes a 2006 publication titled *Comparison of Predicted and Actual*

Water Quality at Hardrock Mines: The Reliability of Predictions in Environmental Impact Statements, by J.R. Kuipers, A.S. Maest, K.A. MacHardy, and G. Lawson. This report states, in most cases, a mine's actual water pollution more closely resembles its potential impacts (before companies' mitigation measures are undertaken) than its predicted impacts (expected impacts described in environmental impact statements that take into account the proposed mitigation measures). Based on other comparable mines, the study reveals that negative impacts are likely to be greater than Pebble Limited Partnership has presented.

Pebble is not the only mine development proposed for the area around Lake Clark National Park and Preserve. A thousand square miles of mining claims have been staked west of the park since 2003, surrounding the Pebble deposit. In addition, a Bureau of Land Management decision during the waning hours of the Bush Administration recommended that nearly a million acres of federal lands in the Bristol Bay watershed be opened for mining. Thus far, the Obama Administration has not embraced this recommendation so these lands remain closed. Efforts to require the Bureau of Land Management to revisit and reconsider the cumulative environmental impacts of these recommendations are actively being pursued. Although these lands are remote and currently inaccessible by road, construction of the Pebble Mine's support infrastructure (roads, port, power sources) could make a Bristol Bay mining district more economically feasible.

A broad coalition of Bristol Bay's nontraditional allies have united over shared renewable resources—clean waters and wild salmon—to oppose development of the Pebble Mine and an industrial mining district. This coalition includes commercial

fishermen, lodge owners, sport fishing guides, rural subsistence users, conservation organizations such as NPCA, and some of the Alaska Native villages downstream of the proposed mine. Several prominent jewelers, including Tiffany and Company, have pledged never to use gold from the Pebble Mine.

If the Pebble Mine is approved and developed, it would signal the start of a mining and energy boom in southwest Alaska. For more information about the potential risks to our national parks from the Pebble mining district, visit www.npca.org/alaska. *Red Gold*, a film about the people of Bristol Bay, the cultural importance of salmon, and concerns about the proposed Pebble mining district, can be found at www.redgoldfilm.com.

Other adjacent development concerns.

A 30-square-mile coal strip mine has been proposed east of the park on the salmon-rich Chuitna River, prompting the river to be featured on American Rivers' "Most Endangered Rivers" list in 2007. It is unknown where the mined coal would be used; yet, whether it is burned by power plants locally, domestically, or internationally, it could negatively affect Alaskan landscapes and fisheries. Airborne pollutants can travel long distances and be deposited far from their source; in fact, the University of Washington has found that toxic particles from power plants and industry in China have contaminated some Alaskan fish with unsafe levels of mercury. Airborne pollutants from coal-fired power plants are known to have degraded national park air quality in Great Smoky Mountains National Park and beyond; potential park air quality impacts (and associated impacts from deposition of pollutants on the landscape and waters) from the Chuitna coal mine are causes for concern. In addition to air pollution from the

burning of coal, increased marine traffic in Cook Inlet related to support services and ore shipments from the proposed Chuitna coal and Pebble mines would significantly increase water pollution risks along Lake Clark and Katmai National Parks' coastlines.

An inholding on the east side of the park includes the Johnson River tract, an area with a patented gold mine that contains an estimated 270,000 tons of ore. Park managers are particularly concerned about the development of mines on the Johnson River tract due to its location. If a mine and support network of new roads and ore stockpiles are developed near the Johnson River, contaminants could reach the coastal estuary and be subsequently transported via prevailing tidal currents. Although there has not been any activity on the Johnson River tract since the 1980s, rising gold prices and development of Pebble and its accompanying infrastructure could make mining there more viable.

Chakachamna Lake has been identified as a potential hydropower generation site; development of such would result in modifications to the natural lake system. Because the lake is adjacent to Lake Clark National Park, park staff will closely evaluate potential effects that hydropower development could have on park resources, if the site is selected for development and proceeds to the permitting process.

If development occurs at Pebble, on the Chuitna River, at the Johnson River tract, and at Chakachamna Lake, Lake Clark National Park and Preserve would be surrounded. While some benefits may be created locally (i.e., jobs, roads, and a potential source of power), in a short time the region would be completely transformed, leaving Lake Clark similar to many national parks in the lower 48 states—an island in a sea of development.

The Alaska Department of Fish and Game manages sport hunting in Lake Clark National Preserve. The department employs strategies to reduce populations of predators, such as wolves and bears, in an attempt to increase prey numbers and maximize hunting opportunities. This can upset the balance of the ecosystem.



JIM NATIONS/NATIONAL PARKS CONSERVATION ASSOCIATION

SPORT AND SUBSISTENCE HUNTING— MORE INFORMATION NEEDED TO GUIDE MANAGEMENT

The Alaska National Interest Lands Conservation Act (ANILCA) of 1980 allows for subsistence use of resources in most Alaska national parks and preserves, and sport hunting in its national preserves. Sport hunting on National Park Service (NPS) lands in Alaska is managed by the Alaska Department of Fish and Game (ADF&G), with regulations set by the Alaska Board of Game (BOG). The Park Service adopts state regulations as their own under a Park Service rule that permits hunting and trapping in national preserves in accordance with applicable federal and non-conflicting state laws and regulations. State laws are automatically adopted into federal regulation as long as they are deemed “non-conflicting” with park purposes. Unfortunately, some actions taken by the BOG have not considered those Park Service comments that point out when proposed new

state regulations conflict with park purposes as detailed in ANILCA (the park’s enabling legislation), and the Park Service Organic Act (the 1916 act creating the National Park Service).

Certain state hunting regulations conflict with Park Service mandates for management of wildlife. While the Park Service at Lake Clark is mandated to maintain natural and healthy populations of wildlife in the park and healthy populations of wildlife in the preserve, ADF&G generally manages wildlife to maximize human hunting opportunities. This one-sided approach to management—with its emphasis on predator control—can upset the ecosystem, leading to an imbalance of interrelated species of plants and animals. ADF&G focus in recent years has shifted to an intensive management strategy that includes liberalizing regulations to make it easier for hunters to harvest predator species, such as bears and wolves. This management includes the reduction of predator populations in an effort to increase prey (i.e., caribou) numbers.

Direct predator control by means such as shooting wolves from airplanes is not allowed within Lake Clark (or other national parks and preserves), but ADF&G is able to manage predator levels indirectly through methods such as the increase of bag limits (number of animals that can be taken) and liberalized hunting seasons for predators. Eliminating the need to purchase hunting tags or permits for predators allows the “incidental” taking of these animals. For example, hunters out to shoot a caribou or moose have the option to kill a bear if the opportunity presents itself; no special tag is needed to do so. This results in more predators such as bears being killed. The State has also authorized same-day airborne hunting and trapping; this means that hunters can locate animals by plane and pursue them on the ground that same day. Under the previous rule, hunters had to camp overnight before pursuing animals located by air. The Park Service does not allow same-day hunting.

NPCA supported the Park Service’s successful efforts to oppose the broadening of formal predator control programs on park-managed lands and negotiate changes to proposed intensive management regulations that would have authorized unrestricted baiting as well as chasing of wolves and other predators with snow machines. Unrestricted baiting and chasing with snow machines likely would have increased the number of predators killed. Even though broadening of predator control programs on park-managed lands has been successfully challenged and unrestricted baiting and chasing of predators with snow machines is not allowed, NPCA remains concerned that changes in seasons and/or bag limits (see above paragraph) have a high potential for significantly impacting predator populations over the long term. Manipulating predator populations is contrary to the Park Service’s *Management Policies*.

Adequate population estimates for harvested animals are needed to successfully manage

these species. According to NPCA’s 2008 report *Minding the Gap*, better survey methods and regular surveys are needed to establish credible baseline information and to allow for consistent population monitoring over time. The possibility that large-scale mining operations may be developed in the area makes the need for reliable wildlife population data even more urgent, as “understanding baseline wildlife populations is the only way to monitor changes to and within park wildlife” (from *Minding the Gap*). The 2008 report concludes that the park “needs reliable, increased base funding to carry out routine surveys and make headway on additional research needs and ideas.” Some of this need is now being addressed by the Southwest Alaska Inventory and Monitoring Network’s baseline inventory program.

Park scientists also need accurate data on animals harvested to effectively manage the hunted wildlife populations under their care; set reasonable and healthy harvest limits; manage for other associated prey or predator species; and assess habitat conditions. But because state and federal agencies use different methods of record keeping, annual totals of animals killed differ. In addition to discrepancies in recording animals killed through subsistence or sport hunting, in a preserve the size of Lake Clark, some wildlife may be killed—either in defense of life and property or illegally poached—without being reported. Lake Clark biologists cannot successfully manage hunted species without accurate information regarding numbers killed.

