

Behavioural Ecology

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A lot of people think of Alaska as "The Last Frontier" due to its vast amounts of pristine terrain and stunning wildlife. This vast, faraway nation has felt the effects of climate change and other environmental changes. Over the last several decades, Alaska has seen substantial environmental change, which has global ramifications. Here we'll take a look at how some of Alaska's natural changes are impacting the globe at large.

Keywords : *Alterations to ecosystems, landscapes, and glaciers*

Introduction

Among Alaska's numerous glaciers are the renowned Hubbard and Mendenhall glaciers. But these breathtaking ice formations are rapidly receding due to warming temperatures. The melting of glaciers is causing sea levels to rise, which poses a serious threat to low-lying coastal populations throughout the world. Sea levels are rising faster than ever before due to glaciers melting in Alaska, which threatens ecosystems and coastal communities throughout the globe [1-3].

Methodological Approach

Thawing permafrost

Approximately 85% of Alaska is covered by the permafrost layer, which consists of soil, silt, and rock. Nothing can defrost it. The rate of melting of this ice covering is worrisome, unfortunately. By releasing massive amounts of carbon dioxide and methane into the air, permafrost degradation hastens global warming. Instability in infrastructure, such as roads, buildings, and pipelines, due to melting permafrost, also causes damage and economic losses [4].

Exotic animal species

A wide variety of animals call Alaska home, including those that live on land (such as polar bears and caribou) and those that live in the water (such as seals and whales). Climate change in the state is disrupting already delicate ecosystems. Because sea ice melts and temperatures rise, marine mammals have less food and fewer places to lay their eggs, which causes population declines and changes in their migration patterns. Warmer temperatures and altered vegetation also affect the homes and diets of land-dwelling animals. Such alterations in animal behaviour may throw ecological systems into disarray.

Deforestation and the release of greenhouse gases

Due to the dry weather and increasing temperatures, wildfires in the boreal forests of Alaska are happening more often and causing greater damage. Forest fires not only wipe out whole ecosystems and their inhabitants, but they also release massive amounts of carbon dioxide into the atmosphere. The destruction of vegetation and trees leads to higher temperatures, which in turn causes wildfires to be more destructive.

Issues voiced by native communities

The Iñupiat, Yupik, and Aleut peoples, among many others, have relied on the land and its resources for existence for innumerable generations. This group is experiencing directly the consequences of ecological changes in Alaska, which are making it harder for them to engage in subsistence activities like fishing and hunting. Disruptions to migratory patterns, shortages of seafood and animals, and the erosion of cultural traditions pose serious risks to the indigenous people's capacity to maintain their food supply and way of life. Rather than taking place in a vacuum, the biological changes in Alaska are influencing people all across the globe. The melting of glaciers contributes to rising sea levels,

which affect coasts worldwide. When permafrost melts, it releases huge amounts of carbon into the air, exacerbating the climate crisis. Changing animal behaviours are causing havoc in ecosystems and endangering biodiversity. Forest fires contribute to global warming because they emit carbon emissions. In addition, indigenous communities bear the brunt of these transformations, which endanger their traditional practices [5, 6].

International cooperation in reducing emissions of greenhouse gases is essential if we are to avert catastrophic climatic changes. Restoring and conserving Alaska's ecosystems helps mitigate the global impact of climate change while also preserving the state's unparalleled natural beauty. At a time when the world is struggling to deal with the consequences of climate change, Alaska serves as a harsh reminder that sustainable practices and environmental care are desperately required. Alaska is the largest U.S. state and famous for its stunning landscapes, diverse wildlife, and pristine ecosystems. Recent ecological changes in Alaska have been driven mostly by both global and local human activities and adjustments in the environment. The delicate ecosystems and endangered species of Alaska have not been immune to the global impacts of these changes. As we delve further into the ecological changes happening in Alaska, we will find ourselves thinking about how these changes may affect the whole planet.

As a result of glaciers melting, sea levels are rising.

Despite Alaska's extensive glacier system, these breathtaking ice formations are rapidly disappearing due to the effects of climate change. The rapid melting of glaciers as a result of global warming is driving up sea levels. This event poses a significant threat to coastal communities in Alaska and worldwide. Continual increases in sea levels are making low-lying areas and islands more vulnerable to flooding, erosion, and the degradation of farmable land. The melting of glaciers releases freshwater into the atmosphere, which might disrupt ocean currents and so affect global climate patterns [7-9].

