

# Community & Copper in a Wild Land

McCarthy, Kennecott and Wrangell-St.  
Elias National Park & Preserve, Alaska

Shawn Olson Ben Shaine

The Wrangell Mountains Center  
McCarthy

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The Wrangell Mountains Center is a private, non-profit institute dedicated to environmental education, research, and arts in Alaska's Wrangell-St. Elias National Park & Preserve.

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Kennicott Glacier panorama. (Wrangell Mountains Center collection)

## Preface and acknowledgements

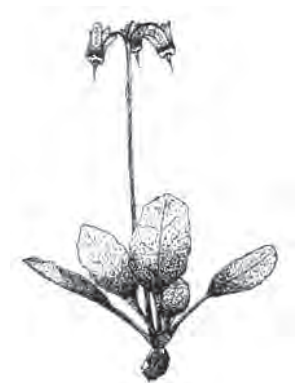
As a general introduction to its natural and cultural history, this book is intended to help those who come to the McCarthy-Kennecott area and Wrangell-St. Elias National Park & Preserve feel at home in the place. It was originally written primarily for employees of local tourism businesses, who are a main source of information for visitors. Readers of a preliminary draft circulated in the McCarthy community last year suggested that it would be of value to a wider audience, and this edition is being made available to the general public, as well.

The work could not have achieved its present form without the many contributions of information, suggestions, and helpful comments by members of the McCarthy-Kennecott community and staff of the National Park Service. We are grateful for the time and effort given to this process, and the book is much better for it.

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Artistic contributions are many. We list only a few here, but refer our readers to the photo and illustration credits for an appreciation of what has been offered. Claire Emery's skills are reflected in several key graphics. Doug Lindstrand donated use of his mammal drawings from his fine book, *Drawing Big Game*. We encourage our readers to take a look at his several books for artists, available at bookstores and from Fox Chapel Publishing ([www.carvingworld.com](http://www.carvingworld.com)). Nancy Simmerman opened the lifetime collection of her professional photographs for our use. Sara Wilson Doyle at Land Design North forwarded their land status maps. The National Geographic Society offered its perspective drawing of the park area, as well as beautiful drawings of birds. Friends of the Loomis Forest and Runesson/Lakehead University Boreal Forest each donated use of multiple photographs. Northwest Ecosystem Alliance provided affordable office space and a community of support for Shawn Olson's work.

Thank you to all listed here and to those of you whose names we haven't included, whose help has made this book possible.



Shooting Star (Wrangell Mountains Center collection)

## Introduction

For a century, McCarthy and Kennecott have been centers of human activity in the midst of vast wild mountains and valleys. Before the arrival of European Americans, the Ahtna native people hunted and gathered food in the area. They collected copper nuggets nearby, which they made into tools and traded with other tribes on journeys over the passes and down the rivers. In the early twentieth century, U.S. prospectors located enormously valuable copper lodes in Bonanza Mountain. Over the next decades, hundreds of workers tunneled into the mountain, processed the ore at Kennecott Copper Corporation's industrial complex alongside the glacier, and shipped it out to the coast by railroad. Four miles down valley, McCarthy served as mercantile center serving not only Kennecott, but a wide expanse of the surrounding country. In 1938, ore depleted, Kennecott's mines closed, leaving a legacy of monumental buildings. Most people left the area, though it was never abandoned and the subsequent years are among the most colorful in its history.

In 1980, Congress designated the federal public lands in the Wrangells as the nation's largest national park unit in comprehensive legislation to protect Alaska's natural ecosystems and wilderness. Wrangell-St. Elias National Park & Preserve is unusual both for the huge scale of its natural landscapes and because it remains home for ongoing human communities, including McCarthy-Kennecott. Today, the McCarthy-Kennecott area is growing. Homes and businesses are being built on private land. The National Park Service is stabilizing buildings it owns in Kennecott, which is now a National Historic Landmark. The area has become a destination for travelers and hub for access into the central Wrangells backcountry. Drawn to the area for diverse reasons, its residents have key roles in providing services, hosting and interpreting the place for its visitors.

Today, the industrial complex alongside the glacier, empty of miners, is available for discovery and appreciation by residents and visitors. They can experience where Kennecott Copper Corporation

got its start on Bonanza Mountain, generating profits that built an international corporate mining empire. Kennecott's buildings, most still intact, incorporated the latest and best technology of their time, imported from Seattle by steamer and full-gauge railroad, built and operated in challenging Alaska conditions.

The Wrangells are one of the best places in the world to experience massive forces of nature. Within sight of McCarthy and Kennecott are huge glaciers, an extinct volcano, nearly mile-high cliffs, rocks containing fossils of tropical sea creatures, rivers eating away at buildings and roads, old forests dying from an epidemic of beetles, and new forests growing up on ground recently exposed by the melting of glacier ice. Summer brings salmon, swimming from the distant ocean to spawn in nearby lakes and streams. Grizzly and black bears migrate between forested valleys and alpine meadows to eat salmon, ripe berries and roots. They sleep through sub-zero winters and snow. Even today, bears and moose wander the streets of McCarthy and Kennecott.

More obviously than in most places, people in the Wrangells live with powerful and unpredictable forces of change. Storms can blow in from the coast, sometimes triggering floods capable of washing away buildings and undercutting bridges. A national economic downturn or terror scare could drastically reduce local tourism, as the depression affected the mines in the 1930s. On the contrary, residents and businesses might wonder if peace and prosperity could generate a flood of tourists. In the summer, low clouds strand hikers in the backcountry, when pilots can't see to land at remote airstrips. And a few days of cold rain can challenge their ability to survive. In the winter, residents prepare for -50 degree cold. But a winter thaw can be even more difficult, turning snow trails to slush.

Getting to know this place means learning to understand these powerful forces and the people who chose to live with them.

## A Land People Call Home

When it designated Wrangell-St. Elias National Park and Preserve, Congress specifically recognized local residence. Local people live in homes on private land within park borders, just as they do on private land elsewhere. Those whose primary year-round residence is in or near the Wrangells can hunt, fish, gather berries, and cut firewood in the park as well as the preserve, in accord with Park Service regulations for subsistence activities. The law provides for continuation of access into and across public lands, including traditional use of motor vehicles and airplanes.

A main feature for many travelers is their experience in the lodges, bed & breakfasts, and local businesses of the McCarthy-Kennecott area. Guide services lead travelers into the mountains, down the rivers, and through the buildings in Kennecott. The air taxis take responsibility for bringing people into the backcountry. The advice they provide to their clients influences where people go and what they do. The skills and services of McCarthy area people are essential for taking care of those who visit, providing for safety, and passing on knowledge about the place, in a setting where other help can be hundreds of miles away.

The privately-owned lodges and homes in the area reflect the initiative of residents and business owners. The character of the place is reflected in their work, including new log and frame buildings and restorations of mining-era structures.

Philosophically, man does have a place within this wilderness. That's one of the distinct features, one of the dramas of this park. There's a unique opportunity to create an understanding of the setting and man's place within that setting, and of the value that has to the guest experience.

—McCarthy resident Neil Darish

## An Ever-Changing Mountain Wilderness

Because of rugged conditions, remote location and steep terrain, most of the Wrangells remain one of the largest wildlands in the country. Across millions of acres, wolves wander freely in their hunt. Moose stay alert for wolves, and their numbers and behavior are affected by them. Bears fish lakes and streams for salmon that swim up from the ocean in the unpolluted, free-flowing Copper and Chitina Rivers. By comparison, the grizzly, symbol of California, is extinct in that state. Salmon are on the endangered species list in Washington and Oregon.

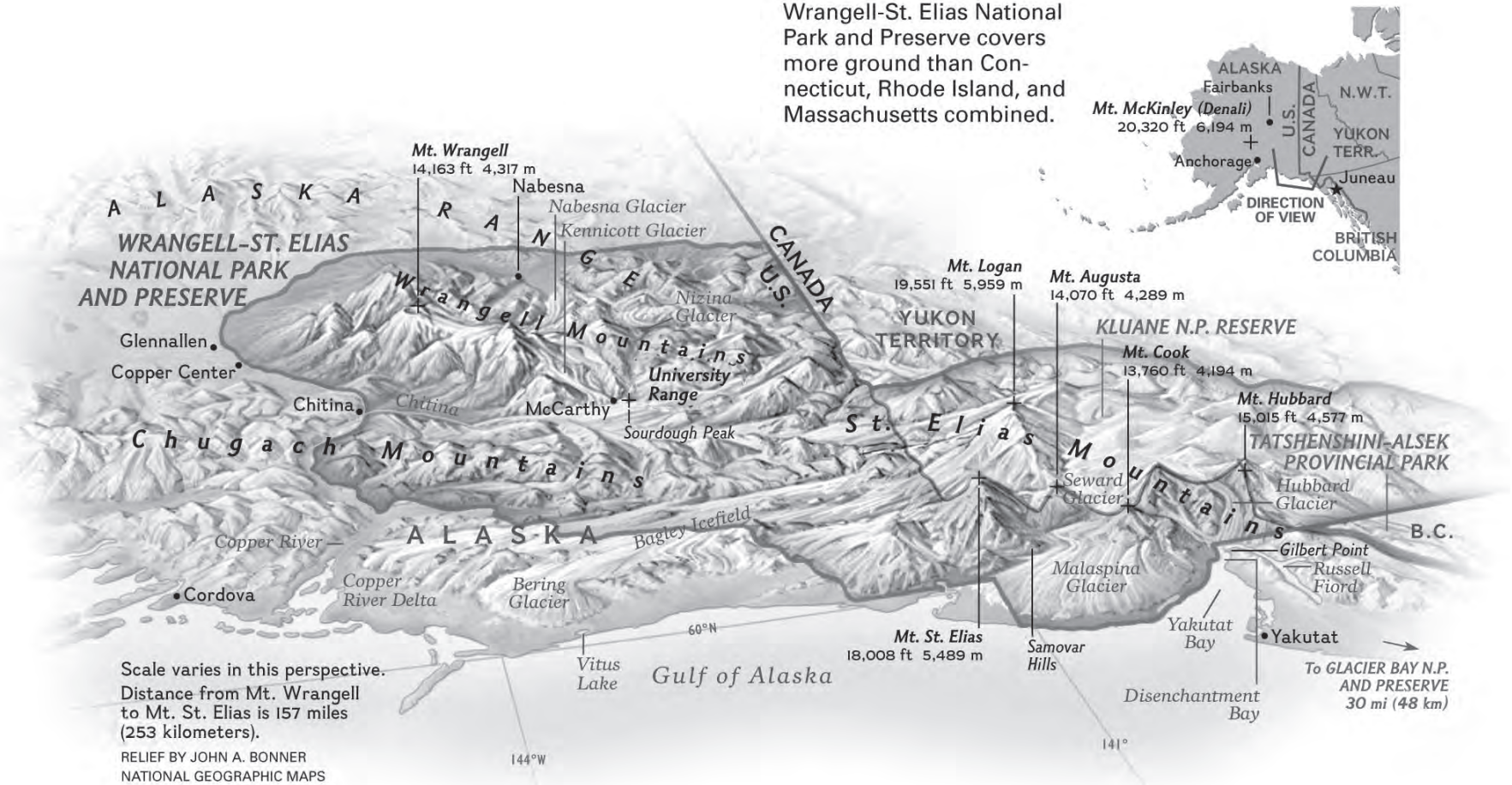
People, too, have reason to be alert here. They can experience solitude, self-reliance and unaltered nature in the deep mountains of the Wrangells to an extent seldom found elsewhere. Without trails, overland travel requires routefinding skill. People in the Wrangells backcountry are on their own, seldom encountering anyone else, handling difficult weather and terrain.

The mountains, glacier, rivers and ecosystems of the Wrangell-St. Elias region are massive and constantly changing. They include most of the highest peaks on the continent. Glaciers melt and advance, rivers flood and change course, and mountainsides slide. The results of change over millions of years is visible in contorted rock layers exposed in mountain cliffs. Similar to the way that the Grand Canyon is known for its monumental static geology, the Wrangells demonstrate a land in transformation.

Recognizing these attributes of the place, Congress designated the nation's largest parkland in the Wrangell Mountains and adjacent ranges and valleys. In addition, it classified most of the backcountry of this parkland for management as the largest unit of the national wilderness preservation system. Together with adjacent parks in Canada and Alaska, Wrangell-St. Elias National Park & Preserve is part of the largest international area of protected natural lands in the world.

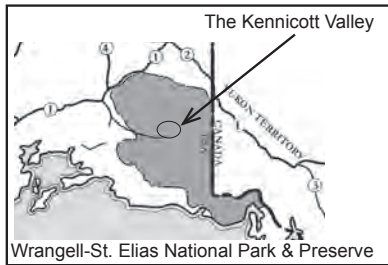
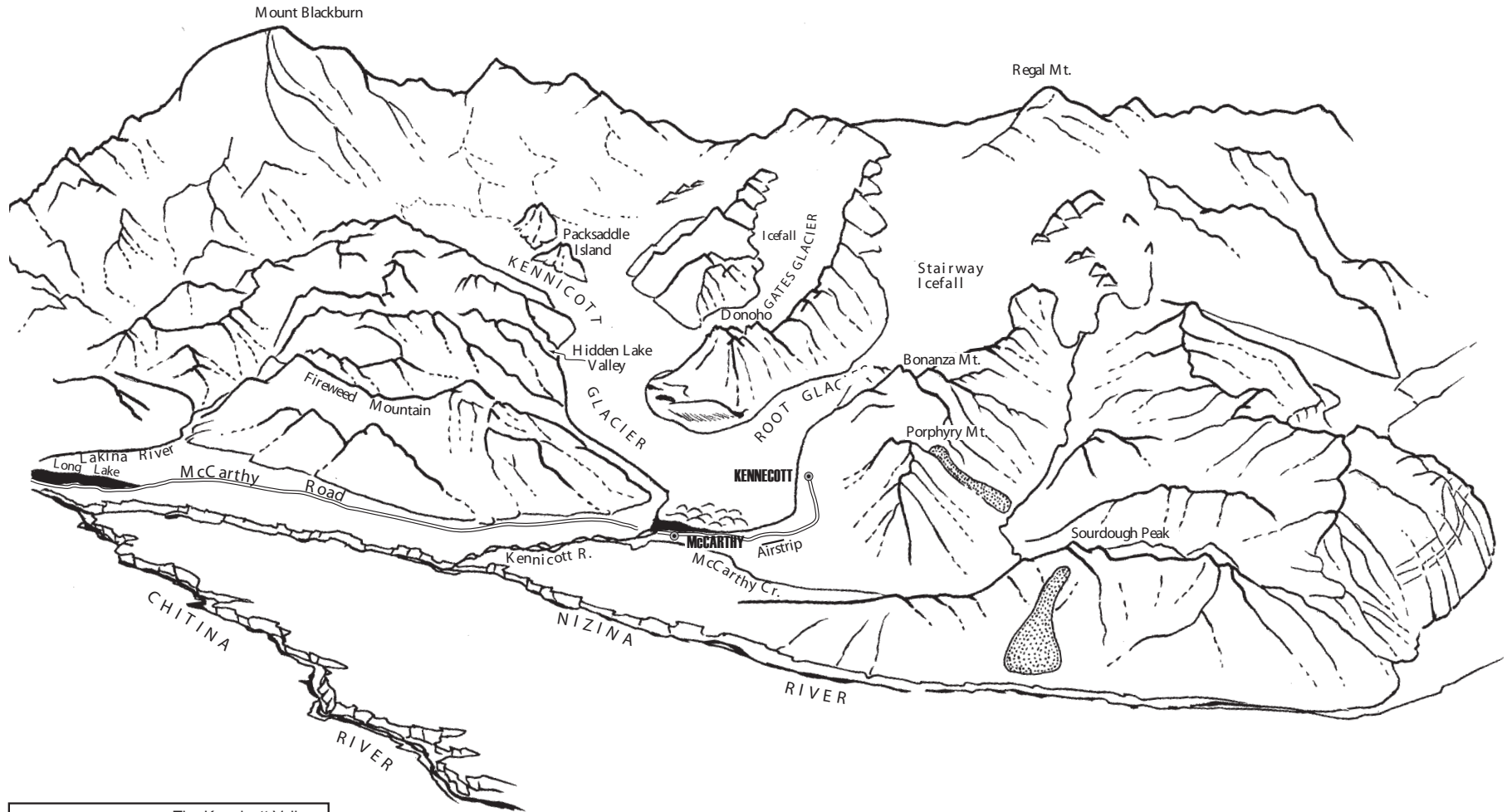
3 Community & Copper in a Wild Land: Maps

Wrangell-St. Elias National Park and Preserve covers more ground than Connecticut, Rhode Island, and Massachusetts combined.



Map courtesy of The National Geographic Society





### The Kennicott Valley

Scale varies in this perspective. Distance from McCarthy to the summit of Mount Blackburn is 27 miles.

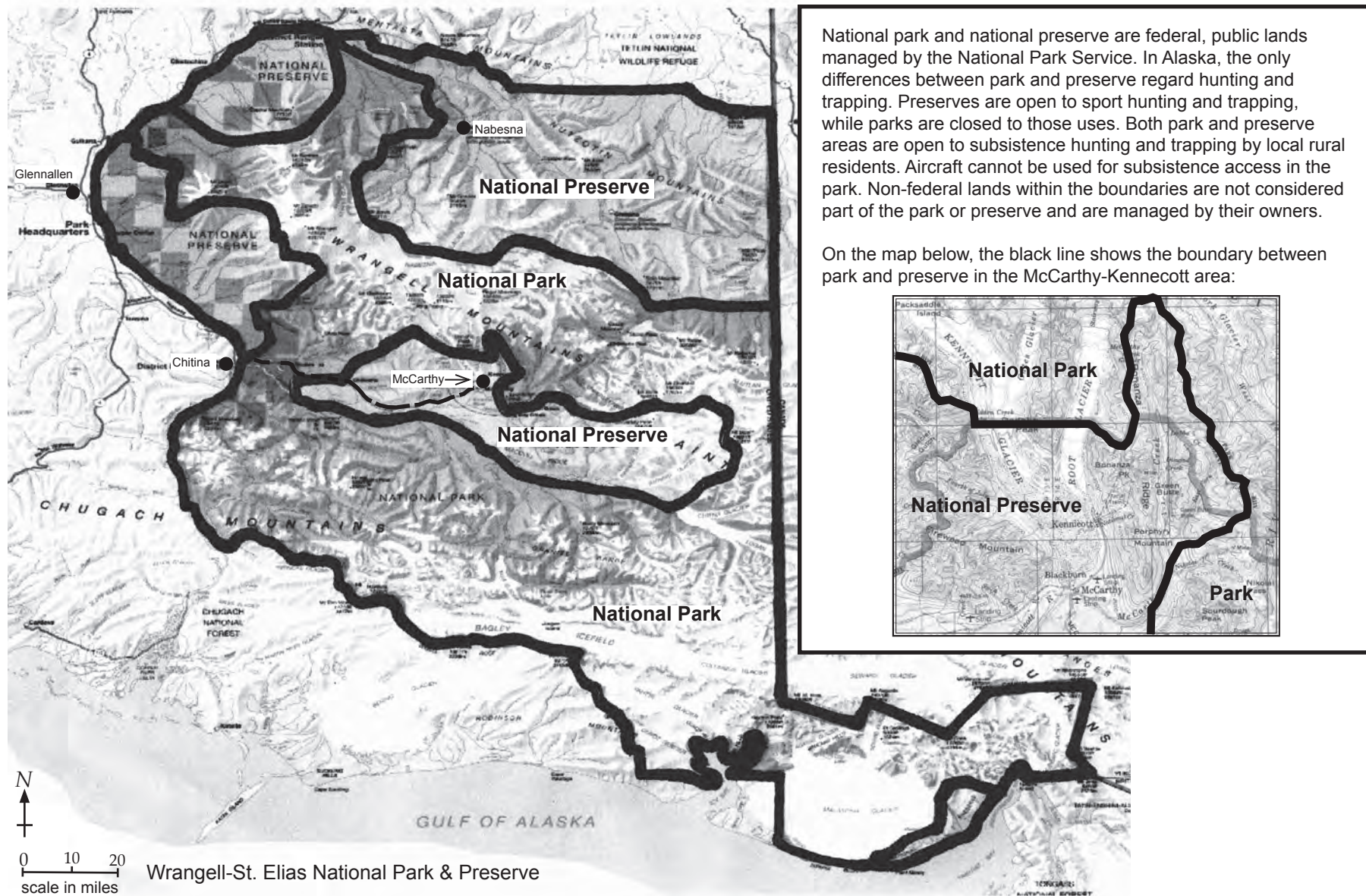
Drawing by Claire Emery

# UNESCO World Heritage Site Kluane/Wrangell-St.Elias/Glacier Bay/Tatshenshini-Alsek

Wrangell - St. Elias National Park and Preserve  
National Park Service  
U.S. Department of the Interior

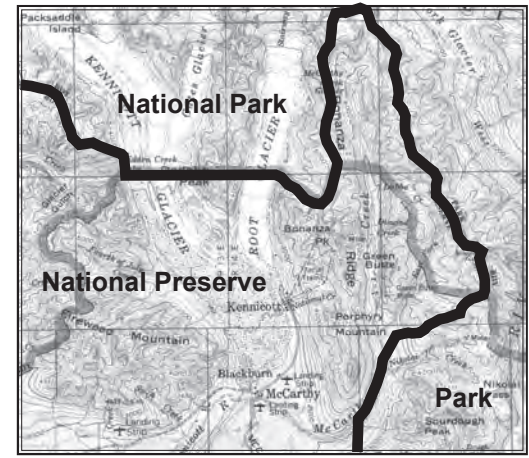


## Wrangell-St. Elias National Park & National Preserve Boundaries



National park and national preserve are federal, public lands managed by the National Park Service. In Alaska, the only differences between park and preserve regard hunting and trapping. Preserves are open to sport hunting and trapping, while parks are closed to those uses. Both park and preserve areas are open to subsistence hunting and trapping by local rural residents. Aircraft cannot be used for subsistence access in the park. Non-federal lands within the boundaries are not considered part of the park or preserve and are managed by their owners.

On the map below, the black line shows the boundary between park and preserve in the McCarthy-Kennecott area:



## Origin of the Wrangell Mountains and their Copper Ore

Recent geologic studies show that the lower ridges of the Wrangell Mountains are made primarily of rock that formed originally thousands of miles away in the tropical Pacific Ocean. Riding a moving fragment of the earth's crust, they first bumped into North America south of California, then gradually slid along the coast until jamming into Alaska, where they stuck. During this journey, they were pushed and distorted, as shown, for example, by the twisted layers of rock on upper Donoho Peak that we can see from Kennecott. More recently, other fragments of earth crust crashed into the Alaska coast behind them, pushing up these rocks into the Wrangell Mountains we know today.

The oldest rock layer visible around McCarthy-Kennecott is made of greenstone, a metamorphosed basalt (an erupted rock chemically altered over a long period of time by pressure and heat). The dark layer visible on lower Bonanza Peak behind Kennecott, Donoho

Peak and the steep cliffs above the west side of the glacier is made of greenstone. When this ancient lava was at the bottom of a shallow part of the Pacific Ocean, it became covered with reefs, mats of plants mixed with sediments, sea creature shells, and calcium carbonate from seawater. When compressed by the weight of other, newer deposits on top, this material became the lighter-colored limestone we see above the greenstone.

Putting the greenstone and limestone together created the opportunity for the development of the ore discovered by prospectors. Water passing through cracks in the rock dissolved and carried away some of the copper present in low concentrations in the greenstone, from where it was pressed up into the layers above. There, it reacted with the limestone, leaving the copper ore behind. In Bonanza Mountain, several huge caves were filled with chalcocite more than three-quarters copper.

Limestone

Greenstone



Donoho Peak

The limestone layers were shifted and bent as the crust fragment called Wrangellia pushed north against the American continent on its way from the tropics to Alaska. The trip took about 60 million years and was completed about 50 million years ago.

Copper ore formed just above the boundary between the greenstone and the limestone.

## The Wrangells Volcanoes



Mount Blackburn. (NPS photo)

The higher peaks and ridges rimming the Kennicott Valley to the north are made of material that poured out of volcanoes erupting up through the older Wrangells rocks, after these rocks arrived in Alaska. When a more recently arriving section of earth crust hit the coast, its leading edge was pushed down under the older Wrangell and Chugach formations. At the high temperatures found deep underground, it melted, and at high pressure from the weight of rock above, it forced its way through toward the surface, creating the volcanoes.

The highest point visible from McCarthy and Kennecott is Mount Blackburn, an extinct volcano which started forming about five million years ago. Since it last erupted three and a half million years ago, glaciers cutting into its side have eaten away most of its bulk. Like huge conveyor belts, they carry the mountain down in pieces, at their lower ends dumping lava chunks into rivers of melted ice, which grind and send the material to the Pacific Ocean. In summer, the Kennicott River runs brown with rock dust. On hot days when melting ice brings high water, standing on the footbridge across the river near McCarthy we can hear the rumble of rocks rolling downstream.

nt Wrangell, west of McCarthy, that covered more than 100,000

At 16,390', Mount Blackburn is the highest peak in the Kennicott Valley. When originally formed, its summit caldera, from which volcanic rock erupted, was eight miles wide. Today's Mount Blackburn is the remaining remnant of this broad mountain.

These cliffs down valley from the volcanics are made of the same limestone and greenstone rock layers found in Bonanza and Donoho Mountains. They are less than half the height of Mount Blackburn and much older.



Mount Blackburn and the upper Kennicott Valley. (Jonathon Schuhrke photo)

The expanse of high, ice-decked mountains at the center of the Wrangells is made of layers of volcanic rock, which erupted through and rests on top of the older rocks formed in the tropical Pacific Ocean.

Carrying rocks as it flows downhill, the Kennicott Glacier has cut away most of the mountain mass that once filled this valley. Most cutting happens when the ice is thicker than it is now, but considerable erosion continues today.

