

Forum: *United Nations Environment Programme (UNEP)*

Issue: *Measures to manage the rapid deterioration of the Arctic*

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Introduction

Climate change is a critical global issue that will likely impact millions of people and various organisms living in different ecosystems. The effects of climate change are already felt by coastal communities due to the rise of sea levels, marine animals suffering from water pollution, extreme weather events globally, and more. The worsening of the issue is most clearly seen in the Arctic, as global warming accelerates the melting of the glaciers. Specifically, the National Snow and Ice Data Center (NSIDC) reports that “A sharp decline of Arctic sea ice at the beginning of September dropped the extent below 4.0 million square kilometers (1.54 million square miles) for only the second time since the beginning of the satellite record in 1979.”

The topic at hand — Measures to manage the rapid deterioration of the Arctic — directly relates to multiple Sustainable Development Goals (SDGs) set by the United Nations (UN). Since marine animals living in the Arctic are impacted by the deterioration of their ecosystem, not only is SDG 13 (Climate Action) relevant, but SDG 14 (Life below Water) is also a highly pertinent target. Issues of research and discussion on the impacts on marine animals include water pollution, ocean acidification, overfishing, and more.

At a time where people can feel the impacts of climate change firsthand (through extreme weather events including hurricanes, wildfires, or other events) and are advocating for greater action to be taken by governments, it is important to consider what places and locations are the most affected by climate change is and in what ways. Especially since the Arctic is a piece of territory concerning the interest of various countries, in handling the situation in the Arctic, delegates must be able to achieve a balance between their states’ economic interests and regard for the protection of animals.

Definition of Key Terms

Arctic

The Arctic is a region including and surrounding the North Pole. While there are no clear boundaries, according to the NSDIC, “most scientists define the Arctic as the region above the Arctic Circle, an imaginary line that circles the globe at approximately 66° 34' N.” Other scientists “define the Arctic as the area north of the arctic tree line” or believe that the region should be established based on temperature — “where the average daily summer temperature does not rise above 10 degrees Celsius (50 degrees Fahrenheit)” (NSDIC).

Glaciers

Glaciers are large masses of ice that move slowly over land. According to the UN World Meteorological Organization (WMO), the melting of the glaciers “will inevitably increase in the future, both for 1.5°C and 2°C temperature increases, with global impacts for water resources and sea level rise.” Glacier melt is a critical issue as habitats of marine animals are wrecked and the fresh meltwater that floats on the ocean’s surface speeds up the melting process of the glacier (BBC).

Climate Change

As defined by National Geographic, “Climate change is a long-term shift in global or regional climate patterns” in a place. It is linked to issues such as global warming and extreme weather. The Royal Society reports that climate change “will threaten food production, freshwater supplies, coastal infrastructure, and especially the welfare of the huge population currently living in low-lying areas.”

Global Warming

Global warming is defined as the “phenomenon of increasing average air temperatures near the surface of Earth” (Britannica). According to the Natural Resources Defense Council (NRDC), global warming is caused when greenhouse gases such as carbon dioxide (CO₂) and methane “collect in the atmosphere and absorb sunlight and solar radiation that have bounced off the earth’s surface.”

Extreme Weather

Extreme weather conditions are a direct result of climate change. Examples include the increased frequency of hurricanes, wildfires, blizzards, storms, and floods.

United Nations Convention for the Law of the Sea (UNCLOS)

UNCLOS, also known as the Law of the Sea Convention or the Law of the Sea treaty, is a document outlining nautical law, replacing the prior “freedom of the seas” concept. UNCLOS has “established freedom-of-navigation rights, set territorial sea boundaries 12 miles offshore, set exclusive

economic zones up to 200 miles offshore, set rules for extending continental shelf rights up to 350 miles offshore, created the International Seabed Authority, created other conflict-resolution mechanisms,” and addressed other important issues (UN). As of 2020, although there are 157 signatories, only 60 countries have ratified the treaty.

Background Information

Greenhouse Gases

Greenhouse gases such as CO₂, nitrous oxide, methane, fluorinated gases, and water vapor trap heat due to the greenhouse effect. According to the NRDC, “the greenhouse effect is the natural warming of the earth that results when gases in the atmosphere trap heat from the sun that would otherwise escape into space.” Instead of going into space, the majority (90%) of the invisible infrared light that radiates from the planet is absorbed by the greenhouse gases and “redirected back toward the earth, causing further warming.” (NRDC) The impact that the greenhouse gases have on global warming is dependent on a couple of factors: the concentrations, lifetimes, and global warming potential (GWP).

