



Arctic Bulletin



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Editorial

A new sea

Climate change is creating a new sea in the North, melting away the ice that has protected arctic waters for thousands of years. The last four years have seen end-of-summer sea ice whose extent was 20 percent less than the average for the previous 22 years. That is equivalent to 1.3 million square kilometers, or 500,000 square miles. Researchers now believe that the Arctic Ocean will be ice-free during the summer well before the end of this century. This will create a sea of opportunities, but also huge environmental and social challenges.

Major changes are taking place beneath the ocean's surface as well. Fish stocks in the North Sea are already moving north as the oceans warm up, and southern species, such as blue mussels, are already appearing near Spitsbergen, in the northern Barents Sea. In the Bering Sea, warmer waters and fishing pressure have caused a dramatic shift in the ecosystem, with crashes of some marine mammal, crab and seabird populations, of pollock and salmon. Over time, scientists predict that existing fisheries will disappear and new ones emerge in new locations in the Arctic.

In the face of these changes, our first priority must be to cut CO₂ emissions as deeply and quickly as possible. Rapid climate change in the Arctic threatens not only polar bears, but also people in the Arctic and in the rest of the world. By cutting CO₂ emissions, scientists believe that we can avoid some of the worst changes in the future. But some of the processes now in motion in the Arctic will continue during our lifetimes and perhaps beyond.

Governments and industry seem poised to seize the economic opportunities of melting sea ice and a new sea. In Alaska, Norway and Russia, governments are pushing arctic offshore oil and gas development. Shipping companies are investing in ice-going vessels. And disputes over arctic marine territory, and fish resources, are heating up.

But who's ready to protect the arctic environment

and the people who depend on it? Some arctic fisheries are already threatened by overfishing and illegal fishing. More shipping traffic will increase the risk to vulnerable coastlines and wildlife populations. And oil development will bring not only more CO₂ emissions, but also huge risks in what will always be a harsh environment.

A lot can be done nationally and bilaterally, and by the private sector. This includes better fisheries management and monitoring; marine management zones that keep risky activities out of sensitive areas; and improved ship routing, quality and monitoring. In the end, however, these measures won't be enough. Issues such as High Seas protected areas, large-scale illegal fishing with sales of illegally caught fish outside the region, harvesting from fish stocks that migrate between national waters, ships sailing under flags of convenience, international transport of hazardous materials through sensitive areas and accident response, can only be solved multilaterally.

Arctic seas are worth conserving. They have incredible natural, cultural and economic values, including some of the world's most productive fisheries, the biggest seabird colonies, cold-water coral reefs and marine mammal ranging from polar bears to fur seals. Resources from the sea have provided food, wealth and the basis for culture to people along the arctic's coasts for hundreds and thousands of years.

A year and a half ago, WWF called for arctic governments to consider a regional marine agreement to conserve these marine values, and manage any development. The conventional wisdom is that a new convention is a political impossibility. But business as usual is clearly not a possibility either. Which leaders will have the vision to conserve, as well as exploit?



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TOURISM ASSOCIATION

A new Sustainable Arctic Tourism Association will continue the ground-breaking work of a three-year project to look at sustainable tourism in the Arctic. The SMART project, which ended in December, set out to empower the arctic tourism sector to more sustainable practices through capacity building and certification. A final SMART workshop for entrepreneurs, authorities, educational institutions and WWF took place in Finland in October. The WWF International Arctic Programme was the only environmental NGO involved in the project. Miriam Geitz, its tourism officer, will be a member of the Sustainable Arctic Tourism Association.

BEAR LAW SUIT

Representatives of three environmental groups have claimed that the US Government is failing to curb the global warming that is slowly destroying polar bears' habitat, possibly leading to their extinction. The groups filed a petition last February to have the polar bear formally declared a threatened species – a step they said would require the Government to try and cut down the toxic industrial by-products that are causing global warming, and the polar meltdown.

Under the federal Endangered Species Act, the Department of the Interior must respond, but the petition has yet to be processed. Greenpeace, the Arizona-based Center for Biological Diversity and the New York-based Natural Resources Defense Council in late October sent a notice of intent to sue to the Department of the Interior. The government has 60 days to respond before a suit is filed in federal court.

BIG OIL PURSUES DRILLING ON ALASKA'S COAST

The US Mineral Management Services (MMS) is developing a new five-year plan for pursuing offshore oil and gas leases along the US coast. While no decisions have yet been made, the Bush Administration has been indicating that it may lift the ban on drilling in coastal areas, like Bristol Bay and the Chukchi Sea coast, that have been withdrawn from consideration for offshore oil and gas development since 1995. WWF and other environmental organizations have presented the MMS with formal comments expressing great concern about this potential change to the area's exempt status. WWF will continue to monitor the situation and hopes many other conservation groups, fisheries interests, and communities will also join in taking a strong stance to protect Bristol Bay and other sensitive sites adjacent to the Bering Sea.