## A Land Still in the Ice Age



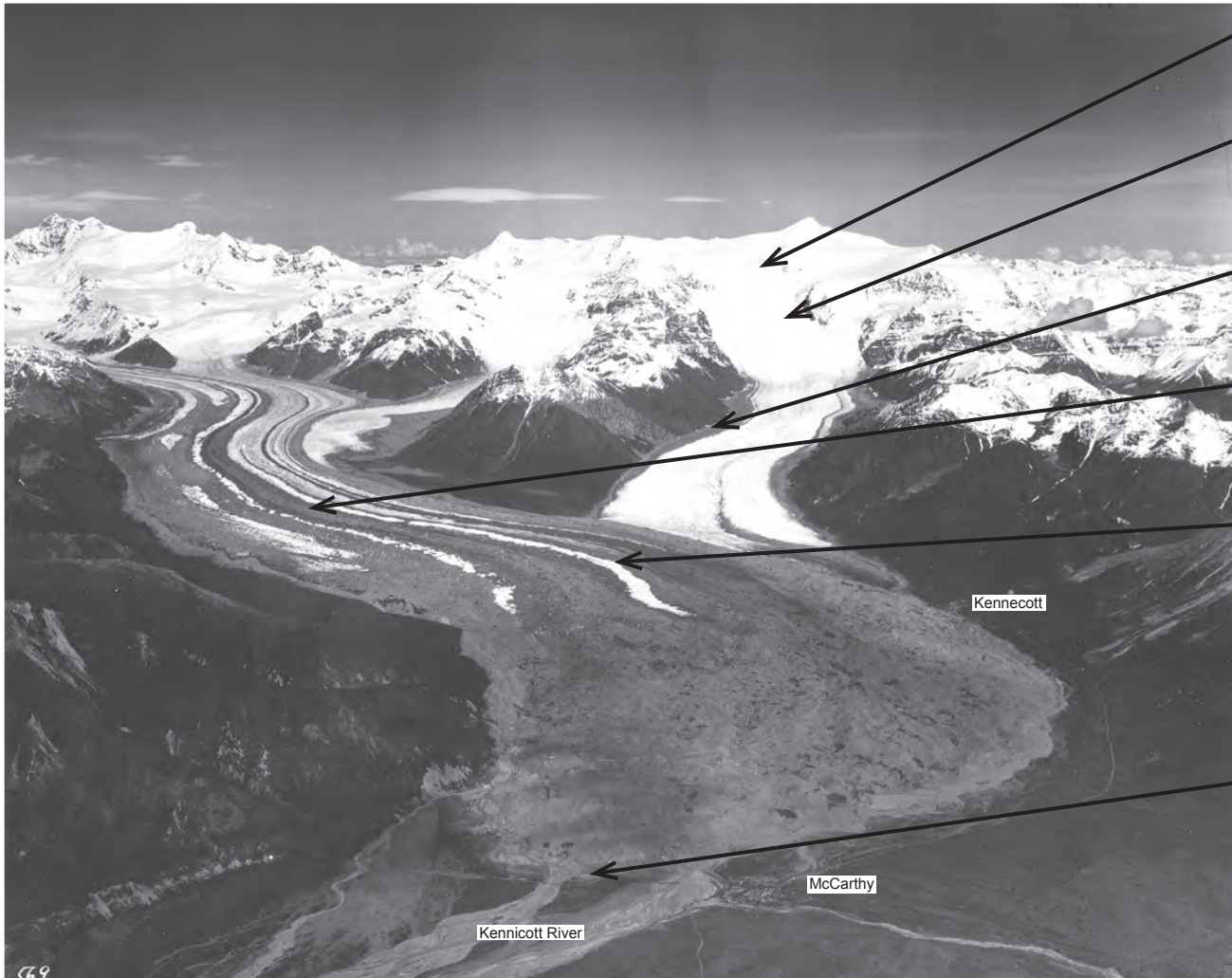
The edge of the Kennicott Glacier near McCarthy, as it looked in 1985. Since then, these ice cliffs have melted as the glacier retreats and thins in the warmer climate of recent years. (Sally Gibert photo)

More than a dozen times during the past few million years, glaciers like the one that now reaches to within a mile of downtown McCarthy grew to cover large areas of North America, Europe and Asia, then melted again as the climate changed. During these periods of maximum glaciation, the locations of Seattle, Chicago and New York lay buried under ice up to a mile thick. These glaciers come in cycles, pulsing repeatedly for about a hundred thousand years, mostly disappearing during warm times, called interglacial periods, for ten thousand years or so, then again advancing. All of human civilization, from the first towns in Mesopotamia and China to now, has taken place during the present, relatively short period between these glaciations. The glaciers may well advance again.

But even in the interglacial warmth we now enjoy, storms from the Pacific Ocean drop more snow on the mountains surrounding McCarthy than can melt during the brief, high-elevation subarctic summer. So today the Wrangell, Chugach and St. Elias Ranges remain capped with icefields. From them, glaciers like the Kennicott flow down into the surrounding valleys. A walk along the glacier edge

near McCarthy now is not all that different than a walk would have been along the margin of the glaciers melting off from Michigan, Massachusetts, and Washington State ten to fifteen thousand years ago.

Today, the Kennicott Glacier is more than a thousand feet thick in some places. At its maximum during the most recent major ice advance, about twenty thousand years ago, it was several thousand feet thicker. Near McCarthy, only the peaks of Bonanza, Fireweed, Porphyry and the other mountains poked out from the surrounding ice. If people had stood on the ice above the present location of McCarthy-Kennecott (though it's unlikely that anyone was in the valley then), they would have looked out over glaciers filling the entire expanse of the broad valley to the south, today covered with forest and cut by the rivers. We find long piles of rocks high on Porphyry Mountain behind McCarthy and other local slopes, dropped there by the Kennicott Glacier when it was much thicker.



**Parts of a Glacier**

*Accumulation zone*, where more snow falls during the year than melts during the summer; white with snow all year round.

*Icefall*, where the glacier flows over a steep drop, breaking into unstable chunks called seracs, which are separated by big cracks called crevasses.

*Lateral moraine*, rocks falling onto or scraped up by the glacier from the adjacent mountainside and carried downstream at the edge of the ice.

*Medial moraines*, bands of rock debris in the middle of the glacier surface, formed by the joining of lateral moraines when two tributary glaciers flow together.

*Ablation zone*, the lower part of the glacier, where all of the year's snowfall along with some of the ice surface melts during the summer. This part of the glacier is either replenished by ice flowing down from the accumulation zone, or, if that flow isn't sufficient, it thins and melts. Today, the lower Kennicott Glacier near Kennecott and McCarthy is stagnant and melting.

*Terminal moraine*, the ridge of debris piled up by the glacier at the line of its farthest advance. The visible terminal moraine of the Kennicott Glacier is the long hill just upstream of the end of the McCarthy Road, easily seen from the footbridge. Previous terminal moraines from older, more extensive glacier advances have been eroded away. Today, the edge of the glacier has melted back from the position shown here, and a lake has formed between the terminal moraine and the remaining ice.

© Bradford Washburn, courtesy Panopticon Gallery, Waltham, MA

Bradford Washburn took this photo of the Kennicott Glacier in 1937, when the copper mines were operating. Notice what looks like the light of a locomotive moving along the railroad tracks in the lower left.

## The Kennicott Glacier

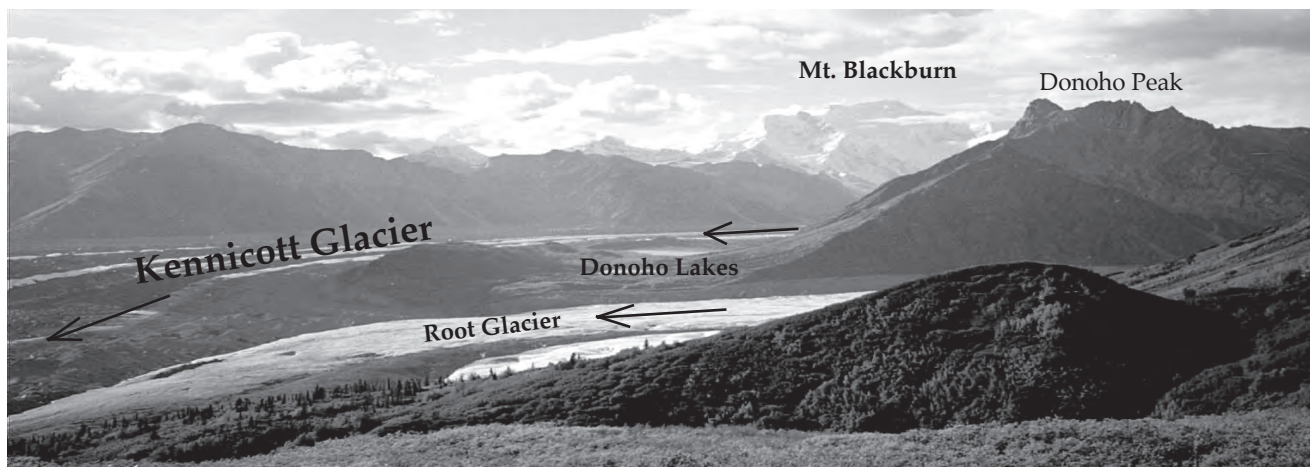
Looking across the valley from the town of Kennecott in summer sunshine, we see the wide expanse below filled with glacier, its rough surface covered with brown rocks. Especially if the day is warm, we might hear the crash of collapsing ice walls and boulders tumbling down the glacier's melting ice cliffs. This ice formed from snow falling on the high mountains of the upper Kennicott Valley, compressing as it accumulates, becoming the glacier, slowly flowing downhill, more than twenty miles to the town of Kennecott.

It takes several centuries for the glacier to make this journey, traveling about 450 feet per year. As it moves, it brings pieces of the mountains along for the ride, rocks that have slid onto its surface and plucked from the valley floor on which it slides. Over many summers, the ice surface melts, but the rocks in it do not, so they accumulate on top of the glacier. By the time it gets to the mining town and beyond to where it finally melts completely within a mile of downtown McCarthy, the white ice is hidden by a covering blanket of rubble and silt.



Looking down to the Kennicott Glacier and across the Kennicott Valley from the bridge over National Creek in downtown Kennecott in 2004. The rugged, rubble-covered terrain filling most of the valley floor is glacier ice, covered by a layer of rocks which it has carried down from the high peaks and ridges. The gravel areas in the foreground, on which some of the Kennecott buildings stand, are mining tailings left over from processing ore.

Looking up the Kennicott Glacier from the mountainside above the town of Kennecott. The arrows show the direction of ice flow down the valley from the slopes of Mt. Blackburn and the adjacent high ridges. The Root Glacier is a tributary ice stream that joins the Kennicott Glacier about a mile north of town.





## The Little Ice Age

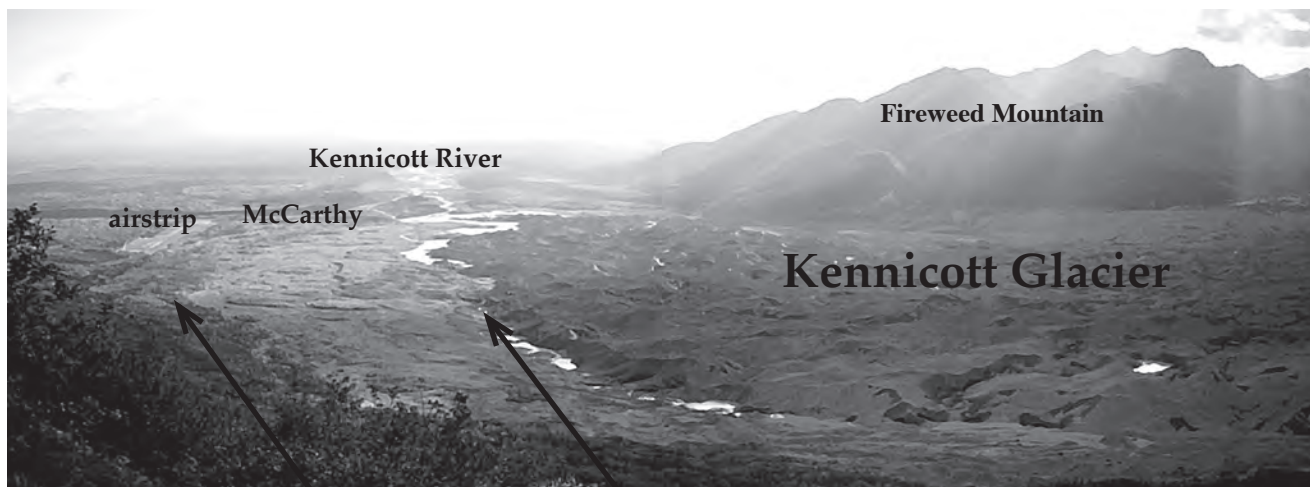
Since the most recent major ice age ended around ten thousand years ago, the Kennicott Glacier has made several smaller advances. The most recent of these was during the “Little Ice Age,” which lasted for about five hundred years, affecting weather around the world. About 150 years ago, the glacier began melting as global climate warmed again, and it continues to melt now. In the mining days, the glacier towered over McCarthy-Kennecott. Two women who lived in Kennecott then remember, “We didn’t know we lived in a valley ... as we could only see the side of the glacier and not the mountains across the valley.” The open expanses around the glacier edge near McCarthy were covered by ice in 1860. As the ice retreats, the forest advances, but has not yet had time to cover this land. The growing lake north of the Kennicott footbridges did not exist in 1990. Its area was under ice.



The rock-covered glacier loomed over Kennecott in this photograph taken in 1919. Compare the view in 2004 on the previous page.



McCarthy in the mining days: The glacier extended almost to the edge of town. (Howard Hodges photo , Kennecott Kids Collection, NPS)



Glacier edge at the Little Ice Age maximum 150 years ago

Glacier edge today

## The Glaciers Today, Compared with their Ice Age Maxima



Today, the Kennicott Glacier covers the floor of the valley, but the mountainsides above are mostly ice-free, green in the summertime with forests growing at lower elevations and flower-filled alpine meadows above. (Dave Mitchell photo)



At the height of the most recent major set of ice advances about 60,000 years ago, the same scene might have looked something like this. We know how far the glacier extended, because it left piles of rocks along its edges, which it had transported from up the valley. These linear piles, called lateral moraines, remain today and can be seen when hiking above McCarthy and Kennecott. They include rock types different from those making up the mountain on which they are found, but the same as rocks from the mountains closer to the head of the Kennicott Valley. For example, there are pieces of lava (rock which flowed out of volcanoes) on the Bonanza trail above the town of Kennecott. The closest source of this lava is miles to the north. The lava chunks were carried down by the Kennicott or Root Glaciers, when they were thicker.



These rocks sit on the side of Porphyry Mountain near Kennecott town at the location marked by "X" in the photo above, about 1500 feet higher than the present surface of the glacier. The large rock is a piece of volcanic ash, a type originating at Mount Blackburn and the adjacent area at the head of the Kennicott Valley. It was brought here by the glacier.

## Rock Glaciers



National Creek Rock Glacier, seen from near the Bonanza Mountain trail above Kennecott.

The Wrangells are one of the best places in the world to see and learn about rock glaciers, mixtures of rock and ice that flow very slowly from steep mountainsides. Visible from downtown Kennecott, a large rock glacier descends from an upper bowl, or cirque, of Porphyry Mountain to National Creek. Hikers headed for the Jumbo Mine on Bonanza Mountain walk up another rock glacier that fills the Jumbo Creek Valley.

These rock glaciers are likely the remnants of ordinary glaciers which mostly melted after the most recent ice age. These glaciers contained large amounts of rock fallen from easily-eroded headwalls above. As the ice melted away, the rocks became concentrated, especially on the surface, which became covered with a layer of debris. Today, the rock glaciers continue to be fed by the mixture of snow and rocks that falls from the cliffs at their upper end. They flow downhill at rates measured in inches per year. In comparison, the Kennicott Glacier moves hundreds of feet during that time. Other rock glaciers may grow where large amounts of avalanched

mixed rock and ice accumulate, without ever forming a regular ice glacier.

In 1993 geologist and McCarthy community member Roger Elconin discovered the broken snout of a rock glacier on Fireweed Mountain unearthed by a recent flood. During the brief period until the exposed face melted, he had the unusual opportunity to see the inside of a rock glacier. His research showed that its inside contains more ice than rock. The covering rock layer was about three to ten feet thick.

When rock glacier movement slows enough for the surface rocks to stabilize, lichens and mosses begin to grow on it. Eventually, they form soil. If the surface remains stable, flowering plants take hold. Large areas on the National Creek rock glacier are covered with thick, soft lichens. Looking from the Bonanza Mountain trail across National Creek, it's possible to see the portions of this rock glacier that are still flowing (bare rock areas), where it is stabilizing (yellowish lichen areas), and where it has been stationary for many years, perhaps centuries (covered in willow and alder).

## Glacier-dammed Lakes

Hidden Valley



Hidden Valley, with Hidden Lake at its bottom, as seen from the mountainside above Kennecott.



Hidden Lake breakout flood during the mining days, gushing out from beneath the Kennicott River at McCarthy. Recent breakouts haven't been as sensational, but are still impressive annual events. (NPS historical photo)

### In the Past: Lake Ahtna

As the most recent ice age came to an end, there was a period when glaciers had receded from the Chitina Valley floor, but glaciers flowing off of mountains lower down the valley sometimes dammed the Copper River near Cordova. Looking south from above where McCarthy-Kennecott is today, we would have seen a giant lake extending to the Chugach Mountains, as much as several thousand feet deep. Sailors (if there had been any) could have boated hundreds of miles from Kennecott to the Alaska Range north of Glennallen, or at least ice-boated across its frozen surface. This body of water, called Lake Ahtna, drained whenever the dams melted, most recently around nine thousand years ago. Thick layers of lake bottom silts lie not far below the surface of the ground in the valley floor near McCarthy.

### Today: Hidden and Iceberg Lakes

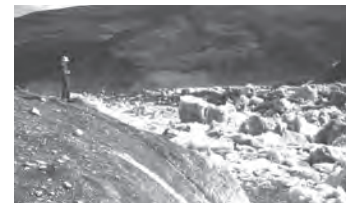
At present, rain and melting ice and snow pool every summer into a much smaller lake at Hidden Valley, which is dammed by the Kennicott Glacier north of McCarthy-Kennecott. Usually in July, the deepening water of this lake makes its way out under the ice. Then the entire lake drains out under the glacier, emerging at its snout near the footbridge in a "breakout flood." For a day or so, the Kennicott River rages with several times its usual flow. Until construction of the footbridge on deep-set pilings, the annual Hidden Lake flood washed away every bridge built across the river. In recent years, Iceberg Lake in the Chugach Mountains south of McCarthy has also drained. Larger than Hidden Lake, Iceberg Lake's water raises the level of the Chitina River several feet, inundating some of the campsites used by rafters, though it doesn't affect the McCarthy area. Several smaller lakes form and drain annually along the edge of the Root Glacier north of Kennecott.



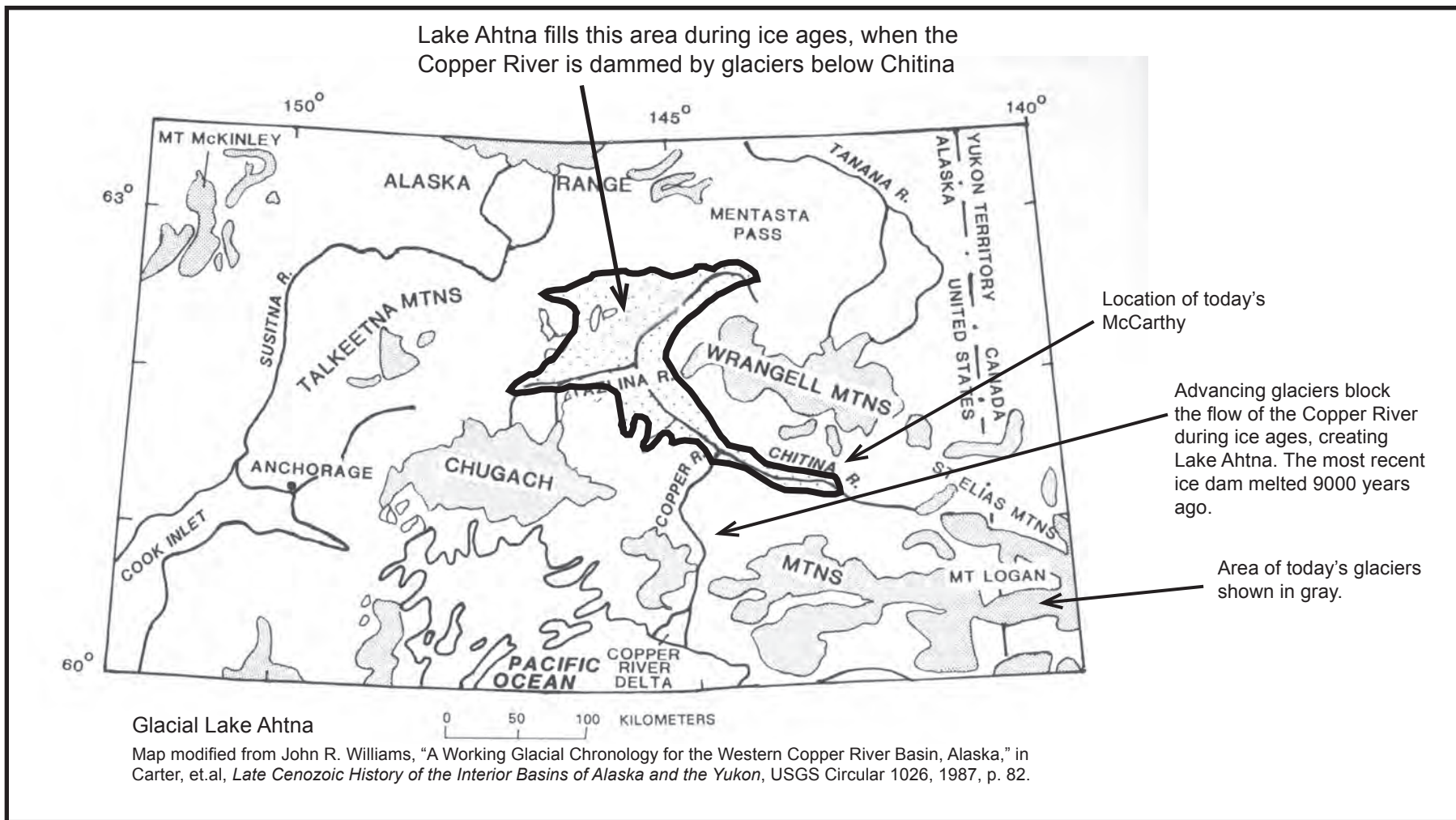
Empty Iceberg Lake after it has drained, its dry bed covered with grounded icebergs. (NPS photo)



Hikers at the shore of Hidden Lake after it has drained. (Jonathon Schuhrke photo)



Lake Erie, dammed by the edge of the Root Glacier, fills and drains every year. (Nancy Simmerman photo)



# Climate

## Cycles and episodes of weather and light

Often, life in the Wrangells moves with the rhythm of natural cycles. More than in most places, people may find themselves aware of the daily rotation of the earth, the monthly circling of the moon, and the annual revolution of the earth around the sun. Early summer brings almost continuous light. But by August, the daily cycle brings the chill of night. During the summer days, we may not notice the full moon passing low to the horizon. But in the winter night, its monthly appearance high in the sky floods the snow-covered land with light. The weather changes in longer cycles also, as shown by the glaciers' advance and retreat in cycles of thousands of years, as climate responds to multiple influences, including the earth's varying orbit around the sun.

### Six Seasons of the North

In northern regions of the world, many people recognize six seasons of the year, rather than just four. In addition to spring, summer, fall, and winter, they identify two periods of major transition: break up and freeze up.

Break up occurs when the winter ice and snow cover begin to melt in the longer days and increasing warmth from the sun. It usually lasts from early April until May. Bare ground appears gradually, and travel becomes difficult as snow trails get deep and slushy. Snow melt occurs while ground underneath is still frozen, leading to snow swamps because the meltwater can't drain away. Rivers and lakes lose their hard winter crust, limiting the freedom of movement enjoyed by residents during the cold months. Break up is a season of opening, uncovering, rediscovering.

Freeze up occurs just after the autumn trees lose their gold brilliance, as the landscape fades together into a hushed, gray

stillness. Beginning in October, the ground slowly surrenders its summer warmth into the increasingly cold air. Rivers and lakes grow colder and slower, gradually becoming stiff as the winter ice sets in. Freeze up is a season of closing, of quieting down and preparing for the long winter ahead.



#### Weather Patterns: What to expect

- Mid-May to July: often sunny, in the 70s or low 80s
- August: starts to get cooler, cloudier, and rainier, often in the 60s
- Summer rains usually bring temperatures in the low 50s.
- September brings temperatures in the 50s and cooler, more rain and some snow, which doesn't stick.
- Lowest officially recorded temperature: -57F recorded on November 11, 1972 (Long-time residents report unofficial readings into the -60s.)
- Highest temperature: 87F recorded on June 21, 1991
- Average Yearly Precipitation at McCarthy: 19 inches of liquid; 68 inches of snowfall
- Kennecott is significantly wetter & snowier than McCarthy.

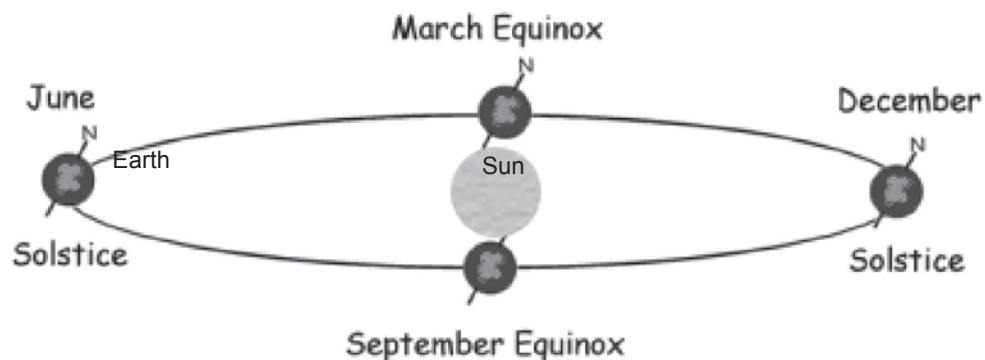
## Why summer is warmer than winter (and why summer days are longer)

Summer is warmer than winter because in summer the sun is up for a longer time each day, and it shines down more directly from above, rather than from low on the horizon as in winter.

The Earth makes one revolution on its axis in 24 hours. Daytime happens for the side of the planet that is facing the sun, while night happens for the side of the Earth that is in the sun's shadow.

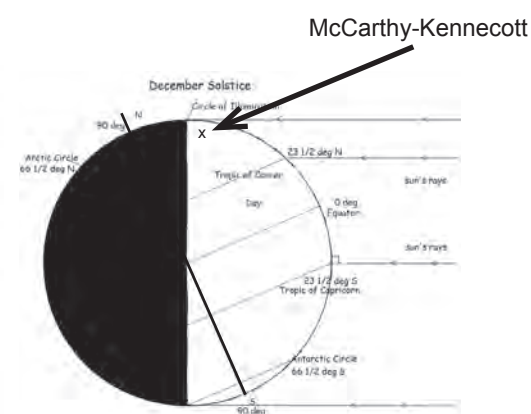
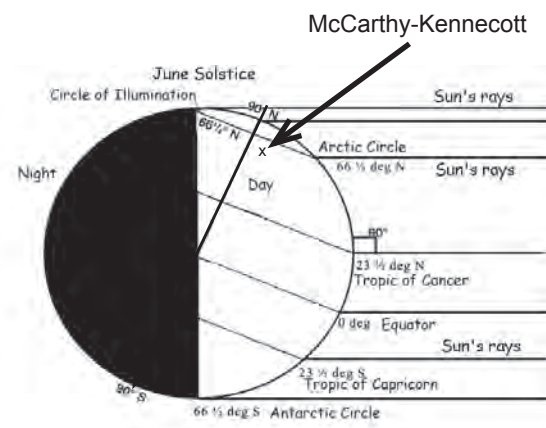
Each year, the earth orbits once around the sun. In the summer, the North Pole is tilted towards the sun, so that high latitudes (such as the Alaska) are in light most of the time each day. During the winter, the North Pole is tilted away from the sun, so that in winter Alaska is in dark shadow most of the time.

At far north or south latitudes, day length changes are very dramatic. McCarthy is at 61 degrees north, five degrees south of the Arctic Circle, which means that the change in day length over the course of even a week is very noticeable. In contrast, places near the equator experience very little day length change—days right at the equator remain the same length throughout the year.



Summer: McCarthy-Kennecott is on the side of the earth facing the sun most of the time.

Winter: McCarthy-Kennecott is on the dark side of the earth most of the time.



Drawings by Jane Thorngren

## Solstices

For the northern hemisphere, the June summer solstice is the longest day of the year, when the North pole is the most directly tilted at the sun. The December winter solstice brings the shortest day of the year for the northern hemisphere, when the North pole is the most directly tilted away from the sun.

