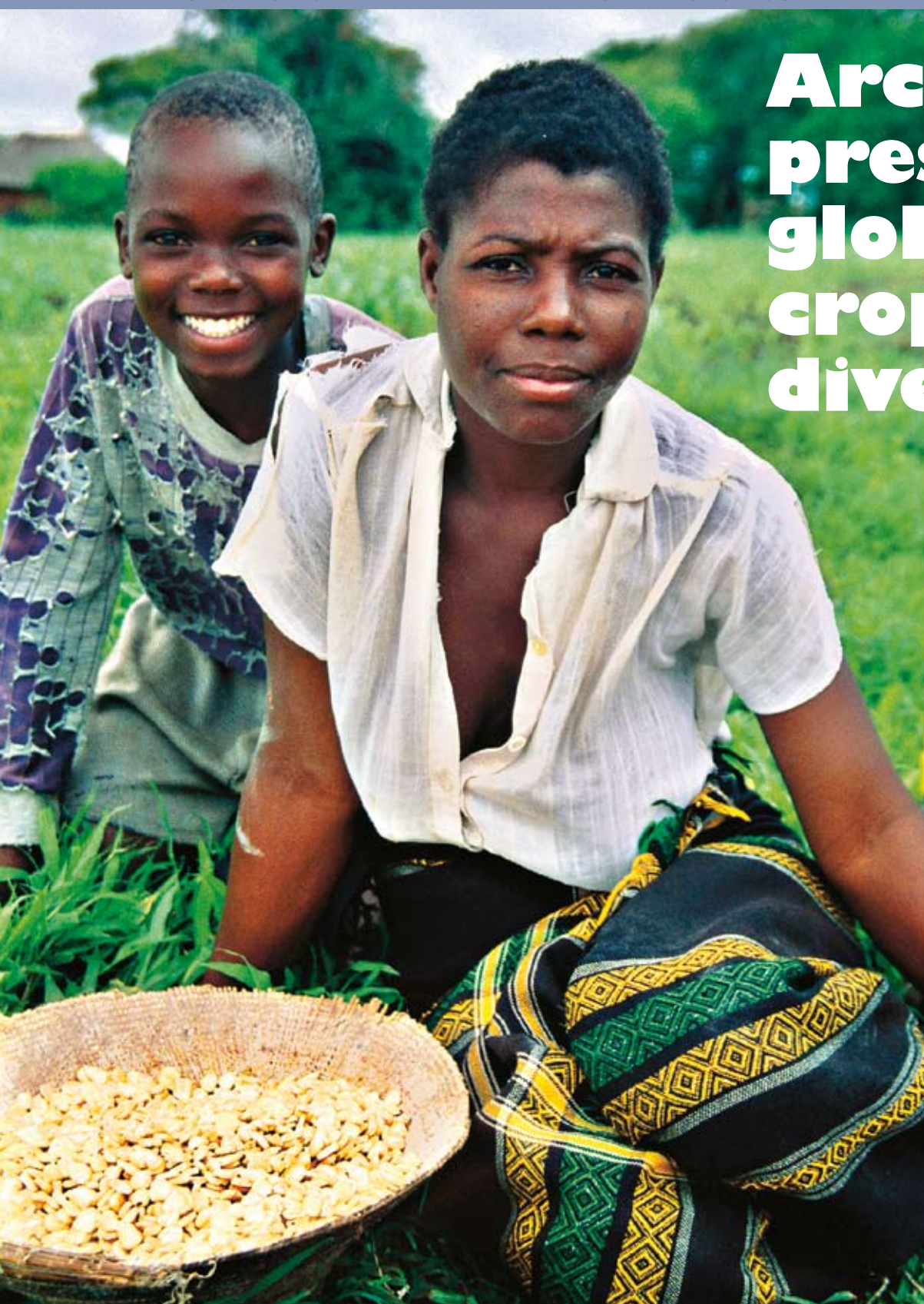




Arctic Bulletin



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Arctic preserves global crop biodiversity

p. 11-13

New hope for polar bears? p. 5

Plans to survey North Pole ice cap p. 9

Climate change & arctic shipping p. 18

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Cover: Maize seeds prior to planting. Photo from a WWF project in Mazabuka, Zambia. Maize is among the seeds stored at the Svalbard Global Seed Vault in Norway.
Photo: WWF-Canon/Sarah Black

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Editorial

Agents for change

The spring melt is already well underway in the Arctic, a theme reflected yet again in this issue of the Arctic Bulletin: the extraordinary impact of climate change on the suite of ecosystems at the top of the world. WWF is becoming increasingly concerned that these impacts threaten not just the Arctic but the entire global system.

How can we say this? Earlier this month we published a new peer-reviewed assessment called *Arctic Climate Impact Science – An Update Since ACIA*, and released it at the Arctic Council Senior Arctic Officials meeting. It represents the most wide-ranging review of arctic climate impact science since the Arctic Climate Impact Assessment was published in 2005. The report is available from our website: www.panda.org/arctic.

The new study found that change was occurring in all arctic systems, impacting on the atmosphere and oceans, sea ice and ice sheets, snow and permafrost, as well as species and populations, food webs, ecosystems and human societies. One factor is particularly worrying: the world's best arctic science lags behind the actual recent arctic changes that have occurred. This is extremely dangerous as some of these arctic changes have the potential to substantially warm the earth beyond current forecasts by modellers. That is because current climate models don't adequately incorporate the important underlying drivers of the arctic changes we are already observing, such as the interaction between sea ice thickness and water temperature.

A powerful agent for policy change, the report is now in the hands of the Arctic Council and the arctic governments. It is not too late for them to act: it is just way too late for business as usual.

Melting of arctic sea ice and the Greenland Ice Sheet has severely accelerated, now even prompting the expert scientists to discuss whether both may be close to their "tipping point" (the point where, because of climate change, natural systems may experience sudden, rapid and possibly irreversible change).

The loss of summer arctic sea ice in particular has increased dramatically, with record lows reached in September 2007 when the sea ice shrank to 39 percent below its 1979-2000 mean. That's the lowest since satellite monitoring began in 1979 and also the lowest for the entire 20th century based on monitoring from ships and aircraft. This winter, we saw perennial sea ice – the older sea ice that lasts for several years – continue its sharp decline (see "Arctic sea ice still at risk despite cold winter," page 8). In Greenland, the rapid melting has generated a moving call to action by a group of

motivated students who are determined to make a difference (see article on page 8).

Further youth-driven, climate-change advocacy is planned for June when students from Canada, Germany, the Netherlands, Norway, Russia, Sweden, the UK, Japan, and the United States will join WWF on the 'Voyage for the Future.' This initiative involves a cruise to the Arctic where the young people will become 'Ambassadors of Change' – effective advocates for climate change action. Each of the students will document their experiences through weblogs, photos and videos which will be posted on www.panda.org/arctic. Once back home they will work with WWF to reach out to the media and national policymakers to deliver the message for urgent action on this issue. We expect these outstanding young people will become fresh new voices and ambassadors for global climate change – the 'Voyage for the Future'.

Beyond deploying advocacy as a policy-changing agent, we are also seeking to answer some of the fundamental questions about arctic change such as how quickly the arctic sea ice is decreasing. In spring 2009, we hope to undertake a ground-breaking venture – The Arctic Survey – which aims to measure the thickness of the arctic sea ice cap along a complete traverse from Point Barrow, Alaska to the North Pole and beyond (see article on page 11). It is the first detailed mapping of the sea ice with state-of-the-art impulse radar technology. Satellites and submarines currently provide the scientific community with such data, but this is respectively imprecise (10km pixels are commonly used) and patchy, and critically, neither method can distinguish between the snow layer and the sea ice beneath.

By working with the scientific community, the Arctic Survey will significantly improve the accuracy and reliability of computer models forecasting the timing of the ice cap's disappearance, and the associated impacts on the global climate. It will form an essential part of WWF's work to protect the Arctic, raising awareness around the world about the plight of the Arctic, the impact of climate change, and the need to secure radical CO₂ emission reductions. We are looking for significant sponsors to support this critical but expensive endeavour – please contact me if you are interested.



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INUPIAT LEADER CONCERNED ABOUT CHUKCHI SEA

The recent US sale of oil and gas leases in the Chukchi Sea off of Alaska's northwest coast worries the Inupiat people who have lived in the region for centuries. Jack Schaefer, president of the Inupiat village of Point Hope, expressed his concerns: "We want to continue to survive. Our lives are tied to subsistence. So is our culture and our religion with all the animals. We don't have anything to replace that with. The high unemployment rate here will continue even if there is offshore oil and gas development since there will only be a few jobs that will be available." (Source: Reuters)

CANADIAN PROVINCES TAKE ACTION TO PROTECT POLAR BEARS

Manitoba has joined a growing list of government bodies that have recognised polar bears as threatened. In February, the Canadian province upgraded the status of polar bears from "of concern" to "threatened" under its regional Endangered Species Act. Under the new designation, polar bears in Manitoba will have special protection including restrictions on how close people can approach bears and limited development near critical habitats along the Hudson Bay coastline. The province will also increase research and study of the bears and climate change. Ontario and Newfoundland have already listed polar bears as endangered. (Source: WWF Bering Sea and Kamchatka Program)

PERMAFROST "WILD CARD" IN GLOBAL WARMING

The threat of arctic permafrost thawing is a "wild card" with potential to accelerate global warming by releasing greenhouse gases frozen in the soil, according to the UN Environment Programme (UNEP). More research is urgently needed to determine the probability and consequences of methane gas emissions from permafrost thawing. UNEP said in its Year Book 2008. Current annual global methane emissions from all sources are estimated at 500–600 million tonnes, with one-quarter to one-third of this coming from arctic soils. Arctic methane emissions are projected to at least double during the 21st century, said the UNEP report. (Source: www.unep.org)

Pacific walrus under stress in the

Coastal resting sites (or "haul-outs") on the Arctic coast of Chukotka, Russia, have become very important for the Pacific walrus population. For example, last year for the first time ever around 40,000 walrus occupied a haul-out on the Chukchi Sea coast near the village of Ryrkaypiy. Although survey data are lacking, about half of the Pacific walrus population is estimated to have inhabited coastal haul-outs between Cape Kozhevnikov and Kolyuchin Island in 2007.

This relatively new phenomenon is due to global warming. Pacific walrus spend winter in the Bering Strait. In spring, they follow the retreating sea ice and migrate northwards into their summer feeding grounds in the Chukchi Sea. At the end of summer, the walrus start their autumn migration back to the Bering Strait.

