Environment Disadvantage

Negative Shell and Affirmative Answers

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Credit: Adapted from files published by the Washington Urban Debate League (WUDL).

Summary/ Strategy

(Do not read this in round- this is meant to help you better understand the Disad)

What is a Disadvantage?

A Disadvantage is a negative argument that says the affirmative plan will cause something bad to happen. It generally has 4 parts:

- Uniqueness- The bad thing isn't happening now (but we are on the brink of a problem).
- Link- The plan causes the bad thing to start happening.
- Internal Link- Explains the steps between the plan and the impact.
- Impact- The really bad thing that happens (e.g. war, extinction, etc.)

Negative Argument Summary:

- Uniqueness: The Arctic environment is currently healing or at least in a somewhat stable state. We are not past the climate tipping point yet.
- Link: Any increased Arctic exploration/ development = more fossil fuel extraction + shipping = more warming, black carbon, oil spills, and militarization. Causes rapid climate change in the Arctic.
- Internal Link: The Arctic is a "planetary keystone." If you disrupt it, the entire climate system is thrown off.
- Impact: Warming → runaway climate change → food shortages, sea-level rise, mass displacement, and human extinction.

Affirmative Argument Summary:

- No Uniqueness: The Arctic is already melting, the AFF is not the sole cause. The status quo is already bad. (The bigger problem is broader global warming/ temperature rise around the globe).
- Link Turn: Some types of development (like green infrastructure or Indigenous-led development) help fight climate change.
- No Link: There are too many possible alternative causes to the impact (called "alt causes"). These are things outside of the plan and outside the control of the AFF (or even outside the control of the US government) that will cause the impact anyways. (For example- drilling for oil.
- Internal Link Defense: Arctic development doesn't necessarily lead to global collapse- there are ways to mitigate it (e.g. emissions limits, environmental protections).
- Impact Defense: Warming is bad but not extinction-level. Tech and adaptation can prevent the worst outcomes.
- AI Turn (if applicable): If the plan helps develop AI or energy systems that solve climate, it flips the DA.

1NC Shell

Uniqueness- The Arctic is healing but on the brink.

TFTC ’24 [Truth for the Commoner; April 1; Truth for the Commoner curates content that surfaces truth and provides actionable advice; Truth for the Commoner, “The Misleading Narrative of Vanishing Arctic Ice,” https://www.tftc.io/arctic-ice-myths-debunked]

Contrary to the predictions made over a decade ago, observational data indicates that there has been no significant trend in Arctic sea ice extent in the last 17 years. Current sea ice extent is recorded to be above the 21st-century average, challenging the notion of an imminent ice-free Arctic summer.

The National Oceanic and Atmospheric Administration (NOAA) has been criticized for presenting misleading information in its Arctic Report Card. Critics argue that NOAA's report only includes satellite data from 1979 onward, allegedly omitting earlier data which shows lower ice extents before 1979, potentially skewing the perception of a long-term declining trend.

Data from before 1979 suggest that the extent of Arctic sea ice was much lower in the early 1970s compared to the peak year of 1979. Publications from that era, including the Guardian and Time magazine, reported on the expansion of snow and ice cover and speculate on the onset of a potential new ice age.

Historical records reveal that periods of warming and cooling have occurred in the Arctic region throughout the 20th century. For instance, the 1970s experienced a significant cooling period, which led to an expansion of Arctic sea ice. This period was preceded by a warming trend in the early part of the century, with several reports noting the substantial melting of Arctic ice and glaciers.

Temperature graphs from untampered U.S. data show higher temperatures and more frequent hot days during the first half of the 20th century, followed by a cooling trend leading up to the 1970s. This cooling is mirrored in the Arctic, with reports from the 1950s indicating a warmer Arctic and reduced ice cover compared to subsequent decades.

The predictions of an imminent ice-free Arctic have not materialized as forecasted, and the lack of a downward trend in Arctic sea ice extent over the past 17 years calls these projections into question. Additionally, concerns over the selective use of data and the omission of pre-1979 satellite data suggest that a more comprehensive and transparent analysis is needed to accurately understand long-term Arctic sea ice trends.

Link- Arctic development and exploration triggers resource wars and locks in irreversible global warming.

Watson ’17 [Paul; May 12; Pulitzer Prize-winning reporter, contributor to Time Magazine; Time Magazine, “A Melting Arctic Could Spark a New Cold War,” https://time.com/4773238/russia-cold-war-united-states-artic-donald-trump-barack-obama-vladimir-putin]

In a land as unforgiving as the Arctic, cooperation is critical to survival. That simple principle, called Piliriqatigiingniq, is a pillar of an ancient social code that has guided Inuit through centuries of hardship, to sustain life and community in one of Earth’s most lethal environments. **Since the end of the Cold War, the U.S., Russia and six other circumpolar neighbors have quietly worked together in the Arctic Council,** a sort of United Nations of the North, even when frictions created heated disputes farther south. Now, **as ancient Arctic ice barriers melt to nothing, the rush to exploit oil, natural gas and other resources has quickened, threatening to destabilize the region.** Secretary of State Rex Tillerson raised hopes Thursday that Arctic cooperation might continue to trump rising tensions elsewhere in the world while handing over the rotating chairmanship of the Arctic Council to Finland. Despite an intense debate in the White House over whether to pull out of the 2015 Paris Agreement to fight climate change, Tillerson joined the Council’s seven other permanent members in signing a fresh commitment to the accord. But he cautioned that U.S. interests, not the views of other countries, will guide Washington’s decision on whether to remain in the climate action agreement. President Donald Trump’s recent decision to overturn President Barack Obama’s 2016 ban on

offshore Arctic drilling pushes the frontiers of fossil fuel extraction further north, right when the world is supposed to be sharply cutting back its carbon output. **A dangerous Arctic paradox has opened: shrinking ice creates more space to compete over, which increases the pace of the onrush**. Forces could be unleashed that endanger more than the spirit of polar cooperation. The health of the planet is at risk. The Arctic is warming at least twice as fast as anywhere else on Earth. Making it easier to drill massive new fields of oil and natural gas would help fuel a climate catastrophe**. Up to a quarter of the world's undiscovered fossil fuel reserves are concealed north of the Arctic Circle. More than 80% of that lies beneath the sea,** according to a U.S. Geological Survey estimate. When Tillerson was Exxon's CEO, he signed a $500 billion deal with Rosneft, Russia's state-owned oil company, to find and tap Arctic reserves. That stalled under economic sanctions following Russia's annexation of Crimea. Exxon has asked the Treasury Department for an exemption in the Black Sea, a request that was rejected. If broader sanctions eventually do melt away with the Arctic ice, more cracks will undermine the 175-nation Paris Agreement to wean the world off fossil fuels. Scientists warn **the Far North may be near, or already past, a climate tipping point. Caught in a calamitous feedback loop, the planet's natural air conditioner may be breaking down**. Sea ice receded to a new record low at both poles this winter. At least three times, temperatures soared as high as 50 degrees Fahrenheit above normal. Ominous signs suggest the Greenland ice sheet may be headed for complete meltdown. That would raise sea levels by 24 feet, according to a recent study. The U.S. military warns that rising seas already threaten coastal bases and "will present serious risks to military readiness, operations and strategy," an expert panel reported last fall. Oil refineries along the Gulf Coast are increasingly vulnerable to storm surges. **Around the world, millions of people living near oceans and river deltas may become refugees as homes and farms, factories and offices, end up under water.** For centuries, ice barriers have protected the High Arctic from the **bloody competition** for resources that has scarred other parts of the planet. **They are collapsing**. This opens new perils for international security. Russia is expanding on its substantial, Soviet-era lead in Arctic military power and civilian infrastructure. The Trump Administration is committed to responding to what it calls Russian aggression. As the Arctic rapidly warms, and the sea ice barrier recedes, **cooperation that has been the hallmark of circumpolar politics since the end of the Cold War is fracturing**. "**The Arctic is key strategic terrain**," Secretary of Defense James Mattis told Congress during his confirmation hearings. "Russia is taking aggressive steps to increase its presence there. I will prioritize the development of an integrated strategy for the Arctic." Russian President Vladimir Putin's military buildup has included moving two brigades to the Far North, reopening several airstrips, and starting construction of a new base in the Laptev Sea. Mattis also told Congress "climate change is impacting stability in areas of the world where our troops are operating today" and combat planners need to take a warming planet into account. That's especially true in the Arctic, where Russia has long been the dominant power. **Russia has more icebreakers than the rest of the world combined, with plans for at least 11 more, including nuclear-powered vessels strong enough to penetrate ice several yards thick.** The U.S. Coast Guard has two seaworthy conventional icebreakers, the medium-class USCGC Healy and the much older USCGC Polar Star, a heavy icebreaker commissioned in 1976. The Coast Guard, which needs a fleet of six icebreakers according to a Department of Homeland Security assessment, has only one in the design stage. If built, it could cost $1 billion. At a recent conference on the Arctic in Archangelsk, Putin tried to calm security concerns by stressing a desire to "maintain the Arctic as a space of peace, stability and mutual cooperation." But Russia's Arctic neighbors remain suspicious. Sweden brought back the military draft in March and, along with Finland, is debating whether to join NATO, which could spur Russia to further strengthen its Arctic forces. The history of human conflict over resources is long and ugly, but it doesn't have to spread to the top of the world. Russia's military strength in the Arctic is still far below Cold War levels. **Green energy sources are getting steadily cheaper, and becoming more widespread, which could persuade investors that pushing higher into the Arctic for fossil fuels isn't worth it.** We still have time to pause, listen and heed the Arctic's lessons, as the Inuit did long ago.

Internal Link- The arctic is key to global sustainability and warming.

Carmack '19 [Eddy, Gail Whiteman, Jeremy Wilkinson, Jan-Gunnar Winther; January 9; Senior Research Scientist Emeritus for the Department of Fisheries and Oceans at the Institute of Ocean Sciences; Director of the Pentland Centre for Sustainability in Business at Lancaster University; Sea Ice Physicist at the British Antarctic Survey; Director of the National Centre for the Ocean and the Arctic; World Economic Forum, "4 Reasons Why The Arctic Is Key To Our Planet's Survival," https://www.weforum.org/agenda/2019/01/4-reasons-why-the-arctic-is-key-to-our-planets-survival]

There are four reasons why the Arctic Ocean is distinct from other oceans and **critical to our planet's survival**: First, while this relatively small (by ocean standards) marine environment holds only 1% of the world's ocean volume and occupies only 3% of the world's ocean surface area, its impact on the global climate system is **disproportionately large**. Second, though small in area, **it scoops up over 10% of global river runoff** and claims twenty of the world's 100 longest rivers. Third, the Arctic marine domain comprises about a **third of the world's coastline**. And fourth, the Arctic Ocean contains one-quarter of the world's continental shelf, of **immense socio-ecological importance**. On all counts, the little Arctic Ocean holds its own on the global stage. Despite its importance, the Arctic Ocean sometimes goes missing from public ocean-talk as more 'local' marine issues take centre stage. A key point for non-experts is to recognize that the Arctic Ocean is different from other oceans and it is the **critical driver of** the **global oceanic conveyor belt**. For example, the Gulf Stream and North Atlantic Current are strongly regulated by processes that occur in the Arctic. The Arctic Ocean is remote to many of us, but its **influence can be felt everywhere**. How do we know this? Oceanographers have robust scientific evidence on the role the Arctic plays within our planet. For instance, the global hydrological cycle determines the distribution of water around the planet – and affects **food and water security globally**. This cycle begins in warmer climates, with the equatorial trade winds and mid-latitude westerlies. It is refined and shaped by the global distribution of land masses that, in the northern hemisphere, collect precipitation and direct it poleward through massive rivers. These rivers introduce substantial amounts of fresh water into the upper layers of the Arctic Ocean, providing the required conditions for an ice cover to form, and regulating **nutrient supplies** and **biological productivity**. But these dynamics are undergoing unprecedented and worrying changes that are already visible. Jonathan Smith, producer of Blue Planet II, reflected on the new realities of filming in the Arctic Ocean: "We were all set and ready to film but we needed two major things – walrus and ice. I had expected that walrus may be hard to find, but I did not expect it to be hard to find ice in the Arctic…. the crew were all commenting how surprisingly warm it was." They were not mistaken. Over many years, scientists have been recording changes in global temperature, hydrological cycles and sea-ice cover. These changes have all had significant and eminently observable effects on the Arctic Ocean. Over the past two decades alone, summer sea-ice coverage in the Arctic Ocean has decreased by about seven million square kilometres to just over 3 million square kilometres. This loss represents a surface area larger than all but about a dozen countries in the world. However, the Arctic Ocean is not just a passive victim of anthropogenic change: it also drives disruptions back to the global system in ways that were overlooked even a decade ago. Though the exact mechanisms are still debated, Arctic sea-ice loss may be affecting both ocean currents and mid-latitude weather patterns along our southern borders. And the processes occurring in the Arctic play a vital role in **connecting** the **Pacific** and the **Atlantic**. The fabled Northwest Passage is more than a destination for explorers and commercial ship traffic; the Arctic is an oceanographic freight train that ties together and influences other **maritime regions** and the **global climate system**.

Impact- Warming causes extinction.

Ng '19 [Yew-Kwang; May 2019; Professor of Economics at Nanyang Technology University, Fellow of the Academy of Social Sciences in Australia and Member of the Advisory Board at the Global Priorities Institute at Oxford University, Ph.D. in Economics from Sydney University; Global Policy, "Keynote: Global Extinction and Animal Welfare: Two Priorities for Effective Altruism," vol. 10, no. 2, p. 258-266]

Catastrophic climate change

Though by no means certain, CCC causing **global extinction** is possible due to **interrelated factors** of **non-linearity**, **cascading effects**, **positive feedbacks**, **multiplicative factors**, **critical thresholds** and **tipping points** (e.g. Barnosky and Hadly, 2016; Belaia et al., 2017; Buldyrev et al., 2010; Grainger, 2017; Hansen and Sato, 2012; IPCC 2014; Kareiva and Carranza, 2018; Osmond and Klausmeier, 2017; Rothman, 2017; Schuur et al., 2015; Sims and Finnoff, 2016; Van Aalst, 2006).7

A possibly **imminent** tipping point could be in the form of 'an abrupt **ice sheet collapse** [that] could cause a **rapid** sea level rise' (Baum et al., 2011, p. 399). There are many avenues for **positive feedback** in global warming, including:

- the replacement of an ice sea by a liquid ocean surface from melting reduces the reflection and **increases** the **absorption** of sunlight, leading to **faster warming**;
- the drying of **forests** from warming increases forest fires and the release of **more carbon**; and
- higher ocean temperatures may lead to the release of **methane** trapped under the ocean floor, producing **runaway** global warming.