## Equinoxes

Spring (vernal) equinox in March and fall equinox in September are the two days in the year that the day and night are the exact same length. No matter where you live on the Earth, you would spend 12 hours in the day and 12 hours in the night as you rotated on your circle of latitude.

### Day length changes: Sunrise and sunset

(Data for Glennallen, Alaska, for 2004)

Month	Sunrise	Sunset
January 1	10:07AM	3:25 PM
February 1	9:09 AM	4:43 PM
March 1	7:43 AM	6:07 PM
April 1	6:02 AM	7:31 PM
May 1	4:26 AM	8:54 PM
June 1	3:07 AM	10:15 PM
July 1	2:58 AM	10:33 PM
August 1	4:09 AM	9:26 PM
September 1	5:33 AM	7:49 PM
October 1	6:51 AM	6:11 PM
November 1	8:16 AM	4:34 PM

## Why it may be sunny in McCarthy, but raining to the South

It's not unusual to see a dividing line extending across the sky above the Chitina Valley, the edge of an overcast cloud layer extending in from the coast. Often, while it's raining to the south, McCarthy-Kennecott enjoys sunshine. The place lies at the boundary between the dry, clear climate of the continental interior and the stormy weather of the Pacific coast. Because the Chugach Mountains stop most of the moisture moving inland from the Gulf of Alaska, hard rains are infrequent. Snowfall averages only a few feet at McCarthy, much less than on the coast.

When it's drizzling in McCarthy, it may be raining in Kennecott. Because the Wrangells catch much of the precipitation that gets past the Chugach range, the amount of rain and snow increases up the Kennecott Valley, closer to the high peaks. By late winter, the snow can be a foot or more deeper in Kennecott than down below. Average yearly precipitation in McCarthy is nineteen inches, about two-thirds the amount in Chicago and Seattle. The Chugach peaks and Mount Blackburn get very much more.

Cooling as they rise over the Chugach Mountains, the coastal storms drop deep snows there that become vast icefields. Getting less snowfall, the glaciers of the Wrangells are not as large, though still impressive. By the time coastal storms have passed over both the Chugach and the Wrangells, most of their moisture is gone. Northeast of the Wrangells, the land is semi-arid, in some places almost desert-like. Glaciers in the Mentasta and Nutzotin Mountains there are small.

When the wind blows to McCarthy from the opposite direction, the North, it usually brings dry air from the continental interior. Sunny summer days reach into the 80s Fahrenheit. During winter clear spells, the snow surface radiates its warmth out into the sky and temperatures can drop below -30 and sometimes into the -50s.



Unlike places closer to the equator, midsummer nights in the Wrangells are short enough that they don't cool off much. (That's a reason why Alaska gardens grow so well). Similarly, mid-winter days are so brief and the sun shines at such a low angle that sometimes the temperature doesn't come up very far from night-time lows. When clouds come in from the coast, they're riding on air from over the ocean, which doesn't change temperature much from season to season. Typically, it stays around 50 degrees during summer rains in McCarthy-Kennecott. When a winter storm reaches McCarthy from the coast, it can bring unwelcome, above-freezing rain that turns the snow trails to slush and then to ice, when they refreeze.

## Recent climate change

Recent climate change is particularly affecting Alaska, where mean temperature has increased seven degrees over the past thirty years. Because of its location, the consequences for McCarthy-Kennecott are not easy to predict. As weather patterns shift, will more coastal storms reach the area, or, to the contrary, will clear, dry air from the continent's interior perhaps prevail more often, bringing sunny skies? Some recent years have featured warm spells (reaching into the 40s) in December and January and briefer winter cold periods. In the Wrangells, like the rest of Alaska, ground which had been frozen for centuries (permafrost) is melting, with resulting earth slumping at places such as the McCarthy Road at Long Lake. The Kennicott Glacier is shrinking visibly from year to year, though it would take many human lifetimes to disappear completely.

## Why McCarthy weather is difficult to predict

Because either wet coastal or dry interior conditions can prevail, weather in the central Wrangells is unpredictable. Occasionally, a coastal storm sweeps past the Chugach barrier. Tropical typhoons originating deep in the west Pacific sometimes travel as far as the Kennicott Valley. When they run up against the tall mountains they can dump enough rain to cause massive flooding. In the flood episodes of 1980, '81 and '85, and to a lesser extent in 2000, rain pelted



National Creek flooding through Kennecott after several days of hard rain in 1985. (NPS photo)

down for days. McCarthy Creek turned into a raging river, carrying off forest and mining-era buildings along the water's edge, wiping out sections of road. During the '85 flood, National Creek, usually small enough to jump over by stepping from rock to rock, flooded its banks, eroding the former road up along the Kennecott mill building into a gully four feet deep, undermining the railroad trestle, and filling the east Kennecott bunkhouse to the ceiling with gravel. In 2000, hillside north of the McCarthy airstrip slumped, moving forest land—full size trees, soil and all—over and across the road between McCarthy and Kennecott.

On the contrary, sometimes an interior high-pressure system stabilizes over the Wrangells. In summer, that brings not only warm sunshine, but also drought and fire danger. Two summer dry spells in the early '90s weakened the spruce, helping start the bark beetle epidemic that has turned large parts of the local forest gray. Residents chainsawed McCarthy buildings into firewood to keep warm during a winter spell of clear, interior weather in the '60s, when it stayed below -40 night and day for two months.

## Life responding to a land of extremes



Dryas growing on recently deglaciated ground.  
(WMC photo)

Those that survive in this place adapt to its cycles and its extreme episodes. Those that thrive have learned to benefit from them.

In this harsh environment, much life depends on nutrients imported from elsewhere. Salmon growing large in the nutrient-rich North Pacific swim upriver, to be eaten in the Wrangells by people, bears or other animals or spawning and leaving their bodies to fertilize the lakes, streams and forest. Birds migrate here using fat stores accumulated in the tropics.

The growing season is short. Almost all the flowers we see around McCarthy-Kennecott are perennials. Because one Wrangells summer season is too brief for growing and for making seeds, they take several years to bloom, Poplars, aspens and birches drop their leaves and grasses turn brown in the fall, withdrawing their nutrients to their roots, safe for use the next spring.

But although short, summer is lush. Birds, including sparrows and thrushes with their lovely songs, migrate from Central American and beyond to nest here, coming for the explosion of food available during the light and warmth. Mosquitoes, butterflies and other insects multiply during the summer, but spend the winter as eggs or encased as pupa. Bears fatten during the summer, then den up to sleep through the cold and dark. Frogs hopping through the poplar forest around McCarthy in summer hibernate through the winter under fallen leaves, insulated by the covering of snow. The wildlife that stay active here in winter have found ways to have enough food available to keep warm. Some are stashes: In late summer, squirrels toss a rain of green cones from the spruce tops to the forest floor, preserving them in buried caches. Gray jays (also called camp robbers) hide food in tree branches, gluing it in place with their saliva. Endlessly taking food from birdfeeders and even from peoples' hands, they fill the forest with stashes, which they search out during leaner times. Others that stay, including redpolls, grosbeaks, and flocks of chickadees, devote the winter to pecking plants for seeds that grew the previous summer. Woodpeckers drill out insects from under tree bark. Moose, hares and beavers can digest the bark and growing layers of tree stems and bushes that remain accessible through the winter, even when the leaves are gone.

Although the Wrangells are known for their wildlife, including mountain sheep and goats, grizzly and black bears, moose and wolves, these big animals are sparsely dispersed over a very large area of relatively unproductive country. You are more likely to encounter a moose on the neighborhood lawns of Anchorage, where there is more food available than around McCarthy. Grizzlies each require many square miles of habitat to survive in the Wrangells. Local wolf packs travel long distances in the course of their hunt.

## Adapting to the Wrangells

### Opportunists

The tough country rewards those who live by their wits. Bears, jays and ravens are opportunists. Their curiosity and ability to take advantage of many sorts of food, even rotting carrion and moldy bread, increases their chances of survival. Persistent efforts to take advantage of opportunity get bears into trouble when they find their way into houses in search of food, making a mess.

### Nature's Pioneers

Changing conditions create opportunities for pioneering. Floods, landslides, and moving and melting glaciers move rivers, sweep away forests and meadows, rip out soil and cover the land with rubble, sand and silt. Fires sear the forest. Expanding as it turns to ice, freezing water churns the ground. Eliminating what lived there before, these powerful episodes open the way for those with the ability to move onto newly vacant land and make do with its sparse resources.

The edge of the rapidly melting Kennicott Glacier is one of the best places to see this pioneering. As the ice disappears, it leaves behind rock piles, cut through and rearranged by meltwater streams. But when the bare ground stabilizes, plants begin to grow. Attached to cotton-like fluffs, dryas, dwarf fireweed and willow seeds ride in on the wind. Many of these first plants survive by making their own fertilizer from nitrogen they pull out of the air. Though growing only an inch or two tall above the surface, dryas sends down a taproot down three feet or more into the gravel and silt, anchoring it in place and enabling it to reach water. By growing into a low mat, it protects itself from the wind-blown snow of winter and basks in the warmth of the ground-warming summer sun.



Although adapted for growth in the most unpromising rocky land, these pioneers do have a weakness. Dryas thrive through wind, cold, heat, flood and drought, but quickly die if run over by vehicles or walking feet. Along the river or glacier edge, please pick routes that avoid these sensitive plants.

### Ecological Succession

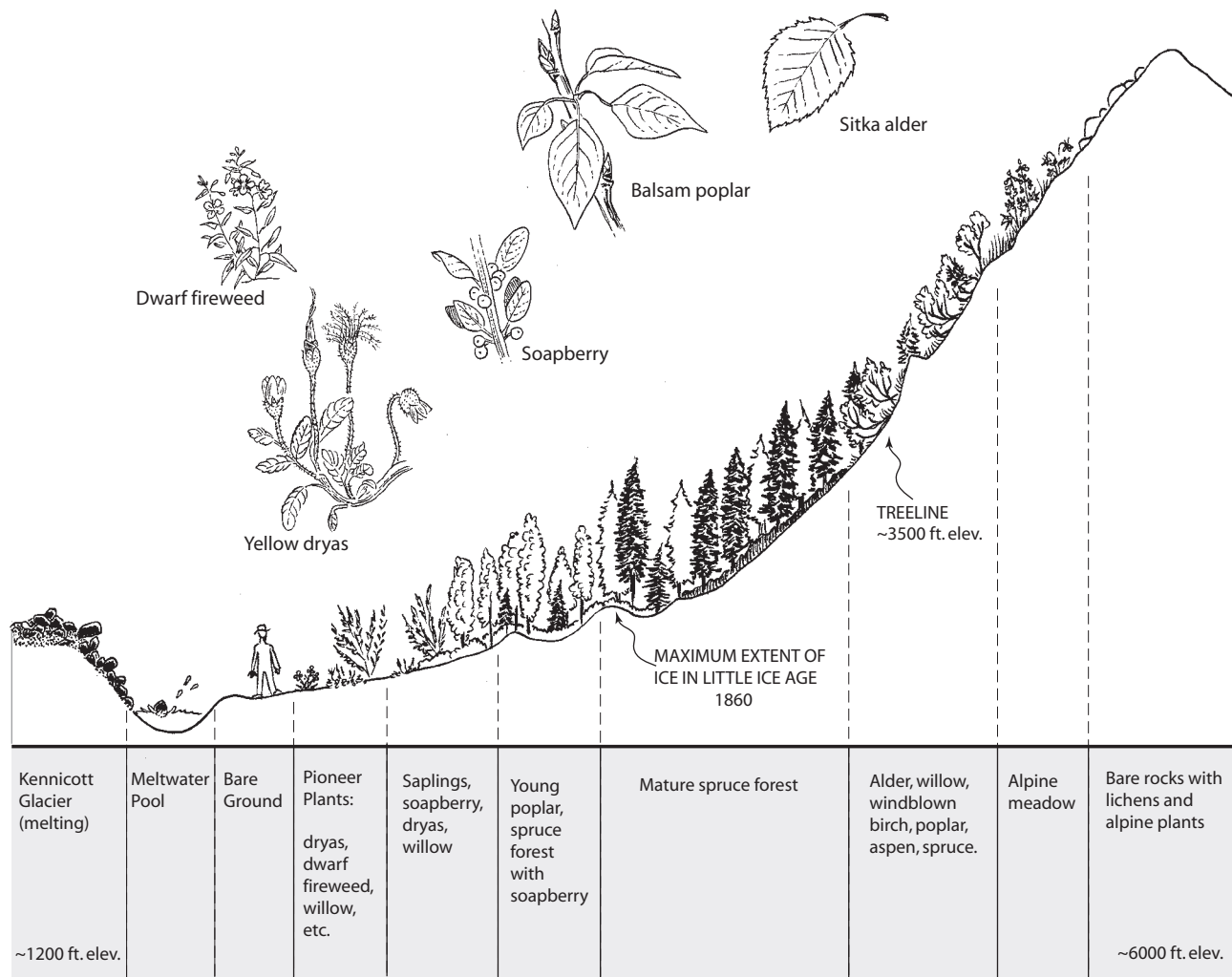
When living organisms establish themselves on open ground, they change the circumstances for those that follow. Near the edge of the retreating glacier, pioneers like soapberry and dryas create soil. Within a few decades, they and larger plants such as willow and poplar hold the soil with their roots, shelter the earth from wind and sun, and so create conditions supporting other kinds of plants and animals. If the land is left undisturbed, a succession of new species arrives to replace the old. Pioneers like soapberry and dryas are crowded out. Eventually, the area becomes forest, with a thick layer of soft mosses and lichens covering the ground between spruce trees.

In the Wrangells, however, a place seldom remains undisturbed for very long. Beavers chew down poplar and aspen. Wildfires sweep through. Bark beetle epidemics kill the old spruce trees. Floods rearrange the ground, once again making habitat for pioneers. Particularly in the Chitina Valley and around McCarthy-Kennecott, people have logged, cleared and set fires over the past century. As a result, the Wrangells landscape is like a patchwork quilt, with almost every area in the process of responding to some sort of disturbance, old or new.

## Vegetation changes with altitude

Even if undisturbed, forests grow only on the lower slopes of the Wrangells. Only below about 3500' elevation are the summers warm and long enough for trees to survive. On and below steep slopes, the forest is broken where avalanching winter snow traveling with the speed and power of a freight train sweeps away the trees. Flexible enough to bend under the snow, alder and willow bushes cover these avalanche paths. Above timberline, alpine flowers and grasses hug the ground, escaping the wind and picking up the most possible heat from the sun-warmed earth during the brief summer season. At elevations beyond 6-7,000', little grows. The high Wrangells are rock and ice.

Since its Little Ice Age maximum in ~1860, the glacier has been melting back. As a result, land nearest the glacier is most recently uncovered from the ice, plants and soil have had less time to develop, and ecological succession is at an earlier stage. Mountainsides above elevations the glacier reached in 1860 have been ice free for thousands of years.



Life between the glacier edge and the mountain ridge

Drawing by Claire Emery

## Natural Habitats

The Kennicott Valley includes three basic kinds of natural habitat: forest, alpine, and wet areas:

### Forest

The lower elevations of the Kennicott Valley are mostly covered with boreal forest. Boreal forests are characterized by their large stands of white and black spruce, both of which are very well equipped to live in the cold temperatures, low light, and thin, acidic soils typical of northern latitudes. Their evergreen needles allow them to get a head start on making food (photosynthesis) when the sun begins to stay longer in the sky during early spring, since they don't have to take the time to grow new leaves first. In some places deciduous trees, including aspen, birch, and poplar, are intermixed among the spruce, and a thick mat of spongy moss and lichen commonly covers the ground under mature forests.

The boreal forest is a place of bustling activity. Red squirrels scurry about collecting cones and seeds to store for later use, while three-toed woodpeckers busy themselves with chipping bark from dead spruce trees to feast on hidden beetle larvae. Predators, such as lynx, coyote, and wolf, are on the lookout for food, while berry eaters and browsers, like bear, moose, and snowshoe hare, stroll from bush to bush. The plants in the forest are also constantly busy, growing, dying, and competing with each other for light, nutrients, and space.

The forest is a dynamic place. A wind storm may blow down an area of old spruce trees, opening growing space for young poplars that need direct sunlight. They grow quickly and fill in the space. A landslide or snow avalanche may suddenly topple from a mountainside above, leveling trees in seconds. About a decade ago, one such avalanche swept down Porphyry Mountain and across the McCarthy-Kennecott Road about a half mile south of Kennecott. That

area can be identified by the tall willow brush that has grown back where trees grew before.

Fire, a natural cycle in northern forests occurring every 70-80 years on average, may burn sections of forest to the ground, and pioneer species start to rebuild the forest on new terrain. Around McCarthy, much of the spruce forest burned during the past hundred years in human-caused fires. In some places, spruce has regenerated. In other spots, poplar or willow still predominate. On the sides of Fireweed and Porphyry Mountains, some burned or avalanched areas have regrown as meadows filled with grass and summer flowers up to six feet tall. Their dense roots make it difficult for baby trees to get a start. But if undisturbed, eventually these meadows will become forest again.

Old growth spruce forest, with trees larger in diameter than a person can reach around, remains on the hillside above Kennecott and in some areas west of the Kennicott River that have not been disturbed for more than a century. Spruce beetles have killed many of these big trees. Residents cutting them for firewood discover that the sections of the trunks close to the ground are often rotted out inside. They were near the end of their lifespan when the beetles bored into them.



Spruce, aspen and poplar forest south of McCarthy Creek



## Spruce Bark Beetles

Many spruce trees around the Kennicott Valley are grayish and without needles. For example, the view uphill from the Glacier Trail north of Kennecott shows a forest that appears almost entirely dead (though, in fact, some live trees remain). These trees were killed by spruce bark beetles, small bugs which eat the layer of tree just beneath the bark, called the cambium. When the beetles eat a complete ring around the trunk, the nutrients produced in the needles cannot flow to the roots and water taken up by the roots is unable to reach the upper branches, causing the tree to die. In the 1980s, a very large spruce bark beetle outbreak began on the Kenai Peninsula and swept through south-central Alaska. Trees in the Kennicott Valley began to die in early 1990s.

Spruce bark beetles are an ongoing component of Alaskan forests. They usually live in fallen trees, but spread into living ones during outbreaks in times of warmer, dryer weather, when the trees have less sap to drown beetles that are boring in through their bark. Beetles prefer older spruce trees or other trees whose natural defense mechanisms have already been weakened. Often the beetles show up in live trees when the forest has grown old. The previous outbreak in the Kennicott Valley region occurred in the 1920s.

The present outbreak throughout Alaska and the North is unusually widespread and correlates with climate warming in recent years. Young spruce, such as those that have started growing on land recently melted free from ice near the glacier edge, are resistant to beetle attack and are surviving. Eventually, there may be a flourishing forest on the newly exposed ground along the receding glacier, while the mountain slopes above are dominated by alder brush, with a few, scattered spruce remaining.



Beetle-killed spruce



Trunk of a spruce tree killed by bark beetles. Woodpeckers have stripped off the bark to get at the beetles, leaving a pile of bark on the snow on the ground below.



Adult spruce bark beetle, *Dendroctonus rufipennis*, life size. (Kristin Malone drawing)



Young spruce growing along the trail north of Kennecott near the edge of the receding glacier.

## Alpine



Alpine paintbrush (Dave Mitchell photo)

Up on the mountain slopes that rise above the Kennicott Valley floor, a roughly horizontal line marks the elevation where trees cease to grow. Trees are able to survive only where annual temperatures stay warm enough for a sufficient period of the summer. Since summer temperatures are cooler at higher elevations, above about 3000-3500 feet there are no trees in the central Wrangells. At the boundary, the forest transitions into the alpine environment. In some places in this transition zone, a few scattered trees, called krummholz trees, grow stunted and shaped as “flags” by the high winds. Above, even these stunted trees are unable to grow, and the landscape opens into true alpine meadow. In this environment, exposure to the wind and cold is extreme and plants grow low to the ground, creating a thick mat of vegetation that covers the thin, rocky soil. This mat is made from a mixture of mosses, lichen, grasses, and small, flowering plants.

In the alpine areas white Dall sheep and mountain goats may be seen grazing in herds or hopping from high cliff to cliff in the distance. Hoary marmots dig burrows, hide beneath rocks, and whistle loudly, startling hikers. Arctic ground squirrels create networks of tunnels, and are often seen standing up on their hind legs, spotting potential predators. Bears, grizzly and black, stroll through the alpine meadows, where they dig large holes in the ground with their claws in search of Eskimo potatoes. In the summer, thousands of birds migrate to the high meadows to breed and raise their young. Some birds stay through the winter, like the ptarmigan, which turns white to match the snow.

Stronger winds, colder temperatures, and a longer snow cover duration demand unique coping abilities from the plants and animals that live in the alpine environment. Alder and willow bushes are

flexible enough to bend over sideways under heavy snowfall, and bounce up unharmed again in the spring when snows melt. Many alpine plants are able to tolerate complete freezing, and can replace damaged tissue each spring.

Bumps and lumps pattern and shape the ground in some alpine meadows. These are caused by freezing and thawing cycles, and by a process called frost wedging, which moves large sections of earth in different directions.

When stepped on, alpine plants and the moss-lichen meadow crust may take a hundred years to grow back. Similarly, human waste and garbage takes a longer time to decompose at high elevations than it does in the forest.



Alpine terrain in the upper Kennicott Valley (Dave Mitchell photo)

## Wet places

At the interface of land and water, such as on a river bank or lake edge, and in water-saturated terrain, including bogs and marshy areas, plants that are adapted to soggy conditions thrive. An array of wildlife species, including waterfowl, moose, beaver, muskrat, and bear, are dependent on stream-edge areas, called “riparian” habitat, drawn by abundant and rich food sources.

## River banks and lake edges

Plants rich in nutrients grow in places of fertile soil and abundant water along the smaller creeks and ponds. Wildlife gather to feed there and travel along the open, more barren floodplains of the Kennicott River and McCarthy Creek. Migrating birds on their way north or south also follow the path of rivers, riding the air currents above the moving water and finding plenty to eat (bugs, berries, fish) to sustain them on their long journeys. Over the course of the summer, a large number of bird species stop for a while to feed and rest, and some to nest, in the Clear Creek corridor through downtown McCarthy. Where McCarthy Creek passes by the town, browsing moose as well as nesting birds like the areas flooded in the 1980s, now regrowing in willow.

Lakes near the Kennicott Valley host substantial salmon and trout populations, and attract eagles, bear, lynx, and other predators that catch and feed on fish. Flowers flourish on nitrogen absorbed into the soil from the bodies of dead fish. Breeding waterfowl sit on nests in the thick grass, protecting their young from predators and building up fat reserves from the summer swarms of mosquitoes and other bugs.

## Bogs

Where past glaciers and large melting blocks of ice have left depressions in the ground, the terrain can dip down next to or

beneath the level of the water table, to where the ground is saturated with moisture. As they develop soil, these places can become bogs, also called muskegs, with little to no drainage and no incoming source of water, except the runoff from the surrounding forests. Bogs also form where areas of permafrost have melted. As the frozen ground begins to melt, the ground that was above it collapses into itself, and the area collects water. Often, the water in a bog is not visible, covered by a thick, floating mat of sphagnum moss. This floating layer can support some shrubs and widely spaced conifers, though the trees fall over easily if they get too tall. The flat areas of the valley floor south of McCarthy are the best places to find the local bogs. North of McCarthy in the Kennicott Valley, the advance and retreat of glaciers has disturbed the land too recently for the soil and plants of bogs to develop, or the mountainsides are too steep and too well drained.



River channels braid between gravel bars, bordered by willow brush and forest frequently disturbed by flooding. (Gaia Thurston-Shaine photo)



## Beaver ponds

Damming streams, beavers transform forest into wetland. When they dam a stream, they slow the movement of water and form ponds. While trees and other forest plants are drowned and die, they are replaced by aquatic plants and organisms that thrive in still water. Beaver ponds also attract breeding waterfowl and create an environment where food is abundant. Woody debris in the ponds provides safe habitat where young salmon and other fish species can escape predators.

Poplar and aspen trees are the beavers' favorite food. Using their teeth to clearcut the forest around their ponds, they drag branches and sections of tree trunk to the water to eat later and to use as construction material. They have built extensive systems of ponds in areas south of McCarthy Creek, west of McCarthy, and in what is perhaps their the most impressive local example of beaver engineering, eleven miles up McCarthy Creek, below Green Butte, where multiple dams create more than a half dozen levels of ponds. When they eat up the trees in one location, they have to move on to find another spot to dam and den, at least until the forest at their old home regrows. A beaver has been seen walking through the streets of McCarthy, presumably en route to a new homesite.



A McCarthy beaver  
(Doris Thurston photo)



Beaver pond south of McCarthy Creek



McCarthy resident Ed LaChapelle skis past a snow-covered beaver den at the pond in winter.

## Plants and Animals

Following are brief descriptions of some plants and animals commonly seen in the McCarthy-Kennecott area. More complete lists of local species are in the appendix.

### Trees

For complex reasons much debated by ecologists, only a few tree species live in the North. The Kennicott Valley forest includes black spruce, white spruce, poplar, aspen, and birch trees, along with alder and willow, which are usually the size of bushes (though some willows grow larger). Each of these kinds of trees grows where specific conditions favor its unique adaptations.

### Black Spruce and White Spruce

Unlike the gigantic Northwest evergreens that may grow to be 1000 years old, spruce trees in this region of Alaska don't last that long. Spruce that haven't been killed by fire or a spruce bark beetle outbreak gradually die on their own. By the time they are 250 years old, spruce begin to rot on the inside. Though black and white spruce appear to have a lot in common, the two conifers are in fact quite different.

### *Picea mariana*/ Black Spruce

Black spruce prevail in cold, boggy areas typically underlain with permanently frozen ground (permafrost). Often, black spruce stands have a thick, insulating layer of sphagnum moss covering the ground, which keeps the soil very cold year round. In some places where underground ice is now melting, the resulting slump of the soil is causing the trees to lean at erratic angles, creating the appearance of a "drunken forest." Near the Kennicott Valley, we find black spruce mostly in flat areas where bogs have had time to develop, away from places disturbed by glacier ice in the past couple of centuries. Black spruce usually look more spindly than white spruce.



A boggy area south of Fireweed Mountain. Some of the black spruce are leaning, because the ice in the ground under them (permafrost) has melted in the recent warmer summers, causing the soil to slump.

### ***Picea glauca*/ White Spruce**

The evergreen trees on the mountain slopes around McCarthy and Kennecott and near the glacier edge are white spruce. White spruce cannot survive in the cold, wet conditions that black spruce can, but they can grow larger and taller in more favorable settings. They flourish on well-drained uplands, especially on hillsides, and in lower areas where sand and gravel recently left by melting glaciers allow for better soil drainage. White spruce generally have a fuller appearance than black spruce.



White spruce forest growing on a well-drained slope above a wet area. (Mary Beth Cook photo, NPS)

### ***Betula papyrifera*/ Paper Birch**

Paper birch live throughout the forest, usually on east and west facing slopes, and occasionally on north facing slopes. They tolerate colder, wetter conditions than aspen and are frequently intermixed with both black and white spruce. Paper birch grow up to 80 feet tall and have diameters up to 18 inches wide. A few big birch are scattered among the spruce of the old growth forest, but young ones are not growing to replace them there. Unlike poplar and aspen, Kennicott Valley birch require established soil, so they generally aren't found near the glacier edge, where soil hasn't had time to form since the retreat of the ice in the past century or so. They thrive on slopes near Kennecott where spruce forest has been burned away by fire or opened by human clearing, but where deep soil remains. For example, healthy, young birch are growing rapidly alongside the upper section of Silk Stocking Road in Kennecott. This area is high enough above the glacier that it has been ice free for many centuries, allowing soil to develop.

