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ARCTIC BIODIVERSITY:

WHERE IS IT HEADING?

ARCTIC BIODIVERSITY

The Circle 4.2021

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COVER: Bowhead whales in Nunavut, Canada.

Photo: © VDOS Global / WWF-Canada

*ABOVE: Imuskox (*Ovibos moschatus*), Bering Land Bridge National Preserve.*

Photo: Roy Wood, Bering Land Bridge National Preserve, CC, Flickr.com

Mainstreaming nature in the Arctic

FOLLOWING COP 26 and the first part of the UN Biodiversity Conference in October, we have an opportunity to look at the Earth's unfolding nature and climate emergencies through a new lens—one that sharpens our view of the indivisibility of these twin crises. This view is particularly relevant to the Arctic, a changing environment that provides ecosystem services the entire planet needs.

Fortunately, part one of the biodiversity conference, held in Kunming, China, concluded with a number of ground-breaking announcements. The Kunming Declaration is an important sign of support for an ambitious 10-year global framework with clear goals and 21 targets, many with measurable elements. The Kunming Biodiversity Fund, to which China alone pledged US$233 million, is a critical contribution. Japan extended its 10-year biodiversity investment by US$17 million, the European Commission announced plans to double its funding for biodiversity, and the UK assigned a significant part of its increased climate funding toward biodiversity.

Even the private sector is on board, as evidenced by the US$14 trillion pledge from Finance for Biodiversity. The EU's proposal to ban the tapping of new oil, coal and gas deposits in the Arctic is another sign that we are moving in the right direction.

All this momentum is welcome and critical. We must act quickly to ensure that the world's economic recovery from the COVID-19 pandemic addresses the climate and nature emergency. That means all levels of government should avoid the types of subsidies and incentives that have, in many cases, become a harmful part of our production and consumption habits. For example, the vast majority of current agricultural subsidies are damaging to nature and social conditions.

What we need is an integrated approach that mainstreams biodiversity by factoring it into policies and practices. This approach is particularly timely and necessary in the Arctic, which can be seen as an evolving experiment in multilateralism: eight member countries share the governance of a region that is home to fewer than five million people, but offers globally significant mining, oil and gas reserves, not to mention an increasingly significant trade transportation channel. In this governance, we have a unique opportunity to mainstream biodiversity across all sectors and incorporate Indigenous knowledge.

There is no time left in the Arctic to work in silos. As a leading multilateral platform, the Arctic Council proposes integrated solutions to protect climate, nature, land management, health, food and water and to support political and economic stability. It is clear that separate responses are not viable.

There is no time left in the Arctic to work in silos. As a leading multilateral platform, the Arctic Council proposes integrated solutions to protect climate, nature, land management, health, food and water and to support political and economic stability. It is clear that separate responses are not viable.

We must also be more ambitious about area-based conservation measures. For example, we should aim to achieve the "30 by 30" goal (to protect 30 per cent of the Earth by 2030) by creating connected ecological corridors that support the migration and adaptation of species and ecosystems. At the same time, we need a precautionary approach for high-impact activities, such as mining and oil and gas extraction. And we need the full and effective engagement of local communities and Indigenous Peoples.

In other words, when it comes to biodiversity, we can no longer view the Arctic as an untouchable jewel. In reality, it is—and should continue to be—an asset for its people that develops and changes in response to their needs. It is uniquely positioned to become a model for mainstreaming and harmony with nature if we can co-manage it carefully to ensure its resources are used sustainably.

Ultimately, the Arctic has the size, the resources and the human and institutional capacity to be a bright spot for biodiversity and a laboratory for sustainability. Let's make sure that happens. ○

ELIZABETH MREMA is executive secretary of the United Nations Convention on Biological Diversity.

Firefighters conduct a burnout operation to combat a wildfire in Alaska's Kenai National Wildlife Refuge, 2014.

Photo: Alaska Region U.S. Fish & Wildlife Service, CC, Flickr.com

ENDANGERED TREES

Northern wildfires endanger black spruce trees

A NEW STUDY published in Proceedings of the National Academy of Sciences of the United States of America has found that more frequent Arctic wildfires are causing black spruce trees to lose their resilience and capacity to regenerate.

Black spruce has long been the dominant tree species in the boreal forests of North America, whose soils contain highly flammable peat moss and lichens. Although the trees usually rely on fires for regeneration—the heat causes their cones to open up and drop seeds—the more severe and frequent fires seem to be damaging their capacity to regenerate.

To conduct the study, scientists gathered data from more than 1,500 fire sites. They found that the black spruce's regeneration capacity had dropped at 38 per cent of these sites and failed entirely 18 per cent of the time.

Widespread loss of black spruce trees could harm biodiversity in the boreal forests, affecting the Arctic as well. For example, caribou, which are already in decline, depend on the trees for shelter and food.

A CHANGING POLAR BEAR DIET?

Unusual footage captures polar bear hunting reindeer

A RESEARCH PAPER published this fall documented how, in the summer of 2020, Polish scientists in Norway's Svalbard archipelago were astonished to observe a polar bear hunting a reindeer. The team was able to film the scene, and the footage shows a young female bear chasing a reindeer into frigid waters. The bear catches and drowns the reindeer, then pulls it to shore and feasts on it.

Scientist Izabela Kulaszewicz, a biologist at the University of Gdansk, was so surprised by the incident that she and two other researchers contacted *Polar Biology* about it, arguing that the incident was one of several observations that, taken together, suggest polar bears are preying more on terrestrial mammals as the Arctic sea ice melts, diminishing their access to seals.

Although seals make up polar bears' main diet, the bears have also been known to eat birds, rodents and even dolphins. Other scientists have cautioned against reading too much into the unusual sighting. They point out that it's possible polar bears have always hunted reindeer, but are only now being filmed doing so as the number of people in the area grows and ubiquitous cell phone use makes it easier to record such events.

WWF ARCTIC PROGRAMME ON THE MOVE

Programme moves from Canada to Sweden

FOR ALMOST 30 YEARS, WWF's Arctic Programme has focused on the conservation challenges facing the Arctic and the people who call it home. The programme coordinates WWF's work in the region and publishes *The Circle*.

WWF–Canada hosted the Arctic Programme for the last 10 years. But after more than a decade, it was time to hand it over to another Arctic nation. On July 1, 2021, the programme moved to its new home at WWF–Sweden.

"I am very enthusiastic about the Arctic programme coming to Sweden," says Gustaf Lind, CEO of WWF-Sweden. "We are happy to learn from them and perhaps share with them part of our perspective when it comes to the Arctic."

Lind himself is a relatively new addition to WWF-Sweden, having joined the organization in August 2021. But he has spent much of his career addressing Arctic issues, both as a diplomat and as the Arctic ambassador and chair of the Arctic Council's Committee of Senior Officials. He says it is critical that Arctic nations work together to protect and support the Arctic.

"There are similar challenges for all the Arctic states, and for the people living there," says Lind. "And obviously, climate change is very much at the core of them. With the region changing so rapidly, I think it is very important for different actors—not only states, but others—to discuss and look for different solutions."

MARINE MAMMALS

Searching for walrus from space

WALRUS ARE a key species in the Arctic marine ecosystem and have immense cultural significance to the people who live in the Arctic. But these powerful animals are increasingly vulnerable to the environmental and human-caused changes occurring in the Arctic.

Walrus from Space is a five-year science project led jointly by WWF and the British Antarctic Survey to shed light on how to help these animals deal with climate change. The aim is to better understand Atlantic and Laptev walrus populations, including how they are affected by the climate crisis now and how they might respond in a climate-altered future. The ultimate goal is to help secure a future for walrus in the context of extreme climate change.

In October 2021, about 550,000 satellite images of Arctic coastline taken in 2020 were loaded onto the Walrus from Space platform, and citizen scientists from around the world began searching the images for walrus. More than 10,000 people responded to the challenge to be "walrus detectives," and there have been nearly six million searches for images on the project platform to date. In the next phase, scheduled to begin in February, participants will count the walrus.