Natural Factors

Natural factors such as “variations in the Sun’s output and Earth’s orbit around the Sun, volcanic eruptions, and internal fluctuations” impact the climate system (Royal Society).

For instance, ice age cycles (“cold glacial periods followed by shorter warm periods”), which take place once for around every 100,000 years, are the greatest climate variations that have occurred on the global scale. These cycles are “mainly paced by slow changes in Earth’s orbit, which alter the way the Sun’s energy is distributed with latitude and by season on Earth.” (Royal Society) However, since the orbital changes are extremely small, these orbital changes “alone are not sufficient to cause the observed magnitude of change in temperature.” (Royal Society)

Additionally, volcanic eruptions influence the climate system. Carbon Brief found that “Volcanoes have a short-term cooling effect on the climate due to their injection of sulphate aerosols high into the stratosphere, where they can remain aloft for a few years, reflecting incoming sunlight back into space. However, once the sulphates drift back down to the surface, the cooling effect of volcanoes goes away.” Thus, the impact of natural factors such as volcanic eruptions is limited and does not fully offset the impact of greenhouse gases.

Another important natural phenomenon is the carbon cycle, which refers to the “process in which carbon atoms continually travel from the atmosphere to the Earth and then back into the atmosphere.” (National Ocean Service) According to Carbon Brief, “currently the land and oceans together absorb about half of the CO₂ emitted from human activities, but the capacities of land and ocean to store additional carbon are expected to decrease with additional warming, leading to faster increases in atmospheric CO₂ and faster warming.”

Human Activity

Various human activities have worsened climate change. The IPCC estimates that “humans were responsible for around 110% of observed warming (ranging from 72% to 146%), with natural factors in isolation leading to a slight cooling over the past 50 years. Similarly, the recent US fourth national climate assessment found that between 93% to 123% of observed 1951-2010 warming was due to human activities.” (Carbon Brief) According to Carbon Brief, “a human contribution of greater than 100% is possible because natural climate change associated with volcanoes and solar activity would most likely have resulted in a slight cooling over the past 50 years, offsetting some of the warming associated with human activities.”

One cause of global warming is the burning of fossil fuels for electricity and heat production, as it releases stored CO₂ in the air. The NRDC discovered that “the burning of coal, oil, and natural gas to produce electricity and heat accounts for one-quarter of worldwide human-driven emissions, making it the largest single source.”

Deforestation and slash-and-burn agriculture also contribute to global warming, accounting for about a “quarter of global greenhouse gas emissions.” (NRDC) According to The Met Office, “forests remove and store carbon dioxide from the atmosphere. Cutting them down means that carbon dioxide builds up quicker since there are no trees to absorb it. Not only that, trees release the carbon they stored when we burn them.”

Globally, around a fifth of human-driven emissions stem from the industrial sector, including “the manufacturing of goods and raw materials (like cement and steel), food processing, and construction” (NRDC). Other causes of global warming are the burning of gasoline and diesel (petroleum-based fuels) that help power transportation systems and building operations (NRDC).

Melting Glaciers

Glacier and sea ice melting is both a cause and effect of global warming. According to the World Wildlife Fund (WWF): “Arctic ice and permafrost — ground that is permanently frozen — store large amounts of methane.” When the ice thaws, the methane that was stored is released into the atmosphere

and increases the rate of warming. Thus, this process “causes more ice and permafrost to thaw or melt, releasing more methane, causing more melting.” (WWF). Moreover, while the methane is released, “more sunlight is absorbed into the darker underlying land and ocean surfaces, causing further warming and further melting of ice and snow.” (Royal Society). The situation is alarming — if the Arctic sea ice decline continues at the current rate, “then possibly the Arctic will be ice-free by the next three decades.” (Yadav et al.)

Key Issues

Impacts of Global Warming

Global warming has a variety of devastating impacts on a global scale, including the aforementioned melting of glaciers, increased frequency of extreme weather events, and ocean acidification.

Extreme Weather Events

As global warming has impacted the Earth’s climate, extreme weather events have become more frequent and intense. While many factors such as patterns of natural climate variability, atmospheric conditions, and increased precipitation contribute to extreme weather events, a warming atmosphere could have severe impacts. With a greater intensity of heatwaves, there would be an increased likelihood of extra hot days. Further, as the Royal Society notes, “climate warming also increases evaporation on land, which can worsen drought and create conditions more prone to wildfire and a longer wildfire season.

