

Glacier Bay

Glacier Bay National Park and Preserve
Alaska

National Park Service
U.S. Department of the Interior

Official Map and Guide



Icebergs grounded on an island remind you how recently the world of ice prevailed in Glacier Bay.
Tom Bean

Streams immediately below glaciers often exhibit this characteristic braided pattern.
Tom Bean

The Alsek River winds through the northwestern reaches of the Park and Preserve.
Kevin Appar

Pan ice shimmers on Johns Hopkins Inlet.
Bruce Paige

Arc-shaped stress patterns on McBride Glacier hint at a glacier's powers.
Jim Luthy

A mature spruce-hemlock forest carpets Bartlett Cove.
Greg Streveler

A peaceful shoreline at Bartlett Cove holds clues to the landscape's glacial origin.
Tom Bean

Cover: Sunset from the Beardslee Islands. Photo by Tom Bean.

Tidewater Glaciers

Enter Glacier Bay and you cruise along shorelines completely covered by ice just 200 years ago. Explorer Capt. George Vancouver found Icy Strait (see map) choked with ice in 1794, and Glacier Bay was a barely indented glacier. That glacier was more than 4,000 feet thick, up to 20 miles or more wide, and extended more than 100 miles to the St. Elias Range of mountains. But by 1879 naturalist John Muir found that the ice had retreated 48 miles up the bay. By 1916 the Grand Pacific Glacier headed Tarr Inlet 65 miles from Glacier Bay's mouth. Such rapid retreat is known nowhere else. Scientists have documented it, hoping to learn how glacial activity relates to climate changes.

Worldwide, the glacial facts are staggering. Glaciers and polar ice store more water than lakes and rivers, groundwater, and the atmosphere combined. Ten percent of our world is under ice today, equaling the percent being farmed. If the world's ice caps thawed completely, sea level would rise enough to inundate half the world's cities. The Greenland and Antarctic ice caps are 2 miles thick. Alaska is four percent ice.

Glaciers form because snowfall in the high mountains exceeds snowmelt. The snowflakes first change to granular snow—round ice grains—

but the accumulating weight soon presses it into solid ice. Eventually, gravity sets the ice mass flowing downslope at up to 7 feet per day. The park includes some 12 tidewater glaciers that calve into the bay. The show can be spectacular. As water undermines some ice fronts great blocks of ice up to 200 feet high break loose and crash into the water. Johns Hopkins Glacier calves such volumes of ice that it is seldom possible to approach its ice cliffs closer than about 2 miles. The glaciers seen here today are remnants of a general ice advance—the Little Ice Age—that began about 4,000 years ago. This advance in no way approached the extent of continental glaciation during Pleistocene time. The Little Ice Age reached its maximum extent here about 1750, when general melting began. Today's advance or retreat of a glacier snout reflects many factors: snowfall rate, topography, and climate trends. Glacial retreat continues today on the bay's east and southwest sides, but on its west side two glaciers are advancing.

The snowcapped Fairweather Range supplies ice to all glaciers on the peninsula separating Glacier Bay from the Gulf of Alaska. Mount Fairweather, the range's highest peak, stands at 15,320 feet. Near Johns Hopkins Inlet, several peaks rise from sea level to 6,520 feet within just 4

miles of shore. The great glaciers of the past carved these fjords, or drowned valleys, out of the mountains like great troughs. Landslides help widen the troughs as the glaciers remove the bedrock support on upper slopes.

Huge icebergs may last a week or more, and they provide perches for bald eagles, cormorants, and gulls. Close by, kayakers have heard the stress and strain of melting: water drips, air bubbles pop, and cracks develop. Colors betray a berg's nature or origin. White bergs hold many trapped air bubbles. Blue bergs are dense. Greenish-blackish bergs may have calved off glacier bottoms. Dark-striped brown bergs carry moraine rubble from the joining of tributary glaciers or other sources. How high a berg floats depends on its size, the ice's density, and the water's density. Bergs may be weighed down, submerged even, by rock and rubble. A modest-looking berg may suddenly loom enormous—and endanger small craft—when it rolls over. Keep in mind that what you see is "just the tip of the iceberg."

