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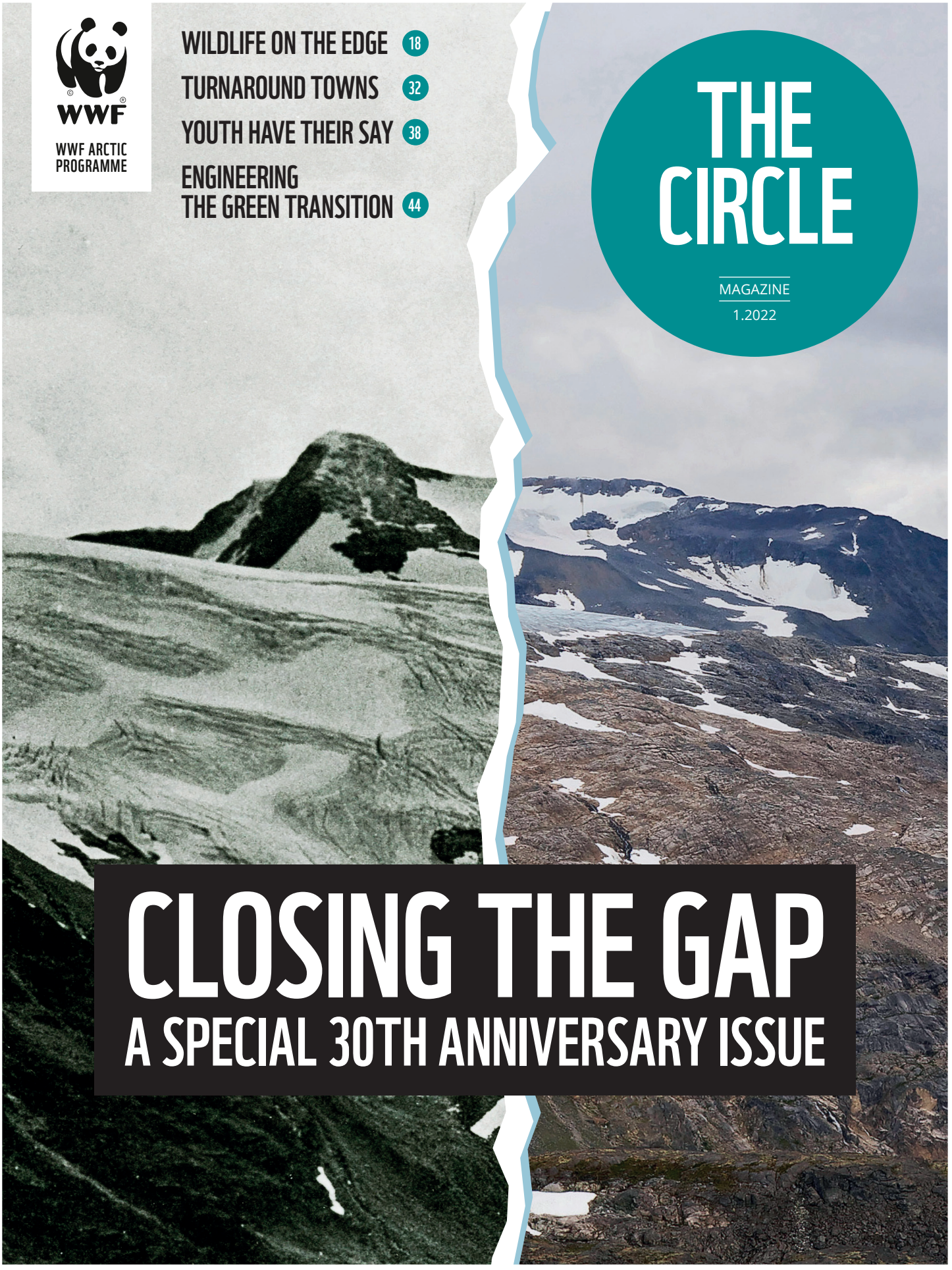
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THE CIRCLE

MAGAZINE

1.2022



CLOSING THE GAP

A SPECIAL 30TH ANNIVERSARY ISSUE

The Circle 1.2022

CLOSING THE GAP: SPECIAL 30TH ANNIVERSARY ISSUE



COVER: Before and after photos show glacial retreat on both sides of Chilkoot Pass at the boundary between Alaska, US and northern British Columbia, Canada.

1906 photo: George R. White-Fraser of the International Boundary Commission. 2014 photo: Ronald D. Karpilo, Jr. and Sarah C. Venator/NPS. Photos via NPS Climate Change Response/Flickr.com/ public domain.

Inuit child jumping on ice, Pond Inlet, Canada.

Photo: Peter Prokosch

Publisher:
WWF Arctic Programme
Ulriksdals Slott,
170 81 Solna Sweden

Internet: arcticwwf.org

ISSN 2074-076X = The Circle

Date of publication:
May 2022

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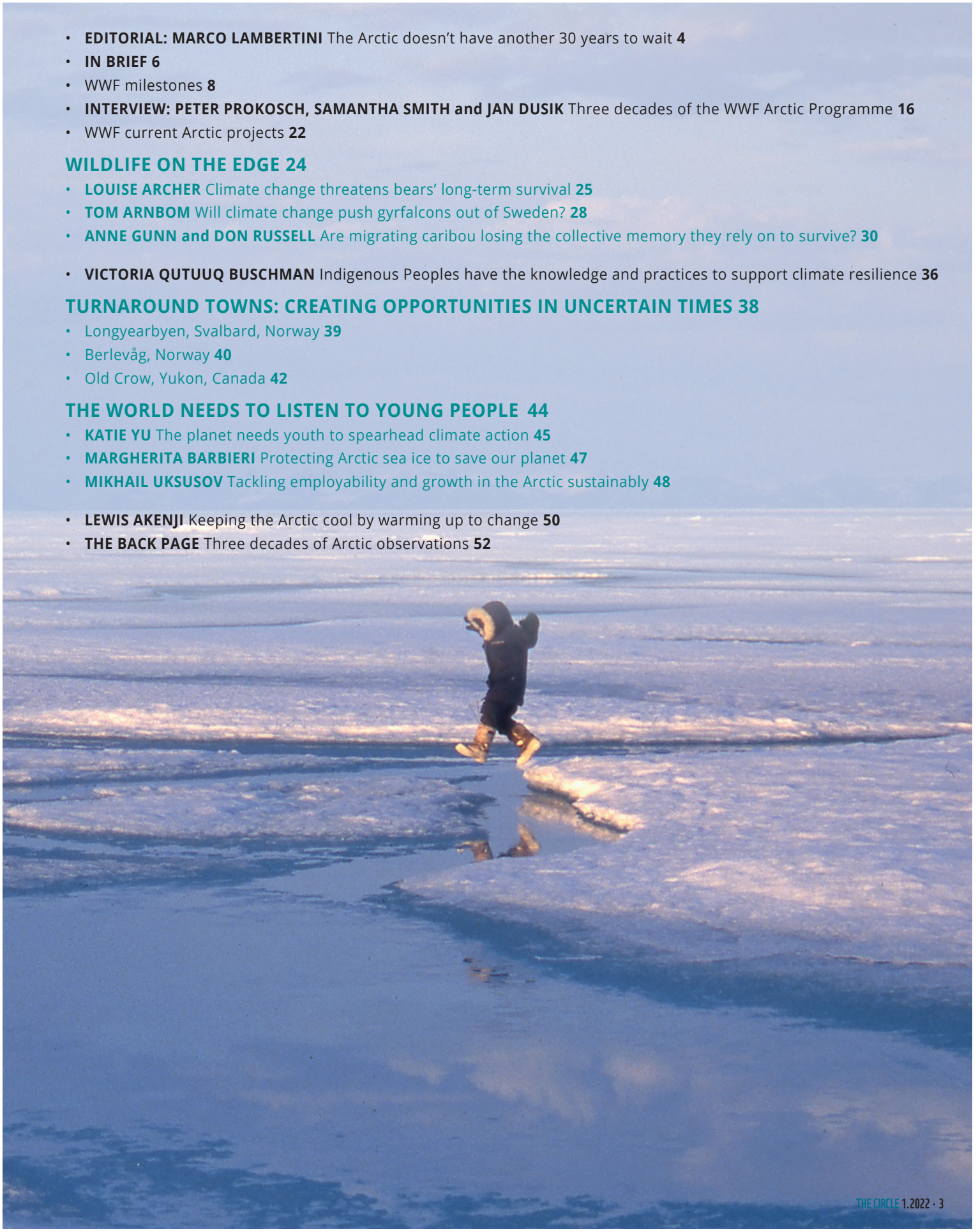
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EDITORIAL



*Brünnich's guillemots (*Uria lomvia*) are in decline in Svalbard. Will the species be able to adapt to a warmer climate?*

The Arctic doesn't have another 30 years to wait

THIS VERY SPECIAL ISSUE of *The Circle* celebrates the 30th anniversary of the WWF Arctic Programme. The programme was created in 1992 as a way to work with partners to combat threats to the Arctic and sustainably preserve its rich biodiversity.

Much has been achieved together with many partners over the past 30 years—but the best efforts of many institutions have not been enough to fully counter the human pressures and impacts. Perceived as one of the toughest and most unconquerable places on Earth, the Arctic has been altered by human activity more than just about any other.

The trends are worrying and there is no room for complacency. The Arctic's climate is warming nearly three times more quickly than the rest of the planet, causing extensive habitat destruction and declines in species such as narwhals, polar bears and walrus. Between 1979 and 2019, sea ice in the region receded by 43 per cent. At the same time, shipping has increased—and more vessels mean greater risks to Arctic ecosystems and wildlife.

Humans living in the Arctic are affected, too. Permafrost temperatures have risen to record levels in the past 30 years, leading to thaws that threaten the stability of roads, buildings and other infrastructure. Coastal erosion in many parts of the Arctic is forcing whole communities to leave their homes. And the effects of Arctic change are also felt far beyond the region. With Arctic temperatures predicted to rise by 3°C to 10°C by the end of the century, the region's role as the "global refrigerator"—a vault of ice and carbon—will diminish, exacerbating global impacts from rising sea levels and temperatures.

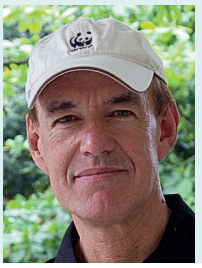
Despite these dramatic changes, not enough has been done in the past 30 years to slow or halt the worsening crisis. Today more than ever before, we are calling for urgent action on climate change and the loss of nature at a regional and global level, while striving to guarantee human equity and prosperity.

Here in the Arctic, the current combination of threats requires responsible and bold stewardship that sets aside national interests. Arctic governments need to work with communities using science-based, Indigenous and local knowledge to conserve, protect and sustainably manage Arctic ecosystems and to alleviate the impacts that are shattering Arctic wildlife and communities alike.

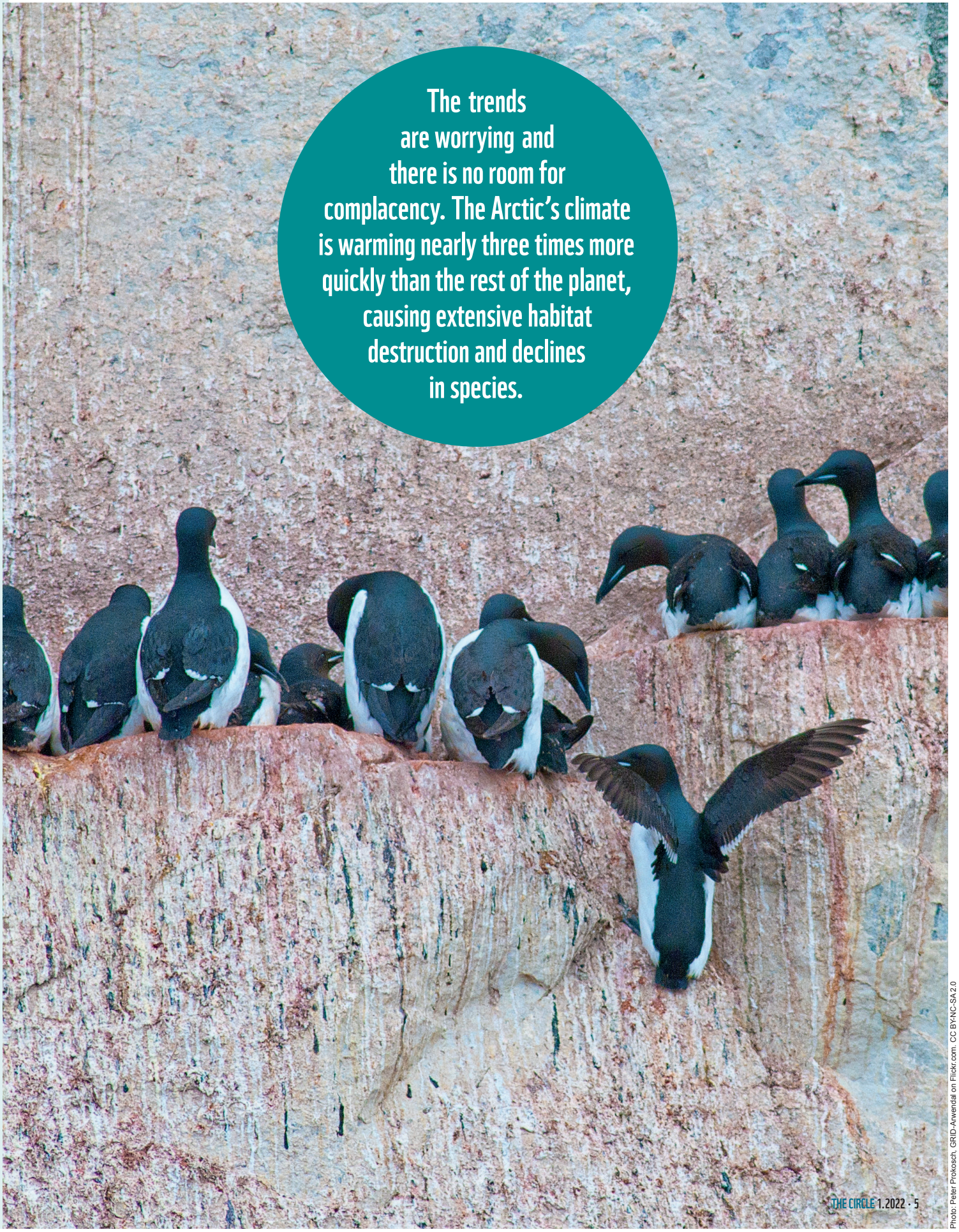
At a global level, one of our key priorities right now is to ensure world leaders agree on a global plan of action for nature at the crucial UN Convention on Biological Diversity summit later this year. We need this agreement to halt and reverse nature loss by 2030 and deliver a nature-positive world so that there is more nature by the end of the decade, not less. That has to apply globally, and particularly to the regions most affected by human activities, such as the Arctic.

This is also where biodiversity and climate meet. To be nature-positive, we must stabilize climate change and keep the global temperature rise below 1.5°C, the point at which the most catastrophic climate impacts become inevitable. We also know that we can't win our battle on climate change without halting nature loss and preserving nature's ability to sequester carbon.

What the Arctic will look like 30 years from now will be shaped by the decisions we make today and the actions we take in the coming decade to turn the tide against climate change and biodiversity loss. Many of the changes we are already witnessing today are irreversible. But together, we can still avoid catastrophe and secure a future for Arctic nature, Arctic peoples and the rest of humanity who rely on it.



MARCO LAMBERTINI is the Director General of WWF International. Based in Gland, Switzerland, he has more than 35 years' experience in conservation leadership.



The trends are worrying and there is no room for complacency. The Arctic's climate is warming nearly three times more quickly than the rest of the planet, causing extensive habitat destruction and declines in species.

Photo: Peter Prokosch, GRID-Arendal on Flickr.com. CC BY-NC-SA 2.0

IN BRIEF

IN THE NEWS... 30 YEARS AGO

POLLUTANTS ON THE MOVE

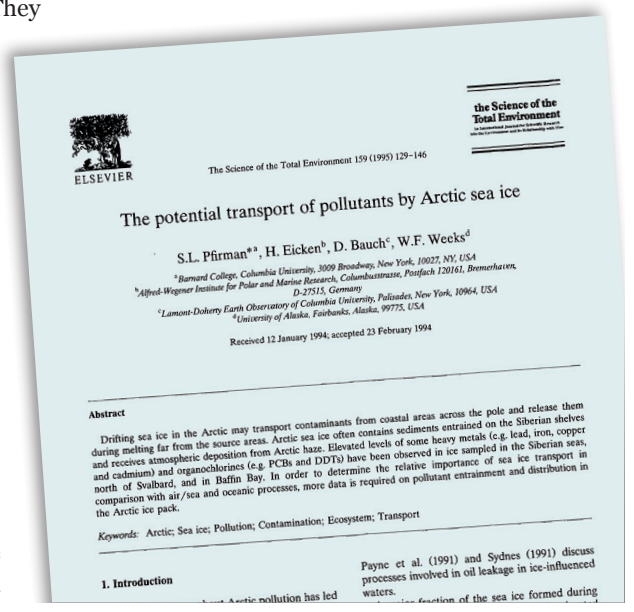
Arctic sea ice found to be transporting contaminants

GROWING CONCERN in the early 1990s about Arctic pollution led scientists to speculate about the relative roles of the atmosphere and ocean in the transport of contaminants. At the time, sea ice was not believed to be a potential carrier. But scientists from the United States and Germany began a research project to explore how ice formation and drift could influence the distribution of heavy metals, radionuclides, organochlorines and other pollutants in the Arctic.