In addition to animals taken through sport hunting, Lake Clark wildlife managers must consider subsistence take. According to U.S. Census Bureau counts, about 650 people lived in the six resident zone communities near the park in 2000. A 2004 subsistence study found that nearly every person in each of the six communities participated in subsistence activities and used wild resources; estimated wild resource harvests averaged 392 pounds per

Manipulating populations of predators, such as bears and wolves, is contrary to the Park Service’s *Management Policies*. However, indirect predator management by the Alaska Department of Fish and Game—such as an increase in bag limits and liberalized hunting seasons—results in more predators being killed.



person. This average—which represents harvest from the park and preserve and other nearby lands—indicates how important subsistence is as a food supply for the region’s residents. In the study, salmon was the primary resource harvested; other fish, moose, caribou, and plants are also regularly harvested, as well as marine mammals, clams, small game, birds, and eggs.

Proposed industrial mining and energy development on adjacent lands may affect subsistence and sport resources at the park and preserve. Workers moving into the region qualify for subsistence hunting as soon as they set up a primary residence in a resident zone community, assuming they have lived in the state for at least one year and have acquired a resident hunting license. Increased demand and pressure upon subsistence resources, particularly moose and caribou, is a significant concern for current residents who anticipate conflicts with new subsistence users. Pebble Limited Partnership has instituted a “No Hunting, Fishing, or Gathering” policy for all employees and consultants working at the Pebble deposit site. However, in fall 2008, a Pebble Mine subcontractor applied for a subsistence sheep-hunting permit in Lake Clark National Park. Ultimately, the request was determined to be fraudulent and prosecution was undertaken. Pebble Limited Partnership has indicated that the mine will create 1,000 permanent jobs (lasting 50-80 years), while the construction phase of the project will create 2,000 temporary jobs (2-3 years), bringing many more people to the sparsely populated region. A mining district that could develop in association with Pebble could exponentially increase the number of workers and new subsistence users. Park staff and concerned residents anticipate that new subsistence hunting applications will increase in coming years, and that non-resident sport-hunting in Lake Clark National Preserve will gain in popularity as well. These topics are ongoing discussion items between Lake Clark staff

and the park’s Subsistence Resource Committee. Significant increases in subsistence and/or sport hunting within the park and/or preserve, or significant increases in resident zone community populations, may trigger Park Service action to maintain sustainable moose and caribou populations and mitigate conflict and competition between subsistence users and sport hunters.

Because federal and state programs each operate under separate legislation and regulations, Alaska’s dual wildlife management program is the most complex in the nation. Managing wildlife—animals that do not recognize arbitrary human borders—over the vast landscape of Alaska requires cooperation among agencies, constituents, and other stakeholders. Despite some difficulties, the Park Service cooperates with the ADF&G and the U.S. Fish and Wildlife Service on a number of wildlife surveys and monitoring programs, exchanging data to build a more comprehensive understanding of wildlife populations.

AIR AND WATER QUALITY—LIMITED DATA INDICATE EXCELLENT CONDITIONS

With a multitude of small plane flights occurring daily in the Lake Clark region, weather monitoring garners more attention than air quality, which is often assumed to be pristine in the midst of such vast wilderness. In 2002, the National Park Service’s Air Resources Division—in cooperation with many western national parks, the U.S. Environmental Protection Agency, the U.S. Geological Survey, and several universities—initiated the Western Airborne Contaminants Assessment Project to determine the risk to ecosystems and food webs in western national parks from the long-range transport of airborne contaminants. Lake Clark is not among the parks included in this project, but Denali National Park and Preserve to the north and Katmai National Park and Preserve to the south are. Data for these two parks show gener-

ally good air quality, suggesting that air quality at Lake Clark is also good.

Lake Clark National Park and Preserve is subject to air pollution from local sources both natural (ash and gases from volcanic activity) and human-associated (wood-burning stoves and diesel generators), nearby industry (oil and gas development along the Cook Inlet), and long-range pollution transported from Asia. If Pebble Mine is developed outside the park, the dust from construction, roads, and finely ground mine tailings are likely to become the main source of local pollution. Although power sources for the Pebble Mine are currently unknown (power demands are anticipated to exceed 350 megawatts), large-scale power generation methods, such as coal combustion, employed at similar mines elsewhere have been sources of significant air-quality degradation.

Water-quality information is lacking for significant portions of the Park Service's Southwest Alaska Network of parks, which includes Lake Clark National Park and Preserve. But due to Lake Clark's remoteness, the fact that potential sources of contamination or degradation are known, and because many of its water bodies originate in the park, water quality is thought to be good at the park and preserve. Studies of several park rivers done in the last ten years indicate dissolved oxygen levels are adequate to support fish and levels of metals are within accepted limits. Additional studies would provide a more comprehensive understanding of water quality throughout the park and of the interconnections to external park tributaries, such as the Chulitna River. Monitoring surface and groundwater quality will be especially critical if the Pebble Mine and mining district infrastructure are established, or if further development in the region occurs. Baseline data collection should be a high priority now in potentially affected areas, but dedicated funds are lacking.

GLOBAL CLIMATE CHANGE—ARCTIC SYSTEMS ARE SEEING FIRST IMPACTS

Climate change impacts are felt most intensely in Arctic regions, where temperatures are rising more rapidly. Global climate change is expected to bring various processes into play throughout Alaska, such as:

- Rising coastal water levels that could inundate cultural and archaeological sites
- Expansion of trees and shrubs into areas that were previously tundra
- Melting of glaciers and reduction in the extent of ice fields
- Introduction and expansion of non-native, invasive species and outbreaks of forest insects, such as the spruce beetle
- A northward and/or upward (elevational) shift in the range of many species, as well as stresses on migratory animals, such as caribou, spurred by ecosystem changes in food sources and calving area locations

Staff at Lake Clark National Park and Preserve are acutely aware of the need to anticipate, study, and mitigate climate change effects. In June 2008, two climate stations were installed in the park at Snipe and Hickerson Lakes to begin tracking baseline data that can be used in climate monitoring and further work to predict changes associated with climate. A third station, in the Chigmit Mountains, will be installed in summer 2009 (weather permitting). The Park Service's Southwest Alaska Inventory and Monitoring Network, in coordination with partners such as the U.S. Geological Survey, is taking a comprehensive approach to assessing and monitoring "vital signs" such as climate change. Already, examination (by the Inventory and Monitoring program) of photographs taken over the last century by local residents and researchers has indicated shrub expansion and glacial retreat.



A climate station at Hickerson Lake collects weather data that are used in efforts to monitor climate changes and to support daily park operations.



Solid working relationships with Dena'ina communities are of primary importance at Lake Clark National Park and Preserve. The park received the highest ethnography score of any park assessed by NPCA to date. In this historic photo from the park's archives, Agafia Trefon poses with a jaeger at Tanalian Point in 1921.

CULTURAL RESOURCES—PARK AND PRESERVE RECEIVES HIGHEST SCORE OF MORE THAN 60 PARKS NATIONWIDE

Lake Clark National Park and Preserve received an overall "good" score of 84 out of 100 for the condition of its cultural resources, which include archaeology, cultural landscapes, ethnography, history, historic structures, and museum collection and archives. This is the highest overall cultural resources score attained by any of the more than 60 parks the Center for State of the Parks has assessed to date. The park's ethnography program (which scored 98 out of 100, by far

the highest score of all parks assessed to date) is the highlight of its cultural resources program. The long tenure and genuine commitment of park staff has helped to build strong relationships between the park, local resident zone communities, and remote park residents. The park's history program received a score of 93 out of 100. Only one other park assessed by the Center for State of the Parks—San Juan Island National Historical Park in Washington—has achieved a such a high score. Outstanding publications and outreach efforts are key reasons behind this "excellent" score.

Cultural resources at Lake Clark include prehistoric camp sites dating back 10,000 years,

late prehistoric Athabascan village sites at Kijik (a national historic landmark), and the historic cabins of hunters, trappers, and prospectors who were the first Euro-American settlers in the region. The park exhibits a restored historic salmon fishing sailboat, a restored traditional Dena'ina fish cache, and the home site of popular wilderness author Dick Proenneke. The museum collection and archives include Proenneke's personal journals.

To better protect its cultural resources the park needs a staff archaeologist to inventory and monitor archaeological and historic sites. The expertise of a historic architect is critically needed and is currently supplied by the Park Service's Alaska Regional Office. The backlog of uncataloged items threatens the park's museum collection. An archaeological overview and assessment, for which the park recently received funding, is a required Park Service archaeological planning document that describes and assesses the known and potential pre-contact and historic-period archaeological resources, identifies their temporal context, and estimates their level of significance and eligibility for listing in the National Register of Historic Places. This document will guide future archaeological work in the park.

ETHNOGRAPHY (PEOPLE AND CULTURES)—COLLABORATION WITH TRADITIONALLY ASSOCIATED PEOPLE EXPANDS KNOWLEDGE BASE AND ENRICHES INTERPRETATION

Lake Clark's park management and recent ethnography program is a true success story. Members of the Dena'ina community are part of the park's staff, and the long tenure and genuine commitment of park staff has helped to build solid working relationships between the park and its traditionally associated peoples. Focusing on the Dena'ina in the park's history, publications, and interpretation programs helps foster in traditionally associated peoples a sense of connection to the park.