A dwarf species of birch, (*Betula nana*), with smaller leaves, bushy form, many stems and knee-high height lives where tree-sized birch can't, including timberline elevations. It's sometimes called "shintangle" by those who walk through thick areas of it. Paper birch and dwarf birch interbreed. On the side of Porphyry Mountain, for example, hybrid birches are intermediate in trunk and leaf size.



Hugging birch & spruce: Above Kennecott, birch and white spruce seeds took root together in the stump of a burned tree, growing up intertwined.

*Populus balsamifera/ Balsam Poplar*

Poplar are common along the glacier edge and gravel floodplains of glacial streams like the Kennicott River and McCarthy Creek, as well as some places opened by forest fires. They grow quickly, invading recently disturbed earth and areas newly freed from glacier ice. Poplar trees can grow up to eighty feet tall. They are eventually replaced by white spruce as the shade cover in the forest increases. Poplar seeds on their cotton strands filling the air around the Fourth of July can look like snow falling in summer. In addition to distributing seeds rapidly and widely this way, poplars reproduce by sending runners out underground from their roots. New poplar trunks grow up from these runners, sometimes a hundred feet or more from the parent stem. As a result, a grove of poplar (or aspen, which are closely related and do the same) usually can be considered a single living organism consisting of many tree trunks, all connected by their roots.



Poplars grow around buildings in downtown McCarthy.

*Populus tremuloides/ Quaking Aspen*

Aspen like dry, upland areas on south facing slopes. They grow very quickly, flourishing in open areas recently disturbed by fire, flood, or windstorm. Aspen generally mature for 60 to 80 years before they are replaced by white spruce, which create a dense shade cover under which aspen are unable to reproduce.



Aspen and poplar growing near the edge of the glacier between McCarthy and Kennecott.



Because the stems attaching them to the tree are flat (rather than round, as on the poplar), aspen leaves shake back and forth (quake or tremor) in the breeze. This adaptation enables the leaves to share access to sunlight and maximize their food production.

### *Salix spp./ Willow*

Twenty-eight species of willow live in Alaska. Some grow close to the ground as a thick mat an inch or two high, and others grow tall like trees. Given this diversity, willow can grow in a variety of conditions, including alpine meadows, lowland wetlands, and on the newly exposed land by the glacier edge. Because most species can bend (are “willow”), they can live on slopes where stiffer trees are broken by avalanches. The species interbred, making them especially difficult to identify.



Tiny willows grow close to the ground above timberline. At lower elevations, other willow species grow larger. In early July, willow seeds floating on cotton strands fill the air around McCarthy. (Middle photo: WMC)

### *Alnus sitkatensis/Alder*

Alders grow on steep slopes, avalanche chutes and in some places along stream channels and near the glacier edge. Because they are pioneering plants that get nutrition from the air (are nitrogen fixers), they can grow in thin or poor soil. They are very flexible and bend under winter’s heavy blanket of snow—another advantage for alder that grow up on high, exposed slopes. Thickets of tangled alder branches are a major obstacle for cross country hikers in the Wrangells. Dense alder on the hillside above Kennecott is apparently preventing the growth of new, young spruce.



Hikers bushwacking through Kennicott Valley alders in the rain (WMC photo)

### Alpine Flowers (a few of the many species)



An alpine meadow in the upper Kennicott Valley. (Dave Mitchell photo)

Summer's progress is often measured by the growth of the tall Fireweed, *Epilobium angustifolium*, blooming pink in July, then bursting with seeds on white cotton and the entire plant turning fire-red late in the season. They're common on disturbed sites, including the front yards of McCarthy, as well as in the alpine.



Dwarf fireweed or "river beauty," *Epilobium latifolium*, is a pioneer species along streams and glacier edges in the alpine and below.

Cowparsnips, *Heracleum lanatum*, grow up to six feet tall in lush meadows down near Kennecott. At alpine elevations, they are smaller. Some people are allergic to the juice in cow parsnip stems. On contact, it makes their skin sensitive to sunlight, causing burns and blistering.



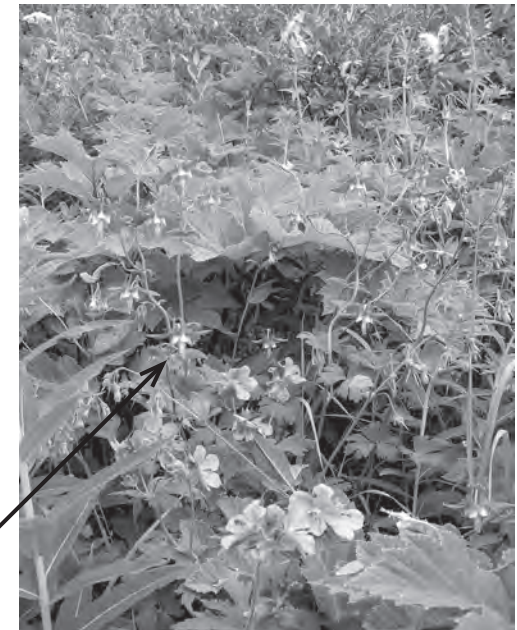
Forget-me-not, *Myosotis asiatica*, is the Alaska state flower.



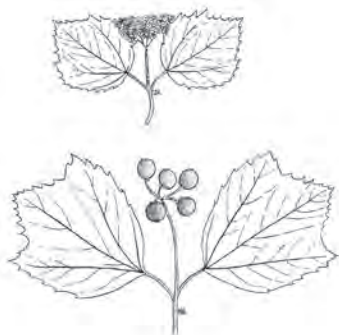
Lupine, *Lupinus arcticus*. Lupine blooms early in the season in disturbed areas near rivers & McCarthy and later on in the alpine.



Columbine, *Aquilegia formosa*, can be found in alpine and sub-alpine meadows, and often at treeline. (Dave Mitchell photos)



## Common Berries



Highbush cranberries, *Viburnum edule*, aren't really cranberries, but the tart taste is similar. The berries are easy to collect, but have big seeds. They grow in younger forest. (Edible)



Silverberry, *Elaeagnus commutata*, grows in dry areas, often in young forest near the glacier edge.



Low bush cranberries, *Vaccinium vitis-idaea*, grow close to the ground at the edge of timberline and below timberline on dry, open areas on hillsides above the glacier. In the late summer, they grow edible, deep-red, slightly bitter berries. (Edible)



Mountain ash, *Sorbus scopulina*, grows as a little tree with multiple trunks up to ten or fifteen feet tall in sunlit forest openings with well developed soil, such as the hillside around Kennecott. Early in summer it has white flowers. They turn into red berries that resident and migrating birds feast on in the fall.



Crowberries, *Empetrum nigrum*, and blueberries often grow together, but the less-tasty, almost black crowberries are more numerous. (Edible)



Blueberries, including *Vaccinium uliginosum*, grow in drier alpine meadows on the mountain slopes above McCarthy and Kennecott. (Edible)



In late summer, black bears come down to the glacier-edge forests to eat the red soapberries, *Shepherdia canadensis*, that grow in the shade of the young trees. The mashed berries can be used as soap.



Raspberries, *Rubus idaeus*, live on road edges and other disturbed areas in the lowlands. (Edible)

Blueberry, silverberry drawings: USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. Illustrated flora of the northern states and Canada. Vol. 2. Cranberries crowberry, mountain ash: United States Department of Agriculture Forest Service Collection, Hunt Institute for Botanical Documentation, Carnegie Mellon University, Pittsburgh, PA. Raspberry: Robert H. Mohlenbrock @ USDA-NRCS PLANTS Database / USDA NRCS. 1995. Northeast wetland flora: Field office guide to plant species. Northeast National Technical Center, Chester, PA. Blueberry photo: Doris Thurston.

Forest and lowland flowers & small plants



Yellow dryas, *Dryas Drummondii*, forms mats along the rivers and glacier edge is also known locally as “little Einsteins” for the cotton balls that form after flowering, looking like heads of uncombed, white hair.



Horsetail, *Equisetum arvense*, are tall, skinny plants that grow in open, moist, newly exposed terrain, such as along the glacier edge or river bank. Because they are forage that helps jumpstart digestion, horsetails are one of the first plants that bears eat after coming out of hibernation in the spring.



Shrubby cinquefoil, *Potentilla fruticosa*, is a little bush with bright yellow flowers that also grows in drier areas without well developed soil. It’s often found near soapberry and silverberry.



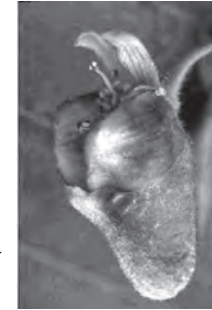
Our local rose, *Rosa acicularis*, flowers pink in early summer and in late summer produces seed pods called rose hips, which are edible and high in vitamin C.



The siberian aster, *Aster sibiricus*, favors recently disturbed ground, including bulldozed soil, in the lowlands around McCarthy.

The flowers of chiming bells (also called bluebells), *Mertensia aniculata* are edible and add color to salads.

But don’t mistake chiming bells for monkshood, *Aconitum delphinifolium*, also blue, but poisonous.



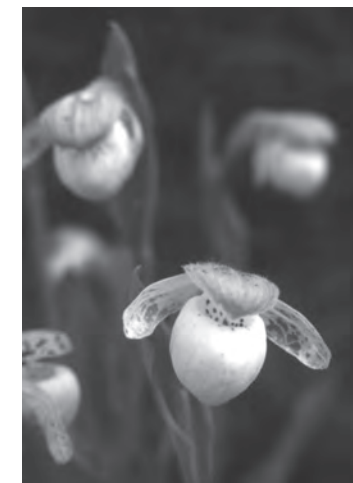
Labrador tea, *Ledum palustre*, has very small, white flowers and is most often found in wetter places than soapberry, silverberry and cinquefoil, such as bogs south of McCarthy Creek and the McCarthy Road.

*Dryas*: left: Dave Mitchell. right: Wrangell Mountains Center. Cinquefoil: James L. Reveal @ USDA-NRCS PLANTS Database. Horsetail, monkshood photos: Thomas G. Barnes @ USDA-NRCS PLANTS Database / Barnes, T.G. & S.W. Francis. 2004. Wildflowers and ferns of Kentucky. University Press of Kentucky. Roses and chiming bells: Nancy Simmerman. Aster: Dave Mitchell.





Five species of anemone, *Ranunculus*, live in the park, some lowland, some alpine. This white one (left) is known as narcissus anemone, *Anemone narcissiflora*. The common yellow anemone of early summer is *Anemone Richardsonii* (right). (Dave Mitchell photos)



Left: The Calypso orchid, *Calypso bulbosa*, is named after a Greek goddess. Its name means "concealment." Growing on the layers of decaying leaves on the floor of the poplar-aspen forest, it depends on specific soil fungi, which makes it difficult to transplant. If the flower is picked, the fragile plant usually dies. Right: Lady's slipper orchids, *Cypripedium passerinum*, grow near the base of Donoho Peak, across the Root Glacier from Kenneott. (Nancy Simerman photo)



Yellow *Arnica*, growing with pink-flowered dwarf fireweed, *Epilobium latifolium*. Dwarf fireweed favors recently disturbed sites, including river bars at low elevations and ground dug up by bears searching for roots and squirrels up in alpine meadows. (Nancy Simmerman photo)



Larkspur, *delphinium glaucum*, is found in moist meadows and woodlands. (Dave Mitchell photo)

The large-flowered wintergreen or arctic wintergreen, *Pyrola grandiflora*, lives around McCarthy-Kennecott in young (early successional) woodland near the glacier edge. (Dave Mitchell photo)



## Moss and Lichens



The mossy floor of an old spruce forest near McCarthy.

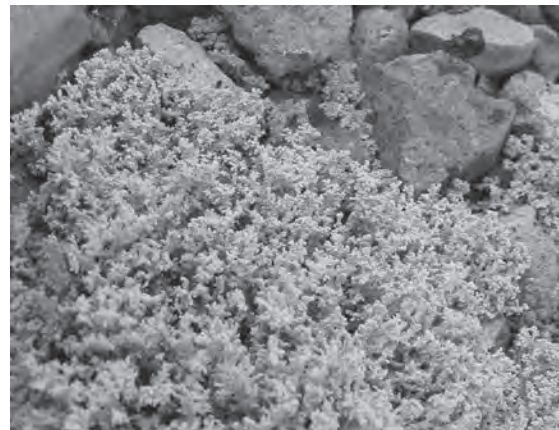


Moss is one of the few plants living on the surface of the Root Glacier, forming balls on mud, rocks and the bones of animals that wandered onto the ice and died there.

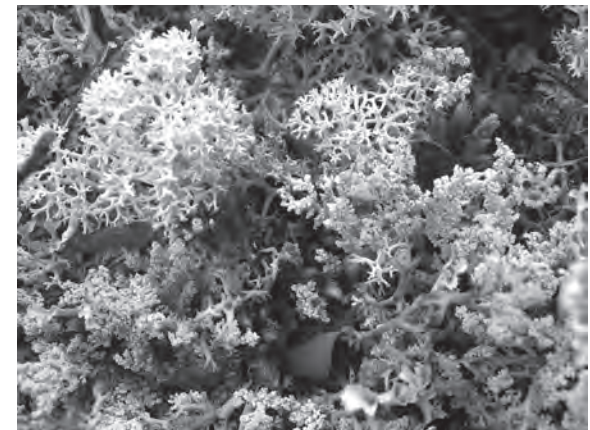
Mosses and lichens grow on soil, tree trunks, and even bare rocks. Mosses are flowerless plants that affect the acidity and temperature of the soil. A lichen is a partnership between a fungus and one-celled green algae and sometimes bacteria. Fungi can't make their own food from sunlight. (Mushrooms are fungi, for example, and they get their nutrition from rotting plants.) But they provide a structure to house the tiny algae and, like a sponge, hold the water the algae needs. In return, the algae, which can use the sun's energy to produce sugar and other nutrients, feeds the fungus.

Mosses make the thick, soft carpet on the forest floor and in boggy places. They hold water (up to 20 times their dry weight), keeping the ground moist. They insulate the soil underneath, preventing the summer sun from melting ice that stays in the ground year-round (permafrost). In bogs, a solid mat of sphagnum moss can grow over the surface of the water, keeping the bog from evaporating and drying. Sphagnum mosses produce high levels of acid, which limits the kinds of plants that can grow. The acid slows the rotting process, so that dead plants accumulate, blocking drainage and maintaining the bog. Black spruce, Labrador tea, and bog berry are plants that live in the acidic conditions produced by sphagnum moss. In forests where there is less moisture and more shade, a species known as feather moss develops instead of sphagnum moss.

Because lichens get moisture in the air, they are often the first pioneers to grow in recently disturbed places, where most plants can't live. They need sun, so thrive in the open areas. Unlike mosses, they don't have roots or water storage tissues, so they dry rapidly, becoming crisp and fragile, vulnerable to damage by boots and vehicles, and providing fuel for forest fires.



Delicate lichens grow on rocks near the glacier.



Lichens on the forest floor. (Dave Mitchell photo)

# Animals

## Birds

### Birds that live here year round

The Wrangells' jays, magpies and ravens are closely related and all are particularly smart, curious, and interested in eating almost anything, which are useful characteristics in the Wrangell Mountains.



Gray jay,  
*Perisoreus canadensis*

*Gray jays* fearlessly swoop down on human camps for a bit of free food as the opportunity arises, so are often called "camp robbers." They are stashes, collecting all sorts of food, as much as they can, whenever they can, and hiding it in the forest, usually on spruce branches, to eat later. They coat what they collect in their mouths with a sticky mucous, which helps preserve it and glue it to the trees for storage. With their stashed supplies, gray jays survive the winter and can begin nesting early in the spring, while the snow is still deep on the ground, getting a head start on most other birds. Squirrels and other animals also benefit from the jays' saving habit, finding some of what the jays have put away.

*Black-billed magpies* are common in the forest and around town.



Black-billed magpie, *Pica hudsonia*

They are large, graceful, loud birds, easy to identify by their black and white bodies and long, black tail. Like gray jays, they take advantage of anything left unattended in a camp, but unlike them, won't land on your hand.

*Ravens* are black, raucous birds, bigger than crows (which don't live in the Kennicott Valley) and with much larger bills and feathers that often look as if they haven't been combed properly. Ravens say a hoarse "kwawk". They hang out in groups, nest high on the mountainsides and play, swooping and diving, on the mountain air currents. Like the jays and magpies, ravens eat whatever they can find.



Ravens, *Corvus corax*, on mine tailings below Kennecott

*Chickadees* are easily recognized by their distinctive chick-a-dee-dee song in the forest as their flocks move in search of seeds to eat, summer and winter. Black-capped chickadees have black heads, and boreal chickadees have brown heads. They nest by digging out cavities in rotting trees.



Boreal chickadee,  
*Poecile hudsonica*

*Redpolls* are small, seed-eating finches with deeply forked tails. They gather at bird feeders in the winter and like to travel in large groups. When birch trees don't produce the usual amount of catkins, massive numbers of redpolls may head south for the winter.



Common redpoll,  
*Carduelis flammea*

Thanks to the National Geographic Society for permission to reprint bird drawings from the *National Geographic Field Guide to the Birds of North America*. Other photos are by the authors, unless otherwise credited.



Pine grosbeak, *Pinicola enucleator*

The mostly-red bodies of the male *pine grosbeaks* can be a startling burst of color against a backdrop of white snow and gray forest. Females have a yellow-olive head and rump, with gray underparts and back. No bigger than 8 inches long, they are commonly seen in flocks, prefer to nest in spruce trees, and eat seeds. Their song consists of a series of two or three high-pitched whistles on a descending scale.



Great horned owl, *Bubo virginianus*

Great horned owls are most commonly seen and heard. They are big, reddish-brown, with ear tufts. At night, pairs call each other in the forest with a series of “hoos” as they hunt snowshoe hares. Boreal owls are small, brown and black with white spots. They drop from branches onto mouse-size voles and shrews. Northern hawk owls are middle-sized, with dark brown coloring and white spots.



Boreal owl, *Aegolius funereus*

*Great horned, boreal, and northern hawk owls* live in the Kennicott Valley forest, silently gliding down onto unsuspecting rodents.



Hairy woodpecker, *Picoides villosus*

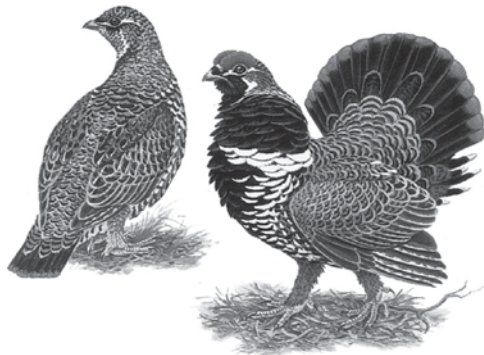
*Hairy and Three-toed woodpeckers* live in the Kennicott Valley. Their constant drumming on tree trunks can be heard year-round, as they drill for beetles. Both are about 7.5 inches long, and are black and white. Three-toed woodpeckers have a completely black head, while hairy woodpeckers have a black and white head. Research in other states has shown that woodpeckers can eat up a significant part of the spruce beetle population. But they haven’t been able to keep up with the beetle outbreak in the Kennicott Valley, although they may have slowed it. Beetle-attacked trees are often stripped of their bark by the woodpeckers. It isn’t the woodpeckers that are damaging these trees. They’re removing already-dead material to get at the bugs underneath.



Camouflaged ptarmigan are almost invisible. (Dave Mitchell photo)

in winter. In spring and fall they are partly brown and partly white, almost invisible to see on ground with patchy snow. Males have a red comb above their eye.

Several species of *ptarmigan* live in and around the alpine meadows, eating dwarf birch, willow buds, stems, and berries, suddenly flying up and making weird cries when disturbed. In winter, they come down into the open areas along the glacier and around Kennecott, but tend to stay out of the forest. They change color, depending on the time of year, for camouflage, brown in summer and white



Spruce grouse, *Falcapennis canadensis*

*Spruce grouse* are related to Ptarmigan, but live in the forest year-round, commonly startling hikers by loudly flapping off into the brush. They are stocky, chicken-like birds.



Tree swallow, *Tachycineta bicolor*

Each spring, several species of *swallows* migrate from as far away as South American nest in the Wrangells, catching summer bugs on the fly. They are small flying acrobats with forked tails, tiny bills and wide mouths. They nest in holes in trees near buggy, wet places like beaver ponds and sometimes under roof overhangs and sheltered doorways in McCarthy. Raising and fledging a family in a few weeks, by mid-July they're usually heading south as the mosquito season ends.

**Summer birds that migrate to warmer places in the winter**



Juvenile golden eagle, *Aquila chrysaetos*

On wings spanning up to seven feet, *golden eagles* ride air currents high along the ridges in search of ground squirrels and other prey.

*Bald eagles*, whose adults have white heads and tails, live primarily along the ocean coast

year-round, but some follow the salmon up into the Wrangells during the summer. They congregate along the streams and lakes where the fish spawn and die. In the mountains they also take advantage of opportunities to hunt in the alpine, soaring along the ridges as golden eagles do.



Golden-crowned sparrow, *Zonotrichia atricapilla*



White-crowned sparrow, *Zonotrichia leucophrys*

*Sparrows* are short-distant migrants, primarily seed eaters, living in young forest and shrubs., with wonderful songs. *Golden crowned* and *white crowned sparrows* are common around McCarthy-Kennecott, with the white crowned species living at lower elevations and the golden crowned nesting at the edge of the alpine zone. Several related species are also found in the alpine, including the *snow Bunting* and *lapland longspur*.



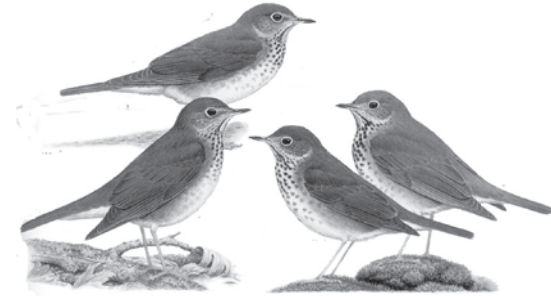
Lapland longspur, *Calcarius lapponicus*



Snow bunting, *Plectrophenax nivalis*

## 41 Community & Copper in a Wild Land

The Kennicott Valley's four *thrushes* each sing a distinctive song during nesting season, which peaks in early June. Later in the summer, they are quiet, though we sometimes hear them again as they are banding together to head south in late August and September. Hermit thrushes are common in bushy areas above timberline and up the glacier and have the most elaborate song, flute-like and serene. Varied thrushes make an unvarying, high-pitched whistle. They're the first to arrive in the spring. Swainson's thrushes sing a rising series of notes. Our thrushes migrate to the southern states and Central America in the winter. Their habitat in the Wrangells is well protected, but they are vulnerable to logging, land clearing, pollution and the growth of cities in their winter area.



Swainson's thrush, *Catharus ustulatus*

Hermit thrush, *Catharus guttatus*



Varied thrush, *Ixoreus naevius*



American robin, *Turdus migratorius*



Robins favor meadows and open areas at the edge of forests. Varied and Swainson's thrushes sing in the woods around McCarthy and Kennecott.



Hermit thrushes nest in small trees in places like this timberline area on Porphyry Mountain.

## Mammals

### Black bears and grizzlies

Black bears tend to stay in or near the forest, though they move up into adjacent alpine areas especially during the berry season there. When the red soapberries are ripe in the forest around the edge of the Kennicott Glacier, the black bears are there feasting on them. They commonly encounter people near McCarthy and Kennecott and on the hiking trails and can cause trouble if attracted to food smells at homes, cabins and camps. Black bear's curved claws appear close to their toes in tracks.

Grizzlies live in the more open, alpine areas north up the glacier from Kennecott and in the upper mountain valleys. They move down to fish along lakes and streams during salmon season, sometimes passing by McCarthy along the glacier edge and coming into inhabited areas that time of year. Grizzlies' straight claws appear far in front of their toes in tracks. They are the same species as the brown bears of the coast, though smaller.

Black bears are most often black, but can be brown, so they can't always be distinguished from grizzlies by color. Grizzlies' behavior is more unpredictable, but both bears can be dangerous, especially if they have learned they can get food from people, camps or cabins.



**Bears compared:** black (on the left) and grizzly (on the right)

(Gary Lyon drawing from "Living in Harmony With Bears," Audubon Alaska/Alaska Natural History Association, reprinted with permission.)

### Dall Sheep and Mountain Goats



Left: Mountain goat. Above: Dall sheep ewe and lamb.

Dall sheep and mountain goats are the white, woolly creatures of the alpine high country. Goats can live on steeper cliffs and mountainsides than the sheep, which favor more gentle meadows, though they are often found together in the Kennicott Valley. Donoho Peak, between the Root and Kennicott Glaciers, is one place known for its goats. Large bands of sheep live on Nicolai Creek east of upper McCarthy Creek and in Hidden Valley, across the glacier from McCarthy-Kennecott.

Both male and female goats and sheep have horns. As they age, male sheep develop the larger, curled horns for which the Wrangells animals are famous.



Dall sheep ram

(Drawings on this page from *Drawing Big Game*, courtesy of Doug Lindstrand)

### Moose



The Kennicott Valley doesn't have many moose, but they can be found almost anywhere in forest, brush, or wet places. They are the biggest member of the deer family, up to 7.5 feet tall at the shoulder and 1,600 pounds. They can run up to 55 miles per hour for short distances and are great swimmers. Bull moose grow a new rack of antlers each year and shed the old ones. In summer, they move between marshy areas, where they feed on reeds and grasses, and areas along streams and glaciers that have willow to eat. In the winter, they eat willow and alder branches. Deep snow makes travel difficult for moose, when they have to punch through snow up to their shoulders. Then they like to stay on hard packed areas, like snowmobile trails, or areas with less snow, such as frozen river channels. By trampling, eating, defecating, and urinating, moose change the way the young forest develops. Because moose prefer to eat willow, alder dominates more than it would if moose weren't present.

Moose are perhaps the most dangerous animal you may encounter around McCarthy and Kennecott. They can kick. If you come across moose in your path, especially a cow moose with young, stay back and wait until the moose wanders out of the way.



Moose tracks





*Coyotes* are frequently seen around McCarthy and along the roads. They eat whatever meat they can find: dead animals, hares, voles (mice), birds, snakes, and frogs, as well as berries, acorns and eggs from birds' nests. Coyotes at times live in packs, sometimes in pairs (male and female), but often alone. They are smaller than wolves, bigger than foxes, and vary in color from light gray to reddish brown.



People see *wolf* tracks more often than the wolves themselves. They generally stay away from humans and are not a threat to people, though sometimes come within a mile or two of McCarthy and even (very rarely) venture into people's yards. They are social animals, hunting, traveling and denning together. Wolves prefer large game, like moose, but also hunt hares, beavers, and the like, when available. If necessary, wolves supplement by eating berries, fruit, and insects. They are the size of a big dog and are larger and less scrawny looking than coyotes.



*Red foxes* usually live alone, hunting for insects, frogs, eggs, birds, and scavenged carrion left by wolves or bears, and even eating berries.



