



Fact Sheet: Arctic Warming

What It Means for the Region and the Planet

By Hannah Fleisch and Cathleen Kelly August 18, 2015

The Arctic is warming twice as fast as the rest of the planet

Since 1900, no other region of the world has undergone such rapid warming as the Arctic.¹ Arctic warming is triggering dramatic changes with serious consequences for both people and wildlife in the region and around the world.²

Diminishing sea ice

- Sea ice provides critical resting and hunting grounds for polar bears, walrus, and other wildlife.³
- Arctic indigenous people rely on sea ice for travel, hunting, and as shields for coastal villages from storm surges.⁴
- Since the late 1970s, rapid Arctic warming has caused late summer sea ice coverage to decline by more than 40 percent—a trend that has accelerated since 2007.⁵
- Sea ice retreat exposes the darker, less reflective surface of the ocean, which increases absorption of the sun's heat and amplifies Arctic warming.⁶

Melting glaciers and ice sheets are driving global sea level rise

- As temperatures increase, vast quantities of runoff from melting glaciers, ice caps, and ice sheets flows into the sea, causing the global sea level to rise.⁷
- Melting land ice has accelerated during the 21st century. Glaciers are now melting at up to three times the rate observed in the 20th century, and on the northeast section of Greenland, ice loss has nearly tripled since 2003.⁸

- Global sea levels have risen by 8 inches since 1880.⁹ Scientists expect sea levels to rise by up to an additional 4 feet by 2100—with roughly 1 foot of this increase occurring by midcentury—putting nearly 3 billion people, or the 40 percent of the world’s population that lives near coasts, at risk of severe flooding and erosion.¹⁰

Permafrost thaw

- Hotter temperatures are thawing permafrost, or frozen ground, that is generally thousands of years old and covers roughly 25 percent of the Arctic’s land area.¹¹
- These frozen soils contain 1,500 billion tons of carbon from plant and organic material—almost twice as much as what is currently in the atmosphere.¹²
- Scientists project that higher temperatures could release between 130 billion tons to 160 billion tons of carbon—or roughly 8 percent to 10 percent of the carbon stored in permafrost—between now and 2100, potentially undercutting global greenhouse gas mitigation efforts.¹³ For context, in 2013, the United States emitted 1.4 billion tons of carbon from fossil fuel use and cement production.¹⁴

Wildfires

- Record high temperatures and persistent dry conditions across Alaska and much of the Western region of the United States have resulted in 2015 being one of the worst wildfire seasons in U.S. history. This year, more than 6 million acres of U.S. forest have been burned by wildfires, and more than 80 percent, or more than 5 million acres, of these forests have been burned in Alaska.¹⁵
- Wildfires choke surrounding skies with thick smoke packed with pollutants, including particulate matter, carbon monoxide, atmospheric mercury, ozone-forming chemicals, and volatile organic compounds. Global air currents also carry these pollutants to distant skies. For example, pollutant-heavy smoke from both Alaskan and Canadian wildfires have triggered unhealthy air quality days in faraway cities such as Minneapolis, Minnesota, and Fort Collins, Colorado.¹⁶
- Wildfires that spread over permafrost accelerate permafrost thawing and the release of carbon previously locked away for thousands of years in the permafrost’s deep freeze.¹⁷

Commercial activity

- While sea ice retreat will open up the Arctic to more commercial activity, it also increases the risk of oil spills, shipping accidents, and other mishaps requiring emergency response and search and rescue operations.¹⁸
- The U.S. Department of the Interior recently estimated a 75 percent chance of a major oil spill from drilling activities in the Chukchi Sea off the coast of Alaska.¹⁹
- The dearth of oil spill cleanup know-how, infrastructure, and response capacity in the harsh and remote Arctic environment may spell disaster for the region's people and environment.²⁰

Coastal Alaska Native communities face imminent risks of climate change catastrophe

- Due to declining sea ice, accelerated coastal erosion, and thawing permafrost, coastal Alaska Native communities face a looming risk of sliding into the sea.²¹
- In 2009, the Government Accountability Office, or GAO, estimated that flooding and erosion imminently threaten up to 31 Alaska Native villages, and at least 12 of these villages have either explored the idea of moving or have decided to relocate their village to higher and safer ground.²²
- The U.S. Army Corps of Engineers estimates that moving the three Alaska Native villages most threatened by climate change to more secure locations would cost between \$80 million and \$200 million per village.²³