They published a study in *The Science of the Total Environment* in 1995 that found that drifting sea ice in the Arctic could carry contaminants from coastal areas across the pole and release them far from their source areas during melting. This process was enabling the contaminants to make their way into the marine food chain.

The team concluded that sea ice that formed in shallow regions of the Siberian sea could incorporate associated contaminants, and that Arctic sea ice also received atmospheric deposits from Arctic haze (air pollution). They also found elevated levels of certain heavy metals (such as lead, iron, copper and cadmium) and organochlorines (such as PCBs and DDTs) in the ice they sampled in the Siberian seas, north of Svalbard, as well as in Baffin Bay, in northern Canada.

In their report, the researchers wrote that some of this ice was transported more than a thousand kilometres to the Greenland and Barents seas, making sea ice a potentially significant transport mechanism for contaminants. On top of that, they found that pollutants released at the sea surface along the marginal ice zone could easily enter the marine food chain. For example, polar bears on Svalbard had levels of PCBs high enough to cause reproductive damage.



ELSEVIER

the Science of the Total Environment

The Science of the Total Environment 159 (1995) 129–146

The potential transport of pollutants by Arctic sea ice

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Received 12 January 1994; accepted 23 February 1994

Abstract

Drifting sea ice in the Arctic may transport contaminants from coastal areas across the pole and release them during melting far from the source areas. Arctic sea ice often contains sediments entrained on the Siberian shelves and receives atmospheric deposition from Arctic haze. Elevated levels of some heavy metals (e.g. lead, iron, copper and cadmium) and organochlorines (e.g. PCBs and DDTs) have been observed in ice sampled in the Siberian seas, north of Svalbard, and in Baffin Bay. In order to determine the relative importance of sea ice transport in comparison with air/sea and oceanic processes, more data is required on pollutant entrainment and distribution in the Arctic ice pack.

Keywords: Arctic; Sea ice; Pollution; Contamination; Ecosystem; Transport

1. Introduction

Arctic pollution has led

Payne et al. (1991) and Sydnes (1991) discuss processes involved in oil leakage in ice-influenced waters.

fraction of the sea ice formed during

RADIOACTIVITY AT THE TOP OF THE WORLD

The lasting legacy of the Soviet atomic programme

IN THE EARLY NINETIES, Russian scientists were sounding the alarm about the impact of the Soviet Union's atomic programme on northern Russia. In April 1992, they warned that thousands of seals in the region were ill with blood cancers.

During the Soviet period, spent reactors from nuclear submarines and icebreakers were often dumped in the White and Barents seas, and Novaya Zemlya, a large Arctic island in northern Russia, was a nuclear weapons testing site. (All of its residents had been cleared out in the 1950s.) This led to high levels of radioactivity in the area, both on land and in the water.

When Russian scientists found that thousands of harp seals were dying of cancer, they pointed the finger directly at the radioactivity caused by the Soviet nuclear testing and dumping. They first became aware of the problem after more than a million dead starfish washed up along the White Sea coast. After that, they began taking blood and tissue samples from the seals.

"In the last decades, monstrous experiments connected with numerous nuclear weapons tests were performed on Novaya Zemlya," wrote Yuri K. Timoshenko, director of the marine mammal laboratory at the Polar Scientific Research Institute in Novaya Zemlya in *Pravda of the North*.

"The Barents Sea and the coast of Novaya Zemlya were turned into a dump for solid and liquid radioactive waste. A catastrophic situation has been created. A real threat has emerged, not only to sea mammals but everything in the ocean. The ecological and genetic consequences are unpredictable."

TROUBLE IN THE UPPER ATMOSPHERE

Expanding hole in ozone layer above the Arctic

THE HOLE in the ozone layer emerged as a big concern in the early nineties as gases like chlorofluorocarbons (CFCs) from spray cans and refrigerants broke down ozone molecules in the upper atmosphere. Scientists began to warn that this depletion of atmospheric ozone would result in increased rates of skin cancer, cataracts and impaired immune systems for humans along with disruptions in agriculture worldwide.

In February 1992, a NASA-led team of scientists announced that they had found record levels of CFCs in the ozone layer above the northern hemisphere. Bases on observations by NASA's Upper Atmosphere Research Satellite, the team determined that there were exceptionally high levels of chlorine monoxide over parts of Europe, Asia and North America. They also found that chemicals that help deactivate ozone-depleting chlorine and bromine were present at significantly reduced levels in the stratosphere above the North Pole.

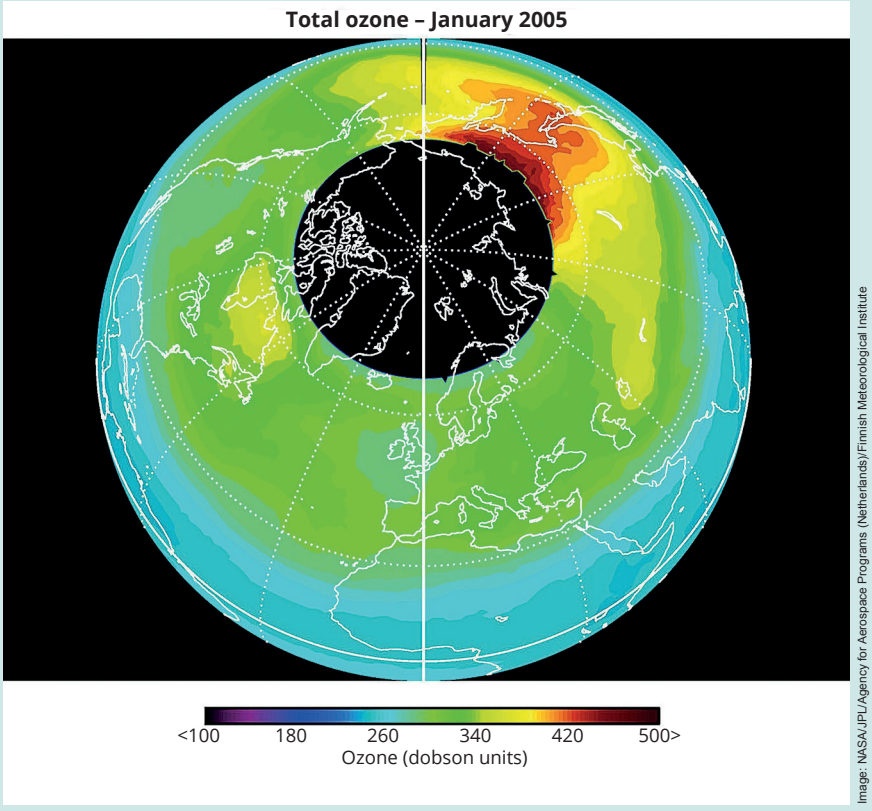


Image: NASA/JPL/Agency for Aerospace Programs (Netherlands)/Finnish Meteorological Institute

The Arctic ozone hole as it appeared in January 2005.

The scientists predicted that a dramatic decrease in protective ozone in the Arctic would occur over the coming decade.

"We believe now that the probability of significant ozone loss taking place in any given year is higher than we believed before," said Dr. James G. Anderson, a Harvard University chemistry professor who was involved in the studies.

HISTORIC AGREEMENT

The Convention on Biological Diversity is born

Convention on Biological Diversity

ON JUNE 5, 1992, the Convention on Biological Diversity—an international treaty hosted by the United Nations Environmental Development Programme (UNEP)—was opened for signature at the Earth Summit in Rio de Janeiro.

The convention aimed to address threats to biodiversity and ecosystem services—including threats from climate change—through scientific assessments, incentives, technology transfer and the active involvement of all stakeholders, from Indigenous and local communities to youth, non-governmental organizations, women and the business community.

By a year later, the treaty had already been signed by 168 parties. It ultimately entered into force in December 1993 with 193 countries participating. The only UN member states that did not sign were Andorra, South Sudan, the United States and Vatican City.

Today, the convention covers all levels of biodiversity, from ecosystems to species and genetic resources. It also includes all domains that could be related in any way to biodiversity and its role in development, from science, politics and education to agriculture, business, culture and more.

The convention's history dates back to 1988, when UNEP convened the first Ad Hoc Working Group of Experts on Biological Diversity in Geneva, Switzerland to explore the need for an international convention on biological diversity. The Convention on Biological Diversity still meets every two years to review progress, set priorities and create work plans to support a sustainable future.

WWF MILESTONES

Although the WWF Arctic Programme was launched in 1992 and turns 30 this year, WWF's work in the Arctic began even longer ago. We collaborated with the Icelandic government to create Skaftafell National Park back in 1967. Click to read about some of our most notable achievements since then.



© WWF-Netherlands / Vincent Kneefel



© Tim Stewart / WWF-Canada

1973: Agreement on the Conservation of Polar Bears signed

Canada, Denmark, Norway, the United States and the Union of Soviet Socialist Republics signed the Agreement on the Conservation of Polar Bears. WWF assisted with the formulation of the agreement. At that time, the largest threat to the polar bear was over-hunting, which had led to the severe depletion of some subpopulations. Thanks to coordinated international efforts and steps taken by the Range States, polar bear numbers in some previously depressed populations have since rebounded.

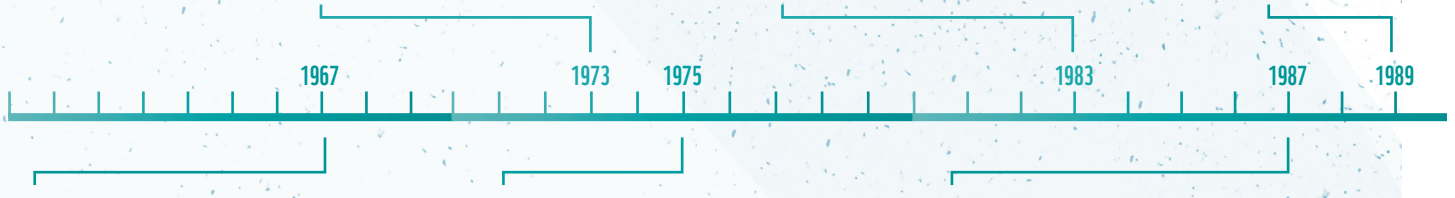
1983: Whale work begins

WWF's Whales Beneath the Ice programme started this year with the aim of learning more about three species of whales associated with ice: beluga, narwhal and bowhead. It engaged Inuvialuit community members and culminated in the 1986 publication *Whales Beneath the Ice: Final Report, Conclusions and Recommendations Regarding the Future of Canada's Arctic Whales*.

1989 to 2009:

Creating a whale sanctuary

1989 marks the start of WWF's work with local people to establish a bowhead whale sanctuary on the northeast coast of Baffin Island, Canada, near the community of Clyde River. Also referred to as Isabella Bay, or Igaliqtuuq, this area is a pristine late-summer and fall feeding and resting stopover for up to 200 bowhead whales at any one time. WWF-Canada worked with Clyde River for more than 20 years to establish protection for the area and its whales.



1967: First WWF-sponsored protected area in the Arctic

WWF collaborated with the Icelandic government to create Skaftafell National Park. This mountainous icy park has since grown to become the largest national park in Europe, growing to almost 5,000 km² from its original 500 km².

1975 to 1978:

Creating a baseline for polar bears

The three-year "polar bear and man" project in Canada was a partnership between the University of Guelph, Richard Ivey Foundation, Canadian Wildlife Service, and governments of Manitoba and the Northwest Territories. This study gave scientists baseline information on polar bears for the first time.

1987: Mikhail Gorbachev calls for the Arctic to be a "zone of peace"

Gorbachev's speech, delivered in Murmansk, Russia, marked the start of foreign policy change. In the speech, Gorbachev invited all those in the region to cooperate on resource extraction, scientific exploration, environmental protection, shipping routes and the issues of Indigenous Peoples.



Photo: Sebastian Bartsch - Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=56756326



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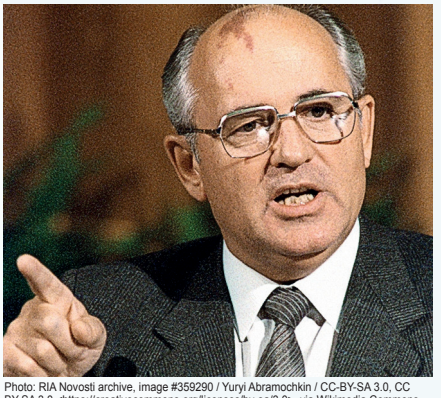


Photo: RIA Novosti archive, image #359290 / Yuryi Abramochkin / CC-BY-SA 3.0, CC BY-SA 3.0 <https://creativecommons.org/licenses/by-sa/3.0>, via Wikimedia Commons

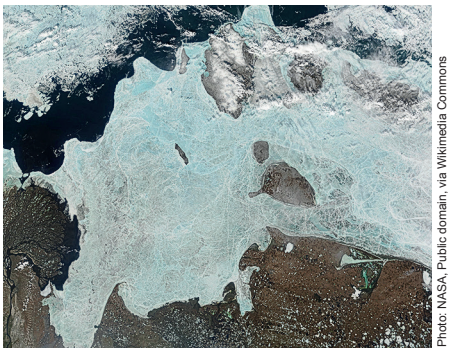


Photo: NASA, Public domain, via Wikimedia Commons



1993 to today:

50 protected areas established in Russia

With the support of WWF-Russia, more than 50 protected areas totalling more than 492,170 km² have been established since 1993, including the Novosibirskie Ostrova (New Siberian Islands) state nature reserve, the first Arctic national park, Kytalyk National Park, the habitat of 98 per cent of the world's Siberian crane population, and Bear Islands national marine strict nature reserve. Eight more protected areas are on the way.

1994: Bringing the Arctic to the world

WWF published the first edition of the *Arctic Bulletin* to bring conservation-related news about the circumpolar world to an influential audience of thousands.

1992 1993 1994 1995

1992: The WWF Arctic Programme is born

Although WWF had been running projects in the Arctic for a number of years already, this new programme brought a circum-Arctic focus to its work for the first time. This happened just as the eight Arctic countries and Arctic Indigenous peoples were joining together in the Arctic Environmental Protection Strategy, the forerunner of the Arctic Council.

1993: The Great Arctic Reserve

With help from WWF, Russia set aside 42,000 km² of the Taimyr Peninsula, including a Kara Sea archipelago, as the Great Arctic Reserve. WWF helped fund the reserve and organize three scientific expeditions that contributed to establishing the region's ecological importance.

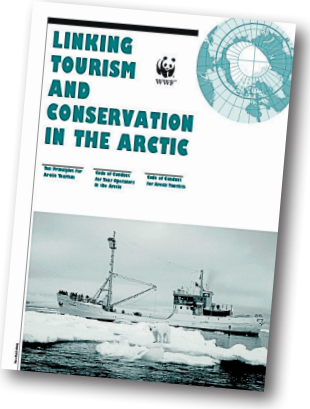


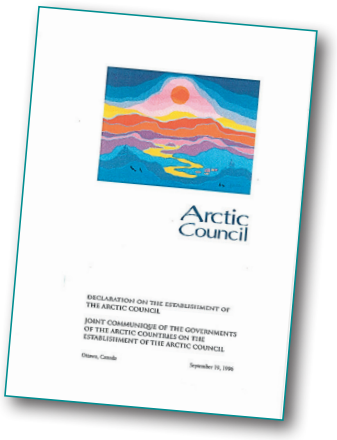
Photo: Peter Prokosch. www.grida.no/resources/2590

1995 to 2006:

Working with tourism for Arctic conservation

To emphasize and promote the benefits of tourism for conservation and local communities, this WWF project developed principles for Arctic tourism as well as codes of conduct for Arctic tour operators and tourists. It also organized a series of workshops and pilot projects and offered yearly awards to businesses, groups or individuals who demonstrated a commitment to conservation.







ARCTIC COUNCIL

1996: The Ottawa declaration marks the creation of the Arctic Council

On September 19, 1996 in Ottawa, Canada, the Arctic Council was established to enhance cooperation, coordination and interaction among the Arctic states with the active involvement of Arctic Indigenous Peoples and other Arctic inhabitants on common Arctic issues.

1997: Russia's Gift to the Earth

In 1997, Yakutia became the first Russian participant in the WWF Gifts to the Earth campaign. The head of the Republic of Sakha (Yakutia) promised to create natural reserves on 25 per cent of the republic's territory. With support from WWF, the region exceeded the plan and reached 30 per cent. The campaign was later joined by 10 more regions of Russia.