Though there are also avenues for negative feedback, the scientific consensus is for an overall net positive feedback (Roe and Baker, 2007). Thus, the Global Challenges Foundation (2017, p. 25) concludes, 'The world is currently **completely unprepared** to envisage, and even less deal with, the consequences of CCC'.

The threat of **sea-level rising** from global warming is well known, but there are also other **likely** and more **imminent** threats to the **survivability of mankind** and other living things. For example, Sherwood and Huber (2010) emphasize the **adaptability limit** to climate change due to **heat stress** from high environmental wet-bulb temperature. They show that 'even **modest** global warming could … expose **large fractions** of the [world] population to **unprecedented** heat stress' p. 9552 and that with substantial global warming, 'the area of land rendered **uninhabitable** by heat stress would dwarf that affected by rising sea level' p. 9555, making **extinction** much more **likely** and the relatively moderate damages estimated by most integrated assessment models **unreliably low**.

2NC/ 1NR Extensions

Uniqueness Extensions

Ice is stable—alarmist predictions are wrong

Bastasch '15 –[Michael; April 29; Senior reporter with The Daily Caller News Foundation, a D.C.-based news organization specializing in policy reporting and investigative journalism; The Daily Caller, " "'Irreversible' Arctic Ice Loss Seems to Be Reversing Itself," http://dailycaller.com/2015/04/29/irreversible-arctic-ice-loss-seems-to-be-reversing-itself/#ixzz4LO47rQRG]

For years, scientists have been warning the Arctic was in a "death spiral" and could soon be ice-free during the summertime and shrink to unprecedented levels due to man-made global warming. Such ice loss could be "irreversible," some scientists claimed.

But new research from the Scripps Institution of Oceanography says that predictions of a permanently ice-free Arctic are based on "oversimplified" theories. Scripps researchers, who were co-funded by the Navy, found that the Arctic sea ice may be "substantially more stable than has been suggested in previous idealized modeling studies."

"We found that two key physical processes, which were often overlooked in previous process models, were actually essential for accurately describing whether sea ice loss is reversible," Scripps climate scientist Ian Eisenman, co-author of a new study refuting claims the Arctic is in a "death spiral," said in a statement.

"Our results show that the basis for a sea ice tipping point doesn't hold up when these additional processes are considered," echoed Till Wagner, also a Scripps scientist. "In other words, **no tipping point is likely to devour what's left of the Arctic summer sea ice.** So if global warming does soon melt all the Arctic sea ice, at least we can expect to get it back if we somehow manage to cool the planet back down again."

"If the associated parameters are set to values that correspond to the current climate, the ice retreat is reversible and there is no instability when the climate is warmed," according to Eisenman and Wagner's study.

Eisenman and Wagner's study comes after the Arctic hit its lowest maximum sea ice extent on record during February. This was followed by the Arctic having its lowest ice extent for March on record, according to the National Snow and Ice Data Center. Indeed, Arctic sea ice has been declining at a rate of 2.6 percent per decade since 1979.

Scientists and climate pundits have already predicted this year's Arctic summer sea ice extent will be the lowest on record, following poor winter extent. This has only bolstered claims that the Arctic could soon be ice free.

"Summertime Arctic sea ice is not long for this world," lamented Joe Romm, a climate scientist and editor for the liberal blog ThinkProgress. "Because of Arctic amplification, the Arctic warms twice as fast (or more) than the Earth as a whole does."

Romm goes on to cite a February study claiming that Arctic ice is losing its thickness and becoming more susceptible to warmer weather — meaning it's melting a lot faster. The study, published in the journal The Cryosphere found that "annual mean ice thickness has decreased from 3.59 meters [11.8 feet] in 1975 to 1.25 m [4.1 feet] in 2012, a 65% reduction."

"The ice is thinning dramatically," climatologist Ron Lindsay, the study's lead author, was quoted saying.

It wasn't long ago that David Barber, Canada's Research Chair in Arctic System Science at the University of Manitoba, warned there was almost no multi-year ice left in the Northern Hemisphere.

"We are almost out of multiyear sea ice in the northern hemisphere," he told Canada's Parliament in 2009. "I've never seen anything like this in my 30 years of working in the high Arctic … it was very dramatic."

Arctic sea ice extent that year was at its third-lowest extent on record, behind 2007 and 2008, and experts were saying there would be no polar ice during the summer by 2030 for the first time in one million years.

"I would argue that, from a practical perspective, we almost have a seasonally ice-free Arctic now, because multiyear sea ice is the barrier to the use and development of the Arctic," Barber said.

But such predictions have fallen flat, as the Arctic has seen a resurgence of multi-year ice since 2009.

NSIDC and European satellite data show that multi-year sea ice made a big comeback in 2013 and 2014 — increasing from 2.25 to 3.17 million square kilometers during that time and making up 43 percent of the north pole's ice pack.

In fact, **Arctic sea ice extent as a whole seems to be stabilizing despite this year's record low maximum** in February. NSIDC data shows **Arctic sea ice extent is currently within the normal range** based on the 1981 to 2010 average extent.

"Global sea ice is at a record high, another key indicator that something is working in the opposite direction of what was predicted," Dr. Benny Peiser, director of the Global Warming Policy Forum, told the U.K. Express in January.

"Most people think the poles are melting… **they're not,"** he said. "This is a huge inconvenience that reality is now catching up with climate alarmists, who were predicting that the poles would be melting fairly soon."

Arctic ice levels are on the rise---their data is cherry-picked.

Morrison '24 [Chris; March 31; . Environmental Editor, citing Allan Astrup Jensen, who is the Research Director, CEO at Nordic Institute of Product Sustainability and Environmental Chemistry and Toxicology; Daily Sceptic, "BBC's Failed 'Fact Check' of Daily Sceptic Report on Arctic Sea Ice," https://dailysceptic.org/2024/03/31/bbcs-failed-fact-check-of-daily-sceptic-report-on-arctic-sea-ice]

If you pick a particular day, you might just be talking about the weather, states Colls. There is **no correlation** between winter sea ice extent and how much the ice will melt in the summer, added Stroeve. What you see since 1979, continued Stroeve, is that the trend in Arctic sea ice is downwards for four decades. The overall decline in long term Arctic sea ice is very easy to see, adds Colls.

If you **'cherry pick'** the date 1979, probably the high point for Arctic sea ice for almost a century, and draw a line to the present day, the cyclical trend is undoubtedly down. There was more ice around at the high point in 1979 than there is now, nobody disputes that. If you are just after a simple political message of climate collapse to promote the Net Zero fantasy, further examination of the data will be unwelcome. But a more detailed review of the statistics gives a more **realistic interpretation**. According to recent work published by the Arctic scientist Allan Astrup Jensen, the summer ice plateaued from 1979-97, fell for 10 years and then resumed a minimal downward trend from 2007. Jensen observes that either side of the 10 year fall after 1997, there have been **minimal losses**.

In fact using a four-year moving average, the trend has been **slightly upwards** over the last few years. The graph below is compiled by the investigative science writer Tony Heller and shows the recent stability of Arctic summer sea ice around the minimum recorded every September. A **slight recovery** from about 2012 can be clearly seen.

As we can see, More or Less has produced little more than a narrative-driven attempt to keep the Arctic sea ice poster scare going for as long as possible. Since the drop in the early part of the century, alarmists have been forecasting ice free summers in the Arctic in the near future. Sir David Attenborough told BBC viewers in 2022 that the Arctic could be ice free by 2035. Professor Stroeve claims to have briefed former U.S. Vice President Al Gore, a man who has never lived down reporting that the ice could all be gone by 2014. In fact what has clearly been happening is noted by Tony Heller. They bury the old data going back to the 1950s, "and pretend they don't notice sea ice is increasing again". Nevertheless activists are starting to learn lessons about putting short timelines on their fanciful forecasts. For her part, Stroeve suggests ice free summers in the Arctic by the next 50 years.

Meanwhile, after the 'hottest year ever', the **maximum winter sea ice** for 2024 was recorded on March 14th at 15.01 million sq kms. Polar bear scientist Susan Crockford noted that the 'U.S. headline writers' at the National Snow and Ice Data Centre said it was below the average for 1981-2010. Indeed it was, although this year's total was within two standard deviations, states Crockford. But why compare the a 30-year average to 2010 when another decade of data to 2020 is available? Cynics might note that taking out the higher totals of 40 years ago and replacing them with the lower recent figures would produce – more or less – an **above average maximum** in 2024.

Pumps in the Arctic are solving for now.

McKie '17 [Robert; February 11; Science and technology editor for the Observer Robin; The Guardian, "Could a £400bn plan to refreeze the Arctic before the ice melts really work?" https://www.theguardian.com/world/2017/feb/12/plan-to-refreeze-arctic-before-ice-goes-for-good-climate-change]

Physicist Steven Desch has come up with a novel solution to the problems that now beset the Arctic. He and a team of colleagues from Arizona State University want to replenish the region's shrinking sea ice – by building 10 million wind-powered pumps over the Arctic ice cap. In winter, these would be used to pump water to the surface of the ice where it would freeze, thickening the cap. The pumps could add an extra metre of sea ice to the Arctic's current layer, Desch argues. The current cap rarely exceeds 2-3 metres in thickness and is being eroded constantly as the planet succumbs to climate change. "Thicker ice would mean longer-lasting ice. In turn, that would mean the danger of all sea ice disappearing from the Arctic in summer would be reduced significantly," Desch told the Observer. Desch and his team have put forward the scheme in a paper that has just been published in Earth's Future, the journal of the American Geophysical Union, and have worked out a price tag for the project: $500bn (£400bn). It is an astonishing sum. However, it is the kind of outlay that may become necessary if we want to halt the calamity that faces the Arctic, says Desch, who, like many other scientists, has become alarmed at temperature change in the region. They say that it is now warming twice as fast as their climate models predicted only a few years ago and argue that the 2015 Paris agreement to limit global warming will be insufficient to prevent the region's sea ice disappearing completely in summer, possibly by 2030. "Our only strategy at present seems to be to tell people to stop burning fossil fuels," says Desch. "It's a good idea but it is going to need a lot more than that to stop the Arctic's sea ice from disappearing." The loss of the Arctic's summer sea ice cover would disrupt life in the region, endanger many of its species, from Arctic cod to polar bears, and destroy a pristine habitat. It would also trigger further warming of the planet by removing ice that reflects solar radiation back into space, disrupt weather patterns across the northern hemisphere and melt permafrost, releasing more carbon gases into the atmosphere. Hence Desch's scheme to use wind pumps to bring water that is insulated from the bitter Arctic cold to its icy surface, where it will freeze and thicken the ice cap. Nor is the physicist alone in his Arctic scheming: other projects to halt sea-ice loss include one to artificially whiten the Arctic by scattering light-coloured aerosol particles over it to reflect solar radiation back into space, and another to spray sea water into the atmosphere above the region to create clouds that would also reflect sunlight away from the surface.

Link Extensions

Exploration Links

Any new Arctic development exacerbates global warming and risks environmental disaster

Corwin 2015

Samuel Corwin, Renewable Energy Market and Policy Analyst, "The Case Against Arctic Resource Exploration." Duke University, March 19, 2015.
https://sites.nicholas.duke.edu/statsreview/samuel-corwin-the-case-against-arctic-resource-exploration/

Despite vast potential for Arctic energy **resources, the Arctic should remain unexplored due to considerable environmental effects that resource exploration would have on the Arctic, and the world, as a whole. Arctic resource exploration will have considerable effects on Arctic ice, global warming, and the risk of environmental disaster.** As nations seek to increase national revenue and decrease dependency on foreign oil, various organizations increasingly look towards the Arctic for resource exploration. The Arctic contains an estimated 13% of undiscovered international oil, and approximately 30% of undiscovered international gas (Berdanier, 2015). Of total Arctic energy resources, gas comprises 67.7%, with oil making up 22.4%, and natural gas liquids (NGL) coming in at 10% (Praprotnik, 2013). These Arctic resources could account for an estimated 412,157 million barrels of oil equivalent (Praprotnik, 2013). Potential Arctic resources could thus provide a variable amount of energy and revenue for the five coastal states in the Arctic: Canada, the United States, Russia, Norway, and Greenland. The issue, however, is the **severe environmental degradation** that **could result from Arctic resource exploration.** Due to increased global warming over the past few decades that has manifested in the form of increased global mean temperatures and more extreme weather patterns, **Arctic ice has decreased considerably, a process that will greatly be exacerbated by resource exploration** in the area. As **shipping vessels** travel through the Arctic, the incomplete combustion of hydrocarbons **emit**s **black carbon, which** becomes lodged in Arctic snow and ice (Ebinger and Zambitakis, 2009). This black carbon **darkens the ice and snow, allowing it to absorb more sunlight, thus melting it at a faster rate** (Ebinger and Zambitakis, 2009). Considering the difficulty in navigating dense ice in the Arctic, **an increased rate of ice melt would make shipping through the region easier. Increased ease of shipping would increase the amount of vessel traffic in the area, further exacerbating the rate of ice melt** (Ebinger and Zambitakis, 2009). In addition to the issues of increasing the rate of melting ice in the Arctic, **resource exploration in the area will also aggravate global warming. The ice-capable ships needed to navigate the Arctic burn more fuel** than comparable transport ships because extra fuel is required to push through the ice, **causing an unnecessary rise in** shipping-related **emissions** (Ebinger and Zambitakis, 2009). Furthermore, environmental scientists tend to agree that to prevent irreversible and devastating

effects of global warming, the average global temperature increase cannot exceed 2° Celsius (McGlade and Ekins, 2015). In a recent study examining the effects of burning fossil fuels on global warming, scientists explored various feasible scenarios in which global temperature rise does not exceed 2° C by 2050 (McGlade and Ekins, 2015). In all of those scenarios, they determined that all Arctic resources needed to be classified as unburnable in order to prevent a 2° C global temperature increase (McGlade and Ekins, 2015). Besides **the exacerbation threat of global warming posed by Arctic resource exploration**, searching for oil and gas in the region also poses the risk of environmental disaster, likely in the form of an oil spill. As evident from the Deepwater Horizon oil spill in the Gulf of Mexico in 2010, catastrophic spills can occur in warm, easily-navigable waters with a long history of resource extraction. The risk of such spills is much higher in the Arctic than in warmer and iceless environments such as the Gulf of Mexico, as the Arctic is harder to access and new, yet-to-be-proven technology is required. These risks are heightened by the uncertain weather patterns in warming Arctic waters, the challenge faced by navigating broken ice, and the lack of maritime traffic management (Ebinger and Zambitakis, 2009). Furthermore, should a spill occur in the Arctic, the environmental effects can be even more devastating than if it were to occur elsewhere; ice interferes with the natural decomposition of oil, enabling the spill to persist for a longer time (Ebinger and Zambitakis, 2009). **Despite the potential for economic and energy resources, the Arctic should be classified as off-limits to resource exploration. This verdict results from the increased rate of ice melt, the exacerbation of global warming**, and the high potential for an oil spill that all result from Arctic energy exploration.