Until the mid-1990s, the walrus fed in a wide



Pacific walrus. Koyevnikov Cape, Chukchi Sea region, Russian Federation.

and comparatively shallow area of the Chukchi Sea during summer, using the scattered sea ice as resting platforms, or haul-outs. However, the shallow areas of the sea are now totally ice-free in summer, and the ice

edge has retreated to deep water. Walrus following the rapidly retreating sea ice now end up in areas where they cannot normally feed because the water depth exceeds their diving abilities.

US admits polar bears threa

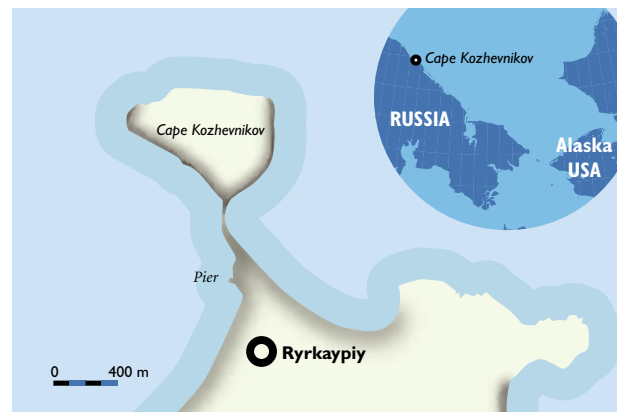


Chukchi Sea



Photo: WWF-Russia / Vlad KAVRY

The only reprieve for walrus is to form coastal haul-outs. However, this leads to higher mortality rates. In December 2007, for example, the WWF Polar Bear Patrol found 1,000 dead walrus during



Map: Katil Berger Film & Form

its inspection of about 350 kilometres of the arctic coast of Chukotka between Cape Shmidt on the west and Kolyuchinskaya Inlet on the east (see "The future is already here", page 16–17).

There are two main causes of this increased mortality. First, the long swim through rough, ice-free seas to the coast is exhausting for the walrus, leading to the death of many young, old, and sick animals. Second, the coastal haul-outs are extremely crowded, which affects mortality in several ways. For example, the increased population density compared to sea ice haul-outs leads to increased competition for food resources. It also

provides favorable conditions for infections. In addition, unlike on sea ice, some walrus in coastal haul-outs occupy slopes above others in a "layering" effect (see photo), which exacerbates mortality during panics.

Given their importance to Pacific walrus, urgent measures are required to study and protect haul-outs on the arctic coast of Chukotka.

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US MOVES TO PROTECT WORLD'S MOST ENDANGERED WHALE

The US government has formally declared the North Pacific Right Whale "endangered" under the federal Endangered Species Act. Perhaps fewer than 50 individuals remain in a population that visits the Bering Sea each summer to feed. The species was previously listed in the Endangered Species Act under older taxonomy that regarded North Atlantic and North Pacific Right Whales as a single species. Separate listing of the North Pacific Right Whale significantly increases its legal protection and triggers requirements to prepare a recovery plan and take other actions to better protect the species and its habitat. (Source: www.biologicaldiversity.org)

CLIMATE CHANGE AND FISHERIES MANAGEMENT

In April, fisheries and climate change experts gathered in Bergen, Norway for a conference about how northern marine ecosystems may be affected by global warming. Among the topics discussed were how climate change may impact marine biological productivity, fish stock distribution, and the political and social consequences of these changes. "Changes in fish stocks' migration patterns are likely to become a major fisheries-policy issue," predicted Helga Pedersen, the Norwegian Minister of Fisheries and Coastal Affairs. Climate change will likely result in the need to revise current international agreements about the geographic distribution of fishery rights. (Source: Nordic News Weekly)

NEW GLOBAL MAP SHOWS HUMAN TOLL ON SEAS

Scientists have produced the first global-scale map of human influences on marine ecosystems. By overlaying maps of activities such as fishing, climate change, and pollution, the researchers produced a composite map showing more than 40 percent of the world's oceans are heavily affected by human activities. "Unfortunately, as polar ice sheets disappear with warming global climate and human activities spread into these areas, there is a great risk of rapid degradation of these relatively pristine ecosystems," said Carrie Kappel, a scientist involved in producing the map. (Source: University of California, Santa Barbara)

tened



Photo: Erik Malm

The United States government has bowed to the weight of scientific evidence and listed the polar bear as 'threatened' under its Endangered Species Act. The news broke as WWF polar bear experts were meeting in Washington to develop a strategy for conserving the bears. Geoffrey York, coordinator of WWF's Polar Bear conservation program cautiously welcomed the US move. "A threatened species designation should provide additional legal protections for the bears, but the US government made it clear that it would continue to support what it called 'vital energy production in Alaska.'"

The US government also took pains to distance itself from the necessary climate change actions required to

conserve the Arctic ice, the critical habitat for the polar bear. York says the crisis in polar bear habitat is underscored by his recent fieldwork. "In the ten years since I have studied polar bears I have never seen such poor sea ice conditions."

The listing provides an opportunity for action on conserving the polar bear in the American Arctic, an opportunity it should not undermine. It also provides a strong example to other countries, such as Canada, that have not yet added the species to their lists of threatened animals.

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StatoilHydro's lack of vision

Rasmus Hansson, CEO of WWF-Norway, argues that Norway's oil company should abandon its push to further exploit oil and gas resources in the Arctic, and instead focus on new energy sources.

In a short time span, Norway's oil company StatoilHydro has damaged its reputation considerably. The company has plunged into tar sand investments in Canada and oil leases in ice-covered areas off Alaska. In December, the second-largest oil spill in Norway's history occurred at one of StatoilHydro's platforms in the North Sea.

With the 2007 merger between Statoil and the oil and gas division of the industrial conglomerate Hydro, the new company ranks as the world's tenth-largest petroleum company. The Norwegian government holds 62.5 percent of the shares.

StatoilHydro should use its money, technology, and brightest minds to develop new energy resources. However, its efforts in renewable energy are so far dwarfed by investments in other forms of "alternative" energy. Even before the merger, last April Statoil entered into tar sand production in Alberta, Canada. The initial US\$2.3 billion (€1.5 billion) investment will be followed by further, much larger investments into a sector with highly negative impacts on global CO₂ emissions.

In its core offshore business, StatoilHydro's current strategy is to push for access to even the most ecologically valuable and sensitive areas in the Arctic. In February, the

company bought 16 leases in the Chukchi Sea off Alaska (see "Chukchi Sea oil lease sale goes ahead", below), a key polar bear habitat and an area where ice conditions leave little chance for oil spill response (see www.panda.org/arctic/publications/oilspillresponse).

At home, StatoilHydro's CEO Helge Lund is putting the company's full political and economic weight behind an outrageous demand for licenses in extremely valuable marine areas off the Lofoten and Vesteraalen islands, north of the Polar Circle. Mr Lund's claims of very

high environmental and safety standards are not supported by StatoilHydro's recent track record. For instance, The Petroleum Safety Authority Norway recently revealed severe violations of safety and environmental rules at the Statfjord A platform where 4,000 metric tonnes of crude oil spilled into the North Sea in December 2007.

Environmentalists are no longer alone in asking whether StatoilHydro and other petroleum companies really are ready for the long-announced run for the Arctic. Clearly, the future belongs to energy companies pursuing a strategy for renewable resources, not those who enter into high-risk gambling with the world's last wilderness.

The future belongs to energy companies pursuing a strategy for renewable resources

Store Norske Spitsbergen Kullkompani (SNSK), the Norwegian mining company on Svalbard, has announced plans to open a new coal mine on the arctic archipelago. In 2001, the Norwegian Parliament agreed to permanent mining on Svalbard. Today, the main operation is located in Svea, about 60 km from Longyearbyen. The new mine is at Lunckefjellet, just next to Reindalen national park. The project is disputed and has drawn sharp criticism from WWF about interference with the untouched environment, such as the fact that the mine requires a road to be built across a glacier.

2007 was the most productive year in SNSK's history, and this



Svea mine, Svalbard

Chukchi Sea oil

On February 6, the US Minerals Management Service's (MMS) Lease Sale 193 in Alaska went ahead, opening around 121,405 square kilometers of the pristine Chukchi Sea to oil and gas activities. Before the sale, the US Fish and Wildlife Service (FWS) missed a legally required deadline for making its final decision on whether to list polar bears as "threatened" or "endangered" under the US Endangered Species Act (ESA).

Polar bear populations are predicted to decline significantly as a result of the impacts of global warming on the bear's habitat in

year may set another profit record. In 2006, coal production was 3.6 million tons. The new mine at Lunckefjellet could potentially hold 10 million tons of coal, and at the current production speed it would be empty in less than four years. It will cost an estimated US\$130 million and release nearly 40 million tons of CO₂.

WWF urges the Norwegian Government to stop these expansion plans. "This is total madness," said Rasmus Hansson, WWF-Norway's CEO. "Representatives of the Norwegian Government travel around the world urging other countries to step down their coal production, and at the same time they want to continue Norwegian coal production".

It is time to phase out coal production on Svalbard. The Svea mine will not produce for many years, and even with the new mine at Lunckefjellet, Svalbard contains limited coal resources. "There is no sense in pushing for such large investments knowing that the mine will be empty after just a few years," Hansson says. "The mine is likely to generate CO₂ equal to two thirds of Norway's annual emissions."

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Norway increases coal production on Svalbard

lease sale goes ahead

the Chukchi Sea and across the Arctic. As a result of FWS' delay, the Chukchi Sea lease sale took place before the ESA listing decision, allowing MMS to sell off polar bear habitat to the oil and gas industry without needing to adhere to protection obligations under the ESA.

A coalition of environmental groups condemned the sale. "Selling off our natural heritage to the highest bidder is a sad spectacle and represents a step backwards in our efforts to save the irreplaceable Arctic and the magnificent polar bears for future generations," said

Carter Roberts, President and CEO of WWF-US.

"According to the final environmental impact statement for Lease Sale 193, MMS estimates a 40 percent chance of a major crude oil spill," said Pamela Miller of Northern Alaska Environmental Center.

"The decision to allow drilling in the Chukchi Sea makes a mockery of the interagency consultation and oversight that is supposed to take place when it comes to managing our public lands and waters," said Trish Rolfe, Alaska Representative for the Sierra Club.

"We already know the future

of the polar bear in the Arctic is tenuous due to global warming," said Margaret Williams, Director of the WWF Bering Sea Program. "Allowing this lease sale to go forward without having proper protection in place for polar bears is extremely irresponsible. The technology to effectively contain and clean up oil spills does not currently exist, so this oil lease is a disaster waiting to happen."

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Climate change threatens arctic

A new report from the United Nations Environment Programme (UNEP) describes the multiple dangers that global warming poses to arctic fisheries. The rapid response report, *In Dead Water*, maps the merged impacts of climate change with pollution, invasive species, and over-exploitation on the world's fishing grounds.