1998: WWF becomes an Observer of the Arctic Council

The WWF Arctic Programme was among the first group of 10 Observers admitted to the Arctic Council in recognition of its mandate and the significance of its contribution to conserving the Arctic environment. Today, the Council has 38 Observers.

1996 1997 1998 1999

1997: WWF campaign begins to protect wilderness in the central highlands of Iceland

One outcome of the campaign was the creation of Vatnajökull National Park, which today covers 14 per cent of Iceland, including the Vatnajökull glacier. Unfortunately, the campaign didn't succeed in preventing the construction of a massive hydropower plant to power an aluminum smelter, which ultimately destroyed two rivers.

1997: Fishing for sustainability

This year, WWF co-founded the Marine Stewardship Council (MSC) to encourage sustainable fishing practices. Today, increasing numbers of fisheries around the Arctic—in Norway, Alaska and Russia—are MSC-certified.

MARINE STEWARDSHIP COUNCIL ©

1999 to 2003:

Tracking ringed seals

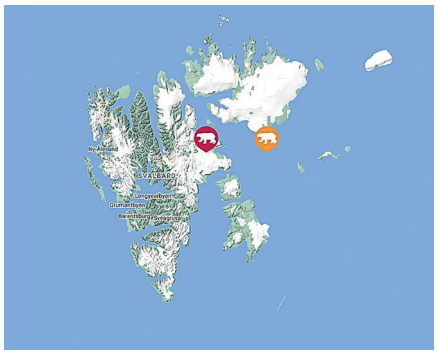
The ringed seal is a key species in the Arctic and is the most numerous and widespread of all seal species. WWF supported a four-year project that used satellite tagging to track the seals' travelling patterns, diving depths and time spent on the surface. Participants in the project included Inuvialuit hunters and trappers' organizations as well as the Canadian Department of Fisheries and Oceans.



© Wild Wonders of Europe / Orsolya Haarberg / WWF



© Tim Stewart / WWF-Canada



2003: WWF launches the Polar Bear Tracker

The WWF Polar Bear Tracker began following polar bears in several Arctic regions this year. The bears' positions are beamed to scientists from trackers on their necks via satellite. The scientists can determine when a female enters a den, when she emerges with her cubs, and how far she travels each day. They can also map a polar bear's range to determine how far individuals travel. Over time, this information can reveal information about how polar bears cope and adapt in years with less sea ice.



Photo: Peter Prokosch, www.grida.no/resources/3010

2006: Protecting the Kamchatka salmon

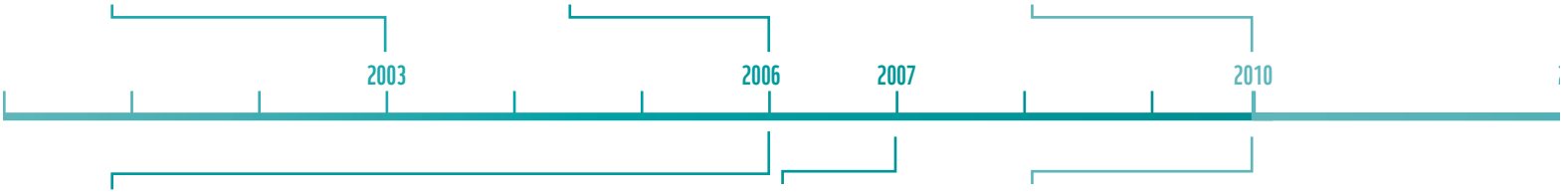
WWF launched its Kamchatka Salmon Conservation Initiative to help protect five species of Pacific salmon in Russia as well as the spawning grounds for a quarter of all Pacific wild salmon. Three years later, WWF worked with the Kamchatka Fisheries Ministry and one of the regional governments to develop a regional management council that would include the public in salmon management. WWF has also started a summer internship program at Kamchatka State Technical University to train future fisheries managers and scientists.



Roy Lowe/U.S. Fish and Wildlife Service, Public domain, via Wikimedia Commons

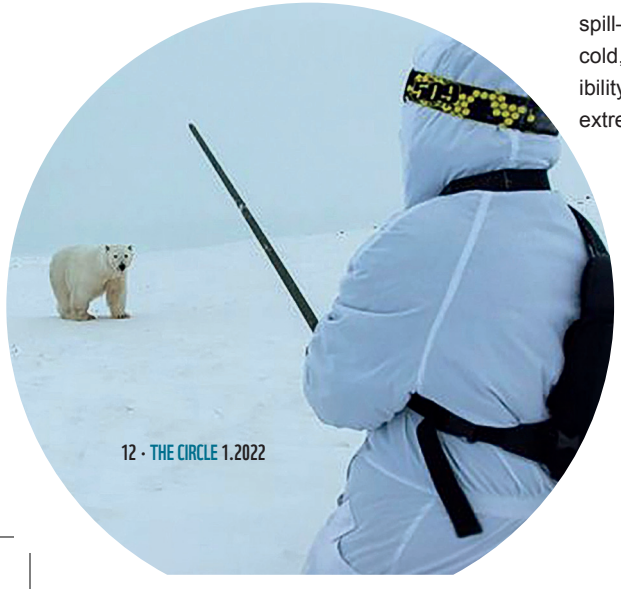
2010: Last release of captive-bred Aleutian cackling geese, Ekarma, Russia

With help from WWF and Russian ornithologist Dr. Nikolai Gerasimov, the release occurred on a remote island (Ekarma) near Kamchatka.These geese were feared extinct until found on this island when a successful captive breeding and release program was introduced. Today, this population is making a strong comeback, with wild geese now breeding in Russia and migrating to wintering grounds in Japan.



2006: Chukchi residents start Russia's first community-based polar bear patrol

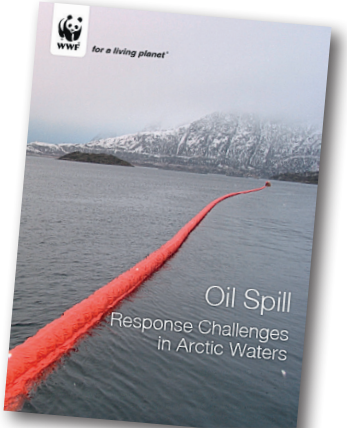
Today, polar bear patrol teams work in the Nenets Autonomous Okrug, Yakutia and Chukotka—but it all started on the coast of the Chukchi Sea in 2006 with a small local project. WWF supported the village of Vankarem—and a year later, the village of Ryrkaipiy—to help them address the "autumn invasion" of polar bears.



© M.Deminov / WWF Russia

2007: Arctic program issues a report on the oil spill response gap

A WWF report, *Oil Spill Response Challenges in Arctic Waters*, concluded that the only way to avoid potentially devastating environmental risks from oil spills is to ensure that no more of the Arctic is opened up to oil development until the response gap is closed. Arctic conditions can affect both the probability that a spill will occur and the consequences of such a spill. The same conditions that increase the risk of an oil spill—such as lack of natural light, extreme cold, moving ice floes, high wind and low visibility—can also make response operations extremely difficult or totally ineffective.



2010: Protection for offshore Alaska

In 2010, thanks in part to WWF research and advocacy, the US government removed Bristol Bay (a major fishery and ecological resource in Alaska) from its five-year plan for oil leasing. The government also announced the creation of a national oceans policy that would, among other things, identify and protect remarkable places in the offshore area of Alaska.



Photo: Joseph, CC, Flickr.com



Photo: SenkYou - Own work, CC BY-SA 4.0, https://commons.m.wikimedia.org/wiki/File:01_gazprom-ru_5.jpg

2011 to 2017: Adaptation Actions for a Changing Arctic project developed

In 2011, senior officials of the Arctic Council said it was necessary "to review the need for an integrated assessment of multiple drivers of Arctic change as a tool for Indigenous Peoples, Arctic residents, governments and industry to prepare for the future." This resulted in the Adaptation Actions for a Changing Arctic project where WWF was a contributor, including reports on three regions to help local decision-makers and stakeholders develop adaptation tools and strategies to better deal with climate change and other environmental stressors.

2012: Russia adopts a law to protect Arctic seas from oil spills

This significant achievement was supported by the collection of more than 120,000 signatures during WWF's 2012 Earth Hour campaign. Three years later, in 2015, Earth Hour called for a moratorium on new oil drilling in Russian Arctic waters. This campaign and other factors led to a significant slowdown in offshore oil and gas development in the area. Today, just one oil rig—*Prirazlomnaya*, in the Pechora Sea—is under operation.

2015: Arctic ministers approve a framework for network of marine protected areas (MPAs) across the Arctic

WWF contributed to a framework developed by the Arctic Council for a pan-Arctic network of places and natural features that would be specially managed to conserve and protect the Arctic marine environment. By approving the framework, the ministers set out a common vision for international cooperation in MPA network development, management and actions to protect the Arctic marine environment based on best practices and previous Arctic Council initiatives.

2011 — 2012 — 2013 — 2015

2012: WWF's Rapid Assessment of Circum-Arctic Ecosystem Resilience (RACER) tool launches

RACER is a tool developed by WWF for identifying and mapping land and sea features that support ecosystem function in a climate-changed Arctic. Recognizing that existing approaches to managing vulnerable Arctic habitats and species are not keeping pace with the accelerating climate crisis, RACER locates sources of ecosystem resilience in the Arctic and looks ahead to whether these areas will persist in a climate-altered future.

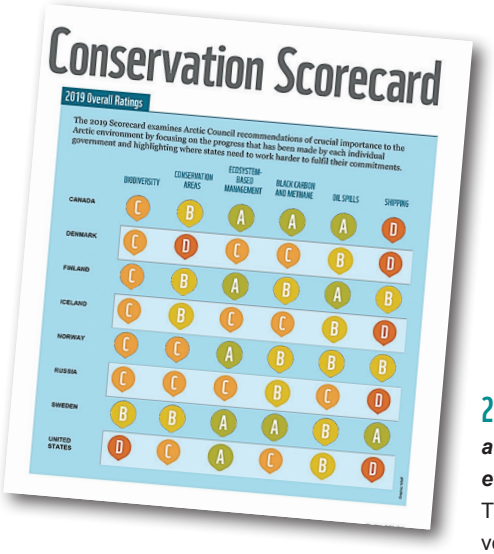


2013: Arctic governments renew commitments to conserve polar bears

Governments of the five Arctic countries with polar bear populations came together this year to reaffirm their commitments to polar bear conservation, identifying the climate crisis as the biggest threat to the bears' long-term survival. This confirmation acknowledged the unique 1973 agreement, which remains one of the only legally binding treaties in existence focusing on conservation of a species. A collaborative WWF effort resulted in a successful International Polar Bear Forum in Moscow, December 2013.



© naturepl.com / Jenny E. Ross / WWF



2017: First WWF Arctic Conservation Scorecard published

The 2017 WWF Arctic Council Conservation Scorecard was the first-ever assessment of the implementation of the Arctic Council's commitments to biodiversity and conservation. Indicators captured the performance of both individual countries and the Arctic Council as a whole.



2018: WWF publishes *Getting it right in a new ocean: Bringing sustainable blue economy principles to the Arctic*

This report outlines how the Arctic's biodiverse ocean resources and economies can be developed to ensure long-term economic and ecosystem health for the region and the planet. It warns that conventional approaches to development threaten the viability of many of the region's distinctive ecosystems, undermining sustainability for communities and economies. The report contributed to the Arctic Council discourse on the sustainable blue economy and bioeconomy.

2016 2017 2018 2019

2016: Bristol Bay withdrawn from offshore oil development

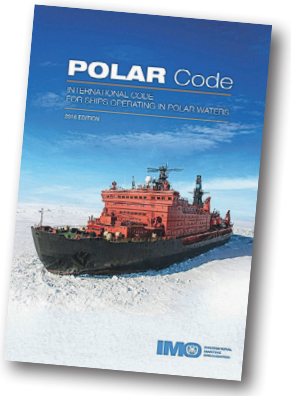
Bristol Bay leaders, fishers, WWF and many partner organizations that had campaigned together celebrated when US President Barack Obama issued an executive order to permanently withdraw Bristol Bay from offshore oil development. With more than 450 species of fish, crustaceans and molluscs, including iconic species like salmon, halibut and king crab, Bristol Bay supports fishing families and businesses across Alaska and the Pacific Northwest. It also supports Alaska Native subsistence lifestyles and culture.



Photo: Chris Ford, Flickr.com. CC BY-NC 2.0

2017: Polar Code enters into force

The International Code for Ships Operating in Polar Waters, or Polar Code, was adopted by the International Maritime Organization to provide a clear set of rules to protect not only ships, but the Arctic's fragile marine ecosystem. In a world first, it set out a series of measures and guidelines for all ships operating in the waters of the polar regions



2019: The last ice area

WWF spent more than a decade pushing for the protection of what it coined "The Last Ice Area," a High Arctic region above Canada and Greenland where ice is expected to persist the longest as the climate breakdown continues. WWF helped create a long-term vision for this region by bringing relevant science and Indigenous knowledge together and supporting Inuit-led conservation. This hard work, coupled with leadership from the Qikiqtani Inuit Association, paved the way for the federal government to declare Tuvaijuittuq (a 319,411 km2 part of The Last Ice Area) an interim marine protected area while also cementing protected status for nearby Tallurutiup Imanga.

Qikiqtani Inuit Association
qia.ca



© WWF-US / Chris Conner

2021: Humpback whale sanctuary created in Nuuk Fjord

In 2021, the municipality of Nuuk decided that Greenland's Nuuk Fjord and surrounding area should become a sanctuary for humpback whales. Ultimately, the area became the first whale sanctuary ever created by an Inuit community, with WWF as a driving force behind its creation. WWF's arguments in favour of protection focused on the local people's interest in the recreational value of humpback whales: whale-watching can generate more income than whale-hunting.

2021: International Maritime Organization bans heavy fuel oil

At a Marine Environment Protection Committe meeting in June 2021, the UN's International Maritime Organization approved a ban on the use and carriage of heavy fuel oil by ships in Arctic waters starting July 1, 2024. Heavy fuel oil produces significant quantities of harmful pollutants, including sulfur oxide, nitrogen oxides and black carbon (soot). In addition, an oil spill would have a devastating impact on the Arctic's ecosystem. However, because of a series of exemptions and waivers, a complete ban would only come into effect in mid-2029. This ambiguous result was partly remedied at the next meeting in November 2021, when a non-binding resolution was adopted calling on flag states to encourage vessels to switch to lighter, distillate fuels and phase out heavy fuel oils. This support was a success for the Clean Arctic Alliance, which includes WWF.



Photo: Roberto Venturini, Flickr.com, CC BY 2.0

2021

2021: Agreement reached to prevent unregulated high seas fisheries in the Central Arctic Ocean

This was the first multilateral agreement of its kind to take a legally binding, precautionary approach to protect an area from commercial fishing before such fishing has begun. There are currently no commercial fisheries in the Arctic high seas, with most of the region covered by ice year-round. However, given that summer ice-free areas are increasing, commercial fishing may be possible in the foreseeable future.



© Kevin Schafer / WWF

2021: The International Maritime Organization grants the Inuit Circumpolar Council provisional consultative status

The Inuit Circumpolar council was the first Indigenous organization to be granted this status. WWF-Canada (and the wider WWF network) lobbied for this outcome for more than five years. Achieving it was a major milestone for WWF and supports its goal to promote Arctic Indigenous voices at the International Maritime Organization (IMO). Ultimately, the objective is for Inuit to be able to speak directly to IMO member states about the impacts of shipping on community livelihoods and marine ecosystems to set rules for shipping that respect Indigenous rights and values.

INUIT

The view from the director's chair

THREE DECADES OF THE WWF ARCTIC PROGRAMME

Over the past 30 years, WWF's Arctic Programme has worked to raise awareness about the issues that matter most to the Arctic and the people and species who call it home. The programme's director always helps to determine these priorities. In autumn 1992, **PETER PROKOSCH** became the Arctic Programme's first director. He was succeeded in 2002 by **SAMANTHA SMITH**, who had begun as his deputy director and stayed on until 2006. **JAN DUSIK** is the current acting director.



The challenges and issues faced by the directors have changed over time, just as the Arctic itself has changed. But all directors have shared a common goal: to protect Arctic ecosystems, biodiversity and communities. We spoke to all three about their experiences and visions for the future.

How would you describe the state of the Arctic during your time as director of WWF's Arctic Programme?

PETER: My first challenge was that back then, hardly anybody had a clue what the Arctic was. We produced several Arctic maps that showed the Arctic from all angles to demonstrate that it is a circumpolar region made up mainly of ocean and surrounded by continents. In 1993, we launched the *Arctic Bulletin*, a newsletter that reflected what was going on in Arctic governmental cooperation. We always tried to highlight the achievements and activities of the countries we thought were most progressive.