If you'd like to join the project and become a walrus detective too, please register here.

A walrus on the ice in the Arctic Ocean north of western Russia.

Photo: NOAA Photo Library, Mike Dunn, NC State Museum of Natural Sciences, CC, Flickr.com

Calling all Arctic youth:
Share your vision for the future!

ARE YOU 30 YEARS OLD or younger and passionate about life in the Arctic? Do you have a vision of what you want the Arctic to look like in 30 years—and what it will take to get there?

WWF's Arctic Programme celebrates 30 years in 2022, and we want to hear how Arctic youth think their communities and surroundings may change in the next 30 years. We are looking for young people who call the Arctic home to contribute to a special 30th anniversary issue of *The Circle*.

The Circle aims to inform decision-makers, scientists and the public about the environmental and sustainability challenges facing the Arctic today—and those that will emerge in the future.

LOOKING FOR YOUTH CONTRIBUTORS

The Circle's upcoming anniversary issue will focus on the concerns and topics that matter most to people living in the Arctic nations: Canada, Finland, Iceland, the US (Alaska), Denmark (Greenland), Sweden and Russia. We want to share the stories of Arctic youth who are seeing firsthand how the changes caused by the climate crisis affect their communities, livelihoods and environments.

WHAT ARE WE LOOKING FOR?

We want to publish short articles (approximately 600 words) that:

- Describe how Arctic communities will change in the next 30 years
- Suggest solutions to address the negative changes taking place
- Share examples of specific projects or actions that are helping, or can help, to protect the Arctic

SHARE YOUR STORY IDEAS WITH US!

All submissions must be received by March 4, 2022. If your story idea is chosen, a member of *The Circle's* editorial team will work with you to help you craft your article.

What you say matters—so please share your vision for the Arctic of the future. Submit your idea here. For more information, contact us at: info@arcticwwf.org.

Asya Fomina, a Russian climate activist from the northern city of Arkhangelsk, holds up a sign that says "Strike for Climate".

Photo: Michael Ransburg, CC, Flickr.com

Arctic tern.

Embedding nature in WWF's work

Creating the right climate for conservation

As a conservation organization, WWF's mission is to create a world where people and wildlife can thrive together. But as VANESSA PÉREZ-CIRERA writes, that goal is increasingly threatened by the climate crisis: as we are seeing all too vividly in the Arctic, warmer temperatures are destroying ecosystems that have evolved over millions of years, pushing untold numbers of species toward extinction.

THE TWIN CRISES of biodiversity loss and climate change are closely interwoven and often mutually reinforcing. We can't halt nature loss without addressing the climate crisis—and we can't stop the Arctic from warming without protecting nature.For example, the climate crisis is altering many species' ranges, forcing them toward the poles or higher ground. The decisions we make about conservation today may need to be revisited tomorrow depending on climate shifts. As WWF's recent Feeling the Heat report documented, some of our most treasured species are threatened by world leaders' failure to agree to ambitious climate targets.

PROTECTING THE EARTH'S NATURAL ASSETS

Meanwhile, nature offers many solutions to the climate crisis. Natural systems on land and at sea already absorb massive volumes of greenhouse gas emissions. Protecting and enhancing them will be vital to preventing runaway global warming. A growing number of governments and private sector actors are embracing so-called "nature-based solutions" to help reduce atmospheric concentrations of greenhouse gases.

VANESSA PÉREZ-CIRERA is deputy global lead of climate and energy at WWF. She is an environmental economist focusing on international climate policy and economics.

Nature will also play a vital role in helping us adapt to impacts of the climate crisis that we are already seeing, not to mention the future impacts that we know are inevitable. For example, vegetation can reduce flooding (and even reduce urban temperatures), while mangroves can reduce the impacts of storm surges.

But focusing on the climate crisis without regard for nature's vulnerabilities risks failure on both fronts. Some solutions designed to address carbon emissions—such as large-scale monoculture plantations of energy crops—can actually threaten biodiversity.

Some of our most treasured species are threatened by world leaders' failure to agree to ambitious climate targets.

These synergies and interrelationships were recently explored by the two intergovernmental bodies charged with advising policymakers on the respective issues: the Intergovernmental Panel on Climate Change and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. These organizations stated that "only by considering climate and biodiversity as parts of the same complex problem, which also includes the actions and motivations and aspirations of people, can solutions be developed that avoid maladaptation and maximize the beneficial outcomes."

APPLYING A NATURE LENS

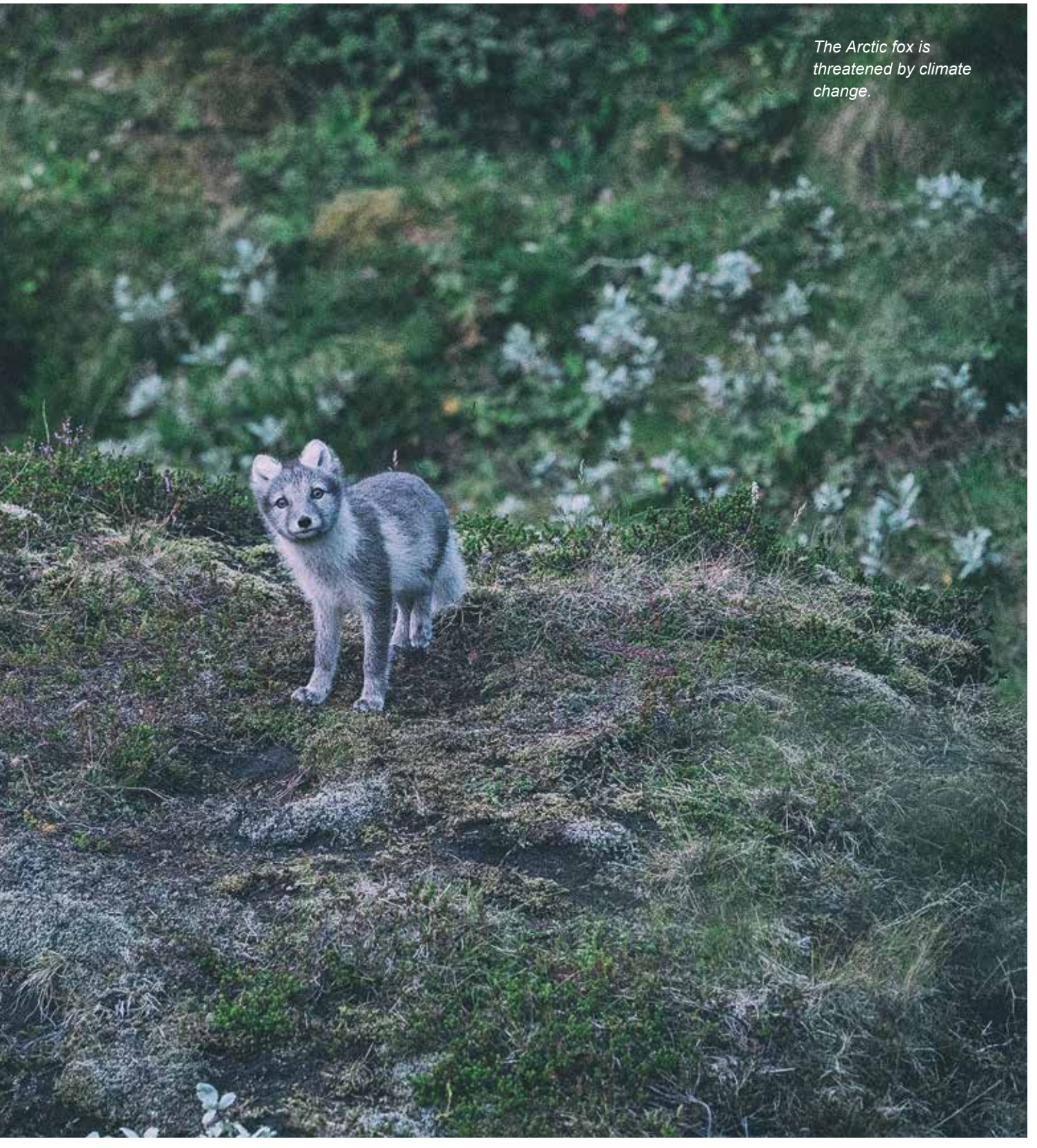
This is something that WWF's global climate and energy practice has long recognized. As its name suggests, the practice focuses on the climate crisis, but always considers the challenge through a "nature lens."