The Arctic is one of the world's most productive fishing grounds, supplying millions of tonnes of whitefish each year. The health of these fisheries depends in part on natural ocean pumps that circulate

water, bringing nutrients to fisheries and keeping them healthy by flushing out waste and pollution. According to the UNEP report, global warming could disrupt this natural pumping system, leading to serious impacts on at least three-quarters of the world's key fishing grounds, including those in the Arctic.

The report also explains that as atmospheric CO₂ concentrations increase, so does ocean assimilation of CO₂, resulting in sea water becoming more acidic. This will likely lead to a reduction in the area covered by arctic cold-water coral

reefs, and possibly to their complete disappearance. As these reefs serve as important fish spawning and nursery grounds, any loss could affect fisheries. Ocean acidification will also reduce the biocalcification of other shell-forming organisms, which may in turn impact the marine food chain, and hence fisheries.

Another threat comes from invasive marine species. The report finds that the major pathways and origins of invasive or exotic species infestations in the marine environment are strikingly concurrent with major shipping routes. This means that

Arctic sea ice still at risk despite cold winter

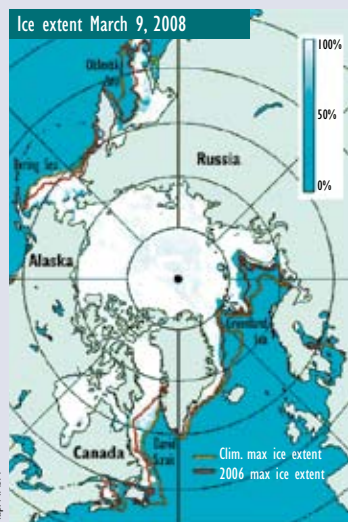
The latest satellite observations indicate that the Arctic is still on "thin ice" when it comes to sea ice cover. A colder-than-average winter in some arctic regions this year led to an increase in the area of new sea ice. However, the extent of older sea ice that lasts for several years (perennial sea ice) continued to decline, reflecting the longer-term trend caused by global warming.

In March, NASA, NOAA and US Defense Department satellites showed the maximum sea

ice extent slightly increased this year by 3.9 percent over that of the previous three years. However, this maximum extent it is still 2.2 percent below the long-term average. Increases in ice extent occurred in areas where surface temperatures were colder than the historical averages.

At the same time, the area of perennial ice decreased to an all-time minimum, due to increased melting of sea ice during summer and greater movement of older ice out of the Arctic. According to NASA, perennial ice used to cover 50–60 percent of the Arctic; however this year it covers less than 30 percent. Very old ice that remains for at least six years comprised over 20 percent of the Arctic area in the mid- to late-1980s, but this winter it decreased to just 6 percent. With perennial ice becoming younger, and therefore thinner, it is more vulnerable during the summer melt period.

Source: NASA



Greenlandic youth send str



Photo: Anders Rosenberg, India Film

The future of Greenland for its youth was a hot topic at a recent international conference on climate change and sustainability held in the village of Narsaq, Greenland. In a special Earth Day message on April 22, a group of students participating in the conference expressed their concerns about the lack of transparency and access to information provided by their government.

Global warming impacts are visible across Greenland. Massive

icebergs are launched into deep fjords by melting glaciers, and huge lakes of melt-water on the island's kilometre-thick ice cap suddenly disappear into gaping holes formed in the ice. Greenland is in transition due to climate change, but also due to a growing independence from its old colonial power, Denmark. With independence comes opportunities for stronger local involvement in decision-making. From atop a melting ice floe, the students launched a 'Messenger Kayak'

fisheries

as melting sea ice opens summer shipping lanes across the Arctic, a surge in shipping traffic could lead to more invasive species introduced through ship ballast water.

According to the report, urgent efforts to control global warming are needed, but this alone will not be sufficient. It calls for integrated ocean management including stronger regulation of fisheries, protecting the continental shelves from bottom trawling and other extractive activities, establishing marine protected areas in deeper waters, and reducing coastal pollution.

Source: www.unep.org

long message

directed towards the politicians in the capital of Nuuk:

"We the youth of Greenland are willing to take responsibility for our impact on Earth. We now look towards our leaders in Nuuk to show such responsibility in an open and transparent way at a national level, and to our world leaders for leadership in addressing climate change and pollution, which so dramatically are affecting our homeland from far away."

One example the students mentioned is the recent decision to allow Alcoa, one of the world's largest aluminum companies, to build a huge smelter in north-western Greenland. The attraction for Alcoa is cheap hydroelectric power and few environmental and social regulations and demands.

"The issue of climate change is bringing awareness to our country. We want to translate that into action on the ground, starting with the issues that are close to home. If Greenland is to be an independent democracy, then there must be ways for the voices of the country's youth to be heard up in the capital," said one of the student activists.

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First detailed mapping of North Pole ice cap



Map: John Plummer/Arctic Survey 2008

WWF has entered into an ambitious research partnership that will use new tools and knowledge to develop a three-dimensional understanding of a key climate issue – the speed and extent of polar ice loss. The Arctic Survey team will cross the ice from Alaska to Svalbard via the North Pole and, by distinguishing between ice and snow, provide a more accurate picture of sea ice loss. WWF's partners for the survey include NASA, the European Space Agency, the US Navy, the University of Cambridge and the UK Met Office.

The Arctic Survey will perform the first-ever detailed mapping of the thickness of the North Pole ice cap using state-of-the-art impulse radar technology. Satellites and submarines currently provide the scientific community with such data, but they are imprecise and patchy, respectively. Neither method can distinguish between the snow layer and the sea ice beneath, which is critical to advancing our knowledge of climate change. The survey will significantly improve the accuracy and reliability of computer models forecasting the timing of the ice cap's disappearance, and the associated impacts on the global climate.

The expedition will take place between February and June 2009 and will consist of a small team of extremely experienced polar explorers, led by renowned explorer Pen Hadow. The team will be travelling on foot, swimming across areas of open water where necessary, and hauling sledges across 2,000 kilometres of shifting sea ice for over 100 days in temperatures down to -50°C.

The Arctic Survey complements WWF's goal to raise awareness about the impact of climate change and to secure radical CO2 emission reductions to prevent an arctic meltdown. Both the Arctic Survey team and WWF are currently searching for donors to support this unique project. The polar expedition will provide worldwide media outreach and branding opportunities, live video and radio broadcasts from the field, professional photography, potential seats on re-supply planes out to the ice, and participation in pre- and post-expedition events. For more information: www.thearticsurvey.com

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Photo: Rob Doeland

WWF's Dutch "Rangers" taking a "white action" dressed as polar bears for an ice-skating event

Dutch campaign for a white Arctic



Dutch campaign poster at bus stop.

Since the end of March across the Netherlands, the image of a polar bear face looks at you when you are waiting for public transport or are just taking a walk in a Dutch city. The image is the centerpiece of a new WWF-Netherlands campaign and appears with the slogan, "Draag bij aan een witte Noordpool," which translates to "Contribute to a white Arctic."

The campaign is designed to stimulate broad Dutch public support for a white Arctic. Research indicates that more than 80 percent of the Dutch public is already aware of the Arctic melting due to global warming. WWF asks the Dutch public to take action and visibly show their concern for the Arctic by using the color white to express this. People are invited to upload photos documenting their "white action" (see www.wnf.nl/noordpool). The photos will be included in a visual petition to the Dutch government later this year.

The first Dutch politician to publicly endorse WWF's campaign was Jacqueline Cramer, the Minister of Environment and Spatial Planning. In a meeting with Minister Cramer, WWF-Netherlands CEO, Johan van de Gronden, asked the government to commit to large-scale development of off-shore wind farms at the North Sea. With off-shore wind farms, the Netherlands can source 20 percent of its energy sustainable by 2020, instead of the current 2.6 percent. WWF wants to show the Dutch government that by

reducing greenhouse gas emissions, the Netherlands can contribute to a white Arctic and a sustainable future for the polar bear.

To strengthen the lobbying efforts towards the Dutch government, WWF has approached a selection of large Dutch corporations that are big energy consumers. WWF intends to form a coalition with these companies to show the Dutch government that the market is prepared to buy energy from off-shore wind farms and make this available to Dutch consumers.

The campaign also includes WWF-Netherlands' Rangers, a youth group involved in animal conservation activities. During a campaign kick-off ice-skating event in early March, 850 Rangers were "transformed" into "polar bears." From March through May, the young campaigners are taking "white action" by going door-to-door to raise funds for polar bear conservation.



Jacqueline Cramer autographs Dutch campaign poster.

Photo: WWF Netherlands

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Svalbard Seed Vault:

Safeguarding Global Biodiversity in the Arctic

Buried deep underground. Able to withstand a “bunker buster” bomb. In a location carefully selected for maximum security. Equipped with state-of-the-art electronic monitoring devices. No, it’s not a high-tech bunker in Baghdad, Kabul or Washington. Look to the North: WWF’s Mark Burnett reports on the new seed bank in Svalbard, Norway.