SAMANTHA: When I joined the Arctic Programme, the Arctic Council had been had just been launched, and we were still in this politically confusing period after the end of the Cold War. There was also a mutual desire for a rapprochement between western governments and Russia in the North, because the Arctic had been, and still is, a zone of military action and even confrontation. There was a desire to try to build a more peaceful post-war cooperation when it came to Arctic environment and culture. But we had no sense, then, that climate



Samantha Smith and Peter Prokosch together in 2001. Samantha took over as director of the WWF Arctic Programme in 2002, when Peter left the programme to become CEO of WWF–Germany.
Photo: Ole Walter Jacobsen



The Arctic Programme's current acting director is Jan Dusik.

change was going to be a big thing. We were just talking about issues such as fisheries, marine protected areas and what resources and other rights Indigenous Peoples have in the Arctic.

JAN: When I joined the Arctic Programme in March 2020, the tangible impact of climate change was already clearly visible in the Arctic. Initially, there was enthusiasm about how the economy would flourish and opportunities would increase as the Arctic became more habitable. People were also starting to realize the disruption that climate change would bring to Arctic infrastructure and livelihoods. But Indigenous Peoples would probably see it the other way around—that the disruption to their livelihoods would matter more than any economic opportunities delivered by a warmer climate. The other thing is that I began just when the COVID-19 pandemic started. All meetings had to be postponed, and the Arctic's well-functioning cooperation and mutual understanding were all disordered by the fact that people couldn't meet.

JAN: "When I joined the Arctic Programme in March 2020, the tangible impact of climate change was already clearly visible in the Arctic."

In your opinion, what was the most critical issue facing the Arctic during your tenure as director?

PETER: For the Arctic countries, the most important issue was certainly pollution. Their main focus was on the POPs—persistent organic pollutants. The work of the Arctic Monitoring and Assessment Programme on POPs had a crucial influence on the Stockholm Convention, which ended the production of such POPs worldwide. I would say that is one of the most concrete outcomes of the circumpolar cooperation that started in the 1990s.

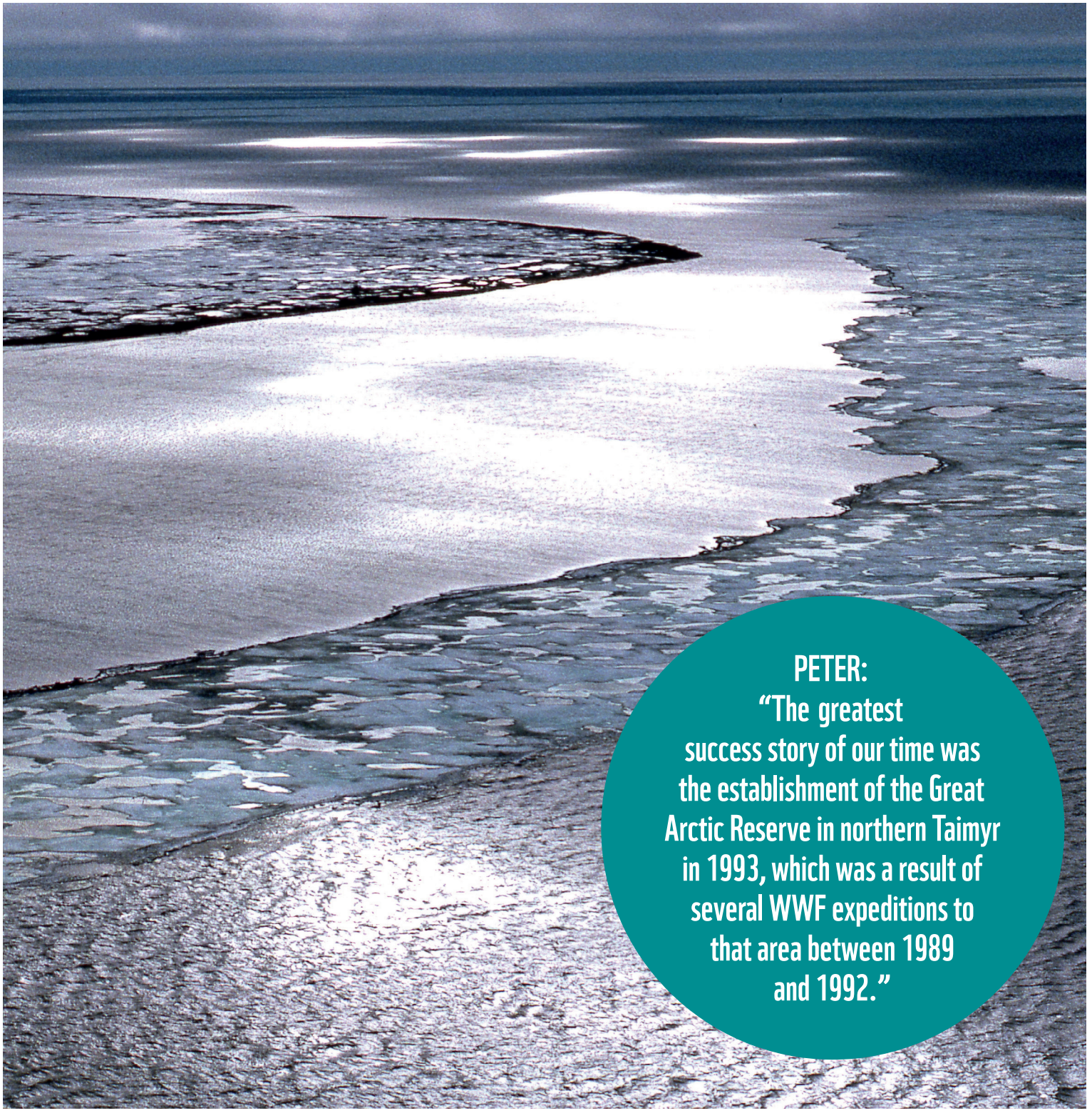
The greatest success story of our time was the establishment of the Great Arctic Reserve in northern Taimyr in 1993, which was a result of several WWF expeditions to that area between 1989 and 1992. In my time, there was also a major change: from working entirely on environmental issues with the Arctic Environmental Protection Strategy [a non-binding agreement among the Arctic states on environmental protection in the Arctic] adopted in 1991 towards the Canadian initiative in 1996, when the Arctic Council's work on "sustainable development" became the larger framework for intergovernmental cooperation

SAMANTHA: In the early 2000s, it became clear that what was happening south of the Arctic wasn't staying there. We were seeing really high accumulations of toxic chemicals in marine mammals and also in Arctic people, who were harvesting and eating those marine mammals. There was also a huge shift in our understanding of the environmental issues facing the Arctic, with the recognition that climate change was now the biggest threat. It was becoming more and more clear just how big a threat climate change was going to be and how quickly the changes were coming. I would not want to go back and read the Arctic Climate Impact Assessment now, because I'm pretty sure the things we thought would happen 50 years in the future have already happened.

JAN: I started at WWF when the COVID-19 pandemic was just beginning, so that was a major issue, not only for the Arctic but for the world. By the second year of the pandemic, when people had learned how to continue cooperating, the impacts of climate change, such as wildfires, were the big issue—the displacements they caused and the risks they posed to economic activities. Today, I think the big disruption is the war in Ukraine and the international isolation of Russia. Not only is it a humanitarian crisis that shocks and saddens us—it impacts everything. It is basically stopping all Arctic cooperation.



Pyasina River, Great Arctic Reserve (Zapovednik), Russia.
Photo: Peter Prokosch, www.grida.no/resources/2591



As director, what concrete changes did you see in the overall health of the Arctic?

PETER: One issue at the time was the Chernobyl atomic catastrophe, which brought radioactive material into the Arctic. It was a big issue for the Sámi people, particularly in northern Norway. For example, they could not eat or sell the reindeer meat. That was a major concern, but it improved over my tenure. In terms of pollutants, a lot came from the Russian side, from the nickel smelters on the Kola Peninsula close to the Norwegian border. But Norway did a lot to influence the clean-up of those polluting industries.

SAMANTHA: I think the Stockholm Convention on Persistent Organic Pollutants that was agreed upon just before I became director was a huge victory.

Some of the other big successes were the creation of very large new protected areas, especially in the Russian Arctic. There was also a much bigger focus on sustainable management of the Arctic fisheries. And of course, there was the issue of climate change, where we suddenly started to understand that it was important, but had almost no tools to do anything about it.

One big initiative was our call for an Arctic Treaty for the Arctic Ocean. We were concerned that as the temperatures warmed up and ice disappeared, we would see much more shipping in the northern seas as well as oil and gas development. I don't think we really foresaw seabed mining that far north, but it was certainly on some people's minds. We were actually hoping for something like the Antarctic Treaty, and we landed on a Regional Seas Convention as a compromise. We saw a multilateral solution as the best way to manage the potential impacts of increased activity. There's now a new agreement on unregulated fishing for the Central Arctic Ocean, which is a great development.

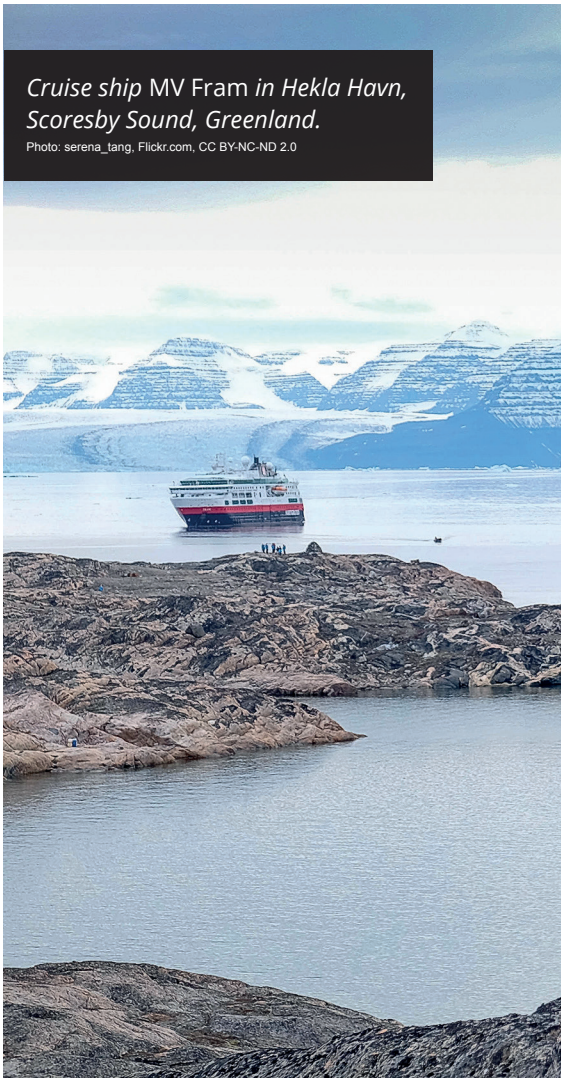
JAN: On the positive side, there has been a realization of the opportunities the green economy offers the Arctic as we need to move away from fossil fuels. People see that the green economy could bring additional jobs and economic development in a way that is more compatible with the Arctic environment. On the negative side, there is now the prospect of extending oil and gas drilling operations in the Arctic and shipping along the Northern Sea Route. Most recently, the prospect of the militarization of the Arctic has become a dark cloud over the area.

What do you think the future of the Arctic is?

PETER: Gorbachev, the final leader of the Soviet Union, once said that the Arctic should be a region of peace and environmental cooperation—and I also believe that the Arctic plays a role in terms of peace. Arctic countries have used the Arctic Council as a place where they could talk to each other. But with this terrible war in Ukraine, it is difficult to see what could happen in the future. Before the war started, themes that were raised in the Arctic had a positive effect on both the Arctic and other parts of the world.

SAMANTHA: I don't think we're going to see a ton of oil and gas development in the far north now—we are just too far down the road on climate change. I'm less concerned about that. I'm also less worried about the shipping issue right now, though I do think shipping in the Arctic is going to increase as we search for shorter and easier routes. But in terms of the future of the Arctic overall, warming is happening really quickly. Everything I understand from the science is that we're certainly well past the point where we can expect to ever return to the Arctic I knew—even when I worked there just 15 or 20 years ago. It is really a sad and also kind of weird feeling to know that the places we've been and things we've seen could be gone or changed so dramatically after such a short period of time.

JAN: I'm still optimistic that the Arctic spirit of cooperation and stewardship will prevail. What I can't foresee is when exactly the contact between the seven Arctic Council members and Russia will resume. But I think the spirit of cooperation is robust among the seven, and that there will soon be new channels to reactivate it. While the biggest concern is obviously everyone who is affected by the war in Ukraine, especially the people who are suffering, I am also a little worried that the war—and the international sanctions and isolation that have followed—will be used to justify environmental deregulation in Russia and its part of the Arctic. There could be more readiness to exploit the Russian Arctic, and due to Russia's international isolation, there will be less counterpressure to ensure that adequate environmental standards, sustainable finance and related safeguards are in place.



Cruise ship MV Fram *in Hekla Havn, Scoresby Sound, Greenland.*
Photo: serena_tang, Flickr.com, CC BY-NC-ND 2.0

What do you think the most critical issue is for the Arctic going forward?

PETER: I think it's climate change—and that is a global issue. The Paris

SAMANTHA: "Everything I understand from the science is that we're certainly well past the point where we can expect to ever return to the Arctic I knew."



Agreement, which aims to keep global warming under 1.5°C, is critical. Equally important for the whole world, including the Arctic, is ensuring that 30 per cent of the entire globe becomes protected—the so-called "30×30 goal." The Arctic could be seen as a forerunner in this. It has huge areas that have been protected, but marine protected areas, in particular, still need to be created. All of the Arctic countries except Russia have already agreed that they would implement the 30×30 goal. If Russia were to join, then in theory, the Arctic could play a major role in this.

SAMANTHA: The most critical action is peace and an end to the war in Ukraine. This war touches several Arctic states as well as the Arctic's Indigenous Peoples, whose cooperation stretches across national borders. Beyond that, the work of the Arctic Council is currently suspended. We need to find ways to allow Arctic cooperation, or parts of it, to resume, though that seems really far away right now. But certainly, peace is the first step. The second most important issue is obviously climate change, and I think the most important thing anyone can do for the Arctic on climate is to significantly reduce CO_2 and methane emissions.

JAN: From WWF's perspective, I think we need to keep working towards our mission: highlighting the importance of Arctic biodiversity, how that connects with the livelihoods of Arctic people, and how it's all endangered by climate change. Obviously, global action on climate change is ultimately decisive for how the Arctic is going to change. But the Arctic also needs to be more prepared and resilient to sustain that change.

We need to look for a low-carbon future, support development that will be compatible with a carbon-free future, and champion the sectors and projects that can support this direction. We also need to ensure it isn't just the like-minded countries that are part of this, because the Arctic is so interconnected. We also need to complete global discussions about biodiversity beyond national jurisdiction, and define their implications for governance in the Central Arctic Ocean. This is where we should continue to push for a framework that will ensure a good governance arrangement, be it within or beyond the Arctic Council, to ensure that biodiversity in the Central Arctic Ocean is well protected against multiple pressures.

WWF ARCTIC CURRENT PROJECTS

From running polar bear patrols to studying narwhal migration routes and implementing the ArcNet program, we are busy in all eight Arctic countries. Click to learn more about our ongoing projects and initiatives.



1. Studying narwhal migration routes

On one side of Baffin Island, where 90% of the world's narwhals reside, researchers are in their final year of combing through decades of data to identify migration routes and important habitats for stopovers. They are also studying the impacts of warming waters and increased shipping traffic to inform environmental reviews and planning for protected areas.

2. Supporting Caribou conservation plans

This project supports the Beverly and Qamanirjuaq Caribou Management Board's development of a 10-year strategic plan to ensure the long-term conservation of these herds for the communities that depend on them.

3. Polar bear patrols

Polar bear patrols have worked successfully for 15 years across the Russian Arctic. Over that time, the project has grown into a serious conservation movement that allows people and polar bears to coexist safely in the country's most remote regions. Patrols are currently working in Nenets Autonomous Okrug, Yakutia and Chukotka.

4. Priority Areas for Conservation (PACS) in Russian Arctic seas

We have identified a network of priority areas for conservation in the Russian Arctic seas. This marks the first time a systematic conservation planning approach has been used in the polar regions. WWF and the scientific community have also developed a conservation plan and recommendations for each area that are being implemented now.