The goal of our work on climate is to hold warming below 1.5°C above pre-industrial levels—the more ambitious objective of the Paris Agreement—by reaching net-zero global emissions by mid-century. We recognize that warming beyond this threshold will threaten nature and the natural systems on which human societies depend.

A big part of our work lies in pushing governments and private sector emitters toward more ambitious climate targets. We are also working to ensure that, as they consider the role of nature-based solutions within their climate policies and actions, these emitters follow the highest standards of environmental integrity and biodiversity protection.

But our work goes further than this. We firmly believe that without systemic changes in how we organize our economies, we will be unable to address either the climate or the biodiversity crises. Both require policymakers and private sector organizations to understand and

Photo: Jonatan Pie on Unsplash



The Arctic fox is threatened by climate change.

seek to address the environmental consequences of their actions.

This requires raising public consciousness, building coalitions and coordinating action and broad engagement. WWF's climate and energy practice, which operates from 60 WWF offices around the world, is carrying out this engagement in pursuit of our climate goals—which, in turn, serve our broader objectives of conserving nature and human well-being. ○

Eavesdropping on a changing Arctic

The animals that inhabit Arctic ecosystems are uniquely adapted to life in the area's cold, icy waters, where the sun doesn't rise for months at a time. But as KATE STAFFORD writes, human activity and the rapidly changing climate are having profound impacts on the Arctic's physical and biological environments, leading to changes in biodiversity.

BELOW THE SURFACE of any ocean, sounds from wind, waves and marine animals contribute to the soundscape. In the Arctic Ocean, sea ice plays a unique role by making an incredible cacophony of noise as it forms, moves and grinds against itself. At the same time, it dampens certain other sounds: in mid-winter, the ice-covered ocean can be eerily quiet because of the absence of wind-driven waves. But in a rapidly warming climate, changes in sea ice, especially its extent and seasonality, are reshaping polar habitats and altering what the underwater Arctic sounds like. For example, increasing storminess and diminishing sea ice are making the Arctic waters louder as winds increase and wave noise is no longer dampened.

LISTENING TO CLIMATE CHANGE

Sound travels further and more quickly underwater than in air, so we can listen across many kilometres—much further than we can see. We can tell species apart by the sounds they make. We can even distinguish human-generated sounds from one another. By eavesdropping underwater, we can actually "hear" climate change, even during the polar night and under ice.

Underwater sound gives us unique insights into how the Arctic is transforming by revealing changes in sounds from the air (wind), water (marine mammals) and land (people). For instance, we are hearing more noise from shipping and oil and gas extraction as well as new sounds related to changing biodiversity as new species move North.

Sounds from wind and waves in the Arctic—and the ocean in general—are similar to how traffic on a freeway creates background noise in a city. The noises made by individual cars and trucks aren't generally distinct from one another, but the combined noise from all of the vehicles together limits what else we can hear—and from how far away. It's clear that increased storminess is increasing background noise levels in the Arctic.

ARCTIC SPECIES FACE CHALLENGES

We know from listening over many years and locations in the Arctic that the area's marine mammals are changing their migratory patterns as sea ice

Humpback whales in the singing position (flukes up and heads down).

We know from listening over many years and locations in the Arctic that the area's marine mammals are changing their migratory patterns as sea ice declines.

declines. For instance, bowhead whales have been heard in mid-winter in the Beaufort Sea, far from their usual wintering grounds to the south in the Bering Sea. Further, we can now hear sub-Arctic visitors—like humpback, fin and even killer whales—during many more months of the year and further north as sea ice loss opens up new habitat for them. These species may prey upon or compete for food with Arctic marine mammals. In this way, climate change is actually increasing the seasonal biodiversity of many regions of the Arctic.

Meanwhile, Arctic shipping traffic between the Pacific and Atlantic Oceans continues to increase, even in winter—and with it, noise levels in the same frequency bands used by marine mammals. This anthropogenic (human-caused) noise may interfere with marine mammals' ability to hear and respond to the sounds they rely on to communicate, find mates and locate prey.

Many Arctic species are critical to food security and culture in the Arctic. People who live in the region worry that increasing noise will displace or change the distribution of the animals they rely on and reduce access to those animals.

Listening underwater in the Arctic provides us with compelling evidence of climate change in the region—and confirms that noise levels are increasing as a result of atmospheric changes, increased human use and habitat changes. All of these are altering the biodiversity of marine mammals in the region. ●

KATE STAFFORD is an oceanographer and marine mammal ecologist at Oregon State University in the United States who uses passive acoustic monitoring to examine the migratory movements, geographic variation and physical drivers of marine mammals, particularly large whales.

Species moving north

The march of the beaver into

The Arctic has long been home to species that are well-adapted to the region's cold, harsh conditions—from polar bears and caribou to narwhals and ringed seals. But now these species have a new neighbour: the beaver. And its appearance in Alaska could have significant consequences for ecosystems and biodiversity.

KEN TAPE is an associate professor at the University of Alaska Fairbanks who has spent much of the last five years photographing and studying beavers in western Alaska. He and several other scientists have used time series of satellite images to document the appearance of hundreds of new beaver ponds in tundra regions of western and northern Alaska. He spoke to *The Circle* about the beaver's expansion into the Arctic and what it could mean for tundra ecosystems. ➤

the Arctic

In Alaska, beavers started moving into tundra regions 40 or 50 years ago and have continued to move outward. At this point, they're all the way out at the west coast of Alaska.

Photo: Ken Tape

How much has the beavers' range expanded in recent years?
In Alaska, beavers started moving into tundra regions 40 or 50 years ago and have continued to move outward. At this point, they're all the way out at the west coast of Alaska. They've actually made it out to the Bering Strait, which is kind of impressive. So far, we've mapped about 12,000 or 13,000 beaver ponds in the Arctic tundra of western Alaska.

How were you able to track this movement?
What's interesting about beavers is that, like people, they make a mark on the landscape that you can see from space. That's what makes this exciting and such an interesting project. It's not just about a species responding to climate change—it's a species imposing changes on the landscape. That's how we are able to say when they got there. You can go back and look at old aerial photography and see beaver ponds being built along streams.

Where was the beavers' range 40 or 50 years ago?
I would say they were restricted to the boreal forest. Remote tundra communities of Alaska really have no record of beavers ever having been there. But hunters have trapped beavers heavily across the northern hemisphere, so part of what we're seeing is a natural

Researcher Ken Tape has mapped 12,000 to 13,000 beaver ponds in the Arctic tundra of western Alaska.

rebound. For example, in the woods around Fairbanks, there probably weren't many beavers 150 years ago. But because the records don't go back to before the fur trade, we don't know if beavers were ever out there. And that's an important question.

Why have they started to move into the Arctic?

There are two key reasons, but we don't know which is playing the biggest role. One is climate change. This is an animal that needs shrubs and saplings, and we know that shrubs are expanding in the Arctic and that the amount of open water in winter is also increasing. That's important because beavers don't hibernate.

