Arctic Bulletin

No 2.06 • PUBLISHED BY THE WWF INTERNATIONAL ARCTIC PROGRAMME

The walrus and the climate

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Date of publication:
August 2006
ISSN 1023-9081

Cover: Walrus
Photo: Staffan Widstrand, www.staffanwidstand.se

Printed at Merkur-Trykk AS on 100% recycled paper.

Editorial

Time to act

It's said that those who can, do; those who can't, are critics. Something similar can be said about the current enthusiasm for arctic research and monitoring, and the lack of progress on creating protected areas in the Arctic. Monitoring, while essential, is no substitute for acting to conserve habitats and species.

In 2000, the Arctic Council's Program for the Conservation of Arctic Flora and Fauna (CAFF) produced a book, *Arctic Flora and Fauna: Status and Conservation*. It provided an excellent overview of the status of arctic ecosystems, habitats and species, based on information available at the time. The authors concluded that while the state of the arctic environment was still generally good, the threats to its continued health were growing, particularly from outside the Arctic. In preparing the book, the authors found that much of the information on the status and trends of arctic flora and fauna was fragmentary, and that a lot of data was lacking altogether. More and better monitoring was needed if scientists were to identify shifts in important biodiversity parameters, and managers and policy-makers were to be able to make informed decisions about the arctic environment. That was six years ago; how has the Arctic fared since? And has the knowledge gap been filled?

The pressures on the arctic environment are mounting – both in scale and in speed. The impacts of climate change are already real and dramatic; pollution from chemicals is better understood and worse than feared; habitat fragmentation continues and will increase as oil and gas pioneers seek out some 25 percent of the world's unexploited reserves that they say lie in the Arctic; and over-fishing is on an upward curve in arctic waters. The region is in the early stages of a period of rapid and large-scale change. Slowing this change by reducing the threats to arctic biodiversity will require large scale and coordinated international action.

The good news is that arctic countries have committed to the UN Millennium Development Goals, including those on ensuring environmental sustainability and eradicating poverty, and to reducing the rate of biodiversity loss by 2010. However, there remain major gaps in data, limited understanding of the status of key species and populations, and poor biodiversity monitoring systems. As a result it will be nigh on impossible to measure whether or not biodiversity loss is, in fact, being reduced.

It was, therefore, encouraging to hear at the recent CAFF biennial meeting in Finland, that the Arctic Council, through CAFF, is now putting substantial resources behind an effort to establish a solid and effective arctic biodiversity monitoring network. This initiative, the Circumpolar Biodiversity Monitoring Programme (CBMP), is set to deliver information on arctic biodiversity to aid scientists, managers and decision-makers in assessing status and trends. Canada has stepped up to lead this important initiative, which if managed well and supported by the Council members, should be a key delivery mechanism for information needed by all the arctic countries in their reporting on their 2010 biodiversity commitments.

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However, it's one thing to have tools to report on status and trends, but quite another to have tools and resources to address, stop and reverse negative trends. WWF wants arctic nations to show global leadership on monitoring, assessing and reporting on biodiversity, but we also want to see plans and actions that ultimately ensure the preservation of arctic biodiversity.

In the past, the Arctic Council has had several opportunities to follow up groundbreaking assessments, such as the AMAP and ACIA reports, with policy recommendations and commitments to take action. But due to the complexities of multilateral cooperation, as well as the decision-making mechanisms within the Council, the follow-up of such assessments has, in WWF's view, mostly been disappointing. And that particular trend looks set to continue.

It was disappointing to experience another missed opportunity to take action, at the CAFF meeting in Finland. There the Circumpolar Protected Areas Network (CPAN) initiative, which has been on the CAFF work plan since 1996, was once again put "on hold". Despite continuing documentation of the need for improved protected areas planning and management, CPAN continues to lack funding, support and a lead country to move it forward. Well-functioning protected areas are precisely the kind of tools needed to address the looming threats to arctic biodiversity, yet there seems to be no willingness at the regional level to engage in planning for and implementing a truly representative arctic protected areas network.

The Arctic is uniquely well positioned to deliver on international commitments to have functioning representative networks of protected areas in place on land by 2010 and in the sea by 2012, the goals set under the Convention on Biodiversity's programme of work on protected areas. However, it will take strong political leadership and well-coordinated efforts from all the arctic countries if these ambitious goals are to be met.

BOWHEAD NEAR SVALBARD

Scientists have spotted eight bowhead whales near Svalbard. The sightings give a glimmer of hope for the recovery of the "Spitsbergen stock" of bowheads, a population that is critically endangered.

EXXON VALDEZ EFFECT

Alaska continues to feel the effects of the Exxon Valdez disaster in 1989 when more than 41 million litres of heavy crude oil were spilled into Prince William Sound. A study by the National Marine Fisheries Service in Juneau has found oil buried in sand and silt that only becomes dry during the lowest tides. This area is prime feeding ground for sea otters, ducks and other wildlife.

SHELL A HOSTILE FORCE?

Kaktovik, a community in northern Alaska, has described Shell Oil as a "hostile" force in the community. Shell plans to bring several vessels to carry out seismic work in waters in the Chukchi and Beaufort Seas, near traditional whaling grounds. However the city's council has become angry with the company's failure to address local concerns in a "respectful, timely, and professional" manner.

BP FACES PROBE

BP could face a criminal investigation in the US over a massive oil spill in Alaska's North Slope in March 2006. The *Financial Times* newspaper has obtained internal emails that reveal BP has been ordered to hand over a number of documents and other data relating to the leak thought to be caused by a corroded pipe. The spill of over one million litres discovered at Prudhoe Bay field, is the largest ever on Alaska's North Slope.

Bathurst Inlet conservation plan

A collection of organisations in the community of Bathurst Inlet in Nunavut, Canada are working together to ensure that a large-scale road project does not diminish the regional environment, local culture and history.

In May 2005, the Bathurst Inlet Road and Port Committee (BRPC) was awarded a Tourism and Conservation Grant by the WWF International Arctic Programme for the development of strategic plans and guidelines to mitigate the potential conflicts and impacts of the Bathurst Inlet Port and Road Project (BIPRP).

The BIPRP will see the development of a deep-sea port in Bathurst Inlet and a 211-kilometre all weather road to make it easier to extract and transport resources from the region.

The project is a 50/50 joint venture between Nuna Logistics Limited and Kitikmeot Corporation, both Inuit-owned.

The BRPC is a partnership of the community of Bathurst Inlet (*Kingaunmiut* – "People of the Nose"), the Burnside Hunters and Trappers Organization, Kingaunmiut Ltd (an Inuit owned business), Bathurst Inlet Developments and Bathurst Inlet Lodge (an ecotourism based business, which is an Inuit owned partnership).

The BRPC strategy is to agree upon protection and conservation guidelines for the Inlet with an emphasis on education programmes and a two-way dialogue with the developer. If mutual concerns cannot be met, then the BRPC will not support the development.

A set of guidelines must also be developed to plan for unavoidable impacts, and the loss, potential removal and relocation of significant features.

BRPC has recommended that the proposed strategies and guidelines be used as a "Document of Conditions" for the approval of the development, which if accepted, would ensure that the BRPC would have a significant role in their implementation.

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Bishop Jack Sperry points out a tent ring are not lost if the Bathurst Inlet port and

Tourism agreement to protect Svalbard

WWF and arctic tour operator Spitsbergen Travel have signed an agreement that will increase awareness about the arctic environment among tourists, company employees and business partners.

Spitsbergen Travel, based in the Svalbard archipelago, will support WWF's work in the Arctic for three years through a joint climate project in which the tour operator has committed to analyse its energy use and reduce its emissions.

Spitsbergen Travel, which represents 80 per cent of the locally-run tourism market will also reduce the environmental impact of its hotels, and tell visitors to Svalbard about environmental issues in the Arctic.

The Arctic has long been a popular destination for tourism. Visitors have been coming to Svalbard since the 1890s.

Jan Sverre Sivertsen, Spitsbergen Travel's CEO, said: "The Arctic is the basis of our business so we must care for it.

"We want to do our part to protect it and hope that this cooperation will be positive both for Spitsbergen Travel

Photo: Bathurst Inlet Lodge

at an old Inuit camp site in Bathurst Inlet. A local group is working to ensure that locations such as these road are developed.

and WWF, but more importantly for arctic nature."

The latest findings indicate that the Earth is warming faster than at any time in the last 10,000 years and climate change in the Arctic is expected to be among the greatest of any region on Earth.

Damage done to the fragile arctic ecosystems is extremely long lasting. In some cases, it may be irreversible. Populations of some whales are still dangerously low after centuries of hunting even though most commercial whaling has ceased. And fish stocks in some arctic waters are being fished to extinction, while sea birds and even polar bears suffer from overhunting.

Samantha Smith, director of WWF's International Arctic Programme, said: "Tour companies can make a big difference in the Arctic.

"They can set an example by running their business in an environmentally-friendly way. They can also educate their guests, who ideally will return home inspired to make a difference on climate change and other issues."

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WORLD ENVIRONMENT DAY 2007

Norway has been chosen by the United Nations Environment Programme (UNEP) to host the main celebrations of World Environment Day 2007. A range of events, reflecting the threats from global warming to the people and wildlife across the world, are to be staged in Norway's most northerly city Tromsø, as well as Oslo and other Norwegian cities.

SENATE PASSES POLAR BEAR ACT

The US Senate has moved to implement a treaty between Alaska and Russia that outlaws the trade of polar bears. It amends the Marine Mammal Protection Act to enforce the US-Russia Polar Bear Agreement, prohibiting the possession, sale, transport or purchase of any polar bears or polar bear products without special approval. The measure also establishes a commission to identify polar bear habitat, develop recommendations for habitat conservation and set limits for subsistence hunting of polar bears. The bill still needs to be passed by US House of Representatives.

UNIVERSITY OF THE ARCTIC

The University of the Arctic (UArctic), a cooperative network of universities, colleges, and other organisations committed to higher education and research in the North, has celebrated its fifth anniversary by thanking individuals who have helped make it a success. During the opening session of the 9th Council of UArctic meeting at Bodø University College in Norway, the organisation reflected on its past and how much it has accomplished. Visit its website at: www.uarctic.org

Grizzly polar bear hybrid

In recent years, biologists have noticed a gradual increase in the number of grizzly bears in arctic regions.

A bear shot by an American hunter in the Northwest Territories (NWT), Canada, last April, was confirmed by DNA test to be a cross between a grizzly and a polar bear.

The bear had many grizzly characteristics, such as long claws, a concave facial profile, and a humped back. Its white fur was interspersed with brown patches.

Roger Kuptana, the hunter's guide, was very surprised as most observed encounters between the species are usually aggressive. Kuptana said: "Some of the elders here in town say in the past there's been grizzly sightings but usually they fight."

Scientists with the NWT Department of Environment and Natural Resources believe that this could be the first confirmed hybrid.

The polar bear and grizzly have been interbred in zoos.

In the last 15 years, biologists have noticed a gradual increase in the number of grizzly bears in arctic regions. Locals and biologists believe that it could be related to global warming, which is making the northern climate more hospitable for the grizzly, coupled with the erosion of grizzly territory in the south.

Grizzlies have been seen on the sea ice and seal meat has been found in their stomachs indicating their adaptability to the arctic sea ice environment.

David Paetkau, a geneticist with Wildlife Genetics, in British Columbia, Canada, believes that interbreeding between the species could have adverse effects for the future of polar bears.

Paetkau said: "As grizzly bears expand their range north, (interbreeding) becomes another potential threat to polar bears. If there's

Ivory gull and walrus endangered

The Committee on the Status of Endangered Wildlife (COSEWIC) in Canada has added the ivory gull and the Atlantic walrus to the list of more than 500 Canadian species now considered at risk of extinction.

The snow-white ivory gull, whose numbers have declined drastically in Canada, was assessed as Endangered. The Atlantic walrus, now at very low numbers in some areas and in need of improved management, was assessed as Special Concern.

The committee estimates that there may be less than 15,000 Atlantic walruses left in Canadian arctic waters.

Dr Andrew Trites, co-chair of the marine mammal specialist group for COSEWIC, told the Canadian Broadcasting Corporation that the populations seem to be particularly low in the south-east part of Hudson Bay and in Baffin Bay.

Trites said: "We're concerned about that, and we're basically letting people of Nunavut and people of Canada know that things are not all well with walrus."

COSEWIC assesses the national status of wild species that are considered to be at risk in Canada. Species in danger of extinction are designated as Endangered, Threatened, or Special Concern, according to the degree of risk and nature of the threats.

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Photo: © Steven Kazlowski, www.lefteyepro.com

too much inter-breeding, the grizzly bear genes could eventually wash out the polar bear, and they could become basically grizzly bears with a little more northern habitat."