Many predators depend on *snowshoe hares* for food, so their numbers go up and down with the size of the hare population. In summer, snowshoe hares are brownish-gray and graze on grasses, clovers, and other green plants. In the winter, they turn white and browse on buds, saplings, and bark of willow and small trees. Their large, fluffy feet keep them on top of deep snow. They are most common in shrubby, brushy places.

*Lynx* depend on eating snowshoe hares. During years when hare numbers are high, lynx are seen along the roads, hunting hares venturing out into the open there, and even in people's yards and gardens. They have very large feet for easy travel across snow. In the winter, lynx tracks are often mistaken for those of a larger predator, such as a wolf, because their large, furry feet make big prints. They are generally the same size or smaller than coyotes.. Lynx are shy, solitary cats, most often hunting alone.



## Snowshoe Hare Cycle

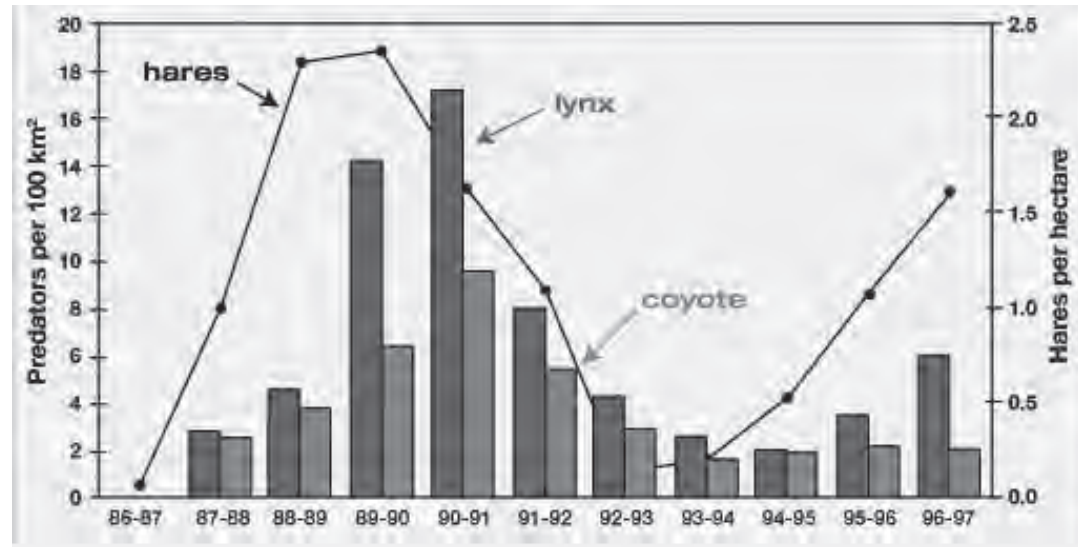
Snowshoe hare numbers change from year to year on a naturally occurring cycle. Over a very regular 8 to 10 year period, the number of hares across North America reaches a peak, then crashes. After that, the population slowly builds up again.

This snowshoe hare cycle is a fundamental rhythm of the boreal forest, closely linked to other wildlife populations. It is often called the “hare-lynx” cycle, because the lynx population fluctuates directly with the number of hares. Lynx stop breeding once hares become scarce, and some starve during the hare crash. While lynx are usually shy of humans, a local resident remembers a starving lynx ventured into Kennecott in search of food the year after the last hare crash. Some lynx learn to hunt squirrels during times of low hare numbers, and at Long Lake they eat frozen salmon carasses during winter.

To residents of the Kennecott Valley, the cycle is very noticeable. One local remembers the year before and after a crash: “During the peak, we regularly saw 15-20 hares at a time licking the road where an icy area had been salted. We also saw lynx hunting the hares there. A year later, we went through the summer hardly seeing a hare anywhere the whole time.”

The last peak in the cycle was in 1998-1999, and the population crashed the year after that. Now, evidence of hares—and lynx—around the Kennecott Valley is again becoming more common.

Some scientists hypothesize that during peak years, hares exhaust their food supply, becoming so weak that predators can easily catch more of them. Others believe that predators themselves control hare numbers. Another theory suggests that as the hare population increases, the plants they feed on respond by producing a bad-tasting chemical. Over ten years of observation, scientists with the Canadian Kluane Project concluded that predation itself is a major influence on the hare population. As the predator population increases, so does the risk of being eaten, which causes an indirect physiological effect of chronic stress in the hares. The stress decreases the hares’ reproductive success, and eventually the population crashes because it is not able to replace the hares that are killed by predators.



Graph used with permission of Charles Krebs, editor, *Ecosystem Dynamics of the Boreal Forest: The Kluane Project*, Oxford University Press, 2001.



marmot



ground squirrel



pika

Three larger rodents live in Kennicott Valley meadows, eating alpine plants. *Marmots* are the biggest, live in tunnel systems built into places with large rocks, and warn each other of danger with a loud whistle. They often can be found sunning themselves, flopped out on boulders. Arctic ground squirrels favor lush meadows with deep soil, where they stand guard at their tunnel entrances, watching for eagles and other predators. They can be seen along the glacier trail north of Kennecott. Hibernating *ground squirrels* are the only mammal known to be capable of lowering their body temperature to below freezing. Grizzly bears tear up alpine meadows digging for squirrels in their holes. This plowing of the meadows provides open soil where new plants can reseed. *Pikas* are the smallest, living in passageways between smaller rocks in places like avalanche slopes. Instead of hibernating in the winter, like most alpine mammals, pikas build up food caches, called “haypiles,” which they store in their tunnels and eat through the winter. They give quick, sharp, barking warning calls.



*Beavers* create wetlands by damming streams with sticks and logs. Their ponds become breeding and feeding places for birds, fish, and other water-dependent mammals. Though

awkward on land, in the water beavers are graceful swimmers, safe from wolves, coyotes, red fox, black bears, and lynx.



Protected by quills (which they cannot throw), *porcupines* pay little attention to threats from predators or people. They live mostly in the spruce forest, where they climb trees to eat the inner layers of bark. They also eat leaves and shrubs, rubber tires, fiberglass insulation, tool handles, and plywood. One was once seen hiking slowly toward an alpine pass above the Root Glacier north of Kennecott.



*Martens* are long, sleek weasels that prefer mature spruce forests, are excellent tree climbers. They grow to about two feet long, head to tail, and feed on rodents, birds, and, if they are skillful, fish. They also like jelly, jam, canned fruit, and garbage scraps, which they eat if they can find them.



*Ermines* are the small weasels seen commonly around woodpiles in McCarthy-Kennecott, much appreciated by people for the voles (local mice) they eat. In summer, they are mostly brown and in the winter, white, with a black-tipped tail. Ermine do not get beyond one foot long, head to tail.



In summer, the *little brown bat* is seen in the late-night dusk, flickering about feeding on insects. During the day they sleep in dark caves, mine tunnels, hollow trees, and old buildings.

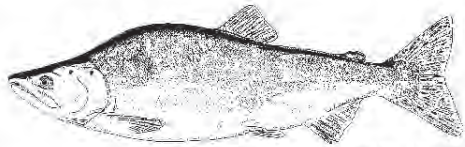
## Fish

The central Wrangells host a flourishing fish population, even in the silty, roaring rivers. Park biologists found a seventeen inch Dolly Varden trout in McCarthy Creek in 2003, though they are more common in smaller, slower streams. Each year, massive runs of salmon swim from the Gulf of Alaska, up the Copper and Chitina Rivers. Some arrive in the lakes and streams in and near the Kennicott Valley, returning from the ocean to spawn where they were born. Between June and September, salmon arrive, lay and fertilize their eggs (spawn), and die. Their carcasses provide nutrients carried from the ocean which fertilize nearby plants and feed eagles, bears, coyotes, otters, marten, mink, lynx, and fox.

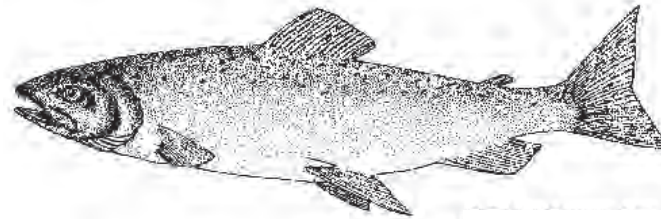
Salmon have been important to the Ahtna for centuries and are currently taken by subsistence and sport fishers in the Copper Basin, as well as commercial ocean fishing operators. Salmon are legally fished at Chitina, where local residents maintain fish wheels to catch them and many Alaskans come to dip net.

The two most common salmon species spawning near McCarthy-Kennecott are reds (or sockeye) and silvers (or coho). Recent marketing has made the Copper River red runs famous. Red salmon spawn in lakes and sometimes in beaver ponds and small streams. Silvers spawn in many streams around the Kennicott Valley, including Clear, Swift, May, Long Lake, Tractor and Crystal Creeks. They arrive later in the season, spawning into September.

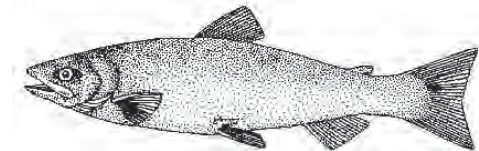
### Salmon Species



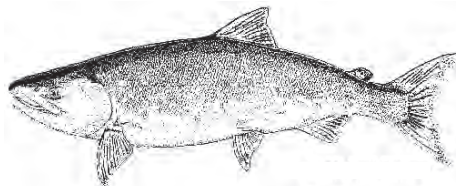
Pink/Humpy *Oncorhynchus gorbuscha*



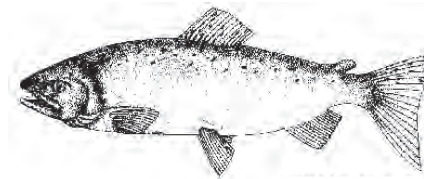
Chinook/King *Oncorhynchus tshawytscha*



Sockeye/Red *Oncorhynchus nerka*



Chum/Dog *Oncorhynchus keta*



Coho/Silver *Oncorhynchus kisutch*

## Salmon Spawning at Long Lake

Each year, between 5,000 and 50,000 sockeye salmon make the long and dangerous journey from the ocean to spawn in Long Lake near the McCarthy Road—an annual average of 11,000 fish. In some years, the Long Lake salmon run makes up as much as 20% of the famous Copper River red salmon runs. The Long Lake salmon run is unique, as well, for its unusually long spawning duration. As late as the end of February—several months after most North American salmon finish spawning—bright red bodies are visible splashing around as they lay and fertilize eggs before dying and joining the building mass of carcasses. In the spring, young salmon hatch from the thousands of eggs and spend a year in the lake, feeding and growing strong, before making the journey to the ocean. They return to Long Lake and other lakes and streams in the Kennicott Valley after spending years in the ocean, bringing with them high concentrations of rich marine nutrients like nitrogen and phosphorus.



Salmon bodies on the Long Lake ice are winter food for animals, including Lynx. (Mason Reid photo, NPS)

## Coexisting with the wildlife

From the animals' point of view, McCarthy and Kennecott are part of the wilderness. People share the trails with bears and moose. Especially when the soapberries ripen, black bears hang out in the bushes and woods near the glacier, including the trail north of Kennecott. Moose have been known to leave their calves under trucks in downtown McCarthy, while mama takes a break. When hiking and camping, keep alert and don't approach moose and bears. Moose can be dangerous, especially when with their calves.

## Hunting and fishing opportunities

Wildlife in Wrangell-St. Elias National Park & Preserve is cooperatively managed by the National Park Service and the State of Alaska. Sport hunting and trapping is allowed only within the

national preserve and requires an Alaska State hunting license. Local rural residents can subsistence hunt in both the park and preserve (though airplanes cannot be used for hunting in the park). Seasonal employees and seasonal residents in the McCarthy-Kennecott area do not qualify for subsistence hunting. All public lands are open to fishing under Alaska state regulations. A state sport fishing license is required. Hunting and fishing seasons, bag and possession limits are set by regulations.

Long Lake has good Dolly Varden fishing at times. Closer to Chitina, Strelna, Van, Silver and Sculpin lakes have Dolly Varden and grayling and are stocked with a variety of fish, including rainbow trout and coho salmon. Access to Silver Lake is privately owned and requires an access fee. Small grayling, which may occur anywhere, are most likely caught in clear streams along the McCarthy road.

## Bears Will Be Bears: You Can Help Them Do It!

by Kennecott District interpreter Megan Brokaw



In the inland part of Wrangell-St. Elias National Park and Preserve bears are on a mission to fill up on small foods like berries, insects and small rodents in order to ensure their survival. The nearby Copper and Chitina Rivers, while filled with salmon, are deep and silty rivers making it more difficult for bears to fish. Can you imagine trying to find enough tiny berries, ants and flower roots to survive? It's hard work!

Efficient consumption of protein and calories is critical to survival. Imagine spending a whole day, month or season eating, stopping only long enough for a short nap or to look for another meal. If you hike out the Root Glacier Trail from mid-July to mid-August you will see bears doing just this. Rich in the building blocks of protein, the soapberries ripening along the glacier edge are one of the most important bear foods in the valley. One bear was estimated to have eaten 200,000 soapberries in one day, each berry deliberately picked by his dexterous and flexible lips. Soapberries are such an important part of bears' nutrition that they spend long hours along the Root Glacier Trail even though this is one of the area's most popular hiking trails. Don't be fooled though, approaching bears eating along the Root Glacier Trail may interrupt their critical work of eating, eating, and eating some more. Don't interrupt the feeding bears!

Like people trying to choose the fastest checkout line in the grocery store bears are always looking for easier and faster ways to accomplish a job. The drive for efficient eating takes them on their directed, seasonal journey around the valley. It has also taken many bears into tents and camps. Just as smells wafting from sizzling steak, popping popcorn or cooking chocolate chip

cookies can draw us towards food, the smells of human food or even toiletries like toothpaste can draw bears. Once a bear has been successful in stealing human food it will return, interrupting its natural foraging, wasting precious energy if food isn't found or becoming increasingly aggressive towards people if they are again successful. In the summer of 2003, bears found food in campsites along the Root Glacier Trail, at the Jumbo Creek Camping Area and the Erie Mine tram cables. As the summer progressed the bears became increasingly aggressive, even approaching cooking campers and tearing into empty tents.

Eating human food often results in death for Kennicott Valley bears. A study examining the bear population in the Kennicott Valley in 2001 and 2002 found that more than twenty bears were killed in defense of human life and property over the course of those two summers. In combination with the death of several older, dominant grizzly bears, this created a situation in which many inexperienced adolescent male bears looking for new homes, after leaving their mothers, came to the Kennicott Valley. These younger bears were easily susceptible to human food, quickly becoming aggressive and dangerous.

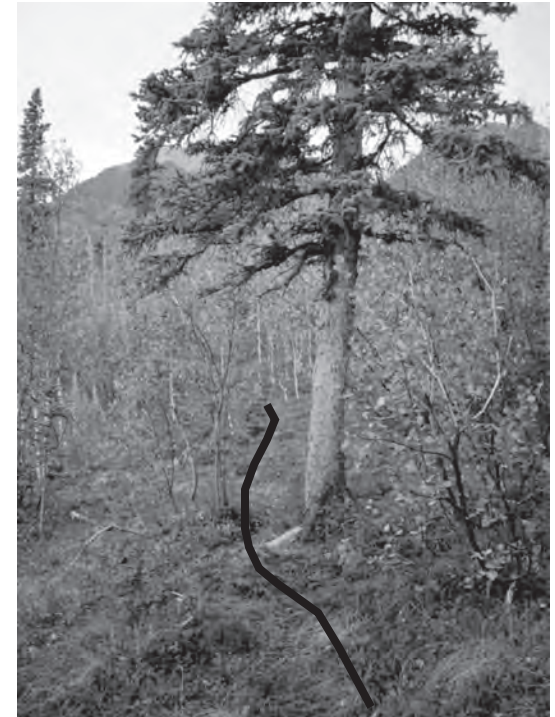


black bear

Please ... Help Kennicott Valley bears!

- Keep a respectful and safe distance from bears. Give them plenty of space to find and eat their natural foods.
- Never leave food, toiletries or garbage unattended outside. This includes in the towns of Kennecott and McCarthy.
- Use the bear-proof food lockers if one is available where you are camping.
- Check out a free bear-proof food container from the National Park Service for use on a backcountry trip to any location without a bear proof food locker.
- Talk to a park ranger or pick up a copy of the “Bear Safety in Alaska’s National Parklands” brochure in any national park visitor center if you have questions.

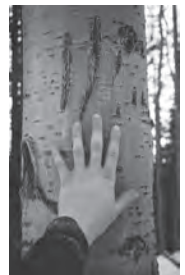
Together we can protect bears and people in the Kennicott Valley and Wrangell-St. Elias National Park and Preserve.



The above photo shows where bears scratching their backs have rubbed bark off a spruce near timberline on Porphyry Mountain, about a half mile from downtown Kennecott. They stop here, leaving their scent as a message to other bears that they are in the neighborhood. The bear trail passing next to this tree (shown by the black line) looks much like trails made by people, and it intersects a human trail nearby, which the bears also use. Scars on a poplar along the trail were made by the claws of a black bear as it slid down the tree trunk. Black bears are great tree climbers.



grizzly bear



## Human History

### The Ahtna

The Wrangells region became habitable as the glaciers retreated from the valleys and the ice-dammed lake covering the lowlands emptied about ten thousand years ago. We don't know exactly when humans first lived in interior Alaska. Artifacts found north of the Copper River area have been dated as eleven thousand years old. Stories recounted in the 1930s suggest that the Ahtna people displaced earlier tribes, perhaps the Eyak, who now live in the Copper River Delta. By the beginning of the Euroamerican historical record around 1750, the Ahtna were the people of the Copper Basin and southern Wrangells.

During the summer, Ahtna groups walked up from their winter villages along the Copper and Chitina Rivers to the valleys and mountains around what is now McCarthy-Kennecott. In the tributaries of the nearby Nizina River, they gathered nuggets of pure copper. These they made into tools and traded with other Native groups. Metal from the Nizina district passed along their network of trade routes extending down the Copper River to the coast, across the Chugach icefields to the Gulf of Alaska, over glaciers to Prince William Sound, across the Wrangells via Skolai Pass, and through the Copper Basin to the valleys near present-day Anchorage.



*Hedysarum alpinum* (from Britton & Brown's *Illustrated Flora of the Northern United States and Canada*, 2nd ed., 1913.)

From a seasonal camp at the confluence of the Nizina River and Dan Creek, they also hunted sheep, which prior to the arrival of guns they snared or shot with arrows. To travel downstream, they made skin-covered boats put together with rawhide strings and willow stems. They ate the roots of a *Hedysarum* plant

species found around McCarthy-Kennecott, commonly called "Indian potatoes, and many kinds of berries that ripened through the summer.

But with its short growing season and unproductive soil, the land here couldn't provide enough food to sustain people through the year. As a result, the Ahtna were the "people of the river," harvesting salmon which swam upstream to spawn after fattening in the rich north Pacific Ocean. Though hunting, metal gathering, and trading expeditions were part of the Ahtna's annual cycle, most of the year they lived in their winter settlements or at fish camps downstream from the Kennicott Valley. Not many salmon spawn in the mostly turbid water of the upper valleys of the south Wrangells. The relatively barren land doesn't support many moose, and caribou are absent.



Chief Nicolai (second from left). (Francis Pope Collection, Rasmuson Library, University of Alaska Fairbanks)





Historic Taral. (Candy Waugaman Collection, Fairbanks)

In the late nineteenth century, the Ahtna of Taral, near today's settlement of Chitina, controlled the sources of copper on the Nizina and its trade. When Euroamerican prospectors arrived, they dealt with the Taral Chief, Nicolai. After Chief Nicolai's death, the Ahtna left the upper Chitina Valley in the early years of the twentieth century.

### The Ahtna today

Today most Ahtna people live in eight villages, six of which are on the Copper River, route of the migrating salmon. They combine traditional activities, including harvesting salmon and hunting, with the construction and management jobs available in the Copper Basin. Others have left for work in Anchorage and other cities. The Ahtna number about 1200 people today.

Early in the twentieth century, building of the railroad to Kennecott and completion of the highway from Valdez to Fairbanks opened the

country to travelers, adventurers and settlers, but offered little to the Native people. Epidemics, including the 1918 influenza epidemic, caused much tragedy and loss. The trans-Alaska oil pipeline, which runs through the Copper Basin, and highway maintenance have brought some new sources of income. Ahtna no longer venture seasonally up the Chitina River to where Chief Nicolai hunted, collected copper and traded over the mountain passes. Today as in the mining days, almost all McCarthy-Kennecott residents are non-Native and have moved to the area from elsewhere.

Most Alaska Native tribes, including the Ahtna, never signed treaties yielding their lands to the U.S. government. As a result, after oil was discovered on the north slope, they asserted ownership of the proposed pipeline route. This hold on development of the oil fields gave them leverage to push a bill through Congress, settling their land claims and, in so doing, clearing title to the pipeline corridor, enabling its construction to proceed. The resulting Alaska Native Claims Settlement Act of 1971 set up corporations owned by the Native people in each of Alaska's regions. Congress granted these corporations the right to select a total of 44 million out of Alaska's 360 million acres of land, mostly near Native villages. The corporations own this land, with the mandate to develop it in the interests of their stockholders.

Ahtna, Incorporated, based in Glennallen, is entitled to 1.8 million acres. About a third of that land is within the boundaries of Wrangell-St. Elias National Park, mostly on the western edge. None is in the immediate McCarthy-Kennecott area, though the lower miles of the road between Chitina and McCarthy pass through Native holdings. Native-owned lands are private property, not managed or regulated by the National Park Service, and not open to public access without permission.

## European American Exploration

### The Russians

Russian fur traders began venturing into the Copper River country in the 1780s. Their exploration paused when a Tlingit/Eyak coalition destroyed the Russian settlement on the coast at Yakutat in 1805. But by 1819, they had set up a trading post near Taral. Although no records remain of their journeys, the Russians must have known about the Ahtna's trade route over the Wrangells and likely made their way up the Chitina River and over Skolai Pass. The last Russian expedition was led by Ruf Serebrenikov in 1848, which attempted to traverse the Copper Basin in search of a Hudson's Bay Company post which had reportedly been established illegally within Russian territory. Serebrenikov's expedition ended when his party was killed by the Ahtna. The Russians had been treating the upper Ahtna like slaves, forcing the men to provide supplies and raping the women.

### U.S. explorers and prospectors

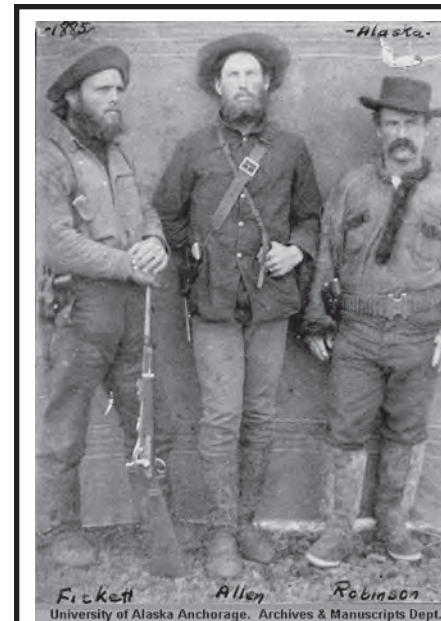
Prospectors started poking into the area following gold discoveries elsewhere in the North in the 1880s, about fifteen years after the U.S. acquired Alaska from Russia. Concerned about potential conflicts between miners and Native people, the American government sent out army expeditions to reconnoiter. Lt. Henry Allen's group was the first to ascend the Chitina Valley, meeting Chief Nicolai at his Nizina camp in 1885.

Lt. Allen's group survived with the help of Chief Nicolai and returned downstream with him in a 27-foot boat the Natives helped them make with four moose skins.

A few of the gold stampedeers came through the Wrangells country on their way to the great Yukon Klondike strikes in the 1890s. But prospectors hoping for similar discoveries did locate gold on Dan and Chititu Creeks, resulting in placer (surface) mining across the Nizina River from McCarthy-Kennecott that continued off-and-on until recently.

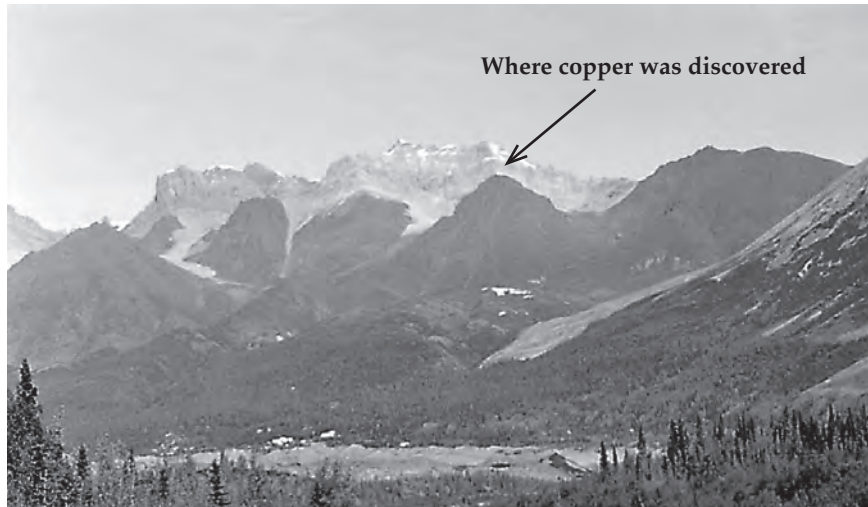
U.S. Geological Survey geologist Oscar Rohn made his way over 4th of July Pass in 1899 descending east to the glacier he named after naturalist and Alaska/Yukon explorer Robert Kennicott. He named its main tributary stream McCarthy Creek, for the prospector James McCarthy.

Meeting prospectors "Tarantula Jack" Smith and Clarence Warner at McCarthy Creek, Rohn tipped them off about copper ore on the mountain above the Kennicott Glacier. The next summer they followed up on his lead, staking the Bonanza claim in 1900. The copper ore discovered at Kennecott was among the richest ever found in the world. Some of the deposits were up to 77% copper, a very high grade. Richer ore requires less processing before it is ready for the market, generating a lofty profit from the quantity that was located in Bonanza Mountain.



*"Rotten moose meat would be a delicacy now. So weak from hunger that we had to stop at noon to hunt. All were so weak that we were dizzy, and would stagger like drunken men."*

—from the journal of Private Fickett, quoted in Lt. Henry T. Allen, "An Expedition to the Copper, Tanana and Koyukok Rivers in 1885," p.46.



Bonanza Mountain

### Founding of an Empire: Kennecott Copper Corporation

Like Warner and Smith, thousands came north at the turn of the 19th century seeking their fortunes in gold and other precious metals. Among them was a young mining engineer named Stephen Birch who had come to Alaska in search of his fortune. With visions of a highly profitable venture, Birch succeeded in buying control of Smith and Warner's claims on Bonanza Ridge. His ambition launched what became a global copper empire.

Securing the financial backing of some of the most influential families of the time, Birch formed the Alaska Syndicate in 1907. This group, which included Wall Street giants Guggenheims and J.P. Morgan, became the Kennecott Copper Corporation in 1915. Along with building the mine and mill works, this corporation controlled the entire transportation route, funded the 196-mile Copper River and Northwestern Railway from Kennecott to Cordova, and organized a steamship line that shipped the ore to the smelters in Tacoma, Washington. (The mining company was named after the Kennicott Glacier. However, the company name was spelled "Kennecott,"

resulting in spelling debates that continue today. Natural features, including the glacier and the river, are "Kennicott;" the company and the town are "Kennecott.")