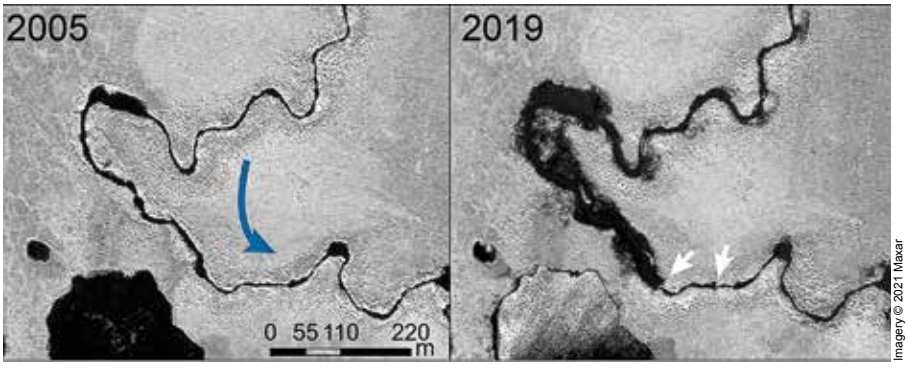
So it's obvious that their habitat has increased in the Arctic due to climate change. But at the same time, they are rebounding from being over-trapped in the 18th and 19th centuries. That's why this question of "Where were the beavers before the fur trade?" is so important. Were they out at the Bering Strait in 1700? We don't know. We're working with archaeologists to look at beaver teeth and bones to try to find out.

Suddenly a beaver moves in, and the streams and landscape never look the same again. This could increase biodiversity, but the endemic species might get squeezed out.

From a biodiversity standpoint, what are the consequences of this movement of beavers?

Our hypothesis is that beaver ponds are like oases in the tundra. When you pool water on a permafrost landscape, you begin to thaw the permafrost around and underneath the pond. And that's a key idea because in more southern ecosystems, people use beavers to trap groundwater in order to ➤

Photo: Ken Tape



Imagery © 2021 Maxar

These satellite images show how waterways have widened in Alaska over time due to beaver dams.

Photo: Ken Tape

Beavers are drawn north as the area sees more shrubs and open water in winter.

widen floodplains and restore dried-up streams to bring fish back. That's what beavers do when they get into a temperate ecosystem.

Beaver dams in the Arctic do all those things too, but they also essentially create heat islands, or oases, because they trap the water on the landscape and the water then traps heat, so the ice doesn't freeze all the way down at the bottom in winter. The result is deeper, warmer water that thaws the permafrost. Our hypothesis is that this will increase biodiversity because it allows boreal forest species to get a foothold in the Arctic. But that's just a hypothesis for now.

Is there a negative impact of this expansion?

Well, I think a lot of people would say that thawing permafrost is a negative impact. That's the big one. We also have preliminary evidence of methane hotspots surrounding beaver ponds. These can create a completely different ecosystem. In the Arctic, there are all these little streams. Then suddenly a beaver moves in, and the streams and landscape never look the same again. This could increase biodiversity, but the endemic species might get squeezed out. For example, you could get fish species like salmon moving northward. Some endemic Arctic species will probably get outcompeted, but that's just guesswork right now.

Could what you discover lead to decisions about management?

That's a difficult question. For one thing, I'm not sure how easy it is to stop what's happening. You can already harvest as many beavers as you want in Alaska, yet I think that's probably barely making a dent in their expansion. We have formed a group called the Arctic Beaver Observation Network. The idea is to synthesize research and put the findings into the hands of land managers and local people so they can make informed decisions. But what they can actually do to stop it, I'm not really sure. ○

Photo: © naturepl.com, David Shale, WWF

Deep sea octopod.

Deep-sea ecosystems

Deep seabed mining would destroy biodiversity—and we don't need it

Covering around half the Earth's surface, the ocean's deep seabed is an uncharted world teeming with life that exerts a major influence on the whole ocean ecosystem and on our climate. It's also rich in metals and minerals—and as we slowly deplete mineral deposits on land, there is increasing pressure to look to the deep seabed. But JESSICA BATTLE of WWF–Sweden explains why deep seabed mining is an idea whose time should never come.

TWO HUNDRED METRES or more beneath the ocean's surface, the deep seabed is our planet's final frontier. It is also vital for life as we know it. But a handful of private companies and a few states argue that mining this sensitive and important ecosystem for minerals is our best bet for providing the cobalt, lithium, nickel and other minerals that will be needed for a business-as-usual approach to the switch to green technologies, such as electric vehicles, solar panels and wind turbines. Proponents also suggest that by mining the deep

Mining would have irreversible destructive impacts on deep-sea ecosystems and biodiversity, which could have a knock-on effect on fisheries, livelihoods and food security and compromise ocean carbon, metal and nutrient cycles.

A global moratorium on deep-sea mining is needed to prevent ecosystem destructions.

seabed, we could avoid the negative environmental and social impacts of mining on land.

This is simply not true.

LASTING CONSEQUENCES

The risks are great. Mining would have irreversible destructive impacts on deep-sea ecosystems and biodiversity, which could have a knock-on effect on fisheries, livelihoods and food security and compromise ocean carbon, metal and nutrient cycles. Such mining plans also run counter to the transition we need to make to a circular economy, undercutting efforts to increase recycling and reduce the exploitation of finite resources.

Economists also project far-reaching consequences for the industries and communities that depend on a healthy ocean if deep seabed mining goes ahead.

The International Seabed Authority—the agency that, paradoxically, is responsible for licensing deep seabed mining operations while also protecting the ocean from its impact—has proven itself unfit for purpose. We need to change course immediately, before irreparable damage is done.

What's urgently needed is a global moratorium on all deep seabed mining activities. Ultimately, moving to a low-carbon future will require major structural changes in our economy and in our lifestyles—not a rush to exploit more finite resources.

ADVOCATING FOR A MORATORIUM

Fortunately, the voices speaking out against a move to mine the deep are growing in volume and number. Calls for a moratorium are increasing, with local and international NGOs, community leaders, scientists, governments, businesses and fishers' organizations leading the way.

WWF is proud to take this stand for our ocean, alongside a global coalition of individuals, businesses and governments. Businesses such as Google, Volvo Group, BMW, VW Group, Scania and Patagonia are all calling for a moratorium and have committed not to source minerals from the deep sea. Investors are beginning to see that this industry is not a sustainable or responsible investment proposition.

Growing demand for metals and minerals doesn't have to cost the Earth. Alternative solutions already exist: a combination of innovation, recycling and repair can satisfy industries' needs for raw materials without opening the seafloor to mining. The journey toward a more sustainable future begins with a simple decision: no deep seabed mining.

It is now a question of what reaches the ocean floor first: protection in the form of a global moratorium, or the mining bulldozers. ○

JESSICA BATTLE is an expert in global ocean governance and policy with 20 years' experience. She leads WWF's global No Deep Seabed Mining Initiative.

WWF is working across sectors to propose the following solutions to avoid deep seabed mining:

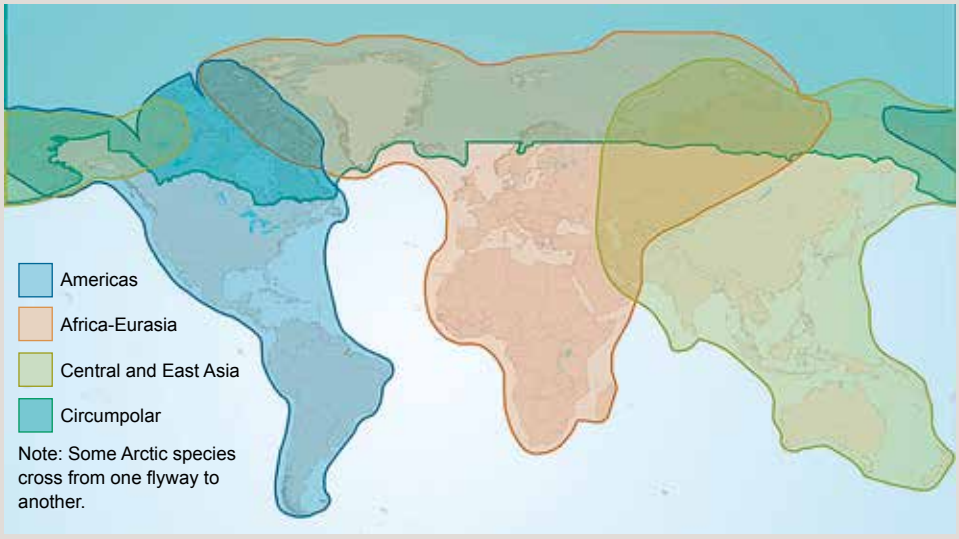
- Businesses can source the materials they need through more conventional, less destructive means of extraction and invest in innovation, recycling and repairability.
- Consumers can recycle their old phones, reduce consumption and investigate where their materials come from.
- Governments can support a global moratorium on deep seabed mining and invest in the circular economy.