5. Walrus From Space

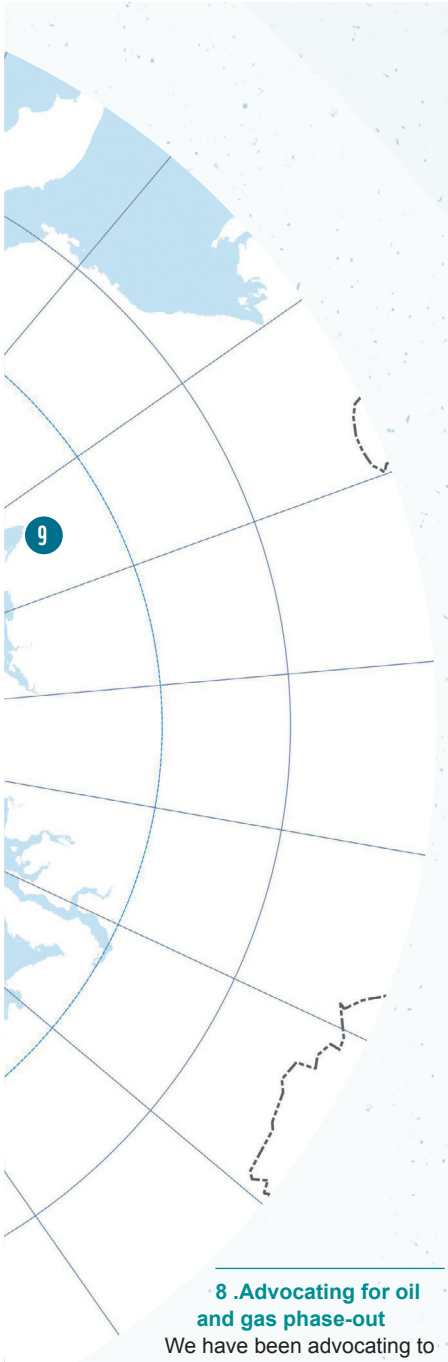
WWF and the British Antarctic Survey are asking the public to become "walrus detectives" and contribute to conservation science by searching for walrus in satellite images of the Earth taken from space. The project aims to carry out a census of Atlantic and Laptev walrus populations over 5 years to help scientists understand how they are coping with climate change.

6. IceNet

Researchers from the Alan Turing Institute, the British Antarctic Survey and WWF are developing an AI-powered tool called IceNet that forecasts sea ice conditions several months ahead of time. Evidence is mounting that Arctic sea ice loss influences weather and climate beyond the Arctic region.

7. Tavvavuoma

Tavvavuoma is a large wetland in northern Sweden that is home to a study of the Arctic fox, gyrfalcon and snowy owl. This work aims to safeguard waders in the area. The project is a collaboration between WWF, Birdlife Sweden, Norrbotten County Board, Lainiovuoma Saami village, Lund University and University of Stockholm.



9

8 .Advocating for oil and gas phase-out

We have been advocating to halt the development of oil and gas in the Arctic, especially offshore oil drilling. We are pushing to phase out existing drilling as quickly as possible and replace it with green alternatives. The Barents Sea is a particular area of concern because Norway continues to explore further north as the sea ice melts.

9. Conserving biodiversity in northern Russia

This project focuses on climate change adaptation and Arctic biodiversity in Nenets Autonomous Okrug, Taimyr-Evenkia Region, parts of Yakutia, and Chukotka Autonomous Okrug. It aims to extend and strengthen the protected area network, improve the effectiveness of existing protected areas, reduce the impacts of industrial development, and monitor and conserve Arctic biodiversity. It is also helping Indigenous communities improve their capacity for climate adaptation.

10. Arctic Refuge

We continue to advocate against oil and gas development in the Arctic Refuge by providing technical input to management authorities and decision-makers. A report commissioned by WWF examined the economics of future oil developments in the refuge and demonstrated that the development is not economically viable. A bill to repeal the leasing program is currently stalled.

11. Pebble Mine

We are engaged in a multi-pronged effort to permanently protect Alaska's Bristol Bay from mining, particularly the proposed Pebble Mine, which would be the largest open pit mine in North America. Our current priority is raising support for the Pedro Bay Conservation Project.

12. Saving the Saimaa ringed seal

The Saimaa ringed seal is one of the world's most endangered seals. It depends on ice and snow to breed, so warmer winters have made nesting difficult. In response, we are helping national nature conservation authorities to pile up snowbanks on frozen Lake Saimaa for the seals to give birth. Since 2014, about 1,500 snowbanks have been built, and some 60% of the pups have been born in them. The ringed seal population is estimated ar around 430.

13 Polar bear monitoring

Since 1992, the Norwegian Polar Institute has monitored Svalbard's polar bear population. Female polar bears are fitted with satellite devices so they can be tracked. Some are part of our Polar Bear Tracker program. Over the years, a comprehensive data set has been compiled, making the Svalbard bears one of the best studied populations. By linking this research with climatological and sea-ice data, we can learn how polar bears are responding to their fast-changing habitat.

14. Polar bear patrol

We established a polar bear patrol in the remote northeastern Greenlandic city of Ittoqqortoormiit in 2016, and the patrol continues today. We chose the community because it is the area with greatest number of invading polar bears in Greenland. Using nonlethal methods, the patrol has successfully discouraged more than 100 bears from entering the community.

15. ArcNet: An Arctic Ocean Network of Priority Places for Conservation

We have launched ArcNet: An Arctic Ocean Network of Priority Areas for Conservation. ArcNet spans the entire Arctic Ocean and adjacent seas. It is at once a mapped vision of an Arctic Ocean conservation network, a blueprint based on rigorous scientific analysis and data, a transparent approach for establishing conservation measures, and an opportunity for ongoing engagement on conservation. We are now engaging with countries, Indigenous Peoples and marine stakeholders to make ArcNet a reality.

16. Polar Code review

We conducted a comprehensive review of the International Maritime Organization (IMO) Polar Code and its gaps and implementation challenges, and presented the findings to the Protection for the Arctic Marine Environment Arctic Shipping Best Practices Information Forum and the IMO Maritime Safety Committee.

17. Exploring pathways for better governance in the central Arctic Ocean

We have convened several expert discussions on options for future governance in the Central Arctic Ocean. We are now seeking platforms for discussion in the Arctic Council and beyond to ensure the framework is ready before the global agreement on protecting biodiversity beyond national jurisdiction is approved.

18. Safeguarding Arctic marine mammals and ecosystems from underwater noise pollution

We are working toward robust, precautionary regulation, backed by science, to safeguard marine mammals and other noise-sensitive species from the increasing threats of underwater noise pollution. Working with governments and industry, we will turn down the volume on underwater noise in important habitats to create safe sound sanctuaries and maintain healthy oceans.

19. Replacing black carbon fuels

Following the ban of heavy fuel oils and the voluntary phasing out of black carbon emissions from Arctic shipping, we are now working with the International Maritime Organization and the Arctic Council to look for other tools to speed up the replacement of fuels producing black carbon in Arctic shipping.

20. Arctic Council participation

We are engaged in numerous projects and several working groups as an active Observer in the Arctic Council. Goals include protecting the marine environment, conserving Arctic biodiversity and promoting sustainable development pathways.

21. Arctic blue corridors

With projects already ongoing in the waters of Iceland, Greenland and Canada, we are mapping blue corridors (migration routes) for Arctic whales (and 20+ whale species that visit the area seasonally) across and into the Arctic Ocean. We are outlining the pressures the whales face on their journeys and advocating for measures to protect them.

22. Polar bear conservation

WWF is an active observer to the 1973 International Polar Bear Agreement, and we have followed the governments of Canada, Denmark/Greenland, Norway, Russia and the US in their collaborative efforts since then, providing advice, participation, research and monitoring support, and critical evaluation.

WILDLIFE ON THE EDGE

Species that have evolved over thousands of years to survive in the Arctic's harsh, unique environment are struggling to adapt and thrive as the climate shifts and temperatures rise. They are being forced to change the way they hunt, raise their young and navigate their landscapes. We looked at three species to see how their world has changed in recent decades, how they are coping and what the future may hold for them.



A polar bear approaches the edge of an ice floe, Spitsbergen, Svalbard, Norway.
Photo: © Steve Morello / WWF

POLAR BEAR RESEARCH

CLIMATE CHANGE THREATENS BEARS' LONG-TERM SURVIVAL

Polar bears rely on sea ice to hunt seals, their main food source. But the Arctic is warming more quickly than any other place on Earth, and the bears' sea-ice platform is rapidly melting away. **LOUISE ARCHER** explains that while models can help us understand how polar bears might fare under different climate change scenarios, their future ultimately depends on our actions.

FOR A POLAR BEAR roaming the Arctic, the next meal is always an uncertain prospect. Sea ice is a dynamic habitat that is subject to cycles of break-up, refreeze and drift, so polar bears' ability to access prey varies with the changing sea-ice landscape. By accumulating large amounts of body fat when conditions are favourable for hunting, polar bears have evolved to cope with bouts of food scarcity. However, rising temperatures are causing unprecedented declines in Arctic sea-ice extent, reducing the bears' access to essential habitat and threatening the long-term persistence of all but a few subpopulations.

REGIONAL HABITS AND CHALLENGES

Because sea-ice dynamics vary across the Arctic, different subpopulations face distinct challenges. In the past, bears from the southern Beaufort Sea could pile on masses of body fat by autumn because even in the summer, sea ice provided access to productive hunting areas over shallow coastal waters. But because of severe declines in the extent of summer sea ice over the last four decades, the ice now recedes over deeper Arctic waters, where seals are absent and hunting opportunities are scarce. The bears here face a choice: follow the retreating ice to less productive waters, or move onshore to wait for the sea ice to return. Both options translate into food deprivation.

At the southern edge of their range, the ice has historically disappeared entirely in the summer, forcing polar bears onto land. Fuelled by hefty stores of body fat, these bears fast until winter temperatures cause the ice to refreeze and they can resume hunting. But earlier sea-ice melt and later refreeze dates in these seasonal ice regions mean the bears are enduring longer and longer periods of on-land fasting. For Canada's western Hudson Bay subpopulation, the ice-free period has extended by an average of almost nine days per decade since 1979, accompanied by declines in the bears' body condition, cub survival rates and population size.

STUDY WARNS OF POPULATION COLLAPSE

The polar bear specialist group with the International Union for Conservation of Nature reports that three out of 19 subpopulations of polar bears are showing long-term declining trends. But we don't have enough long-term data to determine the status of many subpopulations. Despite indicators that some are already struggling, it's hard to know exactly how population dynamics will respond to never-before-seen sea-ice lows, or at what point different subpopulations will be affected.

A 2020 study published in *Nature Climate Change* aimed to tackle these uncertainties by linking climate models and sea-ice projections to estimates of how long polar bears can go without food based on their body condition and the amount of energy they burn each day. The researchers compared these "fasting thresholds" with projections of when different emissions scenarios might lead to periods of sea-ice loss that would exceed the bears' fasting capacity. The study found that if warming continued at current rates, 12 of the 13 subpopulations in the study would reach ➤

their fasting limits before 2100, with declines in reproduction and survival likely leading to population collapse.

Things appear a little less bleak in a scenario of moderate emissions mitigation (average warming of about 2.4 °C by the end of the century), with nine out of 13 subpopulations at risk of reproductive failure by 2080.

Extensions to this research are now considering how additional aspects of polar bear "energy budgets" might alter future population dynamics—for example, if patterns of energy uptake and use change during periods when bears are on-ice feeding.

MULTIPLE EXISTENTIAL THREATS

A variety of factors are poised to make the future even more precarious for polar bears. Because the bears are apex predators, the effects of Arctic change on other species may percolate through the food web to impact them. Human activities encroaching on their territories—such as new shipping routes or oil and gas exploration in denning areas—



Polar bears scavenge for food on Wrangel Island, Russia.
Photo: © naturepl.com / Sergey Gorshkov / WWF

are an added risk. In addition to being less hospitable for polar bears, a warmer Arctic will create opportunities for southerly species to move north, potentially exposing bears to more pathogens, new diseases or increased competition. The potential for human-polar bear conflict may also rise as hungrier bears spend longer stretches of time on land.

A few subpopulations of bears who range in areas of naturally high productivity or in regions with thicker, multi-year ice may be insulated from the worst risks in the short term. However, in the long term, the loss of Arctic sea ice poses an existential threat to all polar bears. Swift, ambitious action on the climate crisis is essential to ensuring they can persist in the Arctic long into the future.



LOUISE ARCHER is a postdoctoral research fellow in the Laboratory of Quantitative Global Change Ecology at University of Toronto Scarborough. She studies polar bear energetics and population dynamics under future global change scenarios.

The study found that if warming continued at current rates, 12 of the 13 subpopulations in the study would reach their fasting limits before 2100, with declines in reproduction and survival likely leading to population collapse.

Flying gyrfalcon.
Photos: © WWF-Sweden / Tom Arnbom



AN UNCERTAIN FUTURE

WILL WARMER TEMPERATURES PUSH GYRFALCONS OUT OF SWEDEN?

The gyrfalcon is adapted to live in the extremely harsh environment of the High Arctic. This powerful raptor can stay alive in –50°C, even during strong winter storms and almost complete darkness. But as **TOM ARNBOM** writes, climate change looks poised to outmanoeuvre Earth's largest falcon. In Sweden, one of the gyrfalcon's most southerly outposts, numbers are decreasing dramatically—and the decline may be a preview of the birds' future in the High Arctic.

WE ARE in the heart of Sweden's Sarek National Park, far, far away from any road. It's a wild and beautiful mountainous tundra landscape. Suddenly, we notice something dark approaching at high speed. It takes only a split second before all that remains to be seen is a cloud of feathers.

I will always remember this rare moment when I witnessed a gyrfalcon attacking a ptarmigan (a northern grouse) at more than 200 kilometres per hour. The power of this bird is enormous. But sadly, the power is no match for the climate crisis. This falcon evolved to withstand harsh, frigid weather, but its environment is rapidly becoming wet and warm.

With a wingspan that can reach 1.3 metres, the gyrfalcon is the world's largest falcon, and it is found in all Arctic states. Gyrfalcons in the really far north have almost pure white feathers, while further south, they take on a more brownish colour.

Winter is the hardest time of year for gyrfalcons in the High Arctic. It becomes much harder for them to find enough prey because most other birds migrate south, leaving only ptarmigans.

THE STRUGGLE TO ADAPT TO A WARMING CLIMATE

Of course, the gyrfalcons are not the only species struggling to adapt to higher temperatures. Polar bears must now

We might be the last generation lucky enough to observe wild gyrfalcons in this part of the Arctic.



Spring rains combined with strong, cold winds can kill gyrfalcon chicks.



The gyrfalcon is built to withstand frigid temperatures, but its environments are increasingly wet and warm.



cope with the loss of sea ice, and the Arctic fox has to compete for prey with the red fox, which has been migrating northward. The Arctic fox has also been hit by more frequent winter rains that affect the survival of its prey species, such as hares, ptarmigans and rodents: when heavy winter rains freeze over, an almost impervious crust forms that prevents hares and ptarmigans from digging down to hide from ferocious winter storms. The crusts also prevent them from finding food because the ice is too hard to break through.

But the gyrfalcons have an additional problem: they start breeding in early spring, often in old raven nests, on steep cliff faces or in gorges. But spring rains combined with strong, cold winds can kill the chicks.

WWF, Birdlife Sweden and other partners are working together to monitor the number of breeding gyrfalcons in the Swedish Arctic. About 30 years ago, there were approximately 50 breeding pairs in northern Sweden. The biggest threat back then was people collecting eggs or chicks to keep or sell. The population slowly decreased, dwindling to about 30 pairs by 2015. Then in 2020 and 2021, we noticed a more dramatic drop. Many known nest sites were abandoned or contained only a single gyrfalcon. Only five known breeding pairs were found in 2021.

The reasons for this are not known, but climate change—several winters with considerable rain and strong storms—is the most likely culprit. The winter air temperature has increased by 3°C since 1960 in this part of Sweden. In Iceland, there are also indications that gyrfalcons have developed lead poisoning from eating ptarmigans injured by shotgun bullets. The injured birds are easier prey.

If we are lucky, this downward trend might be temporary. But sadly, it does not look good for gyrfalcons here. We might be the last generation lucky enough to observe wild gyrfalcons in this part of the Arctic.

For gyrfalcons, as with the polar bear and Arctic fox, the effects of climate change on populations are most visible and substantial at the southern end of the species distribution. Therefore, gyrfalcons in the High Arctic are likely still doing okay—but the experience in Sweden should be taken seriously. It may be painting a picture of what we can expect in other parts of the Arctic soon.

TOM ARNBOM is a senior advisor on Arctic issues with WWF–Sweden.





Caribou from the George River area, Labrador, Canada.
Photo: © GaryAndJoanieMcGuffin.com / WWF-Canada

Caribou numbers are so low in some herds that there may not be enough knowledgeable caribou left to guide the others.

CARIBOU CULTURE AT RISK

ARE MIGRATING CARIBOU LOSING THE COLLECTIVE MEMORY THEY RELY ON TO SURVIVE?

For some time now, constructing an effective conservation strategy for caribou has been like trying to finish a puzzle while missing a piece that is essential to seeing the full picture—in this case, the missing piece is the concept of collective memory. As **ANNE GUNN** and **DON RUSSELL** explain, scientists are just beginning to slot this piece into place.

WE'VE LONG KNOWN that caribou are social animals: we nearly always see them in large groups flowing along their migratory pathways. But until recently, we didn't appreciate how migratory tundra caribou learn and exchange information within those groups—not only at a given point in time, but over the course of generations.

We now suspect that collective memory is what helps the caribou cope when foraging conditions are unfavourable. For example, when freezing rain locks up vegetation in their usual feeding areas, the caribou can draw on a pool of shared memories to find alternative ➤



areas where they have succeeded during similar challenges in the past. By the same token, we think collective memory helps caribou know where and when to start migrating to their traditional calving grounds.