Food security

- Many Arctic communities rely on traditional subsistence hunting, fishing, and gathering. A warming climate threatens ecosystems and hunting seasons; causes food shortages; and disrupts subsistence practices and cultures of Arctic indigenous people.
- Along the Chukchi and Beaufort seas, Native Alaska villagers are facing increased difficulties hunting essential sources of meat, such as the Pacific walrus and bowhead whale, as their respective populations are in severe decline due to diminishing sea ice.²⁴

Infrastructure

- Permafrost degradation and other dramatic landscape changes will affect some existing infrastructure—in some cases causing the collapse of roads, bridges, runways, and buildings.²⁵
- The authors of the 2014 National Climate Assessment estimate that the growing instability of Alaska’s permafrost will add between \$3.6 billion to \$6.1 billion to the state’s infrastructure maintenance costs during the next 20 years.²⁶

Black carbon and methane pollution are accelerating Arctic and global warming

Immediate and significant reductions in carbon dioxide, or CO₂, emissions are essential in order to prevent dangerous levels of global climate change. Reducing short-lived climate pollutants—gases or particles that can stay in the atmosphere for just a few days or for up to a decade, including black carbon, ozone, and methane—would help to curb global and Arctic warming more quickly than if countries only cut CO₂ emissions.²⁷ According to the Arctic Monitoring and Assessment Program, or AMAP, reducing short-lived climate pollutants globally could reduce Arctic warming by roughly 0.5 degrees Celsius by 2050.²⁸

Black carbon pollution

- Black carbon pollution, or soot, is emitted by diesel cars and trucks, woodstoves, wildfires, agricultural burning, oil and gas production, and shipping. Black carbon is a short-lived climate pollutant that directly warms the Arctic by trapping heat in the atmosphere.²⁹
- Black carbon’s warming potential can be hundreds of thousands of times more powerful than carbon pollution, especially when emitted in or close to the Arctic.³⁰
- When emitted in or near the Arctic and other icy regions, black carbon pollution heats and darkens snow and ice, reducing its ability to reflect the sun’s heat away from the surface of the Earth.³¹
- According to the latest AMAP report, the eight Arctic nations—Canada, Finland, Iceland, Norway, Russia, Sweden, the United States, and Denmark, including Greenland and the Faroe Islands—are responsible for roughly one-third of Arctic warming resulting from black carbon.³² Countries outside of the Arctic account for the remaining two-thirds of Arctic warming from black carbon pollution, revealing the need for global action to cut black carbon emissions.³³

- According to experts, global actions to cut black carbon pollution and co-emitted air pollutants could reduce Arctic warming by 0.25 degrees Celsius, or 12 percent, by 2050.³⁴
- Black carbon pollution is also a serious human health risk, particularly for children and older people. Black carbon pollution has been linked to increases in cardiac and respiratory illnesses, as well as infant mortality and premature death.³⁵

Methane pollution

- Methane is a short-lived climate pollutant emitted by venting and flaring at oil and gas fields, leaks when natural gas is transported, coal mining, incomplete combustion, as well as other sources.³⁶
- The world's top four methane emitters—the United States, Russia, China, and India—are members or observers of the Arctic Council. Because methane has a short life span—just nine years—the benefits of reducing methane emissions are felt within years.³⁷
- Fully implementing technically feasible options to reduce methane emissions could curb expected global warming by roughly 0.2 degrees Celsius, or 10 percent of total expected warming by 2050.³⁸

The Arctic Council

- The Arctic Council was established in 1996 to allow the eight Arctic nations and six Arctic indigenous peoples' organizations to collaboratively manage the risks and opportunities of increasing commercial activity at the most northern part of the world.
- U.S. Secretary of State John Kerry became Arctic Council chairman in April. This two-year position rotates among the Arctic nations. The U.S. chairmanship agenda aims to improve economic and living conditions in the Arctic, address climate change, and strengthen Arctic Ocean stewardship.⁴⁰
- In 2013, the Arctic Council granted observer status to China, India, Italy, Japan, Singapore, and South Korea, doubling the number of observer nations from 6 to 12.

Arctic nations and Arctic indigenous peoples' organizations

Member states

- Canada
- Denmark, including Greenland and the Faroe Islands
- Finland
- Iceland
- Norway
- Russia
- Sweden
- United States

Permanent participants

- Arctic Athabaskan Council
- Aleut International Association
- Gwich'in Council International
- Inuit Circumpolar Council
- Russian Association of Indigenous Peoples of the North
- Saami Council³⁹

- At the April Arctic Council Ministerial Meeting in Iqaluit, Canada, Arctic nations adopted the Framework for Enhanced Action to Reduce Black Carbon and Methane Emissions.⁴¹ The framework calls on Arctic nations and observer countries to complete black carbon and methane emissions inventories and action plans.

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