Ultimately, the northern move might only be a temporary advantage for the grizzly bear. According to bear biologist Andy Derocher, grizzly bears are a "population at the edge." The effects of climate change on caribou populations, a grizzly food source, and the decline of sea ice and tundra could also threaten the species.

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Polar bear poacher caught

A poacher has been arrested and tried for killing five polar bears in the Taimyr district of the Russian Arctic.

According to the Regnum News Agency, the resident of Dikson, in the Taimyr district, killed five polar bears around Omulevaya Bay, 100 kilometers south of the village.

The poacher was arrested when he returned to his garage with the bear skins.

Vitaly Yurin, the public prosecutor for the Dikson Region, said that this is the first time someone was tried for poaching since 2000.

Evgeny Kutyrev, the poacher, was given a two-year probation sentence and a 50,000 rouble penalty ($US 1,900)

There are about 22–25,000 polar bears around the Arctic, with about 7,000 in the Russian Arctic. The polar bear is listed on endangered species lists, such as the Red Book of Russia and the IUCN (International Union of Nature Conservation) Red List, and is strictly protected by the Government, but poaching continues.

A WWF investigation has revealed that each year, about 55–60 illegal polar bear skins are sold on the Internet, at an average price of $4,700 US.

WWF experts believe that poachers in the Russian Arctic kill about 200–300 polar bears each year. A separate survey carried out by a local senior game manager in Chukotka had similar results.

The main places of illegal poaching are the coastal villages of the Chukchi Sea, the southern part of Novaya Zemlya, and around Dikson village.

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*TRAFFIC is joint programme of WWF and the World Conservation Union (IUCN) that works to ensure that trade in wild plants and animals is not a threat to the conservation of nature.

Track polar bears on your PC

The WWF Polar Bear Tracker website is now 'live' again and following two new bears and their cubs on the Svalbard archipelago, between Norway and the North Pole.

Their positions are beamed regularly from collars on the bears' necks, via satellite to scientists at the Norwegian Polar Institute (NPI) in Tromsø, Norway, and then to the Polar Bear Tracker website.

The bears were fitted with radio collars in April 2006 by Magnus Anderson and Jon Aars, polar bear researchers with NPI.

A total of 80 bears were tagged and 15 were fitted with collars this season. The bears were also weighed and samples of blood, fat and DNA were collected for analysis.

The researchers noted the warmer weather this year that allowed them to travel further north.

Anderson said: "This year's very unusual weather and ice conditions made it possible for us to go to areas that seldom are reachable with ships at this time of the year. There was less sea ice in the Svalbard area this year than recorded in a very long time, and the temperatures were a record high."

The World Conservation Union (IUCN) recently listed the polar bear as "threatened" on the 2006 Red List of Threatened Species. The species is under threat from climate change, which is literally melting their home.

To learn more about WWF's work to protect polar bears or to track the bears, visit: www.panda.org/polarbears

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A walrus pup alone in the Arctic Ocean, one of nine calves seen swimming far from shore and presumed to have died.

Walrus calves stranded by melting

A research team, led by Lee W. Cooper, a biogeochemist at the University of Tennessee, has reported an unprecedented number of unaccompanied and possibly abandoned walrus calves in the Arctic Ocean, where melting sea ice may be forcing mothers to abandon their pups as the mothers follow the rapidly retreating ice edge north.

Nine lone walrus calves were reported swimming in deep waters far from shore by researchers aboard the US Coast Guard icebreaker *Healy* during a cruise in the Canada Basin in the summer of 2004.

The findings of the research have recently been published in the April 2006 issue of *Aquatic Mammals*.

Lone walrus calves far from shore have not been described before and the sightings suggest that increased polar warming may lead to decreases in the walrus population.

Carin Ashjian, a biologist at Woods Hole Oceanographic Institution and a member of the research team, said: "We were on a station for 24 hours, and the calves would be swimming around us crying. We couldn't rescue them."

The researchers found evidence of warmer ocean temperatures that may have rapidly melted seasonal sea ice over the shallow continental shelf where walruses dive to feed on bottom-dwelling animals such

WWF report shows toxic impact

Growing evidence shows that pernicious chemicals are already affecting the health of many arctic animals, such as polar bears, beluga whales, seals and seabirds, according to a new WWF report.

While it is still difficult to establish a direct cause-and-effect relationship, there is strong reason to link chemical pollution to immune suppression, hormone disturbances or behavioural changes in arctic wildlife, the report says.

Several arctic-wide studies have confirmed that top predators such as polar bears and beluga whales are heavily contaminated with chemicals such as the banned polychlorobiphenyls (PCBs) and organochlorine pesticides. But scientists stress that newer chemicals such as brominated flame retardants and fluorinated chemicals add to the toxic burden of arctic species.

Researchers found that the presence of the PBDE flame retardant chemical in harbour seals was linked to changes in white and red blood cell counts.

Samantha Smith, director of the WWF International Arctic Programme, said: "We can no longer ignore the proof that chemicals are damaging the health of wild animals. And now, on top of the old banned chemicals such as DDT, newer ones accumulate in, and affect polar bears, beluga whales and other arctic species."

WWF is concerned that the interaction of toxic pollution with other current threats to the Arctic, such as climate change, habitat loss and reduced food supply, will put the survival of many of the region's animal species at risk. The chemical contamination of the Arctic has also implications for the health of some indigenous peoples who rely on a traditional marine diet, according to the report.

The global conservation organization calls for an urgent and significant strengthening of the European Union's proposed REACH chemical legislation. As it stands, REACH would fail to identify and replace the most hazardous chemicals.

"There is no time to lose, evidence accumulated so far is more than sufficient to urge EU legislators to resist further pressure from the industry and move to a more precautionary chemicals legislation," said Samantha Smith. "Only a strong REACH will drastically reduce the chemical footprint both in the Artic and globally."

The report, *Killing them softly… Health effects in artic wildlife linked to chemical exposures*, is available at www.panda.org/arctic/toxics.

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Photo: Carin Ashjian, Woods Hole Oceanographic Institution

Arctic winter sea ice at record low

sea ice

Scientists recorded a record low winter sea ice extent this March in the Arctic.

Sea ice extent, or the area of ocean that is covered by at least 15 percent ice, was 14.5 million square kilometres for this March, as compared to 14.8 million square kilometres for March 2005, the previous record low.

The arctic sea ice shrinks during the summer and recovers during the winter. The ice reaches its maximum extent during March, with a long-term (1979–2000) monthly mean extent of 15.7 million square kilometres.

Winter sea ice extent has begun to show a significant downward trend over the past four years.

The record low was recorded by the National Snow and Ice Data Centre (NSIDC). Satellite records date back to 1979.

The weakening winter recovery trend is not as striking as the more dramatic trend for sea ice minimum coverage (see "Arctic melt accelerating" in *Arctic Bulletin* 04.05).

Changes in the sea ice minimum extent are especially important because more of the sun's energy reaches Earth's surface during the arctic summer than during the arctic winter.

Sea ice reflects much of the sun's radiation back into space, whereas dark ice-free ocean water absorbs more of the sun's energy.

So, reduced sea ice during the sunnier summer months has more of an impact on the Arctic's overall energy balance than reduced ice in the winter.

The lower winter extents are still important, however, because they reflect the pattern of reduced sea ice that scientists have already seen. Low winter recovery means that the ice is freezing up later in the fall and growing at a slower pace in the winter.

Walt Meier, of NSIDC, said: "Poor winter recovery of the sea ice leads to less new ice growth and thinner ice. The weaker the ice at the end of winter, the more easily it melts the following summer."

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as clams and crabs.

The research team wrote: "If walruses and other ice-associated marine mammals cannot adapt to caring for their young in shallow waters without sea ice available as a resting platform between dives to the sea floor, a significant population decline of this species could occur."

Adult Pacific walrus forage for food by diving as deep as 200 metres down to the seafloor and using sensitive facial bristles to locate prey. Sea ice normally forms over the continental shelf north of Alaska and persists even in summer. Adult walrus use the sea ice as a resting platform; mothers leave the calves there and dive to the bottom for food.

Source: Woods Hole Oceanographic Institution

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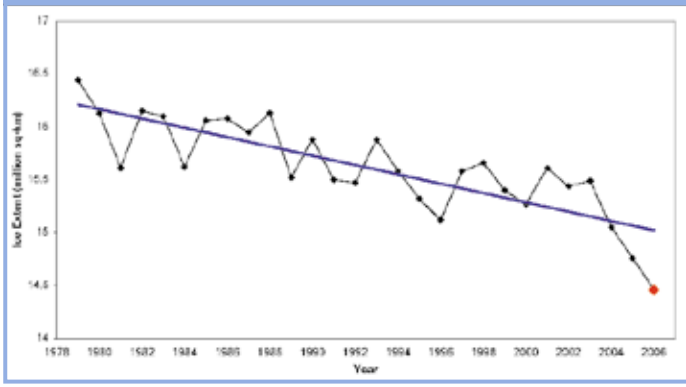
March 2006 mean sea ice extent, indicated by the red dot, is 300,000 square kilometres less than the 2005 record.



Graph: National Snow and Ice Data Center

UK politicians witness climate change impact in Arctic

WWF hosted a visit by the UK Conservative Party to the Svalbard archipelago in the Barents Sea from April 19th to 21st.

Conservative Party Leader and Leader of the Opposition David Cameron, MP, and Greg Barker, MP, the Conservative's Climate Change Spokesman and Shadow Minister for the Environment, visited Longyearbyen and Ny Ålesund where they heard from scientists and WWF about the impact of climate change in the Arctic.

They also visited the Scott Turner Glacier by dog-sled as part of the trip. The Scott Turner Glacier has lost nearly half its mass in the past 100 years as a result of climate warming.

Cameron said: "This has been an incredibly impressive visit and I am very grateful to WWF. Seeing the Scott Turner glacier first hand, which is being impacted by climate change, brings home the challenge of global warming.

"It's very important to understand the impact of climate change on the Arctic, which is experiencing rapid temperature rises and ice melt – which will in turn have an impact around the globe."

The Conservative team also heard from WWF about the record arctic sea ice 'lows' in recent years. Satellite imagery showed that this winter an area three times the size of the Svalbard archipelago was free of ice in January while record warm sea temperatures have also been recorded in the Barents Sea.

Cameron said: "Seeing this with ones own eyes brings home the importance of the problem and the need to re-double efforts to do something about it."

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H.S.H. Prince Albert II encourages his 'lead dog' before departing.

Photo: Palais Princier de Monaco

Prince Albert II of Monaco reaches North Pole

His Serene Highness Prince Albert II of Monaco reached the North Pole in April 2006, after a four-day expedition to highlight global warming.

He was following in the footsteps of his great-great-grandfather, Prince Albert I, who made several arctic trips more than a hundred years ago.

The Prince's great-great-grandfather, known as the father of oceanography, explored Svalbard in the early part of the last century. His team of scientists studied glaciers, mapped previously unknown areas on Svalbard, and carried out other scientific research. Their work is still used by arctic scientists today.

The Prince told news reporters after his trip that he had seen the effects of global warming during the trip, with some channels to the Pole barely frozen.

He said: "We must try to find solutions to global warming. I think everyone by their behaviour can make their small contribution to a global and extraordinary effort."

WWF briefed the Prince on the range of environmental threats confronting the Arctic, and accompanied him to Svalbard last July on an earlier trip to the Arctic.

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US to map energy resources for IPY

Researchers in the UK have joined WWF in expressing reservations abouta US plan to map arctic energy resources as part of their International Polar Year (IPY) activities.

The US Geological Survey (USGS) will assess undiscovered resources including oil, gas, coal-bed methane and methane hydrates.

Major oil companies BP and Statoil are listed as USGS affiliates on the IPY website.

In an interview with the UK newspaper, *The Guardian*, Chris Rapley, the director of the British Antarctic Survey, said: "I would be very uncomfortable with a project that simply was out to log the hydrocarbon reserves of the Arctic as a geological activity. I don't think that fits very comfortably within either the scientific guidelines or the ethical underpinning of the IPY."

The IPY will be a period of intense research aimed at understanding the polar environments and our relationship to them. A significant amount of study will be dedicated to understanding the effects of climate change.

Rapley has questioned the ethics of an IPY project that could potentially supply energy companies with a map to access and extract fossil fuels, a significant cause of human induced climate change, from pristine environments in the Arctic.

The IPY project is part of the USGS Arctic Energy Assessment, which falls under their World Energy Project – a global attempt to map untapped hydrocarbon fuel reserves.

World Energy Project participants include major oil companies ExxonMobil, Amoco, Conoco, Texaco, BP and PetroCanada.