Additionally, warmer climates are also linked to heavier precipitation events, such as rain and snowstorms. The Royal Society found that “Earth’s warmer and moister atmosphere and warmer oceans make it likely that the strongest hurricanes will be more intense, produce more rainfall, affect new areas, and possibly be larger and longer-lived.” Coastal storms may also become even more destructive with the rise in sea level and rainfall. Thus, climate change is a major issue that will especially harm vulnerable coastal communities and populations living in areas already with hurricanes, tornadoes, and more. One notable example is Hurricane Harvey that made landfall in the US states Texas and Louisiana in 2017. Heavy rainfall led to massive flooding, causing 105 direct and indirect deaths, displacement of over 30,000 people, damage or destruction of more than 200,000 homes and businesses, and \$125 billion in damage.

Ocean Acidification

By absorbing atmospheric CO₂, the ocean serves as a 'carbon sink,' slowing the effects of climate change. However, as the absorbed CO₂ dissolves in the ocean, carbonic acid is produced and the pH value of the water decreases, meaning that the ocean becomes more acidic. In fact, BIOACID found that since the start of the Industrial Revolution, "the ocean has absorbed about 30% of all the CO₂ released into the atmosphere by human activities" and "the average pH of the global ocean surface has already fallen from 8.2 to 8.1, corresponding to an increase in acidity of about 26%." Ocean acidification is an especially critical issue for the Arctic, as the cold polar water has lower water temperatures that allow even more CO₂ to be absorbed from the atmosphere.

Ocean acidification is detrimental to Arctic ecosystems and animal life. "Already, high levels of acidification in the cold waters of the North Pacific have caused some oyster die-offs in the U.S. Pacific Northwest." (Yale School of the Environment) As "food webs in Arctic and Antarctic waters are relatively simple compared to other regions of the planet," changes in ecosystems could threaten and endanger species (BIOACID). Pteropods are a key species in the Arctic region that may become vulnerable to population decline and cannot be easily replaced. According to BIOACID, "Arctic pteropods are especially threatened by ocean acidification in winter." Since the water is cooler and more acidic, and the majority of pteropods are at an early developmental stage during winter, the species may not be able to adapt to changes in their environment. The food web will be severely disrupted if pteropods are not able to adapt to a more acidic ocean as many marine animals including fish and whales consume pteropods or like seals survive by relying on other marine animals that consume pteropods.

Further, the carbonate ions that are created as CO₂ reacts with water are essential to marine animals with shells or skeletons made of the calcium carbonate minerals aragonite or calcite (such as starfish and clams). If the carbonate ions are all used to buffer the ocean acidity, such marine animals would struggle to create shells and skeletons, and the shells may even begin to corrode if the ocean reaches undersaturation, a state of low carbonate concentration. In fact, "Models predict that large parts of the Arctic will cross this threshold as early as 2030, and researchers forecast that most Arctic waters will lack adequate aragonite for shell-building organisms by the 2080s." (Yale School of the Environment)

Not only does ocean acidification impact marine animals of the Arctic, but it also has wide-reaching effects such as economic impacts on the fishing industry and tourism industry, as well as the global food supply. As climate change worsens and fish stocks change in size or

range, the traditional inshore fisheries will have to switch from using small boats to boats that can follow migrating stocks into high seas. Adaptations to the fishing industry are critical as “low-pH waters are [also] being exported to shelf regions of the North Atlantic, which are biologically productive and support important commercial fisheries.” (UArctic) Additionally, the tourism industry that currently profits off of whale and bird watching and sport fishing will be impacted by the harmful changes in the marine food web.

Impacts on Wildlife

Countries have economic interests in maintaining or gaining power over the Arctic region, due to the mineral resources available (oil and natural gas reserves and minerals), fishing opportunities, and shipping routes. According to an assessment by the U.S. Geological Survey, the Arctic is estimated to contain 30% (90 billion barrels) of the world’s undiscovered natural gas and 13% of its undiscovered oil. However, Arctic wildlife such as Arctic foxes, beluga whales, seals, walruses, and polar bears may be at risk if industrial and commercial activities increase in the region without any protection for wildlife. The increased presence of ships due to trade between countries and corporations could disturb shorelines, break ice covers, and lead to oil spills. Oil spills are detrimental to the safety of marine animals in multiple ways. Ingestion of oil could poison marine animals’ lungs, enlarge livers, change heart and respiration rates, erode fins, and impair reproduction as “fish eggs and larvae can be especially sensitive to lethal and sublethal impacts.” (NOAA) Once exposed to an oil spill, fur-bearing mammals often lose their ability to insulate themselves from the cold water and thus die from hypothermia, and whales and dolphins are unable to breathe properly due to clogged blowholes. Marine animals’ ingestion of the oil not only affects the contaminated species but also higher-level consumers such as Arctic foxes and polar bears.