Three ethnohistories have been produced for Lake Clark, encompassing traditionally associated groups. The first, Linda Ellanna and Andrew Balluta's 1992 study *Nuvendaltin Quhtana: The People of Nondalton*, focuses on the Dena'ina community of Nondalton but also includes the area north to Lime Village, exclusive of the coast. *West Cook Inlet Ethnographic Overview and Assessment for Lake Clark National Park and Preserve* was published in 2005, written by Ronald Stanek, James Fall, and Davin Holen in cooperation with the park. In 2007, former Lake Clark anthropologist Karen Gaul's ethnohistory was published as *Nanutset Ch'u Q'udi Gu Before Our Time and Now: An Ethnohistory of Lake Clark National Park and Preserve*. Lime Village, located on the Stony River northwest of the park, has not yet been the subject of a specific ethnohistorical study of its own, although it is included in Karen Gaul's 2007 study, and the Lime Village community is participating in the Place Names Project (described below).

The park has entered into a cooperative agreement with the Kijik Settlement Benefits Trust to conduct a cultural affiliation and lineal descent study of the historic Kijik cemetery with funding from a Native American Graves Protection and Repatriation Act grant. This project will identify the people buried at the Kijik cemetery through existing and new oral histories and genealogical and archival research. It will be a foundation to prioritize future work at the Kijik site.

Through collaboration with Dena'ina elders, Lake Clark's ongoing Place Names Project has thus far collected more than 2,000 Dena'ina place names and meanings for locations in the park area. The majority of this collection has been done by linguist Dr. James Kari. Names are entered into a database from which a cultural atlas and GIS maps are being produced. Two books of Dena'ina stories—gleaned through oral histories and traditions—have also been collected as part of this project. Oral histories and Dena'ina language studies are part of the

Interviews with Nondalton residents have contributed to the park's scientific studies of salmon, which are an important subsistence resource for local rural residents. In this photo, cleaned salmon are drying on wooden racks.

REILLY NEWMAN



University of Alaska–Fairbanks Project Jukebox, a multimedia presentation combining oral history with historic photographs of the Lake Clark region. The presentation and collected information are accessible from the park's website: www.nps.gov/lacl. The park assisted Kijik Corporation and the Nondalton Tribal Council in the production of *Dnaghelt'ana qu'ana k'eli ahdeiyax* (*They Sing the Songs of Many Peoples*), a book by Craig Coray and John Coray that includes a CD featuring John Coray's audio recordings of Dena'ina songs gathered in Nondalton in 1954, the first known recordings of the Dena'ina language. And a park-published, Web-based community contact guide assists researchers and visitors who wish to connect with Alaska Native organizations in the Bristol Bay region.

Subsistence management, which combines natural and cultural resources management, is an important element of the ethnography program at Lake Clark. Subsistence hunting, fishing, and gathering rights were granted to rural residents when Lake Clark National Park and Preserve was established. Although rights are based on residence—not Alaska Native ethnicity—the majority of subsistence users of

park resources are Alaska Natives, so subsistence management is closely tied to the ethnography program. Because subsistence rights are subordinate to the park's mandate to maintain healthy, sustainable ecosystems, subsistence management is conducted in conjunction with natural resource management. For example, the park has worked with local people to collect traditional ecological knowledge. Local residents have contributed historic photographs and recollections that have been used to document landscape and climate changes and the impacts of those changes in the park. This collaborative effort to perpetuate traditional knowledge has also contributed greatly to natural resource management. The project titled *K'ezghlegh: Nondalton Traditional Ecological Knowledge of Freshwater Fish* has contributed immensely to the park's scientific studies of salmon. Through the project, Nondalton residents were interviewed in 2001 about past and current use of fish species for subsistence. The information gathered has helped scientists learn more about key spawning locations and changes over time, water quality and level changes, decline of fish in certain areas due to beaver dams, fishing location changes, environmental and weather changes, and resource management methods.

Trans-boundary issues related to subsistence are the greatest threats to ethnographic resources at Lake Clark. Game species such as the Mulchatna caribou herd cross park boundaries and are subject to differing management plans as they move through territory controlled by various state and federal agencies. Salmon runs in Lake Clark are affected by actions and activities on waterways outside park boundaries. The development of the proposed Pebble Mine would introduce thousands of workers to the region in both the short term and the long term, plus more associated with other endeavors in the potential mining district. This could significantly increase the population entitled to subsistence access to Lake Clark (currently about 650

FROM ICE CREAM FLAVORING TO MEDICINAL TEAS, NATIVE PLANTS HAVE BEEN USED IN MANY WAYS

Many Alaska Natives and other residents of the Lake Clark area rely on park and preserve plants for subsistence. While supplying sustenance, these plants also provide Alaska Natives with a spiritual connection to the natural environment. Following are descriptions of several plants and some of their traditional uses.

Blueberry (*Vaccinium uliginosum*)

The berries are an important ingredient in Alaska Native ice cream, which is called *nivagi* by the Dena'ina. It was traditionally made of bear fat, moose fat, sugar, fish, and berries; today it is made from shortening, sugar, a small amount of milk, and berries.

Crowberry (*Empetrum nigrum*)

Cooking enhances the flavor of crowberries, which can be used to extend a batch of pie filling or jam made from other berries. They are also used in ice cream (*nivagi*). Crowberry leaves and stems boiled as tea alleviate diarrhea and stomach problems.

Highbush cranberry (*Viburnum edule*)

Although sour, when mixed with sugar the cranberries make a tasty jelly, juice, or syrup. High in vitamin C, highbush cranberry tea is a traditional cold remedy.

Labrador tea or Hudson's Bay tea

(*Ledum palustre*)

The strongly aromatic leaves of this shrub were once used to make tea. The Dena'ina also used Labrador tea as a spice for soaking meat, especially that of brown bear, which has a fishy taste.

Lowbush cranberry or lingonberry

(*Vaccinium vitis idaea*)

These berries are best cooked as a sauce or mixed with rose hip pulp and sugar to make a nutritious jam.

Northern red currant (*Ribes triste*)

The Dena'ina call the berries *nunazk'et'i* ("that which hangs down") or *jeghdenghult'ila* ("ear it's tied onto"). The latter name refers to the hanging fruits' resemblance to earrings. Red currants are a favorite for jelly, and red currant tea was traditionally used as a wash for sore eyes.

White birch (*Betula papyrifera*)

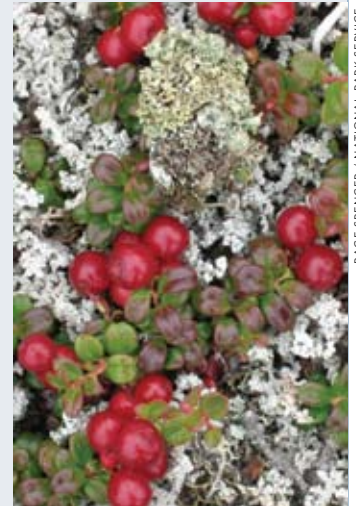
The Dena'ina use birch bark for fire-starters and to make baskets. White birch is also used to build sleds and make snow shoes.

White sphagnum (*Sphagnum wulfianum*)

Dried sphagnum was used to bandage wounds in World War I because of its absorbent and naturally sterile properties (it is acidic and retards the growth of fungus). Dena'ina, like many other Native Americans, once used sphagnum for baby diapers, and it remains a favorite wilderness "toilet paper."

Wild chive (*Allium schoenoprasum*)

Wild chive (also known as wild onion or wild garlic) is a tasty herb that the Dena'ina use to flavor soups and stews.



Lowbush cranberries can be mixed with sugar to make jam.

The park is home to a restored double-ender, a traditional sailing vessel used for gill-netting salmon. In this photo the boat is outdoors with its sail unfurled; today the vessel is on display in a special building at the Port Alsworth visitor center.



JEANNE SCHAAF / NATIONAL PARK SERVICE

people), increasing pressure and demand upon the resource base. Park managers are working with the local population to assess and manage these and other issues (e.g., cutting firewood) through the Lake Clark Subsistence Resource Commission and community meetings.

The park's ethnography program is staffed by a cultural anthropologist (currently not funded for full-time work) and supported by the cultural resource program manager, curator, and park historian, as well as by the park's subsistence program manager, who divides time between the subsistence program and interpretation activities. The cultural resource program manager's time is split among the Southwest Alaska parks, including Lake Clark, Katmai National Park and Preserve, Alagnak Wild River, and Aniakchak National Monument and Preserve. The cultural anthropologist and histo-

rian are not shared with Katmai or the other park units, though they lend expertise as needed and as time permits. Lake Clark has identified the need for a full-time cultural anthropologist assisted by two additional staff members to work as community liaisons for the program to consult with tribal liaisons and ensure that communication channels remain open and effective.