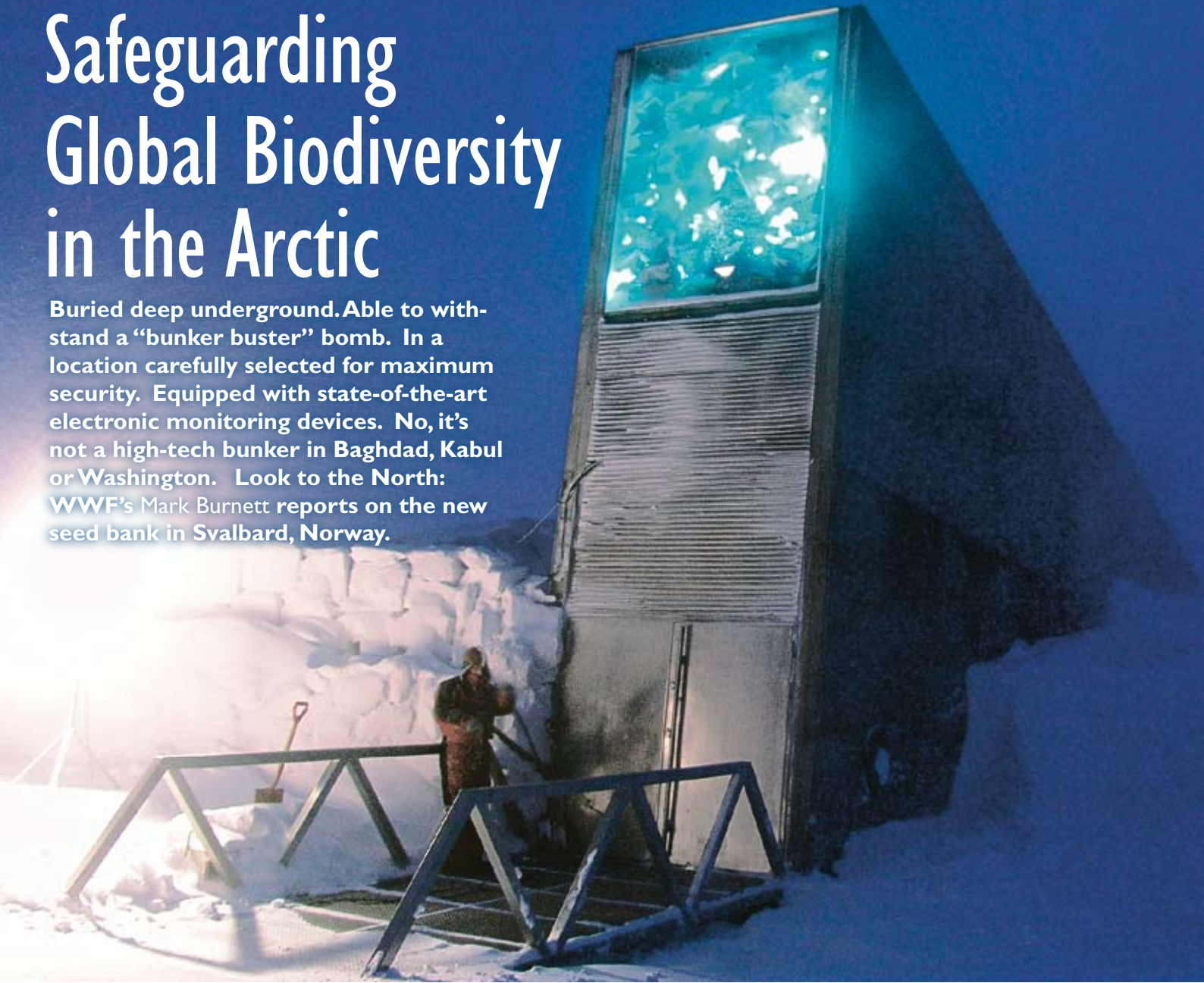


Photo: Mari Tefre/Global Crop Diversity Trust

The Svalbard Global Seed Vault, which opened on February 26, has a simple purpose: to provide insurance against both incremental and catastrophic loss of crop diversity held in traditional seed banks around the world. The bunker-like facility in Svalbard represents a partnership including the Nordic Gene Bank, the Norwegian Ministry of Agriculture and Food, and the Global Crop Diversity Trust. International seed banks participated in preparing and shipping to Svalbard over a quarter of a million samples containing 100 million seeds. Eventually the vault will hold more than two billion seeds.

The Seed Vault functions like a safety deposit box at a bank. Statsbygg (the Norwegian Directorate of Public Construction and Property) owns the building and vault, while the depositing seed banks own the contents of their individual boxes. The samples stored in Svalbard are back-up copies that seed banks can access if their original samples are lost, destroyed or damaged.

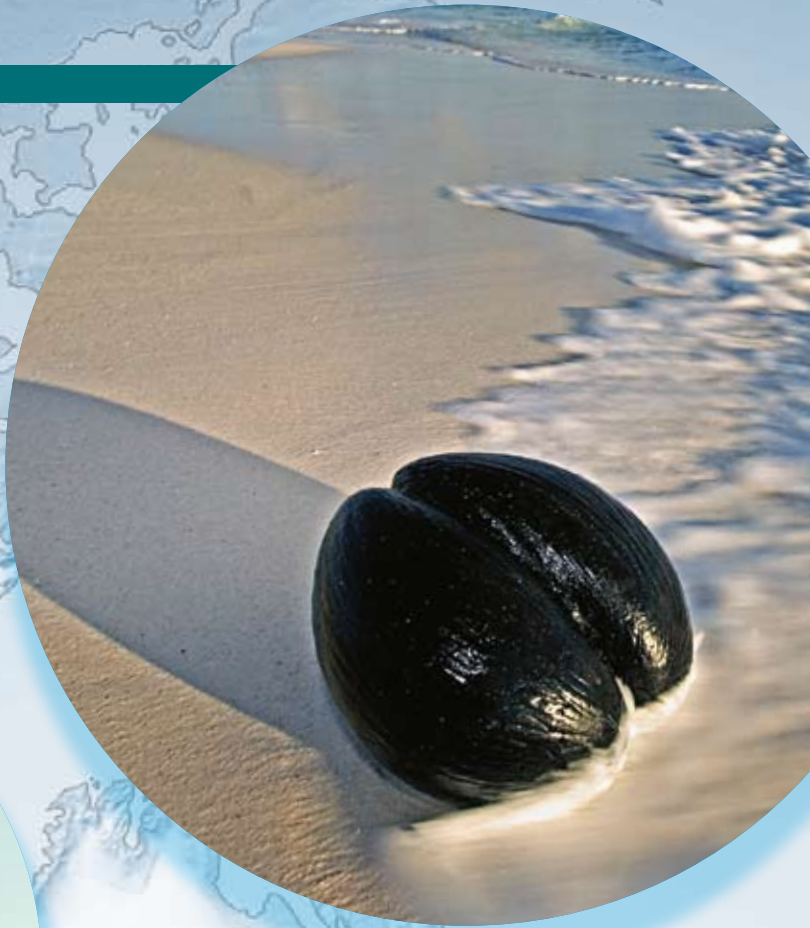
Svalbard, an arctic archipelago located in the northwestern Barents Sea, was chosen for a variety of reasons: The permafrost offers natural freezing for the seeds; the vault’s remote location enhances the security of the facility; the

local infrastructure is excellent; Norway, a leader in many multinational efforts, is a willing host; and the area is geologically stable. The polar bears that prowl the area may be seen by some as providing an extra layer of security.

The arctic climate provides a reliable environment conducive for seed storage. Located 125 meters inside a mountain, the vaults are buried deep within the arctic permafrost. Even given worst-case scenarios for global warming, the vault rooms will remain naturally frozen for up to 200 years, according to the Norwegian Meteorological Institute.

Stability is another advan- ➤ 12

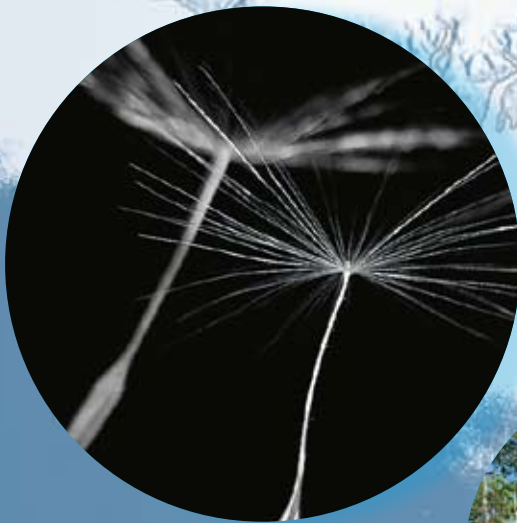
WWF's global network is active in sustainability initiatives involving agriculture. With its deep connections to the world economy, human societies, and biodiversity, agriculture is one of the most important frontiers for conservation. The photos show WWF agricultural conservation projects around the world.



ARCTIC
OCEAN



G R E E N L A N D



ATLANTIC
OCEAN



Seed vault

Svalbard



Barents Sea

II ► tage the Arctic offers. Some of the world's best seed banks are located in countries with unstable political or geological situations: Peru, Columbia, Syria, India, Ethiopia, and the Philippines. "We are inside a mountain in the Arctic because we wanted a really, really safe place that operates by itself," said Dr Cary Fowler, Executive Director of the Global Crop Diversity Trust.

Food security is a challenge in many developing countries, and in the face of climate change is a growing concern in the west. Crop diversity is the resource we need to develop varieties that can withstand pests and diseases that come with warmer temperatures. By providing a backup sample, the Svalbard Seed Vault will ensure that unique diversity held in seed banks in developing countries is not lost forever should an accident occur. In effect, the Arctic now provides a kind of insurance policy for the world's agricultural biodiversity.

"Crop diversity will soon prove to be our most potent and indispensable resource for addressing climate change, water and energy supply constraints, and for meeting the food needs of a growing population," Dr Fowler argues.

With growing evidence that climate change could seriously threaten global agricultural production, the Svalbard Global Seed Vault plays a valuable role in safeguarding genetic material stored in seed collections scattered around the world. Scientists believe that rising CO₂ emissions are causing not only global warming, but also increasing

the frequency and intensity of extreme weather events. Floods, droughts and hurricanes are effects of climate change that threaten the world's food security.

"A quiet rescue mission is under way," said Fowler. "It will intensify in the coming years, as thousands of scientists, plant breeders, farmers and those working in the Global Crop Diversity Trust identify and save as many distinct crop varieties as possible." As gene banks around the world produce fresh seeds, they will send a steady flow of new samples to Svalbard for safekeeping.

While the Seed Vault is a testament to international cooperation, it is also emblematic of the Arctic's role in safeguarding and regulating the global environment. Arctic sea ice and glaciers hold trillions of liters of fresh water that - if released in large amounts due to global warming - could alter the world's ocean currents and change weather patterns dramatically. Governments and institutions have united to preserve the world's agricultural biodiversity in the Arctic - now the onus is on international decision-makers to join forces and take action to protect our planet from the dangers of a melting Arctic.

Mark Burnett

Barents Sea Officer

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Learn more about the Svalbard Seed Vault:

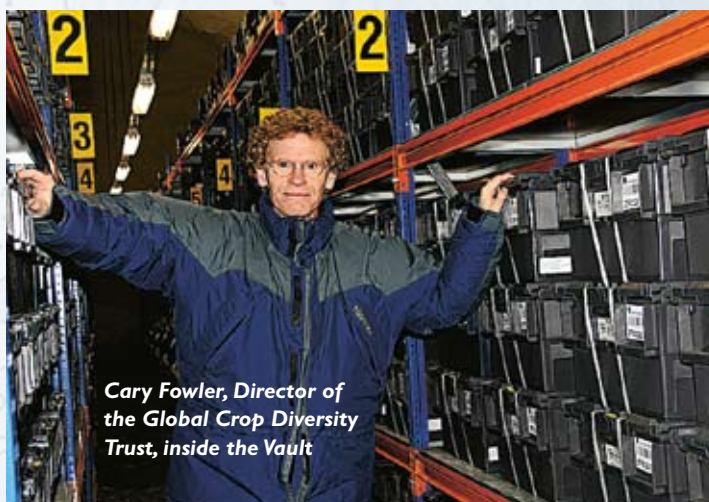
www.seedvault.no • www.croptrust.org •

www.nordgen.org

A quiet
rescue
mission is
under way

On guard in the seed vault: Dr Cary Fowler

"Climate change will place enormous pressure on agriculture, presenting our crops with conditions that will make productive harvests ever harder to achieve. Scientists must turn to the genetic diversity of our crops to breed crop varieties which can succeed in these new conditions. However, this very diversity is also threatened - as the climate changes, crop species will no longer find suitable growing conditions, and will disappear. The Svalbard Global Seed Vault will protect this crop diversity from climate change by providing the world's safest storage, at the same time as ensuring that plant breeders have the best possible chance to protect our food supply from climate change."