Flyways and wetlands

Birds without borders need protection everywhere

Arctic migratory birds fly through dozens of countries on their way to and from the North—so whose birds are they, anyway? For example, if a bird migrates from southern Africa but breeds in the Arctic, is it a South African bird or an Arctic one? For the bird, it really doesn't matter: what matters is being adequately protected from climate-related threats along the entire flyway. To that end, WWF–Sweden has launched the Tavvavouma Arctic Flyways project to study and protect an important wetland used by wading sandpipers.

EVERY SUMMER, MILLIONS of birds migrate to the Arctic to take advantage of the 24/7 daylight and enormous quantities of insects. Threatened by overharvesting and habitat destruction outside the Arctic, many of these birds are decreasing in number—and unfortunately, the effects of the climate crisis are also starting to take a toll on them. To safeguard Arctic migratory birds, we must reduce threats to them in their wintering areas and where they rest on their way to and from the Arctic.



To help with this, the Arctic Council's Conservation of Arctic Flora and Fauna (CAFF) runs the Arctic Migratory Bird Initiative. The initiative organizes activities across the Americas, Circumpolar, African-Eurasian and Central-East Asian flyways.

In summer 2021, WWF launched the Tavvavouma Arctic Flyways project to better protect the area, discover where the waders overwinter, and study how climate change is affecting both reindeer herding and breeding for birds.

The ruff is a medium-sized, long-necked wader that breeds in marshes and wet meadows across northern Eurasia. Ruffs are decreasing in number in northern Sweden and Finland. The reason for their decline is not known for certain, but it is likely because of habitat destruction along their migration routes as well as hunting of the birds during their migration and at their overwintering grounds in western Africa.

The ruff is one of several bird species in Sweden that participate in a lek—that is, a large mating party where males put on a show to attract females. In Tavvavouma, Sweden, these leks take place on large peat hills—known as palsas—from which the birds can easily detect predators.

Photo: Ola Jennersten, WWF.

Photo: Tom Arnbom, WWF-Sweden.

Tavvavouma is a 55,000 hectare wetland in northern Sweden. In the 1970s, it was renowned among birdwatchers for its large numbers of bird species. Two Saami villages that engage in traditional reindeer herding rely on this wetland.

One important explanation for Tavvavouma's wealth of biodiversity is likely the presence of palsas—peat mounds with permanently frozen peat and mineral soil cores. Palsas push the peat upward, creating small hills that rise six to seven metres above the surrounding mires. This phenomenon creates many different micro habitats, including small pools with insects that serve as food for birds. But palsa landscapes are threatened by the climate crisis because higher temperatures are thawing permafrost.

Photo: Tom Arnbom, WWF-Sweden.

To safeguard Arctic migratory birds, we must reduce threats to them in their wintering areas and where they rest on their way to and from the Arctic.

Photo: Tom Arnbom, WWF-Sweden.

In summer 2021, WWF launched the Tavvavouma Arctic Flyways project to better protect the area, discover where the waders overwinter, and study how climate change is affecting both reindeer herding and breeding for birds. The focus was originally on taking a census of birds and insects and studying how climate change is affecting the area. To our surprise, the number of birds was still unusually high—as high as it was in the 1970s.

In 2022 and 2023, we will focus on tagging and tracking migratory waders to find out more about their migration routes. From 2024 onward, our aim will be to restore, strengthen and protect the waders' overwintering and resting areas (in Africa and Asia) by working with local people to reduce stressors in those areas.

The Tavvavouma project is a collaboration between WWF–Sweden and Birdlife Sweden together with scientists from Stockholm and Lund universities. We are also working closely with the Saami village in Lainiovuoma and the County Administrative Board of Norrbotten. By working together, we hope to find ways to protect this important wetland—and the birds that depend on it.

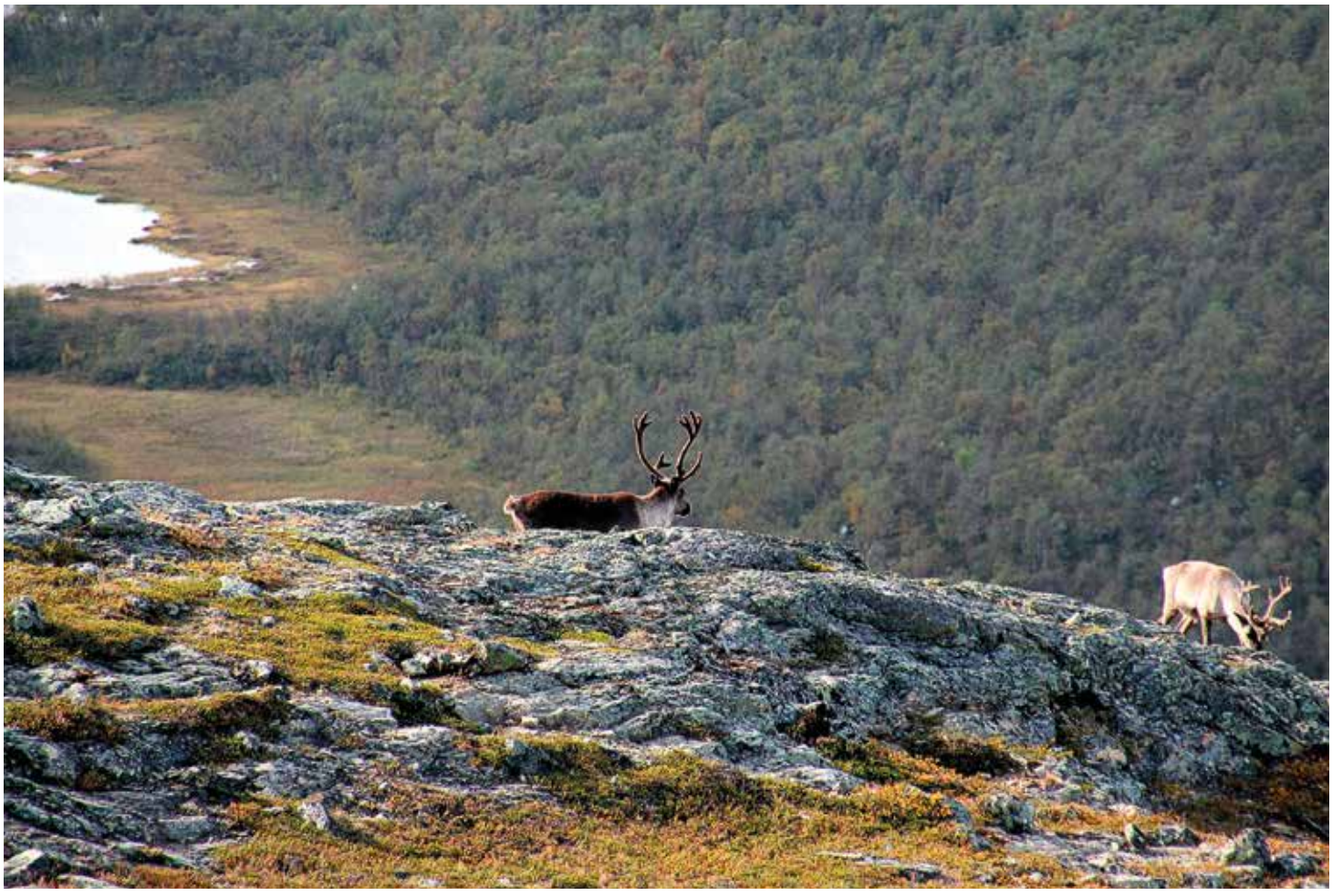


Photo: Tuomo Lindfors, CC, Flickr.com

Reindeer on Saana Mountain in Finnish Lapland.