Impacts on Indigenous Peoples

Approximately 1 million people (9% of the Arctic population) are part of the 40+ indigenous groups in the Arctic, including the Saami, Nenets, Khanty, Evenk, Chukchi, and more. Especially as indigenous groups have strong bonds with nature and traditions in regards to their identity, issues that arise from global warming have significant impacts on their lifestyles.

Rapid weather changes, severe weather conditions (e.g. strong winds and storms), and changes in ice (e.g. thinning and cracks) are hindering travel accessibility and safety, raising maintenance costs (for housing and infrastructure), and making hunting more dangerous. While previously, communities without road systems could travel by riding snowmobiles over sea ice, the ice is now too thin to support heavy vehicles. For example, “the island community of Diomedede traditionally used an ice runway, but by 2019, the ice had been too thin to support one for a decade, forcing the community to turn to less-reliable

helicopter access.” (NSIDC) The NSIDC finds that “accidents on the sea ice are increasing due to unusual conditions, resulting in injuries and death, loss of valuable equipment, and expensive rescues” and “unexpected storms have left hunting parties stranded.”

Furthermore, disappearing sea ice affects many species that are subject to harvest, “for instance[,] polar bears, seals, whales[,] and some fish stocks depend on ice cover.” Thus, indigenous peoples’ livelihoods are gravely affected, and “the survival of many groups as distinctive peoples is endangered.” (Arctic Centre at the University of Lapland)

Major Parties Involved and Their Views

Arctic Council

The Arctic Council is an Intergovernmental Organization (IGO) that was created in 1996 to promote cooperation and “address the common concerns and challenges faced by the Arctic governments and the people of the Arctic [by] addressing all three of the main pillars of sustainable development; the environmental, social and economic.” (UNEP) Members of the forum include Canada, Denmark, Finland, Iceland, Norway, Russia, Sweden, and the USA. According to the Arctic Council, since 2019, the International Maritime Organization (IMO) has held observer status, meaning that they “can contribute to the Arctic Council through meeting attendance, providing scientific expertise to Working Groups, project proposals[,] and financial contribution.”

Intergovernmental Panel on Climate Change (IPCC)

The IPCC is a UN body that “was created [by the UNEP and the WMO] to provide policymakers with regular scientific assessments on climate change, its implications and potential future risks, as well as to put forward adaptation and mitigation options.” (IPCC) The IPCC conducts findings and releases assessment reports “about knowledge on climate change, its causes, potential impacts and response options.” (IPCC)

United States of America (USA)

The USA is a coastal state of the Arctic and has not ratified the UNCLOS. In November, the Trump administration attempted to start oil drilling plans by starting a 30-day nomination period for oil and gas companies to pick areas of the Arctic National Wildlife Refuge they are interested in drilling. Recently, the US Court of Appeals has rejected an offshore oil drilling project in the Arctic, and after

President-elect Biden's inauguration in January, the USA may take a more protective approach in the Arctic.

Russian Federation

Russia has ratified the UNCLOS and plays a major role in the Arctic due to the economic gain Russia receives through the shipping routes. According to the Arctic Institute, "Russia's Arctic territory stretches along 24,140 kilometers of coastline along the Arctic Ocean and waters above the Arctic Circle from the Barents Sea in the west at the border to Norway to the Bering Sea and the Sea of Okhotsk in the far east."

People's Republic of China (PRC)

Since 2013, the PRC has held observer status in the Arctic Council. The International Institute for Strategic Studies (IISS) found that the PRC's "interest in the Arctic region is clear: access to Arctic natural resources and use of the Northern Route, which work together to enhance its image as a major power." However, Western nations have distanced themselves from cooperating with the PRC and have believed that its participation is disadvantageous to Western and regional interests, as the EU in 2019 declared the PRC a "strategic rival" and reported in a 2018 Parliament Briefing that "China's Arctic policy suggests a strong desire to push for the internationalization of the Arctic's regional governance system."