HISTORY—STRONG PROGRAM RECEIVES "EXCELLENT" SCORE

Lake Clark National Park and Preserve received a score of 93 out of 100 for its history program, due largely to the presence of engaged staff and outstanding publications and outreach efforts. A comprehensive historic resource study—which provides a historical overview of a park and identifies and evaluates its cultural

resources within historic contexts—was completed for Lake Clark in 1994. This report focuses on the Russian fur-trading era, American exploration, the commercial fishing industry, sport hunting, and mining. It touches briefly on the indigenous history of Alaska Native populations and on the sociocultural and economic impact of Euro-American settlement on Alaska Native populations.

In 2005, the park published a history of the canning community at Snug Harbor on Cook Inlet. Other historical research currently under way includes transcription and editing of the Richard L. Proenneke journals; archival research of John W. Clark, the Bristol Bay trader for whom Lake Clark is named and one of the first Euro-American settlers in the region; investigation of post-World War II historic properties associated with Lake Clark; and expansion of the historic photograph collection. An administrative history is being prepared by the park's historian and a historian working with the park through a cooperative agreement with National

History Day in Alaska. It will describe the park's conception and establishment, and it will document its management through time to the present day.

Completion of additional research, such as a history of sport hunting and fishing, would expand the park's historic themes and add richness to an already robust history program.

On-site interpretation of history at Lake Clark occurs primarily at its two visitor centers in Port Alsworth and Homer. Themes include prehistoric and historic Dena'ina habitation and activities; the Bristol Bay salmon fishery; sport hunting and fishing in the Lake Clark region; and Dick Proenneke and the wilderness movement he embodied. Historic exhibits in the park include the Bristol Bay double-ender, a restored traditional sailing vessel used for gill-netting salmon. This sailboat is housed in a special building at the Port Alsworth visitor center. The exhibit there includes fishing paraphernalia and boat equipment; signboards feature historic photographs and information.



A restored Dena'ina fish cache, donated to the park by a Dena'ina family from Tanalian Point, is on display at Port Alsworth.

JEANNE SCHAFF / NATIONAL PARK SERVICE

The Trefon Dena'ina fish cache is also on view at Port Alsworth. The restored cache, originally built at Miller Creek, 3 miles east of historic Kijik, was donated to the park by a Dena'ina family from Tanalian Point. It was restored by a Dena'ina elder familiar with traditional building techniques. At the Proenneke site on Upper Twin Lake, visitors can enter Proenneke's hand-built cabin, sit at his desk, admire the view from his "picture" window, and handle the tools he used to build his home. The cabin is fully furnished with supplies and household items that Proenneke used, including the ubiquitous gas cans that served as cupboards.

The park historian, a park guide, and the park's subsistence coordinator present interpretation programs, both in the park and in locations outside the park. Because historical interpretation at Lake Clark is closely tied to ethnography and archaeology, the park's cultural anthropologist and its chief of cultural resources—an archaeologist—also participate in interpretation programs and incorporate the park's historical themes into their presentations. Volunteers at the Proenneke site provide historical interpretation daily throughout the summer visitor season.

The other half of the Lake Clark National Park and Preserve's interpretation program consists of outreach and a prolific publication program designed to reach people who may not have the opportunity to visit Lake Clark National Park and Preserve. The park shares books written by park staff at information centers, community centers, and guest lodges throughout Alaska. In addition, the park publishes excerpts or the entire contents of shorter works as e-books on the park's website. Expanding these outreach efforts and reprinting out-of-print works would help share the park's story with a wider audience.

CULTURAL LANDSCAPES—KIJIK AND TELAQUANA TRAIL ARE TWO PREMIER LANDSCAPES

Cultural landscapes encompass natural and human-made features, illustrating the ways people have altered and adapted to their surroundings through time. The park's two premier sites—Kijik and the Telaquana Trail—are listed in the park's cultural resources inventory. Documentation of other identified landscapes through cultural landscape reports, and their corresponding records in Park Service-wide databases, is necessary to facilitate their protection and management. (The landscapes inventory—and the entire cultural landscapes program—are managed by staff from the Park Service's Alaska Regional Office.)

Kijik is a national historic landmark and an archaeological district, one of only three areas in Alaska with both designations. Kijik village first appears in historical texts in 1818, but early Dena'ina residents may have occupied the area several centuries prior to the arrival of Russian fur hunters beginning in the late 1780s and '90s. The village contained many houses, as well as a Russian Orthodox church that was built around 1889. Following outbreaks of influenza and measles between 1902 and 1909, families began to leave for Old Nondalton, Tanalian Point, and elsewhere. By 1909, the village was abandoned, though seasonal use continued.

The Telaquana Trail is a traditional Dena'ina travel corridor extending from Lake Clark at Kijik 50 miles north to Telaquana Lake, the site of another abandoned Dena'ina village. Once a major route for social travel, trade, and hunting, the trail is now a popular backcountry hiking and camping destination.

Although Kijik and the Telaquana Trail are both listed in the park's cultural landscapes inventory, cultural landscape reports have not been completed for either site, or for any other identified cultural landscape. Cultural landscape reports contribute additional information to the existing historical record, identify treat-



The Telaquana Trail (views from the trail shown here) was once a Dena'ina travel corridor and is now a popular hiking and backpacking route.

ment opportunities, and provide direction for management. Park staff have submitted requests for funding to complete these vital reports for both Kijik and the Telaquana Trail, but funding has not yet been approved.

Tanalian Point and the Chulitna River-Sixmile Lake watershed are two identified cultural landscapes that the park would like to document soon. These landscapes are located partly on private land within and outside the park that could potentially be sold and/or developed. Lake Clark recently negotiated a contract to acquire 26 acres of privately owned land in and around Tanalian Point. Staff will continue to work with private landowners to protect and document this historic landscape. The Chulitna River watershed begins just north of the proposed Pebble Mine site. This watershed is the main subsistence area for the

community of Nondalton, and it is the largest freshwater tributary of Lake Clark National Park, so maintaining the area's health is essential for drinking waters, salmon, and wildlife habitats. Explorations of a gold and copper deposit in the headwaters of the Chulitna is one example of a mining claim that may become far more economically feasible to develop in the Pebble mining district if access and infrastructure (roads, ports, and power) are constructed. The park is working cooperatively with the Park Service's Alaska Regional Office, the Nondalton Tribal Council, and the landowners to prepare a cultural landscape inventory for the watershed.

Interpretation of the park's cultural landscapes and historic districts varies. The Lake Clark website provides would-be visitors with information, and while the Telaquana Trail, Kijik, Proenneke Complex (another identified

Jeanne Schaaf, the park's chief of cultural resources, digs an archaeological test hole in conjunction with restoration work done at Snipe Lake Cabin in summer 2008.



MELISSA BLAIR / NATIONAL PARKS CONSERVATION ASSOCIATION

potential cultural landscape), and Tanalian Point each have specific Web pages that provide historical information and/or site access information, only the trail and Kijik are identified there as cultural landscapes. When permission is granted by private landowners, rangers lead tours to Tanalian Point, interpreting the history of that landscape. Interpretation at the Proenneke site, conducted by volunteers, focuses on Dick Proenneke's philosophy of minimal impact. None of the park's other cultural landscapes are interpreted as such.

Because Lake Clark's cultural landscape program operates at the regional level, the park employs no cultural landscapes personnel. A historical landscape architect in the Park Service's Alaska Regional Office maintains Lake Clark's cultural landscape inventory documentation. The regional office also submits all project proposals for funding and performing cultural landscapes projects at Lake Clark.

ARCHAEOLOGY—SURVEYS NEEDED TO COMPREHENSIVELY DOCUMENT 10,000 YEARS OF HUMAN PRESENCE

Only 1 percent of Lake Clark National Park and Preserve has been surveyed for archaeological resources. But within that 1 percent, 140 sites have been identified so far, including a coastal site dating back 3,000 years, and one on Two Lakes that may be 10,000 years old. Based on known human activity and occupation of park lands—and sites identified to date—many additional sites of significance likely remain undiscovered. The park received funding this year to begin preparation of an archaeological overview and assessment. This important project will address gaps in the current archaeological program, provide direction for future projects, and allow park personnel to better identify, preserve, and protect valuable sites by developing funding proposals and completing projects.

Lake Clark National Park and Preserve is home to the Kijik Archeological District, a national historic landmark, which contains the largest known concentration of Athabascan sites in the world. The significance of Kijik is in its potential to greatly expand knowledge and understanding of the late prehistoric inland Dena'ina who settled the Kijik area after 1000 CE. Cultural, social, and economic ties linked inland and coastal Dena'ina, and trading connections existed between the Dena'ina and their Aleut and Yupik neighbors.