New visions for the CAFF

We are all tied to the Arctic

Arctic biodiversity knows no borders—nor do the environmental drivers affecting it. But the carrying capacity of the Earth has limits, and they are not negotiable. MIA RÖNKÄ explains why the ongoing biodiversity and climate crises call for collaboration and co-creation—and how the Finnish chairship of the Conservation of Arctic Flora and Fauna (CAFF) from 2021 to 2023 will emphasize a sustainable, participatory approach and a just transition that acknowledges the knowledge, cultures and livelihoods of Indigenous Peoples and local communities.

IN SEPTEMBER 2021, I walked the slopes of Saana Mountain in the Saami homeland in Finnish Lapland. The autumn colours were beautiful, but the creeks in the mountain were desiccated after an extremely dry summer, and there were none of the usual mushrooms. A local reindeer herder was concerned that as a result, the reindeer will struggle in winter. Similarly, a researcher I spoke to in the area pointed to the unique vegetation and described the delicate mosaic of microcli- ➤

MIA RÖNKÄ is chair of the Arctic Council's Conservation of Arctic Flora and Fauna (CAFF) Working Group and of CAFF's Circumpolar Seabird Expert Group. She is an adjunct professor in environmental ecology and works as a scientist, science writer and poet.

A key CAFF priority during Finland´s chairship is the new Action Plan for Arctic Biodiversity 2023–2030, which will provide a framework for cooperation on biodiversity conservation. It will offer a fuller picture of the state of Arctic biodiversity, its resilience to climate change and the state of its conservation in the global context.

mates and snow conditions, explaining that the effects of the climate crisis are threatening these highly specialized species.

NEGATIVE FEEDBACK LOOP THREATENS BIODIVERSITY

Climate change and biodiversity loss are affecting Arctic Indigenous Peoples and communities, compromising their well-being, health, safety, livelihoods, food security and culture. Pollutants and other environmental drivers that originate outside of the Arctic make their presence known in the far North, while climate change and biodiversity loss in the Arctic have global effects.

On top of that, climate change and biodiversity loss interact, fuelling a negative feedback loop. This issue needs to be addressed and halted collaboratively, internationally and holistically. Scientific research, Indigenous and local knowledge should be used together to guide our responses, such as by informing conservation decisions, land use planning and the sustainability of livelihoods. We must reduce greenhouse gas emissions, increase the conservation of marine, coastal, freshwater and terrestrial biodiversity, and implement the United Nations Sustainable Development Goals in the Arctic.

The Arctic Council´s new strategic plan emphasizes biodiversity, climate change and the co-production of knowledge. These are also at the core of the Arctic Council's CAFF Working Group.

THREE CENTRAL PRIORITIES

A key CAFF priority during Finland´s chairship is the new Action Plan for Arctic Biodiversity 2023–2030, which will provide a framework for cooperation on biodiversity conservation. It will offer a fuller picture of the state of Arctic biodiversity, its resilience to climate change and the state of its conservation in the global context. The action plan will link to the new Global Biodiversity Framework (currently being developed), the UN Sustainable Development Goals and the Arctic Council´s strategic plan for 2021 to 2030.

A second priority for Finland's CAFF chairship is to address the ecological, social and cultural effects of the climate crisis through a project focusing on the impacts on Arctic ecosystems and associated climate feedbacks—a collaboration between CAFF and the Arctic Council's Arctic Monitoring and Assessment Programme Working Group. This project aims to combine knowledge systems to assess how climate change affects Arctic ecosystems and related feedbacks and to inform strategies for adaptation and resilience.

The third priority is the co-creation and communication of Arctic biodiversity conservation. CAFF is arranging calls and workshops to facilitate meaningful engagement of Arctic Council Permanent Participants and offering training on Indigenous knowledge and co-production of knowledge.

CAFF's focus on youth is part of its co-creation and communication priority: CAFF has a Youth Advisory Committee, is implementing a Youth Engagement Strategy, and provides youth fellowships and internships. As well, the Finnish CAFF chairship plans to launch a writing competition for Arctic youth, conduct video interviews with school children to learn about their views, concerns and wishes for Arctic biodiversity, and provide learning materials about Arctic biodiversity. We will also plan the next Arctic Youth Summit.

During the Finnish CAFF chairship, most board meetings will take place in the Saami homeland in close collaboration with local communities. CAFF will also train journalists on Arctic biodiversity issues and produce a video series about Arctic biodiversity. The next Arctic Biodiversity Congress, scheduled for 2023 in Russia, will be an important forum for communicating the Actions for Arctic Biodiversity and other Arctic biodiversity topics.

Through collaboration and co-creation of conservation, we can achieve a just transition and biodiversity-respectful leadership, drawing a clear line from policy and economics to consumer choices. This transition is needed because the limits of the Earth are not negotiable. Ecological sustainability should not be viewed as parallel to the other dimensions of sustainability, but rather as the very basis of them. ○

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The Russian Arctic Council chairship

Advancing conservation and protecting biodiversity in the Russian Arctic

The global pandemic has made it clearer than ever that nature underpins our society, economy, health and well-being—and that we need to transform our relationship with it. VICTORIA ELIAS explains how the Russian chairship of the Arctic Council can advance conservation in the region.

ICELAND HANDED the Arctic Council chairship torch to Russia in May 2021, the second year of the pandemic. The chairship began at a critical moment of overlapping danger and opportunity: the danger of a global health challenge, economic recession and growing political tensions and instability, and the opportunity to analyze what needs to be fixed, learn important lessons and set new frameworks for sustainable development and well-being.

Ultimately, the Council's aim is to conserve fragile Arctic ecosystems and support Arctic people. But to make a green recovery from the COVID-19 pandemic and take the next steps for Arctic ecosystems conservation, we need smart, strategic approaches, and we must engage all players in the process.

The Arctic is one of the world's most rapidly changing regions, suffering from amplified climate change effects while also trying to cope with a growing global rush for resources, new routes, attractions and opportunities. It needs wise and careful, balanced and visionary stewardship that includes policies and commitments to advance its sustainable development, shield its ecosystems, dramatically reduce growing pressures and support and sustain its communities.

PRIORITIES FOR THE CHAIRSHIP

The programme of the Russian chairship from 2021 to 2023 is built on four main pillars: people, including Indigenous Peoples; environmental protection, including climate change; socio-economic development; and strengthening of the Arctic Council. Achieving practical outcomes and delivering measurable results to ensure the conservation of Arctic ecosystems and biodiversity will require persistent attention to all four areas.

A window of opportunity is opening now with the Russian chairship's plans to strengthen marine cooperation in the region. Wildlife do not recognize borders. Decision-makers, practitioners and Arctic peoples must support a comprehensive, science-based approach to conservation planning and implementation on a circumpolar scale to achieve real results now and ensure the resilience of Arctic nature into the future.

VICTORIA ELIAS is the conservation director for WWF–Russia and chair of the WWF Arctic Programme Steering Committee.

ArcNet, an Arctic Ocean network of Priority Areas for Conservation, represents such an approach, and has been gaining attention recently, including through the support of the Russian chairship. Implementing ArcNet will require coordinated action across ➤

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the region. Appropriate management regimes can and should be identified and established for the priority conservation areas that have been mapped by experts for the whole Arctic.

COORDINATED MEASURES NEEDED

Beyond the important and timely designation of marine protected areas, this work should include the creation of specific seasonal and spatial regulations for wildlife breeding and feeding areas, shipping speed control zones, special priority ecosystems management regimes and voluntary business commitments and actions, among other effective area-based conservation measures. For example, whitefish fisheries in Russia's Barents Sea have voluntarily committed to avoid disturbing vulnerable and sensitive ocean-bottom habitats during their trawling operations to conserve priority ecosystems.

Measures like these should be coordinated across sectors and throughout the Arctic. The chairship has called for the development of a marine spatial planning approach to ensure well-coordinated results. This is resonating well with the approach that WWF–Russia has been promoting for many years in the Russian Arctic and which has been successfully implemented in the Baltic and several other regions of the world. Balancing interests and coordinating the actions of stakeholders and interested parties—while ensuring that priority conservation areas are protected—can offer a way forward in the rapidly developing and changing Arctic.