Cary Fowler, Director of the Global Crop Diversity Trust, inside the Vault

Photo: Mar Telle/Global Crop Diversity Trust

Inuit perspective on oil & gas development in the Arctic

Chair of the Inuit Circumpolar Council
Patricia Cochran shares
her views on the
impacts of petroleum
development on arctic
indigenous people.

Although I am proud to be the head of an organisation that represents Inuit around the circumpolar world, in this article I will focus on the experience of Inuit in my home in Alaska. This is partly because I can discuss this with the knowledge that comes from personal experience. It is also because the Inuit in Alaska have the longest history of living with oil and gas development, compared to other parts of the Inuit world.

More than thirty years ago, a man named Eben Hopson appeared before the Mackenzie Valley pipeline inquiry in Canada. This inquiry was trying to figure out whether a pipeline that would begin the exploitation of large gas reserves in the Canadian Arctic should be allowed. Hopson was an extraordinary man, an Inupiat who helped lead the push for land claims in Alaska, and instrumental in forming the Inuit Circumpolar Council that I represent today.

Hopson gave this inquiry a full account of his views of oil and gas development. He was not anti-development. As mayor of the North Slope Borough in Alaska, he used revenues from development to help build roads and houses, to improve the lives of the Inupiat. But he had also seen the downside of development, and was most concerned about how the sudden influx of oil and gas money distorted local economies, which in turn distorted local cultures, local societies, and local politics.

"I am very concerned," Hopson told the inquiry, "about the long-term economic impact of oil and gas development upon our arctic community. We are riding the crest of a high economic wave, and I fear

about where it will deposit us, and how hard we will land."

Now, more than 30 years later, we are still riding that wave, still wondering where, and how hard, we will land. In this time, we have gotten some ideas about what effects we can expect, and what others might learn from our experiences.

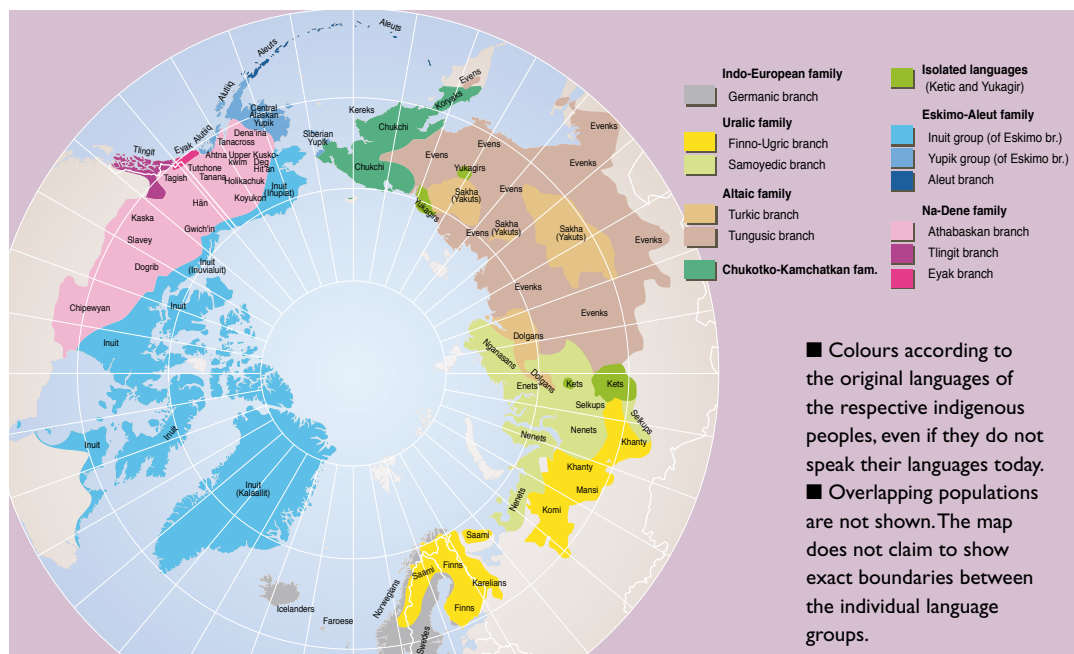
We have seen effects on the animals on which we have traditionally relied for subsistence. Our observations, backed up by scientific studies, have concluded that noise from underwater drilling and seismic work has driven away bowhead whales. This has driven our hunters further offshore, following the whales into increasingly dangerous waters. We do not know if the bowhead may eventually move away altogether.

We are intensely afraid that there will be a major oil spill in our traditional area. We saw what happened as the result of the *Exxon Valdez* spill. If the coastal resources on which we rely are polluted, then the bottom drops out of our culture. We need that link to the land, to our history, to our traditions. In many cases we still need the food, as even with the extra money coming into

our regions from oil and gas, food prices are very high.

Perhaps the lesson other regions can draw from this experience is to be very careful that oil and gas technologies have been thoroughly tested before they are used in your area. Another lesson is that essential habitat for subsistence food resources should be protected in advance of oil and gas development. Knowledge is so important when you are dealing with oil and gas development. What we have learned in our region is that the commitment to knowledge, to learning about the effects of oil and gas development, must be continuous.

"Landing" from our current economic wave may be one of the most difficult impacts of oil and gas development on our Inupiat communities. In the 40 years since the discovery of the Prudhoe Bay field, our communities, our society, and our culture have been transformed by the addition of cash from those developments. But when the wells eventually run dry, those communities who maintain traditional lifestyles and build up enough local financial capital are likely to have a softer landing.



■ Colours according to the original languages of the respective indigenous peoples, even if they do not speak their languages today.

■ Overlapping populations are not shown. The map does not claim to show exact boundaries between the individual language groups.

■ Typical colonial populations, which are not traditional Arctic populations, are not shown (Danes in Greenland, Russians in the Russian Federation, non-native Americans in North America).

Map: Hugo Ahlenius, UNEP/GRID-Arendal.

Data sources: Adopted from map by W.K. Dallmann published in Arctic Human Development Report (2004). Data and information compiled by W.K. Dallmann, Norwegian Polar Institute and P. Schweitzer, University of Alaska Fairbanks.

Even though the Alaskan North Slope may be declining as a source of oil and gas, the Arctic as a whole will become ever more important. A study by the US Geological Survey says that one-quarter of all untapped reserves in areas known to contain oil are found north of the Arctic Circle. That is only the *known* reserves — experts can only guess at the size of unknown reserves in the largely unexplored Arctic. Some of those guesses would place the Arctic at the forefront of oil and gas exploration over the coming decades. This means that those pockets that have so far mostly escaped the inroads of industrial development will shrink, and may ultimately disappear.

From the shores of Chukotka, ever-deeper into the Beaufort Sea, through Canada's arctic islands to Greenland, the rigs are coming. The global thirst for oil and gas is such that it is not question of *if* exploration will come, but *when*. We need to be ready, more ready than we were in Alaska. One important way in which we can be ready is to be politically ready.

Wherever development occurs in the Inuit world, it cannot be a process that goes on above the heads of local people. Decisions made by remote control in southern centres, no matter how well intentioned, cannot understand the reality of the lives of Inuit living in small arctic communities. The Inuit must be involved, not just on a consultative level, but on a *decision-making level*. We may not always make perfect decisions for ourselves. But *if* we make mistakes, *when* we make mistakes, those mistakes will surely be easier to live with if they are *our* mistakes. Other peoples' mistakes, imposed on our people, breed resentment and dysfunction.

Eben Hopson once said: "The politics of the Arctic are no longer the politics of the people, but they are the politics of oil." It is our responsibility to ensure that does not happen to Inuit or to any of the other peoples of the Arctic. As new parts of the Arctic are opened up to oil and gas development, the politics of the Arctic *must* be of the people of the Arctic, and *not* the politics of oil.

Patricia Cochran

Chair, Inuit Circumpolar Council
www.inuitcircumpolar.com

International Polar Year update:

The Circumpolar Biodiversity Monitoring Program

The 4th International Polar Year (IPY) — an international program launched in the late 19th century involving coordination and cost-sharing among polar scientists and researchers — began in 2007 and continues through to 2009. Mike Gill, Chair of the Circumpolar Biodiversity Monitoring Program, provides an update on one IPY initiative.

In recognition of the increasing pressures on the Arctic's biodiversity and our limited capacity to monitor and understand these changes, the Arctic Climate Impact Assessment recommended that long-term arctic biodiversity monitoring be expanded and enhanced. In response, the Arctic Council's Conservation of Arctic Flora and Fauna (CAFF) Working Group launched the Circumpolar Biodiversity Monitoring Program (CBMP).

Currently led by Canada, the CBMP forms part of this year's IPY activities. It operates as an international network of scientists and local resource users working together to harmonise and enhance long-term biodiversity monitoring efforts across the Arctic. The program aims to improve our ability to detect, understand, report on, and respond to significant trends and pressures. The resulting information will be used to facilitate better conservation and adaptation actions from local levels to global fora such as the United Nations Convention on Biological Diversity, the Ramsar Convention on Wetlands, the Biodiversity Information Partnership, United Nations Millennium Development Goals, and the International Arctic Science Committee.

Given the size and complexity of the Arctic, the CBMP is taking an integrated ecosystem-based approach to monitoring. This involves monitoring that bridges ecosystems, habitats, and species and which demands information not only on the status and trends in Arctic biodiversity, but also on their underlying causes.

The information will be collected and made available to generate effective strategies for adapting to the changes now taking place in the Arctic.

In March, the CBMP held an international workshop, *Building a Partnership for Enhanced Understanding and Conservation of Arctic Biodiversity*. Participants included international government agencies, academic institutions, non-governmental organisations, and funding foundations. The group prioritised the CBMP's five-year implementation plan with key activities focused on development of five Expert Monitoring Groups for developing Integrated Pan-Arctic Monitoring Plans. The workshop also produced plans to develop a web-based data portal to provide a central clearinghouse for current Arctic biodiversity trend data.

With the help of our existing partners, the CBMP has leveraged new strategic partnerships to deliver on the key products and activities planned over the next five years. The CBMP is confident that our vision of expanded and enhanced Arctic biodiversity monitoring and improved conservation and adaptation decisions for the Arctic will be achieved.

For more information, visit the CBMP website: www.cbmp.is



The future is already here

In 2007, Dr Tom Arnbom, a biologist at WWF-Sweden, joined WWF's Polar Bear Patrol project in Vankarem, Chukotka, northeast Russia. The following excerpts from his expedition diary highlight changes in the region caused by global warming.