Arctic ecosystems devastated

Alaska and the Arctic region are feeling the effects of climate change the most acutely. As a result of the warming climate, the delicate balance of the Arctic's ecosystems is being disrupted, impacting not just land and marine species but also aquatic organisms. Polar bears, walruses, and seals are among the well-known creatures that are struggling to adapt to their new home. The declining food supply for marine creatures brought on by the melting sea ice might lead to disruptions in the food chain. Any disruptions in the Arctic may have far-reaching consequences on ecosystems across the globe due to the region's critical role in regulating the global climate.

Animal behaviour patterns that are evolving

Alaska is a safe haven for many different kinds of wildlife, including large terrestrial species, birds of prey, and marine mammals. The distribution and behaviour of a number of these organisms are changing, nevertheless, due to environmental changes. Birds play an essential role in seed dispersal and pest management, so when their migration timetable is disrupted by changing temperatures and patterns, it might have far-reaching implications on ecosystems throughout the world. Similarly, fish populations may be impacted by changes to marine ecosystems, which might impact fishing worldwide.

Deforestation and the release of greenhouse gases

The massive boreal forests of Alaska, sometimes referred to as the "lungs of the Earth," are now seeing an upsurge in the frequency and intensity of wildfires. Both the duration of fire seasons and the total area burnt have grown as a result of human interference with the climatic system. All of these forest fires are adding to the issue of global warming and greenhouse gas emissions because of the enormous amounts of carbon dioxide that they release into the air. The rate of climate change is accelerated by deforestation because the planet's capacity to absorb carbon dioxide decreases [10, 11].

Native American communities and traditional practices

Many indigenous communities in Alaska have relied on the state's natural resources for generations, using them for sustenance, cultural practices, and spiritual connection. Changes in the environment pose a significant danger to these groups' traditional practices, food sources, and cultural heritage. The cultural identities of indigenous peoples are intricately linked to their traditional hunting and fishing practices, which are being significantly affected by the decline of sea ice and changes in animal migratory patterns. Erosion of coastlines and the danger of rising sea levels also pose the risk of relocation for many indigenous communities.

The far-reaching consequences of Alaska's shifting environment will affect every area. Because of forest fires, rising sea levels, altered animal migratory patterns, and melting glaciers, Alaska serves as a model for the global environmental disaster. Rapid climate change, changed weather patterns, altered ecosystems, and rising sea levels are all manifestations of these changes. In order to address these environmental issues and protect Alaska's unique ecosystems while reducing their global impact, we must all do our part, collaborate on a global scale, and follow sustainable practices. The ecological changes happening in Alaska have far-reaching consequences for the rest of the planet.

Coastal communities throughout the world are facing a growing threat from rising sea levels caused by the melting of glaciers in Alaska. Island and low-lying locations are particularly vulnerable to erosion and flooding, which threatens their agricultural land. Not only will Alaska suffer, but so will every other vulnerable region on Earth as a result of increasing sea levels. Much of the Earth's climate control takes place in the Arctic region, which encompasses Alaska. Global warming is accelerated as a result of a drop in Earth's albedo effect caused by melting Arctic sea ice. All around the world, this cycle influences weather patterns and exacerbates the problem of climate change. As a consequence of ecological changes, wildlife patterns are altering in Alaska, leading to a reduction in biodiversity and the worsening of ecological problems. Polar bears, walruses, and seals are just a few of the many once-thriving species that are now in risk of extinction as a result of human activity. These alterations are having a domino effect on the food chain and might disrupt marine ecosystems and fisheries worldwide [12–14].

The increased frequency and severity of wildfires in Alaska's boreal forests is leading to a significant increase in atmospheric carbon dioxide levels. The emission of greenhouse gases increases, hastening the onset of climate change and the warming of the planet. As forest cover declines, the Earth's capacity to absorb carbon dioxide diminishes as well, creating a vicious cycle. Native Alaskans are bearing the brunt of the state's environmental shifts. The local communities' way of life, economics, and existence depend on the area's natural resources. As a result of coastal erosion, changing migration patterns, and decreasing sea ice, they are losing their fishing grounds, hunting areas, and traditional arts. When indigenous communities are uprooted from their homes by rising waters, it creates social, economic, and cultural problems. Alterations to the Arctic ecosystem may have global meteorological consequences, such as shifting sea ice cover and changing wind patterns. Arctic amplification happens when global warming accelerates in the Arctic relative to the rest of the planet. This has the potential to disrupt atmospheric circulation, which may alter the global patterns of weather systems and jet streams. This may cause catastrophic weather events in remote regions, such as heatwaves, droughts, and storms [15].