WWF raised similar concerns at the Arctic Council Senior Officials Meeting last April.

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Arctic peoples ask EU to stop polluting them with chemicals

A recent gathering of arctic indigenous people met with conservationists and scientists in Brussels to send a message to the European Parliament about the impacts of toxics in the Arctic. Noemi Cano **of the WWF DetoX Campaign reports.**

Despite its remote location, the Arctic has become the world's toxic sink. Air and water currents transport hazardous chemicals from industrialised areas like the EU to the the Arctic, where they accumulate in the environment and the bodies of its inhabitants. As a leading chemical producer, the EU must assume its responsibility in the situation and take immediate action to reduce the chemical footprint in the Arctic and everywhere else.

This is the essential message that a delegation of arctic indigenous peoples carried to the Members of the European Parliament in Brussels at a conference organised by the Arctic Council Indigenous Peoples' Secretariat and the Arctic Monitoring and Assessment Programme, with the support of WWF.

At the conference, Dr Jon Øyvind Odland, from the University of Tromsø in Norway, denounced the fact that "already banned chemicals but also new contaminants are being found in the bodies of arctic peoples, mainly due to ingestion of chemicals from traditional food".

Dr Odland says: "Until now we have very scarce research on human health effects of the new contaminants. However, that doesn't stop industry from producing and spreading them without any control."

In fact, results from the first study testing people living in the Arctic for newer, current-use chemicals, show that brominated flame retardants (BFRs) and the fluorinated chemical PFOS (used in household items such as televisions, computers and cooking pans) were detected in the blood of all 20 pregnant women tested in the northern town of Bodø, Norway, and in Taimyr, a town in the Russian Northern Siberia where there are no local sources or uses of these pollutants.

Furthermore, Dr Odland's observations in far east Russia show that "there is a positive correlation between the amount of PCBs found in the mothers and the number of baby girls being born, thus altering the natural balance in that region".

Rune Fjellheim, executive secretary of the Indigenous Peoples Secretariat (IPS), says: "The lives of arctic indigenous peoples are being radically impacted by chemicals that end up in the Arctic. Overall, these chemicals are neither produced nor used by us. We do not see their benefits, instead we suffer only their harmful effects on our health, cultures and ways of life."

An opinion shared by Alona Yefimenko, technical advisor to IPS. She says: "Arctic indigenous peoples may have to turn away from traditional foods because they are becoming so heavily contaminated. In some regions, the body burden of chemicals such as brominated flame retardants is expected to double every four or five years."

After hearing the evidence, Lena Ek, Swedish Member of the European Parliament that hosted the event, said: "We all believed this was an untouched area … but we now see what's happening and it's really terrifying".

But hazardous chemicals do not only have an impact on the life of the arctic peoples but also on the many species that live there.

Julian Woolford, from WWF's International Arctic Programme, says: "Marine mammals eat contaminated invertebrates, fish, birds and other mammals, thus increasing the accumulation of chemicals up the food chain. These chemical exposures in arctic wildlife have been linked to disturbances of the hormone and immune systems, vitamin A levels and altered behaviour."

Dr Odland says: "The Arctic is the predictor of global processes, so the situation in the Arctic now is a warning of what may happen to the European Union and other regions in the future".

Participants in the conference agree that REACH, the future EU chemicals legislation, offers hope to reduce the presence of toxic chemicals in the Arctic and everywhere else, by identifying and phasing out the most hazardous chemicals. But it can only achieve this if it is substantially strengthened.

Alona Yefimenko from the Indigenous Peoples Secretariat says: "We hope that the EU will take the lead and will bring in a new chemicals legislation that is a benchmark to which other governments around the world should aspire."

A new WWF report titled: *Killing them softly … Health effects of arctic wildlife linked to chemical exposures* outlines the effect of toxics on polar bears, beluga whales and seals. To download a copy of the report go to: www.panda.org/arctic/toxics

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Safe cruising in the Arctic

Magdalenefjord, Svalbard.

Photo: Miriam Geitz

The Svalbard archipelago, in the Norwegian Arctic, is a prime destination for cruise tourism. WWF's Miriam Geitz **reports.**

This summer, the port of Longyearbyen, and especially the west coast of Spitsbergen, the main island in the Svalbard archipelago, will be the destination for more than 40 cruise ships and their passengers. While cruises have visited the islands for more than a century, tourism activities – both ship- and land-based – have increased considerably in the past 15 years; 2005 set a new record for the number of ships to the islands.

Cruising, of course, is a good way to see Svalbard during the summer. But it takes place when arctic life is at its most sensitive, growing and reproducing. So cruise tourism presents a number of risks to the environment, such as pollution, disturbance and destruction of vegetation. The size of these risks depends on a number of factors, including ship size, passenger numbers, location and, not least, the knowledge and awareness of cruise operators and tourists, and human error. Managing these risks has been a challenge for Norwegian authorities, WWF and parts of the cruise industry for the last three years.

In 2003, the WWF International Arctic Programme received support from Norwegian authorities to evaluate the existing and potential environmental impacts of cruise tourism on Svalbard. The strategy was to adopt an open and constructive dialogue between Svalbard authorities, WWF and the cruise industry. WWF wanted a 'win-win' solution. The aim of the project was to establish best practice procedures for cruise tourism on Svalbard.

Kjerstin Askholt, director general of the polar department of the Norwegian Ministry of Justice and the Police, says: "Norwegian authorities have very ambitious environmental goals for Svalbard and this has to be reflected in the way cruise tourism is managed on the islands. Addressing the challenges through a cooperation between federal and local authorities, industry and WWF has been an exciting approach."

Since 2003, WWF has compiled information on how cruise tourism impacts the Svalbard environment. WWF presented its findings in a report, published in October, 2004, *Cruise tourism on Svalbard – a risky business?* (the report can be downloaded at www.panda.org/arctic).

Simultaneously, the Association of Arctic Expedition Cruise Operators (AECO) was founded to develop self-regulatory guidelines for tour operators to help ensure that risks to the enviroment are minimised.

More recently, the Norwegian Government has suggested measures to improve shipping safety, and so reduce the risk from oil spills from ships around Svalbard. The Norwegian Government proposes banning all but the least environmentally-damaging fuel type for any ships visiting the large nature reserves in East Svalbard. It will also impose restrictions on the size of ships, and the numbers of passengers they carry when visiting these areas. WWF also hopes that the restriction on fuel quality will soon encompass all shipping traffic in all of Svalbard's marine protected areas.

More assessments are underway and the cruise ship industry should also expect some areas to become 'no-go' areas for tourism, both because of the need to protect cultural heritage and vulnerable species and habitats.

Further discussions are now taking place to follow up still outstanding recommendations. An important factor in whether additional restrictions are introduced will depend on the cruise industry's willingness to develop and abide by self-regulatory guidelines to reduce its impact.

Kjerstin Askholt says: "We feel that the coastal cruise operators have shown a lot of responsibility in the process and AECO's self-regulatory guidelines have reduced the need for authorities to develop very detailed regulations. But we will follow further development in the industry closely and hope for a continued good cooperation with AECO."

WWF hopes the combined efforts of industry and government will mean sufficient protection for Svalbard's sensitive coastal and marine environment.

Miriam Geitz,
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The cruise ships visiting Svalbard fall into two categories:

- Those that visit the west coast of Spitsbergen as part of a trip to other parts of the Arctic, eg the Norwegian mainland or Greenland, and
- Those exploring the islands in more depth and operating out of Longyearbyen on either day trips or multi-day trips.

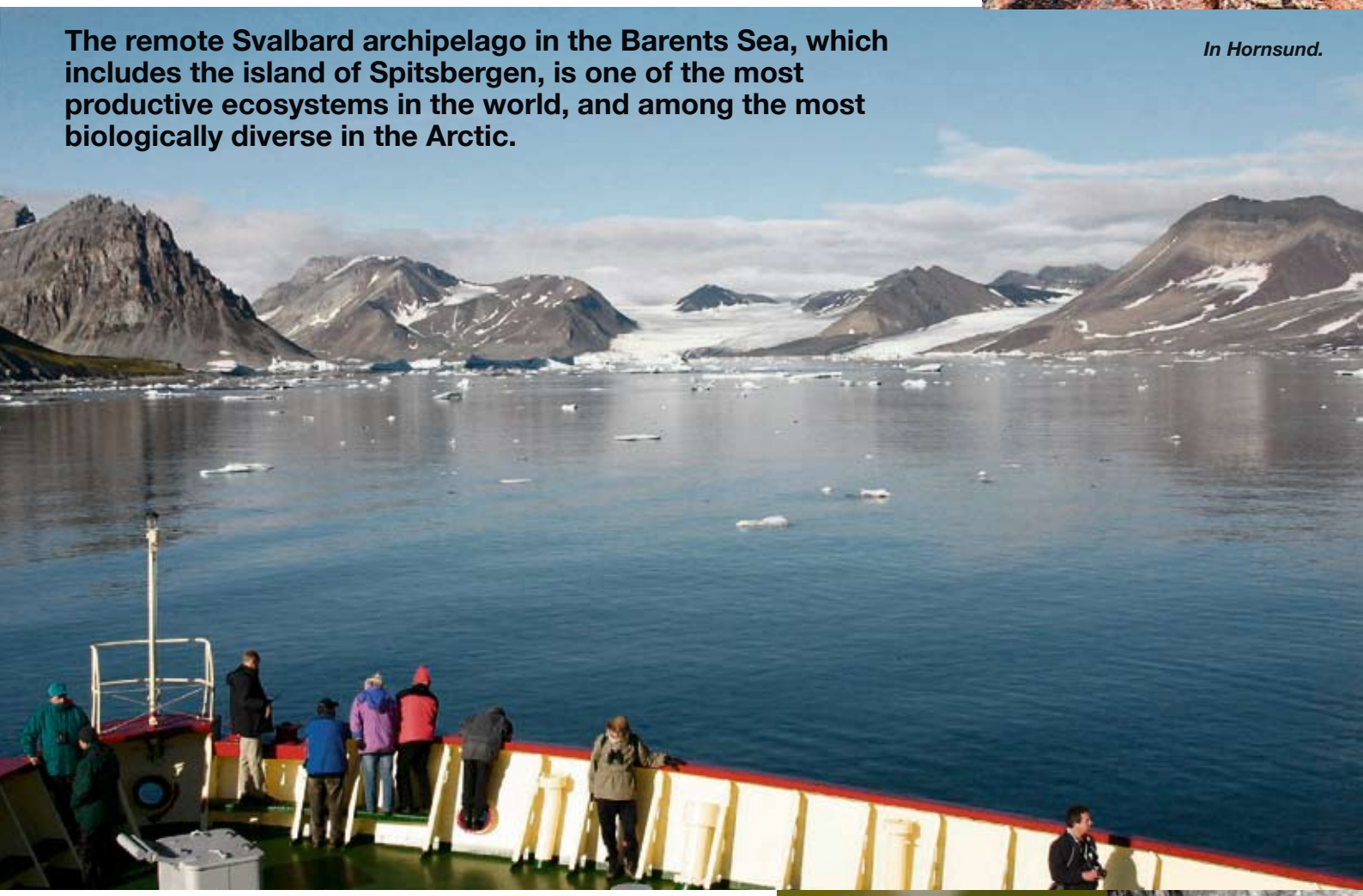
WWF *for a living planet*

Brünnich's Guillemot.

The Svalbard archipelago in the Barents Sea

AN ARCTIC PARADISE

The remote Svalbard archipelago in the Barents Sea, which includes the island of Spitsbergen, is one of the most productive ecosystems in the world, and among the most biologically diverse in the Arctic.



In Hornsund.

Photos: Miriam Geitz

Svalbard, and the seas and sea ice around it, are home to polar bears, seals, walrus, arctic fox, and Svalbard reindeer. Millions of seabirds breed here every summer, and the seas contain some of the largest fish stocks in the world as well as a number of whale species. Svalbard is also rich in historical sites from the early days of polar exploration, whaling and mining.

However, despite its remoteness, the islands are not immune to environmental threats.

Climate change is the greatest long-term threat to the Arctic, and has already begun affecting natural ecosystems and traditional ways of life at an alarming rate. Air and water temperatures are increasing on Svalbard, glaciers are shrinking and there is less sea ice around the archipelago.

Oil and gas exploration is a new threat: some 25 percent of the world's unexploited oil and gas reserves lie in the Arctic, some in the waters around Svalbard. Depleted reserves elsewhere in the world, coupled with high oil prices mean oil companies now see the Arctic as ripe for exploitation. With development will come a growing risk to biodiversity from increases in shipping to the potential for oil spills.