Biosphere Reserve and World Heritage Site

Glacier Bay National Park and Preserve was designated a national monument in 1925. Its purpose was to preserve the glacial environment and plant communities for public enjoyment, scientific study, and historic interest. Expanded several times, Glacier Bay was redesignated a national park and preserve in 1980. In 1986 the park was named a Biosphere Reserve by UNESCO. In 1992 it was listed as a World Heritage Site, the principal international recognition given to natural and cultural areas of universal significance. This dual status shows that the international community values the uniqueness of this dynamic glacial landscape, a major ecosystem that protects the diversity of life.

Biosphere Reserve 
World Heritage Site 

Minke

Minke whales occur throughout many oceans and are common from southern California to the Bering Sea and Chukchi Sea. They are relatively

uncommon in the Glacier Bay area. In diving, the Minke shows its relatively small dorsal fin last above water.



Distribution of whales

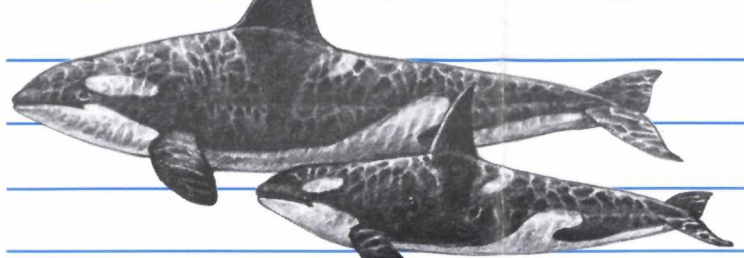
Water surface



Orca

Orcas, also known as killer whales or wolves of the sea, show distinctive black-and-white markings. Their large dorsal fin is also distinctive.

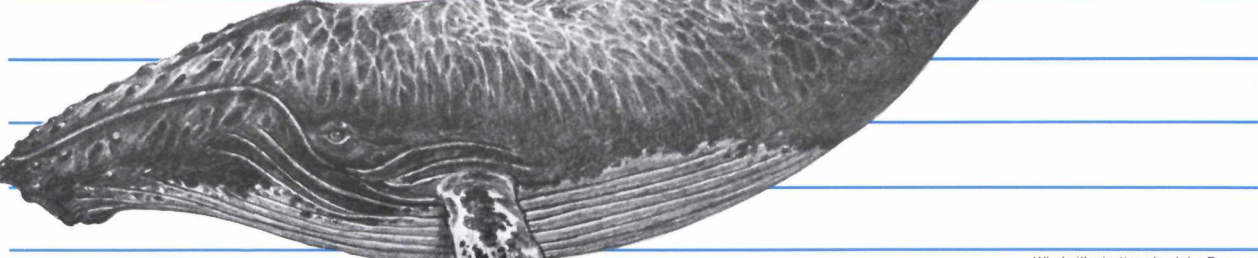
Carnivores, orcas feed on fish and many other marine animals.



Humpback

Humpback whales show their enormous fluke—tail fin—last in diving. An endangered species, the much-diminished humpback whale is now

protected from whaling. The park's humpbacks migrate as far as Hawaii each winter.



Whale illustrations by John Dawson

The World of Whales

Whales, symbolizing the struggle to preserve nature, include the largest creatures our world has known. Blue whales weigh up to 140 tons. Sixty to 100 million years ago the ancestors of today's whales were land-dwelling, warm-blooded, air-breathing mammals who successfully returned to the seas to live. Alaskan waters boast 10 species of baleen whales and 5 toothed whales. Glacier Bay waters include baleen whales, the minke and humpback, and one toothed, the orca. The whale's appeal mixes familiarity and strangeness. Whales often live in family groups, aid each other in distress, and communicate with each other. Many observers credit whales with rational thought.

