Glacier Bay National Park

Discover the Wild Worlds of Glacier Bay

Explore...

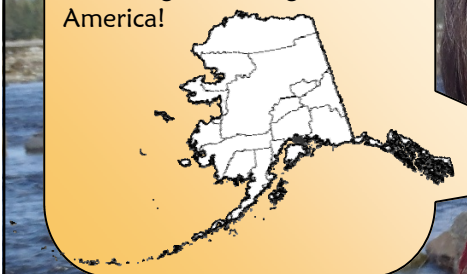
Frozen Lands of Ice
Life Between the Tides
Wild Forests of Beasts
Mysteries Beneath the Bay

ALSO FEATURING

Meet the Rangers!

How Does Your State Measure Up?

Turn to page 14 to see what it's like living in the largest state in America!



Volume 1, Issue 1

Youth Newsletter

In This Issue...

In this issue of the Youth Newsletter, you'll explore the different **biomes** within Glacier Bay National Park. Check out:

Have you ever wanted to know what it is like being a ranger? Meet education rangers Steve, Marieke, Sonia, Jennifer, and Kelly and find out!

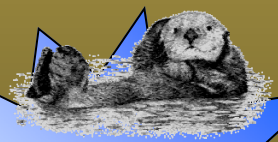
Glacier Bay National Park is located in the state of Alaska, which is the largest state in America! Find out why Alaska is such a special, unique place.

What's a **biome**?

Biomes are regional communities. They are the homes to the many different kinds of plants and animals that live in different climates. Within these homes (or biomes), there may be many different species of plants and animals. Get to know the different biomes of Glacier Bay!

EXPLORE...
LEARN...
PROTECT...

Become a Junior Ranger!
Turn to page **16** to find out how!

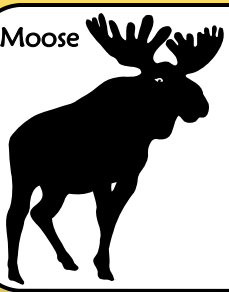


Look for me to discover something new!

Glacier Bay National Park

Can you match the animals to their **biomes**? Draw a picture of each animal and each biome, then draw a line to connect each creature to its habitat! The first one has been done for you.

Moose



Harbor Seal

Killer Whale

Sea Star

Glacier Country

Intertidal Zone

Beneath the Surface

Temperate Forest

Frozen Lands of Ice: A Dynamic Diversity of Life

Glaciers Are Alive

Glaciers are dynamic forces of nature— gigantic rivers of ice carving out the mountains and valleys that make places like Glacier Bay special and unique! Although the ice in Glaciers looks stationary and solid, it actually moves! Glaciers are called "rivers of ice" after all! Glaciers move from a combination of events, including the forces of gravity and the friction created by the ice scraping against the rock beneath the glacier. Gravity acts upon the glacier, pushing it slowly down the valleys as it carves through rock. This movement causes friction of the ice against the rock and small meltwater streams flows under the glacier between the rock and ice, which then causes the glacier to move. Some glaciers move multiple feet every day!

Life Thrives in This Icy Environment

Ice Worms

Ice worms live in the ice of glaciers and look like small earthworms. Surprisingly, they do not freeze! The tissues in their bodies freeze at a lower temperature than water, (32 degrees Fahrenheit), so they are able to successfully survive in this chilly environment. In fact, ice worms are so sensitive to temperature that if it gets too hot, they'll melt! Ice worms are still a great mystery to scientists, but it is believed they eat snow algae and pollen grains as they crawl around in the glacial ice.

Harbor Seals

Harbor seals depend on the ice for their survival. Mothers use the icebergs that **calve** off the glaciers as safe places to haul-out. They have their pups on the icebergs, which are safe places to hide from hungry Killer Whales waiting for a meal! Harbor seals also fish in the waters in and around the glaciers for food.

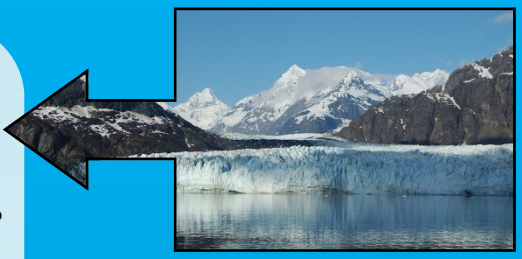
Black-legged Kittiwakes

These birds are not your typical gull! They are, in fact, the only true "sea-gull," as their diet consists exclusively of fish. They are surface feeders and soar down to the water to scoop up fish just beneath the surface of the water. Glacier Bay is a great habitat for the kittiwakes and boasts 1,000-3,000 nesting pairs on the cliffs beside the Margerie Glacier!