The Arctic Council Russian chairship views WWF as a strategic partner in this endeavour. We look forward to achieving ambitious results if the chairship and members can provide frameworks for coordinated approaches, seek solutions for advancing governance and stewardship, and jointly and individually care for the unique and fragile diversity of life at all levels in the coming years. Together, we can ensure the recovery, survival and prosperity of the fragile and beautiful Arctic. ○

Protecting the Pribilof Islands

The future of the Bering Sea

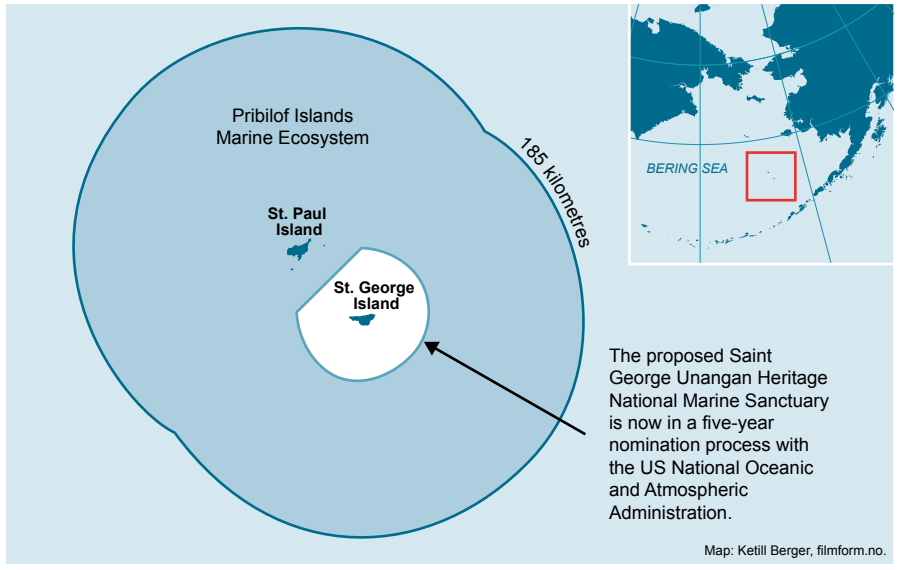
The Bering Sea is one of the world's most important ecosystems. With its critical socio-environmental, economic and cultural values, it is also a bellwether of Arctic change. LAUREN DIVINE describes the rapid transformations that are taking place in the ecosystem of the Indigenous Unangax̂ (Aleut) communities of St. Paul and St. George—the islands comprising the Pribilof Islands in Alaska's Bering Sea—and how local, traditional and Indigenous knowledge and tribal-led management are addressing them.

THE CHANGES NOW happening in the Pribilof Islands are taking a toll on wildlife, human and ecosystem health, local economies and cultures, with alarming declines of fur seals, sea lions, seabirds, fish and invertebrates. The decline in laaqudan (northern fur seals) is a particularly acute example. Our communities depend on these seals, but their population has diminished to less than a quarter of their historical peak of about 2.1 million.

These changes are compounded by large-scale commercial fisheries and the residual impacts of over-exploitation of marine resources. To respond to these impacts, our communities pursued area-based conservation that centre on Indigenous values to preserve the area's long-term integrated ecosystem.

PROTECTIVE CIRCLES

There is no question that the Pribilof Islands are part of an ecologically, socio-economically and culturally significant area that warrants a protective designation and inclusive management approach. In 2017, the City of St. George showed incredible foresight and leadership when it successfully nominated a 50 kilometre circle around most of the island (37 kilometres north toward St.



The proposed Saint George Unangan Heritage National Marine Sanctuary is now in a five-year nomination process with the US National Oceanic and Atmospheric Administration.

Map: Ketill Berger, filmform.no.

depends on tribal-led management

Fur seals on St. Paul Island.

Photo: Allen Shimada NOAA NMFS/OST/AMD.

Paul Island) to the US National Marine Sanctuaries inventory.

Expanding on this effort, the Aleut Community of St. Paul Island Tribal Government began to synthesize western science with traditional, Indigenous and local knowledge to refine an area that would encompass the needs of an ecosystem that is critical to the area's communities, marine mammals, seabirds and other species. This region, called the Pribilof Islands Marine Ecosystem, extends about 185 kilometres around both of the inhabited Pribilof Islands. Our vision is to designate a co-managed marine area that will address our conservation concerns, provide continued fishing opportunities and ensure the sustainability of our local economies.

There are many Indigenous-led conservation efforts across the globe that we can look to for guidance in creating successful co-management frameworks. They facilitate approaches that are more culturally and ecologically appropriate and have successfully incorporated diverse kinds of knowledge (such as place-based and experiential knowledge) into science-based resource management decisions.

DRAWING ON INDIGENOUS VALUES

Now more than ever, we see the ability to come together with the federal government, affected industries and other stakeholders to achieve shared conservation and economic resilience goals for our marine ecosystem. The communities have concluded that the best existing method or tool for this effort is a National Marine Sanctuary designation because it provides additional potential strategies for the islands that fall within the larger ecosystem, such as the creation of cultural heritage and subsistence use areas.

The incredibly productive Bering Sea ecosystem has sustained Indigenous Peoples, marine mammals, seabirds, fish and invertebrates for millennia. Indigenous values, rooted in thousands of years of traditional and Indigenous knowledge, are inherently adaptable, dynamic and designed to preserve long-term ecosystem health. Through tribal-led stewardship of our marine ecosystem, our communities will continue to draw on these values to anticipate and manage the future use of the Bering Sea sustainably. ○

LAUREN DIVINE is a marine biologist and director of the Ecosystem Conservation Office for the Aleut Community of St. Paul Island Tribal Government.

Pod of gray whales. Santa Catalina Island, California, US. Gray whales migrate north to the Chukchi Sea for summer.

Photo: Wayne Perryman NMFS/SWFSC/PRD, NOAA Fisheries

Marine pathways

Safeguarding marine mammals who spend time in the Arctic

From the elusive narwhal to the charismatic walrus, the Arctic is home to marine mammals found nowhere else on Earth. It's also a summer gathering place for tens of thousands of whales that make epic migrations from southern locations to feed in the Arctic's highly productive waters. But as MELANIE LANCASTER and BEN SULLENDER explain, Arctic whales and seasonal visitors to the Arctic face growing threats on their journeys.

MELANIE LANCASTER is a senior specialist in Arctic species with the WWF Arctic Programme.

BEN SULLENDER is a spatial ecologist and freelance conservation contractor.

EVERY WINTER, PACIFIC gray whales—champion swimmers who hold the record for the longest known mammal migrations on the planet—give birth to calves in the sheltered lagoons of Mexico. In spring, they swim some 11,000 kilometres north to their summer feeding hotspots in the Chukchi Sea. In autumn, they head south again to repeat the journey in reverse.

Just as Arctic marine mammals need protection in their icy habitats, those whose migrations bring them to the Arctic need to be safeguarded throughout their long journeys. The International Union for Conservation of Nature recognizes the need to protect the habitats and corridors that whales and other marine mammals rely on. But how exactly to do this is a new conservation challenge, particularly in the Arctic—and unfortunately, many of the corridors the whales rely on are poised for significant growth in shipping traffic.

FOLLOWING ENVIRONMENTAL CUES

While there are still many gaps in what we know about the timing and pathways of migration for Arctic marine mammals, we do know that whales and walrus migrate according to environmental cues that are at least partly related to sea ice. For example, narwhal in Eastern Canada swim 2,000 kilometres on return trips between their summer and winter habitats. They closely follow the retreat and advance of the ice edge to stay in the shelter of the sea ice, likely

to avoid predation by killer whales.