Jennifer Morgan,
director of
the WWF
International
Climate
Change
Programme.



Photo: IISD/ENB, Leila Mead

Montreal progress

Real progress was made at the Montreal climate talks in December as governments finalised the ground rules for the first phase of the Kyoto Protocol and set the stage for discussions to further cut carbon emissions after 2012, says WWF.

Ministers agreed to start talks that will deliver deeper reductions in carbon emissions. The deal also opened the door to broader participation from developing countries in the future.

The Montreal conference displayed the groundswell of support for real climate action.

This was especially visible through the participation of an unparalleled number of mayors, youth, business leaders and elected representatives.

The attempt by the US, and later Russia, to scupper the talks failed

when a broad coalition including major developing countries, Japan, Canada and the EU rebuffed it.

In Montreal, representatives from the Inuit announced that they had filed a petition against the United States in the Washington offices of the Inter-American Commission on Human Rights, a body examining claims of rights abuses in the Americas.

The Inuit Circumpolar Conference (ICC) petition asserts that unabated US emissions of heat-trapping greenhouse gases are threatening Inuit traditions and urges the Commission to press the US to curb the gases.

Temperatures in the Arctic are rising at about twice the global average.

The petition was filed by Sheila Watt-Cloutier on behalf of the ICC, of which Watt-Cloutier is the elected Chair.

If the Commission rules in favour of the ICC, it could refer the US to the Inter-American Court of Human Rights for a legal judgement. Both the Commission and the Court work within the framework of the American Convention on Human Rights.

The US has not ratified the Convention, but a ruling would still be symbolic, according to the ICC.

To read more about the petition, go to: www.earthjustice.org

Prince Albert II of Monaco to visit North Pole

His Serene Highness Prince Albert II of Monaco will embark on an expedition to the North Pole in April 2006.

He hopes to reach the North Pole by dogsled from the Russian base of Borneo, around 100 kilometres away.

The hope is that the expedition will draw much needed global attention to

the Arctic and the huge threats that it faces, particularly from climate change.

In 1905, Prince Albert I of Monaco, a pioneer of oceanography and the great-grandfather of Prince Albert II, was among the first to explore regions of Svalbard in the Arctic.

Photos taken in 1905 and





Photo: Tonje Folkestad

A special Arctic Day in Montreal helped build awareness of how climate is impacting the Arctic. Hosted by the Canadian

Government, the Day included speeches, discussions, traditional food and cultural performances.

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At the conference, WWF highlighted the need to save the Arctic from climate change.

A LANGUAGE FOR CLIMATE CHANGE

Inuit translators and elders from across the Arctic met recently to develop standard language to allow speakers of northern aboriginal languages to talk about the accelerating global warming of their homeland. David Akeegok, of Nunavut's Department of Culture, Language, Elders and Youth, said: "We don't have any terminologies per se in Inuktitut right now when we focus on climate change. What we want to do is ensure that there are standard words in English and Inuktitut, for climate change especially. That way the hunters can talk to the scientists on the same wavelength, where both of them have very valuable information that they'd like to share"

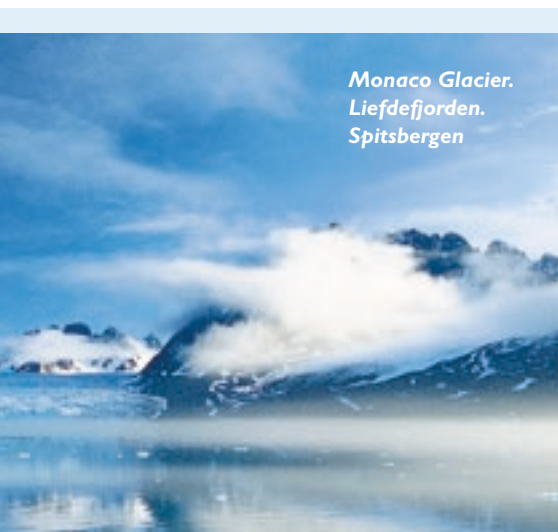
NWT PARK EXPANDS

The Canadian Government recently expanded the Tuktu Nogait National Park in Canada's Northwest Territories. Tuktu Nogait, means "caribou calves" in the Siglik dialect of Inuvialuktun, the western Arctic Inuit language. The park is home to the Blue Nose caribou herd, musk oxen, grizzly bears, wolves and wolverines. It is also the location of 360 archaeological sites, important to Sahtu Dene people. Raymond Taniton, representing the Sahtu Dene and Métis of the Sahtu Settlement Area, said: "We have ensured that the calving grounds of the Bluenose caribou herd, which have played an important role in the lives of our people for thousands of years, will be protected." The park is 170 kilometres north of the Arctic Circle and, with the latest expansion of 1850 square kilometres, now totals 16,340 square kilometres.