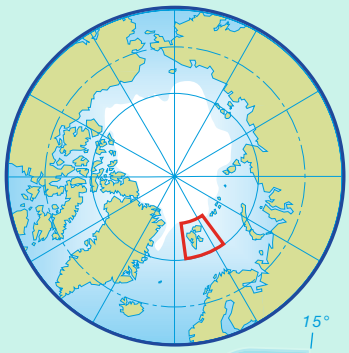
Illegal fishing is threatening the long-term survival of fish stocks, while damaging chemicals, used in everyday goods around the world, are now turning up in arctic wildlife, such as the polar bear.

Tourism too can threaten this fragile enviroment. Cruise tourism and day trips by ship have become increasingly popular, and unless their impact on the environment is limited, they will add to the existing stresses to these high arctic ecosystems.

Tufted saxifrage (Saxifraga cespitosa).

Near Alkefjellet.

SAVING SVALBARD'S TREASURES



National park

Nature reserve

Protected site

Bird sanctuary

0 50 100 km

Map adapted from original by Norwegian Polar Institute

NORDVEST-SPITSBERGEN NATIONAL PARK

OSSIAN SARS NATURE RESERVE

Ny-Ålesund

FORLANDET NATIONAL PARK

NORDRE ISFJORDEN NATIONAL PARK

SASSEN-BÜNSOW LAND NATIONAL PARK

Pyramiden

Longyearbyen

Grumantbyen

FESTNINGEN PROTECTED SITE

Barentsburg

NORDENSKIÖLD LAND NATIONAL PARK

Sveagruva

SØR-SPITSBERGEN NATIONAL PARK

Spitsbergen

Nordaustlandet

Barentsøya

Edgeøya

Kongsfjorden

Magdalenefjorden

Prins Karls Forland

Forlandsundet

Isfjorden

Van Mijenfjorden

Hornsund

Storfjorden

Hinlopenstretet

Vestfonna

Nordenskiöldbukta

80°

78°

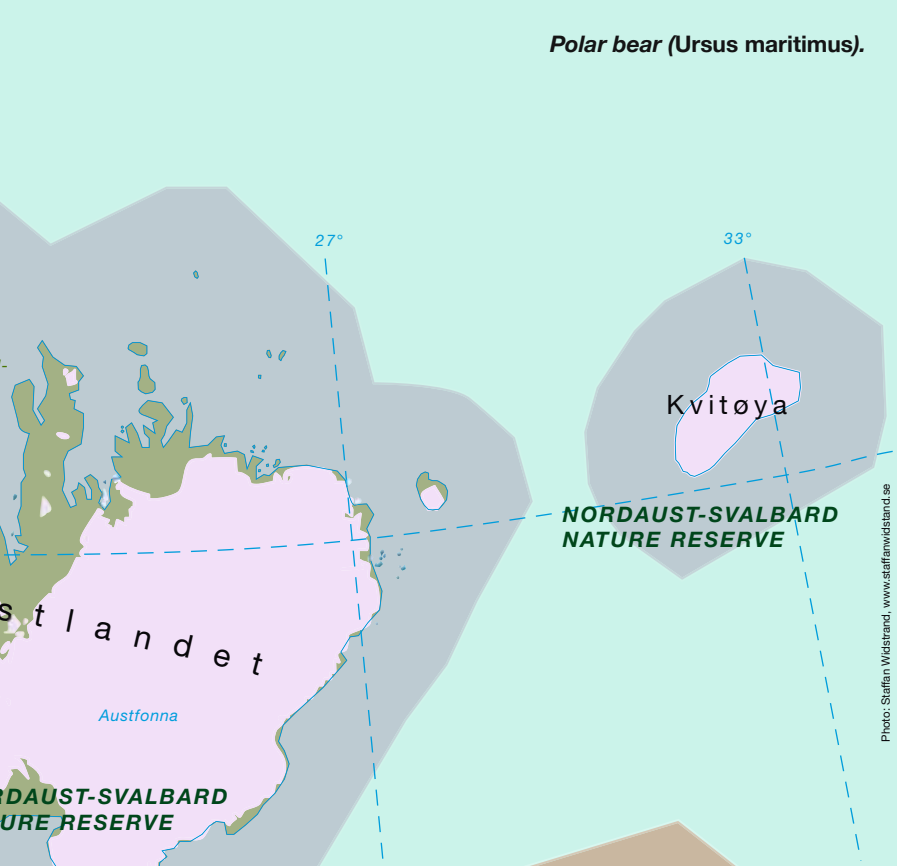
15°

21°

Svalbard is a refuge for walrus, ringed seals, bearded seals, beluga whales and other marine mammals. During the short and productive summer season, they can feed off the bounty of the Arctic Ocean relatively undisturbed. However, invisible stresses, such as toxic pollution and climate change, or noise and disturbance from increased shipping traffic or seismic activities from oil exploration, can affect wildlife.

Photo: Miriam Geitz

*Walrus (*Odobenus rosmarus*).*



***Polar bear* (Ursus maritimus).**

Photo: Staffan Widstrand, www.staffanwidstand.se

Polar bears are marine mammals and dependent on sea ice for food. There are about 3,000 polar bears in the Barents Sea region, a number that is likely to decrease considerably in the next 50 years as the climate warms and melts the sea ice.

Plant life on Svalbard is much more diverse than one might assume. Perfectly adapted to harsh conditions, delicate plants begin to grow as snow and ice recede and the polar summer brings 24 hour-daylight. But survival remains a struggle; vegetation is vulnerable to trampling and other physical impacts. A warming climate will also bring new species to Svalbard, and reduce the 'niche' occupied by existing arctic species.

Photo: Miriam Geitz

***Svalbard poppy* (Papaver dahlianum).**

Svalbard is the summer feeding and breeding ground for many millions of seabirds. Some species migrate extraordinary distances to take advantage of the richness of waters off Svalbard to breed and raise young. Most common are kittiwakes, Brünnich's guillemots, and little auks, but arctic terns (pictured) are also a familiar sight. A change in the availability of food as a result of warmer ocean temperatures or over fishing, can have devastating effects on bird colonies.

Photo: Miriam Geitz

***Arctic tern* (Sterna paradisaea).**

THREATS

CLIMATE CHANGE: The biggest threat facing Svalbard and the Arctic is global climate change. The average temperature in the Arctic is rising at twice the rate of the rest of the world. The Arctic Ocean is projected to be ice-free in summer by the end of this century.

OVER FISHING: Illegal and unmanaged fishing is a threat to the rich fishing grounds of the Barents Sea and Svalbard. While there is evidence that this activity is common to all parts of the Barents Sea, the situation in the international waters between Svalbard, Norway and Russia is worse; a free-for-all that has the potential to cause enormous long-term damage to fish stocks.

OIL AND GAS DEVELOPMENT: Oil and gas exploration is increasing in the southern Barents Sea between Svalbard and Norway. A number of licenses for exploratory drilling around Svalbard have also been applied for but so far denied. However, economic and political interests are driving the quest for 'black gold' and Svalbard's waters and coastlines remain threatened. With oil and gas exploration comes increased shipping and the risk of oil spills and pollution. Invasive species can also cause damage as they can enter the ecosystem from ships' ballast water.

TOURISM: Cruises and other tourism activities account for a large part of human activities on the islands. So far, these activities leave few traces behind. For this to remain the case, cruise tourism in particular must be conducted properly in the long run.

For tourists to be able to come and enjoy the unique natural and cultural values that Svalbard has to offer, tour operators, tourists, visitors and locals must minimise their impact.

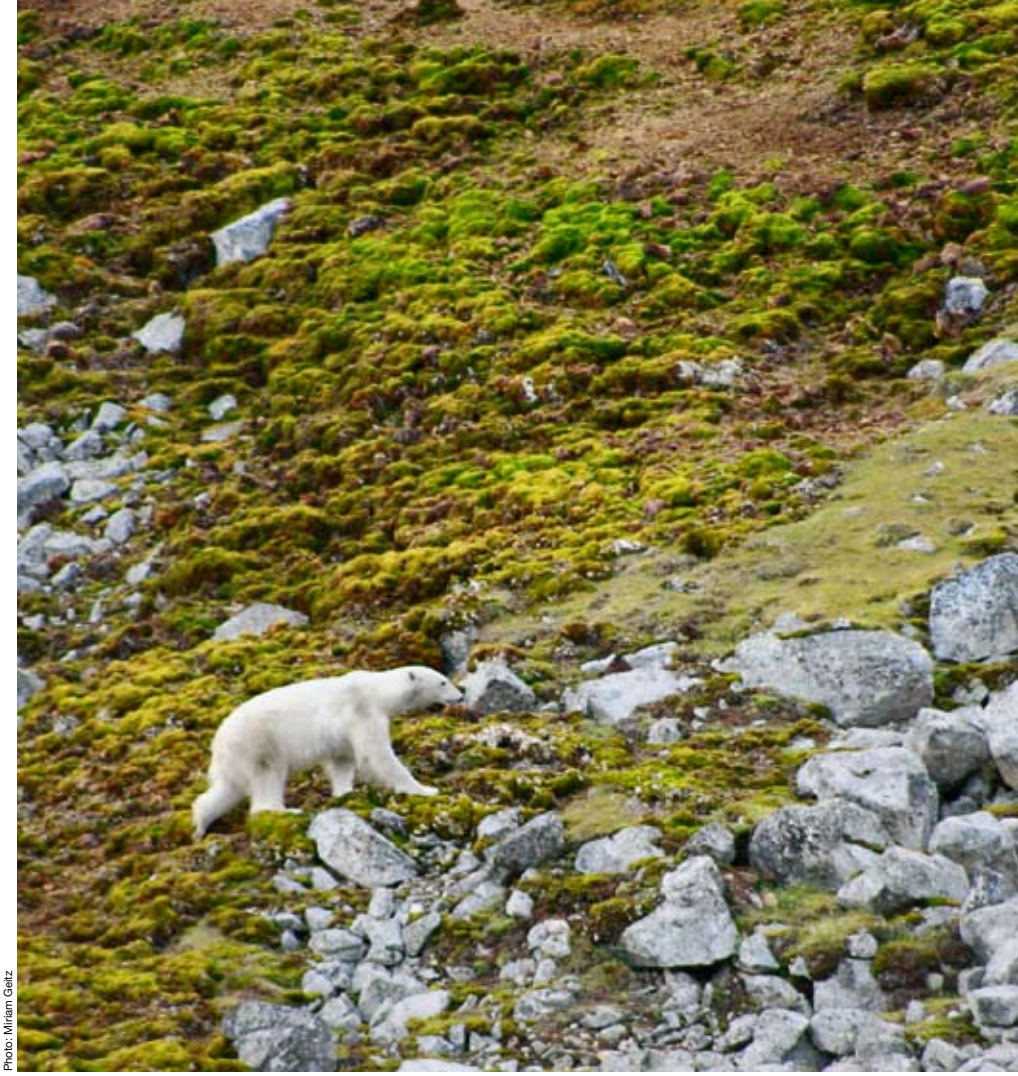


Photo: Miriam Geitz

How can you help?

Think about your impact on the environment:

As a consumer of resources, you can take action by
- reducing energy use, eg turning off lights and stand-by functions on electrical appliances, and buying energy efficient electrical appliances.
- switching to green energy companies or to exclusively renewable energy companies, eg buying electricity from alternative sources like wind or biomass.
- buying fish from certified fisheries, eg The Marine Stewardship Council.

For more information, visit www.panda.org and www.panda.org/arctic

As a tourist in Svalbard, consider the environmental profile of your cruise or tour operator. For a cruise or day trip, look for:
- activities in small groups because they give you a better experience and reduce the risk of damage to vegetation and disturbance to wildlife.
- knowledgeable guides because a good guide will teach you about the unique features of Svalbard and how they can be protected.
- the fuel used for your ship; marine gas oil is less damaging to the environment than heavy fuel oil if there is an oil spill.

On Svalbard, you can choose to travel with a tour operator organized in the Association of Arctic Expedition Cruise Operators (AECO). This industry-initiative works towards good environmental practise by its members, and thus less risk and impact on Svalbard's environment. AECO has also developed specific visitor guidelines.

■ WWF is one of the world's largest independent conservation organisations, with more than four million individual members and projects in about 100 countries. The WWF International Arctic Programme was established to coordinate and run the organisation's conservation efforts in the arctic region. The Barents Sea and Svalbard are a priority area for WWF's work to address the threats from climate change, over fishing and oil and gas

For more information on WWF's work on Svalbard and in the Arctic:

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This publication was made possible through the generous support by the Norwegian Ministry of Justice and the Police.