Timeline of Relevant Resolutions, Treaties and Events

Date	Description of event
November 16th, 1982	<p data-bbox="432 1402 727 1429">UNCLOS Established</p> <p data-bbox="432 1458 1410 1547">First treaty outlining nautical law, signed by 157 countries and ratified by 60 countries.</p>
May 28th, 2008	<p data-bbox="432 1581 707 1608">Ilulissat Declaration</p> <p data-bbox="432 1659 1481 1798">A joint declaration is signed by the 5 coastal states (US, Russia, Canada, Norway, Denmark) to reaffirm responsible management and implementation of appropriate measures.</p>
May 12th, 2011	<p data-bbox="432 1850 1481 1926">Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic</p>

First legally binding agreement signed by the Arctic Council member states. The aim is to strengthen and coordinate aeronautical and maritime search and rescue responses in the Arctic. It is also known as the Arctic Search and Rescue Agreement.

Agreement on Cooperation on Marine Oil Pollution Preparedness and Response in the Arctic

May 15th, 2013

A legally binding agreement is signed by the Arctic Council member states, aiming to build stronger alliances and coordinate to protect the Arctic from oil pollution.

International Code for Ships Operating in Polar Waters

May 15th, 2015

The IMO adopted a legally binding document that “covers the full range of design, construction, equipment, operational, training, search and rescue and environmental protection matters relevant to ships operating in the inhospitable waters surrounding the two poles.” (IMO) Also known as the Polar Code, it entered into force on January 1st, 2017.

Agreement on Enhancing International Arctic Scientific Cooperation

May 11th, 2017

A legally binding agreement is signed by the Arctic Council member states to cooperate in scientific research and entered into force on May 23rd, 2018.

China’s Arctic Policy Paper Published

January 26th, 2018

The document clarifying and providing further information about China’s ambitions in the Arctic is published.

Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean

February 14th, 2019

EU, Canada, China, Denmark, Iceland, Japan, the Republic of Korea, Norway, Russia, USA sign a treaty banning future (16 years) commercial fishing in the Arctic.

USA Trump Administration Starts 30-Day Nomination Period

November 17th, 2020 “Oil and gas companies can pick which parts of Alaska’s Arctic National Wildlife Refuge they’re interested in drilling.” (NPR)

Relevant UN Treaties and Events

- United Nations Convention for the Law of the Sea, 11 November 1982

Evaluation of Previous Attempts to Resolve the Issue

As seen by the lack of agreement between various parties on different issues and the worsening conditions of climate change, previous attempts to resolve the situation have been ineffective. While there have been a couple of noteworthy instances where the Arctic countries cooperated and agreed on treaties — such as the 2011 Arctic Search and Rescue Agreement, 2013 Agreement on Cooperation on Marine Oil Pollution Preparedness and Response in the Arctic, 2017 Agreement on Enhancing International Arctic Scientific Cooperation, or the 2017 Polar Code — the actions outlined in such agreements are limited to specific actions that do not address all issues, such as the rights of indigenous people and territorial claims, and may not be enough to slow the alarming rate of warming.

Challenges remain in resolving the issue at hand. As greater nations are pushing for the globalization of the Arctic due to the growing global maritime industry, clear boundaries must be set between leading actors in determining the international policies that will guide maritime governance.

Possible Solutions

One possible solution is to focus on solving the root causes of climate change, such as the increased greenhouse gas emissions. This solution could be carried out by encouraging nations to cooperate and having IGOs monitor the implementation of current agreements. Such an approach would be ideal in ensuring long term change as it would be effective and call for sustainable development. However, delegates must keep in mind that countries may have different stances on climate change, especially if the country that they are representing prioritizes developing their economy based on fossil fuels over the impacts of global warming. As Less Economically Developed Countries are often more

focused on developing a fossil-fuel-based economy to quickly become a competitor in the global market, incentives may be a necessary component to gain the support of LEDCs and create feasible solutions.

Another possible solution is to build on an existing or create a new treaty outlining specific actions that will be taken regarding certain issues in the Arctic. Delegates could decide to build on UNCLOS with detailed policies or attempt to create a new treaty devoted to the Arctic. When choosing between the two options, delegates should consider which actors the treaty would impact (whether their country would support a global or regional agreement), the content (environmental concerns, limits in resource extraction, development of economic activity such as shipping, protection of and incentives for indigenous people, increasing military presence), and the feasibility.

Lastly, a solution could be to appoint an existing organization or create a UN task force to check and monitor the globalized governance system, coordinate events to raise awareness, streamline data and information, and lead efforts to take measures to manage the situation in the Arctic. Although multiple organizations have been created to highlight the environmental issues in the Arctic, the potential issues that may arise with globalization have not yet been discussed and tackled. Therefore, delegates must consider the question of global governance and decide which actors should be given the power to manage the Arctic governance system.

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