NEW ARCTIC PORT

Iqaluit, on Canada's Baffin Island, wants to build Canada's first deep-water arctic seaport, a facility that proponents say would boost both economic development and efforts to enforce northern sovereignty. The city plans to present its proposal to both the territorial and federal governments this winter when initial engineering plans are to begin. If funding is secured, construction would begin in 2008.

The \$49-million port could be operating as early as 2009. As climate change gradually reduces the amount of ice in northern waters, many observers have pointed to the likelihood of greatly increased ship traffic through arctic sea lanes. But Canada is the only arctic country that doesn't have a deep-water port along its northern coastline. Iqaluit's proposed port would operate from the end of June through the end of November. It would offer a single berth big enough to accommodate oil tankers, cargo and cruise ships and would also serve as a small-craft harbour.



*Monaco Glacier.
Liefdefjorden.
Spitsbergen*

Photo: Bryan & Cherry Alexander Photography / www.arcticphoto.co.uk

more recently show a drastic decline in the size of the Lilljehook Glacier. Around 40 percent of the glacier has melted in the last one 100 years.

WWF is supporting the expedition in an advisory role on arctic conservation issues. For more information, visit the Monaco Arctic Expedition website: www.monaco.arctic-expedition.mc.

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Conference aims to safeguard Barents

Plans to reduce the impact of oil and gas development in the Barents region were at the centre of an international conference in Murmansk in November.

The conference, "Oil and Gas Industry and Sustainable Development of the Barents Region", was organised by WWF with the Northern Alliance, Gaia, the Kola Biodiversity Centre, Bellona, Nature and Youth, and Svanhovd Environmental Center.

Its aim was to map out how to minimise environmental and economic damage, and maximise benefits to the communities as petroleum development goes ahead.

Delegates from the Valdez community in Alaska shared their experiences about how to set up a public trust fund to develop improved safety systems at oil companies' installations, to the benefit of surrounding communities. After the disastrous Exxon Valdez oil spill in 1989, the so-called Prince William Sound Regional Citizens' Advisory Council was set up to this end, with funding from the oil companies and oil transporters.

Participants at the seminar urged the Murmansk Oblast

Government and Duma to study the organisational and practical experience of this Alaskan council.

Russian authorities were also urged to study experiences from their own country, such as the interactions between the Sakhalin emergency departments and the petroleum companies involved in activities on the far-eastern Russian island.

The WWF and Nature and Youth proposal to establish petroleum-free areas in the Barents Sea to protect the most valuable and vulnerable biological resources was also given serious attention.

Delegates agreed that it is necessary to discuss and create a system to control economic activity in the western part of the Russian Arctic, and to assess the ecological impacts of planned activities in the region.

Delegates came from a wide range of institutions, including the Murmansk Oblast Duma, the Murmansk City Council, local authorities in Russia, Norway and the US, petroleum companies, experts in public participation issues, and NGO leaders.

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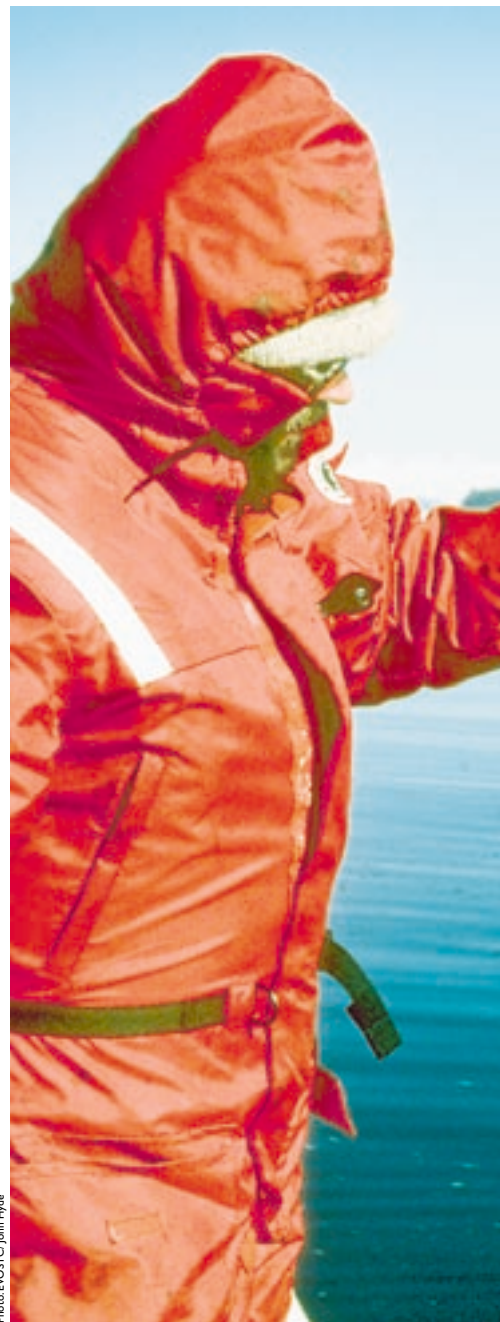