Meet the Glaciers

Margerie Glacier

Margerie is one of the few glaciers in the world that is healthy and stable. Because of large amounts of snowfall in mountains, this glacier moves about 7 feet every day! It also calves at about the same rate, so the face stays in the same place. Visitors come to watch large chunks of ice calve, or plunge, into the water.



Grand Pacific Glacier

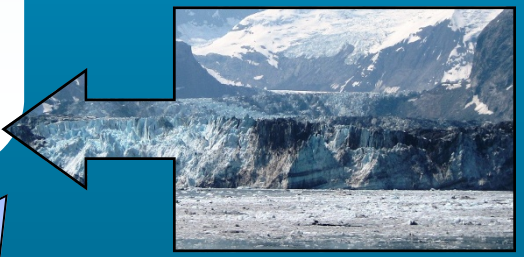
This is what we call a "dirty glacier." Having picked up plenty of dirt and rock on its journey, the Grand Pacific almost blends in with the landscape. This grand glacier used to cover all of Glacier Bay, and has receded 65 miles in the past 250 years!

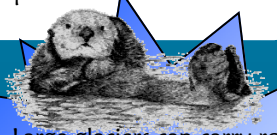
Lamplugh Glacier

Nicknamed "Lamplugh the Blue," this glacier has a distinct blue color. This is because of the way that light passes through the ice. Colors like red and yellow are low-energy, and are absorbed by the deep ice. Only the high energy blue light can escape the solid glacier ice. As a result, the glacier appears a mysterious blue.

John Hopkins Glacier

This glacier is one of the fastest advancing glaciers in the park and one of the four fastest advancing glaciers in Alaska. It moves about 10 feet a day, and its icebergs are home to many harbor seal moms and their pups!





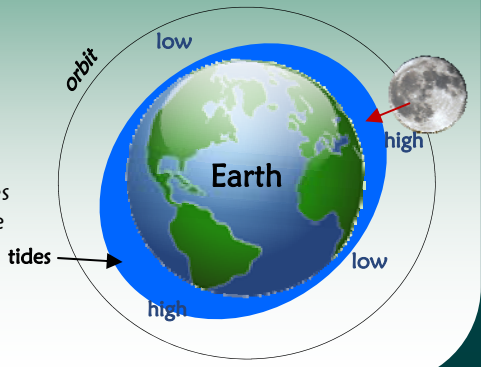
Large glaciers can carry rocks of any size, even boulders as large as a house! When these large boulders are deposited by a retreating glacier, they are called **glacial erratics**.

Life Between the Tides:
A Community of Relationships

It's All About Tides

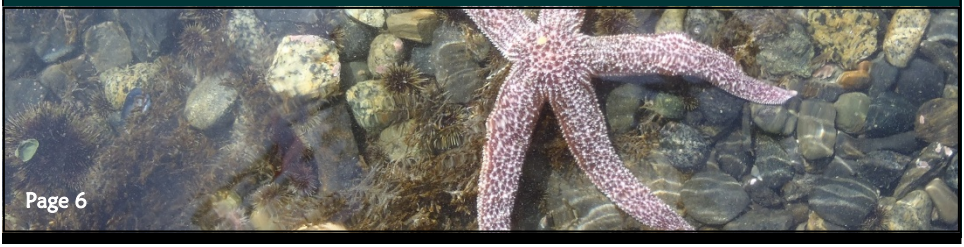
The rising and falling of ocean levels all over the planet are called tides. Tides are a very important part of marine ecosystems. When the water rises, it's called flowing. When the water falls, it's called ebbing. The movement of the tides is caused by the **gravity** of the Moon pulling on the spinning Earth. As the Earth turns, the Moon pulls on the water covering the earth so the water bulges on one side and is thin on the other.

Here in Glacier Bay, the high and low tides roll in and out twice each day. Each time this happens, the **intertidal zone** (the area between high and low tide lines) is covered with water and then exposed to the air. Many creatures live in the intertidal and depend on the cycles of Glacier Bay's tides.