People, polar bears and walrus

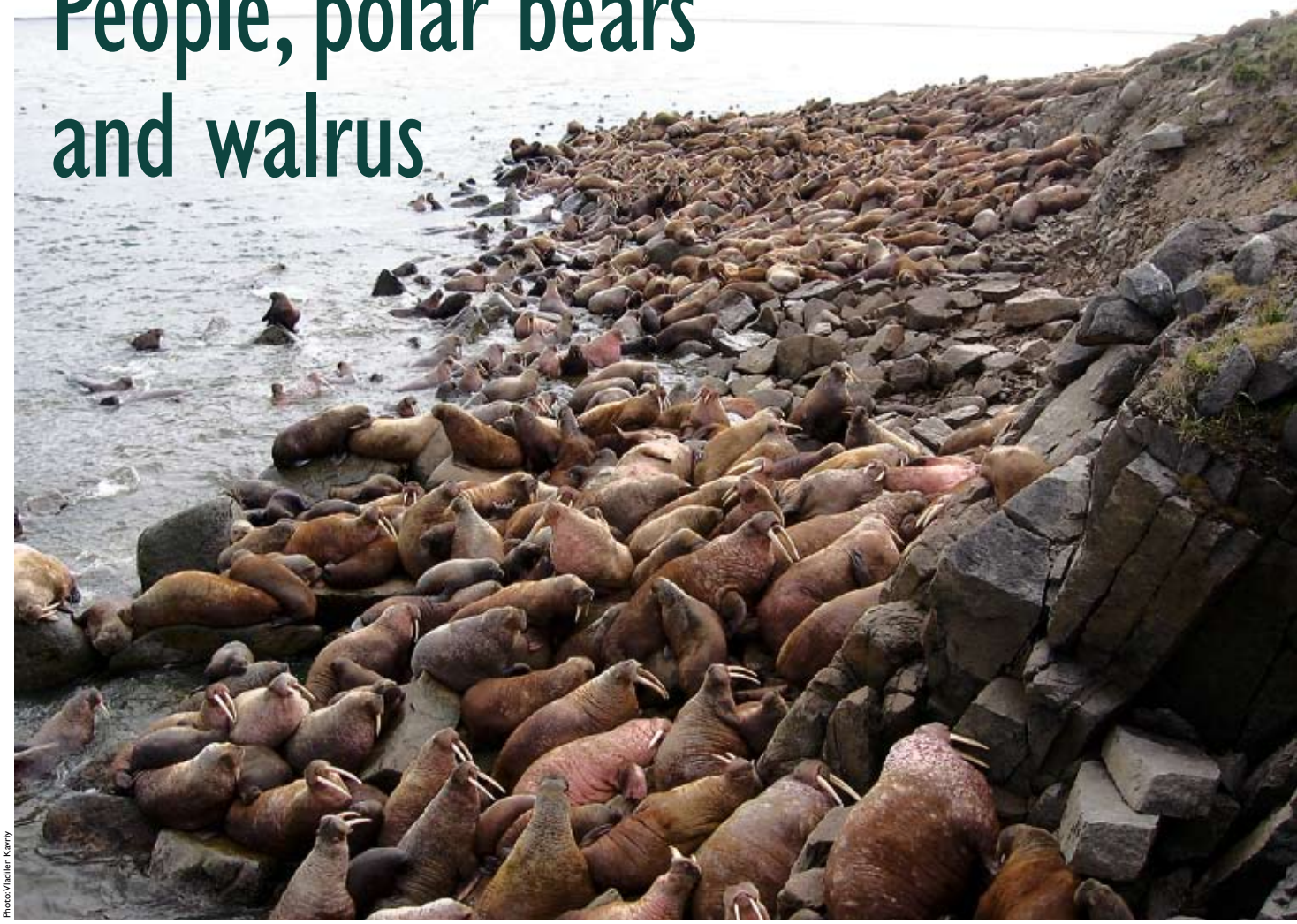

Photo: Vladilen Kavriy

A walrus haul-out near the Chukotkan village of Vankarem used by an estimated 35,000 walrus annually. As sea ice declines more walrus are forced onto the land to rest and find food.

Margaret Williams**, director of WWF's Bering Sea ecoregion programme, reports on Chukotkan villagers' work to monitor the impact of declining sea ice on the community, and the local polar bear and walrus populations.**

On the northern coast of Russia's Chukotka Peninsula, one community has witnessed the consequences of decreasing sea ice and is recording a whole chain of events affecting people, polar bears and walrus.

The village of Vankarem, with a population of around 200 people, is currently home to a walrus haul-out used annually by some 35,000 walruses.

Vankarem residents and biologists believe this haul-out to be truly unique: nowhere else in the world can one find such a high concentration of walruses so near to a human population. Even more amazing is the fact that the walruses began using this area less than ten years ago. With the ice now forming in deeper waters, the walruses must come into shore where they have easier access to their food source in the shallower depths

Vladilen and Sergey Kavriy, two brothers and residents of Vankarem, have been tracking the development of the haul-out and the consequences of having such great numbers of walruses in a place rarely used before by this species.

The Kavriys, both hunters and stewards of wildlife in this region, observe that because the walruses are crowding onto a steep and rocky cape in the Chukchi Sea, they cause rockslides and erosion which lead to stampedes of walruses below. The result each year is over one hundred animals that are squashed during these chaotic events – a phenomenon which would likely occur more seldom on the expansive and flat surface of the ice.

The appearance of large numbers of walrus carcasses is a welcome development for the polar bears. On their annual migration east towards the Bering Strait, they pass along the coast and are learning that Vankarem is an attractive foraging area.

This worries the Kavriys, however, as polar bears frequenting their village could lead to a fatal run-in with one of the village residents. Just this year, in the neighboring village of Reirkaipi, a young girl was killed by a polar bear, the second such occurrence in three years in that very village.

In March 2006, I travelled to Chukotka with Andrei Boltonov, senior biologist at the ➤ 14

13 ➤ Institute of Nature Conservation in Moscow, and Charles Johnson, director of the Alaska Nanuuq (Polar Bear) Commission to meet the Kavriys and the residents of Vankarem as well as the leaders and residents of the villages of Nutepelmen and Amguema.

The purpose of the visit was to learn first-hand about the residents' concerns and interests regarding polar bear conservation and management.

An additional goal of the trip was to inform community leaders about the status of the US-Russia polar bear treaty, which still requires implementing legislation in the US in order for the treaty to become active. Through community events and individual meetings, our international group held numerous discussions on a range of issues related to polar bears and possible solutions to address local concerns.

The WWF-led expedition to the north was part of a WWF effort to conserve the Alaska-Chukotka population of polar bears. Our approaches are multi-tiered, and one important step is working with local communities to reduce factors that stress the population of Alaska-Chukotka polar bears. For example, WWF is now supporting the development of polar bear brigades that would set up community patrols to ensure bears stay away from villages. The brigades will be modeled on the successful patrols across the Bering Strait in Alaska, which have helped to greatly reduce negative human-bear interactions.

Charlie Johnson says: "The patrols not only save people – they save bears, too." As an indicator of success, Johnson points out that there has not been a bear-related fatality in arctic villages in Alaska in 13 years.

Another aspect of WWF's community-based work in Chukotka includes supporting local efforts to protect and manage habitat and manage marine resources. For example, this year, WWF will support work by the Kavriy brothers and biologists Anatoly Kochnev and Andrei Boltonov to conduct a coastal survey of important habitat areas used by polar bears.

Additionally, the Kavriys are now leading an effort to establish a small protected area on the cape where the walruses congregate. WWF-Russia will lend its expertise in creating locally-run protected areas as the Kavriys and the community leaders of Vankarem prepare the necessary maps and documents. By designating this cape as a protected area they will prevent construction and other disturbances but still allow local residents to continue subsistence activities in the region.

Despite the huge challenge that climate change poses to conserving the community of wildlife, fish and birds that thrive along the unique and productive ice edge, WWF is hopeful that by working closely with local partners like the leaders of Vankarem, Nutepelmen and other coastal communities in Russia, as well as the Alaska Nanuuq Commission in the US, and other partners throughout the Arctic, we can make a difference for the future of wildlife and people, too.

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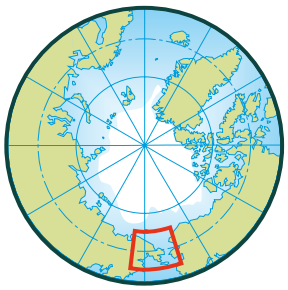

Camping an

Six young people from the UK and the Netherlands recently spent a week on the Greenland Ice Sheet as part of their six-month training to become climate ambassadors for the Climate Change College.

The Climate Change College is the initiative of Dutch polar explorer Marc Cornelissen, and is sponsored by Ben & Jerry's – the US ice cream company – and supported by WWF.

None of the future ambassadors had camped out in winter before. But they wanted to spread the word on the need to act urgently to control global warming, and their time on the ice provided them with important knowledge and experience.

The stay in Greenland included a few days in Ilulissat, West Greenland, to get a glimpse of life in the Arctic. After this "soft" start the ambassadors moved onto the Ice Sheet and spent a week with a team of scientists from Edinburgh and Aberdeen Universities. The ambassadors assisted the scientists by recording snow and ice measurements on the ground to validate satellite recordings from of the European Space Agency's CryoSat 2 mission.

The aim of the six-month programme is to give the participants the opportunity to experience first-hand the fragile environment of the Arctic, understand how climate change affects this region, and learn the skills to be 'ambassadors': after returning to their home countries, their task is to inspire the public to take action to reduce the impact of climate change.

Marc Cornelissen said: "It was quite a responsibility and challenge to set up and guide a two-week programme that included cultural and scientific aspects of climate change in the Arctic. But seeing the Arctic through the eyes of those who haven't been there was very inspiring. The students were clearly impressed. And so was I seeing how they picked up the challenge of working with the scientists on the Greenland Ice Sheet."

Read more at www.climatechangecollege.org

Tonje Folkestad
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d campaigning for climate

Blog entries from the Greenland Ice Sheet

Andrew Seagrave (24) NL
Dog-drawn sled trips over the mountains. The thunder of icebergs crumbling. The view from our hotel window. The flight here, when I realised how enormous Greenland really is. The humbling experience of standing on the edge of a fjord. A trip to the aquamarine Russels Glacier. This adventure is beyond words. The bison-like muskox here have a white patch on their backs, which they use to regulate their temperature by controlling blood-flow to this cooler area. Greenland is the 'white patch' of the northern hemisphere, and without it our climate will become chaotic.

Froujke Oostvogel (24) NL
Greenland is one of the most beautiful countries I've ever seen. The scenery here is white with colourful houses that the Inuit live in, and when we look out of the window we see icebergs! All we have learned the past months from the Climate Change College is taking shape now. It is so much easier to spread the word once seeing the problem and hearing stories from the Inuit. One direct consequence of climate change is the amount of snow here. There isn't supposed to be this much snow here in winter. This is because of less sea ice. Less sea ice causes more humidity, forming snow when contacting cold air.

Ben Richards (24) UK
Not only did the scientists give us Irish coffees at four in the afternoon the other day (it was too snowy for us to work, honest), but it's brilliant to have access to their expertise. Pete and Doug, the scientists, explained some of the various scenarios for the Greenland Ice Sheet in their tent. While it's not entirely clear what's going on up here, warmer temperatures due to an increase in carbon emissions could mean a number of things. For example, a temperature increase of between three and five degrees centigrade could melt the bottom of the Greenland Ice Sheet and cause sea level rises of two to three metres.

Ilona Bontekoning (20) NL
We've just been to Rodebay, a small village of about 50 people. Here we saw the traditional way the Inuit live together with nature, fishing and hunting. It made me realise that a changing climate will have big consequences for them because these people are so dependent on nature's resources. A warmer climate means less ice so less seals for them to hunt, and changing water temperatures means a disturbance of the fish and all the other animals, probably making them move to another place or die. The marine ecosystem is very fragile so we have to be careful to not disturb it.

Photo: Climate Change College|10

Hayley Potter (23) UK
Today's been another great day – its really warm here – only minus two, which is horrible as the snow melts on you and you end up really wet. I never thought I'd say this, but I wish it was colder; if it was colder I wouldn't be wet and miserable! Today we spent a very fruitful day getting hands on with the science stuff. Ruth and I spent the day laser levelling – basically mapping the contours of the Ice Sheet, which trust me is very flat. Every ten centimetres you take a reading and we managed 30 metres by 12 metres before the weather got so bad you couldn't see the laser. It's quite exciting stuff but it's the coldest job as you're standing and not doing a lot other than writing.

Ruth Cameron (22) UK
Yesterday was a really productive day. We dug a huge trench in the snow for sampling and mapping. It's fascinating to see the different layers of snow (now I know why the Inuit have 38 words for it!) and the layers of ice, which are evidence of warm spells when the snow has melted, percolated down and re-frozen. We also did some laser levelling yesterday, mapping out the texture of the snow surface along transects, but that is pretty chilly work because you don't move around much, so we took it in shifts.