Arctic development damages the environment in multiple ways. The more development, the more damage caused.

US Climate Resilience Toolkit 2025

US Climate Resilience Toolkit, "Arctic Development and Transport." Arctic.gov, 2025

https://toolkit.climate.gov/arctic-development-and-transport

As sea ice declines in the Arctic, **activities such as trans-Arctic shipping,** oil and gas **extraction, mining, and tourism increase risks to people and ecosystems across the Arctic.** Oil spills and other **drilling- and maritime-related accidents can foul water and land, and increased traffic increases the risk of introducing invasive species. Greater levels of industrial activity also have the potential to alter the distribution of species, disrupt subsistence hunting and gathering activities, and create or exacerbate a range of social issues.** At the same time, development activities may provide new economic opportunities for Arctic communities.

Development Links

Development in the arctic brings noise pollution and increased traffic that hurts the environment.

Bullens ’24 [Lara; August 6; Writer and reporter for France24 specializing in American politics; France 24, “As Arctic ice vanishes, maritime traffic boom fuels the climate crisis,” https://www.france24.com/en/environment/20250608-as-arctic-ice-vanishes-maritime-traffic-booms-fuel-climate-crisis]

The Arctic helps keep the planet's climate in balance. As sea ice perishes and maritime traffic increases, further accelerating global warming, environmental consequences become ever more far-reaching.

“The polar regions act to help cool the rest of the planet through the white ice reflecting energy from the sun back to space,” Buzzard explained. “They act a bit like a giant freezer for the rest of the planet.”

This has an effect on global temperature. “Sea ice regulates heat exchange between the atmosphere and ocean, impacting the global circulation of heat,” said Buzzard. “[So] anything that reduces the amount of ice, or darkens it, can mean less energy is reflected, which means extra warming, which then has consequences for the entire planet.”

Some changes are being implemented to slow down this worrying feedback loop. A ban on heavy fuel oil, which releases black carbon, was introduced in July 2024, though some vessels can continue to use it until July 2029.

The UN agency responsible for regulating maritime transport, the International Maritime Organization (IMO), also pledged to reduce emissions by at least 20 percent in the next five years.

But the Clean Arctic Alliance, a group of 21 NGOs who advocate for government action to protect the Arctic's wildlife and its people, insists there is not enough being done to curb the rise of black carbon and methane pollution from shipping in the Arctic. Its lead advisor, Sian Prior, said that “in recent years, black carbon emissions from Arctic shipping have more than doubled,” in a statement published on 14 May.

For Buzzard, the economic interests of using Arctic shipping routes may be beneficial. But increased traffic must be coupled with strict environmental regulations.

“While there can be a saving both in terms of carbon and time for ships to travel across the Arctic, this is a very fragile ecosystem that is already struggling to cope with changes from human-created climate change,” she said.

“Sea ice not only acts to help cool the planet, it is a habitat for creatures like polar bears that use the ice for hunting,” Buzzard noted. The polar bear, now a mascot for environmental issues in the Arctic, relies on sea ice to hunt and move around to find crucial denning areas. It accounts for over 96 percent of the animal's critical habitat.

Increased traffic also brings noise pollution, which disturbs mammals who travel through these frozen waters, like whales. Pods use sound to find their food, mates, avoid predators and migrate. A recent study found that underwater noise in some places in the Arctic Ocean has doubled in just six years because of increased shipping.

The list of environmental consequences of the maritime traffic boom in the Arctic goes on. Vessels navigating through the Arctic also release air pollutants, flush out sulphur oxide into the ocean through scrubbers that remove the substance from a ship's exhaust, and can leave behind litter.

“There is also the increased risk of pollution from oil spills,” added Buzzard.

Development spurs oil and gas burning in the arctic that melts it.

Borshchevskaia ’22 [Ekaterina, Valerie Gorokhovskaya, Maria Khludova, Erdni Mangutov, Anna Shapulenko; June 28; Ira Weiner Fellow at The Washington Institute and a fellow at the European Foundation for Democracy, Faculty at St. Petersburg Polytechnic University, recent graduate of UWC Dilijan from Kalmykia, Russia, Erasmus Mundus Joint Master in Global Environment and Development

and has worked at the University of Copenhagen on climate and development projects; The Arctic Institute, "Pollution in the Arctic: Oil and Gas Extraction on the Continental Shelf as a Major Contributor," https://www.thearcticinstitute.org/pollution-arctic-oil-gas-extraction-continental-shelf-major-contributor]

Global climate change affects the Arctic region more than any other part of the world – the Arctic is warming up to seven times faster than mid-latitudes.1) While eco-activists and environmental organizations point out that this process is a threat to the whole world, oil and gas companies see a great opportunity in developing their offshore projects on the continental shelf due to several reasons. Firstly, the melting of glaciers and sea ice provides access to the new oil and gas fields2) that are estimated to account for 5.3 percent and 21.7 percent of the global proved oil and gas reserves.3) Secondly, a longer ice-free period reduces the costs of exploration and production activities.4) Thus, the Arctic has a potential for hydrocarbon's energy development and hence the problem of affiliated pollution is acute.

Scientific research is mostly concerned with the remote sources of Arctic pollution. However, the ongoing oil and gas extraction on the Arctic continental shelf has already had a devastating impact on the composition of the Arctic atmosphere. One of the main sources of Arctic air pollution is gas flaring – the practice of burning associated gas, a common byproduct of oil extraction. The joint study of Norwegian, Finnish, and Russian scholars concluded that in the Arctic region gas flaring contributes to a much larger share of total black carbon emissions: in fact, it accounts for 42 percent of all Arctic black carbon surface concentrations, when the global average is only 3 percent.5) It is essential to highlight that the method of gas flaring is used at the Prirazlomnoye field, the only Russian project on the Arctic shelf.6) In 2021 140.57 million m3 were flared on the Prirazlomnaya offshore platform.7) The pollutants released during the gas flaring and other oil and gas exploration activities on the Arctic shelf facilitate the warming of this region, which has implications for the biodiversity in the area and the lives of at least 5 million people,8) including the Indigenous peoples. Therefore, the issue of the pollution related to oil and gas extraction on the Arctic shelf is worth consideration.

Internal Link Extensions

Arctic Key

The Arctic is Key- It also cascades into every other planetary system.

Nuka ’10 [Nuka Research and Planning Group; December 1; Environmental consulting firm offering a range of services to support policy development, planning, training, outreach and facilitation for international clients in industry, government, and non-profit sectors; Nuka Research, “Drilling for Oil in the Arctic: Too Soon, Too Risky,” http://assets.worldwildlife.org/publications/393/files/original/Drilling_for_Oil_in_the_Arctic_Too_Soon_Too_Risky.pdf?1345753131]

Before we delve into the details, however, there is a simple question that merits posing: Why should we care about the Arctic when most of us don’t live there? Planetary Keystone The Arctic and the subarctic regions surrounding it are important for many reasons. One is their **enormous biological diversity**: a kaleidoscopic array of land and seascapes supporting millions of migrating birds and charismatic species such as polar bears, walruses, narwhals and sea otters. Economics is another: Alaskan fisheries are among the richest in the world. Their $2.2 billion in annual catch fills the frozen food sections and seafood counters of supermarkets across the nation. However, there is another reason why the Arctic is not just important, but among the most important places on the face of the Earth. A **keystone species** is generally defined as one whose removal from an ecosystem **triggers a cascade of changes** affecting other species in that ecosystem. The **same** can be said of the Arctic in relation to the rest of the world. With **feedback mechanisms** that affect **ocean currents** and influence **climate patterns**, the Arctic functions **like a global thermostat**. **Heat balance**, **ocean circulation** patterns and the **carbon cycle** are all related to its regulatory and carbon storage functions. Disrupt these functions and we effect far-reaching changes in the conditions under which **life** **has existed** **on Earth** for thousands of years.

Green Tech Can’t Solve

There isn’t time for tech to solve climate change

Dr Jonathan **Foley 3/30** [Jonathan Foley is a renowned PHD environmental scientist, sustainability expert and the director of Project Drawdown, the world’s leading resource for climate solutions’; New tech won’t save us from climate change. Here’s what will; Science Focus; March 30, 2024] https://www.sciencefocus.com/nature/climate-change-tech-solution

The fundamental reason high-tech solutions won’t save us from climate change is simple: time. Time is by far the most important variable – and the one thing technology can’t give us more of. Climate change is a cumulative problem.

The warming we see now is caused by the year-by-year, decade-by-decade build-up of greenhouse gas pollution in Earth’s atmosphere. The severe climate disruptions of 2023 – the record temperatures, storms, fires and other disasters – weren’t caused by 2023’s emissions alone. Nor were they caused by those of 2022. They were caused by our long-term, cumulative emissions, building up over many, many years.

Over the past several decades we’ve been emitting a lot of greenhouse gases – tens of billions of tonnes each year, adding up to a staggering amount of pollution dumped into the atmosphere. The cumulative impact of that pollution has fundamentally changed our atmosphere and climate system.

The longer we keep emitting greenhouse gases, the more this pollution builds up in the atmosphere, and the more climate heating it causes. It's a process that effectively locks in warmer temperatures on our planet for thousands of years to come. The only solution is to stop polluting as quickly (and as safely and equitably) as possible.

To avoid the worst outcomes of climate change, we need to start lowering our emissions immediately. By cutting emissions now, and continuing to cut them in each consecutive year, we can reduce the future impacts of climate change. Every tonne of greenhouse gases we don't emit, starting today, will help reduce the amount of warming we'll see. Every tonne matters. Every year matters.

Solutions today for saving tomorrow

That's why we need to focus on the solutions we already have. Despite what some think, climate solutions are already here. In fact, today's climate solutions are abundant, whether they're achieving huge gains in efficiency, reducing food waste, deforestation, and other destructive processes, electrifying our homes and vehicles, plugging methane leaks in oil and gas, or switching to zero-carbon energy sources. My organisation, Drawdown, is the world's leading resource for learning more.

Better yet, we should focus more attention on the fastest 'emergency break' climate solutions that have an immediate impact on the atmosphere, quickly helping drive down emissions.

The top such measures include stopping deforestation (which accounts for about 11 per cent of global emissions – more than the entire US economy), curbing methane emissions (which have a disproportionately fast impact on climate), and cutting energy, food and industrial waste as rapidly as possible.

These fast-acting climate solutions can buy us time for other tactics – building new power-generation systems, transmission lines, energy-efficient buildings and transportation infrastructure – to kick in.

The worst possible thing we can do is wait, hoping that a new, 'better' solution will arrive to solve the problem. Waiting means we continue to spew pollution into the atmosphere, locking in more warming. Waiting is the enemy of climate action.

At the COP28 conference in November, Bill Gates once again told the world that we can't solve the worst of the climate crisis with the technologies we have now. But that's not really true.

We can – it's just that some of these solutions are inconvenient or expensive. For the most part, we have the tools we need. What we don't have, is time. That's why we shouldn't wait for new technologies.

Fusion's for the future

We shouldn't wait for fusion. Government research into fusion energy has been going on since the 1950s, with little of substance to show for it. Despite rosy hype, decades of effort and billions spent, we're still many years away from a commercial energy source. As the wry saying goes: fusion energy is 20 years away… and it always will be.

We shouldn't wait for advanced nuclear power, either. Nuclear energy generation is stagnating across much of the world, hit by lengthy delays and cost overruns. Promises of better, cheaper, faster, safer nuclear power plants, repeated over decades, have never been met.

The last hyped-up technology, the Small Modular Reactor, has recently faced embarrassing delays and failures, casting doubt on the commercial rollout of this technology. And we shouldn't wait for industrial carbon capture techniques.

After decades of work and tens of billions of dollars spent, such technology is still incredibly ineffective at removing carbon dioxide from the atmosphere. Projects are still laughably small, wildly expensive and consume massive amounts of energy that would be better used elsewhere.

It's unlikely that these technologies will make any real dent in the atmosphere for decades to come, if ever. Their only use, so far, is as a PR fig leaf for fossil fuel companies.

In the race against climate change, it's quite simple: time is more important than tech. Wishing and waiting for solutions that may never come is exactly the wrong thing to do. So, for now, we must stop dreaming about being Captain Kirk or Doctor Who, and start deploying the tools that are available now.

There are science-backed solutions we can use today – and there's no time to wait to see what else science fiction can conjure up at the last minute.

“Green tech” can’t solve climate change

Fuge 21 [Lauren Fuge is a winner of the UNSW Bragg Prize for Science Writing; Tech alone cannot solve climate change; Cosmos; August 5, 2021]
https://cosmosmagazine.com/technology/tech-alone-cannot-solve-climate-crisis/

An international team of scientists says that we cannot rely on technology to meet climate targets – instead, wealthy countries must change their lifestyles to dramatically reduce emissions and avoid climate breakdown.