23 November

We are flying over a harsh and desolated landscape with not a single trace of human presence. Our destination is Cape Schmidt, due south of Wrangel Island on the mainland of the Autonomous

District of Chukotka, Russia. Every winter this coastline is visited by hundreds of polar bears. In 2006, about 200 gathered around the village of Vankarem which has a population of about 200 people. This is not a good combination, and is why the Polar Bear Patrol was formed: "to decrease the conflict between humans and polar bears."

24 November

The polar bears should have been here some weeks ago, but the winter sea ice which should have frozen by October to form a "bridge" from Wrangel Island to the mainland Chukotka coast is absent — instead I see a dark open sea. The starving bears are dependant on this bridge to get to the mainland to find food after being stranded at Wrangel Island and unable to hunt properly. We are hoping for, and expecting, hundreds of bears to turn up within the next two weeks.

28 November

On a visit to the local school, I ask some children if any of them have

ever seen a polar bear? There are smiles everywhere, and a ten-year-old girl explains that last fall they could count up to ten polar bears at a time in the school yard. All have different stories about encountering bears to and from school. I realise that for these kids, polar bears are part of their normal life.

1 December

The wind shifts and it starts to rain, which is very unusual for this time of year. Luckily, I am wearing a survival suite made for rain, but the others in the team have warm clothes made for dry, cold air. It does not take long before they look more like drenched dogs than tough Arctic explorers in fluffy down jackets.

I ask Vlad Kavry, head of the Polar Bear Patrol, if he has noticed any differences over the last few years. Yes, he has observed many changes. Last summer, several large flocks of swans were observed, and on the beach a large ray was washed up for the first time. The numbers of ptarmigan and lemming are decreasing along the

The Polar Bear Patrol in action, Chukotka, Russia.

Photo: Viktor Nikiforov/WWF



coast, probably due to winter rain: the wet ground freezes, creating an ice shield that stops the birds and rodents from getting access to food on the ground.

3 December

The sea ice along the Chukotka coast has still not frozen. This means that few (if any) female polar bears will be able to give birth on the mainland this year. Normally, around 20 females build winter dens along the coast. By now, they should be in their dens, where the cubs will be born around New Year. Vlad turns to me and says: "This is the first time I really wonder if the winter will come. Yesterday it rained, and hundreds of polar bears are missing — what is happening?"

5 December

I am shocked to see so many dead Pacific walrus along the coast. I can barely hold my tears anymore. Forty thousand appeared on Vankarem beach earlier this year — the first time they appeared along this coastline, probably because there was no summer sea ice for them to rest on in their usual feeding grounds at sea. Thousands

must have died. Most of the carcasses were moved away from the village but some are still lying on the beach. When the polar bears arrive from Wrangel Island, they will be attracted by the carcasses. This will most likely cause some problems.

10 December

Out on a routine monitoring trip, we spot a male polar bear 200 metres from us. We leave the skidoo and walk like a living wall towards him. Vlad has a spade as the main defence weapon. Fifty metres from the bear, we all sit down. He suddenly stands up and takes a few steps towards us. I realise how big he is, much larger than all the brown bears I have seen in Finland. I estimate his weight at 500–600 kilograms. The bear smells us and suddenly everything explodes as he runs at full speed to the beach. On his way, he breaks through a snow wall and finally he throws himself into the water and starts swimming away from us. I walk up to where he had been — the snow is a mixture of red and brown and it smells horrible. I had no idea that polar bears smell. What a memory of a wild polar bear!

14 December

World leaders are in Bali right now discussing climate change. At the same time, the sea ice in Chukotka is almost two months late following a summer where all the sea ice melted. For over a week we have not been able to fly out from Cape Schmidt due to bad weather and snowstorms — weather that used to be normal until the sea ice freezes in October, but lately has been continuing even in November. The polar bears are missing. The walrus had to swim to land to rest.

This is what climate change researchers have been saying would happen to the Arctic in the future: large weather variations, winter rains, less summer sea ice, and more snowstorms. All this I know by heart, but it is not until now that I realise the enormity of the coming changes in the Arctic. It is an insight that I hoped I never would have to experience. What kind of world are we living in?

Dr Tom Arnbom

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Read more from the expedition diary at www.panda.org/arctic/arnbomdiary
For more information about the WWF Polar Bear Patrol project, see: www.umkypatrol.ru



On the rocks without ice: Shipping in the

WWF's Anne-Beth Skrede explains why an ice-free Arctic Ocean creates new needs for mandatory regulation of international shipping.

In 2004, the Arctic Climate Impact Assessment projected an ice-free Arctic Ocean for a short summer period in 30–50 years. Now we know the Arctic is melting

much faster, and some experts think the Arctic Ocean will be ice-free during summer in just a couple of years. Increased shipping in this area is regarded as inevitable.

The Arctic Council, being the official circumpolar body comprising the five Arctic Ocean states plus Iceland, Sweden, Finland, and representatives of several indigenous peoples, has expressed concern over the dangers of increased shipping.

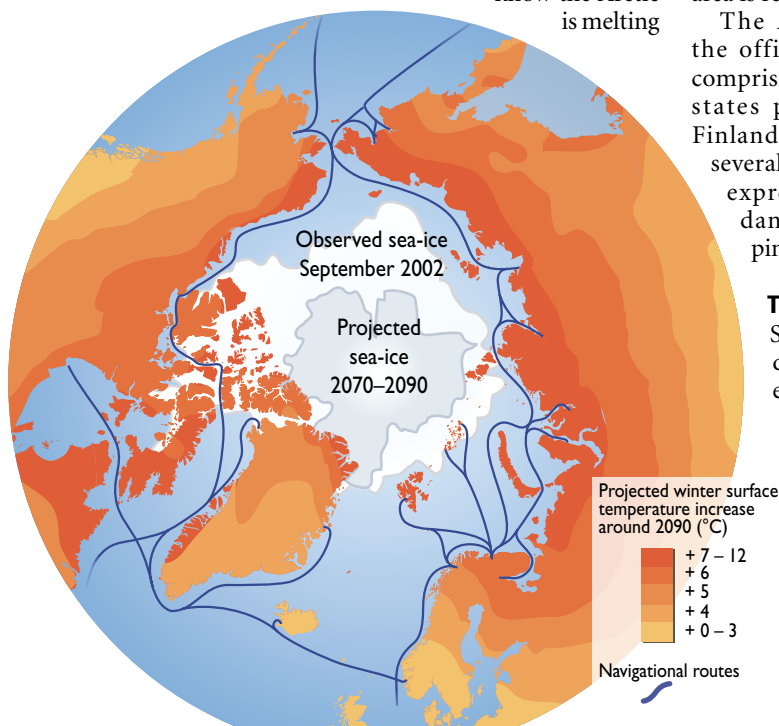
pollution is very slow due to low temperatures and lack of sunlight for long periods. Preparedness for rescue operations and combating oil spills are lacking — and anyway difficult in vast, remote areas. There are large seasonal variations (in temperature, weather and light) and biological production and food access are very concentrated in time and space. This makes arctic renewable resources both sensitive and vulnerable.

Mandatory regulations needed

A report published in 2007 by the Fridtjof Nansen Institute (FNI), *The IMO Guidelines for Ships Operating in Arctic Ice-covered Waters*, shows that today's shipping legislation and regulations have major gaps for protection of the Arctic's vulnerable environment and are not sufficient to meet a future with an ice-free Arctic

Threats

Shipping poses great dangers to the arctic ecosystem. Accidents happen, and risks are higher in polar areas as they are difficult and dangerous to navigate and operate in. The natural breakdown of



Arctic

The heat is on

Ironically, international shipping is also a contributor to climate change. The tank ship owner organization INTERTANKO estimates that CO₂ emissions from burning fossil fuels for international shipping are about 1,200 million tonnes each year, adding up to about 5 percent of annual global CO₂ emissions. Emissions from national sea transport like ferries, inland navigation, and fisheries are also significant. In Norway, for example, internal sea transport and fisheries contribute 9 percent of Norway's total CO₂ emissions. The release of particulate matter also contributes to global warming: soot, for example, builds up on ice, reducing its reflective capacity for the sun's radiation.

CO₂ emissions from international shipping are not yet part of the Kyoto Protocol and not calculated to be part of any nation's reduction responsibilities. However, a 50% reduction of CO₂ emissions from shipping is readily within reach. According to calculations by Det Norske Veritas (DNV; DNV Paper Series 2007-P004), technical measures such as optimal hull shape and better propulsion systems could reduce CO₂ emissions by 17–28% percent, while a 10 percent reduction in speed would reduce CO₂ emissions by 23 percent.

WWF calls on ship owners to reduce their emissions as a matter of urgency.

While we wait

While we wait for the establishment of a binding international instrument to regulate shipping in the Arctic, WWF asks responsible, precautionary, and proactive ship owners to ensure that their ships adhere to the following when operating in the Arctic Oceans:

- Absolutely NO discharges at sea
- Ice class
- No heavy bunker fuel
- Ballast water treatment on board
- Environmentally friendly hull paint and anti-fouling systems
- Booms and equipment on board to take care of minor accidental spills
- Minimised air emissions
- Full transparency on all environmental aspects
- Documentation of impacts and measures to reduce impacts, and comparison with other ship owners and other transport modes.

Photo: The Norwegian Bureau Secretariat

Ocean and increased traffic.

Responsibility for monitoring and controlling international shipping is unclear, and there is currently no adequate mandatory international regulation. The Arctic Ocean falls under the regime of the United Nations Convention on the Law of the Sea (UNCLOS), thus all states involved in arctic shipping share responsibility for environmental protection of the region. But while UNCLOS is good, it is not sufficient as it does not provide specific regulations for shipping. The International Maritime Organization (IMO), the UN body that regulates international shipping, has adopted voluntary, non-binding guidelines for arctic shipping (the Polar Guidelines).

The FNI report concludes:

“Given the likely future developments in arctic shipping, it is of utmost importance that any shortfalls

in today's arrangement be addressed in (sic) near future, and that the feasibility of improved and mandatory regulations be considered by the IMO under the SOLAS Convention [International Convention for the Safety of Life at Sea]”

“In a non-binding form, the (Polar) Guidelines' contribution to maritime safety in ice-covered waters seems rather limited.”

We will probably not see extensive shipping in the Arctic within this decade, or maybe even for decades. Physical conditions such as water depth, icing, and bad weather are obvious limitations. In addition, it will be difficult for commercial shipping to ensure punctuality and predictability in such conditions. Safe operations and safety for the ship, crew, and cargo is challenging in this area, since the Arctic is vast and remote

and not easily covered by rescue services.

