Glacier Bay

National Park Service
U.S. Department of the Interior

National Park & Preserve
AK

Witnessing Change

Glacier Bay, like many places around the world, is experiencing the impacts of climate change. Historically, the park's glaciers moved in a natural cycle of advance and retreat. Now, humans burn a vast amount of fossil fuels, increasing atmospheric carbon dioxide (CO_2), which acts as a heat-trapping blanket warming the Earth and disrupting natural cycles. As a park established for scientific discovery and the observation of glaciers, Glacier Bay National Park and Preserve provides us the opportunity to study the effects of climate change. We invite you to investigate and connect with our changing planet.

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Climate Change in Alaska

Climate change is a reality in Alaska. Sea ice loss has caused the polar regions to warm over twice as much as the rest of the Earth. Alaska has experienced a 5°F (~3°C) increase since 1949. What are some of the other major impacts?

- **Coastal Erosion** – Changes in sea ice leave coastal Arctic communities vulnerable to erosion from increasingly intense storms. Rates of erosion have measured over 59 feet (18 meters) per year, forcing some communities to relocate at great expense and with incalculable cultural loss.
- **Glacial Melt** – Of the more than 100,000 glaciers in Alaska, 95 percent are currently thinning, stagnating, or retreating, impacting both land and ocean environments.
- **Loss of Permafrost** – Permafrost is ground that remains frozen for two consecutive years and is vital to the Northern Alaska landscape. Increased thawing of permafrost releases stored greenhouse gases and causes erosion, landslides, and damage to infrastructure.

Climate Change in Glacier Bay

What does our research indicate?
These impacts, and others, are being observed in Glacier Bay.

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Mountain goats are especially vulnerable to **habitat change**. They rely on cool temperatures and accessible alpine vegetation. As temperatures warm, plants become less nutritious and tree growth reduces alpine habitat. Researchers are currently investigating potential declines in park populations.

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Oceans absorb carbon dioxide (CO_2) from the atmosphere. As atmospheric CO_2 levels rise, the ocean absorbs the additional CO_2, increasing acidity. **Ocean acidification** is harmful to many important species, like crabs and salmon, which are critical food sources for terrestrial and marine animals.

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Ocean temperatures are rising globally. A marine heat wave in the Gulf of Alaska in 2014-2016 was linked to significant changes in the quantity and quality of forage fish, causing a 58 percent drop in whale numbers, a decline in calf numbers and survival, and many malnourished humpback whales.

Mitigate and Adapt

Climate change is a global problem felt on local scales. Responding effectively to climate change requires both mitigation and adaptation. We must mitigate the severity of changes by reducing emissions of greenhouse gases and conserving natural areas that store CO_2. We must also adapt by building community and ecological resilience through informed planning in response to new and more drastic climate conditions.

The National Park Service is committed to preserving and protecting our public lands while promoting stewardship of the natural world. Glacier Bay National Park and Preserve was established for scientific study and we continue to monitor ecosystem changes. Our research findings lead to responsible, evidence-based management decisions that reduce human-caused stressors on the ecosystem.

What Are We Doing?

- Leveraging the park's concession contract process to reduce pollution by only awarding contracts to cruise companies that will use cleaner fuels and invest in green technologies.
- Collaborating with Marine World Heritage site managers to promote sustainable visitation by sharing environmental education techniques and management frameworks.
- Engaging the public in connecting to and understanding our changing world.
- Upgrading to more efficient electric or hybrid vehicles, and installing charging stations.
- Advancing a project into hydroelectric power, providing 85 percent of the park's needs.
- Diverting over 60 percent of our waste stream with an award-winning recycling program.
- Researching opportunities for a hybrid electric vessel for our day tour operations.
- Installing energy efficient lighting.

What Can You Do?

Individual action is critical. Responding to climate change also requires collective action from communities, businesses, and governments. Awareness and action together can create necessary change.

- **Learn more.** Examine your carbon footprint.
- **Take action.** Adopt new climate-friendly habits.
- **Talk about it!** Acknowledge and discuss changes in your community.
- **Exercise your rights.** Vote.
- **Plan ahead.** Work with your community leaders to plan for a changing climate.
- **Engage with others.** Help your community transition to low-emission energy sources.
- **Eat well.** Eat a plant-rich diet from local, sustainable agriculture, and avoid food waste.
- **Travel wisely.** Support low carbon transportation systems like trains and bike paths.
- **Speak up.** Encourage organizations you are involved with to make meaningful change.

Now Is the Time to Act

Just as parks provide benefits beyond their boundaries, our actions have effects beyond today. Climate change is an urgent challenge, yet humans have great capacity for innovation and collaboration. By working together, we can increase our understanding and response to changing CO_2 levels, protect our natural systems, and preserve these special places for future generations.

What will your contribution be?

"As a living laboratory, Glacier Bay is one of the best places to witness change and experience the dynamic forces that connect us all. This is a powerful place to see, touch, feel, and understand the issue of climate change."

- Philip Hooge, Superintendent

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Trustworthy Resources

Climate change is a multifaceted issue and expert knowledge is available. Look to resources like these for more information and guidance.

NPS.GOV/SUBJECTS/CLIMATECHANGE

CLIMATE.NASA.GOV

GLOBALCHANGE.GOV

DRAWDOWN.ORG/SOLUTIONS