The new article, published in Nature Energy, calls for the urgent development of new climate models that explore ways economies can remain stable without constantly growing, reducing the reliance on potentially unfeasible new technologies to fix our problems.

“We cannot keep temperature rises below 1.5 degrees using technology alone – unfortunately this will require lifestyle changes in wealthy countries,” says Manfred Lenzen from the University of Sydney, co-author of the study.

“Because we’ve not implemented significant emissions reductions over the past decades when we should have, we now need to reduce emissions rapidly and like we’ve never done before.”

Models attempt to predict future temperatures and climate based on current data and simulations; they can follow a variety of pathways to different outcomes based on our choices now.

Many of these current models accept that economies will continue to strive for growth, and factor in dramatic technological change in order to meet climate targets such as the Paris Agreement.

The United Nations Framework Convention on Climate Change, for example, argues that innovative technology is essential for not only cutting greenhouse gas emissions but also adapting to the impacts of climate change.

But this new study argues that technological fixes – such as carbon capture and storage, nuclear fusion, or injecting particulates into the atmosphere – may be unfeasible to scale up to the required levels, especially as increased economic growth drives up energy demand.

The authors point out that to remove carbon from the atmosphere at a fast enough rate, direct air carbon capture and storage (DACCS) methods may use up to half of the world’s current electricity generation. This would then make it difficult to make the global transition to renewables.

“Scientists have raised substantial questions about the risks of negative emissions technologies and the feasibility of sufficiently decoupling economic growth from rising emissions,” says Jason Hickel, lead author of the paper from the London School of Economics and Political Science (LSE).

“Put bluntly, these approaches may not be adequate to address the crisis we face. We’re gambling the future of humanity and the rest of life on Earth because of the assumption that GDP must continue to grow in rich countries.”

This echoes previous research arguing that over-reliance on new technology is enabling us to delay a dramatic reduction in emissions, creating a dangerous cycle of technological promises and re-framed climate change targets.

Instead, scientists call for widespread cultural, social and political transformation.

Innovation can’t solve climate change – it sidesteps backlash from a century of pollution.

Felix 10-23-20**23** (Kwolanne Felix, Columbia University Graduate with a focus on African diaspora, international development, gender-responsive frameworks and environmental policies; “Our Fixation on Green Technology Harms Our Ability to Confront Climate Crisis”; truthout; Accessed 7-24-2024; https://truthout.org/articles/our-fixation-on-green-technology-harms-our-ability-to-confront-climate-crisis/) GH AB:(

Green technology is at the forefront of many climate conversations, from electric cars, to solar energy batteries, to the burgeoning interest in carbon capture. Though sometimes well-meaning and useful, **green technology is only one piece of the greater climate solutions pie. A narrow focus on green technology** as a panacea for the climate crisis can **obscure the importance of immediate political action and social change.** Before I joined the climate movement, I, like many Americans, saw the climate crisis as just a scientific problem. This made sense to me because it was scientists who, through decades of research, linked carbon emissions to global warming. So, if scientists identified the problem, then science and technology could get us out. If we had new energy sources, more efficient cars and could capture carbon, our problems would be solved, I mistakenly once thought. However, **framing climate problems as a science issue is a strategic misplacement of responsibility that benefits the corporations** that profit from the perpetuation of the status quo. **This framing is a strategy meant to displace the burden of responsibility for action from fossil fuel companies**, polluting industries and acquiescent politicians, all of which are to blame for the climate crisis's root causes. The focus on technology ignores many factors. For one, waiting on a perfect technology without a swift reduction in emissions and an urgent transition away from fossil fuels will doom us to the worst of the climate crisis. Nuclear fusion, for example, will not be ready for mass utilization by 2050; and **neither carbon capture and storage or blue hydrogen alone will solve the climate crisis**. To continue to rely on the hope of such technologies, while ignoring the immediate gravity of the climate crisis, is a mistake — a mistake that many fossil fuel companies hope we will make and buy them more time. We must be realistic and not let the promise of exciting new technology get in the way of the immediate action needed. The ongoing focus on new technologies also helps keep everyday people complacent about the climate crisis. When I was under the impression that we just had to wait for scientists to perfect a miracle invention, I had no interest in climate action. It allowed me to separate myself from the problem, and not keep my elected officials and corporate leaders accountable. However, in the past few years, scientists have made it abundantly clear that this is not the case. **We already have 95 percent of the technology we need. Technologies like renewable energies are ready for an energy transition away from fossil fuels and must be coupled with a scaling down of polluting industries and confronting over-production.** We must also address the appeal of these promised ideal green technologies that continue to capture the public imagination and corporate interest. Emerging technologies like carbon capture and storage and nuclear fusion promise a future where people who live resource-intensive lives, particularly wealthy people in Western countries, can continue to do so in a "green way." This vision of the world is one where fossil fuels are swapped out for renewable resources, without any fundamental challenge to our economic, social or political systems. **We are not in this climate crisis because we have bad technology. We are here because our societies have prioritized the resource-intensive livelihoods of a few, at the cost of the environment and well-being of many.** This narrow and unimaginative vision of a sustainable world is unfortunately holding us back from what needs to happen to address the climate crisis. **There will be no magical technology that will save us**. The answer to climate change has always been much more than just scientific innovation; it is economic, social and geopolitical. We are not in this climate crisis because we have bad technology. We are here because our societies have prioritized the resource-intensive livelihoods of a few, at the cost of the environment and well-being of many. The **unsustainable and polluting technology we have is only responding to our society's obsession to go faster, grow bigger and consume more at any cost.** It is that system of value that must be disrupted to solve the climate crisis. Relying on green technology without systemic change is a Band-Aid approach. Our understanding of technology and its role in our society must also shift. For too long, we've seen technology as a way to dominate or overcome our natural environments. Western societies have built this illusion that we are somehow separate from our local ecologies because of technology. We are not beyond the laws of nature and we can't expand and consume resources endlessly. Technology cannot fix this delusion, and if anything, it can only fuel it. For **centuries, Western countries have invisibilized the ecological costs of our industrial societies. This is often done by relying on nature to absorb pollution, forcing poor communities and communities of color to take the brunt of environmental issues**, and shipping environmental problems off to lower-income countries. In many ways, the climate crisis is a confrontation of this belief. After centuries of ignoring the temporal and physical limitations of our planet, the chickens are coming to roost. Only through systemic change can we avoid ecological collapse, mass displacement and the global turmoil of an unmitigated climate crisis. In my work as a climate advocate, I've had to

accept that our world will have to look very different if we hope to address the climate crisis. The logic of our economic system must be fundamentally challenged. We live on an Earth with a finite number of resources, and infinite economic growth is not only impossible, it is destructive. Our economic logic must shift to calculating success through collective social and environmental well-being, not stakeholder profits. The most carbon-intensive industries and fossil fuel production that continue to jeopardize the livability of our planet must be quickly phased out. Our politicians must prioritize social and ecological health, as two sides of the same coin in promoting well-being. Technologies must be reframed as tools that work with and enhance, not against or independent of, our natural environments. Technology is without a doubt a critical component of creating a more sustainable world. However, **technology can't solve problems that require political, economic and social change**. For that, we must continue to mobilize and demand accountability from politicians and change from corporations. Only through systemic change can we avoid ecological collapse, mass displacement and the global turmoil of an unmitigated climate crisis.

Impact Extensions

Warming

Warming causes extinction

Sprat and Dunlop 19 [David Spratt and Ian Dunlop, *Research Director for Breakthrough National Centre for Climate Restoration and co-author of Climate Code Red: The case for emergency action; **member of the Club of Rome AND formerly an international oil, gas and coal industry executive, chairman of the Australian Coal Association, chief executive of the Australian Institute of Company Directors, and chair of the Australian Greenhouse Office Experts Group on Emissions Trading, "Existential climate-related security risk: A scenario approach," Breakthrough National Centre for Climate Restoration, 5-30-2019, https://docs.wixstatic.com/ugd/148cb0_90dc2a2637f348edae45943a88da04d4.pdf]

2050: By 2050, there is **broad scientific acceptance** that system tipping-points for the West Antarctic Ice Sheet and a sea-ice-free Arctic summer were passed well before 1.5°C of warming, for the Greenland Ice Sheet well before 2°C, and for widespread permafrost loss and large-scale Amazon drought and dieback by 2.5°C. **The "hothouse Earth" scenario has been realised**, and Earth is headed for another degree or more of warming, especially since human greenhouse emissions are still significant. While sea levels have risen 0.5 metres by 2050, the increase may be 2–3 metres by 2100, and it is understood from historical analogues that seas may eventually rise by more than 25 metres. Thirty-five percent of the global land area, and 55 percent of the global population, are subject to more than 20 days a year of lethal heat conditions, **beyond the threshold of human survivability.** The destabilisation of the Jet Stream has very significantly affected the intensity and geographical distribution of the Asian and West African monsoons and, together with the further slowing of the Gulf Stream, is impinging on life support systems in Europe. North America suffers from **devastating weather extremes including wildfires, heatwaves, drought and inundation.** The summer monsoons in China have failed, and water flows into the great rivers of Asia are severely reduced by the loss of more than one-third of the Himalayan ice sheet. Glacial loss reaches 70 percent in the Andes, and rainfall in Mexico and central America falls by half. Semi-permanent El Nino conditions prevail. Aridification emerges over more than 30 percent of the world's land surface. Desertification is severe in southern Africa, the southern Mediterranean, west Asia, the Middle East, inland Australia and across the south-western United States. Impacts: A number of **ecosystems collapse**, including **coral reef systems, the Amazon rainforest and in the Arctic.** Some poorer nations and regions, which lack capacity to provide artificially-cooled environments for their populations, become unviable. Deadly heat conditions persist for more than 100 days per year in West Africa, tropical South America, the Middle East and South-East Asia, which together with land degradation and rising sea levels contributes to 21 perhaps a billion people being displaced. **Water availability decreases** sharply in the most affected regions at lower latitudes (dry tropics and subtropics), affecting about two billion people worldwide. **Ag**riculture **becomes nonviable** in the dry subtropics. Most regions in the world see a significant drop in food production and increasing numbers of **extreme weather events**, including heat waves, floods and storms. **Food production is inadequate** to feed the global population and food prices skyrocket, as a consequence of a one-fifth decline in crop yields, a decline in the nutrition content of food crops, a catastrophic decline in insect populations, desertification, monsoon failure and **chronic water shortages**, and conditions **too hot for human habitation** in significant food-growing regions. The lower reaches of the agriculturally-important river deltas such as the Mekong, Ganges and Nile are inundated, and significant sectors of some of the world's most populous cities — including Chennai, Mumbai, Jakarta, Guangzhou, Tianjin, Hong Kong, Ho Chi Minh City,

Shanghai, Lagos, Bangkok and Manila — are **abandoned.** Some small islands become **uninhabitable.** Ten percent of Bangladesh is inundated, displacing 15 million people. According to the Global Challenges Foundation's Global Catastrophic Risks 2018 report, even for 2°C of warming, more than a billion people may need to be relocated due to sea-level rise, and In high-end scenarios "the scale of destruction is beyond our capacity to model, with a high likelihood of human civilization coming to an end". 22

Warming causes extinction.

Coviello 21, BA, environmental activist, citing Guy R. McPherson, PhD, professor emeritus of natural resources and ecology @ the University of Arizona. (John, 12-26-2021, "Are Humans Facing Near-Term Human Extinction Due to Global Warming?", Soapboxie, https://soapboxie.com/social-issues/Are-Humans-Facing-Near-Term-Human-Extinction-Due-to-Global-Warming,)

Now that we're progressing through the 21st century, why are some in scientific circles raising concerns about our **near-term survival** as a species? In recent years, the effects of global warming have become exceedingly extreme. In fact, from record-breaking heatwaves to unprecedented forest fires to melting polar ice sheets, the effects of global warming are occurring **faster** than the scientific community had projected they would just a decade or two ago. The concern about our viability as a species on Earth is due to the fast-developing effects of global warming. If we don't address the causes of global warming or take mitigative actions, it could transform into runaway global warming that would heat up the Earth so rapidly that humans and many other species will likely be imperiled.

Many scientists wrongly had confidence that mankind would come to its senses when faced with the stark reality that our survival as a species is threatened and we'd collectively take actions to avert catastrophic global warming by discontinuing our burning of fossil fuels and replacing them with renewable non-carbon energy sources. However, despite some tepid efforts to cut carbon emissions, such as the 2016 Paris Agreement, it appears that due to a combination of ignorance and a concerted effort by the fossil fuels industry to stop any efforts to move away from carbon-based products, we will likely not address our continuing release of global warming gases into Earth's atmosphere until it's too late and the global warming we've experienced in recent decades transforms into irreversible and catastrophic runaway global warming.

This will occur because human-caused global warming will eventually trigger natural climate warming **feedback loops** to take over. At that point, global warming will be like an **unstoppable** runaway train, as the Earth's atmospheric temperatures rise to life-threatening levels. These warming feedback loops include such things as releases of global warming gases from melting polar ice sheets and from frozen methane deposits beneath the oceans, as well as the loss of polar ice causing the Earth to absorb more of the sun's heat energy. **All** of which will cause **additional warming**, which then results in additional releases of global warming gases that will cause additional global temperature rises in an unstoppable loop that will continue until the planet is warmer than it has been in many millions of years (long before humans existed).

Such **rapid** and **uncontrollable warming** of Earth's atmosphere could warm the planet by 4 to 5 degrees Celsius (7 to 9 degrees Fahrenheit) within the current century and perhaps eventually lead to a planet that is 8 to **9 degrees** Celsius (14 to 16 degrees Fahrenheit) **warmer** than it was before humans started burning fossil fuels in large quantities starting in the 19th century.

Some might wonder, what's the big deal if the planet is 4 to 5 degrees Celsius or even 8 to 9 degrees Celsius warmer than it has been as humans evolved on Earth? After all, many parts of the planet routinely experience temperature swings of this magnitude on a daily or weekly basis. There are several ways that rapid global warming on a planetary scale could **threaten human survival**.

Warming is not evenly distributed. Some areas, including currently farmable land, will warm well in excess of the global average, which would lead to **desertification** and **crop failures**. This would obviously imperial humans due to massive food shortages.