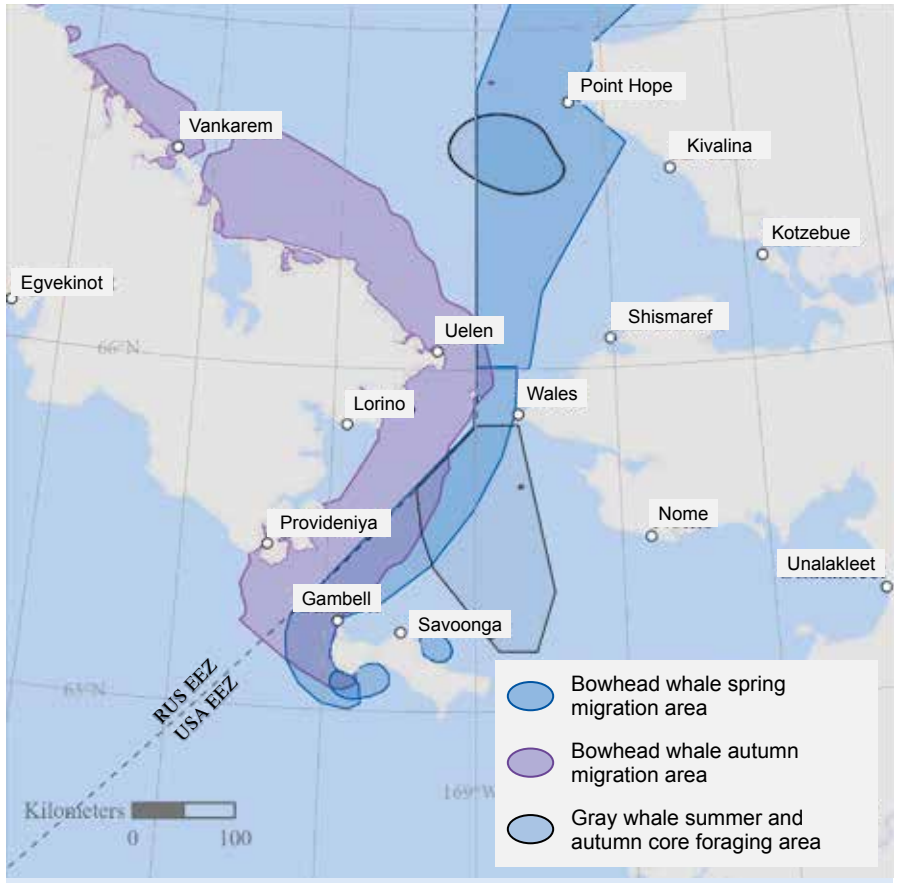
As Arctic sea ice melts, some species are shifting the timing of their migrations. For example, in 2018, for possibly the first time ever, bowhead whales in Alaska halted their autumn migration early, remaining north of the Bering Strait all winter.

As animals try to adapt to their changing surroundings, we need innovative, dynamic measures that will give them the best chance of success. Measures to safeguard marine mammals as they migrate should be flexible in space and time. They could include rules such as seasonal fisheries closures, ship speed reductions, or vessel rerouting. The effectiveness of these measures can be greatly improved by local monitoring, better communication, knowledge-sharing and cooperation between national governments.

INTEGRATING INDIGENOUS KNOWLEDGE

There is also great potential for Indigenous and local knowledge to be applied alongside western science to inform many aspects of migration. For example, the timing of spring migrations for many Arctic whale populations is a critical knowledge gap not easily filled by GPS tracking studies—but many coastal communities have been carefully observing these migrations for generations.

For migratory species, "home" is many different places. Each year, the Chukchi—the Indigenous Peoples living in Siberia's Chukchi peninsula—celebrate the return of the gray whales to the Russian Arctic. When those same whales arrive in Mexico, they are celebrated with an International Whale Festival. All along their journeys, the whales are enjoyed by whale watchers on the Pacific coast. The world has a shared responsibility to safeguard these whales and other migratory species at every step of their journeys, from the equator to the Arctic. ○



Map: Citta et al. 2015, Progress in Oceanography; Clarke et al. 2015, Aquatic Mammals; Clarke et al. 2019, OCS Study BOEM 2019-021.

Making the Bering Strait safer

The Bering Strait is a critical bottleneck in Arctic migration for a wide range of species. This narrow corridor, spanning about 80 kilometres, is the sole link between the Pacific and Arctic oceans.

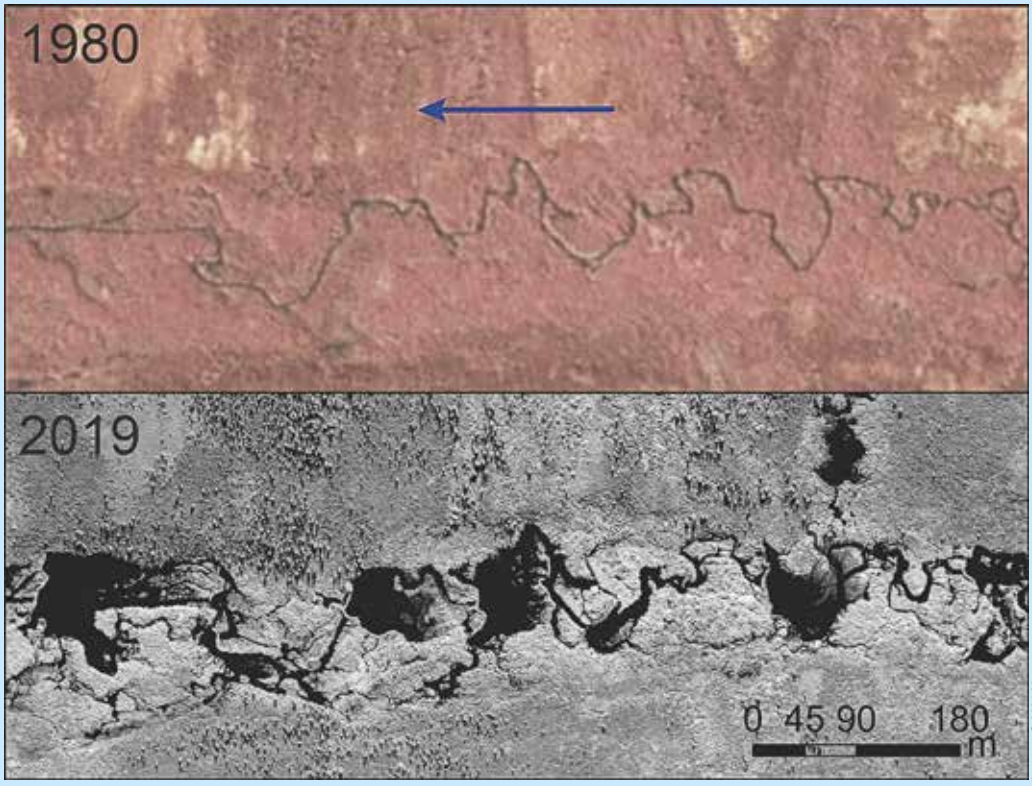
Every spring, more than 15,000 bowhead whales follow openings in the sea ice north to access summer foraging habitat. They are usually followed by tens of thousands of beluga whales. Gray whales typically arrive a bit later and forage near the Bering Strait. In the summer and autumn, walrus and southbound whales pause to feed, primarily using waters in the Russian portion of the strait.

Historically, sea ice expanded south to cover much of the Bering Sea in the autumn as sunlight and temperatures decreased. But dramatic reductions in the extent and duration of the ice have attracted a new variety of marine giant: large tankers and cargo ships. More than 500 large vessels transited the strait in 2020, up from about 150 in 2004. This number is expected to grow, exposing migratory marine wildlife to a host of impacts—from underwater noise to pollution to lethal injuries after collisions with ships.

WWF is working to ensure safer shipping in the Bering Strait. In 2018, a network of internationally recognized shipping routes was established to direct vessels away from important ecological areas, and conservation efforts are underway to further safeguard this irreplaceable region.

THE PICTURE

Changing landscape, changing biodiversity



Shown side by side, these satellite images of Alaska show how beaver dams are changing the Arctic landscape by creating beaver ponds in tundra streams.