Successfully meeting countless challenges posed by the extreme Alaska setting, Kennecott Copper's system of mining and transport engineering operated from 1911, when the railroad to Kennecott was completed, to 1938, when world copper prices dropped and the rich ore veins were depleted. At the time of its closure, almost 600,000 tons of copper had been extracted, with a value then of approximately \$200 million, in addition to nine million ounces of silver.

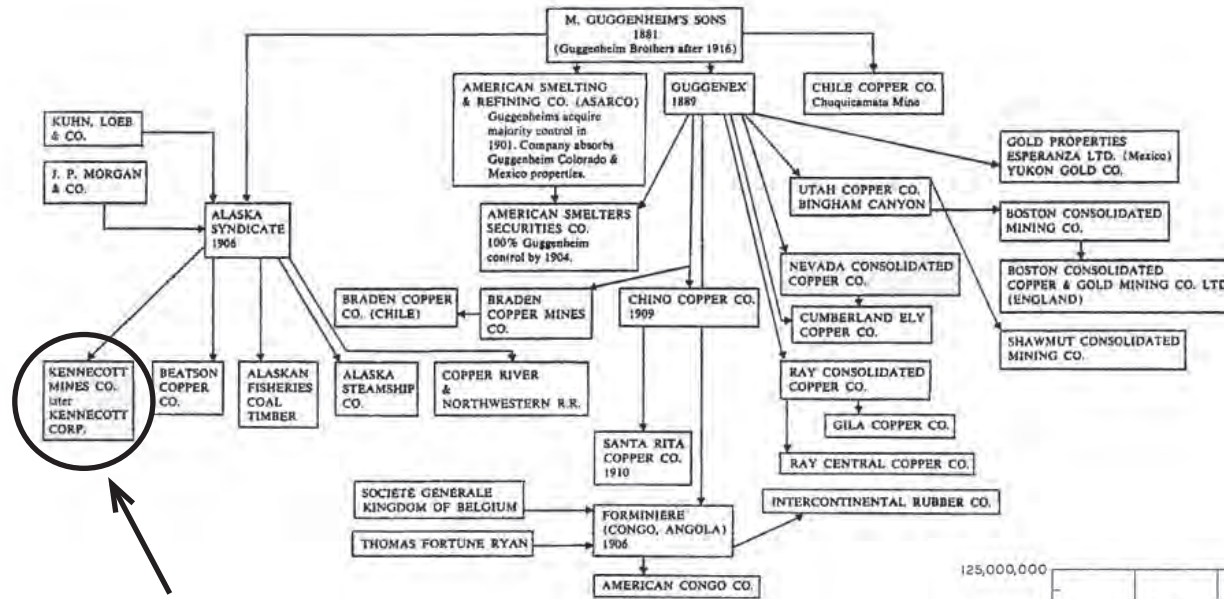
The combination of the high quality ore and the high international price of copper during that time made for a very profitable venture. If the Kennecott ore bodies were discovered today, it's questionable whether or not they could be mined at a profit.

At its peak Kennecott Copper was the largest copper producer in the U.S., with the ability to produce one billion pounds of copper annually. Under Birch's direction, Kennecott Copper rose to control fourteen percent of world copper production, with mines in Utah, Nevada, Arizona, and Chile, in addition to those in Alaska. Kennecott Copper Corporation, now a subsidiary owned by Rio Tinto, remains



The Kennecott mill complex early in the mining era. (NPS photo collection)

## Kennecott was Part of an International Industrial Empire and a Global Economy



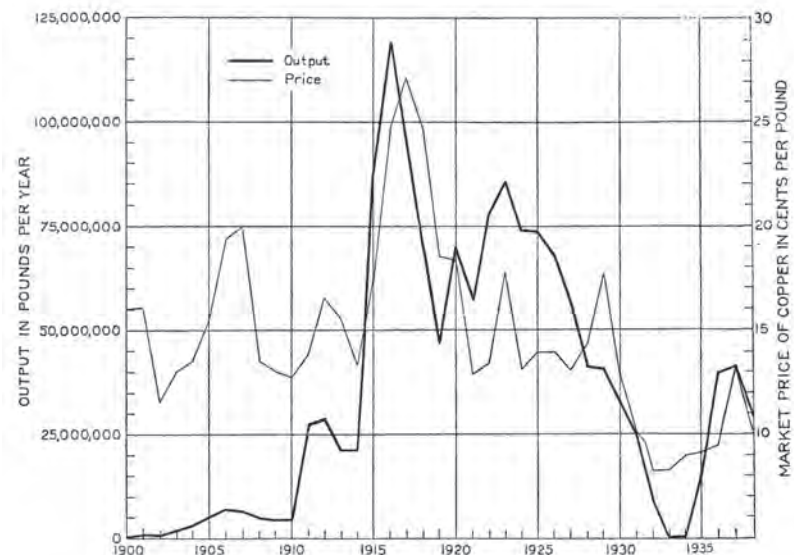
Kennecott Copper fit into the Guggenheim Empire here.

### The Guggenheim Mining and Smelting Empire in 1910

(Chart from John Davis, *The Guggenheims: an American Epic*. New York: Morrow, 1978.)

### Copper Produced from Alaska Mines 1900-1938 and Fluctuations in the Price of Copper During that Period

Alaskan production of copper has historically fluctuated widely with changes in price, more than producers in more accessible areas. Kennecott mines accounted for virtually all Alaska copper while they operated. The first major shipments began in 1911, with full production reached in 1915. Thereafter, fluctuating annual production was related mainly to swings in the price of copper, including a complete shutdown in the mid-1930's. The mines were considered as exhausted when closed down in 1938. (Graph by Barry Hecht, UC-Santa Cruz, 1973)



## The Ballinger-Pinchot Affair & the Presidential Election of 1912

During the early part of the twentieth century, the Guggenheim-Morgan Syndicate bought vast tracts of Alaskan land, purchased steamship lines and controlled fisheries in addition to opening mines and building the railroad to Kennecott. In 1907 its attempt to utilize coal fields near the mouth of the Copper River became a center of national controversy. To get cheap fuel for the railroad, they negotiated with Cunningham Associates for a portion of its coal claims. However, these claims had been staked before the federal government opened the coal fields in 1904. In addition, the number of claims staked exceeded the legal limit. President Taft's Secretary of the Interior, Richard Ballinger, initiated an investigation with the intent to award development patents for those claims made in "good faith" prior to the 1904 law.

U.S. chief forester Gifford Pinchot challenged Ballinger. Under former president Theodore Roosevelt, Pinchot had led efforts to retain federal natural resources in public ownership. Pinchot found himself at odds with new president Taft's privatization and development policies. Aiming to discredit Ballinger and remove him from office, Pinchot accused Ballinger of making a fraudulent coal deal with the Alaska Syndicate. Pinchot knew that the cancellation of the claims would pass control of the coal fields to the U.S. Forest Service, which could then establish a leasing system similar to that used for timber harvest, which Pinchot supported.

The ensuing battle over Alaskan coal lands, known as the Ballinger-Pinchot affair, swept the nation, heightening public resentment of big business. Pinchot used his accusation of Ballinger as a means of raising bigger issues of conservation and corporate control of public resources. Ballinger took more than his share of the heat and eventually resigned from office, though congress eventually found him innocent. The press escalated the debate, portraying the Guggenheim-Morgan Syndicate as an immense political force aiming to exploit all of Alaska. Animosity towards the Taft administration heightened when the president fired Pinchot, a popular public figure, for insubordination.

The controversy also affected internal Alaska politics. A leader in the struggle for Alaska self-government, federal judge James Wickersham became alarmed by the potential influence of external corporate interests in the territory. Wickersham believed that Alaskans themselves would develop Alaska's natural resources in a way more fair and compatible with national conservation interests than if they were developed by absentee corporations. But the Alaska Syndicate's lobby in Washington successfully quelled any further extension of Alaskan home rule.

The Ballinger-Pinchot affair impacted the Syndicate's operation in Alaska and affected Alaskan development in general. Given a court injunction against opening the coal fields, the Syndicate turned to oil shipped in from Seattle to fuel its trains. The resulting higher freighting costs changed the course of railroad construction and subsequent development in the Copper Basin and interior Alaska.

The controversy affected the outcome of the 1912 presidential election. Aroused to support conservation and public control over resources, former President Theodore Roosevelt decided to come out of retirement to run against President Taft. Forming the Bull Moose Party, Roosevelt divided the Republican vote, resulting in the election of Democrat Woodrow Wilson.



Political cartoon, ~1910

### Kennecott's Lifeline: The Copper River and Northwestern Railway



The snowplow train at work.

While pack horses and sleds were able to haul sufficient building materials and supplies to the Kennecott mine and mill site, a railway was necessary to move the copper ore. The Alaska Syndicate initially considered four possible routes from tidewater into the Copper Basin, each prone to dangerous natural conditions.

Michael J. Heney, an engineering contractor experienced with Alaska's hazards, eventually convinced the Syndicate that the direct route from the ice-free port of Cordova on Alaska's southcentral coast was the safest bet. Contracting with the Syndicate, Heney tackled the task of building the Copper River and North Western Railway from Cordova to Kennecott. By horse and dog team in winter, with steamboats in summer, equipment, supplies and men moved up the Copper River to construct the mines and the railroad. Though the best of the initial four options, the route was not without its own hazards, passing between moving glaciers; over unstable moraine, ice and rivers; and through rock-walled canyons.



Winter snow slides delayed train operation for weeks at a time while crew of men worked to clear the track.

The Copper River and Northwestern (CRNW) Railway was critical to Kennecott's operation. Although much of the mill was constructed before the railway was completed, it would not have been possible to move large quantities of ore with horse and dog sleds. Without a railway, there could have been no Kennecott.

In the winter, a special train was used that was equipped with a powerful rotary snowplow in the front. This train required three large locomotives and an extra crew to operate. Setting out with six weeks of provisions and coal to make the trip from Cordova to Kennecott, there were times when the train could only make one and a half miles of progress per day. In the winter of 1909-1910, the track between the Miles Glacier and Tiekel was buried so thick in snow and ice that the snowplow train would travel only 15 feet before riding up on the ice and derailing. The crews would then have to back the train up and chip away at the ice before setting the train on the rails to try again. It was recorded that year that the plow derailed 1,500 times.

## An Engineering Marvel

*Although only 195 miles long, the CR&NW was an engineering marvel. On a scale similar to the later Alaska Highway and Trans-Alaska Pipeline, the project took a peak crew of 6,000 men nearly five years to complete and cost the then staggering sum of \$23,500,000.*

*To overcome the valley's precipitous terrain, the CR&NW elevated much of its track, placing about 15 percent on either bridges or trestles. While many such structures still stand, three are especially striking monuments to the skill of their builders.*

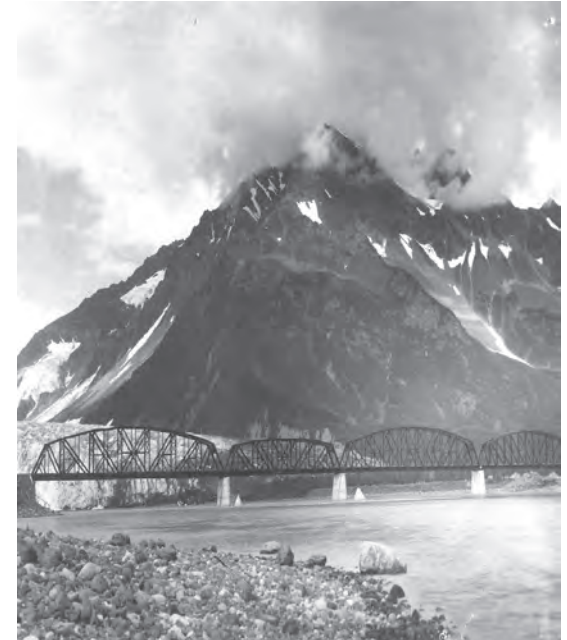
*The Miles Glacier Bridge, often called the "million-dollar" bridge despite the fact that it actually cost nearly a million and a half to complete, was the route's single most ambitious feature. Located between the termini of the Miles and Childs Glaciers, this 1,550-foot-long, four-span, steel structure not only had to withstand the Copper River's eight-mile-per-hour current, but an endless barrage of floating icebergs.*

*In order to save time and money, the contractor built this bridge during the winter of 1909-10 on a wooden falsework, erected on top of the frozen river. As the third span neared completion that spring, the temperature rose and so did the water, causing the ice to drift downstream. Faced with losing their whole season's labor, the steelworkers managed to drag the 450-foot section back into position and bolt it permanently into place. They finished just in time. One hour later, the ice went out, taking all of their scaffolding with it*

*The CR&NW overcame another serious obstacle 17 miles east of Chitina when it successfully spanned the canyon of the Kuskulana River. Built in two months during the bitter winter of 1910, this 525-foot-long, 238-foot-high structure was on completion the seventh highest bridge in the United States.*

*By comparison, erecting the wooden trestle over the Gilahina River probably seemed downright easy. Despite requiring over a half-million board feet of lumber, this massive, 880-foot-long and 90-foot-high structure was completed in just eight days.*

*—Geoff Bleakley, "The Copper River and Northwestern, Alaska's Bonanza Railway"*



The Million Dollar Bridge



Construction of the Kuskulana bridge



The Copper River bridge at Chitina washed out frequently, as shown here during the flood from a glacial lake break-out in 1932. (Photo courtesy of Geof Bleakley)

The railroad employed two permanent bridge crews. Each spring during breakup, large chunks of ice were let loose and sped down river, crashing into and often removing large sections of bridge. Once a year, the railroad had to replace the 950' wooden bridge across the Copper River beyond Chitina. The company planned for the bridge washout each year, and did not replace it with a stronger, permanent steel bridge because the cost of this would have exceeded the cost of replacing the wooden bridge twice a year for many years. Damages on numerous other temporary trestles were frequent and needed constant maintenance.

Despite the challenge and monetary nuisance of keeping the railroad functioning year after year, its cost was nothing compared to the profits produced by its copper cargo. However, when world copper prices plunged in 1937, the mines at Kennecott were no longer profitable and shut down. This was the end of the Copper River and Northwestern Railway. With less than 4,000 people living in the entire Copper River Basin area, the railroad's operation could never have been profitable without the copper mines, and so when Kennecott's



The Million Dollar Bridge, after the 1964 earthquake. (Photo courtesy of the Historic American Engineering Record)

operation ceased, so did the trains. The last train to ever pull out of Kennecott did so on November 11, 1938.

Since its closure, the Copper River and Northwestern railway has undergone various stages of decay. For a while, tourists rode speeders the five miles from McCarthy to the mill, but in the late fifties, the rails were taken up along this section. By 1963, the last of the rails were removed between Chitina and McCarthy, and this 60 mile section is now a gravel road that serves residents and visitors driving to McCarthy/Kennecott. Old railroad spikes commonly resurface in the road's gravel and cause flat tires. The Million Dollar bridge survived nature's whims until March 27, 1964, when the Good Friday Earthquake knocked the northernmost span from its concrete piling.



## Kennecott: A Place to Live



Kennecott town during the mining years in winter darkness. In the background, the snow-covered glacier extends south down the Kennecott Valley toward McCarthy. (Jim McGavock photo)

During the peak of the mining period in the early 1920's, a maximum of about seven hundred people lived in the McCarthy-Kennecott area. Nearly half of residents worked in the mines and lived in bunkhouses at the mine entrances, high on Bonanza Mountain. Up to three hundred lived downhill around the ore processing and shipping facilities, the single male workers in bunkhouses and the management with their families in individual houses. The Kennecott mines, mill and town were owned entirely by the mining corporation.

The story of life in Kennecott as experienced by the families of its managerial staff is best told through the words of those who were there. During the mining years, usually about ten to fifteen school-age children played together, attended the two-room school, and grew close in their adventures around town. Over the last decade, several of these "Kennecott kids" have reported their experience in books and interviews.

Sissy Lommel Klueh, was born in 1920, recalls the Kennecott of her youth:

*Kennecott (referred to as camp) was a complete company town. It was a truly picture perfect, red and white painted, cluster of cottages and mill buildings. Camp was built along a strip of railroad tracks lying between the Kennecott Glacier and a very imposing range of mountains. Surrounded by the Wrangell Mountains and the Chugach Range, the town had a setting of magnificent beauty...*

*Kennecott was squeezed between the glacier and the tree line of the mountains. National Creek bisected the town from east to west and flowed down a gully past the hospital and the assaying office. It passed under the railroad tracks and a short trestle and emptied into the Kennecott River. In the 1920s most of the glacier was gleaming white, often reflecting the grays or blues of the sky.*

*The mill was the central point of town and the terminal for all of the ore from the five mines. The mines fanned out three to five miles above camp. There were at least forty miles of tunnels dug into the mountains. The mines were named Bonanza, Jumbo, Glacier, Motherload and Erie.*

*Camp had a hospital, school, efficient steam power plant, grocery store, post office, recreation hall and a small library. Cottages for the foremen and their families and bunkhouses for the single miners and mill works were also provided by the company. The large bunkhouses had their own kitchens, dining halls and recreation areas. Several larger homes were provided for superintendents and managers. A staff house provided lodging for office workers, teachers, and nurses. The staff house annex had a dental office. A dentist would come from Cordova several times a year and stay for a couple of weeks. Near the mill, there was a company machine shop where anything from the smallest bolts to heavy equipment could be built, and it was the pride of camp. An efficient carpenter shop supplied anything from furniture to buildings.*

*The efficiently operated town of about 500 people had telegraphic contact with most of the outside world. Radio reception was very poor. The town was built to be self sufficient. The train was the only transportation into or out*

*of town, and there were times during the winter when it would be delayed for weeks by slides and storms. Air service into Kennecott was non-existent at that time. To my young parents, living in Kennecott meant a secure and interesting job, food on the table, and an adventure in real pioneering spirit. To my sisters and I, all born in camp, it was the only world we knew; it was our home, and we were happy there. (Sissy Lommel Klueh, Born in Kennecott: Memories of a Kennecott Kid, 1996.)*

Inger Jensen Ricci was born in the Kennecott hospital in 1918, and stayed until she left to attend high school in Seattle in 1932. She later returned to Kennecott to work as a typist during the mine's last years. Many of her fondest memories come from the years she spent as a child wandering free in Kennecott:

*Living in Kennecott was a wonderful experience, especially for the children. They were considered very special and most particularly by the single adults. Everyone was so good to us. The freedom of living there was special. The children of "camp" had the run of the town and if anyone got into trouble, there was always someone around to help. Of course, they were all raised quite strictly and knew what they could and could not do. However, there was a sort of class system, as the office workers, nurses, doctors, teachers and those who were "bosses", didn't always attend the same social functions.*

*In the winter we went to school in the dark and came home in the dark. There were lights all along the main street, but not on the hill, so we all carried flashlights. We left our ice skates at school, as we used them during recess, after school, and often were joined by our parents after supper. Several of us cross-country skied and often skied to one of the two stations on the tram. However, we also had our own ski trail starting at the mill, traversing several lightly treed hills, and then a long ride down to the glacier and home. Card playing was another of our entertainments during the winter. The children as well as the adults very well attended the Saturday night dances. There was usually live music, a piano, drums, horn, or whatever was available. However, records were also played and we all*



Children playing in the snow-covered streets of Kennecott. (Photo: NPS archives)

*had our favorites. Following the dances, refreshments were served. I shall always remember those sumptuous homemade cakes!*

*In the summer, there were hikes, picnics, tennis, and ball games to watch. The miners had their own team, as did both McCarthy and Kennecott. One of our favorite activities on warm days was running through the garden hose on our lawn, usually followed by real lemonade and cookies. A hike to McCarthy and back for ice cream cones was a special treat. Fall brought berry picking, currants and cranberries being our favorites. Often we shared patches with black bears, though they were much more frightened than we were. (Inger Jensen Ricci, Kennecott Kids, foreword.)*

Besides the remote mountain setting and isolation from the "Outside," life in Kennecott for the families of the staff (teachers, nurses, office assistants, store managers, mechanics, etc.) and "upper crust" (management) was not entirely different than the lives of families across the country during that time. Children went to school and played, women socialized as mothers and friends

and formed ladies groups and reading clubs. Any modern amenity, such as a sewing machine or cake pan, could be mail ordered through catalogues if it wasn't available through the company store in Kennecott or in McCarthy. During holidays, the community celebrated together in the recreation hall and held parades in the street.

*...on Christmas Eve the school always put on a play or a program in the social hall and then after that Santa Claus distributed the gifts that the company provided. (James McGavock interview, Kennecott Kids, volume II, page 133.)*



In the community recreation hall, weekly dances with live music were held and well-attended. (Catherine Howard Hodges photo)

### Social Diversity

America during the early 1900s was a melting pot of nationalities. Kennecott was no different. A large percentage of the company's workers came directly from Europe, particularly from Scandinavia, Finland, Sweden, Norway, and Switzerland. There were also several Asians working in Kennecott. Many Kennecott kids remember a Japanese family that ran the laundry service for many years, and several Chinese worked as cooks in the mess halls.

In the summer of 1929, Chuck Herbert, a student from the University of Alaska, went to Kennecott with a friend to work at the Jumbo Mine. According to him they were the only Americans on site, and the supervisor had a tough time finding a place for them in the bunkhouse. All bunks were assigned by nationality, and there was no American section. To solve the problem he assigned them bunks between the Greeks and the Italians.

*The Yugoslavians were the best liked group in the camp. The Finns were disliked and not trusted. No other nationalities associated with the Finns and they were said to always carry knives. ...There was very little language problem even though there were a variety of nationalities represented. Most of the workers could speak two or three languages and all were surprisingly well read...The crew leaders were mostly Irish with the exception of one Greek who was well liked and was a very popular leader.*

—Chuck Herbert, written interview, *Kennecott Kids*, volume II, page 362.

## Life in the Mines



Jumbo mine in 1929, with the bunkhouses where the workers lived. (Photo courtesy of Geoffrey Bleakley, Copper Center, Alaska)

For all the socializing and good times had by those down in Kennecott town, life was much different for those whose job it was to extract copper. The miners lived four miles up from the mill town on Bonanza Mountain, working in dangerous and uncomfortable conditions.

*The miners were a hardy group of young men. I didn't see them often. When they came down out of the mines it seemed to me, as a child, that they were men from another world, which, indeed they were. They looked different, rough and tough. The mines were reached by tramways which brought the ore down in buckets. The miners would also come down in these buckets with their arms and legs dangling over the sides.*

*The miners worked hard in the mine shafts and tunnels, putting in long hours. Some stayed up there for months at a time, even for as long as a year. This often pushed them to their limits. They told stories about frayed tempers that erupted into fights...Working in the mines was a dangerous*



The Bonanza Mine and bunkhouse. (Photo courtesy of Geoffrey Bleakley)

*occupation. The rolling ore cars inflicted serious injuries on anyone in their way. Head injuries, broken arms and legs, and asphyxiation accidents were not uncommon. Dr. Gillespie visited the mines often, and took care of minor illnesses as well as serious injuries. Many of the sick or injured were brought down to the hospital to stay until they recovered. Some were even sent "outside" for medical attention that could not be given at the hospital. (Sissy Lommel Klueh, Born in Kennecott)*

Miners slept year round in exposed bunkhouses built on steep rock and ice. They worked all day in cold, poorly lit tunnels far below the ground surface, and even ate their daily meals deep within the Earth—the Bonanza Mine's dining hall was five hundred feet beneath ground level. In the winter, miners contended with extreme temperatures, storms, and potential snow slides which threatened to come down upon the bunkhouses and mine entrances. In 1927, a worker was swept away and buried by an avalanche. They had just

two official days off, Christmas and the Fourth of July, which were taken without pay.

*...essentially those [miners] lived without seeing the outside air from the first of November to...the end of March. ...and it was cold. ...they were essentially captives of the company. (William Douglass interview, Kennecott Kids, Vol. II, page 59.)*

Working conditions in the mines were poor and the hazards many. Falling rocks, collapsing mine tunnels, and poor air circulation were just a few of the dangers.

*Hard hats were available. Most miners wouldn't wear them. They wore these caps with carbide lamps on them. And I never did see a miner who wore a mask. There were miners who got what we called "miner's consumption" [silicosis] from time to time and ship them down to Arizona. Very often they'd have to take a collection for the fare. Nels Konnerup interview, Kennecott Kids, Vol. II, page 57.)*

Despite the miners' demanding work and lifestyle, they were paid little, especially in comparison with the company's other employees. Mill and plant workers, staff, and management living in town received decent salaries, were given free housing, and did not have to endure the hardships of the mines. Miners made about \$80 per month, with about \$30 taken out each month for room and board. (In comparison, the superintendent made \$8,000 per year, plus a free house to live in.) During the span of Kennecott's operation, miners staged strikes for higher wages and better working conditions.

Miners rarely came down to town or associated with those living there, doing so only to pick up their paychecks en route to McCarthy, where they went to relax and spend their money on liquor and girls. They often returned to the mines empty handed.

*...normally what happened at the mines was on pay day why there would be poker games up there and maybe one individual or two would end up with all the money and then those who ended up with all the money went to McCarthy for wine, women and song and when it was all over, they came back and went to work. The company decided well, this is the*

*best arrangement, you can't have these miners, these workers, going on to Chitina or Cordova or even Seattle...Just let them go down to McCarthy and have their fling and they'll straggle back and go to work...After they've blown all their money in McCarthy on wine, women and song, why they couldn't afford to go Outside. (James McGavock interview, Kennecott Kids, Vol II, pages 113-114.)*

## McCarthy

Four miles down the side of the glacier, the town of McCarthy grew on private land that John Barrett subdivided from his homestead, which included the area closest to Kennecott flat enough for trains to turn around. The railroad company arranged with Barratt to build its depot and turnstyle on his land. Watching people step off the train onto his land, often setting up camp, Barrett decided to subdivide his



In McCarthy: General Merchandise and the Golden Saloon. (Molly O'Neill Huckins photo)

## McCarthy in the Copper Mining Days

*Over the last 98 years, since John Barrett had the foresight to stake his homestead on the narrow strip of land that the C.R. & N.W. Railroad would have to traverse on its route to the Kennicott ore site, many colorful characters have passed this way. ....*

*While many disputes about bootlegging and prohibition remain the stuff of legend, the town at the time understood its place in the economy of the day. The occasional Ladies League feud erupted and accusations of fraud or corruption from various business and political elements were quickly settled. Politics were integral to McCarthy's survival as a commercial center and many businessmen and townspeople banded together in organized entities such as the Commercial Club promoting McCarthy's bright future and the Red Cross and Armenian Relief for charitable causes, Arctic Brotherhood, Masons and other fraternities flourished for fellowship and charitable/social causes. Sports were often organized events. Religion flourished but oddly*

*no church was ever established in the early days, though traveling ministers were common. Sheriffs, constables and judges were established. Prostitution was business in McCarthy and openly engaged in. Most of the women in the business were treated with respect if not considered respectable. Children were not often allowed to interact with such, though I am aware of at least two homes and merchants located too close to "THE ROW" not to have been within sight. Children were few and special, protected from the numerous dangers such as sled dog teams by having all such teams staked on the east side of town near Clear Creek today.*

*...The population was enormously diverse. Chinese, Blacks and European immigrants were all present. ...*

*As we look back on the myths, and they are myths as so many of the stories have become mythic in their proportions and loose with the actual facts, I find myself in awe of the earliest settlers of our area. The hardships of the most mundane daily activities are beyond even our hardest residents today. Take a moment and consider life at our present temperature extremes (as I write this, -43F) without insulation, chainsaws, snowmobiles, compact generators, phone/internet and all the little things we take for granted. Horses, dogs, handsaws and kerosene lamps were the conveniences of the day. Conversation, dinner parties, socials, books and sports were the great entertainments through the dark months of winter. And the hardy bunch that made it through the long months of darkness together naturally felt the closeness of a community developing within the first several years of its founding...*

*What these people accomplished can never be done again. They carved out of this wild landscape a community, one we still benefit from today.*

—Doug Miller, "Centennial Project—McCarthy's 100 Years in the Wrangells," *Wrangell St. Elias News*, March/April 2004.