Minke whales are thought to be quite migratory and are more at home in cold northern waters than most baleen whales. (Baleen whales are named for how they feed, which is described below, under the entry for humpback whales.) Cod and pollock are their main diet here. Farther south minkes favor krill. The upper size limit of minke whales in northern waters is 33 feet. Among large whales, minkes are fast swimmers, making speeds up to 20 miles per hour. As whaling has depleted more favored species, the rich-meated minke has become the most heavily taken of baleen whales today. Their North Pacific population appears to have declined to between one-fourth and one-third its pre-whaling numbers.

Orca whales feed on various marine animals, including fish, sea lions, seals, porpoises, sharks, squid, and other whales. Also called killer whales, orcas can hunt in teams and have killed blue whales, the world's largest animals. Male orca whales average about 23 feet long; the females less. They have no natural enemies. Thought to be highly intelligent, orcas are readily trained in captivity. They can swim at a steady 29 miles per hour. Their distinctive, largely triangular dorsal fin may reach nearly 6 feet high on old males.

Humpback whales are the most acrobatic of whales, heaving their massive bodies by leaps and turns out of the water. Humpbacks are both cosmopolitan—found in all oceans—and endangered. Only about seven percent of their pre-whaling numbers remain. Coastal feeders who love shorelines, bays, and fjords, they are naturalists for Alaska, which boasts nearly 34,000 miles of tidal shoreline. Humpbacks feed here on krill, shrimp, and various fish, including capelin. Humpbacks feed heavily because, unlike most birds and mammals, they do not feed year round. Humpbacks must store enough fat in summer to last the rest of the year. Adults average 40 to 50 feet long, females being the larger. Adults weigh in at about three-quarters of a

ton per running foot. An adult humpback has from 600 to 800 baleen plates in its mouth. These plates end in bristles. In the feeding process, huge masses of sea organisms are scooped into the mouth. Then the water, some 150 gallons at a shot, is expelled while the plates filter *in* the edibles. Were you to stare into a humpback's mouth—which opens to 90 degrees—you might not readily discount the Biblical mishaps of Jonah. Glacier Bay humpbacks have been observed working singly or in pairs to cast a "net" of bubbles about their prey and then harvesting the hapless creatures—probably shrimp and other slower-moving organisms—caught in their airy illusion. To see these large whales in their native habitat surely counts as

one of the great experiences of a lifetime. The situation of whales, and particularly of the endangered humpback whales, in Glacier Bay has recently been under intensive scrutiny by scientists. The purpose of the studies has been to learn enough about these awe-inspiring creatures to protect them. The numbers of whales present can vary dramatically from year to year. Whether these variations are wholly natural or not is uncertain. Historically, most of the available information about whales derives from attempts to hunt them, not to save them from extinction.

Whale range information copyright 1978, The Alaska Geographic Society. Reprinted by permission from ALASKA WHALES AND WHALING.



Horned grebe



Baneberry



Moose



Red columbine



Wolf tracks



Skunk cabbage



Guillemots

Plants and Animals Return to the Land

Scientists and other observers came to Glacier Bay to see the great glaciers and found here the ideal natural laboratory for the study of the infant theory of plant succession. How do plants recover a raw landscape? What happens when nature wipes the slate clean and starts over from scratch? Glacier and plant studies go hand in hand. Rapid revegetation following the glaciers' speedy retreat has enabled us to map and photograph the course of plant succession. When naturalist John Muir came to Glacier Bay in 1879 he was seeking corroboration of the continental glaciation theories of Louis Agassiz, whose controversial *Études sur les Glaciers* was published in 1840. Here, in the aftermath of retreating glaciers, Muir found a landscape not yet formed. At Glacier Bay you watch a vegetative wilderness being created—and also see its culmination in coastal forest. A trip up bay mimics glacial retreat and rolls back plant succession, from the mature forest at Bartlett Cove to the naked Earth structure at the fjords' farthest reaches. Biological succession produces profound change here in a mere decade. Earnest, long-range studies of plant succession began in Glacier Bay in 1916, with the work of