The Athabascan Dena'ina village at Kijik was abandoned in the early 20th century. The 17 archaeological sites there are located on the western shore of Lake Clark—scattered in the Kijik village area, around Kijik Lake, and on the slopes of Kijik Mountain. A survey of the area is ongoing, and discovery of more sites is anticipated. This work is important because beaver activity is causing flooding that could lead to inundation of known and undiscovered sites. The Kijik Archeological District includes parcels owned by the Kijik Village Alaska Native Corporation and private landowners. The park has been actively involved in surveying and documenting the archaeological sites in partnership with the owners and descendent community.

An archaeological survey was initiated in 2008 in the higher elevations of the park, exploring areas newly exposed by receding snow and ice. Although there are no large proj-

ects planned or in the funding queue at this time for coastal archaeological research, small-scale coastal and inland surveys for archaeological sites are carried out by staff archaeologists at every opportunity. The most critical areas in need of survey work in the park include locations along the mouth of the Chulitna River, all lakeshores, travel corridors, and waterways, and on the coast of the park at Shelter Creek, Tuxedni Bay, and Chinitna Bay. Development on private land both inside and outside park boundaries could harm resources that have yet to be discovered, so continuation of the park's partnerships with other landowners is critical.

Two prehistoric pictograph sites—the only ones known to exist on National Park Service land in Alaska—are found on the shores of Cook Inlet, at Clam Cove in Chinitna Bay and at Tuxedni Bay. Determinations of eligibility for National Register of Historic Places listing have been drafted for these sites and will be forwarded to the Alaska State Historic Preservation Office. A comprehensive preservation plan has been completed for the two pictograph sites. The sites are also interpreted in a book by Brian Fagan titled *Where We Found a Whale: A History of Lake Clark National Park and Preserve*. The book explores the diverse history of human settlement in the region. The Park Service intends for the book to encourage an appreciation of Alaska's heritage and stimulate interest and research focused on Alaska's rock



Archaeologist, anthropologist, and author Brian Fagan stands in a late prehistoric house depression near Clam Cove.

art. The park hopes to sensitively manage and preserve the rare prehistoric rock art and other cultural sites in the park in cooperation with Dena'ina and Alutiiq neighbors and park visitors. Park staff based in Anchorage access the sites via aircraft and boat and strive to monitor them once a year. Tuxedni Bay is near the Silver Salmon Creek sport fishery, the most heavily visited location in the park, and Clam Cove is a popular clamming location. Staff work with commercial operators and local residents to raise awareness about cultural sites so that vandalism or inadvertent damage do not occur.

Lake Clark's chief of cultural resources has identified the sale of inholdings, potential flooding of sites at Kijik National Historic Landmark by beaver activity, coastal erosion, melting of perennial snow and ice patches, and inadvertent damage by visitors using remote

campsites and digging "catholes" for burial of human waste as the main threats to archaeological resources in the park and preserve. Known archaeological sites and areas that likely contain yet-to-be-identified sites exist on privately owned lands within the park boundaries, such as Alaska Native Corporation lands, Native allotments, and other small parcels. The sale of those lands, which appears likely, could lead to development or other activity that could damage or destroy archaeological resources. Staff have expressed concern about the possibility of damage to undiscovered resources from small plane landings throughout the park. Impacts associated with climate change in coastal areas and the possibility that important sites may be inundated by rising waters are further concerns.

Looting of archaeological sites is not a signif-

Archaeological excavations in the park uncovered a 4,000-year-old hearth.



icant concern at Lake Clark; most looting in Alaska is in search of fossilized walrus or mammoth ivory, or ivory artifacts, which are associated with Eskimo and Aleut peoples but not with the Dena'ina. However, historic artifacts and historic sites are at risk of vandalism. The park distributes information to help visitors recognize and understand the importance of archaeological resources and to make them aware of the laws regarding such resources.

The park's chief of cultural resources is a trained archaeologist, and a full-time archaeologist funded by Katmai National Park and Preserve covers most of Lake Clark's compliance with Section 106 of the National Historic Preservation Act (NHPA, as amended). Seasonal archaeological staff are employed for specific projects when funds are available, and in general, Lake Clark archaeology staff perform survey work on an ongoing basis.

Park staff participate in archaeological survey and inventory projects on private land within the park boundaries—such as at Kijik—and outside the park through partnerships like the Mulchatna Archaeological Survey. This eight-year project was a cooperative effort between Lake Clark National Park and Preserve, the Alaska Department of Natural Resources, Lake and Peninsula Borough, the Bureau of Indian Affairs-Alaska Claims Settlement Act office, the Kijik Corporation, and McKinley Capital Management, and it will culminate in a 2010 report of the archaeological and historical findings at Mulchatna. Staff have identified the Chulitna River area as ripe for a similar partnership. This historic travel corridor and significant freshwater tributary of the park, on privately owned land within and outside the park boundary, borders the southwest shore of Lake Clark. State mining claims are being explored there for potential development as part of a future Pebble mining district.



HISTORIC STRUCTURES—REMOTE LOCATIONS COMPLICATE PROTECTION EFFORTS

Fourteen historic structures and other cultural resources—located on land owned by the park—comprise Lake Clark's List of Classified Structures (LCS). (This list of prehistoric and historic structures is maintained by a coordinator in the Park Service's Alaska Regional Office, not by park staff.) Some other historic structures are found on private land or Alaska Native Corporation land within the park's boundaries and are not included in the LCS, but the park is an active participant in managing and preserving them. Two of the most noteworthy sites located on park-owned land are the Proenneke site at Upper Twin Lake and the Bly House at Hardenburg Bay. Both are listed in the National Register of Historic Places. These two sites contain four of the park's listed historic structures.

The cabin, cache, and woodshed/outhouse at the Proenneke site, with about 400 visitors per

Naturalist Dick Proenneke (pictured) lived in this hand-built cabin on Upper Twin Lake from 1968 to 1998, documenting his simple wilderness lifestyle ethic in journals and home videos.

The Park Service restored the Snipe Lake Cabin, shown here, in 2008. The remote locations of some of the park's cabins makes it difficult for park staff to visit and maintain them regularly.



JOHN BRANSON / NATIONAL PARK SERVICE

year, are the park's most visited historic structures. Naturalist Dick Proenneke built the cabin, cache, and woodshed with hand tools, some of which he made himself. The one-room cabin is built of peeled white spruce logs with a stone fireplace, gravel floor, and sod roof; the cache, which was used to store food out of the reach of animals, stands on 9-foot-tall spruce log legs and is accessed by a wooden ladder. The woodshed/outhouse is about 6 feet by 8 feet and is divided into an open woodshed and an enclosed outhouse. Proenneke documented the building process and his life at the cabin in a series of journals, first published in 1973 as an edited collection titled *One Man's Wilderness*. He also filmed the construction process, and a video featuring some of this footage is available for sale within the park. The Proenneke structures are considered to be in "good" condition. Local volunteer Monroe Robinson, who knew Proenneke personally and has studied his construction methods, maintains the Proenneke structures; he and the park historian

completed significant reconstruction work in 1999, 2001, and 2004. The most significant threats to the site are weather and damage by bears and porcupines that scratch or rub against the logs.

The Bly House, a one-story log cabin with a metal roof, was built as a summer residence by Anchorage dentist Dr. Elmer Bly in 1947. Situated across Hardenburg Bay from the village of Port Alsworth, the Bly House has been used for park administrative offices and housing since the park was established in 1980. It was first rehabilitated between 1982 and 1984, and then again in 2005; it is in "good" condition. There are no significant threats to the structure, and no treatment plans exist at present.

Other historic structures found on park-owned land include cabins that have been determined eligible for listing in the National Register of Historic Places, including Spring Lake Trapping Cabin, Red River Trapping Cabin, Igitna River/Kenibuna Lake Cabin, and Snipe Lake Cabin. These one-room log cabins were

used for hunting, trapping, or fishing and are found in remote locations within the park. Historic architects from the Alaska Regional Office have assisted with condition assessments and treatment plans for these structures. The Red River Trapping Cabin is listed in “poor” condition; the other cabins are listed in “fair” condition. Due to their remote locations, staff are able to visit them only rarely, so maintenance and monitoring activities are limited. The Snipe Lake Cabin was completely repaired in summer 2008. The Igitna Cabin is located in a far-northern end of the park, requiring a generous allotment of staff time to reach and mitigate threats to it. Additional cabins at Priest Rock and Hardenburg Bay are currently being considered for National Register listing and are scheduled to be repaired in summer 2009.

Several years ago a Dena’ina family living at Tanalian Point donated a traditional Dena’ina fish cache to the park. The small cabin-like structure sits on stilts and is accessed by ladder. It was built to store as many as 2,000 dried fish out of the reach of animals. The cache was originally constructed by Wasili Trefon in 1920, at Miller Creek on the west side of Lake Clark; it is exhibited at the Port Alsworth visitor center. The cache was restored by a Nondalton resident and Dena’ina elder, after consultation with members of the Trefon family. The cache is one of only two traditional Dena’ina caches known to exist in the Lake Clark region. It is included on the park’s List of Classified Structures as a cultural resource. Although it has been moved from its original location to be restored, protected, and used as an exhibit, the structure retains eligibility for listing in the National Register of Historic Places and will be nominated for listing in 2010.