Oceans, another major source of food that humans **need to survive**, are impacted by rising global temperatures, as higher ocean temperatures lead to **acidification** of ocean water, which will eventually lead to **massive die-offs of sea life** that provide much-needed food for humans.

Water resources will **completely dry up** in many arid parts of the world, making those areas **uninhabitable**.

Dwindling food and water resources will inevitably lead to wars between competing nations that could be catastrophic.

Humans **can't survive** at **wet-bulb temperatures** above 35 degrees Celsius (95 degrees Fahrenheit), even in the shade, as the human body loses its ability to cool itself off. Higher global temperatures and the higher humidity levels that will occur with the higher temperatures could make **large parts of the Earth uninhabitable** due to **wet bulb temperatures** that are lethal.

Guy R. McPherson, Ph.D., a former Ecology professor from the University of Arizona, is a big proponent of the view that humans will soon become extinct due to global warming.

mikenowak.net/

Would Runaway Global Warming Actually Lead to Human Extinction?

It's a very big step go from runaway global warming to the extinction of all human beings on Earth. Humans possess the intellectual skills necessary to design and build technologies that can help us adapt to climate change. We're also able to move to places with more hospitable climates. However, some scientists are concerned that humans will not have time to adapt to the quick pace of runaway global warming and some of the impacts will be too harsh for us to survive.

If farmlands and oceans are no longer capable of providing food for humans, where will we turn to obtain life-sustaining food? It is possible that humans could migrate towards the poles and try to farm on land in those areas that is freed up from the ice. However, it is unclear if the currently frozen areas in and around the polar regions will have topsoil suitable for farming. What about freshwater fish? Unfortunately, freshwater lakes and rivers will also undergo acidification that will likely **wipe out** most or all **fish** species that can provide humans nourishment. Our only hope might be some sort of synthetic food that is created in factories using basic elements (a technology that is certainly viable).

There will be other life-threatening factors that humans will face in a fast warming world. Massive fire balls from methane releases will create havoc for humans. These fireballs will start enormous forest fires driven by the warmer and in many places a more arid world, which will cause turmoil for humans. A lack of freshwater in areas that undergo desertification will **make survival impossible** in such areas. **Wars over dwindling resources** will be fought out of **desperation** and **could end in catastrophe**.

The stress of a warmer world will **weaken human immune systems**. If industrial society collapses or is greatly reduced, healthcare and medicines might become very limited, lowering life expectancy dramatically. Humans that survive **all the dangers associated with runaway** global **warming** might **succumb to pandemics** that will likely **sweep the world** as opportunistic pathogens take advantage of weakened human systems and cause a large loss of life in the remaining human populations.

Warming causes extinction.

Xu & Ramanathan 17 Xu, Yangyang, and Veerabhadran Ramanathan. (Prof of Atmospheric Sciences at Texas A&M University; Professor of Atmospheric and Climate Sciences at the University of California, San Diego). 2017. "Well below 2 °C: Mitigation Strategies for Avoiding Dangerous to Catastrophic Climate Changes." Proceedings of the National Academy of Sciences 114 (39): 10315–23. https://doi.org/10.1073/pnas.1618481114. Accessed 1/9/18.

We are proposing the following extension to the DAI risk categorization: warming greater than 1.5 °C as "dangerous"; warming greater than 3 °C as "catastrophic?"; and warming in excess of **5 °C** as "unknown??," with the understanding that changes of this magnitude, not

experienced in the last 20+ million years, **pose existential threats** to a majority of the population. The question mark denotes the subjective nature of our deduction and the fact that catastrophe can strike at even lower warming levels. The justifications for the proposed extension to risk categorization are given below. From the IPCC burning embers diagram and from the language of the Paris Agreement, we infer that the DAI begins at warming greater than 1.5 °C. Our criteria for extending the risk category beyond DAI include the potential risks of climate change to the physical climate system, the ecosystem, human health, and species extinction. Let us first consider the category of catastrophic (3 to 5 °C warming). The first major concern is the issue of tipping points. Several studies (48, 49) have concluded that 3 to 5 °C global warming is likely to be the threshold for tipping points such as the collapse of the western Antarctic ice sheet, shutdown of deep water circulation in the North Atlantic, dieback of Amazon rainforests as well as boreal forests, and collapse of the West African monsoon, among others. While natural scientists refer to these as abrupt and irreversible climate changes, economists refer to them as catastrophic events (49). Warming of such magnitudes also has catastrophic human health effects. Many recent studies (50, 51) have focused on the direct influence of extreme events such as heat waves on public health by evaluating exposure to heat stress and hyperthermia. It has been estimated that the likelihood of extreme events (defined as 3-sigma events), including heat waves, has increased 10-fold in the recent decades (52). Human beings are extremely sensitive to heat stress. For example, the 2013 European heat wave led to about 70,000 premature mortalities (53). The major finding of a recent study (51) is that, currently, about 13.6% of land area with a population of 30.6% is exposed to deadly heat. The authors of that study defined deadly heat as exceeding a threshold of temperature as well as humidity. The thresholds were determined from numerous heat wave events and data for mortalities attributed to heat waves. According to this study, a 2 °C warming would double the land area subject to deadly heat and expose 48% of the population. A 4 °C warming by 2100 would subject 47% of the land area and almost 74% of the world population to deadly heat, which could pose existential risks to humans and mammals alike unless massive adaptation measures are implemented, such as providing air conditioning to the entire population or a massive relocation of most of the population to safer climates. Climate risks can vary markedly depending on the socioeconomic status and culture of the population, and so we must take up the question of "dangerous to whom?" (54). Our discussion in this study is focused more on people and not on the ecosystem, and even with this limited scope, there are multitudes of categories of people. We will focus on the poorest 3 billion people living mostly in tropical rural areas, who are still relying on 18th-century technologies for meeting basic needs such as cooking and heating. Their contribution to CO2 pollution is roughly 5% compared with the 50% contribution by the wealthiest 1 billion (55). This bottom 3 billion population comprises mostly subsistent farmers, whose livelihood will be severely impacted, if not destroyed, with a one- to five-year megadrought, heat waves, or heavy floods; for those among the bottom 3 billion of the world's population who are living in coastal areas, a 1- to 2-m rise in sea level (likely with a warming in excess of 3 °C) poses existential threat if they do not relocate or migrate. It has been estimated that several hundred million people would be subject to famine with warming in excess of 4 °C (54). However, there has essentially been no discussion on warming beyond 5 °C. Climate change-induced species extinction is one major concern with warming of such large magnitudes (>**5 °**C). The current rate of loss of species is ~1,000-fold the historical rate, due largely to habitat destruction. At this rate, about 25% of species are in danger of extinction in the coming decades (56). Global warming of 6 °C or more (accompanied by increase in ocean acidity due to increased CO2) can act as a major force multiplier and expose as much as 90% of species to the dangers of extinction (57). The bodily harms combined with climate change-forced species destruction, biodiversity loss, and threats to water and food security, as summarized recently (58), motivated us to categorize warming beyond 5 °C as unknown??, implying the possibility of **existential threats.** Fig. 2 displays these three risk categorizations (vertical dashed lines).

Warming → War

Arctic melting enables Russian adventurism – Putin is deterred now but further melting undercuts naval deployments and spurs revisionism – causes nuclear great power war

Al-Marashi 19 (Ibrahim Al-Marashi is an associate professor of Middle East history at California State University, San Marcos, and the co-author of The Modern History of Iraq, "The Great Game Over the Arctic", Pacific Council on International Policy, https://www.pacificcouncil.org/newsroom/great-game-over-arctic, September 20, 2019, Ak.)

The Arctic Ocean served as a theatre of military and diplomatic maneuvers last August, both **terrifying and surreal**, ranging from a failed Russian nuclear missile launch to U.S. President Trump's desire to purchase Greenland.

While not necessarily linked, these events constitute a prelude to a geopolitical contest**,** a Great Game for the Arctic Ocean **as its ice sheets melt due to climate change**, an example of "Global Warring."

From a geopolitical perspective, the recent events are not only part of Moscow's posturing over the Arctic, but an attempt to project power over waterways from the North Pole to the Baltic Sea, from Ukraine, Crimea, and the Black Sea to the Caspian, and ultimately Syria and the eastern Mediterranean.

The new Russian missile arsenal

In late August Russia ostensibly launched missiles from the Arctic Ocean **to send a message to Washington**, as **that is the shortest path of a nuclear weapon to** reach **the United States**.

The precedent was set a few years ago when Russia sought to demonstrate the far reach of its missile to the European members of NATO but using Syrian skies to make the point.

From fall 2015 to summer 2016, Russia fired its long-range Kalibr cruise missiles from naval vessels in the Caspian towards Daesh targets in Syria. Russian planes stationed in Syria would have been more accurate and effective in targeting Daesh, not to mention cheaper than using costly cruise missiles. However, an air raid would not have delivered the same political message.

The range of the cruise missiles demonstrated to the United States and NATO the advances in Russian military technology, more related to Moscow's posturing over Syria, but also over Ukraine and NATO's presence in the Baltic states and the Arctic.

The Arctic Ocean served as a theatre of military and diplomatic maneuvers last August, both terrifying and surreal, ranging from a failed Russian nuclear missile launch to U.S. President Trump's desire to purchase Greenland.

The most recent round of brinkmanship diplomacy over America's and Russia's nuclear missile arsenal can be traced back to February 2018, when the U.S. Department of Defense released a new nuclear arms policy, implementing Trump's promise to develop an arsenal "so strong and powerful that it will deter any acts of aggression."

Just two weeks later, on March 1, President Vladimir Putin delivered the annual state of the nation address, most of it focused on a carefully calibrated message that promised new advances in Russian missile technology, with even CGI video footage showing a hypersonic missile approaching Florida.

After this spectacle, the onus was on Putin to make these missiles a reality, which he attempted in early August of this year. However, Russia suffered a setback due to an accident involving a nuclear-powered cruise missile he referred to during his speech. Nonetheless, the disaster was then followed up by the successful firing of two ballistic missiles from two submarines in the Arctic in late August.

Ben Hodges, former Commanding General of U.S. Army forces in Europe, projected that in a future conflict scenario with Russia, **NATO forces could deny Russian naval access through these chokepoints**, essentially trapping the Russian navy in both seas.

The latter Arctic launches occurred after the United States had fired a ground-based cruise missile from an island off the coast of California, an indication that America had formally withdrawn from the Intermediate-Range Nuclear Forces Treaty (INF), signed in 1987 as part of the de-escalation of the Cold War.

The August launches served as the culmination of a pattern of both Trump and Putin launching and testing cruise and ballistic missiles to send symbolic political messages to the other, a form of "missile diplomacy." This missile diplomacy, unfortunately, led to the **unravelling** of **the INF**, a diplomatic coup **that** had **averted** an **accidental nuclear war** during the Cold War.

From the Mediterranean to the Arctic

The fact that the launches occurred in the Arctic serves as a reminder of **the role that geography plays in Russia's geopolitical outlook**.

While the United States faces wide open seas on both the Pacific and Atlantic to project its naval power, Russia's navy is hemmed in by narrow straits.

To reach the Atlantic, the Russian naval fleet has to depart from the Baltic Sea, then through the Danish Straits chokepoint.

To reach the Mediterranean from Crimea, Russia has to navigate two chokepoints at the Bosphorus and the Dardanelles Straits.

During a security conference in Tbilisi I attended last week, Ben Hodges, former Commanding General of U.S. Army forces in Europe, projected that **in a future conflict scenario with Russia, NATO forces could deny Russian naval access through** these **chokepoints**, essentially **trapping the Russian navy in both seas**. Of course, in this scenario, he did not mention whether Turkey would agree to such a plan.

Climate change offers Russia an opportunity to navigate the Arctic through a northeast passage, but this will not translate into open seas for Moscow immediately.

Examining Russian geographic constraints from Moscow's perspective demonstrates how even events in the Arctic are indirectly linked to the Turkish straits. Hodges concluded that based on these vulnerabilities, **Russia would have** an **incentive to weaponise the Arctic**.

Climate change offers Russia an **opportunity to navigate the Arctic through a northeast passage**, but this will not translate into open seas for Moscow immediately. The **open lanes are still constricted by** the **remaining ice sheets and resulting icebergs**. Theoretically, its vessels could navigate this passage on the roof of the world, however, to reach the Pacific it would have to navigate another chokepoint at the Bering Strait across from Alaska.

The environmental legacy

Both Putin and the Trump administration seek to reap benefits from climate change. Russia would be able to not only **deploy naval vessels** in the Arctic but exploit energy and mineral resources. The Arctic contains an estimated 20-25 percent of untapped global oil and gas reserves. Trump's interest in Greenland was most likely also a result of seeking to exploit mineral resources as the island's ice sheets recedes.

The mysterious accident surrounding the nuclear-powered cruise missile and possible contamination from radiation in its environs also harken back to a Soviet legacy. The Russian government's attempt to keep the extent of the damage hidden invoked dark memories of the Chernobyl or the Kursk submarine disasters, recently coming to public attention as a result of recent docudramas and films.

While Moscow and Washington continue to **play a nuclear duel**, and spar over the Arctic, it is the global environment that has and will suffer as a result.

Worsening climate change in the Arctic only increases the chance of escalating conflict

OWP 21 (The Organization for World Peace is a not-for-profit organization promoting peaceful solutions to complex issues across the globe, "Arctic Circle Territorial Conflicts", February 16, 2021, https://theowp.org/?s=Arctic+Circle+Territorial+Conflicts)//aehd

The Arctic is divided between the eight states that have territorial claims within the area. These states are America, Denmark, Norway, Sweden, Canada, Russia, Iceland, and Finland. Canada was the first Arctic state to claim vast land areas in the region in 1935, followed shortly after by the Soviet Union in 1937. The region's strategic importance increased during the Cold War due to the potential to base submarine-launched nuclear weapons in the area, resulting in the ratified UNCLOS treaty at the end of the Cold War between the Arctic States. However, as global warming reduced ice caps in the region, the treaty has failed to clarify territorial disputes, increasing tensions between the Arctic states that is only expected to increase as more of the Arctic Ocean is released beneath the ice caps.