Alive With Life, Hanging in the Balance

Animals like birds or fish can move in and out of intertidal areas as the tides rise and fall, but other creatures live there permanently! They must adapt to the crashing power of waves, rising and falling of tides, and a constantly changing, wet and dry habitat. To protect themselves from the elements, as well as predators, these marine creatures hide in small cracks, or use hard shells on their bodies to hold on tightly to rocks. They are some incredibly tough creatures!



A Diverse Intertidal Community

Sea Stars

Sea stars are many-armed animals that have spiny skin. In the center of a sea star is a bright orange dot called a **madreporite**, which it uses to pump water into its body to create suction with its arms as it moves. When it finds food (like a baby clam), it uses the suction to pull apart the shell, then inserts its stomach to digest the meal!

Barnacles

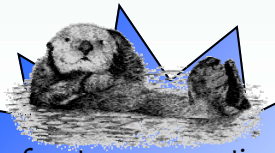
Barnacles are soft-bodied animals with hard shells. They feel prickly and sharp! Using their own form of **cement**, barnacles clamp down onto rocks to keep from being destroyed by crashing waves. During high tide, they kick out their legs to trap plankton and other small animals.

Limpets

Limpets are soft-bodied animals that have a cone shaped shell. They are a type of sea snail that uses a **foot** to holds on tightly to the rocks. During high tide, limpets eat by scraping up algae as they move slowly across rocks.

Sea Urchins

Sea Urchins are small, round animals that are covered in spines, much like a porcupine. Their round bodies, called **tests,** look like stones. They have hundreds of small feet under their bodies which they use to move across rocks. Using their mouth on the underside of their body, they crawl over their food and tear at it with their mouth.



Sea stars are sometimes called “star fish.” This is a misleading name, as sea stars are not fish...they are echinoderms!

Wild Forests of Beasts:
Wilderness Comes Back to Life

Bears, Moose, and Wolves: Oh My!

Black Bears

Of the three species of bears in Alaska, black bears are the smallest and most common. They are **omnivores** (they eat plants and animals) and can be seen in three different colors. They cab be black, cinnamon, or brown, and a rare few look silvery-blue called "glacier bears."

Moose

Moose are the largest member of the deer family and only eat plants, which makes them **herbivores**. They can be found all over Glacier Bay and can swim across streams, rivers, and even the bay itself! They can live up to 16 years. Only male moose can grow antlers, which they lose every year in the fall.

Brown Bears

Brown bears are larger than black bears and have a distinct hump on their back. They are also omnivores, but their diet consists largely of fish. They are called "Brown Bears" on the coast and "Grizzly" in the Alaskan Interior.

Grey Wolves

Wolves are **carnivores** (they eat meat) and will eat anything they can find in Glacier Bay, even dead animals. Their diet includes rodents, bear, and moose! They travel in packs of up to 30 wolves. Wolf pups are born blind and defenseless and are cared for by the pack until they are 10 months old.

From Rocks to Roots

Glacier Bay is a special place for many reasons. The temperate forests here are some of the last remaining, raw, pristine wilderness areas in the world. The remarkable eruption of plant life after the retreat of the Grand Pacific Glacier is an example of how life returns to an icy, barren landscape. With the return of plants, animal life is soon to follow. Today, we see an enormous scene of temperate forest filled with spruce, hemlock, shrubs, and an array of beautiful wildflowers.

Scientists in the park are still studying how plants come back after the ice retreat. They discovered that **spores** or seeds are blown into a new area by the wind or carried in by birds and other animals. When spores land on the rocks, they hold on tight and take root. The spores grow into **lichens**, which break down the rocks, turning them into **soil**. After the soil is created, more seeds continue to blow in. The mosses begin to grow, followed by low-lying plants and shrubs. Once these plants have formed dense, heavy thickets, **deciduous** trees like alder and cottonwood can take root and will provide shelter and shade for even more plants. Next come the spruce and hemlock, nestled in the lower areas of Glacier Bay among lush, spongy meadows of marshy **muskeg**. As mats of wildflowers carpet the mountain valleys, a temperate rainforest is born.

Glacier Bay has over three million acres of wilderness. That's about the size of Connecticut!