McCarthy (Photo: Museum of History and Industry, Seattle)



Bill Herman, standing on a fresh harvest of hay. (Bill Herman photo)

homestead, creating the town of McCarthy. During the height of the mining era, over one hundred people lived in McCarthy. Thousands more passed through.

McCarthy had many things Kennecott didn't. Kennecott kids remember leisurely day hikes to McCarthy and back for ice cream cones at the drugstore. The mercantile store supplied stampeding prospectors who took the train to McCarthy during the Chisana gold rush, outfitting themselves for the journey over the Wrangell Mountains. McCarthy also had a red-light district—located along McCarthy Creek (now almost all washed away) on the south side of town—responsible for the town's reputation of being "wide open". Here liquor was sold during prohibition, call girls were paid for their services, and the bars stayed open all night.

Across the Kennicott River, farmers at four homesteads on the Kennicott flats grew vegetables, raised cattle, and provided hay for

the horses of McCarthy. Dirt roads reached from McCarthy East across the Nizina River to the gold mines behind May Creek and up McCarthy Creek to copper prospects and moonshine liquor stills. Prospectors cruised the high country, staking claims up the glacier at Donoho Mountain and in Hidden Valley.

### **Winding Down: Kennecott Copper on the Verge of Closure**

Throughout the 1920s, Kennecott and McCarthy bustled with activity and purpose. Trains loaded with copper and passengers ran regularly in and out of Kennecott twice a week. By the 1930s, however, business slowed down. The economic depression took its toll on Kennecott, and in 1933 the mines closed temporarily for less than a year. During this time, the trains stopped running and railroad services were carried out using speeders, small vehicles mounted on the tracks. Business resumed in 1934, mines and trains operating, but it was not like the old days. Before the Depression, typically twenty to thirty cars of ore were shipped out of Kennecott with every train load. After 1933, the company was lucky to ship ten cars out with each train. During the last four years of operation, the railroad closed down three or four months in the winter. Falling world-wide commodity prices, combined with the increasingly played out copper veins—Kennecott's lifeblood—made for an unsure future. As early as 1935, the Kennecott Copper Corporation's annual reports hinted at closure, unless new lodes of high-grade ore were discovered.

In 1937, world copper prices hit an all time low, plunging to fifteen cents per pound. That year's annual report explicitly predicted the mine's closure the next year. By 1938, no new ore had been found. That November the mines shut, ending some thirty years of operation.

### After the Mines Closed

When the mining activity ended in 1938, much of the town life in McCarthy and Kennecott ceased also. Much like the Prudhoe Bay oil fields today, the Kennecott operation was self-contained. People came from other places to work for the company or in McCarthy and its economy was closely tied to the big copper mines. As a result, all but a handful of the population left when Kennecott shut down. The copper company was owned and financed from Outside, and the profits largely returned there. Almost all materials and supplies were hauled in by the trains that ceased when the mines shut.

When the last train pulled out, the dishes stayed in Kennecott's cupboards, linens on the beds and 1938 calendars on the walls. In the company store, the inventory of bolts, pipes and tools awaited workmen who never returned. In 1939, the railroad bridge over the Copper River at Chitina washed out in the spring flood and was not replaced. In 1940, fire burned much of downtown McCarthy. After the Kennecott River railroad bridge washed out in 1943, the post office in McCarthy closed. Those few who stayed on hauled water from Clear Creek and lit their houses with kerosene lamps.

To revive the economy, in 1938 Ernest Gruening, who became the Alaska territory's delegate to congress and later a U.S. senator, proposed designating the area a national park. But with the start of World War II, the idea came to nothing. In the mid-'50's, Merle "Mudhole" Smith (named after an encounter with a wet spot on the Bremner mine airstrip in the mountains south of McCarthy) flew in DC-3's filled with tourists, who stayed at the McCarthy Lodge and rode to Kennecott on a model T Ford mounted on the railroad rails. Over the years, a few people moved to McCarthy. Some moved into abandoned buildings, without bothering to ask who legally owned them. Some came for remoteness, solitude, the austere beauty of the mountains and abandoned towns, the chance to lead a life unencumbered by society's rules and the opportunities for self-reliance. Some came with dreams of discovering new, rich mineral lodes. Most left the first winter. Some, with commitment and

initiative, stayed. Prospectors, both individuals and representatives of companies large and small, continued to search the country, but found no new large-scale deposits.

Through the '50s into the '70s, about a half dozen people lived in McCarthy. Another handful lived in the cabins and houses remaining on the outlying mining claims, at places like the Green Butte on McCarthy Creek, Long Lake, May Creek, Dan Creek across the Nizina River, and in the depths of the Chitistone Canyon. Alaskans flying their own planes or chartering in with area air taxis hunted, mainly for the area's famed Dall sheep. Over time, professional guides developed field camps in the remote valleys, bringing wealthy trophy-hunting clients.

Concerned about liability, Kennecott Copper Corporation closed its property to tourists. After further studies confirmed the ore was depleted, the company arranged with Ray Trotochau to raze Kennecott's buildings. He tore down a couple of houses, took the top off the mill and the store, and carried off the brass fittings and copper wire. In the 60s, an Anchorage partnership, the Consolidated Wrangell Mining Company, acquired Kennecott. Gathering rocks dropped on the ground during the mining days, they flew some planeloads of ore out from the new McCarthy airstrip. In the early '70's, Consolidated Wrangell arranged for a summer caretaker, Kennecott's only resident, who harvested a flourishing garden in his front yard. The next caretakers were a family, who lived in the west bunkhouse. Their twelve children filled bags with the ore chunks that the mining company had left lying around the buildings and in the streets.

Around the same time, three prospectors worked up McCarthy Creek, hoping to make new finds at old mining claims. But they found no new lodes. Floods washed out their bridges and by the early 80s ate away at the roads.





These cabins at Blackburn, north of McCarthy near the glacier edge, are gone today. (Nancy Simmerman photo)



Dog teams sledged through a Kennecott mostly, but not entirely, empty of human residents. (Nancy Simmerman photo)



Loy Green and his brother Curtis began living up McCarthy Creek in 1967.

## New changes

Around 1970, a series of national and statewide events initiated another direction of change in McCarthy-Kennecott's history. 1970 marked the first Earth Day and the beginning of a new national awareness of the natural environment. Many young Americans sought to go back to the land and the wilderness. In Alaska, oil was discovered at Prudhoe Bay, prompting a flurry of attention to northern resources. What had seemed an unbounded wildland extending into the Arctic was to be bisected by roads. Across the country and in the state, many came to the conclusion that preservation of Alaska wilderness they cared about could no longer be taken for granted. As a result, when settling the Alaska Native peoples' land claims in 1971, Congress also committed itself to consider designation of remaining public lands in Alaska as national parks, national forests, wildlife refuges, and protected wild and scenic rivers.

These external events combined to change the McCarthy area, much as Wall Street and the global metals market had been an influence during the mining days. At first, change was slow. Government and university study teams arrived, looking not only for mineral resources, but at recreational backpacking and river-running opportunities. On summer days in the early 1970s, as many as seven

mineral exploration helicopters parked on the open Kennicott River flats. (They found no significant new deposits.)

A sprinkling of young people and families came to make their homes in the wilderness that included McCarthy. Alaska's oil pipeline construction in the mid 1970s brought a bit of a boom, as workers flush with cash came to the area in their off time, buying land, cutting house logs, able to afford building supplies. One brought in an entire truckload of expensive foam insulation lifted from a pipeline company site. Kennecott's empty buildings remained a convenient source of free hardware, windows, and other useful items.

For the first time since the '30s, the hammering and sawing of new construction echoed across the valley, creating new homes in addition to the remaining mining-era buildings, a small portion of which had been occupied and maintained during the previous decades. A few old homesteads were subdivided, and houses once again had market value. Consolidated Wrangell's owners platted a two thousand acre subdivision including the Kennecott townsite and surrounding slopes, opened an office for The Great Kennicott Land Company, and advertised lots for sale. After a dozen years of this growth, Thanksgiving dinner at a local home in the early '80s brought together three dozen local winter residents.

### Designation of the national park

Meanwhile, outside the valley, widespread public concern for preservation of Alaska's federal wildlands grew into a statewide and national movement. Following the schedule set out in its 1971 Native claims settlement, Congress started debating proposals for new land protection legislation. Alaska and national conservation and habitat protection groups pooled staff and resources to advocate for new parks, refuges and wilderness areas. President Jimmy Carter made the issue a personal priority.

Opposed were mining, logging and oil companies, along with Alaskans who didn't want their activities on the land restricted by government laws and regulations. Alaska's two senators and single congressman led the opposition, working with sympathetic colleagues from rural western states and other places dependent on resource development industries. They did what they could to defeat the legislation or, if that wasn't possible, to reduce its scope and add provisions helpful to their constituents.

Alaska's Native communities sought to assure continuation of the hunting and gathering which had been central to their cultures for generations.

The outcome was a complex compromise. In 1980, Congress passed the most sweeping land preservation measure since the days of Teddy Roosevelt. The new law put over a hundred million acres of federal land, more than a quarter of the state, into an array of conservation areas in Alaska. Public lands in the Wrangells became part of a new national park & preserve, dedicated to protection of its ecosystems and wildlands and closed to staking of mining claims. At the same time, the 449-page document included a host of provisions making exceptions to usual park laws and regulations and providing for continuation of traditional use of the land by local rural residents, including the people of McCarthy.

McCarthy-Kennecott then found itself at the center of a park six times the size of Yellowstone. But during the first years, not much changed for most residents. A small National Park Service staff, headquartered a hundred miles away in Copper Center, seldom ventured in for more than a brief visit.

### **The Alaska National Interest Lands Conservation Act of 1980:**

- created ten new park units, including Wrangell-St. Elias, and added to three existing ones, adding 44 million acres to and more than doubling the size of the U.S. national park system; created ten new wildlife refuges and expanded others, adding 55 million acres to and more than doubling the size of the U.S. national wildlife refuge system; designated 56 million acres of Alaska's federal parkland, refuges and national forests to be managed as wilderness areas.
- specified that "customary and traditional" subsistence hunting and gathering by local rural people could continue, including surface access for these purposes by snowmobile and motorboat, and gave priority to subsistence over sport uses.
- directed that sport hunting and trapping would be allowed in preserves managed by the National Park Service, but not in national parks. (The only difference between a national park and a preserve in Alaska concerns hunting and trapping.)
- authorized continued use of fixed-wing aircraft, snowmobiles, and motorboats for traditional activities, even in wilderness areas. Airplanes can be used for subsistence activities by local rural residents in the national preserve, but not in the national park.
- guaranteed reasonable and feasible access to private lands.
- specified that the parks, refuges and other conservation areas include only the federally-owned lands within their boundaries. Private lands are not regulated by the federal agencies under the act.

### **Wrangell-St. Elias National Park and Preserve:**

- The Wrangells are in the largest unit of the U.S. national park system, including more than 8 million acres of park and more than 4 million acres of preserve, of which 9.6 million acres are designated wilderness. By comparison, Yellowstone National Park is 2.2 million acres. The large size of Alaska's conservation areas, including the Wrangells, is intended to protect entire animal and plant communities better than can be done in the lower states, where habitat is already fragmented by roads, cities, farms and ranches. It also enables people to experience natural wildness on a scale no longer available elsewhere.
- Congress directed that the purpose of the park and preserve is "... to maintain unimpaired the scenic beauty and quality of high mountain peaks, foothills, glacial systems, lakes and streams, valleys, and coastal landscapes in their natural state; to protect habitat for, and populations of, fish and wildlife, including but not limited to caribou, brown/grizzly bears, Dall sheep, moose, wolves, trumpeter swans and other waterfowl, and marine mammals; and to provide continued opportunities including reasonable access for mountain climbing, mountaineering and other wilderness recreational activities. Subsistence uses by local residents shall be permitted in the park, where such uses are traditional ..."
- State-wide provisions for continued residence, access and subsistence use in federal conservation areas apply in this park unit. More than a million acres within the boundaries are non-federal land, most owned by Native corporations and the rest by the State of Alaska, its university, and numerous individuals, including mining claims scattered through the backcountry as well as property concentrated near settlements like McCarthy.
- Together with the adjacent Kluane National Park in the Yukon, Tatshenshini-Alsek Park in British Columbia and Glacier Bay National Park and Preserve in Southeast Alaska, Wrangell-St. Elias is part of a 24 million acre World Heritage Site, the world's largest international protected area. While giving recognition to the area's global significance, World Heritage Site designation does not affect the management authority of the U.S. government.

## A new economy and a growing community

### Tourism

In those first park years, so few tourists came to the area that the owners of the McCarthy Lodge left on vacation themselves for the 4th of July in 1983, at the height of the summer season. Cups labeled with the names of the local regulars hung from hooks in the café, and their user's drinking and eating comprised much of the lodge's business.

But by the early '90s, word had gotten out to those in the know: McCarthy, Kennecott and Wrangell-St. Elias National Park were discovered on a modest scale. Encouraging and providing for new visitors, local McCarthy businesses opened shuttle van service on the east side of the river. Air taxis expanded to fly sightseers over and land hikers in the backcountry. Landowners converted houses into bed & breakfasts and built cabins for visitors. Lodges were renovated and new ones opened.

Today, the McCarthy-Kennecott area has become the primary visitor destination in our largest national park. Because most who come to Alaska want to see Denali and cannot come to the Wrangells on the same short vacation, McCarthy-Kennecott remains off the beaten path. The area attracts mostly independent travelers, who seek something special. Many of its businesses are locally owned, and managed by their owners with an emphasis on the quality of the visitor's experience.

As a result, visitor numbers are lower than places like Denali, which are reached by tour bus and train and where most people are hosted by large tourism companies. Alaska Department of Transportation consultants have estimated that about 18,000 visitors came to the McCarthy-Kennecott area in 2000, which they predict to increase to 44,000 by 2025 in their middle, "modest growth" scenario. In this scenario, they forecast an increase in the total number of

seasonal and year-round residents, including employees of local businesses, from 138 in 2000 to 206 in 2025. These figures assume gradual improvement of the road to McCarthy and its possible paving. For comparison, 543,000 people visited Denali National Park in 1995, most of whom entered the park at its gateway along the highway between Anchorage and Fairbanks.

During the mining days, activity in McCarthy-Kennecott had gone up and down with world copper markets. Now, visitation is related to global economic conditions and travel trends, as well as publicity the area receives, promotion by local businesses, and other factors. For example, when National Geographic Magazine printed a Wrangells article in 1994, it rose. When 9/11 raised travel fears, it dropped for awhile.

### A diverse local economy

Businesses serving visitors are one part of what has become a more complex local scene. The National Park Service seasonally employs several dozen people, most of whom work on the crew maintaining its buildings at Kennecott, and most of whom are hired as local residents. There is what McCarthy resident Ed LaChapelle calls the "hidden economy," revealed in the purchase of land and construction of cabins by people supported by income derived from elsewhere: investments, pensions, social security, government payments, book royalties, private contract work (often based on telecommuting), scientific research projects, craft products sold to distant markets, real estate transactions and transfers from family members outside the community. And, as in the past, some people work outside the valley part of the year, living on savings when they return part-time to the place they call home. For some, their cabin in the area is a place for a seasonal vacation.

### A community expands on private land

The mining-era townsite gives McCarthy a real downtown, though most residences are scattered widely across the miles of forest and former homesteads on private lands west of the Kennicott River

and south of McCarthy Creek. Owners have restored or remodeled a number of the old McCarthy buildings, several of which are on the national list of historically significant structures (the National Historic Register). A new church has been built nearby and several mining-era structures have been converted for educational and community uses.

Private land continues to be available for purchase and development. In addition, the State of Alaska Department of Natural Resources and the University of Alaska have subdivided land they own near McCarthy, selling lots to individuals. Although located within the park's external boundaries, non-federal lands are not considered part of the park, and activities within them are not regulated by the National Park Service. Residents and land owners appreciate sensitivity to their needs and respect for private property rights in the McCarthy-Kennecott area.

### Governance

McCarthy has no city or county government and thus no mayor or city council, local police, municipal land use planning or zoning, building codes, construction permits, or (except for telephone service) public utilities. Trash must be carried out to dump sites more than a hundred miles away. Residents and businesses provide their own water, power, and sewage systems. They take personal responsibility for their safety and for keeping warm through the winter. The National Park Service has authority only on federal lands.

Without government, public functions in unincorporated Alaska towns are often carried out by non-profit organizations, which debate and take positions on local issues, receive government grants for community projects, and assume tasks such as maintaining public outhouses.

Today, residents and businesses bring almost all of their supplies in from Anchorage, trucked over the road or flown to the state-owned and maintained airstrip. Supported by the U.S. postal service, mail comes twice a week by plane from Glennallen, which also carries

passengers and connects to a flight to Anchorage. Mail arrival at the airstrip is the main community gathering occasion. Telephone service is entirely wireless, based from two cell sites and a satellite dish near McCarthy owned by Copper Valley Telephone and AT&T. Valdez public radio KCHU broadcasts from a McCarthy repeater at 89.7 FM.

### Roads, trams and bridges

After the railroad closed in 1938 and bridges over the Copper, Lakina and Kennicott Rivers washed out, overland access to McCarthy-Kennecott became difficult. For those area residents who remained, "speeders" mounted on the rails moved along usable sections of track and air service from Cordova scheduled flights. In what was perhaps the slowest journey, long-time resident Jim Edwards recounts taking a month to travel from Chitina, bringing supplies to McCarthy for his family by bulldozer and sled.

Gradually, access became easier. Ownership of the railroad route passed to the State of Alaska at the time of statehood in 1959,

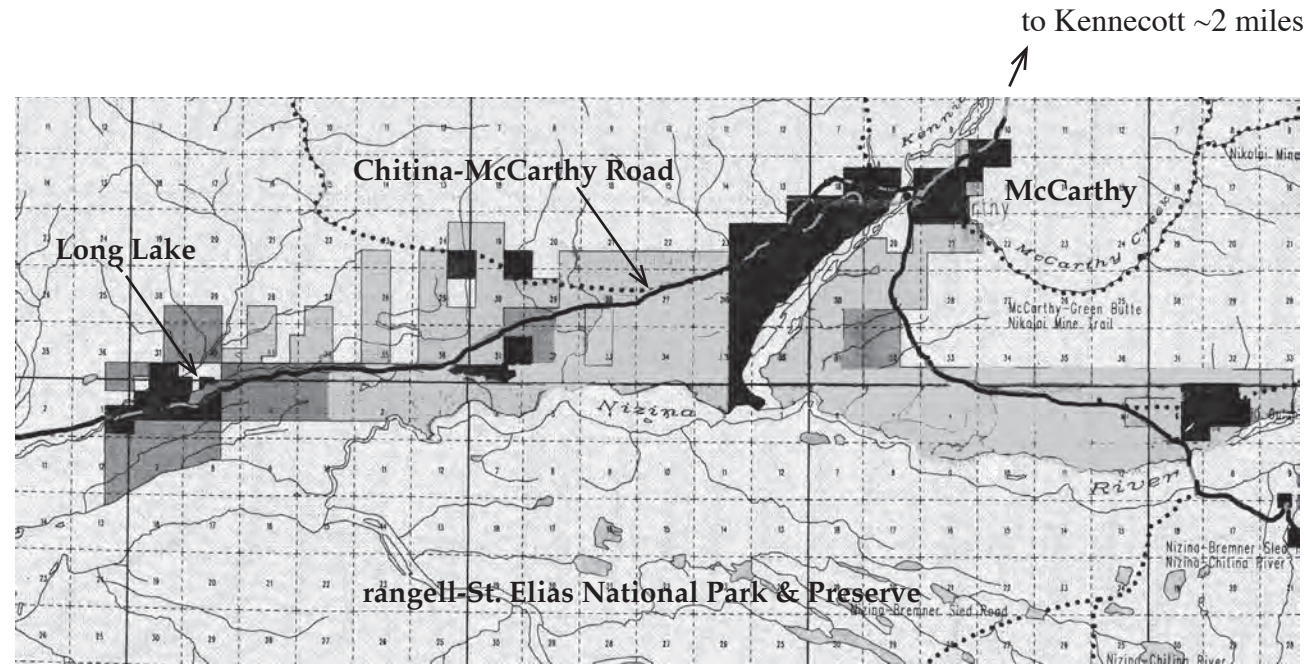


Glacial outbreak flood washing out the railroad bridge across the Kennicott River, which had to be rebuilt frequently. (Candy Waugaman Collection, Fairbanks)

## Land Ownership

Almost all of the town of McCarthy and much nearby land are private property. Several hundred acres are in private ownership in and around Kennecott. Mining claims up McCarthy Creek and scattered elsewhere through the backcountry are also private property.

The University of Alaska has land, most located south of McCarthy along the roads to Chitina and to the Nizina River. These lands are managed to generate income for the university, which has subdivided and is selling property



U.S. government lands are open to the public under National Park Service regulations. Near McCarthy, federal lands are designated National Preserve, open to the public, including local subsistence uses and sport hunting. Though within the exterior boundaries of the park, non-federal property in the McCarthy-Kennecott area is not park land and is not managed or regulated by the National park Service. Access to non-federal land is by permission of the landowner. Alaska's Native-owned corporations do not have property in the immediate McCarthy area. Chitina Village and the Ahtna, Inc., the Native regional corporation, own land in the lower Chitina Valley, including holdings along the McCarthy Road.

non-federal holdings is public land managed by the U.S. National Park Service.

and, unlike most highways in national parks, it remains in state ownership today. First, the rails were removed to make a roadbed. (Some ended up on the bottom of Valdez harbor, dumped by the great 1964 earthquake, when the dock on which they were awaiting shipment as scrap was hit by a tidal wave). 1971, the state completed a highway bridge over the Copper River at Chitina. During the 1973 construction season, its crews opened the railroad grade between Chitina and McCarthy to vehicles. Over the following years, the Alaska Department of Transportation smoothed out its surface, pothole by pothole. What in 1980 had been a two-day drive from Anchorage, including six hours to cover the sixty miles between Chitina and the Kennicott River, became a one day journey a decade later, rough but passable by passenger car.

When the state built wooden bridges across the Kennicott River late in 1973, the town of McCarthy was briefly opened to traffic from the outside. The next annual Hidden Lake glacier outbreak flood knocked out pilings. No longer able to carry vehicles, the structures became what turned out to be the first set of footbridges. (Remnants

of those log pilings can still be seen in the bed of the now-dry east channel.)

Subsequent annual floods took out these bridges entirely, leaving the community with no safe way to cross the river. In 1983-84, residents built a new river crossing system, consisting of hand-pulled tram carts slung from cables. The project was paid for by a state grant to a local organization called "Kennicott Cross Purposes," which was disbanded after construction. The cable trams became a symbol of McCarthy, serving until tourism increased in the 90s. Then during summer holidays, waiting lines of visitors backed up behind locals freighting lumber and groceries over the river. And with all this use, the maintenance of carts, cables and pull ropes became more than local volunteers could handle.

A local landowners association asked the state government to build footbridges to replace the trams. In response, the state department of transportation held public hearings and solicited written comments, deciding in favor of a footbridge alternative and



Kennicott River tram in 1945. (Photo from Historic Collection, Wrangell-St. Elias National Park and Preserve)



Tram that was in use 1983-1997. (Kelly Bay photo.)



The footbridge was built in 1997.

proceeding with construction, which was completed in 1997. In addition, a private service bridge opened in 2004.

Meanwhile, maintenance crews have continued to work on the road between Chitina and the Kennicott River. The Alaska Department of Transportation plan includes a project to rebuild the road at an cost estimated at about \$60 million, paid for primarily by the state's allocation of federal highway funds. By the state government's schedule, the beginning of that construction is some years away. The agency is now evaluating alternatives and making plans. A joint National Park Service-Alaska Department of Transportation study recommended a forty mile per hour, twenty-four foot wide highway including scenic wayside pullouts and special attention to roadside clearing and landscaping. While National Park Service is officially cooperating in the environmental review, upgrade of the road is a state project.

## The Park Service at Kennecott

### The park acquires most Kennecott buildings and land

Until acquired by the National Park Service in 1998, all of the mill town of Kennecott, the mines above, and much surrounding land were private property. Under the U.S. mining laws, three thousand acres had passed from public to private ownership when copper was discovered and developed. With the ore mined out, the empty big buildings were a liability hazard and maintenance headache for their owners. At the same time, they were a part of Alaska's history, increasingly recognized for their architecture and mining technology, and attractive to visitors. In 1986, the Kennecott area was designated as a National Historic Landmark.

By then, The Great Kennecott Land Company had sold most of Kennecott's smaller buildings to individuals, along with about two hundred acres of undeveloped lots scattered on the mountainside. Some of the historic houses were being restored by their new owners,

but the mill building and the rest of the industrial core were rotting away.

In response, a group of local residents and other Alaskans organized Friends of Kennicott in 1990 to advocate for protection of the site. As their first project, they convinced Congress and the state legislature to appropriate funds for emergency stabilization of the most critical structures. With that half million dollars, Friends of Kennicott construction crews put roofs back on the mill building and the company store, replaced beams, and worked on several other structures.

The Friends organization went on to support federal acquisition of the site and its inclusion in Wrangell-St. Elias National Park and Preserve. Given legal and land ownership complexities, liability concerns about hazardous materials, and the anticipated expense of maintaining the massive, deteriorating buildings, this was a difficult task.

It succeeded through the united efforts of an unusual coalition: The current owners wanted to sell, to rid themselves of liability exposure and make at least some profit. Alaska miners cared about the place as central to their history. Historians saw that the mill town told an important story about the development of the North and represented a significant phase of industrial technology. Environmental groups sought to protect the glacier-edge and mountainside trails of the National Historic Landmark, which had become the most-visited natural area of the park and were subject to change by additional sales of subdivision lots. Local residents considered the old industrial site their home, preservation of its character personally important, and its continued attractiveness to park visitors essential to the success of their businesses. Although worried about the maintenance costs of keeping Kennecott standing, the Park Service leadership concluded they had to take responsibility for what had become the main visitor destination in the largest national park in the country. Many of the acquisition's supporters fit into more than one of these categories.



Some opposed the acquisition, anticipating that an expensive restoration effort would drain resources away from other areas and programs in the national park. Others were sad to see the regulation and closure of the historic buildings, places they had explored freely for years, and the increase in federal bureaucratic presence. (The buildings at Kennecott are now locked closed to ensure public safety, entered only on guided tours or by park staff and maintenance crews.) Still others felt the restoration would be an unnatural reversal of a natural deterioration process. Local resident Dianne Milliard remembers, “We were thinking, if we didn’t get the buildings fixed, they were going to fall down. On the other hand, if we did get them fixed, we knew we were going to be ‘riding the tiger’.”

In a complex deal, ownership of most of the National Historic Landmark passed to the Park Service in 1998. Alaska Senator Ted Stevens arranged for a congressional appropriation to buy out the Great Kennicott Land Company’s and Consolidated Wrangell Mining’s holdings for over \$3 million. Kennecott Copper Corporation donated the subsurface and agreed to clean up hazardous materials.