Wildlife science has been slow to recognize how memory and social learning contribute to individual fitness and how animals maintain and share that knowledge over generations. Only in the last decade or so have we started to see scholarly descriptions of social learning during migration, as well as an emerging recognition that such socially learned, long-term behaviour patterns—what we call culture—are shared within animal communities.

COMPREHENDING COLLAPSES

Unfortunately, our failure to appreciate caribou as social beasts has influenced how we have dealt with declines in herd populations and conservation decisions in the past. Over the last 20 years, we have witnessed a decline in migratory tundra caribou populations. But even though we've long known that caribou numbers cycle over decades, we didn't anticipate declines and didn't react to them early enough. If we had we listened—really listened—to Indigenous elders' accounts of caribou retreats, we would not have waited so long to act.

Overall, among 22 migratory tundra herds around the Arctic, all but two



We now suspect that collective memory is what helps caribou cope when foraging conditions are unfavourable.

have declined from their peak numbers in the 1990s. The Russian migratory tundra wild reindeer have declined by 64 per cent, from 1.4 million to about half a million. Alaska's three coastal herds have declined by 45 per cent, although by 2017, two herds were starting to recover. (An exception is the Porcupine herd, which has doubled in size since 2001, reaching 218,000 caribou in 2017.)

In Canada, migratory tundra caribou are down a shocking 65 per cent—from 5.4 to 1.6 million—and most herds are marooned at perilously low numbers. Some have even collapsed by 98 per cent. Indigenous elders cannot recollect such low levels. Why the numbers dropped so steeply under our watch is a complicated question, but Indigenous People's grief is intense and unmistakable.

When caribou herds collapse, understanding their social behaviour becomes critical. We now recognize that the numbers of cows on traditional calving grounds dropped too low to provide safety in numbers during calving, leading some cows to abandon their traditional calving grounds and migrate to neighbouring ones. The level of abandonment took wildlife managers by surprise, given that cows typically ➤



Caribou migrate across tundra, Kobuk Valley National Park, Alaska, US.
Photo: © Staffan Widstrand / WWF



maintain fidelity to their traditional grounds. They have a good reason for doing so: in unfamiliar areas, fewer of them survive.

PRESERVING CARIBOU'S COLLECTIVE MEMORIES

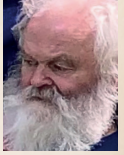
The low numbers of caribou that we are seeing now align with how Indigenous elders have described cyclical changes in caribou migrations. The implication is that when their numbers recover, the caribou will resume many of their customary migration routes. But here's the worry: caribou numbers are so low in some herds that there may not be enough knowledgeable caribou left to guide the others.

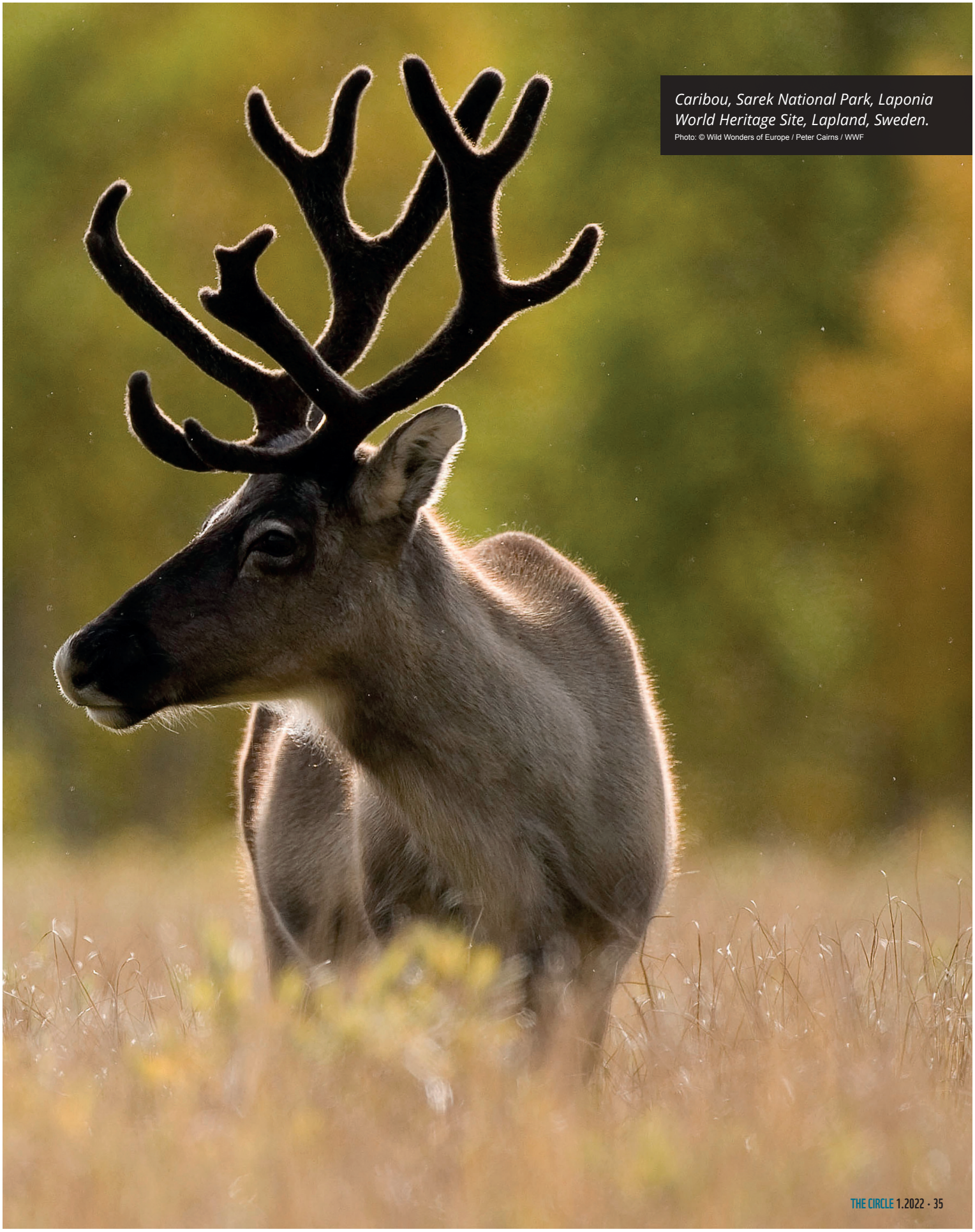
A sense of place—the persistence of calving grounds over generations, for instance—is based on social behaviour, which suggests that caribou can move efficiently through their memory-scape. We have the broad outlines of how this works, but there's still a piece missing in the conservation puzzle: we are trying to figure out whether and how we can we fast-track caribou's recovery from these cyclical collapses before their collective memories—the invaluable knowledge gleaned from experience and social learning over generations about how to negotiate the complex geographies of their physical world—are irretrievably lost.

The need for a solution is urgent as the climate warms and our human footprint expands within their habitat.

ANNE GUNN and **DON RUSSELL** are Canadian caribou biologists who work with the CircumArctic Rangifer Monitoring and Assessment Network, better known as CARMA.







Caribou, Sarek National Park, Laponia World Heritage Site, Lapland, Sweden.

Photo: © Wild Wonders of Europe / Peter Cairns / WWF

Recognizing Indigenous ways of knowing

INDIGENOUS PEOPLES HAVE THE KNOWLEDGE AND PRACTICES TO SUPPORT CLIMATE RESILIENCE

Indigenous communities in the Arctic have something to say about climate change—namely, that with the proper support in policy- and decision-making, they are resilient. Many Indigenous hunters, fishers, herders, harvesters and other knowledge holders have provided countless records of climate change's disruption to the stability of snow, ice, water, ecosystem dynamics and wildlife populations. Now, **VICTORIA QUTUUQ BUSCHMAN** explains, the world is beginning to recognize that Indigenous communities have considerable strength and adaptive capacity to provide solutions to the impacts of climate change.

ON FEBRUARY 28, 2022, the global community received the new Intergovernmental Panel on Climate Change (IPCC) report on the impacts, adaptation and vulnerabilities of ecosystems, biodiversity and people amid climate change. In part, the report explains what's at stake and how we're attempting to address these issues.

But this isn't the first report to make a strong call for the support of Indigenous communities and practices. The 2019 IPCC Special Report on Climate Change and Land recognized that Indigenous communities actively safeguard the biodiversity within their homelands. The 2022 report reiterates what Arctic Indigenous communities have always known: that we have the knowledge and practices to identify impacts, evaluate risks and adapt to climatic changes as long as we prioritize self-determination, Indigenous rights and inclusive governance.

RECOGNIZING THE LEGACY OF COLONIALISM

Indigenous authors—including Dr. Tero Mustonen, head of Snowchange Cooperative in Finland, and Dr. Dalee Sambo Dorough, chair of the Inuit Circumpolar Council—led a body of experts across the circumpolar North in developing the report's assessment of the impacts of climate change on Indigenous Peoples and the implications for adaptation and governance in the Arctic. The report recognizes that the legacy of colonialism is behind Arctic Indigenous Peoples' climate vulnerability. Land dispossession and displacement, the introduction and proliferation of carbon-intensive economies, discrimination, racism, marginalization, and social, cultural and health inequities all limit Indigenous Peoples' abilities to respond to impacts effectively.

These impacts include human health risks and injuries related to unpredictable and unsafe environmental conditions on land, water and ice. They also include food insecurity and the instability of harvested food sources, which are affected by changes in seasons and preparation conditions as well as shifts in the sizes and structures of populations.

In addition, waterborne diseases have emerged, and pathogens such as anthrax and smallpox have the potential to resurface in buried carcasses as permafrost thaws. Additional impacts include mental health problems related to climate change and heightened by colonial contexts, the stress of livelihoods and culture continually upended by climate impacts, and the inflexibility of policies and laws that were not designed to accommodate rapid environmental change.

RESILIENCE LINKED TO SELF-DETERMINATION

Despite these challenges, Indigenous communities display inherent climate resilience—a quality that is important for adapting to climate change. There is growing recognition that this resilience is linked to Indigenous self-determination. The IPCC calls for equity by recognizing that Indigenous communities' ability to adapt to climate change is linked to this self-determination in adaptation strategies, governance and ecosystem-based policies. It also acknowledges that developing local definitions of social and economic success

Indigenous communities display inherent climate resilience—a quality that is important for adapting to climate change. There is growing recognition that this resilience is linked to Indigenous self-determination.



An Inuit man from Greenland teaches Canadian Inuit kids how to build and paddle kayaks, Pond Inlet, Baffin Island, Nunavut, Canada.

Photo: © Staffan Widstrand / WWF

and culturally legitimate government and leadership is a significant part of this process.

Recognizing Indigenous knowledge as a valuable and valid way of knowing is another. The document calls for the use of Indigenous knowledge in planning, decision-making and management processes, and in implementing adaptation.

The Arctic provides ecosystem services for Indigenous communities. In turn, Indigenous knowledge can detect change, evaluate risk and inform adaptation. It also provides cultural ecological services. Despite barriers to the use of knowledge in institutions and international fora—and within research, management and implementation processes—Indigenous knowledge-based solutions and inclusive ecosystem-based policies have shown the ability to address climate change impacts. To continue to do so moving forward, we need to create or improve decision-making processes and adaptive management in human health, Arctic shipping, tourism, reindeer herding, commercial fisheries, marine and terrestrial subsistence, and other areas of Indigenous concerns.

NEW TOOLS NEEDED

This shift may require new research, management, monitoring, assessment, policy and governance structures that are equipped to address the needs of Arctic Indigenous Peoples.

For example, research and climate modelling that focus on Indigenous objectives are useful to communities planning to tackle issues such as shoreline erosion, permafrost thaw, flooding, and changing wildlife populations and food web dynamics. Developing green technologies in partnership with Indigenous Peoples can ensure that green energy does not continue as a colonial, externally imposed and inequitable burden placed on those already impacted and marginalized amid climate change. Removing the external pressures that limit autonomous evaluation, self-assessment and the response to climate change—such as the often inflexible and centralized policies imposed by state governments—can also support community-led adaptation.

In the absence of national and international adaptation strategies in the Arctic, Indigenous communities are moving forward with adaptations at smaller scales. These contributions may seem small, but they are being seen and heard around the world. Supporting Indigenous communities' ability to make the necessary decisions and changes will ensure a more resilient, secure and equitable future for Indigenous Peoples and a healthier planet for all. ●

VICTORIA QUTUUQ BUSCHMAN is a conservation biologist with the International Arctic Research Center, University of Alaska Fairbanks and the Greenland Institute of Natural Resources.



Turnaround towns

CREATING OPPORTUNITIES IN UNCERTAIN TIMES

In recent decades, the climate crisis has introduced considerable uncertainty into the lives of the four million people who call the Arctic home. Rising sea levels, changing temperature and precipitation patterns, increasingly severe weather events, and the loss of fish stocks, birds and marine mammals are all affecting communities in this region.

Some Arctic communities are trying to address these issues by working toward a greener future. They are demonstrating how reducing their dependence on costly and contaminating non-renewables can not only be economically feasible, but beneficial. We look at three towns that are finding innovative ways to take their future into their own hands: Longyearbyen in Svalbard; Berlevåg in Norway; and Old Crow in Yukon, Canada.



Northern lights, Longyearbyen, Svalbard, Norway.
Photo: Greg McCormick Follow, Flickr.com, CC BY-NC-SA 2.0

LONGYEARBYEN, SVALBARD, NORWAY



THERE IS NO QUESTION that Longyearbyen, the world's northernmost town, is a community on the brink of multiple crises. Its colourful houses look postcard-perfect, but beneath the picturesque surface, Longyearbyen is struggling. Situated on the Svalbard archipelago halfway between mainland Norway and the North Pole, this town of about 2,500 people is facing dramatic changes due to the climate crisis.

Since 1971, temperatures on the island of Svalbard have risen five times faster than the global average and are now up by 4°C. In winter, Longyearbyen now deals with the threat of avalanches from the slopes above the town, and as permafrost thaws, its buildings and houses, built on wooden piles, could begin to sink.

But Longyearbyen isn't waving the white flag yet.

PAVING THE WAY TO ZERO EMISSIONS

Longyearbyen has hatched a plan to be part of the solution to the climate crisis by transforming itself into a zero-emissions town. Right now, it depends on coal supplied by Norway's last operating coal power plant as well as diesel. But it is working to wean itself and the region off of coal, which contributes to the very climate crisis that threatens the town's survival.

In January 2022, Longyearbyen announced that it had bought a giant battery—one of the largest in Scandinavia. Representing the first step in the town's ambitious plan, the battery will provide a less costly, more secure power supply while also reducing emissions.

PUTTING AN END TO THE DEPENDENCE ON COAL

Construction of the battery system is slated to begin this summer, and the battery is expected to be fully operational some time in 2023. The system will be made up of six containers that provide six megawatts of energy. It will be located next to the town's coal-fired power station. With enough storage capacity to supply the whole town with power for more than an hour, it will provide reserve capacity to overcome power fluctuations as well as the ability to restore power after a shutdown or system collapse.

The installation is just the first phase in the town's plan to shutter its coal power plant permanently by fall 2023. When the plant closes for good, the battery system will provide voltage and frequency control to integrate diesel generators as well as growing capacity for renewable energy sources. By transitioning from coal to diesel, the town will cut its CO_2 emissions in half and take the first important step in its plan to cut emissions completely.

In addition, Longyearbyen's move to diesel is only a temporary one. In the long run, the local council's goal is to cut greenhouse gas emissions by 100 per cent. In November 2021, it approved a plan to implement an all-renewable energy supply by 2030.

"This will reduce CO_2 emissions by 43,000 tons per year," the Longyearbyen community council stated in a press release. "At the same time, Longyearbyen is preparing for future climate change by building landslide/avalanche protection... [W]ork on climate adaptation and the transition to green energy is in focus and will be particularly important for Longyearbyen in the future."

Unfortunately, Longyearbyen has no control over the greenhouse gas emissions generated elsewhere in the world that are contributing to its existential crisis. But by taking action to reduce its own emissions, its residents are doing their part—and may inspire other Arctic communities to do the same. ➤





A winter day in Berlevåg, Norway.
Photo: Jean-Marie Muggianu Follow, Flickr.com, CC BY-NC-ND 2.0

Two green tech

BERLEVÅG, NORWAY

YOU CAN'T GET much further north in Norway than Berlevåg. Located far above the Arctic Circle, the municipality is almost 900 kilometres from the nearest city. And just like other towns across northern Norway, this traditional fishing village has struggled in recent years.

In the 1980s, it began to suffer a steady population decline. In 1976, there were 1,810 people who called Berlevåg home, but today it has a population of just over 900. Many residents still fish for a living, as their ancestors did for hundreds of years. But the dwindling population has meant lost economic opportunities and an uncertain future. Facing the prospect of becoming a "commuter society," the town decided it was time to give people a reason to stay in place.