Most responsible ship owners will probably find it unattractive to put too many eggs in this basket in the short-term. However, WWF fears that some less responsible operators might try to exploit the fact that the route between Northern Europe and North-Eastern Asia can be almost halved by sailing through the Arctic. That's why we need strict, prompt, and binding international shipping regulations.

Anne-Beth Skrede

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Officer

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The FNI report: O. Jensen. The IMO Guidelines for ships operating in Arctic ice-covered waters. The Fridtjof Nansen Institute for WWF. www.fni.no

Views on the Arctic Council:

Personal reflections from Ambassador Helena Ödmark, senior arctic official for Sweden.

The effects of globalisation and climate change are strongly felt in the Arctic. Social and economic conditions are changing fast. The Arctic is also heavily influenced by decisions taken outside the region. There is an urgent need to strengthen cooperation, confidence building, and coordinated political decision-making on arctic matters. Arctic matters are best addressed in a circum-Arctic context.

The Arctic Council has a unique mission: to address arctic issues at a political level through multilateral cooperation, on the basis of consensus.

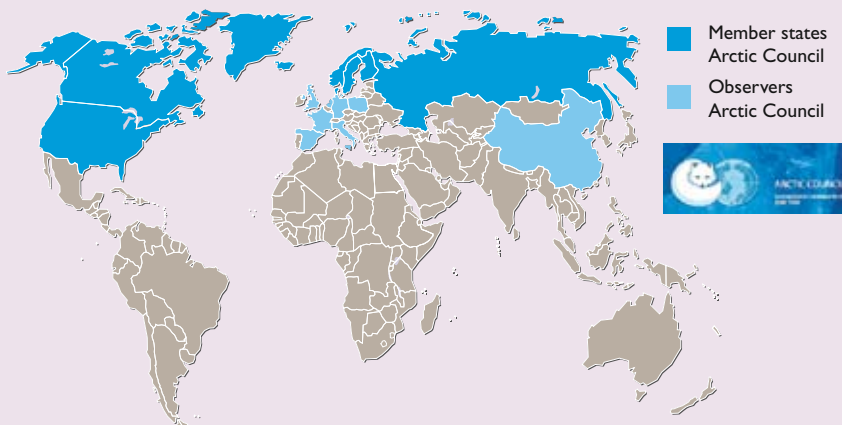
The Council also has a unique composition: the governments of the eight arctic states and representatives of the indigenous peoples in the arctic region.

Observer states, intergovernmental organisations, United Nation bodies, international financial institutions, and non-governmental organisations that deal with various issues including arctic science, environmental protection, and higher education also take part in Arctic Council work. Industry too is expressing interest in becoming involved.

Through its unique composition and many observers, the Arctic Council comprises a wide range of interests and provides an excellent forum for meaningful discussion. It has the legitimacy required to influence policy-making on arctic matters, and the capacity to provide circum-Arctic perspectives through its multilateral approach. It has the potential to develop solid and well-founded views through its access to experts, and offers the transparency needed for political impact.

Many look to the Arctic Council for leadership — the Council should rise to this challenge.

It has already shown that it can lead. Through the *Arctic Climate Impact Assessment* (ACIA) the Council successfully presented the effects of climate change in the Arctic to the global community in 2004. Since then, arctic aspects are an integral part of the United Nations Framework Convention on Climate Change (UNFCCC) negotiations on global climate change. Through its "Policy document" in response to the ACIA key findings, the Council also showed that it can reach consensus also



on politically sensitive issues.

Expanded and transparent cooperation under the auspices of the Arctic Council would contradict alarmist media reports on growing tension and conflict in the Arctic.

The Arctic Council has a strong tradition of cooperation, not confrontation. Trust and understanding are essential elements in the Council work. The structure it inherited from the Arctic Environment Protection Strategy (AEPS), however, does not fully meet present requirements. The Council should spend more time on developing innovative cooperation mechanisms to effectively address new challenges in the Arctic. It should identify policy options and concrete measures that could be implemented in a coordinated fashion. It should also provide more circum-Arctic input to intergovernmental negotiations as well as to national and local decision-making on specific issues.

Substantive action is often required to achieve tangible results. Fact-finding might be a necessary starting point, but needs to be accompanied by longer-term cooperative arrangements and other measures. Scientific advice is best provided to the Council by the expanding international arctic science community. As a legacy of the International Polar Year, this community is making concerted efforts to promote outreach and effective communication of research results to policy-makers and arctic residents. These developments will facilitate a clearer division of work and reinforce the role of the Council as a forum for circum-Arctic dialogue on policy issues.

Arctic land territory falls under the jurisdictions of the eight arctic states. Substantial areas in the Arctic Ocean will still remain beyond national jurisdiction after maritime territorial claims have been settled. Arctic states and observer states have special responsibilities in the Arctic Council since they decide on the political and legal frameworks that apply in the Arctic.

At Arctic Council Ministerial Meetings, foreign ministers and leaders of the permanent participants gather every second year. If well prepared in advance, their decisions will reflect their joint political will and provide a basis for coordinated follow-up action at the national/federal level, and at the local level in arctic communities — as well as ensure that proper attention is given to arctic matters in global contexts such as the United Nations Framework Convention on Climate Change (UNFCCC) and the International Maritime Organization (IMO).

"Senior Arctic Officials" meetings provide an opportunity for the participants to contribute their views and explain their concerns so that others become aware of all aspects of relevance and can consider the interests at stake. Observers should be more active.

Multilateral cooperation might seem cumbersome, but it enables the parties involved to develop consensus views and joint positions through informed consultation and discussion. This increases trust and confidence. The Arctic Council offers a much-needed platform to address pressing problems in the Arctic.

Sled dog race heats up

Martin Buser has completed the Iditarod sled dog race in Alaska 25 times and has won four times. He spoke with Nigel Allan, communications manager of the WWF Climate Witness Programme, about new challenges on the trail, including hundreds of miles of bare ground, rain, and mosquitoes — all in the Alaskan winter.

Nigel Allan: How long have you been dog sledding and what got you started?

Martin Buser: I was born and raised in Switzerland and I always liked the great outdoors. As a teenager I was exposed to some sled dogs, which I ended up helping with in my spare time. I had absolutely no intention to make the dogs my livelihood and dedicating the rest of my life to them, but that sort of just evolved.

In 1979 I decided to go to Alaska for a year. It was just supposed to be an adventure, but I am still here.

NA: What is the Iditarod and how long have you been competing?

MB: The Iditarod is the longest sled dog race in the world. The official length is 1,049 miles, simply because Alaska is the 49th US state and the trail is over 1,000 miles long. Unofficially it is about 1,150 miles (1,850 kilometres), but every year the course varies slightly as there might be open water that we have to go around or frozen sea ice that we can pass over.

I just finished my 25th Iditarod sled dog race and I now hold the dubious distinction of having the most consecutive finishes.

NA: What changes have you seen in the race over the years?

MB: My first 16 Iditarod's were brutally cold. I ran the coldest-ever Iditarod during the early 1990s



Martin Buser

when the temperature hovered at around -50 degrees Fahrenheit (-45 degrees Celsius) for over a week. But in recent years, the temperature increase has been drastic to the point where in the last few years we actually got rained on a few times, which is totally unheard of.

So here we are in northern Alaska in winter and we encounter mosquitoes!

One time, more recently, we were well into the second third of the race and it got so warm that we got stung by mosquitoes, which is also totally unprecedented. We jokingly call mosquitoes the "Alaskan state bird", and they were out in force around a crossing on the frozen Yukon River near a checkpoint called Kaltag, about 70 miles (110 kilometres) west of the coastal town of Unalakleet. So here we are in northern Alaska in winter and we encounter mosquitoes!

Every year there is a bit of a variance in the trail and the conditions. Of course we start on the south side of the Alaska Range where there is typically a lot of snow and then on the north side of the range it is not unheard of to have 60–80 miles (96–128 kilometres) of bare ground, even in a cold year. But in 2007 we had 260 miles (418 kilometres) of bare ground, and that is totally unprecedented. We are moving over frozen tundra and literally on bare ground for hundreds of miles. It is great for the dogs as they get excellent traction of course, there is no snow impeding their little feet, but it is really challenging on the driver and his or her equipment because it is such a bouncy ride. One five-mile (eight-kilometre) section of the trail alone knocked out about 15 percent of the participants. This one section of bare and icy ground was so rough that it was very difficult for a lot of people.

2008 was another pretty unusual race. We are used to having 50 or ➤ 22



22 ➤ 60 miles of trail that is what we call “punchy”. This is where the warm temperature has softened the trail to the point where the dogs break through the upper layer of snow and they punch down into the lower layer. But we had hundreds of miles of that this year, and we also got rained on well before the first half of the race.

The warmer temperatures, like we have had recently, of around 40 degrees Fahrenheit (4 degrees Celsius) and higher can make it easier for the driver but it makes it harder for the dogs. They like it right around 0 degrees Fahrenheit (-18 degrees Celsius) or a little

colder to be able to run those distances without getting too hot.

NA: What are the prospects for the future of the Iditarod?

MB: We are starting to discuss that more recently. Traditionally the race has started the first Saturday in March. In the 1980s and early 1990s, every now and then we would get a relatively warm year and we would joke that we would have to move the race closer to February or into February. But more recently we have started to seriously discuss these sorts of things and whether we should look at moving the race up a week or two.

At first glance this might not have a big impact, but in the bigger picture of course there is a ripple effect as the whole season would have to be moved up and we could start to see the shrinking of the sled dog racing season. The impact would also be felt in some of the southern states such as Montana and Michigan where there is sled dog racing and they are also experiencing warmer temperatures with

The window of opportunity to run sled dogs is shrinking like so many other things in the North.

a longer autumn and a shorter winter.

The window of opportunity to run sled dogs is shrinking like so many other things in the North.

NA: What impact do you think these changes will have on people in Alaska?

MB: I am starting to hear a lot more anecdotal stories from people who are experiencing changes. My friend Joe Garnier who lives north of Nome in a tiny little place called Teller is seeing the impact of global warming even more than I am. Joe and I talk a lot about climate change: he is like me and spends a lot of time in the outdoors and he has seen plenty of changes in the environment over the last 20–30 years as well.

Joe runs coastal dogs and these dogs have been bred with a much thicker coat than our dogs, which we jokingly call “banana dogs”. My dogs have less hair and a thinner coat because we live in a warmer region of Alaska. So Joe’s dogs had a much harder time in the warmer conditions this year and that literally knocked them out of the race. Joe had to pull out on the southern side of the Alaska Range before he reached the interior. So this is really crazy when it is too warm in Alaska to run dogs in winter time.