Results

Carbon sequestration, water purification, and habitat conservation are just a few of the many important roles played by Alaskan ecosystems. The ecological changes in Alaska are threatening these functions and have an impact on the global ecosystem's stability and resilience. Human populations throughout the world might face a range of far-reaching consequences if these services were to disappear, including less access to clean water, increased vulnerability to natural disasters, and reduced agricultural production. To turn back the environmental clock in Alaska, we'll need a concerted effort from people on every level of government. It is critical to protect ecosystems that are especially vulnerable to climate change, increase the adoption of sustainable practices, and decrease emissions of greenhouse gases if we want to mitigate the global impact of ecological changes in Alaska.

Ecological Change	Global Impact
Melting Glaciers	- Rising sea levels worldwide
	- Disruption of marine ecosystems
	- Changes in ocean circulation patterns
Permafrost Thaw	- Increased vulnerability to coastal erosion and flooding
	- Release of greenhouse gases (CO ₂ , methane)
	- Amplification of global warming
	- Altered ecosystems and habitat loss
Changes in Wildlife Distribution	- Infrastructure damage
	- Shifts in species' ranges and migration patterns
	- Impacts on biodiversity and food webs

	- Potential increase in invasive species
	- Disruption of traditional subsistence activities
Forest Fires	- Increased carbon emissions
	- Degradation of air quality
	- Loss of wildlife habitat
	- Changes in atmospheric composition
	- Potential feedback loop for more fires
Ocean Acidification	- Impacts on marine organisms (corals, shellfish)
	- Disruption of marine food chains
	- Potential decline in fish stocks
	- Threats to coastal communities and economies

Table 1: Some ecological changes in Alaska and their potential global impact.

Many people, including scientists, politicians, and environmentalists, are worried about the effects of the ecological changes in Alaska on a worldwide scale. It is imperative that we work together to solve environmental problems because of how interdependent ecosystems are and how widespread these concerns are. Now, let's explore some important points:

Discussion

Climate change is the primary driver of the biological changes occurring in Alaska, including the melting of glaciers and the changing patterns of species. More investigation into the worldwide effects and origins of climate change is warranted by this conversation. It stresses how critical it is to adopt climate adaptation measures, switch to renewable energy, and reduce emissions of greenhouse gases immediately. Because of its Arctic position, ecological changes in Alaska have an even greater global influence. We may talk about how permafrost degradation, ocean acidification, and the melting of sea ice are some of the specific risks to Arctic ecosystems. Gaining a better understanding of these weaknesses brings attention to the pressing need to save Arctic biodiversity and maintain its vital role in regulating the global climate. Ecosystems outside of Alaska may be impacted by the changes occurring there. Possible topics for this kind of conversation include the interdependence of ecosystems and the havoc that extinctions, shifts in migratory patterns, and changed food webs may wreak. Determining the significance of preserving biodiversity and sustaining ecological balance for the planet's general well-being requires investigating these knock-on consequences.

Native Alaskans are bearing the brunt of the state's environmental shifts because of the profound connection between the land and their way of life. Indigenous peoples' specific struggles, such as the erosion of cultural traditions, risks to food security, and the need of fair and inclusive climate action, might be better understood via this conversation. It stresses that indigenous peoples' knowledge is crucial, and that they should be included in making decisions. International collaboration and policy actions are necessary to address the worldwide consequences of the ecological changes in Alaska. The importance of global accords like the Paris Agreement in reducing the severity of climate change and safeguarding at-risk areas like Alaska might be discussed in this context. In order to bolster adaptation and resilience initiatives, it might also emphasize the significance of international cooperation, information exchange, and resource distribution.

Conclusion

The ecological changes in Alaska provide a chance to talk about how important it is to be creative and use sustainable approaches to solve environmental problems. Sustainable land management approaches, renewable energy sources, and new technologies for tracking and reducing environmental impacts are all potential areas to investigate in this regard. It promotes discussion on how Alaska's ecological changes may be mitigated on a global scale and possible long-term solutions to this problem.

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