Prof. William S. Cooper. His plant studies were continued in 1941 by Prof. Donald Lawrence and others. Plant recovery may begin here with no more than "black crust," a mostly algal, feltlike nap that stabilizes the silt and retains water. Moss will begin to add more conspicuous tufts. Next come horsetail and fireweed, dryas, willows, alder, then spruce, and finally hemlock forest. In many areas the final or climax stage of plant succession may be the boggy muskeg, but this may take hundreds of years to develop, after the establishment of hemlock-spruce forest. Where plant's seeds happen to land can be critical. The chaotic rock-and-rubble aftermath of a glacial romp is deficient in nitrogen. Alder and dryas are important pioneers because they improve the soil by adding nitrogen to it. Much of northern Europe and America were pioneered by dryas when the last Ice Age ended. Sitka alder begins to form dense entanglements that are the bane of hikers. Spruce takes hold and eventually shades out the alder. A forest community is begun. Each successive plant community creates new conditions. The theory holds that plant competition modifies the environment—light and moisture

availability, and soil nutrients—so that plant populations also change. Over time, successive plant communities will occupy the environment, hence plant succession. The time from naked rock to revegetation is not necessarily long.

The patterns by which animals re-inhabit the land after glaciers retreat are not as neat as with plant succession. There are no true pioneer species paving the way for succeeding species. Land mammals must either walk or swim. They cannot, as plant seeds and spores do, hitch rides on wind and waves or with birds. Extensive water, ice, or mountains loom as impassable barriers. Low mountain passes are often the conduits through which land mammals begin to repopulate the park. Usually they will live off this young terrain only part of the year at first. Then resident populations may gradually build. The process of colonization at Glacier Bay and throughout Southeast Alaska is somewhat hindered by the fact that mammals in general have not had enough time since the Wisconsin Ice Age wound down to recolonize the land.

Human History

Tlingit Indians were the original inhabitants of Glacier Bay and still consider it their ancestral home. Hunters and gatherers of salmon, seals, berries and roots, they were driven from the bay by advancing glaciers during the Little Ice Age. Naturalist and adventurer John Muir is credited with discovering the bay in 1879, and tourism to this land of ice and snow began soon after. Pioneering homesteaders began farming in Gustavus around 1923, when fish canneries and salteries dotted the region. Though a few hardy men and women have chosen to live in Glacier Bay and on the outer coast in times past, the area remains largely isolated and undeveloped.

here now, but not expected eventually, are Sitka black-tail deer, beavers, lynx, and snowshoe hares. Capable of flight, birds do not experience ice and open water as barriers to recolonization.

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A park concession tour boat will drop off and pick up campers.

Brian Suderman



Photography in this wet but cloudy-bright landscape poses special challenges.

Ruth and Louis Kirk



The park can be experienced by kayak or cruise ship.

Chad Soiseth



Mountaineering and glacier travel require special skills and equipment.

Tom Bean



One last itinerary check in the backcountry before the pilot leaves.

Ruth and Louis Kirk



Extensive open country and glaciers attract campers to Glacier Bay.

Tom Bean

Access and Services Information

Geography Glacier Bay National Park and Preserve, west of Juneau in Southeast Alaska, can be reached only by boat or plane. Park headquarters at Bartlett Cove is 65 miles from Juneau. It is an additional 55 miles from Bartlett Cove to tidewater glaciers.

Concession Services

Travel options from mid-May through September include scheduled and charter air services, tour boats, cruise ships, and charter boats. Some 50 companies provide services in the park; write

for a list. Flying time from Juneau to Gustavus is about 30 minutes.

Lodging, groceries, a restaurant, and services are found at Gustavus. Bus or taxi service from Gustavus to the park is available.

At Bartlett Cove, Glacier Bay Lodge offers lodging, food service, fuel, a daily boat tour, back-

country drop-off, and other services. For reservations write: Glacier Bay Lodge, 520 Pike St., Suite 1610, Seattle, WA 98101; or call 1-800-451-5952.

Vessels based outside the park also tour Glacier Bay. Many large cruise ships and smaller tour vessels schedule a day in the bay in their Southeast Alaska itineraries. Charter boats offer many services. Kayak rentals are available.

There are guided kayak and backpacking trips, raft trips down the Alsek River, hunting and fishing guides, and lodging in the preserve.