In addition to the above listed historic structures, at least 50 known wilderness cabins are scattered within the boundaries of the park and preserve. Most of the cabins are located on private land; a few are trespass cabins constructed in the early and mid-1970s on park

land without authorization. Seventeen cabins—some of which are in ruins—are considered eligible for the National Register and determinations of eligibility have been prepared and submitted. Structure stabilization and fire mitigation at the cabins is hampered by their remote locations and the inability of staff to monitor them, due to travel restrictions in place to conserve money and a short working season determined by weather conditions. As time permits, staff clear brush and stabilize the structures. All cabins have been recorded in the park’s draft cabin management plan, which outlines fire mitigation measures (though fire is a rare occurrence at Lake Clark), site documentation, and National Register eligibility.

Of historical significance but not on park-owned land are the ruins of the Russian Orthodox church at Kijik, as well as remains of the foundations of dwellings. The park, in cooperation with the landowner—Kijik Corporation, an Alaska Native Corporation—has removed debris from the church.

No historic structure reports exist for any of the park’s historic buildings. Lake Clark managers feel these reports are unnecessary for the historic cabins, since their documentation and preservation plans are addressed in the cabin management plan; maintenance plans, however, need to be formalized. In addition, the park plans to complete Historic American Buildings Survey (HABS) and Historic American Engineering Record (HAER) documentation of the Proenneke cabin and cache. HABS and HAER are programs that were created by the National Park Service to document historic places.

Lake Clark’s cultural resources staff and park volunteers maintain historic structures, and park rangers assist cultural resources staff with monitoring remote cabin sites. The most significant threats to the structures are fire, weather, damage from animals, and vandalism by visitors. Clearing of vegetation and removal of accelerants are the primary fire mitigation meas-

The park's historian, John Branson, interprets historic structures at Tanalian Point (on private land) during special group tours.



MELISSA BLAIR / NATIONAL PARKS CONSERVATION ASSOCIATION

ures and are performed as part of the staff's monitoring activities. Additional travel funding and seasonal staff to provide annual monitoring and maintenance at the historic cabins would improve resource condition and protection.

The Dena'ina fish cache and the Proenneke site buildings are the only historic structures being formally interpreted at Lake Clark National Park and Preserve. Historic structures at Tanalian Point (on private land) are occasionally interpreted for special group tours. Much interpretation of historic structures takes place through staff participation in historic preservation programs with members of local communities. For example, in May 2007 park staff and a Nondalton teacher led a group of high school students on a four-day survey of prehistoric and historic Dena'ina winter house depressions at Kijik National Historic Landmark. This was part of an ongoing partnership with the school district that dates from about 1992.

MUSEUM COLLECTION AND ARCHIVES—MUSEUM CURATOR VITAL TO PROGRAM

Lake Clark National Park and Preserve's museum and archival collections include archaeological and botanical specimens, small mammal skins, historic photographs, Dick Proenneke's journals and other belongings, and ethnographic items such as oral histories and 160 audio recordings. More than 92,000 items comprise the collection, 79 percent of which are archival. The collection contains 6,200 archaeological artifacts, but this number is expected to increase with completion of the park's archaeological overview and assessment and ongoing survey projects.

Lake Clark's museum and archival collections are housed in the Alaska Curatorial Center in Anchorage. The park's full-time museum curator, who is shared with Katmai National Park and Preserve and Aniakchak National Monument and Preserve, is also located at the

center in Anchorage. According to the park's current Sustainable Budget Plan, this position could be cut to save money; however, recent budget increases appear to have eliminated this possibility. Loss of the curator would seriously compromise efforts at ongoing management of Lake Clark's (and Katmai's and Aniakchak's) collections. It could also be detrimental to Alaskan communities' efforts to preserve their heritage. In May 2007, the Pedro Bay librarian and Pedro Bay Village Council used grant funding to bring Lake Clark's museum curator to Pedro Bay to address community concerns about the preservation of historic photos and other heirlooms. More than half of the village attended a presentation showcasing historic photos of the Pedro Bay area, and several community members learned how to scan and save their family photos at workshops held in September. The park hopes to expand community outreach in the future, but a loss of staff would hamper these efforts.

A full-time term archivist—hired with special funds in 2007 for a three-year position—is cataloging a backlog (60 percent) of archival materials. Addressing the archive backlog has been a high priority at Lake Clark National Park and Preserve, and significant progress has been made in organizing and cataloging this material, essential for completion of the park's administrative history.

The scope of collections statement for the park is currently being updated; collection management reports are filed regularly; and strategic plan goals for museum collections have been met or exceeded in recent years.

In 2007, staff from the Park Service's Harpers Ferry Center, representing the Park Museum Management Program, visited the Alaska Curatorial Center in Anchorage to photograph items from Lake Clark's collections. Photographs of these pieces will be added to online exhibits available for viewing at the National Park Service website "NPS Focus" (<http://npsfocus.nps.gov>). The items

photographed represent a broad selection of the cataloged artifacts in the museum collections; unfortunately, the Proenneke items, which are of particular interest to the public, have not yet been cataloged and were not included in the photography session.

Because the collections are housed in Anchorage, and park staff are stationed in Port Alsworth during the prime visitor season, interpretation of actual museum pieces is limited and visitor center exhibits do not feature any. The online exhibits at "NPS Focus" will serve as the primary means of interpreting Lake Clark National Park and Preserve's museum collections to the public. Lake Clark also hopes to have its museum collection available on the Park Service's "Museum Collections on the Web Catalog" within a year. (Visit www.museum.nps.gov to view collection items from various national parks.) Some interpretation of the park and preserve occurs at the Pratt Museum in Homer, an independent nonprofit museum and long-term park partner. Unfortunately, interpretation at the Pratt Museum focuses only on natural history and no Lake Clark museum collection items are used, with the exception of cultural items that are loaned for temporary exhibits once in awhile. Staff consider Homer—located at the southern end of the Kenai Peninsula—to be an important gateway for park visitors. While they wish to increase the number and variety of small interpretive exhibits at this and other gateway locations outside the park, specific plans and funding requests for these exhibits have not been submitted.



Much of Lake Clark National Park and Preserve is accessible only by air, so staff and supplies must be transported by plane. In addition, ranger patrols to ensure visitor safety and enforce park laws must be done by plane. The park needs additional funds to support its aviation program so that these important activities can continue.

STEWARDSHIP CAPACITY

FUNDING AND STAFFING—MORE STAFF NEEDED TO PROTECT, MONITOR, AND MANAGE PARK RESOURCES

Stewardship capacity details how well equipped the Park Service is to protect the parks. The most significant factor affecting the park's ability to protect its resources is the funding a park receives from Congress. The operational budget for Lake Clark National Park and Preserve was \$2.5 million in fiscal year 2008, an increase of \$500,000 from 2007. While the budget has increased annually in the last decade, the increases reflect the development of fundamen-

tal programs and positions that had been eroded or had not previously existed. For example, the park's interpretation program has grown as new funding has become available, especially through the Park Service's Centennial Initiative. The actual value of budget increases have depreciated over the last decade or so due to inflation, amounting to a 27.5 percent loss in purchasing power.

Managing Lake Clark National Park and Preserve is more costly than managing other park units in the National Park System, primarily due to the park's remote location. The park headquarters (and an overwhelming majority of park lands) is accessible only by air, so every-

thing—mail, food, heating fuel, aviation fuel, other supplies, and refuse—must be transported via plane. In addition to the inherent added expenses of air travel versus road travel, aviation industry costs—insurance, maintenance, and fuel—have risen in recent years, reducing the flight hours available to staff for backcountry aircraft patrols to ensure visitor safety and enforce park laws. Hourly rates and monthly lease/availability costs have increased as much as 30 and 150 percent, respectively, in recent years. The park needs funds to support an aviation program because much of the park is accessible only by plane.

While much of the cost related to air travel is out of the park's control, Lake Clark National Park and Preserve managers have undertaken other measures to save money while being more environmentally friendly. Simple, relatively inexpensive solar technologies (e.g., water pumps and chargers for phone and radio batteries) are used at remote ranger stations at Telaquana Lake, Upper and Lower

Twin Lakes, Chinitna Bay, and Silver Salmon Creek. The park has also transitioned from two-stroke to four-stroke outboard motors for boat operations, which results in less noise and less pollution.

In addition to funding general, day-to-day operations, the park needs money for specific management projects, including continued work on wolves, moose surveys on the coast, brown bear genetic studies, visitor use and impacts, and ongoing cultural resources inventories.

To increase efficiency and decrease costs, Lake Clark National Park and Preserve has pursued both internal and external partnerships; one result is shared staff with other Alaska national parks. Lake Clark, Katmai National Park and Preserve, and Aniakchak National Monument and Preserve share the time and expertise of a cultural resources manager and her staff (i.e., museum curator, historian, and cultural anthropologist), a chief of concessions, an Inventory and Monitoring Program manager,



Solar panels at remote ranger stations, including those at the Telaquana Lake ranger station pictured here, help the park save money and lessen impacts on the environment.