Looking north for a global perspective on climate change

Sheila Watt-Cloutier**, chair of the Inuit Circumpolar Conference, explains the impact climate change is having on Inuit around the Arctic.**

Photo: Staffan Widstrand, www.staffanwidstand.se

Climate change will affect many Inuit families who rely on the ice to hunt in the winter.

The circumpolar Arctic is no longer an isolated region peripheral to world events. This huge region now attracts the attention of national governments everywhere, for it is the globe's "barometer" of climate change.

The 155,000 Inuit in Russia, Alaska, northern Canada and Greenland, and Sami, Athabascans and other arctic indigenous peoples, are effectively the mercury in the barometer. But are the messages from the arctic barometer being heard and heeded?

An Inuk out on the sea ice hunting for a seal or on the land hunting for a caribou to feed his family observes even minute changes to the environment. In a very real sense, he is the sentinel – the first line of defence against and warning of climate change. That Inuk hunter illustrates something else – climate change is a human and family issue.

For more than 20 years Inuit hunters have reported shorter winters, hotter summers, thinner sea ice, invasion of new species of fish and insects, unpredictable weather, accelerating coastal erosion and much more – all a result of global climate change. Hunters have fallen through sea ice and lost their lives in areas long considered safe.

In November 2004, foreign affairs ministers of the eight-nation Arctic Council received the 1,000-page plus *Arctic Climate Impact Assessment* (ACIA). Prepared by more than 300 scientists from 15 countries and drawing heavily as well upon the traditional knowledge of the Arctic's indigenous peoples, the Assessment (www.acia.uaf.edu) makes stark reading and attracted much international comment. Two key findings have attracted the attention of Inuit:

Marine species dependent on sea ice, including polar bears, ice-living seals, walrus, and some marine birds, are very likely to decline with some species facing extinction.

And:

For Inuit, warming is likely to disrupt or even destroy their hunting and food sharing culture as reduced sea ice causes the animals on which they depend to decline, become less accessible, and possibly become extinct.

At their meeting in Reykjavik in November 2004, Arctic Council ministers endorsed a policy document dealing with climate change mitigation; adaptation; research, observations, monitoring and modeling; and outreach. This policy document says:

To address the risks associated with climate change in the Arctic of the magnitude projected by the ACIA and other relevant studies, *timely, measured and concerted action is needed to address global emissions* (emphasis added).

Recognising the need for adaptation to unavoidable impacts of climate change, the policy document also said that states should work closely with indigenous and local communities which may need "enhanced access to information, decision makers, and institutional capacity building to safeguard their health, culture and well-being."

These helpful arctic messages were picked up at the summer 2005 meeting in Gleneagles, Scotland of the G8 nations. The Arctic was referenced for the first time in a G8 communiqué, stressing the need for adaptation to climate change. The Arctic then received considerable attention ➤ 18

Moving beyond analysis

WWF's Nigel Allan **spoke with** Sheila Watt-Cloutier**, outgoing chair of the Inuit Circumpolar Conference (ICC), about the current state of the Arctic Council and the need to turn analysis into action.**

Nigel Allan: *During your time as chair of the ICC, what have been some of the notable achievements of the Arctic Council? And where has it not succeeded as much as you would have liked?*

Sheila Watt-Cloutier: The Arctic Council has been very good at doing technical and scientific assessments. The work that ICC was involved with, the Arctic Climate Impact Assessment (ACIA) and the Arctic Human Development Report (AHDR), were very commendable. Those works are remarkable pieces that brought together a cross-section of people. The Arctic Monitoring and Assessment Programme (AMAP) is also remarkable.

The Arctic Council's weaknesses lie in being unable to translate these assessments into policy and political change. The Council becomes paralysed as it is a consensus-based forum, so when one country does not want to progress, as we have seen, then we have a problem.

It should not be assessments for the sake of assessments. There needs to be policy change, so that sustainable development can be real, especially for people in the Arctic.

NA: *Where does the Arctic Council need to move if it is to continue to be an effective voice for sustainable change in the Arctic?*

SWC: My question is

whether it is really effective. In order for it to be genuinely effective it will need to start to change the way it is structured. I think there now has to be an assessment of its effectiveness and we need to look at what needs to change.

How long are we willing to remain ineffective? The arctic people are at a place in the world where things need to be addressed urgently. We look at the work of the ACIA and the AHDR and there are monumental challenges that need to be addressed. We must come to a place where there is not a constant 'paralysis of analysis' where we move beyond assessment and implement true policy changes.

NA: *What is your hope for the future of the Arctic Council and the future of the Arctic?*

SWC: It is time to re-evaluate and look at the big picture. With the impact of climate change and the opening up of the Northwest Passage, we are going to have a huge intrusion with an international shipping route on our doorstep. The Arctic Council is now preparing to do more assessments including the Arctic Marine Shipping Assessment. These will have to look at how changed the Arctic is going to be ten to 20 years from now and effectively address this new reality.

When the first wave of great change came through we experienced a sense of loss of control over the changes that affected our lives. We didn't realise how quickly these changes can happen and how negatively they can impact our lives at a family, community and societal level, but now as we see this second great wave of change coming that will create huge challenges, we want to be in control.

The Arctic Council needs to be a forum for creative and innovative solutions for real sustainable change that puts arctic people at the forefront and in control of our future.

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We must come to a place where there is not a constant 'paralysis of analysis'

17 ➤ at the December 2005 Conference of Parties (COP) to the UN Framework Convention on Climate Change (UNFCCC) in Montreal. A political statement was read to the plenary on behalf of the eight arctic member states and six European observer states to the Council committing them to consider the Arctic in their efforts to promote the effectiveness of the Convention. The Arctic was also referenced in the preamble to the COP's decision on a five-year work plan on impacts, vulnerability, and adaptation.

These examples show that climate change in the Arctic is registering globally. This is well and good, but political statements have yet to reduce emissions of greenhouse gases and slow and eventually reverse human induced climate change, in line with the objective of the UNFCCC.

In the face of these good words and intentions, Inuit ask two basic questions: how would you respond if an international climate change assessment concluded that your culture and economy that had survived for thousands of years were doomed, and that you were to become a footnote to globalisation? What would you do if year after year countries failed to implement the UN Framework Convention on Climate Change and its greenhouse gas reduction protocol concluded in Kyoto, Japan in 1997?

Human-induced climate change is an assault on the very way of life and culture of Inuit. It threatens the memory of who we have been and who we are, and all that we wish to become. Climate change is an assault on our basic human rights as an indigenous people.

In response, we have petitioned the Washington DC-based Inter-American Commission for Human Rights under the 1948 American Declaration on the Rights and Duties of Man. We seek a declaration that destruction of the Arctic's natural environment and our culture and economy as a result of the virtually unrestricted emission of greenhouse gases by the US is a violation of our human rights as Inuit. View our petition online at: www.inuitcircumpolar.com.

The petition focuses on the US because it is by far the largest emitter of greenhouse gases and it refuses to join the international effort to reduce emissions. We have asked the commission to come to the Arctic to learn what climate change means to Inuit. We don't want and nor are we seeking compensation or money. Our goal is to stop the US from violating our human rights.

The petition asks the commission to recommend that the US adopt mandatory limits to its emissions of greenhouse gases and co-operate with the community of nations to "prevent dangerous anthropogenic interference with the climate system," the very object of the UNFCCC signed by the US Government and ratified by their Senate. As well, the petition requests the commission to declare that the US has an obligation to work with us to develop a plan to help Inuit adapt to unavoidable impacts of climate change, and to take into account the impacts of its emissions on the Arctic and Inuit before approving all government actions.

These are reasonable suggestions. I want to repeat something I said when we launched this petition last December:

We submit this petition not in a spirit of confrontation – that is not the Inuit way – but as a means of inviting and promoting dialogue with the US within the context of the climate change convention. Our purpose is to educate not criticise, and to inform not condemn. I invite the US to respond positively to our petition. As well, I invite governments and non-governmental organisations to support our petition and to never forget that, ultimately, climate change is a matter of human rights.

The arctic barometer is sending an unmistakable message to the world. It is vital that the world hear and act upon this message. After all, what is happening to Inuit now will happen to others further south in years to come.

Sheila Watt-Cloutier
Chair of the Inuit
Circumpolar Conference (ICC)

■ Born in Nunavik (northern Quebec) and living now in Iqaluit, the capital of Nunavut, Sheila Watt-Cloutier was the elected Chair of the Inuit Circumpolar Conference (ICC) from 2002 to 2006.

Bering Sea changes

The Bering Sea is responding to changes in arctic climate; the effects could extend from the base of the food chain to native hunters. Peter West**, of the US National Science Foundation, reports.**

Physical changes – including rising air and seawater temperatures and decreasing seasonal ice cover – appear to be the cause of a series of biological changes in the northern Bering Sea ecosystem that could have long-range and irreversible effects on the animals that live there and on the people who depend on them for their livelihoods.

In a paper published on March 10 in the journal *Science*, a team of US and Canadian researchers use data from long-term observations of physical properties and biological communities to conclude that previously documented physical changes in the Arctic in recent years are profoundly affecting arctic life.

The northern Bering Sea provides critical habitat for large populations of sea ducks, grey whales, bearded seals and walruses, all of which depend on small bottom-dwelling creatures for sustenance. These bottom-dwellers, in turn, are accustomed to colder water temperatures and long periods of extensive sea ice cover.

However, "a change from arctic to sub-arctic conditions is under way in the northern Bering Sea," according to the researchers, and is causing a shift toward conditions favouring both water-column and bottom-feeding fish and other animals that until now have stayed in more southerly, warmer sea waters.

As a result, the ranges of the region's typical inhabitants can be expected to move northward and away from the small, isolated native communities on the Bering Sea coast that subsist on the animals.

Jackie Grebmeier, a researcher at the University of Tennessee and one of the paper's co-authors, says: "We're seeing that a change in the physical conditions is driving a change in the ecosystems."

Grebmeier says the new report is unusual in that it looks at the potential effects of a changing climate in the Arctic primarily through a life sciences lens, rather than an analysis of the physics of climate change. She says: "It's a biology-driven, integrated look at what's going on."

Grebmeier is chief scientist for the Western Shelf-Basin Interactions (SBI) research project, which conducted a series of research cruises to observe changes in the carbon balance of the offshore areas of the Alaskan Arctic and their effects on the food chain. The cruises included a number of researchers supported by the National Science Foundation (NSF), the National Oceanic and Atmospheric Administration (NOAA), and other US federal agencies.

NSF and the Office of Naval Research (ONR) jointly funded SBI.

NSF and NOAA also funded US researchers who contributed data collected by the Bering Strait Environmental Observatory, which annually samples waters in the northern Bering Sea to assess the biological status of productive animal communities on the sea floor.

Those highly productive waters currently act as sponges for carbon dioxide, absorbing quantities of the gas that otherwise would remain in the atmosphere where it would be expected to contribute to warming. But, the researchers say, if the biological trends they observe in the northern Bering Sea persist and are not reversible, the accompanying shift in species and ecosystem structure could have important implications ➤ 20

Photo: Peter West, National Science Foundation

Jackie Grebmeier, an NSF-funded researcher at the University of Tennesee, prepares sediment samples taken from arctic waters as part of the Western Shelf-Basin Interactions research project.

19 ➤ for the role of the sea as a "carbon sink."

James Overland, a co-author of the paper and an oceanographer at NOAA's Pacific Marine Environmental Laboratory (PMEL) in Seattle, added that the changes researchers are observing are not uniform throughout the Bering Sea. But both are tied to the nature of the sea ice.

Overland says: "The northern Bering Sea ecosystem is changing as well as that in the south-east. In the south-east, fish population and (bottom-dweller) animal changes are happening in the context of a complete loss of sea ice. But in the northern Bering Sea, ecological changes are occurring in the context of shifts in the quality of the sea ice. The ice there is broken and thin compared with ice floes that were more the norm."

Satellite observations and other measurements, for example, combined with observations of native Yupik hunters, confirm that sea ice extent and thickness have become greatly reduced in recent years.

Also, observations by scientists on the SBI research cruises in 2004, confirm that walrus mothers were leaving their pups when sea ice, which the animals normally use as a summer resting platform, retreated to the north (see page 6).

Shifts in fish populations have also been observed, including the appearance much farther north of juvenile pink salmon in rivers that drain into the Arctic Ocean. Salmon feed on pollock, a species that is beginning to appear in larger numbers in the northern Bering Sea, possibly in response to warmer ocean temperatures.