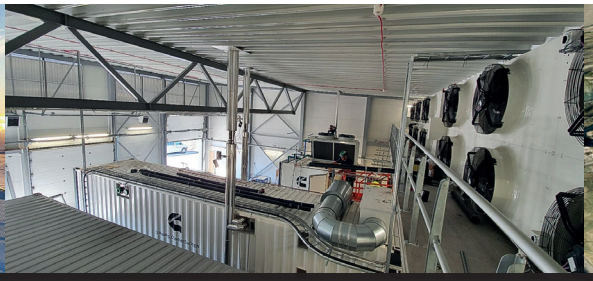
INNOVATING TO CREATE A MORE SUSTAINABLE FUTURE

Over the past few years, the town has started a green shift that is not only bringing new economic life to the town, but promises to do the world a favour by decarbonizing Arctic shipping and off-grid power plants. Two combined innovative solutions are making Berlevåg an Arctic centre for emission-free industrial development: the construction of a wind farm and the introduction of green industry. Not only are these initiatives helping the community to forge a path forward that is greener, but they are also creating jobs that will be needed for years to come. The hope is that this will motivate people to stay—and even attract new residents.

■ "Green" ammonia is produced from water and renewable power using electrolysis, and can replace traditional fossil fuels in ships, rigs and off-grid power stations.

Winds on the nearby Varanger Peninsula blow at a powerful average speed of 9.5 metres per second all year long. The Raggovidda wind power plant was built in 2014 to tap into that power. It now produces close to 200 gigawatt hours of energy—twice as much as the average wind park—and the plan is to double it.

The town has also been working since 2017 to convert some of the energy from Raggovidda into green hydrogen and ammonia at a new pro-


een technology projects are creating jobs and reducing greenhouse gas emissions in Berlevåg.

Over the past few years, the town has started a green shift that is not only bringing new economic life to the town, but promises to do the world a favour by decarbonizing Arctic shipping and off-grid power plants.

duction plant. The new facility, known as Berlevåg Industrial park, is being built with support from the EU and national and international partners. Once the facility reaches full-scale production in 2024, it will decrease carbon dioxide emissions by around 200,000 tons per year.

"As green hydrogen and ammonia become more viable, that amount will increase," explains town administrator Jørgen Holten Jørgensen. "We expect it to have a long-term positive impact on the climate."

PROVIDING BENEFITS BEYOND BERLEVÅG

Not only are these projects good news for Berlevåg and the global environment, but they could benefit other Arctic communities. For instance, across the ocean directly north of Berlevåg sits the inhabited archipelago of Svalbard. Right now, it depends primarily on coal and diesel for energy. But in the future, Berlevåg Industrial park has the potential to develop into a hub for renewable energy that could not only supply clean energy to Svalbard, but provide zero-emission fuel to ships operating in northern waters for years to come: a win for everyone.

"Ultimately, I hope we will see a more circular and connected economy as the projects bring in new businesses, households and suppliers," says Holten Jørgensen. "I would say the overall outlook is positive—not only for Berlevåg itself, but for Europe."



OLD CROW, YUKON, CANADA

THE COMMUNITY of Old Crow in the Canadian territory of the Yukon may have a population of less than 250 people, but it has lofty ambitions when it comes to combatting climate change. Home of the Vuntut Gwitchin First Nation, it is the sole community in the territory located north of the Arctic Circle, and can only be reached by air. Like many other remote and northern communities, Old Crow has had to rely on diesel fuel to meet its energy needs—until now.

Old Crow is now tapping into the power of the sun in an effort to transition toward clean, renewable energy. The first rows of solar panels went up in April 2021 as part of the Sree Vyàa solar project. By August of that year, the solar array's batteries were storing enough power for the community to turn off its diesel generators. Now the project is meeting almost a quarter of the community's electrical needs.

TAPPING INTO THE POWER OF THE SUN

Old Crow's solar project is the only one of its kind in the territory. When it was being designed, software analysis was conducted to determine the ideal number, size, location and orientation of more than 2,100 single-sided, monocrystalline panels to make optimal use of the long daylight hours.

The project also includes a 616-kilowatt battery energy storage system and a micro-grid controller that will curtail the community's use of diesel generators by 2,200 hours, or almost 190,000 litres per year. The project is expected to reduce Old Crow's diesel use by 4.7 million litres over its lifetime.

As part of the project, the Vuntut Gwitchin First Nation entered into an electricity purchase agreement with ATCO Electric Yukon, a private electrical utility in the territory. Through this 25-year agreement, ATCO will purchase the solar electricity generated from this project, but residents will be able to buy energy directly from the First Nation. The project is expected to generate nearly $400,000 a year—revenue that will be reinvested into the community.



A MODEL FOR NORTHERN COMMUNITIES

The Sree Vyàa solar project was a completely community-driven initiative. In fact, the town's desire to explore renewable energy options actually led Yukon to enact new legislation to support green energy initiatives like Old Crow's.

In 2018, the Yukon government created an Independent Power Producer policy that would allow entrepreneurs, communities and First Nations governments to build renewable energy projects and sell the electricity they generated. Before this policy, residents and businesses could only feed small amounts of self-generated power into the electric grid to reduce their costs.

As the first community to embark on an independent power producer venture in the Yukon, Old Crow is modelling the transition to green energy for other communities in the territory and across the North.

Old Crow is tapping into the power of the sun in an effort to transition toward clean, renewable energy.



Solar panels, Old Crow, Yukon, Canada.
Photo: Gwitchin Government/Gyde Shepherd

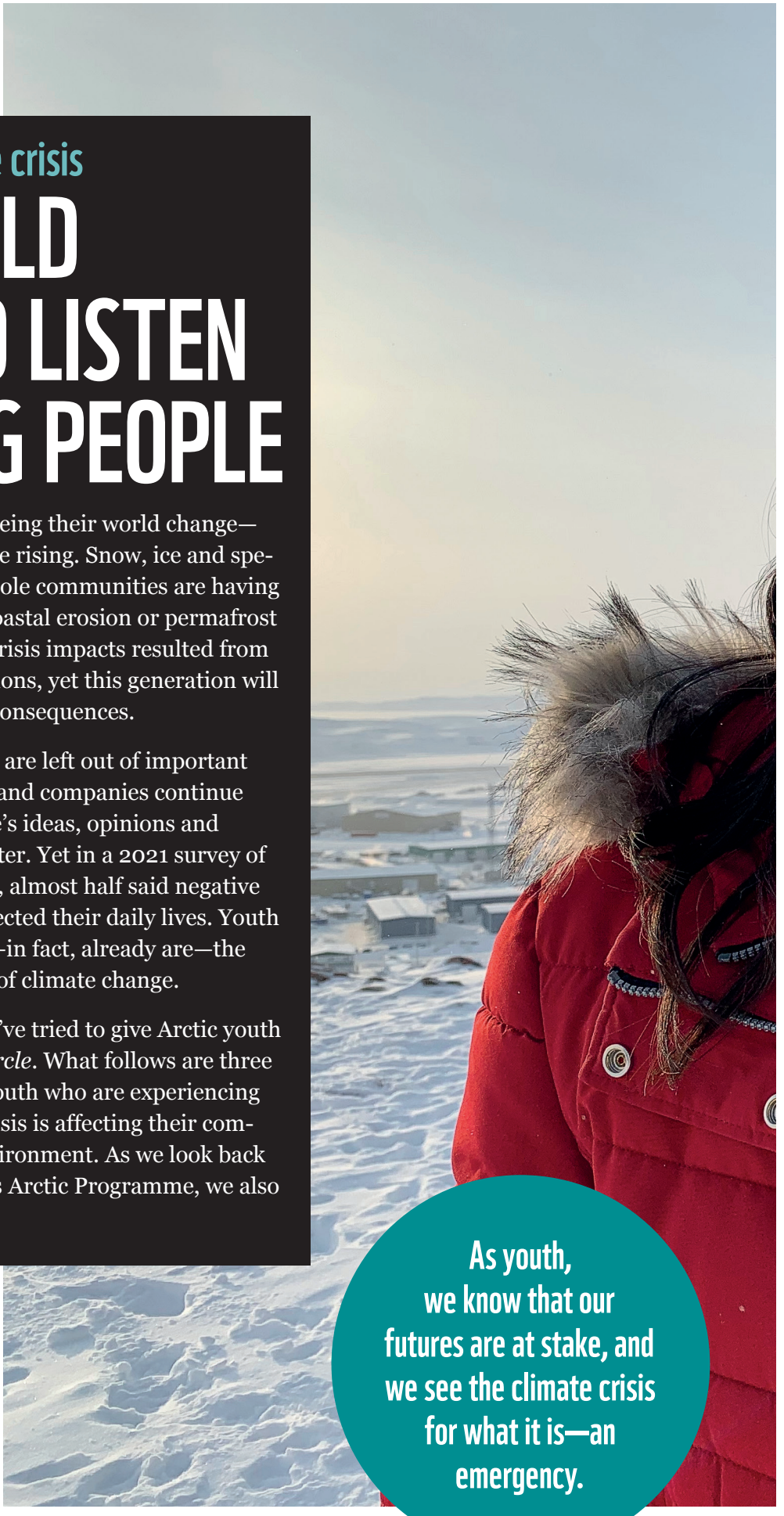
Youth and the climate crisis

THE WORLD NEEDS TO LISTEN TO YOUNG PEOPLE

Youth across the Arctic are seeing their world change—and quickly. Temperatures are rising. Snow, ice and species are disappearing, and whole communities are having to pick up and move due to coastal erosion or permafrost thaw. None of these climate crisis impacts resulted from young people's choices or actions, yet this generation will be forced to reckon with the consequences.

Too often, the voices of youth are left out of important conversations. Governments and companies continue to act as though young people's ideas, opinions and proposed solutions don't matter. Yet in a 2021 survey of 10,000 peopled aged 16 to 25, almost half said negative feelings about the climate affected their daily lives. Youth who live in the Arctic will be—in fact, already are—the most affected by the impacts of climate change.

For the past several years, we've tried to give Arctic youth a voice in the pages of *The Circle*. What follows are three different perspectives from youth who are experiencing first-hand how the climate crisis is affecting their communities, livelihoods and environment. As we look back at the past 30 years of WWF's Arctic Programme, we also want to look forward.



As youth, we know that our futures are at stake, and we see the climate crisis for what it is—an emergency.



LEADERSHIP: THE PLANET IS COUNTING ON YOUTH TO SPEARHEAD CLIMATE ACTION

Young people should be shaping the future, not worrying about it. But the climate crisis continues to threaten the planet, and the window to act is closing. **KATIE YU** explains why her generation must lead the fight.

THE WORLD is experiencing the devastating effects of climate change, including more frequent and intense heat waves, floods and wildfires. Today's youth will continue to feel these impacts for decades to come even though we are the least responsible for causing them. Our climate anxiety is at a high because we don't know what our futures will look like.

The climate crisis is also affecting certain geographic areas and people disproportionately. For example, it affects culture and way of life for Indigenous youth in northern regions. Growing up in Iqaluit, Canada, I've learned from my community how integral the land and sea are to Inuit culture.

As youth, we know that our futures are at stake, and we see the climate crisis for what it is—an emergency. For years, young climate activists around the world have called for a just and sustainable world. To sound the alarm, we have organized and attended climate strikes, addressed decision-makers, written to the media and worked with environmental organizations, among many other actions.

KATIE YU is a high school student and climate activist living in Iqaluit, Nunavut, Canada. She has interned with WWF–Canada and is a UNICEF Canada Youth Advocate.

Last summer, I worked as a community liaison intern in WWF–Canada's Iqaluit office. I assisted with community initiatives, such as clean-ups, and wrote two blog posts for the organization's website, including one about what youth can do to fight climate change. During my internship, I met amazing people and learned a lot about climate change and climate solutions. For example, it was there I learned that the Arctic is warming about three times faster than the global average.

VALUING YOUTH AND CREATING OPPORTUNITIES FOR ACTION

Opportunities for climate action need to be accessible and inclusive to all youth, especially those who are (or will be) most impacted by climate change. Environmental and youth advocacy organizations should continue to offer volunteer and work positions specifically for youth and must value them as team members. I've learned that it is crucial to have peers and mentors to support you in climate activism work.

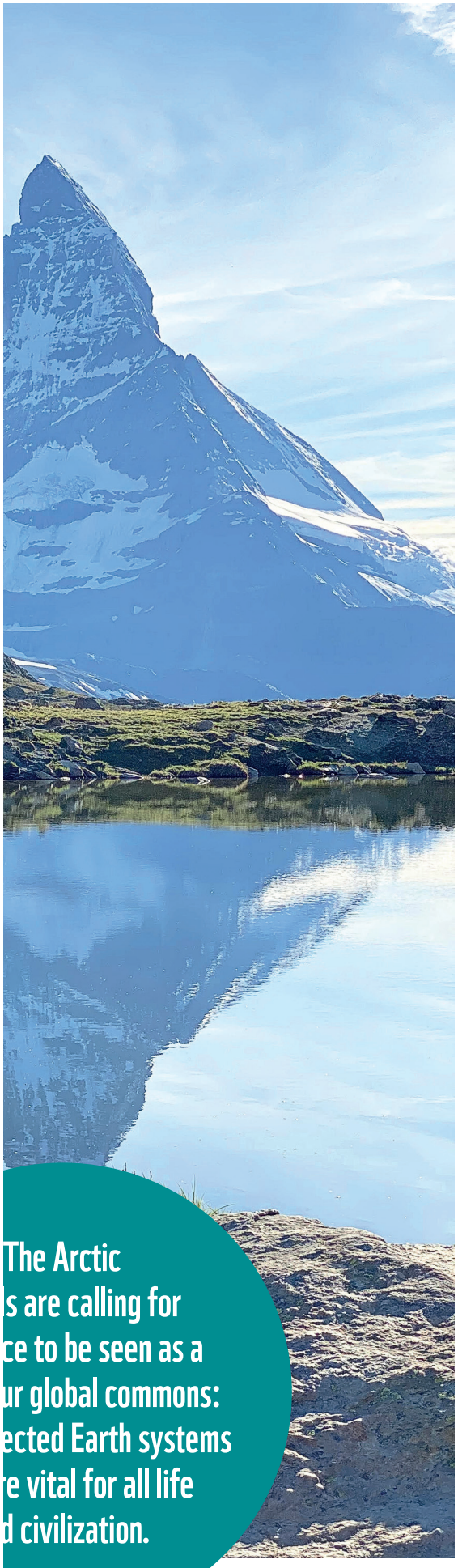
On the other hand, it is extremely frustrating when adults and decision-makers do not take the concerns and demands of youth seriously. I am a litigant in the Voting Age Challenge, a Canadian court case arguing that the current voting age of 18 is unconstitutional and advocating to lower it. A huge part of our rationale for pushing for this change is so we can play a more active role in fighting the climate crisis, such as by voting for governments that take the issue seriously.

The climate crisis was passed on to us from previous generations. If anything is going to change, we must take a much more proactive approach in the transition away from fossil fuels.

I am still hopeful about the future because I know that youth activists, like me, will never stop fighting for a better one. It's important that we speak up, act now, and recruit and support other youth to do the same. We are the last generation who can take substantial action to avert climate catastrophe, and every decision matters. Our futures and those of the next generations depend on our tenacity.

MARGHERITA BARBIERI writes about the climate crisis and biodiversity for Italian Climate Network and is a member of the Arctic Angels, a youth-led intergenerational action network committed to protecting the global commons.





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THE ICE CRISIS: PROTECTING ARCTIC SEA ICE TO SAVE OUR PLANET

We can't replace Arctic sea ice once it's gone—so protecting it now is critical. **MARGHERITA BARBIERI** explains why we all need to step up and take responsibility.

I LIVE IN the northern Italian city of Torino (Turin). This winter, it didn't rain in my city for more than 100 days.

In addition to this unusual drought, the effects of climate change were apparent in the warm spring-like temperatures of the Italian Alps in December. I went downhill skiing without a winter jacket while flowers bloomed and the memory of those freezing days of skiing in my childhood faded away.

The effects are also there in the anxiety I feel every time an unbearable heat wave hits Torino in the summer, when it feels as though I am living in the tropics or sub-Saharan Africa rather than northern Europe.

No matter where we live or what we care about, the climate crisis is affecting all of us, and a lot of climate instability is linked to the loss of the Arctic sea ice. Our planet is our most precious resource. It allows us to breathe clean air, access clean water and enjoy the simple things in life, such as our morning cup of coffee, our daily run in the park or simply the beauty of our favourite natural getaway spots.

For this reason, I am committed to raising awareness of how the climate, the Arctic and biodiversity are connected. That's why I'm a member of the Arctic Angels, a group of 45 young leaders aged 10 to 33 years from more than 27 countries who are advocating for urgent policy action to protect our planet and its polar regions.

CHANGE IS ALREADY HAPPENING

One of the most important functions of polar ice is to act as a thermostat for the Earth, reflecting the sun's rays back into the atmosphere (known as the albedo effect). Losing the Arctic sea ice will trigger a cascade of negative climate effects around the world.

This March in Antarctica and the Arctic, temperatures hit 40°C and 30°C above normal, respectively. Temperatures like these have never been observed before. Obviously, they are disastrous for sea ice.