Nigel Allan

Communications Manager

WWF Climate Witness Programme

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Hail and farewell to WWF staff in the Arctic

Nigel Allan

The Arctic Programme wishes Nigel Allan all the best in his new position as communications manager for WWF’s Climate Witness — an



initiative to document the direct experiences of people who are witnessing the impacts of climate change on their local environment. Since January 2004, Nigel has served as the web manager and editor of the Arctic Bulletin. Working from his home north of Sydney, Australia, Nigel has provided outstanding communications support for

the Arctic Programme. He will continue to be based in Australia in his new position. WWF expects that Nigel’s communications expertise in using new media will help Climate Witness stories reach a wider audience. For more information about Climate Witness, see: www.panda.org/climatewitness

Amalie Finlayson

Amalie Finlayson joined the WWF International Arctic Programme as web manager in March 2008. Amalie graduated from Charles Sturt University in Bathurst, Australia, with a Bachelor of Arts (Communications) in 1995.

Previously, she has worked on the online news desks of *The Times* and *The Guardian* newspapers in London and the *Sydney Morning Herald* newspaper in Australia. Most recently, she was news and home page editor for *Yahoo!* in Australia. Amalie is currently studying for a PhD in Communications at Charles Sturt University, with research interests in the area of crisis communications and information flow in digital media, and the use of computer gaming for educational purposes.



Forthcoming arctic meetings & events

Arctic Council events

Emergency Prevention, Preparedness and Response Working Group Meeting

WHERE: Luleå, Sweden • WHEN: 19–21 August • MORE INFO: <http://eppr.arctic-council.org/>

Conferences and workshops

“Impacts of Climate Change on the Maritime Industry” International Conference

WHERE: Malmö, Sweden • WHEN: 2–4 June • MORE INFO: www.iccmi.info

2008 American Society of Limnology and Oceanography (ASLO) Summer Meeting: “Interactions on the Edge”

WHERE: St. John's, Canada • WHEN: 8–13 June • MORE INFO: www.aslo.org/meetings/stjohns2008/

The 11th Chatham House Conference on Climate Change 2008:

“A New Global Climate Deal? Achieving real collaboration for a low carbon future.”

WHERE: London, UK • WHEN: 16–17 June • MORE INFO: www.chathamhouse.org.uk/climatechange

“Understanding the Role of Permafrost in a Rapidly Warming Climate” Summer Course for K-12 Teachers

WHERE: Fairbanks, US • WHEN: 25–27 June • MORE INFO: www.nicop.org/courses.html

9th International Conference on Permafrost

WHERE: Fairbanks, US • WHEN: 29 June – 3 July • MORE INFO: www.nicop.org/

2nd St. Petersburg International Ecological Forum: Environment and Human Health

WHERE: St. Petersburg, Russia • WHEN: 1–4 July • MORE INFO: www.ecoforum2008.com

19th International Association of Hydraulic Engineering and Research (IAHR) International Symposium on Ice: Using New Technology to Understand Water-Ice Interaction

WHERE: Vancouver, Canada • WHEN: 6–11 July • MORE INFO: www.cripe.ca/iahr-2008

Scientific Committee on Antarctic Research (SCAR) and International Arctic Science Committee (IASC)

Open Science Conference: Polar Research – Arctic and Antarctic Perspectives in the International Polar Year

WHERE: St. Petersburg, Russia • WHEN: 8–11 July • MORE INFO: www.scar-iasc-ipy2008.org/

ICETECH 2008 – International Conference on Exhibition and Performance of Ships and Structures in Ice

WHERE: Banff, Canada • WHEN: 20–23 July • MORE INFO: www.icetech08.org

“Planning for Climate Change: Weathering Uncertainty” Symposium

WHERE: Iqaluit, Canada • WHEN: 20–23 July • MORE INFO: www.planningforclimatechange.ca

Standing Committee of Parliamentarians of the Arctic Region

WHERE: Fairbanks, US • WHEN: 1 August • MORE INFO: www.arcticparl.org/

5th World Congress of the Society of Environmental Toxicology and Chemistry (SETAC):

“Interactions Between Climate Change and the Fate of Contaminants in Polar Environments”

WHERE: Sydney, Australia • WHEN: 3–7 August • MORE INFO: www.setac2008.com/

Marine Geology of Fjords – 33rd International Geological Congress

WHERE: Oslo, Norway • WHEN: 6–14 August • MORE INFO: www.33igc.org

The 2nd Global Fisheries Enforcement Training Workshop

WHERE: Trondheim, Norway • WHEN: 7–11 August • MORE INFO: www.gfetw.org or www.imcsnet.org

“Climate, Language and Indigenous Perspectives” Workshop

WHERE: Fairbanks, US • WHEN: 13–15 August • MORE INFO: Olga Lovick (e-mail: Olga@lithophile.com)

6th International Moose Symposium: “Moose in Virgin and Anthropogenic Altered Landscapes”

WHERE: Yakutsk, Russia • WHEN: 13–23 August • MORE INFO: Innokentiy Okhlopov (e-mail: mountlab@ibpc.ysn.ru)

6th International Congress of Arctic Social Sciences (ICASS VI)

WHERE: Nuuk, Greenland • WHEN: 22–26 August • MORE INFO: E-mail: iassa@ilisimatusarfik.gl

For more on these events and other meetings, please visit:

<http://arcticportal.org/iasc/services/arctic-meeting-calendar> • <http://calendar.arcus.org>

ABOUT THE BACK COVER: Climate Solutions – WWF's vision for 2050

Is it technically possible to meet the growing global demand for energy by using clean and sustainable energy sources and technologies that will protect the global climate? This is the question that a recent WWF report, *Climate Solutions*, seeks to answer.

The report's conclusion is that the technologies and sustainable energy resources known or available today are sufficient to meet this challenge, and there is still sufficient time to build up and deploy them, but only if

the necessary economic policy decisions and government interventions are made in the next five years.

The figure on the back cover is a representative scenario of the WWF Climate Solutions Model. It depicts technology “wedges” capable of averting dangerous climate change that could cause an arctic meltdown. Each “climate solution wedge” grows over time and the sum of all wedges becomes significant as industrial capacity and deployment increase in

scale. The top yellow line refers to the energy demand projection. Note that since energy-efficiency technologies are shown alongside energy supply from low-emission sources, the results are expressed in final energy supplied or avoided (rather than primary energy production).

The WWF Climate Solutions Model builds on the Pacala-Socolow “wedges” concept by adapting it to go beyond stabilization, to achieve by 2050 the significant reductions

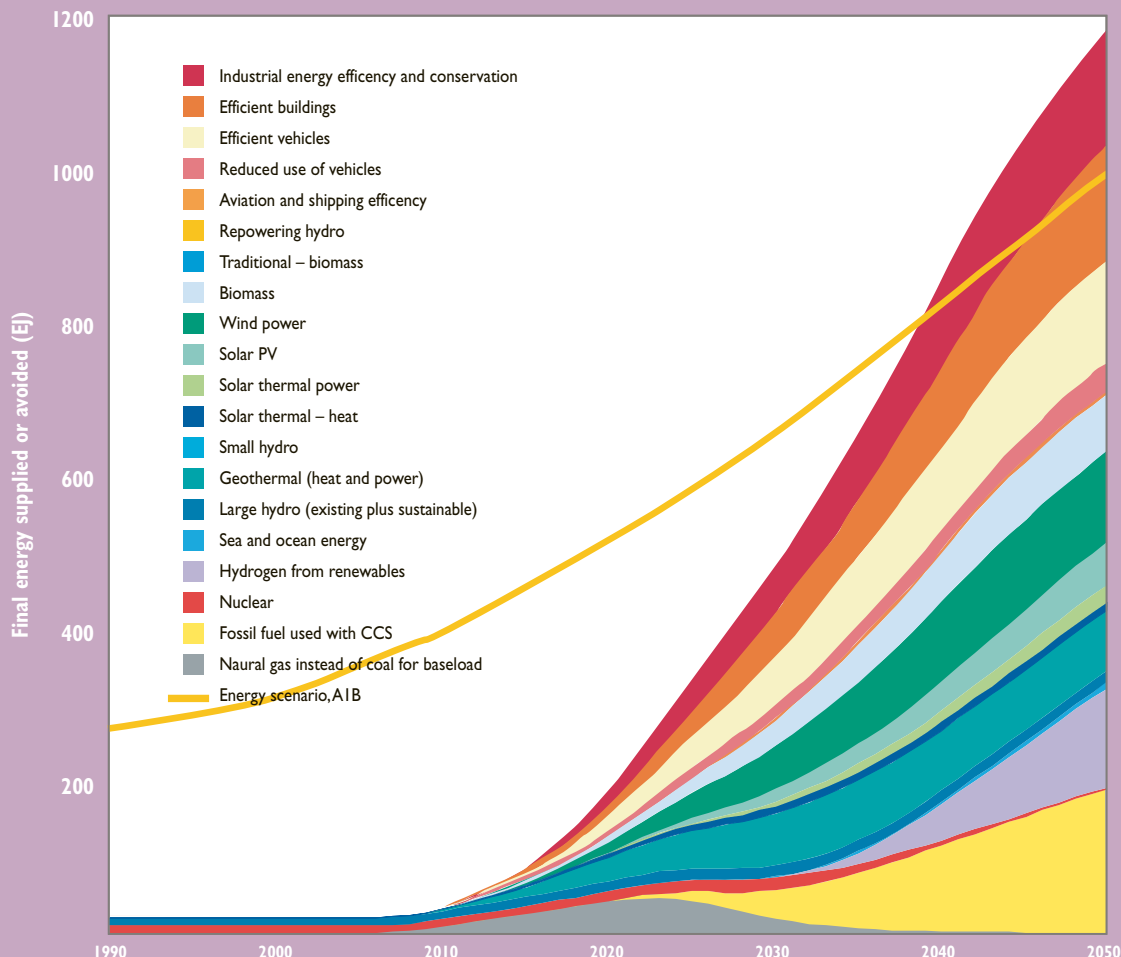
in global emissions which the current scientific consensus indicates are needed to avert dramatic climate change impacts. WWF believes that radical and immediate greenhouse gas reductions are necessary to prevent the Arctic from disintegrating.

The full *Climate Solutions* report can be found at: www.panda.org/climate



Climate Solutions

Each wedge depicts technology capable of averting dangerous climate change. Each "climate solution wedge" grows over time. The sum of all wedges becomes significant as industrial capacity and deployment increase in scale. The yellow line refers to the energy demand projection in the SRES A1B scenario. Since energy-efficiency technologies are shown alongside energy supply from low-emission sources, the results are expressed in final energy supplied or avoided (rather than primary energy production). To download the full *Climate Solutions* report, go to: www.panda.org/climate



Graph: WWF International 2007

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WWF is the world's largest and most experienced independent conservation organisation, with almost five million supporters and a global network active in 90 countries. WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature. WWF continues to be known as World Wildlife Fund in Canada and the United States of America.