"What we are seeing," Grebmeier concluded, "is a change in the boundary between the sub-arctic and the arctic ecosystem. The potential is real for an ecosystem shift that will be felt father north."

But, Overland noted, continued observations are needed to fully understand the scope and potential permanence of the changes. He says: "Both physical and biological indicators need to be watched closely over the next few years to track the persistence of changes in the context of natural variability."

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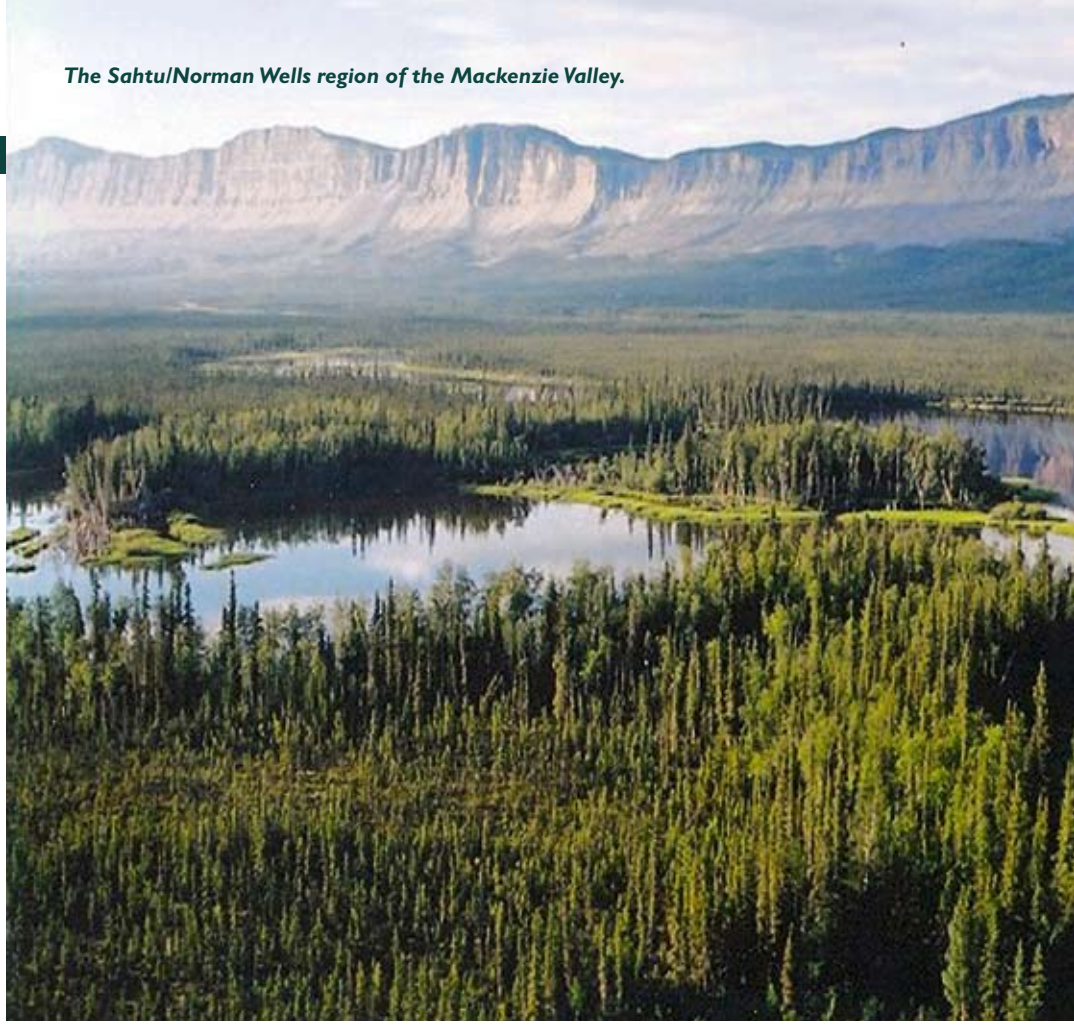

The Sahtu/Norman Wells region of the Mackenzie Valley.

CAFF update

The Conservation of Arctic Flora and Fauna (CAFF) working group under the Arctic Council recently held its 11th Biennial meeting in Ylläs, northern Finland. WWF's Head of Conservation Stefan Norris **reports.**

The CAFF meeting in Finland was the last gathering for all CAFF participants (expert groups, observers, and indigenous peoples representatives) before the Arctic Council Ministerial in November. Key to the meeting was a review of deliverables for the upcoming Ministerial, as well as preparation of a draft 2006–2008 CAFF work plan.

The meetings revealed three general trends:

First, substantial work has been done, and achievements made, by several of the CAFF expert groups and CAFF-supported projects. Even with limited resources, reports and other products and publications brought to the Biennial revealed a large degree of inter- and circum-arctic cooperation on important issues.

For example, the CAFF Flora Group presented progress in working with IUCN to prepare an official "Red List" of threatened or vulnerable arctic plant species, developments in preparing unified vegetation maps for both the high arctic and boreal vegetation zones, and work on identifying and mapping "Arctic Vegetation Hotspots" (eg terrestrial ecosystem components that are important in terms of climate change impacts).

The CAFF Sea Bird expert group is also very active and productive, issuing a number of reports and other products, including a report on the status of various sea bird species and populations and seabird by-catch issues.

The second observation was that, despite progress in some areas, other key components of the CAFF program suffer from lack of commitments, leadership, or resources, or from lack of contributions from cooperating parties. This includes the Circumarctic Protected Areas Network (CPAN) initiative, and the ECORA project on integrated ecosystem management in three model areas in arctic Russia.

CAFF's contributions to several of the major "joint" Arctic Council processes, where CAFF is meant to contribute along with other working groups, have also been limited due to lack of lead country commitments or resources. These include follow-up on the ACIA report on arctic climate change, development of a joint strategy with the AMAP working group on arctic environmental

Photo: Ducks Unlimited Canada (Langhorst)

Mackenzie pipeline — public hearings update

Pete Ewins, species conservation director for WWF-Canada, reports on the progress of the public hearings into the proposed Mackenzie Gas Pipeline in northern Canada.

June 2006, marks the halfway point in the ten months of public hearings into what could be the largest industrial project in Canadian history.

The proposed Mackenzie Gas Pipeline (MGP) would run down the Mackenzie Valley of Northwest Territories (NWT), Canada and connect major hydrocarbon deposits under the Beaufort Sea, Mackenzie Delta and further south in the Mackenzie Valley to existing pipelines in Alberta.

The so-called 'Joint Review Panel' (JRP) is holding hearings in communities and regional centres to address the broad environmental assessment issues. The report of their findings and recommendations will go this coming winter to Canada's federal government and then to the National ➤ 22

monitoring, and several processes led by the PAME working group, for example the assessment of Arctic Large Marine Ecosystems, the Arctic Marine Strategic Plan, and the Arctic Marine Shipping Assessment.

However, the third observation is that new energy, and a raft of new commitments and resources, is flowing through CAFF as two major initiatives emerge as part of CAFF's mandate and responsibilities. These are the Circumpolar Biodiversity Monitoring Programme (CBMP) and the 2010 Biodiversity Assessment.

The Circumpolar Biodiversity Monitoring Programme

Developing a comprehensive programme within the Arctic Council that monitors key aspects of arctic biodiversity, has been a CAFF goal for a number of years. Such a programme would improve understanding of status and trends, and enable us to detect critical shifts in the condition and health of arctic species and ecosystems. This is an enormous task, with many complexities in terms of scale, geographic coverage, timelines, politics, as well as overlaps and competition with other related initiatives. It has therefore stalled and been delayed repeatedly. It was thus heartening to see presented at the Biennial a conceptual framework for this work reflecting the scope and complexities of the task. Most importantly however, was that Canada has stepped up as lead country on this initiative, and has now established a programme secretariat and provided the necessary resources to implement the initial phases of the CBMP.

The current work is concentrated on identifying available and useful datasets, indicator species and parameters, and the database structure and functionality.

The CBMP is now a cornerstone of CAFF. However, much work is required before a fully-fledged CBMP emerges as a useful tool for the Arctic Council, scientists, decision-makers, and others interested in arctic biodiversity. The CBMP will clearly demand much of CAFF's resources and focus for years to come. Having Canada firmly behind it is key to maintaining direction and progress on this important initiative.

The 2010 Arctic Biodiversity Assessment

The other major emerging initiative, the 'CAFF 2010 Arctic Biodiversity Assessment', is to be a report on the status and trends of key arctic biodiversity elements. It is intended as a delivery from the Arctic in connection with commitments countries have made under the UN Convention on Biological Diversity to "limit" or to "halt" the loss of biodiversity by 2010. Though planning has started, there is currently no lead country on the initiative, an absolute requirement for successful implementation. A thorough conceptual framework, detailed work plans, and committed funding are also lacking at this stage. Though widely supported, and endorsed by the Senior Arctic Officials of the Arctic Council in April 2006, it is clear that this important assessment will not be realised – at least not by 2010, unless a strong lead country steps up to support and move it forward, and substantial commitments of resources are made by others.

In sum, the CAFF working group, especially with its two new initiatives, is now positioning itself as a major deliverer of facts and figures on arctic biodiversity. WWF's concern, of course, is if and how the findings and recommendations from CAFF's monitoring and assessments are translated into practical and meaningful conservation on the ground, and improved sustainability of arctic human development trends.

In his keynote address to the Biennial, Judge Steven Point – an aboriginal from Canada – described CAFF as possibly standing for "Conversation" on Arctic Flora and Fauna rather than "Conservation". WWF would like to follow up on that and voice concern that the working group might end up representing the "Compilation" of Arctic Flora and Fauna data, rather than actually delivering "Conservation". Hopefully the Arctic Council body, as it develops through its various chairmanships, will allow and encourage, rather than hinder, actual on-the-ground conservation and sustainable development initiatives as a consequence of the findings in the numerous important reports and assessments it generates.

Stefan Norris
Head of Conservation
WWF International Arctic Programme
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21 ➤ Energy Board (NEB), which is expected to announce its decisions in the overall public interest by summer 2007.

The seven member JRP has already heard a wide range of views from both northern residents and many organisations as to the short and long-term pros and cons of such a basin-opening project, and the 'reasonably foreseeable induced development' that such a major pipeline would trigger.

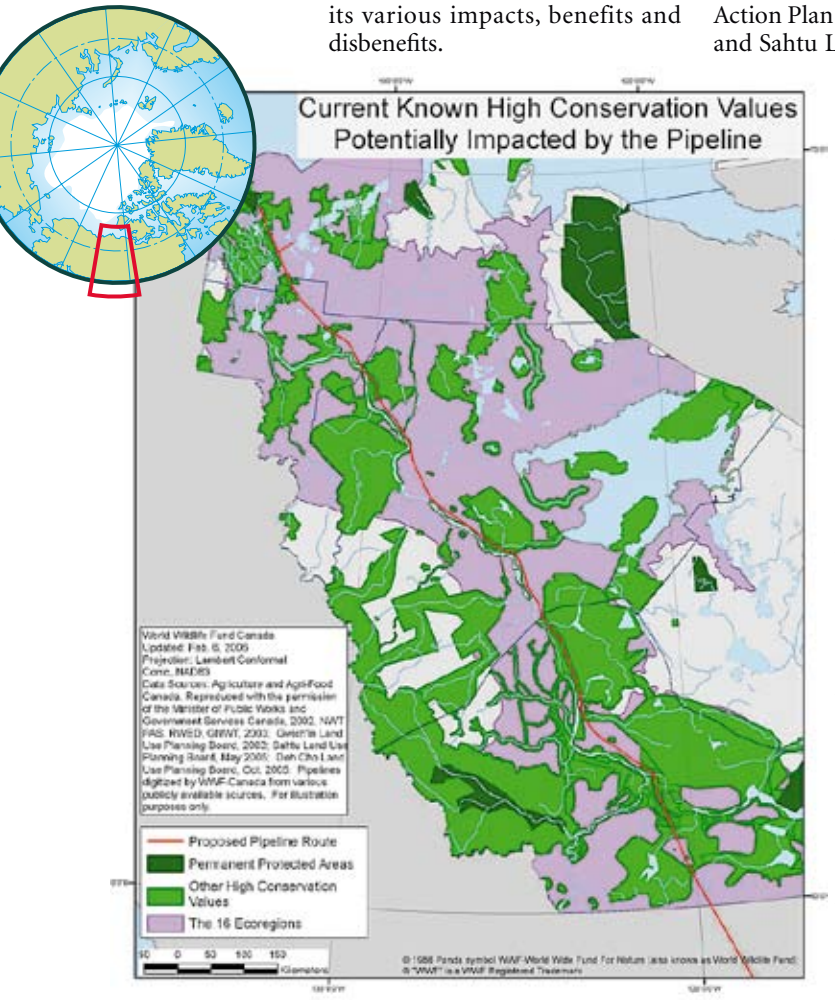
In parallel with the JRP Hearings, the NEB is holding its own NWT hearings on other aspects of the proposal, including tolls/tariffs, cross-border issues, engineering and industry technical issues.