Arctic melting causes great power war --- vast resources, existing great power competition, and fraying cooperation

Heggelund 23 [Ragna Mathisen Heggelund. MA in International Relations and Affairs @ University of Iceland. October 2023. "Thawing Arctic Realities: Analyzing Arctic Security through the Lens of Arctic Exceptionalism and Great Power Politics" University of Iceland. https://skemman.is/bitstream/1946/45722/2/Master%20Thesis%20%2522Thawing%20Arctic%20Realities%2522%20-%20Ragna%20Mathisen%20Heggelund.pdf ww

Numerous scholars express concern regarding the potential for geopolitical competition arising from the Arctic treasure trove that might trigger great power conflict in the region (Gross, 2020). As previously noted, the melting ice caps have **sparked** the interest of various nations in participating in a contemporary 'gold rush' within the Arctic's domains — encompassing unclaimed ocean and land territories, along with its abundant natural resources and strategic positioning. It has triggered nations to strive for control over these unclaimed territories, driven by the aspirations of resource extraction and dominance over the new trade routes (ibid.). Until now, the AC has determined the legal matters concerning the region. The primary nations competing for the resources in the Arctic are the US, Russia, and China (ibid.). Given that most resources lie beyond the Exclusive Economic Zones of individual countries, there is a scramble to ensure established control over these resources beyond international organizations' influence. This scramble, in turn, **catalyzes heightened conflicts.**

The US was long the least active Arctic nation within the region post the Cold war (Ahmad & Zafar, 2022). However, as mentioned earlier, the US recently updated its Arctic strategy after many years in trying to strengthen its Arctic identity. The U.S. Department of Defense (DoD) has expressed concerns over the growing interest in the region and the increased presence of Russia and China in the Arctic (Lopez, 2021). Therefore, there is an urgency to develop the U.S. as a more persistent player in the region. Air Force General Glen D. VanHerck said,

To compete in the Arctic, you have to be on the field, and currently, our capabilities, I would assess that we are in the game plan development. We are not able to have the persistence that I need to compete day-to-day in the Arctic (Lopez, 2021).

Currently, the **U.S. military**, in cooperation with the Canadian Armed Forces, is in the early stages of **updating the infrastructure for their military capabilities in the Arctic** (ibid.). Furthermore, General VanHerck emphasizes the necessity of enhancing their presence in Arctic waters due to Russia's significant influence in the region and China's newfound interest in Arctic investments. He states, "It's incumbent upon us to be persistent, working with allies, partners, and like-minded nations, to ensure the maintenance of the consistency of international rules-based norms and laws that have served us well over time" (Lopez, 2021).

Furthermore, **Russia**, possessing the largest territory in the Arctic, has implemented measures to reinforce its position within the region. Over the past decade, Russia has **increased its military presence** in the Arctic by expanding the number of bases and airfields and installing large-scale radar systems (Humpert, 2022). These new installations are primarily concentrated along

the Northeast Passage, along the Barents and Kara Seas, strategically located near Russia's Northern Fleet Headquarters in Severomorsk. In 2022, Russia unveiled a new naval doctrine with a significant focus on the Arctic (ibid.). Jonas Kjellén, Military Analyst at the Swedish Defense Research Institute, said, "The Barents Sea serves as a passageway through which Russia's largest fleet gains access to the world's oceans" (Humpert, 2022). Furthermore, Russia aims to protect its interest linked to the NSR and its oil and gas fields as it is economically important for the Russian investment (ibid.). In the Russia Arctic Policy from 2020, Moscow includes the utilization of the Arctic as strategic resource base which could fulfill its socioeconomic needs (Ahmad & Zafar, 2022). Russia also considers the US its primary geopolitical rival, and the heightened US presence in the Arctic has consequently prompted an expansion of Russian interests in the region (ibid.).

Another superpower competitor with an interest in expanding its investment to the Arctic region is China. As China rises as a prominent player on the Arctic stage, there are discussions surrounding China's Arctic plans and policies (Sharma, 2021). In just over ten years, China has transitioned from a peripheral participant to an active member of the AC. During this time, the Arctic has grown in importance, driven by factors like global warming and exciting new economic and strategic possibilities (ibid.). These changes have led the Arctic to hold a more significant role in China's policymaking considerations. In 2018, China released a description of its Arctic policy titled China's Arctic Policy which reflects its confident and proactive regional policy (ibid.). China's main interest in the Arctic stem from the potential opening of the "Polar Silk Road." The expansion of the Polar Silk Road would create logistics and transportation channels traversing the link between Europe and Asia (ibid.). Furthermore, China's interests can be separated into two categories. The first is its involvement in scientific research, resource survey, shipping, and ensuring maritime security (ibid.). The second is the region's potential impact on climate change (ibid.). Moreover, even though **China** wishes to downplay the risk of military competition in the Arctic as it could harm its goals, it still acknowledges the potential for great power competition and the possible necessity of using force (Doshi et al., 2021).

As the US, Russia, and China maneuver the Arctic landscape and influences the geopolitical dynamic, the situation related to the Russia-Ukraine conflict has affected Arctic cooperation significantly. There is **much uncertainty tied to the future of the Arctic cooperation.**

Add On- Biodiversity

Arctic environment spurs key biodiversity. Otherwise extinction.

Huntington, 13—Senior Officer for the International Arctic at The Pew Charitable Trusts, Doctoral Degree in Polar Studies from the University of Cambridge, Science Writer for Conservation of Arctic Flora and Fauna (Henry, "Arctic Biodiversity Assessment: Report for Policy Makers," pg 3-5, dml)

Arctic biodiversity is an **irreplaceable cultural, scientific, ecological, economic and spiritual asset**.

In addition to its intrinsic worth, Arctic biodiversity provides **innumerable services** and values to people. Arctic habitats are home to species with remarkable adaptations to survive in extreme cold and highly variable climatic conditions. Millions of migratory birds breed in the Arctic and then fly to every continent on Earth, contributing to **global biodiversity and ecological health**. More than a tenth of the world's **fish catches** by weight come from Arctic and sub-Arctic seas. Tourists are travelling north in increasing numbers, and globally there is a growing appreciation of Arctic species and ecosystems as increasingly rare examples of largely pristine biodiversity. The Arctic is home to more than 21,000 known species of highly cold-adapted mammals, birds, fish, invertebrates, plants and fungi including lichens, as well as tens of thousands of microbe species.

These include iconic species such as polar bear, muskox, bowhead whale, narwhal, walrus, caribou, Arctic char, ivory gull, Arctic fox and snowy owl as well as thousands of lesser known species. In addition to species themselves, the Arctic also harbors a diversity of marine, freshwater and terrestrial habitats, such as vast expanses of lowland tundra, wetlands, mountains, extensive shallow ocean shelves, millennia-old ice shelves, pack ice and huge seabird coastal cliffs.

Among those who live in the Arctic are **dozens** of distinct indigenous peoples who call the Arctic home. Their ways of life demonstrate the vitality of language and traditional knowledge, key aspects of the human relationship with biodiversity. Arctic cultures have been **more reliant** on hunting and fishing than those in almost **any other part** of the world because of the limited availability of edible wild plants. Some species, such as bears and whales, have **great spiritual importance** in Arctic cultures, and harvest of wildlife is **deeply rooted** in the selfperception of Arctic peoples. Traditional foods currently account for a smaller portion of indigenous diets than in the past, but biodiversity and a healthy natural environment remain **integral** to the wellbeing of Arctic inhabitants. They provide **not only food**, but the **everyday context** and **basis for social identity**, **cultural survival** and **spiritual life**.

What is biodiversity? The United Nations Convention on Biological Diversity defines biodiversity as "the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems, as well as the ecological complexes, of which they are part; this includes diversity within species, between species, and of ecosystems". Biodiversity includes the multitude of poorly known species, of which there are many in the Arctic, that collectively provide the **foundation for food webs and ecosystems**. The interactions between humans and their surroundings are also part of the diversity, vitality and sustainability of **life on Earth**.

Geographically, the Arctic is made up of the world's smallest ocean and neighboring seas, surrounded by a relatively narrow fringe of island and continental tundra, much of it underlain by permafrost. Freshwater habitats range from shallow tundra ponds fed by small streams to large deep lakes and rivers. Arctic land and freshwater areas are generally low in productivity and species richness, though there are exceptions. For example, the number of plant and lichen species in some tundra areas is as high as in the richest grasslands of temperate and subtropical regions. For the ocean, sea ice is the defining feature of the Arctic. Unlike Arctic terrestrial and freshwater habitats, marine ecosystems on some Arctic shelves are among the most productive on Earth. The sea ice itself provides important habitat for many species and is vital to the Arctic marine food web. Arctic marine, freshwater and terrestrial ecosystems are **interconnected** physically and biologically.

Affirmative Answers

No Uniqueness

It's too late to save Arctic ice

Pincus 24 [Dr. Rebecca Pincus, Ph.D. in Natural Resources – Energy Security from the University of Vermont, MSEL and MSNR in Environmental Law and Energy Security, BS in Foreign Service from Georgetown University, Director of the Polar Institute at The Wilson Center, Former Assistant Professor at the Naval War College, former Arctic and Climate Strategy Advisor in the Office of the Secretary of Defense for Policy, "Small Ocean, Big Hype: Arctic Myths and Realities," 05-03-24, War on the Rocks, https://warontherocks.com/2024/05/small-ocean-big-hype-arctic-myths-and-realities/]

It's also become commonplace to say that the Arctic will be increasingly threatened by climate change. Unfortunately, if there's anything false about this claim, it is that the **threat** is **already here**. The Arctic is **actively**, rapidly undergoing climate-driven catastrophic transformation right now. On **any reasonable timescale** for **climate** **mitigation**, the Arctic as we know it now **will be gone**. An ice-free Arctic Ocean in September, the time of year when sea ice is at its minimum, may come in the next few years, and **ice-free** conditions are expected by as early as **2035**. While sea ice can grow back if warming factors are reversed, other environmental changes in the Arctic are climate tipping points, including permafrostcarbon.

Shipping is an alternative cause to Arctic environmental damage.

Reuters, 2/25/**2016**. "Arctic thaw opens shipping waterways, risks to environment," http://www.reuters.com/article/us-climate-shipping-arctic-idUSKCN0VY1N9.

The Arctic is thawing even faster than lawmakers can formulate new rules to prevent the environmental threat of heavy fuel oil pollution from ships plying an increasingly popular trade route.

Average Arctic temperatures are rising twice as fast as elsewhere in the world and the polar ice cap's permanent cover is shrinking at a rate of around 10 percent per decade. By the end of this century, summers in the Arctic could be free of ice.

As the ice melts, traffic of ships carrying cargoes of gas, coal and diesel through the region has increased. Russia, in particular, is keen to expand shipping through the Arctic given its rich natural resources and efforts to cut costs. It aims to cut journey times between Europe and Asia by 30 to 40 percent.

"It is time for regulators to wake up and realize that the Arctic is melting away right in front of us," said Whit Sheard of the Circumpolar Conservation Union (CCU) green group.

"Common sense regulations, integrated ocean planning, and explicit protections are all needed before the resources of the region are targeted for exploitation or before it becomes a major shipping route."

While there is a non-binding agreement in place between Arctic states aimed at Arctic environmental protection, campaigners say there has been no progress on regulating the use of heavy fuel oil (HFO), which is banned in the Antarctic region owing to its toxicity and the polluting emissions it generates.

Regulations for the Antarctic came into effect in 2011 after being adopted by the United Nations' shipping agency the International Maritime Organization (IMO).

It was arguably an easier sell as less commercial cargo ships such as oil tankers operate in the Antarctic, where fishing boats, cruise ships and yachts predominate.

Any effort to tackle the issue is likely to take some time even after last year's climate deal in Paris, which commits nations to curb emissions. The Paris deal did not set specific targets for commercial shipping, leaving the IMO to take up the charge.

HFO was not the top focus of an Arctic Council meeting on environmental protection earlier this month, leading campaigners to seek more action. They plan to raise the issue at the IMO's next marine environmental protection committee session in April.

Julie Gourley, senior Arctic official at the U.S. State Department, said Washington, which has the rotating chair of the Council, was "presently studying" the risks associated with HFO and continued to engage with Council partners to find solutions for Arctic issues.

"SIGNIFICANT THREAT"

According to a 2009 study by the intergovernmental Arctic Council, the release of oil into the Arctic's marine environment "either through accidental release, or illegal discharge, is the most significant threat from shipping activity".

Last year, the U.S., Russia and other Arctic nations signed an agreement to bar their fishing fleets from seas around the North Pole.

Under the Polar Code, which was adopted by the IMO, ships trading in polar regions will have to comply with environmental provisions from January 2017.

The code imposed prohibitions on the carriage of oil or oily mixtures from any ship into the sea and prevented pollution from garbage and noxious liquid substances. But it only "encouraged" ships not to use or carry HFO in the Arctic.

A 2015 study by the CPB Netherlands Bureau for Economic Policy Analysis estimated that two thirds of the volume of world trade that goes through the Suez Canal could be re-routed via the Arctic route in future. It gave no time frames.

Other analysts are more conservative on how much trade could be re-routed given the recent economic slowdown in China and oil price uncertainty.

The Suez Canal, which allows ships to travel between Europe and South Asia, accounts for an estimated 8 percent of world seaborne trade.

The International Association of Oil & Gas Producers (IOGP), representing the global upstream industry, said it had gained extensive experience "in the safest and most environmentally sensitive ways of operating in such conditions".

"While some parties have called for codes of best practices in the Arctic, as far as the industry is concerned, wherever we do business the same high standards apply," the IOGP said.

Looser ice means icebergs and there is the risk of vessels being holed. Insurers are also looking for more clarity.

"The level of regulation applying to these new waterways has, perhaps inevitably, not had time to catch up with the physical changes to the Arctic environment," said Joe Hughes, chairman and chief executive of ship insurer American Club.

Newest research shows the Arctic is beyond saving anyway.

Carrington 23, environmental editor (Damian, 06/06/2023, “Too late now to save Arctic summer ice, climate scientists find,” The Guardian, https://www.theguardian.com/environment/2023/jun/06/too-late-now-to-save-arctic-summer-ice-climate-scientists-find)

It is now **too late** to save summer Arctic **sea ice**, research has shown, and scientists say preparations need to be made for the increased **extreme weather** across the northern hemisphere that is likely to occur as a result.