Mysteries Beneath the Bay: A Wet and Wild World

One Fish, Two Fish

Killer Whales

Killer Whales are warm blooded, air breathing mammals. It is the largest dolphin and as one of the world's most powerful predators, feeds on seals, fish and even other whales. They have been called the "Wolves of the Sea," as they can hunt in packs called **pods**.

Capelin

Capelin are small forage fish that play a critical role in the ocean food system. They affect the survival of all species that depend on them for a primary food source, namely the humpback whale in Glacier Bay. Capelin are the primary link between **zooplankton** and predatory fish.

Zooplankton

Mostly invisible to the naked eye, zooplankton are the tiny, microscopic primary food source at the bottom of the **food chain**. They are the most abundant life form on the planet!

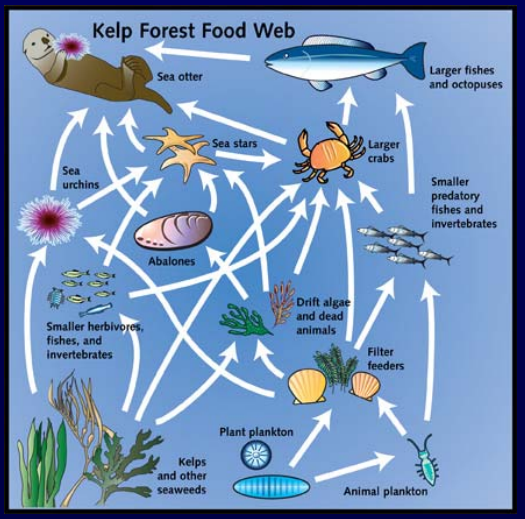
Corals in The Cold?

Photo: NOAA Fisheries

In the depths of Glacier Bay, fragile and colorful corals thrive in almost total darkness. Unlike tropical shallow corals that require sunlight and photosynthesis for food, deep ocean corals can live in dark environments and instead grab food such as plankton from the surrounding waters. Growing to be hundreds of years old, deep ocean corals are a very important part of Glacier Bay's ocean ecosystem as they provide habitat for many fish and small **crustaceans**. In Glacier Bay, the most common type of deep ocean coral is the red tree coral, which grows in lush thickets within recently **deglaciated** areas of the bay. Ongoing research is an important tool in discovering more about the **biology** of red tree corals, and will aid in its protection from destructive activities. When disturbed, it can take decades for the red tree coral to grow back!

A Sea Otter Saga

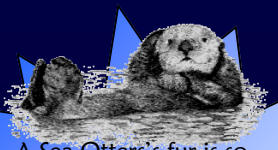
Sea Otters were wiped out for their fur during the 19th century and were reintroduced near Glacier Bay National Park in the 1960s. Their thriving numbers have spread throughout the southern half of the park, and over 3,000 have been counted in Glacier Bay.



The return of sea otters has drastically changed the populations of their favorite food such as mollusks, crabs and **sea urchins**, and consequently the structure of shallow-water ecosystems. Check out the sea otter food web. Notice how drastically different the web becomes with and without sea otters!

Sea Otter Food Web

Sea Otters rely on fish and **invertebrates** for a healthy diet. If sea otters were to disappear, then sea urchins, a common prey of sea otters, would increase in number. Sea urchins feed on **kelp**, and with no predator to keep their numbers in check, the kelp would also disappear.



A Sea Otters's fur is so thick, there are more than 1,000,000 hairs per square inch! They need that to stay warm, as they don't have blubber and never leave the ocean.

Meet the Rangers

Hello, pleasure to meet you!

We're the Glacier Bay National Park Education Rangers. We work very hard to bring Glacier Bay to as many youth as possible from all over the world. We come from many different places but all share one common goal: to protect and preserve this place by connecting, inspiring, and sharing the beauty of Glacier Bay National Park and Preserve!

What's it like being a ranger, you ask?

Between seeing humpback whales, bears, moose, and thousands of birds everyday to listening and watching the white thunder of glaciers calving, being a ranger is pretty cool! We meet visitors from all over the globe. Being a National Park ranger is something to be proud of and each of us has a different story to tell. Look below for a blurb from each of us to learn why we came here and why we love it so much!