Solar panels provide the energy needed to run water pumps and charge radio and phone batteries at the park's remote ranger stations. The Silver Salmon Creek station is pictured here.



NATIONAL PARK SERVICE

a subsistence program manager, maintenance Facility Management Software System reporting staff, and a compliance biologist. The Southwest Alaska Network Inventory and Monitoring Program provides administrative, natural resources, and interpretive support. In addition, the park has cooperative agreements with the Kachemak Bay Research Reserve and the Pratt Museum, both in Homer. As a result of these cooperative efforts, duplication of personnel and operational costs have been avoided, enabling the park to channel base funds into essential positions and services, backlogged maintenance, research projects, and visitor services. Although the park has been able to maximize the efficiency of current staff through sharing, additional positions, including a chief of interpretation and an education specialist, must be added to help protect resources and serve the public.

At current staffing levels, providing a consistent presence in the remote park and preserve is not possible; some visitors come and go without ever once interacting with a ranger. Park personnel work from three locations—Anchorage, Port Alsworth, and Homer. Administrative and cultural resources personnel are situated in Anchorage, while maintenance, natural resources, and ranger personnel operate out of the Port Alsworth field station. Interpretive rangers staff the Homer field office and offer programs at the Islands and Ocean Visitor Center and the Pratt Museum. Because visitors access various sites in the park and preserve by airplane, they most likely will not interact with the small number of park personnel during their visit.

An archaeologist and a geologist are needed along with staff to analyze data and communicate research findings to colleagues and the public. Retaining curatorial and archival staff at the Alaska Curatorial Center in Anchorage—where the park's museum collection and archives are stored and the park's curator is based—is important to ensure the collections

continue to receive good care. There is a growing need to develop a comprehensive data management system. Advances in digital data collection (photography, GIS, GPS, and other methods) generate more files than ever before, exacerbating the need for an adaptable system of data management and a concise set of collection and storage protocols. In 2008, funds from the Park Service's Centennial Initiative, a program aimed at ensuring parks are preserved as the centennial of the agency approaches, improved staffing in law enforcement, interpretation, and maintenance. Funding proposals have been submitted and, if approved, would restore the important positions of Kijik district ranger and maintenance chief that were lost after 2004 due to budget shortfalls.

Troubling for the park in terms of long-term planning, three critical full-time positions—a fisheries biologist, the subsistence program analyst, and the subsistence support assistant—had been funded from non-operational park funds. The funding for the two subsistence positions was made permanent in the park's base budget in 2008, but there are still no funds in the base budget for the fisheries biologist position. Lake Clark's primary purpose in its enabling legislation is protection of sockeye salmon habitat, and a fisheries biologist on-staff is critical for the park to meet its management mandate, particularly in light of external mining pressures and potential risks to salmon and waters. This position should be covered by operational money to ensure its continuance in the future.

In the face of increasing costs, the park may be forced to make difficult decisions; however, successful budget proposals and Centennial Initiative funding have negated any immediate need to eliminate or combine positions such as the cultural anthropologist and subsistence support assistant.



The visitor center in Port Alsworth (pictured) provides opportunities to interact with park rangers and view exhibits about the park's natural and cultural resources.

PLANNING—VARIOUS PLANS NEEDED FOR MANAGEMENT

To guide management of diverse resources, parks depend on a variety of plans. The primary, overarching document at most parks is the general management plan (GMP). Lake Clark National Park and Preserve's GMP was written in 1983; it is still used and there are no plans for a new one. However, the park is developing its foundation statement, which is a formal description of the park's core mission that will be used to support planning and management. It is expected to be finished fall 2009. The park's 1999 resource management plan is no longer used to guide management. It has been functionally replaced by the Project Management Information System used by the Park Service to list and prioritize resource management and other park projects. A fire management plan (2002) provides the framework for occasional burns in the park, and a

2009 superintendent's compendium states park policy on Park Service regulations such as obtaining permits, food storage, etc. As previously mentioned, the park's administrative history is under way, with an expected completion date of 2011, and an archaeological overview and assessment recently received funding. A subsistence management plan exists and is currently being revised. While loosely defined as a "plan," it is actually a binder of pages documenting current subsistence management practices and information.

Lake Clark managers have identified the need for a wilderness plan, backcountry plan, an updated long-range interpretive plan, and business plan. The park expects to receive funding in the 2010 budget for a backcountry plan. Some of these planning needs will be addressed with help from a new staff member (recreational planner and wilderness coordinator) hired in January 2009 who also serves

the Western Arctic National Parklands, which include Noatak National Preserve, Cape Krusenstern National Monument, and Kobuk Valley National Park.

RESOURCE EDUCATION AND OUTREACH—TOP-NOTCH EFFORTS INVOLVE THE COMMUNITY

Visitors to Lake Clark National Park and Preserve generally travel there via airplanes (there is no road access); float planes may land on lakes throughout the area, while wheeled planes can land on open beaches, gravel bars, or private airstrips. Because there are so many potential park entry points, most incoming visitors do not come in direct contact with park staff, but there are opportunities to connect with rangers and obtain park information at the park's main visitor center in Port Alsworth and at an interagency visitor center across Cook Inlet in the town of Homer. Travelers often fly from Homer into the park for bear-viewing day trips or to stay overnight at one of the lodges located on inholdings in the park, so the town is considered a gateway into the park and preserve. The Port Alsworth visitor center interprets cultural history, botany, volcanology, glaciology, traditional use of resources, and ecology. Information is also provided on boat safety and recreational opportunities. Interpretation at the Homer field office is focused primarily on natural resources. To further the park's education and outreach capabilities, a new visitor center in a vacant suite of the Park Service's Alaska Regional Office in Anchorage is being considered for funding in 2009 or 2010.

In addition to the visitor centers, park staff connect with visitors via air taxi providers and at wilderness lodges when these businesses request programs. Remote, seasonal ranger stations and volunteer hosts are strategically located along the Cook Inlet coast, at Twin Lakes (the site of Dick Proenneke's cabin), and at Telaquana, all popular park destinations and launching points for backcountry adventurers. These staff and

volunteers prevent theft and vandalism of artifacts, monitor visitor use trends, and notify the park superintendent when a visitor heading into the backcountry seems unprepared and/or likely to need emergency assistance. Volunteers at Proenneke's cabin work on maintenance and stabilization projects.

Lake Clark staff interact with local communities and school groups, presenting programs on the park's history and wildlife. In 2007, 152 formal interpretive programs were conducted on and off-site, reaching an estimated 12,988 participants. Programs presented to students in grades kindergarten through 12 in resident zone communities include formal talks, slideshows, and curriculum-based activities. Guided hikes are also scheduled. Each year, several high school students participate in the park's annual backcountry hike.

Staff work with Alaska Native and non-Native area residents to integrate traditional ecological knowledge into park management and interpretation. The park also works closely with the Subsistence Resource Commission (SRC). Subsistence is a fundamental value and use of the parks, monuments, and preserves created by ANILCA and requires close working relationships between park managers and subsistence users. The superintendent and staff of Lake Clark National Park and Preserve rely on the SRC to gain knowledge about the values and needs of subsistence users in the park's resident zone communities, including the sociocultural importance of the subsistence way of life. The SRC meetings provide a valuable forum to engage local communities, exchange ideas and information, and solicit meaningful public input into park resource management decisions.

Lake Clark National Park and Preserve currently makes its resource publications available at guest lodges in and near the park, at the Alaska Public Lands Information Center in Anchorage, and at community centers throughout the region. Excerpts or the entire contents of shorter works are published as e-books on the



High school students participate in Archaeology Camp, a partnership between the Park Service and the Lake and Peninsula School District's School-to-Life program. The program uses archaeology and anthropology to teach math and cultural awareness. Here, students are mapping a site.

park's website. The park produces a Telaquana Trail guide, available at its visitor centers and through Alaska Geographic. The Telaquana Trail map contains both English and Dena'ina names for important features.

Park staff are currently involved in historic preservation in nearby communities. As mentioned in the "Museum Collection and Archives" section on pages 54 and 55, the park's curator has met with residents of Pedro Bay to address community concerns about the preservation of historic photos and other heirlooms, and several community members have attended workshops to learn how to scan and save their family photos.

One of Lake Clark National Park and Preserve's archaeology outreach programs is Archaeology Camp, an innovative partnership with the Lake and Peninsula School District's School-to-Life program. Now in its third year, the two-week program for high school students uses archaeology and anthropology to teach

math and cultural awareness. Through the camp, students have mapped the Old Newhalen village site and cemetery, performed an archaeological survey of the Newhalen Road and the Newhalen Portage (a portage route between Iliamna Lake and Nondalton), and studied traditional ecological knowledge as a component of medicine (i.e., medicinal plants and their uses) and water-quality monitoring.