The increased intensity and frequency of floods, droughts, storms and fires the world has been experiencing are linked to sea ice loss—and those are just the weather effects. Habitat and biodiversity loss will also accelerate. Competition for resources will intensify. All of these developments pose risks to humanity and food security and will turn more and more people into climate refugees. That's why the Arctic Angels are calling for Arctic ice to be seen as a part of our global commons: interconnected Earth systems that are vital for all life and civilization.

No nation owns the global commons. By their very nature, they are shared resources, a heritage of humankind. The global systems of outer space, the atmosphere, Antarctica and the High Seas are already recognized as global commons.

THESE ARE GLOBAL DECISIONS

Currently, decisions about the Arctic region are made primarily by consensus among the eight Arctic states (Russia, United States, Canada, Denmark/Greenland, Finland, Iceland and Norway). However, the impact of Arctic sea ice loss will have global consequences, so this is no longer a matter solely for Arctic governments.

In addition, rather than collaborating to mitigate further damage, nations and corporations are angling to capitalize on new opportunities presented by melting ice. These new prospects—which include deep sea mining, fossil fuel extraction, ➤

radioactive waste dumping, nuclear weapons testing, and increased commercial shipping, including a transpolar sea route—threaten Arctic ice and biodiversity. This is why I am fighting to raise awareness and defend the remaining ice from a "business as usual" scenario. As an Arctic Angel, I am calling for a 10-year pause on any harmful exploitation of Arctic sea ice.

Raising awareness about the Arctic crisis, the role of Arctic ice in mitigating climate change, and the interconnections among the climate, the polar regions and biodiversity loss is essential to protecting our planet. Young people need to speak up, and our voices need to be heard. It's time for bold and ambitious government action to preserve the Arctic and save our planet while we still can.

THE CREATIVE ECONOMY: TACKLING EMPLOYABILITY AND GROWTH IN THE ARCTIC SUSTAINABLY

Industrial activity in the Arctic endangers its environment and wildlife. To help counter this, an international project known as BRIDGE matches university students from three Arctic countries with small local businesses to work on case studies aimed at growing the region's creative economy. As **MIKHAIL UKSUSOV** explains, it could be a model for how youth, academia and local businesses can work together in the future.

IF YOU MENTION the "Arctic economy," most people will imagine mining and other large-scale industrial projects that deplete the Arctic's natural resources and harm the environment. They envision the Arctic as an unpopulated expanse of snow and ice with plenty of natural assets to be exploited and few other avenues for economic activity.

But it doesn't have to be that way—and a project known as BRIDGE is trying to make sure it isn't.

BRIDGE stands for "Barents region initiative for growth and employability." It connects academia, youth and small businesses in the Arctic in an effort to build a creative economy in the region as an alternative to the resource-based economy. The groups work together on case studies meant to achieve environmental and economic sustainability in the Arctic.

Many youth are not aware that the Arctic is home to a number of businesses that are essentially passion projects for their owners. These businesses yield moderate incomes without harming the environment. They have a lot to offer to youth in search of employment.

To make sure youth recognize these opportunities, BRIDGE brings students from five universities in Russia, Norway and Finland together into international and multidisciplinary student teams to work on business cases. The cases aim to help businesses become more visible and profitable. The programme's combination of youthful energy backed by the skills and knowledge of professional coaches and researchers is a great asset.

WHAT DOES ALL OF THIS HAVE TO DO WITH THE ENVIRONMENT?

Think about the consequences for a remote location if its inhabitants abandon it (or live there only seasonally) because there are no jobs: people are not usually committed to places they've never seen or to which they feel no sense of responsibility. In this way, depopulation can make a place less sustainable.

WHAT IS THE CREATIVE ECONOMY?

According to the UN Conference on Trade and Development, the creative economy builds on the interplay between human creativity and ideas and intellectual property, knowledge and technology. It consists of knowledge-based economic activities upon which "creative industries" are based.

But a stronger creative economy could benefit small Arctic communities by attracting youth and motivating them to stay. Youth with education and some hands-on experience have a lot to offer. Their presence, commitment and contributions could improve not only the services available within individual communities, but the Arctic's overall sustainability and economic performance.

BRIDGE participants team up with businesses to run ecological excursions and nature experiences (such as wildlife- and bird-watching expeditions), local food production and catering (such as greenhouse facilities and ice cream production), cultural and Indigenous experiences (like arts festival management or tours with Saami people), and even information technology (like educational games development), to name just a few examples. Students develop insights and analysis to help these companies rethink their everyday activities and grow.

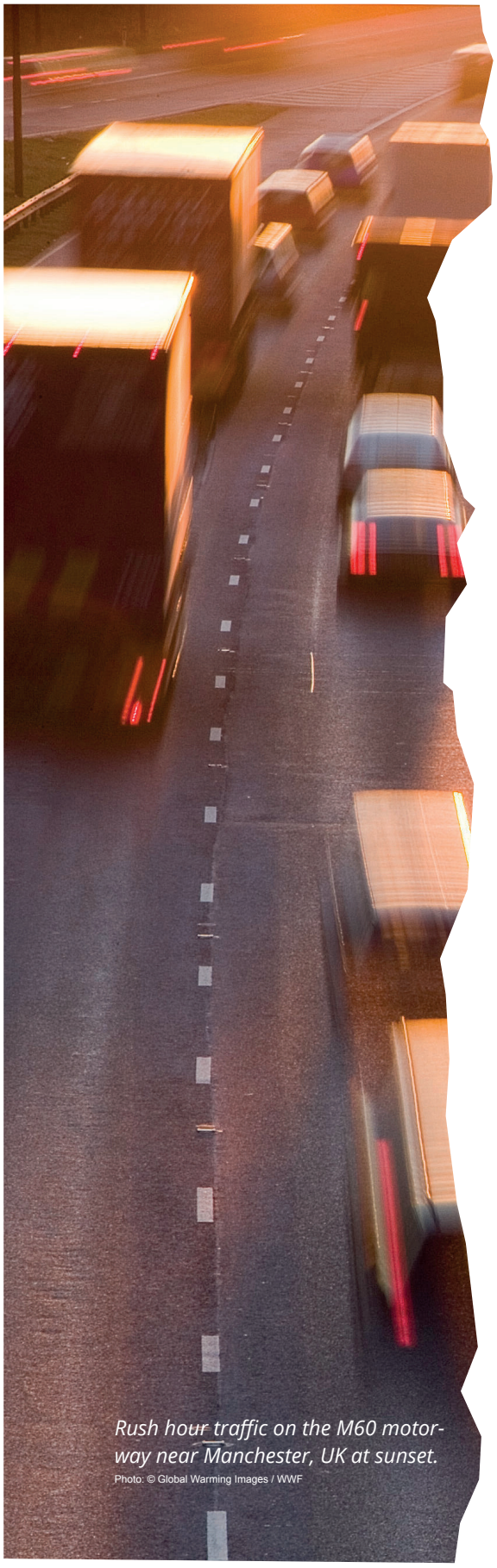
The businesses benefit, but so do the youth: they explore their creative potential, engage in hands-on learning, acquire new skills, and—most importantly—begin to recognize the potential for interesting employment in the region.

Has BRIDGE completely reshaped the Arctic's economic image? Not yet—that could take decades. But what we know for sure is that in Arctic countries, academia, youth and businesses of all sizes should be taking steps toward each other every day. It is exactly this kind of brainstorming on challenging projects that may bring polar communities closer to responsible governance for a sustainable Arctic.

MIKHAIL UKSUSOV is Russia's envoy for Arctic youth cooperation during Russia's Arctic Council chairmanship. He works at Murmansk Arctic State University, where he is trying to boost the image of human capital in the Arctic.

A stronger creative economy could benefit small Arctic communities by attracting youth and motivating them to stay.





Rush hour traffic on the M60 motorway near Manchester, UK at sunset.
Photo: © Global Warming Images / WWF

Engineering the green transition

KEEPING THE ARCTIC COOL BY WARMING UP TO CHANGE

Our carbon-intensive lifestyles and the greenhouse gases they generate are having devastating effects on the Arctic. As **LEWIS AKENJI** writes, it is clear that our planet cannot support this version of "the good life" for everyone. In the midst of a climate emergency, we must curb our excesses now.

AS I WAS WRITING this in April, the Intergovernmental Panel on Climate Change released the third instalment of its sixth assessment report. For the first time in its 32-year history, the panel concluded that lifestyle changes, enabled through policies, infrastructure and technology, could reduce carbon emissions by 40 to 70 per cent by 2050. The report also confirmed what many of us have understood for years: that the options for cutting our emissions by 2030 already exist, but are hamstrung by a stunning lack of political will.

The past winter saw temperatures in the Arctic 30°C above normal and the collapse of an ice shelf the size of Rome. Many of us read this news from our centrally heated homes far, far away, but nature does not recognize this distance. We are all part of an interdependent ecology, and the Arctic helps regulate our entire planetary ecosystem. Although the need for lifestyle change to help prevent warming has long been acknowledged in theory, it is still not well reflected in government policies.

Measures like bans on single-use plastic, as seen in Canada, help address the material residue of overconsumption. But actions that could lead to significantly reducing our carbon footprint—such as eating less meat and dairy, flying less and living in smaller spaces—are still largely framed as matters of personal choice.

RESHAPING NORMS AND INFRASTRUCTURE

Last year, an analysis by Oxfam revealed that the wealthiest 10 per cent of people in the world generate almost half of all global emissions, and the wealthiest 1 per cent are responsible for twice as many emissions as the poorest 50 per cent. Therefore, policies that focus on curbing the consumption appetites of the wealthiest can have a significant impact on climate change mitigation while allowing people in poorer nations to consume more to meet their material needs.

Understanding the context in which people over-consume is essential. Nobody wakes up in the morning and thinks, "I'm going to wreck the environment today." Consumption is the result of deeply established social norms. We consume to meet our biological and psychological needs, such as for social recognition, self-esteem and creativity. But political, economic and urban planning decisions about infrastructure also push us into consumption. For example, building airports instead of expanding

rail networks drives people to travel by plane rather than train.

The 1.5-Degree Lifestyles report estimated that in order to limit global warming to 1.5°C, the carbon footprints from lifestyles in high-income countries will need to shrink by 91 to 95 per cent by 2050. Change on this scale cannot be left to individuals. Governments, businesses and institutions—the custodians of our norms and culture—must take responsibility for engineering this change.

CHOICE EDITING AND SOCIAL INNOVATION

One solution is choice editing: removing harmful consumption options, especially where the benefits are enjoyed by only a few while the negative impacts are shouldered by all. For example, frequent flier mileage programmes, five-star hotel loyalty programmes, and other incentives to sustain or increase consumerism have no place in a climate emergency. Similarly, we should edit out harmful investment options, such as in fossil fuels and industrial meat farms, and speculative investments in housing, food and water that lead to artificial scarcity by financializing the necessities of life.

Meanwhile, we need to edit *in* more sustainable alternatives. For example, a frequent flier tax could complement more sustainable transportation options, with subsidies for public transport. But as long as governments continue to delay these kinds of actions, they enable the cognitive dissonance between our everyday actions and their harmful effects on regions such as the Arctic, the Amazon rainforest and underwater reefs.

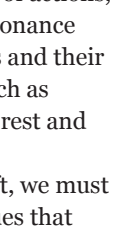
To make this profound shift, we must also reassess the cultural values that fuel overconsumption in the first place. Lifestyles should encompass more than just consumer spending. Activities like caring for children or parents, spending time with friends, playing, studying, making art and music, volunteering or engaging in activism can contribute to a sense of well-being and life satisfaction without excess consumption. To avoid making the green transition all about scaling down—an understandably uncomfortable proposition for many—we must combine choice editing with social innovation to shift values and norms.

Because the carbon-intensive lifestyles of a few set the consumption aspirations for everyone else, the top 10 per cent of emitters have the opportunity to be role models—to use their social capital and influence to support political campaigns, lobby governments and change our notion of what constitutes a good and meaningful life.

The link between income inequality and climate change is now undeniable. It will not be possible to address one without addressing the other. A recent study in *Nature* found that lifting hundreds of millions of people out of extreme poverty would raise global emissions by less than 1 per cent. Curbing the consumption habits of high-income nations will allow for the creation of a fair consumption space in which all people will be able to meet their needs without dangerously overstepping our planetary boundaries. ●

Change on this scale cannot be left to individuals. Governments, businesses and institutions—the custodians of our norms and culture—must take responsibility for engineering this change.

LEWIS AKENJI is managing director of the Hot or Cool Institute, a think tank that explores the intersection between society and sustainability.





Cycling in Copenhagen, Denmark.

Photo: Kristoffer Trolle, Flickr.com, CC BY 2.0

THE BACK PAGE

THREE DECADES OF ARCTIC OBSERVATIONS

The first *Arctic Bulletin*, *The Circle*'s predecessor, was published 28 years ago. The issues covered may have changed over time, but the goal has remained the same: to protect the Arctic.

No. 1.1994 "Because of its severe climate the Arctic, up until now, has been protected from many of the human threats which have affected other bioregions. For this reason WWF has concentrated much of its efforts on other parts of the world. [But] apart from the increasing fear that the climate itself may change, there are good reasons for WWF to bundle the existing Arctic projects of its different national organisations into a pan-Arctic framework…." *–Peter Prokosch, director, WWF Arctic Programme (from his editorial in the first issue of* The Circle*)*

No. 3.1996 "The support of the World Wide Fund for Nature (WWF) for the concept of an Arctic Council is most welcome….The creation of an umbrella forum of the eight Arctic countries will provide the means to address the wide range of Arctic issues; to strengthen existing circumpolar initiatives; and to bring political focus to addressing the urgent issues affecting the circumpolar North."*—Ronald A. Irwin, minister of Indian Affairs and Northern Development, Canada*

No. 1.1998 "WWF is calling for a representative network of marine protected areas throughout the Northeast Atlantic to safeguard threatened species and their habitats beyond 12nm territorial waters and in the deep sea."—*Stephan Lutter, WWF NE Atlantic Programme*

No. 3.2000 "Former U.S. President Jimmy Carter came to Alaska in August to commemorate a landmark U.S. conservation law, urging President Bill Clinton to designate the Arctic National Wildlife Refuge coastal plain a national monument to fulfill one of its shortcomings."*—Pamela A. Miller, Arctic Connections*

No. 4.2001 "Scientists warn that climate warming will occur most rapidly in the Arctic, with so-called feedback processes that are expected to have effects extending far beyond this region."*—Lynn Rosentrater, WWF Arctic Programme*

No. 1.2005 "Dangerous levels of climate change could be reached in just over 20 years' time according to a new WWF International Arctic Programme report."*—Tonje Folkestad, WWF*

No. 2.2007 "An international team of scientists believes that catastrophic forest fire outbreaks in Siberia are happening more frequently because of climate change. In the extreme fire year of 2003, smoke plumes from Central Siberia were so huge that they caused air pollution in the United States."*—Brief based on* Journal of Climate*, August 2007*

No. 2.2011 "The pressure from the rest of the world, not least China, in having a role in the Arctic will only increase and the Arctic States must look at ways of accommodating not only interested nation states from the Far East but also NGOs and indigenous peoples."*—Diana Wallis, vice-president, European Parliament with responsibility for Arctic and High North issues*

No. 1.2014 "Expedition cruise ships and smaller pleasure craft vessels such as private yachts are showing up in increasing numbers throughout the Arctic. In Canada's far north, commercial cruise ship itineraries have more than doubled since 2005 while the number of yachts and other small vessels has increased by over 400 per cent."*—Jackie Dawson & Margaret Johnston*

No. 2.2015 "Arctic waters provide habitat for fish that are caught to be sold for local subsistence and even for food security beyond the Arctic. But some commercial fisheries are treating these waters like a free lunch."*—Tomas Declercq, UNEP*

No. 3.2016 "Alaska Native ways of knowing are seldom incorporated in state or federal decision making and that sad truth should be remedied. We have something to offer and can help make better decisions that will address social, economic, and environmental needs."*—Austin Ahmasuk*

No. 3.2017 "We are heading toward a tipping point for some communities and we need to rigorously examine the protection and sustainable management of critical natural resources for the practice of traditional livelihoods."*—Svein D. Mathiesen (International Reindeer Husbandry Center, Norway) and Mikhail Pogodaev (World Reindeer Herders Association)*

No. 2.2018 "Since many changes in the Arctic have their origins outside the region, it is important for Arctic countries and peoples to take 'Arctic messages' to global forums. Sustainable development in the Arctic is going to be very difficult if the rest of the world does not understand how its actions affect the region, and cannot or will not acknowledge its responsibility."—*Timo Koivurova, director, Arctic Centre, University of Lapland, Finland*

No. 2.2019 "We were surprised to find that plastic debris was plentiful in the Greenland and Barents seas to the east of Greenland and north of Scandinavia. Our study concluded that most of the plastic found in this part of the Arctic was coming from faraway sources."*— Andrés Cózar Cabañas, University of Cádiz, Spain*

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