WWF-Canada presented a number of recommendations to the Joint Review Panel in Inuvik, NWT in February. Central to WWF's interventions was the evidence from 30 years of oil-gas developments on the Alaskan North Slope, provided by expert witness Professor Emeritus Gordon Orians, who chaired the review for the US National Academy of Sciences into this cumulative development, and its various impacts, benefits and disbenefits.

Lessons learned in Alaska, in very similar ecosystems and human situations to those found in the NWT, will hopefully help the JRP produce a series of important recommendations. Perhaps the most important lesson learned in Alaska was that once a means of transporting oil and gas is constructed, further industrial development is inevitable.

The challenge for the JRP, NWT and Canada alike, is to decide what conditions must be satisfied and in place in order to maximise the overall benefits, and reduce the long-term risks and disbenefits.

During the hearings so far, the Panel has heard from many northerners. Unlike the situation 30 years ago, many people now want to see a major pipeline built. But the majority of northerners do not want to see a major energy corridor built the old fashioned way, without key conditions met to safeguard the land, water, and northern cultural traditions. WWF strongly supports these views, and has recommended to the Panel that the NWT Protected Areas Strategy Action Plan (PAS) and the Dehcho and Sahtu Land Use Plans be fully completed before any approvals for an MGP are granted.



The JRP is conducting its environmental assessment work on the 16 ecoregions that would be directly intersected or affected by the initial basin-opening pipeline corridor, concentrating on the areas of high cultural and ecological conservation value within these key ecoregions, and ways in which overall impacts of accelerated industrial development can be minimised.

WWF is working with community and regional organisations to help protect a network of these special areas prior to new industrial approvals, via the PAS Action Plan and high quality land use plans (see map).

World energy prices, and especially the rapid expansions of the Alberta tar sands operations, have been driving oil and gas companies to seek greater secure supplies of natural gas. In the NWT, areas of known medium-high potential for hydrocarbons are being leased by the federal government at an increasing rate, and one can expect this frenzy to accelerate further if an MGP is approved next year.

WWF agrees with concerned northerners that proper sequencing of socio-cultural and environmental conservation measures is absolutely critical – while the opportunity to plan things correctly is still there in the NWT. Already, many who have spoken to the JRP stress that a new, properly balanced approach is within everyone's grasp, and definitely necessary.

The outdated 'frontier' development approach is clearly no longer in anyone's interest, nor is it necessary. Recent advances in hydrocarbon technology have now added the NWT coal deposits to this natural gas equation – via the so-called 'coal gasification' techniques – and it is clear that fossil fuel and other industrial development opportunities and pressures will continue to increase in the NWT for much of this century.

By November 2006, the JRP will be hearing closing statements, and then preparing its recommendations from this extensive Environmental Assessment exercise. Everyone eagerly awaits their report, to see how Canada might proudly showcase a new, satisfactorily balanced major basin-opening project like this, without repeating the social and environmental mistakes experienced in the past elsewhere.

Pete Ewins
Species Conservation Director
WWF-Canada.

■ Daily transcripts and live audio feeds of JRP and NEB public hearings can be found at: www.ngps.nt.ca

■ Information about the Mackenzie Valley including WWF's written intervention to the Joint Review Panel for the Mackenzie Gas Project. Can be found at: www.wwf.ca/AboutWWF/WhatWeDo/Initiatives/Initiatives.asp?project=mackenzievalley

Forthcoming arctic meetings & events

Arctic Council events

Senior Arctic Officials (SAO) meeting
WHERE: Salekhard, Yamalo-Nenetsk, Russia • WHEN: 24 – 25 October • CONTACT: Email: ac-chair@mid.ru

Arctic Council Ministerial Meeting
WHERE: Salekhard, Yamalo-Nenetsk, Russia • WHEN: 26 October • CONTACT: Email: ac-chair@mid.ru

Focal Point (Arctic Climate Impact Assessment follow-up) meeting
WHERE: Copenhagen, Denmark • WHEN: 11 September (tentative) • CONTACT: Email: amap@amap.no

Conferences and workshops

Arctic Change and Coastal Communities – Coastal Zone Canada 2006
WHERE: Tuktoyaktuk, Northewest Territories, Canada • WHEN: 12 – 18 August
CONTACT: Website: www.czc06.ca/e/home.html

International Polar Year (IPY) GeoNorth 2007
WHERE: Yellowknife, Northwest Territories, Canada • WHEN: 20 – 24 August
CONTACT: Website: ess.nrcan.gc.ca/ipygeonorth/index_e.php

International Glaciological Society Symposium – Cryospheric Indicators of Global Climate Change
WHERE: Cambridge, England • WHEN: 21 – 25 August • CONTACT: Website: www.igsoc.org/symposia/2006/cambridge/

The Role of Permafrost Ecosystems in Global Climate Change
WHERE: Yakutsk, Russia • WHEN: 28 – 30 August • CONTACT: Dr. Trofim Maximov, tel: +7 411 233 58 97

Beringia Days
WHERE: Anchorage, Alaska • WHEN: 7 – 8 September • CONTACT: www.nps.gov/akso/beringia

North Atlantic Climate and Ecosystems: A Current Threat? Symposium
WHERE: Reykjavik, Iceland • WHEN: 11 – 12 September • CONTACT: Website: www.hafro.is/symposium

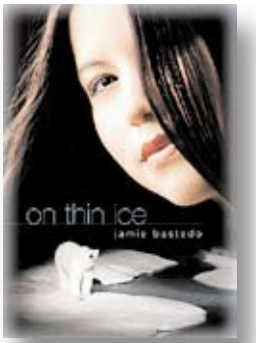
Wildlife Society's 13th Annual Conference and Trade Show
WHERE: Anchorage, Alaska • WHEN: 23 – 27 September • CONTACT: Website: www.wildlife.org/conference/index.cfm

AAAS (American Association for the Advancement of Science) Arctic Division 2006 Annual Meeting – "The State of the Arctic"
WHERE: Fairbanks, Alaska •WHEN: 2 – 4 October • CONTACT: Website: arctic.aaas.org/¨p

The Borderless North: 4th Northern Research Forum Open Meeting
WHERE: Oulu and Tornio, Finland and Haparanda and LuleÂ, Sweden • WHEN: 5 – 8 October
CONTACT: Website: thule.oulu.fi/nrf2006

For more on these events and other meetings, please visit:
http://www.arcus.org/Calendar/upcomingEvents.shtml • http://www.iasc.no/SAM/samtext.htm

On Thin Ice
Jamie Bastedo
Red Deer Press, Canada
2006
349 pp
ISBN 0-88995-337-6



Sometimes good fiction gives the reader a more intense experience of the real world than non-fiction. Such is the case with Jamie Bastedo's latest young adult book, On Thin Ice.

Ashley's family has just settled into her father's ancestral home in Nanurtalik, an imagined hamlet in Canada's high arctic. Ashley's parents felt they had to move back to look after aging Uncle Jonah who has been kicked out of the local elder's home for acting like "a bloody caged bear."

Bears and blood – they both appear in different forms throughout the book. Ashley has recurring dreams of a giant, bloodied polar she-bear which she feels compelled to sketch over and over again. And then two of her friends from school die when their pickup truck breaks through unpredictably thin ice. Jim managed to get out before the truck sank, but when his body is found, he has been mauled and partly eaten by a huge polar bear. But polar bears haven't been seen in the area for years.

As the community mobilises to protect its people from bears, they face all sorts of natural anomalies related to weather – a southern-style thunderstorm with lightning, torrential rain and hail; a wild blizzard that lasts for days; the appearance of southern butterflies and a moose; even a plummeting jetliner caught in a huge and bizarre air pocket.

We see this turmoil through Ashley, an edgy, idealistic, sarcastic, passionate teenager of the twenty-first century – a young woman struggling to make sense of her powerful bear visions and a strange connection to her wide-snouted Uncle Jonah.

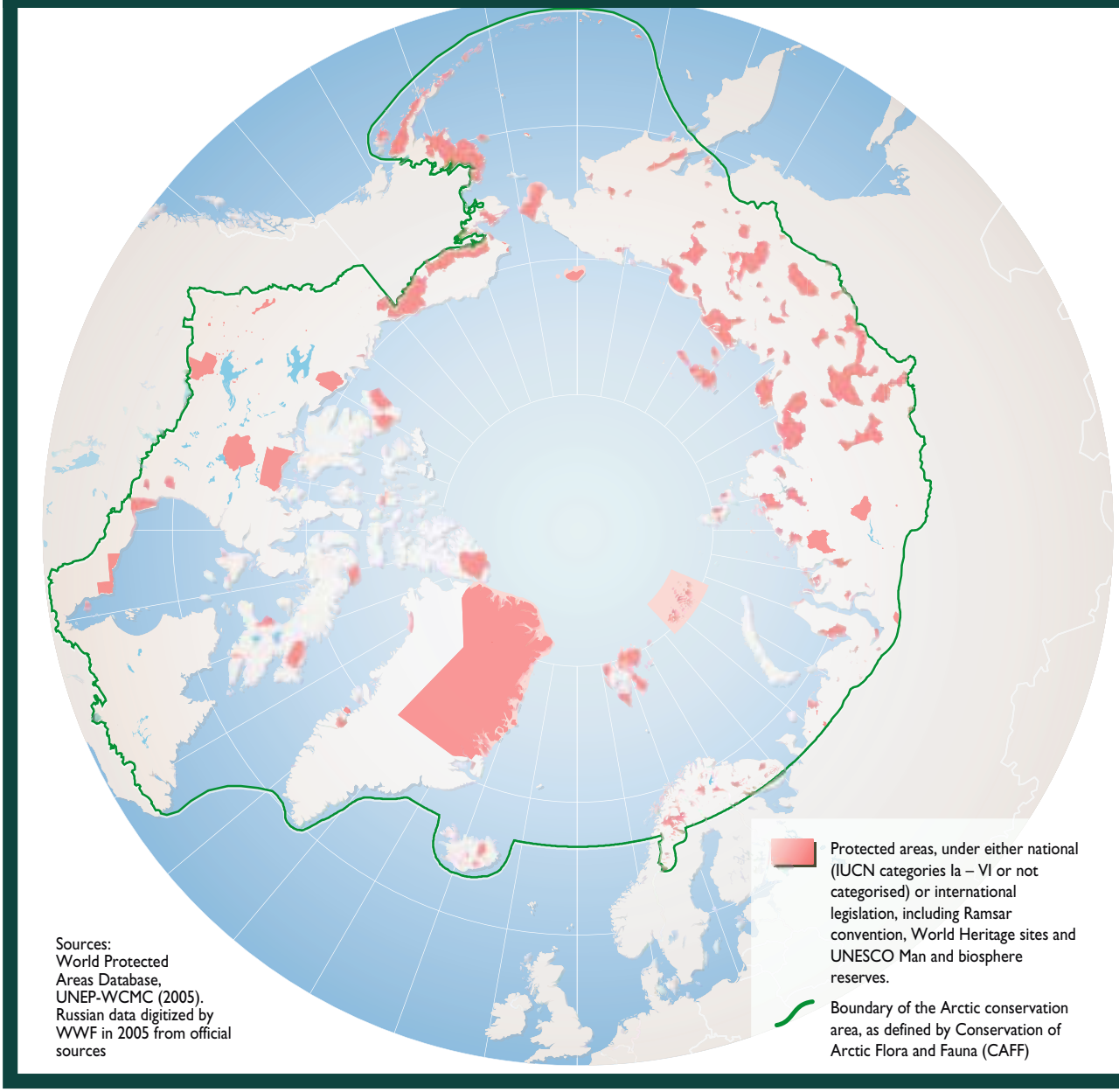
The theory of climate change and the concept of traditional knowledge become exciting experiences for the teen reader to feel and thereby understand – all packaged together in a darn good read.

The publisher promises a teacher's guide, *Polar Bears in a Climate of Change*, for August 1, 2006, at www.onthinice.ca. The book, supported by WWF-Canada, is available internationally through Internet booksellers.

Ann Love

Ann Love is the author of *Cool Woods: a Trip Around the World's Boreal Forest*; *Snow Amazing: Cool Facts and Warm Tales*; and *The Kids Book of the Far North*.

Protected areas in the Actic



Sources:
World Protected Areas Database, UNEP-WCMC (2005).
Russian data digitized by WWF in 2005 from official sources

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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.

WWF