Analysis shows that **even if** **g**reen**h**ouse **g**as emissions are **sharply reduced**, the Arctic will be **ice-free** in September in coming decades. The study also shows that if emissions decline slowly or continue to rise, the first ice-free summer could be in the 2030s, a decade earlier than previous projections.

The research shows that 90% of the melting is the result of human-caused global heating, with natural factors accounting for the rest.

Since satellite records began in 1979, summer Arctic ice has shrunk by 13% a decade, in one of the clearest signs of the climate crisis. Arctic sea ice reaches its annual minimum at the end of summer, in September, and in 2021 it was at its second lowest extent on record.

"**Unfortunately it has become too late** to save Arctic summer sea ice," said Prof Dirk Notz, of the University of Hamburg, Germany, who was part of the study team. "As scientists, we've been warning about the loss of Arctic summer sea ice for decades. This is now the first major component of the Earth system that we are going to lose because of global warming. People didn't listen to our warnings.

"This brings another warning bell, that the kind of projections that we've made for other components of the Earth system will start unfolding in the decades to come."

Other climate scientists said in 2022 that the world was on the brink of multiple disastrous tipping points.

Prof Seung-Ki Min, of Pohang University, South Korea, who led the new study, said: "The most important impact for human society will be the increase in weather extremes that we are experiencing now, such as heatwaves, wildfires and floods. We need to reduce CO2 emissions more ambitiously and also prepare to adapt to this faster Arctic warming and its impacts on human society and ecosystems."

In 2021, the Intergovernmental Panel on Climate Change (IPCC) concluded that the Arctic would not lose its summer ice if emissions were cut sharply and global temperature rises were limited to 2C. But **the new research**, published in the journal Nature Communications, projects the loss of summer sea ice in the 2050s in the low emissions scenario.

Link Turn- Development = Green Tech

Development in the arctic is key to renewables which help spurs the clean energy transition and solve climate change

Simon 5-26 [Matt; May 26, 2025; Matt Simon was a senior staff writer covering biology, robotics, and the environment; Wired, "Beneath Greenland's Ice Lies a Climate Solution—and a New Geopolitical Battleground," https://www.wired.com/story/beneath-greenlands-ice-lies-a-climate-solution-and-a-new-geopolitical-battleground]

But underneath all that melting ice is something the whole world wants: the rare earth elements that make modern society—and the clean energy revolution—possible. That could soon turn Greenland, which has a population size similar to that of Casper, Wyoming, into a mining me cca.

Greenland's dominant industry has long been fishing, but its government is now looking to diversify its economy. While the island has opened up a handful of mines, like for gold and rubies, its built and natural environment makes drilling a nightmare—freezing conditions on remote sites without railways or highways for access. The country's rich reserves of rare earths and geopolitical conflict, however, are making the island look increasingly enticing to mining companies, Arctic conditions be damned.

When President Donald Trump talks about the United States acquiring Greenland, it's partly for its strategic trade and military location in the Arctic but also for its mineral resources. According to one Greenland official, the island "possesses 39 of the 50 minerals that the United States has classified as critical to national security and economic stability." While the island, an autonomous territory of Denmark, has made clear it is not for sale, its government is signaling it is open to business, particularly in the minerals sector. Earlier this month, Greenland's elections saw the ascendance of the pro-business Demokraatit Party, which has promised to accelerate the development of the country's minerals and other resources. At the same time, the party's leadership is pushing back hard against Trump's rhetoric.

Rare earth elements are fundamental to daily life: These words you are reading on a screen are made of the ones and zeroes of binary code. But they're also made of rare earth elements, such as the terbium in LED screens, praseodymium in batteries, and neodymium in a phone's vibration unit. Depending on where you live, the electricity powering this screen may have even come from the dysprosium in wind turbines.

These minerals helped build the modern world—and will be in increasing demand going forward. "They sit at the heart of pretty much every electric vehicle, cruise missile, advanced magnet," said Adam Lajeunesse, a public policy expert at Canada's St. Francis Xavier University. "All of these different minerals are absolutely required to build almost everything that we do in our high-tech environment."

To the increasing alarm of Western powers, China now has a stranglehold on the market for rare earth elements, responsible for 70 percent of production globally. As the renewables revolution unfolds, and as more EVs hit the road, the world will demand ever more of these metals: Between 2020 and 2022, the total value of rare earths used in the energy transition each year quadrupled. That is projected to go up another tenfold by 2035. According to the European Commission's Joint Research Centre, by 2030, Greenland could provide nearly 10,000 tons of rare earth oxides to the global economy.

One way to meet that demand, and for the world to diversify control over the rare earths market and speed up clean energy adoption, is to mine in Greenland. (In other words, the way to avoid future ice melt may, ironically, mean capitalizing on the riches revealed by climate-driven ice loss.) On the land currently exposed along the island's edges, mining companies are starting to drill, and the US doesn't want to be left out of the action.

But anyone gung-ho on immediately turning Greenland into a rare earths bonanza is in for a rude awakening. More so than elsewhere on the planet, mining the island is an extremely complicated, and lengthy, proposition—logistically, geopolitically, and economically. And most importantly for the people of Greenland, mining of any kind comes with inevitable environmental consequences, like pollution and disruptions to wildlife.

The Trump administration's aggressive language has spooked Indigenous Greenlanders in particular, who make up 90 percent of the population and have endured a long history of brutal colonization, from deadly waves of disease and displacement to forced sterilization. "It's been a shock

for Greenland," said Aqqaluk Lynge, former president of the Inuit Circumpolar Council and cofounder of Greenland's Inuit Ataqatigiit political party. "They are looking at us as people that you just can throw out."

Lacking the resources to directly invest in mining for rare earths, the Greenland government is approving licenses for exploration. "We have all the critical minerals. Everyone wants them," said Jørgen T. Hammeken-Holm, permanent secretary for mineral resources in the Greenland government. "The geology is so exciting, but there are a lot of 'buts.'"

No Link

Oil drilling is an alt cause to environmental degradation.

Arctic Council 20 [8/25/20; "USING DATA TO IMPROVE OIL SPILL RESPONSE IN THE ARCTIC"; https://arctic-council.org/en/news/data-improve-oil-spill-response-in-arctic/; accessed 8/26/21; Lowell-TT]

How are oil spills different in Arctic waters compared to oil spills that happen in southern regions? Synnøve Lunde: The main differences of an oil spill in Arctic conditions compared to southern regions are the **cold water** and **rough conditions**. We do not have that much experience with different types of oils in the Arctic and how they react on cold water. The cold water and presence of **sea ice** may **affect** the oil spill **equipment** and **make it difficult** or impossible **to use**. Cold temperatures also will affect responders. Øivin Aarnes: Considering the physical environment and geography, weather conditions, cold temperatures, darkness and accessibility makes an oil spill response quite challenging in some regions. A key difference is that an oil spill in the Arctic is **likely to stay** there **for a very long time**, and the **environmental impact** can be **severe and lasting**. The nature of Arctic ecosystems makes them particularly **sensitive** to marine pollution because of their **dependency to** the **ocean** as a source of **food**, a **low reproduction** rate and because many habitats and communities are so **specialized**. Synnøve Lunde: The Arctic environment is very vulnerable to oil spills. You might have just a few species but a huge number of individuals. An oil spill at wrong place in wrong time might do a lot of damage for that specific species.

Nigerian flaring is an alt cause.

Banerjee '13 [Subhankar; September 29; Professor of Ecology and Lannan Chair at the University of New Mexico, M.A. in Physics and Computer Science at the New Mexico State University; Common Dreams, "Destabilization of Arctic Sea Ice Would Be Game Over for Climate," https://www.commondreams.org/views/2013/09/29/destabilization-arctic-sea-ice-would-be-game-over-climate]

According to the NSIDC the 1979 to 2000 average of the minimum Arctic sea ice extent was 2.59 million square miles, 2007 (1.61), 2008 (1.77), 2009 (1.98), 2010 (1.79), 2011 (1.67), 2012 (1.32), 2013 (1.97). You can see that in two successive years, 2008 and 2009 the number went up a bit from 2007, but then three years in a row, starting in 2010 it went down reaching the lowest ever recorded in 2012, and now it's back up a bit but still 24% less than the 1979–2000 average. This is what Julienne Stroeve refers to as "bumps and wiggles along the long–term declining trend." But the most worrisome part of Stroeve's statement is that "we are eventually going to lose all of that summer **sea ice**." When that happens, **life on earth** will be in very **serious trouble**. So we need to understand all aspects of the significance of the Arctic sea ice and why we shouldn't contribute further to its **disintegration**.

The enormous white surface of the Arctic sea ice reflects **back** **solar radiation**. But when the sea ice is replaced by dark water it does the reverse, absorbs solar radiation, which in turn contributes to the melting of the Greenland Ice Sheet (which would raise the sea level), thawing of permafrost on tundra (which would **release methane** trapped in soil), and destabilization of the subsea permafrost (which would release methane trapped in methane hydrates or clathrates). Methane as a greenhouse gas is 72 times more potent than carbon dioxide over a 20–year period. A complete loss of summer sea ice could potentially release **huge** **amount of** **Arctic methane** that might lead to a **catastrophic** **climate change** **event**, even possibly akin to the end–Permian **extinction** 252 million years ago that wiped out more than 90% of life on earth.

So our goal should be—to not add salt to the injury.

Dr. James Hansen has repeatedly warned that if Canada's tar sands were fully exploited it would be "game over" for the climate. A complete destabilization of the Arctic sea ice would also be—game over for the climate.

Unfortunately, the Obama administration's National Strategy for the Arctic Region that was released in May is a disaster in the making. The document states: "The region holds sizable proved and potential oil and natural gas resources that will likely continue to provide valuable supplies to meet U.S. energy needs." It's referring to the oil and gas that sits underneath the Arctic seabed in the Beaufort and Chukchi seas of Alaska. In 2012, the Obama administration ignored science and all concerns of the indigenous Iñupiat communities, and gave Shell the approval to begin exploratory drilling (only top–hole drilling and not to penetrate the oil bearing zones) in the Beaufort and Chukchi seas. In February, Shell announced that after both its rigs, Noble Discoverer and Kulluk, suffered heavy damage last year and were cited for EPA violations, it would not drill in Alaska's Arctic waters in 2013. Shell's Arctic drilling operation is in limbo right now. "Six months after federal officials chastised Shell Oil for its faulty offshore drilling operations in the Arctic, the company has yet to explain what safeguards it has put in place or when it plans to resume exploring for oil in the vulnerable region," the Los Angeles Times reported on September 25. Shell has not yet applied to drill in Alaska's Arctic seas in 2014.

This is a good time to reflect on drilling in the Arctic Ocean as it relates to sea ice. Drilling in Arctic seas will result in gas flaring, which emits black carbon that absorbs solar radiation and will speed up melting of the Arctic sea ice. We need to connect a few dots about gas flaring.

Professor Rob Nixon wrote in Slow Violence and the Environmentalism of the Poor: "Children, moreover, who had no access to electricity to read or learn by also had no experience of night, as they lived 24/7 beneath the blazing false sun of interminable flares, as if in some seasonless equatorial rendition of an Arctic summer. In the mid–90s, when **flaring** [from Shell and Chevron pipes] from **Nigeria**'s oil fields was pumping 12 million tons of methane and 35 million tons of carbon dioxide into the atmosphere annually, it was argued by some that this was the **single greatest contributor** worldwide to climate change."

Iñupiaq cultural activist Rosemary Ahtuangaruak wrote in her testimony in Arctic Voices: Resistance at the Tipping Point (that I edited) that in her community, Nuiqsut in Arctic Alaska, between 1986 and 1997 there was "a 600 percent increase in respiratory patients in a village of 400 people." As a community health aide, she was able to analyze the cause: "What was contributing to this increase in respiratory illnesses? The most overwhelming issue was that oil development around Nuiqsut had increased, and had gotten closer. The worst nights on call were nights when many natural gas flares occurred. Those flares release **particles** that traveled to us. Increased concentrations of particulate matter from flares occur during inversions, a bowl–like trap, with cold air trapped by warm air."

And skies are now ablaze over the Bakken oil fields in North Dakota. Citing a report published by Ceres, Lauren McCauley wrote on Common Dreams in July: "Bright torches of natural gas are to become an ever–more common sight along the horizon of North Dakota as the **environmentally devastating practice** of flaring, or burning off natural gas as a byproduct of oil production, continues to **skyrocket**."

Moreover, the Ceres report states, "a variety of other hazardous pollutants are generated by the process, including **black carbon**, **a**nother potent driver of climate change with adverse health effects." The report also explains why the natural gas is flared off: "At current market rates, oil is approximately 30 times more valuable than natural gas. As a result, producers have chosen to flare much of the gas they produce, rather than invest in the infrastructure necessary to collect, process and market it."

Internal Link Defense

Arctic ice is not scientific.

Thomas **Nicholas et al. 20**. Ph.D. student in computational plasma physics, University of York; Extinction Rebellion Scientists. Galen Hall: Researcher at the Climate and Development Lab, Brown University. Colleen Schmidt: Columbia University. "The faulty science, doomism, and flawed conclusions of Deep Adaptation." https://www.opendemocracy.net/en/oureconomy/faulty-science-doomism-and-flawed-conclusions-deep-adaptation/

As the atmosphere warms, more Arctic sea ice melts and less refreezes each year. The receding ice reveals more of the ocean and, as darker water reflects less sunlight than white ice, the surface absorbs more incoming energy from the sun. This "**ice albedo effect**" is a well-established part of climate modelling and, like any other positive feedback, a real cause for concern. But it is not, as Bendell claims, a near-term **existential threat**. A summary of the relevant research explained by Dr. David Armstrong McKay, a postdoctoral researcher on climate tipping points, shows that the **overall warming** expected as the result of ice-free summers is about **0.15°C globally**, which would be **primarily concentrated** in the Arctic — a fraction of the goal set by the Paris Agreement of limiting global warming to 2°C.