Friends of Kennicott proposed that the Park Service manage the site in partnership with local organizations, which would have a role in stabilizing and rehabilitating buildings and operating educational,



Stabilizing the machine shop (NPS photo)

arts and science programs for the public in some of them. Along with its appropriation of money, Congress endorsed this idea.

Park acquisition didn’t include subdivision lots and buildings already sold by the Land Company. While the Park Service has since purchased some of this property from owners who desired to sell, private land, residences and businesses are expected to be part of Kennecott’s future. Within the Kennecott townsite, deeds to lots include architectural covenants put in place at the time of the original subdivision. Development of other private land in the area is not subject to regulation.

### The Park Service at Kennecott today

Today, the National Park Service is active at Kennecott. Its maintenance crew is replacing roofs, shoring up foundations, and doing what it can to arrest deterioration of the historic site. Park interpretive rangers meet visitors. Through an arrangement with the Park Service, a local guide service offers tours through Kennecott’s publicly owned industrial buildings.

The park’s interim plan for Kennecott identifies public buildings south of National Creek as potentially available for restoration and use, while the industrial complex around the mill building north of the creek is being stabilized to prevent deterioration. Following through with the partnership concept endorsed by congress, the Park Service and the Friends of Kennecott group worked together to restore the Kennecott recreation hall. Federal funds paid for fixing the structure, while private donations and a grant from the Rasmuson Foundation to Friends funded finishing the interior. Equipped to serve as a theater, gym, and meeting room, the rec hall is once again an active center, for use by both the park and the community.

Historic sites offer unique opportunities to appreciate and study the past. Using artifacts in their historic locations, archeologists and historians can piece together events of the past, helping us better understand our heritage. Visitors can explore these historic treasures without altering them, leaving all objects in place.

### The National Park Service's Management Concept for Kennecott

*The approach taken would reflect the 1997 Park Service report supporting federal ownership of the NHL, "Kennecott Acquisition Past, Present and Future". That report stated (page 25):*

*"What is (to be) maintained is the sense of ..., a site abandoned but still haunted by past residents, a place that has not been... sanitized. It is a place of discovery for the visitor, but one where investigation and inquiry can be done safely and with respect for the remaining historic objects and structures." ...*

*Most interested parties within the community envision a future in which Kennecott:*

- *is stabilized to prevent deterioration of historic structures or artifacts and to make them available to the public.*
- *is managed with a "light touch" in which projects are undertaken in small steps, at modest costs, with minimal intervention process.*
- *is not just an abandoned mining town, but also is a place that reflects the vitality, creativity, and community spirit of today's residents.*
- *retains the slow pace, quiet, and spaciousness that foster contemplation and individual reflection.*
- *is part of a larger community in which residents act both individually and collectively to guide the future of the area.*
- *contributes to a strong, reasonably diverse economy that includes locally owned and operated businesses, community-based nonprofits, and traditions of barter and subsistence.*
- *protects and honors small-town values: safety, cooperation, self-sufficiency, and personal freedom.*
- *Is a place where tourism is allowed to evolve within the capacity of the community, rather than a place where external intervention and control accelerate growth.*
- *Is seen by local residents and visitors alike in its true context: a remote outpost of civilization in the midst of an enormous mountain wilderness.*
- *Is managed to protect the cultural and natural resources of this historic mining district and the surrounding glacial landscape; and provides a safe, educational, and rewarding experience for the area's visitors and residents.*

*The NPS supports the goals that the community and Friends of Kennicott have articulated above.*

—From the "Interim Operations Plan-Kennecott National Historic Landmark," National Park Service, 2000, with goals quoted by NPS from "Kennecott National Historic Landmark Partnership Management Strategy, by Michael G. Loso.



NPS photo

## McCarthy-Kennecott: Entryway to the Wild Wrangells

Given its location at the center of one of the world's most spectacular mountain landscapes, McCarthy-Kennecott is a hub for access into the wilderness. Glaciers, rivers, forests, alpine meadows and mountain peaks are within a day's walk. Many hike the trail north from Kennecott along the glacier edge, an easy stroll into one of the most spectacular mountain wildlands in the world. A couple of miles north of Kennecott, a side route drops down from this trail to the white ice of the Root Glacier, where people venture with crampons and ice axes. Other trails from Kennecott lead up Bonanza Mountain into alpine meadows with views out over the glaciers and peaks and to the mine entrances (now closed) more than three thousand feet above the mill. Routes from downtown McCarthy lead

to the glacier terminus, where rocks tumbling from melting ice cliffs splash into pools, and alongside the sources of the Kennicott River. Going beyond these relatively easy walks, for those with the skill to traverse untrailed boulderfields, ice, steep slopes and brush, it's possible backpack for weeks, starting from downtown.

But most of the Wrangells can't be reached on foot. Air taxis drop hikers, campers and (in the national preserve) hunters at remote landing strips that access country that is isolated from roads and towns by ridges and unfordable streams. Rafters set out on the Kennicott River at McCarthy, floating the Nizina, then the Chitina and the Copper Rivers as far as the Gulf of Alaska coast near Cordova, more than a week's journey.



Backcountry camp (Wrangell Mountains Center photo)



Rafting on the Chitina River (Gaia Thurston-Shaine photo)



Climbing on Mount Blackburn (Mike Loso photo)



Air taxi at a backcountry airstrip (Kelly Bay photo)



Crossing a stream on glacier ice (Mike Loso photo)

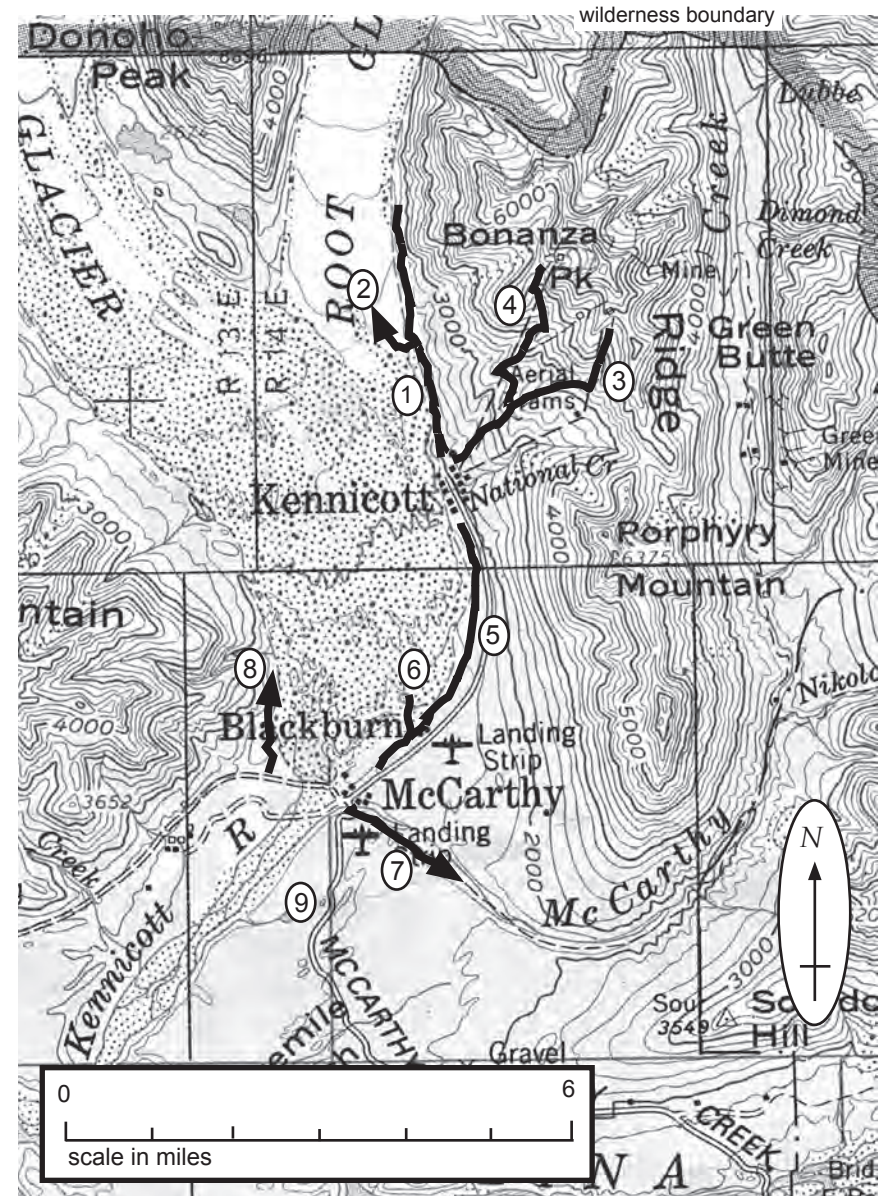


Camping in an alpine meadow (Jonathon Schuhrke photo)

## Hikes in the McCarthy and Kennecott Area

For further information about these walks, see Kristin Malone's *A Guide to Exploring the Kennecott Basin*, published by the Wrangell Mountains Center.

1. Glacier Trail: Beginning at the north end of downtown Kennecott, this trail traverses mostly Little Ice Age moraines near the glacier edge with spectacular views, ending below where the Erie Mine building is perched on the mountainside.
2. Root Glacier: A side spur of the Glacier Trail drops down to a spot where it is relatively easy to get onto the ice. Walking on the glacier requires skills and equipment. Guides in Kennecott and McCarthy offer trips.
3. Bonanza Trail: A wide trail gains more than 3500' elevation to the ridge above Bonanza Mine, with great views overlooking the glacier and valley beginning at a nob just above brushline, 2000' above Kennecott.
4. Jumbo Trail: Branching from the Bonanza Trail, a trail extends to the remnants of Jumbo Mine in an upper bowl of the mountain. The upper section traverses rock glacier. Lower parts are overgrown with brush, but passable on foot with some effort.
5. Lower wagon road from Blackburn to Kennecott: This route winds through forest below the main road to Kennecott. Watch out for bears and mosquitos.
6. To the glacier edge near McCarthy: A spur from the wagon road heads out across the area where the glacier has receded since 1860 to a good place to watch rocks fall off the melting ice on warm summer days. Off-trail wandering is possible on this open ground.
7. McCarthy Creek: Beginning on the south bank near town, the route up the creek is washed out in places; no bridges above McCarthy; fine views north in the first mile. It traverses private property the first several miles, so stay on the trail or along the creek on the rocky floodplain.
8. West Glacier Trail: Beginning at the Park Service kiosk, this trail detours around private property to ice-edge terrain that is changing rapidly as the glacier melts.
9. Nizina Road: Bicyclers can ride to the Nizina River. The Nizina Bridge is washed out and the river is unfordable.



**Appendix: Species Lists**

(Lists courtesy of National Park Service)

**Alpine Flowers**

*Apiaceae* (Parsley Family)  
*Achillea borealis* / Cow Parsnip  
*Asteraceae* (Sunflower Family)  
*Antennaria monocephala* / Single-headed Pussytoes  
*Arnica alpina* / Alpine Arnica  
*Arnica frigida* / Arnica  
*Artemisia arctica* / Arctic Wormwood  
*Crepis nana* / Dwarf Hawk's Beard  
*Petasites hyperboreus* / Sweet Coltsfoot  
*Solidago multiradiata* / Northern Goldenrod  
*Betulaceae* (Birch Family)  
*Betula nana* / Dwarf Birch  
*Boraginaceae* (Borage Family)  
*Myosotis alpestris* / Alpine Forget-me-not  
*Caryophyllaceae* (Pink Family)  
*Silene acaulis* / Moss Campion  
*Ericaceae* (Heath Family)  
*Arctostaphylos alpina* / Alpine Bearberry  
*Cassiope stelleriana* / Alaska Moss Heather  
*Cassiope tetragona* / Mountain Heather  
*Fabaceae* (Pea Family)  
*Astragalus alpinus* / Alpine Milk Vetch  
*Gentianaceae* (Gentian Family)  
*Gentiana glauca* / Glaucous Gentian  
*Gentiana propinqua* / Arctic Gentian  
*Geraniaceae* (Geranium Family)  
*Geranium erianthum* / Northern Cranesbill  
*Liliaceae* (Lily Family)  
*Veratrum viride* / False Hellebore  
*Papaveraceae* (Poppy Family)  
*Papaver alaskanum* / Alaska Poppy  
*Papaver Macounii* / Poppy

*Ranunculaceae* (Crowfoot Family)  
*Ranunculus pygmaeus* / Dwarf Buttercup  
*Rosaceae* (Rose Family)  
*Dryas octopetala* / Dryas  
*Potentilla hookeriana* / Hooker's Potentilla  
*Saxifragaceae* (Saxifrage Family)  
*Parnassia palustris* / Northern Grass-of-Parnassus  
*Saxifraga bronchialis* / Spotted Saxifrage  
*Saxifraga flagellaris* / Spider Plant  
*Saxifraga hieracifolia* / Stiff-stem Saxifrage  
*Saxifraga oppositifolia* / Purple Mt. Saxifrage  
*Scrophulariaceae* (Figwort Family)  
*Aquilegia formosa* / Columbine  
*Castilleja hyperborea* / N. Indian Paintbrush  
*Casilleja unalaschcensis* / Unalaska Indian Paintbrush  
*Pedicularis capitata* / Capitata Lousewort

**Forest and Lowland Plants**

*Asteraceae* (Sunflower Family)  
*Achillea borealis* / Common Yarrow  
*Aster sibiricus* / Siberian Aster  
*Solidago multiradiata* / Northern Goldenrod  
*Betulaceae* (Birch Family)  
*Alnus crispa* / Green Alder  
*Betula papyrifera* / Paper Birch  
*Boraginaceae* (Borage Family)  
*Mertensia paniculata* / Chiming Bells  
*Caprifoliaceae* (Honeysuckle Family)  
*Linnaea borealis* / Twinflower  
*Viburnum edule* / High Bush Cranberry  
*Caryophyllaceae* (Pink Family)  
*Stellaria borealis ssp. Borealis* / Chickweed  
*Cornaceae* (Dogwood Family)  
*Cornus canadensis* / Bunchberry  
*Elaeagnaceae* (Oleaster Family)

*Elaeagnus commutata* / Silverberry  
*Shepherdia canadensis* / Soapberry  
 Empetraceae (Crowberry Family)  
*Empetrum nigrum* / Crowberry  
 Ericaceae (Heath Family)  
*Arctostaphylos rubra* / Bearberry  
*Arctostaphylos uva-ursi* / Knik Knik  
*Ledum palustre* / Labrador tea  
*Vaccinium uliginosum* / Blueberry  
*Vaccinium vitis-idaea* / Lowbush Cranberry  
 Fabaceae (Pea Family)  
*Hedysarum alpinum* / Eskimo Potato  
*Lupinus arcticus* / Arctic Lupine  
*Oxytropis campestris* / Northern Yellow Peavine  
 Nymphaeaceae (Water Lily Family)  
*Nuphar polysepalum* / Dwarf Water Lily  
 Onagraceae (Evening Primrose Family)  
*Epilobium angustifolium* / Fireweed  
*Epilobium latifolium* / River Beauty  
 Orchidaceae (Orchid Family)  
*Corallorrhiza trifida* / Northern Coral Root  
*Cypripedium passerinum* / Lady's Slipper  
*Platanthera hyperborea* / Northern Bog Orchid  
 Polemoniaceae (Polemonium Family)  
*Polemonium acutiflorum* / Acutish Jacob's Ladder  
*Polemonium boreale* / Boreal Jacob's Ladder  
*Polemonium pulcherrimum* / Beautiful Jacob's Ladder  
 Primulaceae (Primrose Family)  
*Trientalis europaea* / Starflower  
 Pyrolaceae (Wintergreen Family)  
*Pyrola asarifolia* / Liverleaf Wintergreen  
*Pyrola grandiflora* / Large-flower Wintergreen  
*Pyrola secunda* / One-sided Wintergreen  
 Ranunculaceae (Crowfoot Family)  
*Aconitum delphinifolium* / Northern Monkshood

*Anemone narcissifolia* / Anemone  
*Anemone parviflora* / Northern Anemone  
*Anemone richardsonii* / Yellow Anemone  
 Rosaceae (Rose Family)  
*Dryas Drummondii* / Yellow Dryas  
*Potentilla fruticosa* / Shrubby Cinquefoil  
*Potentilla nivea* / Snow Cinquefoil  
*Rosa acicularis* / Prickly Rose  
*Rubus arcticus* / Nagoonberry  
*Rubus idaeus* / Raspberry  
*Sorbus scopulina* / Mountain Ash  
 Salicaceae (Willow Family)  
*Salix* sp. / Willow  
*Populus balsamifera* / Balsam Poplar  
*Populus tremuloides* / Quaking Aspen  
 Santalaceae (Sandalwood Family)  
*Geocaulon lividum* / Northern Comandra  
 Saxifragaceae (Saxifrage Family)  
*Saxifraga tricuspidata* / Three-toothed Saxifrage

## Mammals

### Carnivora (Carnivores)

Ursidae—Bears  
*Ursus americanus* / Black bear  
*Ursus arctos* / Brown (Grizzly) Bear  
 Canidae—Wolves, Dogs, and Foxes  
*Canis lupus* / Gray Wolf  
*Canis latrans* / Coyote  
*Vulpes vulpes* / Red Fox  
 Felidae—Cats  
*Lynx canadensis* / Canada Lynx  
 Mustelidae—Weasels  
*Mustela vison* / Ermine  
*Martes americana* / American marten  
*Mustela vison* / American Mink

*Gulo gulo* / Wolverine

**Artiodactyla (Even-toed Ungulates)**

*Cervidae*—Deer

*Alces alces* / Moose

*Bovidae*—Cattle, Sheep, and Goats

*Ovis dalli* / Dall's sheep

*Oreamnos americanus* / Mountain goat

**Lagomorpha—Lagomorphs**

*Leporidae*—Hares

*Lepus americanus* / Snowshoe Hare

*Ochotonidae*—Pikas

*Ochotona collaris* / Collared Pika

**Rodentia (Rodents)**

*Sciuridae*—Squirrels

*Glaucomys sabrinus* / Northern Flying Squirrel (probable)

*Marmota caligata* / Hoary marmot

Red Squirrel *Tamiasciurus hudsonicus*

Arctic Ground Squirrel *Spermophilus parryii*

*Castoridae*—Beavers

*Castor canadensis* / American Beaver

*Muridae*—Mice, Rats, and Voles

*Peromyscus maniculatus* / Deer Mouse

*Neotoma cinerea* / Bushy-tailed Woodrat

*Clethrionomys rutilus* / Northern Red-backed Vole

*Microtus longicaudus* / Long-tailed Vole

*Microtus miurus* / Singing Vole

*Microtus oeconomus* / Tundra Vole

*Microtus pennsylvanicus* / Meadow Vole

*Microtus xanthognathus* / Taiga Vole (probable)

*Ondatra zibethicus* / Common Muskrat

*Lemmus trimucronatus* / Brown Lemming

*Synaptomys borealis* / Northern Bog Lemming

*Zapodidae*—Jumping Mice

*Zapus hudsonicus* / Northern Bog Lemming

*Erithizontidae*—New World Porcupines

*Erithizon dorsatum* / Common Porcupine

**Insectivora (Insectivores)**

*Soricidae*—Shrews

*Sorex cinereus* / Masked Shrew

*Sorex monticolus* / Dusky Shrew

*Sorex hoyi* / Pygmy Shrew

*Sorex palustris* / Water Shrew

*Sorex tundrensis* / Tundra Shrew

*Sorex yukonicus* / Tiny Shrew

**Chiroptera (Bats)**

*Vespertilionidae*—Vespertilionid Bats

*Myotis lucifugus* / Little Brown Bat

**Fish**

Sockeye (Red) Salmon

*Onchorhynchus nerka*

Coho (Silver) Salmon

*Onchorhynchus kisutch*

Rainbow Trout

*Onchorhynchus mykiss*

Lake Trout

*Salvelinus namaykush*

Dolly Varden

*Salvelinus malma*

Arctic Grayling

*Thymallus arcticus*

Longnose Sucker

*Catostomus catostomus*

Burbot

*Lota lota*

Slimy Sculpin

*Cottus cognatus*



**Birds**

Key to symbols:

\* Positive identification made in the park/  
preserve

C common

U uncommon

R rare

+ casual or accidental vagrants

Parenthesized numbers represent season:

1=Spring, 2=Summer, 3=Fall, 4=Winter

Say's Phoebe \*U(1,2,3)  
Alder Flycatcher \*C(1,2,3)  
Hammond's Flycatcher \*U(1,2,3)  
Western Wood Pewee \*U(1,2,3)  
Olive-sided Flycatcher \*U(1,2,3)  
Horned Lark \*C(1,2,3)  
Violet-green Swallow \*C(1,2,3)  
Tree Swallow \*C(1,2,3)  
Bank Swallow \*C(1,2,3)  
Cliff Swallow \*C(1,2,3)  
Barn Swallow \*R(1,2,3)  
Gray Jay \*C(1,2,3,4)  
Stellar's Jay +(3)  
Common Raven \*C(1,2,3,4)  
Black-billed Magpie \*C(1,2,3,4)  
Black-capped Chickadee \*C(1,2,3,4)  
Siberian Tit +(1,2,3,4)  
Boreal Chickadee \*C(1,2,3,4)  
Red-breasted Nuthatch \*+(1,2,3,4)  
Brown Creeper R(1,2,3,4)

American Dipper \*U(1,2,3,4)  
American Robin \*C(1,2,3)  
Varied Thrush \*C(1,2,3)  
Townsend's Solitaire \*U(1,2,3)  
Hermit Thrush \*U(1,2,3)  
Swainson's Thrush \*C(1,2,3)  
Gray-checked Thrush \*C(1,2,3)  
Mountain Bluebird \*R(1,2,3)  
Northern Wheatear \*U(1,2,3)  
Golden-crowned Kinglet R(2,3)  
Ruby-crowned Kinglet \*C(1,2,3)  
Arctic Warbler \*R(1,2,3)  
American Pippit \*C(1,2,3)  
Bohemian Waxwing \*C(1,2,3)  
Northern Shrike \*U(1,2,3)  
European Starling R(1,2,3)  
Orange-crowned Warbler \*C(1,2,3)  
Yellow Warbler \*U(1,2,3)  
——Yellow-rumped Warbler \*C(1,2,3)  
Townsend Warbler \*R(1,2,3)  
Blackpoll Warbler \*U(1,2,3)  
Northern Waterthrush \*C(1,2,3)  
Wilson's Warbler \*C(1,2,3)  
Rusty Blackbird \*U(1,2,3)  
Red-winged Blackbird R(1,2,3)  
Brown-headed Cowbird +(1,2,3)  
Savannah Sparrow \*C(1,2,3)  
Dark-eyed Junco \*C(1,2,3)  
American Tree Sparrow \*C(1,2,3)  
Chipping Sparrow R(1,2,3)  
Brewer's Sparrow \*+(1,2)  
White-crowned Sparrow \*C(1,2,3)

Golden-crowned Sparrow \*U(1,2,3)  
Fox Sparrow \*C(1,2,3)  
Lincoln's Sparrow \*C(1,2,3)  
Song Sparrow R(1,2,3)  
Lapland Longspur \*C(1,2,3)  
Smith's Longspur \*R(1,2,3)  
Snow Bunting \*C(1,2,3)  
Pine Grosbeak \*U(1,2,3,4)  
Rosy Finch \*U(1,2,3)  
Common Redpoll \*C(1,2,3,4)  
Hoary Redpoll \*C(1,4)  
Pine Siskin \*U(1,2,3)  
White-winged Crossbill \*C(1,2,3,4)  
Brambling \*+(1,3,4)  
Common Loon \*C(1,2)  
Yellow-billed Loon +(1,3)  
Pacific Loon \*C(1,3)  
Red-throated Loon \*U(1,2,3)  
Red-necked Grebe \*C(1,2,3)  
Horned Grebe \*C(1,2,3)  
Fork-tailed Storm-petrel +(3)  
Double-crested Cormorant +(2)  
Tundra Swan \*C(1,3)  
Trumpeter Swan \*C(1,2,3)  
Canada Goose \*C(1,2,3)  
Brant +(1)  
Snow Goose \*C(1,3)  
Greater White-fronted Goose \*C(1,3)  
Mallard \*C(1,2,3)  
Gadwall R(1,2,3)  
Northern Pintail \*C(1,2,3)  
Green-winged Teal \*C(1,2,3)

Blue-winged Teal \*U(1,3)  
 Northern Shoveler \*C(1,2,3)  
 American Wigeon \*C(1,2,3)  
 Eurasian Wigeon \*R(1)  
 Canvasback \*U(1,2,3)  
 Ring-necked Duck \*U(1,2,3)  
 Greater Scaup \*C(1,2,3)  
 Lesser Scaup \*C(1,2,3)  
 Redhead \*U(1,3)  
 Common Goldeneye \*C(1,2,3)  
 Barrow's Goldeneye \*C(1,2,3)  
 Bufflehead \*C(1,2,3)  
 Harlequin Duck \*U(1,2,3)  
 Oldsquaw \*C(1,3)  
 Black Scoter R(1,2,3)  
 White-winged Scoter \*C(1,2,3)  
 Surf Scoter \*C(1,2,3)  
 Hooded Merganser R(1,2,3)  
 Red-breasted Merganser \*U(1,2,3,4)  
 Common Merganser \*R(1,2,3,4)  
 Bald Eagle \*C(1,2,3)  
 Northern Harrier \*U(1,2,3)  
 Sharp-shinned Hawk \*C(1,2,3)  
 Northern Goshawk \*U(1,2,3,4)  
 Red-tailed Hawk \*C(1,2,3,4)  
 Swainson's Hawk R(1,2,3)  
 Rough-legged Hawk \*C(1,3,4)  
 Golden Eagle \*C(1,2,3,4)  
 American Kestrel \*U(1,2,3)  
 Merlin \*U(1,2,3)  
 Peregrine Falcon \*R(1,2,3)  
 Gyrfalcon \*U(1,2,3,4)

Spruce Grouse \*C(1,2,3,4)  
 Ruffed Grouse R(1,2,3,4)  
 Willow Ptarmigan \*C(1,2,3,4)  
 Rock Ptarmigan \*C(1,2,3,4)  
 White-tailed Ptarmigan \*U(1,2,3,4)  
 Sharp-tailed Grouse \*C(1,2,3,4)  
 Sandhill Crane \*C(1,3)  
 American Coot R(1,2,3)  
 Semipalmated Plover \*C(1,2,3)  
 Killdeer \*R(1,2,3)  
 Lesser Golden Plover \*C(1,2,3)  
 Black-bellied Plover R(1,2,3)  
 Hudsonian Godwit R(1)  
 Whimbrel \*U(1,2,3)  
 Greater Yellowlegs \*U(1,2,3)  
 Lesser Yellowlegs \*C(1,2,3)  
 Solitary Sandpiper \*U(1,2,3)  
 Upland Sandpiper \*C(1,2,3)  
 Wandering Tattler \*U(1,2,3)  
 Long-billed Dowitcher \*C(1,3)  
 Red Phalarope +(1,2)  
 Red-necked Phalarope \*C(1,2,3)  
 Common Snipe \*C(1,2,3)  
 Surfbird \*U(1,2,3)  
 Ruddy Turnstone R(1)  
 Black Turnstone +(2,3)  
 Pectoral Sandpiper \*C(1,3)  
 Red Knot +(1)

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