General Park Information The park's visitor center, located upstairs in Glacier Bay Lodge, has an information desk, interpretive sales area, and auditorium. Exhibits illustrate natural and human history. The free park newspaper, *The Fairweather*, offers articles on local subjects. *Glacier Bay*, the official national park handbook, and other publications are for sale by the Alaska Natural History Association. Write to the park address for a list of references, maps, charts, and videos.

Exhibits near the dock highlight marine natural history and Tlingit culture. Three miles of maintained trails wind through rainforest and along the beaches. Park naturalists

present evening programs and films daily in the auditorium, lead hikes in the forest and along the shore, and give talks on tour boats and cruise ships entering Glacier Bay.

Camping and Backcountry Use Campers are required to attend a camper orientation given at the visitor information center. A free campground (14-day limit) with firewood, bear-resistant food caches, and warning hut is at Bartlett Cove. No reservations are needed.

Access to the backcountry generally requires a drop off by tour boat or float plane. Filling out a backcountry use permit at Bartlett Cove before departure is required.

Kayaking the shoreline is often the easiest way to get around. There are no backcountry trails, but beaches, recently deglaciated areas, and alpine meadows offer excellent hiking. Backcountry users should be self-sufficient and fully equipped and provisioned. Cook stoves are necessary because wood is scarce and wet.

Permits are required for float trips on the international Tachsheni-Alsek River. Write: Yakutat Ranger Station, P.O. Box 137, Yakutat, AK 99689; or call 907-784-3295 or 907-784-3370.

Boating Vessel permits are required before entering Glacier Bay from June 1 to August 31. To obtain permits, write to the park address; call

907-697-2627; or contact VHF radio—KWM 20 BARTLETT COVE. Reservations are recommended. Boating information is available at the visitor information station near the Bartlett Cove dock.

Glacial sedimentation and rapid land rise cause annual changes in water depth. Nautical charts quickly become outdated—use special care when navigating. Maintain a ¼ mile distance from tidewater glaciers. Waves from calving ice can swamp skiffs or kayaks. Bergs frequently turn over or split apart; give them a wide berth.

Fishing Fishing can be good for halibut, Dolly Varden, outthroat trout, and salmon; an Alaska fishing license is required.

Precautions

Weather Long periods of rainy, overcast, and cool weather are normal in Southeast Alaska. Summer daytime temperatures are usually 45–65°F, but nights may cool to near freezing. To protect against hypothermia a hat, gloves or mittens, and rain gear are essential. Sturdy, waterproof footwear is desirable.

Bears Black and brown/grizzly bears are wild animals and should always be considered dangerous. When hiking, lessen your chances of an encounter by watching for bears and bear sign, making noise, traveling in groups, and avoiding travel at night.

Food, trash, and cooking gear must be stored properly. Avoid taking

odorous foods. Bear-resistant food canisters are required in the non-forested areas of Glacier Bay and are available for loan. Photograph bears with a telephoto lens. A close approach is dangerous.

Insects Mosquitos and biting flies may make repellent necessary.

Giardia Even though the water looks clear, it may contain organisms that cause a debilitating intestinal disorder. Water should be boiled vigorously for at least one minute, filtered, or chemically treated.

Regulations

Natural Features Do not destroy, injure, or remove plants, rocks, shells, or other features. The harassing, injuring, or killing of any wildlife is prohibited by law. Help wildlife remain wild; never feed any animal, including squirrels and gulls.

Closures Some areas are closed or restricted because of bears, nesting bird colonies, feeding humpback whales, or other wildlife activity. Check on closures at Bartlett Cove before heading up the bay.

Pets Pets must be leashed or physically restrained at all times. They are prohibited in the backcountry.

Firearms Firearms are prohibited in Glacier

Bay. They may be secured at Bartlett Cove for the duration of your stay. They are allowed only in the Preserve and the park addition. Hunting is prohibited except in the Preserve with an Alaska hunting license.

More Information Write: Superintendent, Glacier Bay National Park and Preserve, P.O. Box 140, Gustavus, AK 99826-0140; or call 907-697-2230.

Email: giba_administration@nps.gov; Internet: www.nps.gov/giba.

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