Compare this summary of multiple studies to Deep Adaptation's treatment of the same topic:

"One of the most eminent climate scientists in the world, Peter Wadhams, believes an ice-free Arctic will occur one summer in the next few years and that it will likely increase by 50% the warming caused by the CO2 produced by human activity (Wadhams, 2016). In itself, that renders the calculations of the IPCC redundant, along with the targets and proposals of the UNFCCC."

This passage shows the author's tendency to dismiss the work of **hundreds of scientists** based on **one person's estimates**. It is, needless to say, a **bold move**. In this case it is also a bad one, because even a cursory search reveals that the **magnitude** of Wadhams' prediction is off, and so is his timeline.

Half of the warming caused by anthropogenic CO2 so far equates to around 0.4˚C, because one-third of the warming experienced so far is due to emissions of other greenhouse gases such as Nitrous Oxide. However, this **estimate of the warming** from an ice-free Arctic summer is likely **two times too large**. The summary of the science suggests that this **amount of excess warming** would only occur if the Arctic became ice-free **all year round**, and not just in the summer.

The 2016 claims Wadhams made predicting ice-free summers by 2018 were condemned by **multiple scientists** as "**low credibility**". These other scientists were right: Arctic sea ice continues to deteriorate but not **nearly as fast** as Wadhams predicted, and it **still persists** through the summer. This means that Deep Adaptation's claims on ice are wrong on two counts: 1) an ice-free summer won't happen as soon as it claims, and 2) that ice-free summer won't cause nearly as much warming as it claims.

If Wadhams's position were widely shared by experts, one might excuse Bendell's reliance on this single source. But other **climate scientists** have **repeatedly cautioned** against trusting Wadhams' predictions. This is a pattern we'll see again: Deep Adaptation invokes an **extreme prediction** by an **outlier scientist** (or even non-scientist), and then seemingly implies that we should trust that prediction because it goes against the consensus. Such unfounded trust is inconsistent with the demands of Extinction Rebellion and the broader environmental movement to "Listen to the science," and "Tell the Truth." Indeed, it aligns Deep Adaptation with **fringe conspiracy theorists**, who seek out **single extreme views**, rather than reflecting on **all available evidence**.

Overall, as McKay summarizes: "The first ice-free summer in the Arctic will happen sooner than originally thought and likely sometime in the next few decades, but is hard to predict exactly when because of large natural variability on top of the human-driven warming trend. And while losing the summer sea ice will drive significant regional warming and may increase mid-latitude weather extremes, the **global warming boost** will be modest (estimated at +~0.15-0.2˚C, of which **around half** has **already**

happened) and won't happen in **one sudden jump**." The first summer without sea ice is now predicted to occur before 2050 in all emissions scenarios, but this, and its effect on warming, still falls short of Wadham's predictions. This is a far cry from "runaway climate change."

Impact Defense

Even unchecked warming won't cause extinction.

Ord '20 [Toby; 2020; Senior Research Fellow in Philosophy at Oxford University, DPhil in Philosophy from the University of Oxford; Hachette Books, "The Precipice: Existential Risk and the Future of Humanity," p. 110-112]

But the purpose of this chapter is finding and assessing threats that pose a direct existential risk to humanity. Even at such **extreme levels** of warming, it is difficult to see exactly how climate change could do so. Major effects of climate change include reduced **ag**ricultural yields, sea level rises, water scarcity, increased tropical diseases, ocean acidification and the collapse of the Gulf Stream. While extremely important when assessing the overall risks of climate change, **none** of these **threaten extinction** or irrevocable collapse. Crops are very sensitive to reductions in temperature (due to frosts), but less sensitive to increases. By all appearances we would **still have food** to support civilization.85 Even if sea levels rose **hundreds of meters** (over centuries), **most** of the Earth's land area would remain. Similarly, while some areas might conceivably become uninhabitable due to water scarcity, other areas will have increased rainfall. More areas may become susceptible to tropical diseases, but we need only look to the tropics to see civilization **flourish** despite this. The main effect of a collapse of the system of Atlantic Ocean currents that includes the Gulf Stream is a 2°C cooling of Europe—something that poses no permanent threat to global civilization. From an existential risk perspective, a more serious concern is that the high temperatures (and the rapidity of their change) might cause a large loss of biodiversity and subsequent ecosystem collapse. While the pathway is not entirely clear, a large enough collapse of ecosystems across the globe could perhaps threaten human extinction. The idea that climate change could cause widespread extinctions has some good theoretical support.86 Yet the evidence is **mixed**. For when we look at many of the **past cases** of extremely high global **temp**eratures or extremely rapid warming we **don't see** a corresponding loss of **biod**iversity.87 <<FOOTNOTE BEGINS>> We don't see such biodiversity loss in the **12°C warmer climate** of the **early Eocene**, nor the rapid global change of the **PETM**, nor in rapid **regional** changes of climate. Willis et al. (2010) state: "We argue that although the underlying mechanisms responsible for these past changes in climate were very different (i.e. natural processes rather than anthropogenic), the rates and magnitude of climate change are similar to those predicted for the future and therefore potentially **relevant** to understanding future biotic response. What emerges from these past records is evidence for **rapid community turnover**, **migrations**, **development** of novel ecosystems and thresholds from one stable ecosystem state to another, but there is **very little evidence** for **broad-scale extinctions** due to a warming world." There are similar conclusions in **Botkin** et al. (2007), **Dawson** et al. (2011), **Hof** et al. (2011) and **Willis & MacDonald** (2011). The best evidence of warming causing extinction may be from the end-Permian mass extinction, which may have been associated with large-scale warming (see note 91 to this chapter). <<FOOTNOTE ENDS>> So the most important known effect of climate change from the perspective of direct existential risk is probably the most obvious: **heat stress**. We need an environment cooler than our body temperature to be able to rid ourselves of waste heat and stay alive. More precisely, we need to be able to lose heat by sweating, which depends on the humidity as well as the temperature. A landmark paper by Steven Sherwood and Matthew Huber showed that with sufficient warming there would be parts of the world whose temperature and humidity combine to exceed the level where humans could survive without air conditioning.88 With 12°C of warming, a very large land area—where more than half of all people currently live and where much of our food is grown—would exceed this level at some point during a typical year. Sherwood and Huber suggest that such areas would be uninhabitable. This may not quite be true (particularly if air conditioning is possible during the hottest months), but their habitability is at least in question. However, **substantial regions** would also **remain below** this threshold. **Even with an extreme 20°C of warming** there would be **many** coastal areas (and some **elevated regions**) that would have no days above the temperature/humidity threshold.89 So there would remain **large areas** in which humanity and **civ**ilization could **continue**. A world with 20°C of warming would be an unparalleled human and environmental tragedy, forcing mass migration and perhaps starvation too. This is reason enough to do our utmost to prevent anything like that from ever happening. However, our present task is identifying existential risks to humanity and it is hard to see how any realistic level of heat stress could pose such a risk. So the runaway and moist greenhouse effects remain the only

known mechanisms through which climate change could directly cause our extinction or irrevocable collapse. This doesn't rule out unknown mechanisms. We are considering large changes to the Earth that may even be unprecedented in size or speed. It wouldn't be astonishing if that directly led to our permanent ruin. The best argument against such unknown mechanisms is probably that the PETM did not lead to a mass extinction, despite temperatures rapidly rising about 5°C, to reach a level 14°C above pre-industrial temperatures.90 But this is tempered by the imprecision of paleoclimate data, the sparsity of the fossil record, the smaller size of mammals at the time (making them more heat-tolerant), and a reluctance to rely on a single example. Most importantly, anthropogenic warming could be over a hundred times faster than warming during the PETM, and rapid warming has been suggested as a contributing factor in the end-Permian mass extinction, in which 96 percent of species went extinct.91 In the end, we can say little more than that direct existential risk from climate change appears **very small**, but cannot yet be ruled out.

Climate refuges are survivable, even in a global collapse.

Pester '21 [Patrick; 2021; Master's Degree in International Journalism from Cardiff University, MA Candidate in Biodiversity, Evolution and Conservation in Action at Middlesex University London, and Staff Writer for Live Science; Live Science, "Could Climate Change Make Humans Go Extinct?," https://www.livescience.com/climate-change-humans-extinct.html] [added 'not'---clear based on context]

Climate change has also played a role in the collapse of **past** human civilizations. A 300-year-long drought, for example, contributed to the downfall of ancient Greece about 3,200 years ago. But **Neanderthals** disappearing and **civilizations collapsing** do **not** equal human extinction. After all, humans have **survived climate fluctuations in the past** and currently live **all over the world** despite the rise and fall of numerous civilizations.

Homo sapiens have **prove**n themselves to be **highly adaptable** and able to **cope** with many different climates, be they hot, cold, dry or wet. We can use **resources** from **many** different plants and animals and share those resources, along with **info**rmation, to help us **survive** in a changing world, according to the Smithsonian's National Museum of Natural History.

Related: How would just 2 degrees of warming change the planet?

Today, we live in a global, interconnected civilization, but **there's reason to believe our species could [not] survive its collapse**. A study published on July 21 in the journal Sustainability identified countries most likely to survive a global societal collapse and maintain their complex way of life. Five **island countries**, including **New Zealand** and **Ireland**, were chosen as they could **remain habitable** through agriculture, thanks to their relatively cool **temp**eratures, low weather variability and other factors that make them more **resilient** to climate change.

New Zealand would be expected to hold up the best with other favorable conditions, including a low population, large amounts of good quality agricultural land and reliable, domestic energy. So, **even if** climate change triggers a **global** civilization collapse, **humans will likely be able to keep going**, at least in some areas.

'Existential' warming is the worst case that even the IPCC thinks is highly unlikely AND every model is ruined by systemic upward bias.

Wade '21 [Robert H.; 2021; Professor of Global Political Economy at the London School of Economics, DPhil and MPhil in Social Anthropology from Sussex University, Master's in Economics from Victoria University, BA in Economics from Otago University; Global Policy Journal, "What is the Harm in Forecasting Catastrophe Due to Man-Made Global Warming?," https://www.globalpolicyjournal.com/blog/22/07/2021/what-harm-forecasting-catastrophe-due-man-made-global-warming]

Upward Bias in Temperature Forecasting Models

The prospect of a coming catastrophe for humanity and the biosphere rests **heavily** on outputs of climate forecasting **models**. But as David Legates and co-authors argue, these models "exhibit a **strong exaggeration** in their results even when narrowly adopting atmospheric carbon dioxide as the sole driver of climate responses…. [General circulation models, such as those of the IPCC, the Intergovernmental Panel on Climate Change] have **consistently overestimated** the climate sensitivity to rising atmospheric carbon dioxide."

Ross McKitrick (2020) begins his assessment, "Two new peer-reviewed papers from independent teams confirm that *climate models overstate atmospheric warming, and the problem [of overstatement] has gotten worse over time, not better*". One of the papers (by McKitrick and John Christy) examined 38 models, the other, 48 models, used by the Intergovernmental Panel on Climate Change (IPCC), the various US "National Assessments", the EPA's "Endangerment Finding", and more.

McKitrick continues, "Both papers looked at **'hindcasts'**, which are reconstructions of recent historical temperatures in response to observed greenhouse gas emissions and other changes (eg aerosols and solar forcing). Across the two papers it emerges that the models **overshoot** historical warming from the near-surface through the upper troposphere, in the tropics and globally." The study based on 48 models for 1998 to 2014 found that *they warm on average 4 to* **5 times** *faster than the observations*.

McKitrick concludes, "modelling the climate is incredibly difficult, and no one faults the scientific community for finding it a tough problem to solve. But we are all living with the consequences of climate modelers **stubbornly** using **generation after generation** of models that exhibit **too much surface** and **tropospheric** warming, in addition to running **grossly exaggerated forcing scenarios** (eg RCP8.5).

"[W]hen the models get the tropical **troposphere** wrong, it drives potential errors in many **other** features of the model atmosphere. Even if the original problem was confined to excess warming in the tropical mid-troposphere, it has now expanded into a more pervasive warm bias throughout the global troposphere.

"If the discrepancies in the troposphere were evenly split across models between excess warming and cooling we could chalk it up to noise and uncertainty. *But that is not the case: it's* **all** *excess* **warming**…. *That's* **bias**, *not uncertainty, and until the modelling community finds a way to fix it, the economics and policy making community are justified in assuming future warming projects are overstated, potentially by a great deal….*"

The **strong upward bias** in temperature forecasts relative to observations **compromise** the **models' forecasting impacts** on ecosystems, including agriculture, by **exaggerating** the probability of catastrophic effects.

The IPCC makes projections of future global temperatures to the end of century based on various models. They range from a low of 1.4 C to a high of 5.6 C over pre-industrial temperature (roughly 1900). The wide range makes them almost **meaningless**. The IPCC explains that the wide range results from uncertainty about the magnitude of the feedback between warming and increased rates of evaporation---and David Seckler adds, also about the effects of evaporation on clouds and precipitation. (5)

It is astonishing to learn that the climate models miss a critical component of the climate system -- the hydrological cycle, and specifically clouds, which the IPCC calls the "wild card" in the climate system.

The IPCC's **Worst Case** Scenario is commonly used as the **Business as Usual** without a Radical Policy Action' Scenario

The IPCC's Assessment Report 5 (AR5), published in 2014, presented a range of forecasts of global climate out to 2050 and 2100, based on different assumptions about radiative forcing (a measure of how much of the sun's energy the atmosphere traps). The most extreme---the worst case---was called Representative Concentration Pathway (RCP) 8.5. It assumes **ominous reversals** in several **basic, long-standing trends**, all heading in the extremely wrong direction to 2100:

- high population growth to reach more than 12 billion people
- slow **tech**nology development
- coal consumption increases by 500 % between 2005 and 2100 (no account taken of supply constraints)
- slow GDP growth

- fast rise in world poverty
- high energy use
- high GHG emissions.
- **temp**erature forecast: **5 C** rise between 2005 and 2100.

RCP 8.5's vision is **horrifying**, as worst-case scenarios should be.

A **whole wave** of **lit**erature, in peer-reviewed journals as well as in media, even by IPCC authors, has since presented this worst-case as either "the most **likely** case" or "the baseline case---business as usual without policy action". This **misleading** assumption provoked a recent paper in Nature subtitled: "Stop using the worst-case scenario for climate warming as the most likely outcome" (see also, Chrobak, 2020).