Lake Clark National Park and Preserve employs two permanent interpretive rangers and hires three additional rangers seasonally. This is insufficient to conduct the meaningful programs needed for outreach in the park's resident zone villages. An additional full-time interpreter would allow the park to better serve visitors. At this time, the park does not have any staff positions solely dedicated to interpretation and education. The park needs such a position in order to properly manage its education and outreach programs.

EXTERNAL SUPPORT—PARTNERSHIPS VITAL TO RESOURCE PROTECTION

Most of the funds Lake Clark National Park and Preserve receives from Congress cover fixed costs such as salaries and benefits for permanent staff, utilities, travel, and contract services. To boost visitor services, assist in resource management projects, and cover the gaps created by staffing shortfalls, Lake Clark relies on devoted volunteers, strategic partnerships, and private contributions.

Volunteers contribute around 9,000 hours of service to Lake Clark National Park and Preserve each year. Volunteers play an important role at the Dick Proenneke site on Upper Twin Lake, where they provide historical interpretation daily throughout the summer visitor season; as previously mentioned, Monroe Robinson maintains the Proenneke structures. Jerry and Jeanette Mills are longtime volunteers who live much of the year at the ranger station at Telaquana Lake. The park's dedicated volunteers

provide visitor information, conduct backcountry monitoring to determine visitor use numbers and the types of activities visitors are engaged in (e.g., fishing, hunting, kayaking, etc), assist with archaeological work, participate in other resource projects, and more.

The park uses existing visitor facilities in Homer at the Alaska Islands and Ocean Visitor Center through an agreement with the U.S. Fish and Wildlife Service and the Alaska Department of Fish and Game. In addition to providing office space for the park, the collaboration between the Park Service and the Department of Fish and Game has resulted in cooperative research, monitoring, and educational activities related to the coastal areas of Lake Clark National Park on Cook Inlet.

Partnerships with land conservation organizations, such as The Conservation Fund and The Nature Conservancy, have been effective in helping the park negotiate the purchase of inholdings. The Park Service has also partnered

Volunteers contribute about 9,000 hours of service to the park each year. Monroe Robinson (pictured) maintains the Proenneke structures and has assisted park staff with significant reconstruction work.



with these two organizations and the U.S. Fish and Wildlife Service, Alaska State Parks, the Nushagak-Mulchatna Wood-Tikchik Land Trust, Bristol Bay Native corporations, and tribes to protect salmon habitat in Bristol Bay since 2000. This partnership, now known as the Southwest Alaska Salmon Habitat Partnership, has secured funding through the U.S. Fish and Wildlife Service to conduct fish distribution surveys and in-stream flow reservations in watersheds potentially affected by the Pebble Mine. A primary goal will be to develop a regional strategic interagency plan for the protective management of fish habitat within the Bristol Bay watershed. In 2009, NPCA will participate in this critical salmon habitat assessment with teams assisting scientists with salmon studies and baseline data collection in the Chulitna River watershed to help further knowledge about the potential effects an adjacent mining district could have on park waters and fish habitat.

The Pratt Museum, an independent nonprofit museum in Homer, has been a long-time partner of Lake Clark National Park and Preserve, providing natural history and other park information to its visitors. The park also benefits from its relationship with Alaska Geographic, the official nonprofit partner of Alaska's 15 national parks, 16 national wildlife refuges, and America's two largest national forests, plus a variety of other public lands. Alaska Geographic contributes \$3 million annually to support Alaska's public lands, through donations and income from the bookstores it operates in 48 locations statewide. Alaska Geographic has provided support for some of Lake Clark National Park and Preserve's publications.

WHAT YOU CAN DO TO HELP:

- **Express your opinion.** Contact the Secretary of Interior, Alaska's congressional delegation, Alaska's state officials, and other decision-makers to let them know why you believe it is important to protect Lake Clark National Park and Preserve, the rest of Alaska's national parks, other federal lands, and the Bristol Bay watershed from incompatible development that would threaten their natural and cultural resources.
- **Help support organizations working on Bristol Bay protection efforts.**

NPCA: www.npca.org/alaska

Pebble Science: www.pebblescience.org

Nunamta Aulukestai: www.nunamta.org

Trout Unlimited: www.savebristolbay.org

The Nature Conservancy: www.nature.org

Earthworks: www.earthworksaction.org

Alaska Coal: www.alaskacoal.org

- **Volunteer in the parks.** Many parks are looking for dedicated people who can lend a helping hand. To learn about opportunities for volunteering at Lake Clark, contact the park's volunteer program manager Elizabeth Wasserman at Elizabeth_Wasserman@nps.gov.
- **Become an NPCA activist and learn about legislative initiatives and protection projects affecting parks.** When you join NPCA's activist network, you will receive *Park Lines*, a monthly electronic newsletter with the latest park news and ways you can help. Join by visiting www.npca.org/takeaction.
- **Learn more about Lake Clark National Park and Preserve.** Visit the websites maintained by the National Park Service (www.nps.gov/lac1), NPCA (www.npca.org/parks/lake-clark-national-park.html), and Alaska Geographic (www.alaska-geographic.html).



APPENDIX: METHODOLOGY

To determine the condition of known natural and cultural resources at Lake Clark National Park and Preserve and other national parks, the National Parks Conservation Association developed a resource assessment and ratings process. The assessment methodology can be found online at NPCA's Center for State of the Parks website: www.npca.org/stateoftheparks.

Researchers gather available information from a variety of research, monitoring, and background sources in a number of critical categories. The natural resources rating reflects assessment of more than 120 discrete elements associated with environmental quality, biotic health, and ecosystem integrity. Environmental quality and biotic health measures address air, water, soils, and climatic change conditions as well as their influences and human-related influences on plants and animals. Ecosystems measures address the extent, species composition, and interrelationships of organisms with each other and the physical environment.

The scores for cultural resources are determined based on the results of indicator questions that reflect the National Park Service's own *Cultural Resource Management Guideline* and other Park Service resource management policies.

Stewardship capacity refers to the Park Service's ability to protect park resources and includes discussion of funding and staffing levels, park planning documents, resource education, and external support.

For this report, researchers collected data and



DAN OBERLITZ

Camping in Lake Clark National Park and Preserve's backcountry provides a true wilderness experience.

prepared papers that summarized the results. These technical documents were used to construct this report, which was reviewed by staff at Lake Clark National Park and Preserve before publication.

NPCA's Center for State of the Parks represents the first time that such assessments have been undertaken for units of the National Park System. Comments on the program's methods are welcome.

ACKNOWLEDGMENTS

For more information about the **Center for State of the Parks®** and this and other program reports, contact:

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Cabrillo National Monument (CA)
Canyonlands National Park (UT)
Catoctin Mountain Park (MD)
Channel Islands National Park (CA)
Charles Pinckney National Historic Site (SC)
Chesapeake and Ohio Canal National Historical Park (DC/MD/WV)
Chickamauga and Chattanooga National Military Park (TN/GA)
Cumberland Island National Seashore (GA)
Death Valley National Park (CA)
Denali National Park and Preserve (AK)
Fort Donelson National Battlefield (TN)
Fort Laramie National Historic Site (WY)
Fort Necessity National Battlefield (PA)
Fort Pulaski National Monument (GA)
Fort Sumter National Monument (SC)
Fort Union Trading Post National Historic Site (ND)
Frederick Douglass National Historic Site (DC)
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Glacier Bay National Park and Preserve (AK)
Great Basin National Park (NV)
Great Smoky Mountains National Park (TN/NC)
Harpers Ferry National Historical Park (WV)
Hawai'i Volcanoes National Park
Hopewell Furnace National Historic Site (PA)
Indiana Dunes National Lakeshore (IN)
Isle Royale National Park (MI)
Joshua Tree National Park (CA)
Keweenaw National Historical Park (MI)
Knife River Indian Villages National Historic Site (ND)
Lewis and Clark National Historical Park (OR)
Lewis and Clark National Historic Trail (various)
Little Bighorn Battlefield National Monument (MT)
Longfellow National Historic Site (MA)
Missouri National Recreational River (NE)
Mojave National Preserve (CA)
Nez Perce National Historical Park (WA, ID, MT, OR)
Olympic National Park (WA)
Pictured Rocks National Lakeshore (MI)
Point Reyes National Seashore (CA)
Redwood National and State Parks (CA)
Rocky Mountain National Park (CO)
Saint-Gaudens National Historic Site (NH)
San Antonio Missions National Historical Park (TX)
San Juan Island National Historical Park (WA)
Santa Monica Mountains National Recreation Area (CA)
Shenandoah National Park (VA)
Shiloh National Military Park (TN/MS)
Sleeping Bear Dunes National Lakeshore (MI)
Stones River National Battlefield (TN)
Vicksburg National Military Park (MS)
Virgin Islands National Park
Virgin Islands Coral Reef National Monument
Waterton-Glacier International Peace Park (MT-Alberta)
Zion National Park (UT)

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