Ranger Steve

My first day at Glacier Bay, I watched a sea otter hammering a huge clam on a rock to open it. That was the day, I realized I was home. I enjoy working with youth, helping them discover the power of glaciers, and the incredible wildlife of Glacier Bay

Ranger Marieke

For many years, I dreamed of living in Alaska. I was thrilled to find a job at Glacier Bay and to have the chance to make the journey north up the Inside Passage. Working as a park ranger allows me to share my passion for the natural world with thousands of people from all over the globe.

Ranger Sonia

I came to Glacier Bay because I love to learn about all sorts of ecosystems. After reading in books about how glaciers carve out landscapes, it's been a lot of fun to see them up close. My favorite thing about working here is being able to share my knowledge with park visitors.

Ranger Kelly

I have worked at Glacier Bay National Park for many years. It is one of the most amazing places on the planet! As a high school biology teacher, Glacier Bay gives me the biggest classroom and the most awesome outdoor laboratory of any teacher in the country! I love sharing my knowledge and excitement with children and adult visitors who come to Glacier Bay from around the world.

Ranger Jennifer

I came here because I wanted to live and work with kids in one of the most beautiful places in the world! My favorite part about Glacier Bay is seeing so much wildlife everyday, especially the porcupines!

How Does Your State Measure Up?

The state of Alaska is HUGE compared to the other states in America! Here are a few quick Alaska Facts:

- 586,400 square miles
- 29 volcanoes
- 33,000 miles of coastline
- Over half the world's glaciers and also the largest
- Borders the Arctic, Pacific, and Atlantic Oceans
- Tallest mountain in the United States (Denali)
- One person per square mile of land
- 17 National Parks
- Largest remaining tract of wilderness outside of Antarctica

What cool facts can you find out about your state?

How many National Parks do you have? _____.

How large is your state? _____.

What is your state famous for? _____.

Alaska is the largest state in the U.S. Just how much bigger is it than yours?

Alabama x 11
Arizona x 5
Arkansas x 11
California x 3
Colorado x 6
Connecticut x 114
Delaware x 277
Florida x 10
Georgia x 10
Hawaii x 88
Idaho x 7
Illinois x 10
Indiana x 16
Iowa x 10
Kansas x 7
Kentucky x 14
Louisiana x 12
Maine x 17
Maryland x 54
Massachusetts x 69
Michigan x 10
Minnesota x 7
Mississippi x 12
Missouri x 8
Montana x 4
Nebraska x 7
Nevada x 5
New Hampshire x 61
New Jersey x 73
New Mexico x 5
New York x 12
North Carolina x 11
North Dakota x 8
Ohio x 14
Oklahoma x 8
Oregon x 6
Pennsylvania x 13
Rhode Island x 470
South Carolina x 18
South Dakota x 7
Tennessee x 14
Texas x 2
Utah x 7
Vermont x 59
Virginia x 14
Washington x 8
West Virginia x 24
Wisconsin x 10
Wyoming x 6

Use this space to write how much bigger Alaska is than your state!

What is your state? _____.

Alaska is __ times bigger than_____.

Glacier Bay National Park

Become a Junior Ranger!

Explore, Learn, Protect

A Junior Ranger is an **explorer**. You and your family can explore national parks using fun activity booklets designed especially for you!

A Junior Ranger is a **learner**. You learn more about the nation's history, cultural heritage, and the natural world.

A Junior Ranger is a **protector** of your national parks. You discover things you can do to help make sure there are always national parks to visit in the future. Then, you can take what you've learned home with you to protect other places you love!

Once you have completed your activity booklets, you are sworn in as a national park Junior Ranger and receive a **badge**! Want to become a Junior Ranger? Visit your national parks and start today!

Be a WebRanger

Become a Care-taker, an Adventurer, an Explorer! You can become a Junior Ranger even if you are not able to visit a national park. Visit the WebRanger site to start your journey. Set up your ranger station, and you're ready to explore your national parks! There are over 50 activities to explore, and you can earn a WebRangers patch!
Visit **www.nps.gov/webrangers**

Glacier Bay Junior Ranger

Come visit us in Glacier Bay National Park to become an official Glacier Bay Junior Ranger! Earn your Glacier Bay Junior Ranger badge, and complete your activity booklet for a Junior Ranger patch!

Learn More

National Park Service
www.nps.gov/glba/forkids