Photo: EVOSTC / John Hyde

The future of oil and gas in the Arctic

Rapidly changing economic circumstances associated with the increased global demand for oil and gas, technological advances, and not least the possibility of improved access to arctic resources as a result of climate change, mean that the prospect of increased oil and gas development in the Arctic is a reality. Such development can be undertaken in a responsible manner to both minimise impacts on the environment and respect the

interests of arctic populations.

Against this background, the Arctic Council's *Assessment of Oil and Gas Activities in the Arctic* (OGA) will be a major focus of attention during the Arctic Council Ministerial meeting that is set to take place in Russia at the end of October 2006.

Originally conceived as an update to the 1997 Arctic Monitoring and Assessment Programme (AMAP) assessment of pollution effects of oil and gas development in the Arctic,

the scope of the OGA has been considerably expanded to address other issues, including the socio-economic effects of arctic oil and gas development.

A group of experts established to produce the OGA is currently working to meet the challenges involved in obtaining necessary data and information from several countries.

As part of the OGA process, stakeholders, including industry, NGOs, and indigenous peoples

Clean coast boost



The likelihood of protecting the vulnerable Norwegian Barents Sea coast from the worst ravages of an oil spill were increased in November when WWF trained the first group of oil spill clean-up volunteers in northern Norway.

The training programme, which has already been introduced by WWF in Finland and Murmansk in Russia, aims to enhance the oil spill contingency plans in the Barents region by establishing voluntary oil-spill response groups that can assist in the clean-up operations after oil spills.

The transport of oil and other petroleum products in the Barents Sea region is growing rapidly. In 2004 the amount of oil exported from north-west Russia, and shipped through the Barents Sea and the White Sea, amounted to 12.6 million tons.

The transport could increase to 22.75 million tons in 2006 and could reach as much as 150 million tons by 2012. This dramatically

increases the potential risk of oil spills.

When an oil spill reaches the shore, manpower is normally the main limiting factor for effective clean-up operations. It is estimated that volunteers and fishermen handled about 70 percent of the oil clean up after the *Prestige* accident.

Nina Jensen, in charge of the 'Clean Coast!' project in Norway, said: "Cleaning the shoreline is a very time- and resource-consuming activity, and it requires competent personnel and basic safety equipment. There is a great need for more trained personnel who can be mobilised on short notice, and for proper equipment that can ensure safe and efficient operations in the region."

WWF's Clean Coast! programme offers a professional, practical and cost-free training course for volunteers. The course runs for three days, and gives a broad insight into oil-spill clean-up strategies, including organisation, execution and general knowledge about the most common strategies for handling oil-spills in the open ocean, coastal areas and shorelines.

The participants also get practical experience through testing several types of equipment and through participating in simulated oil-spill situations. The courses are carried out in cooperation with several organisations, including fishermen's associations, the Norwegian Coastal Administration, Russian oil spill authorities, the Barents Secretariat and NORLENSE. The aim is to train between 200 to 300 Russian and Norwegian volunteers per year.

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A new WWF programme will establish voluntary oil-spill response groups that can assist in the clean-up operations after oil spills.

organisations, have been invited to contribute to the OGA. To facilitate this, AMAP arranged an International Symposium on Oil and Gas Activities in the Arctic in St Petersburg, Russia, as part of the Seventh International Conference and Exhibition of Offshore Oil and Gas Development, a large industry-sponsored event.

The Symposium sessions reflected the content of the OGA and were intended to both communicate information about the OGA and also encourage relevant stakeholders to provide their information.

An indigenous people's side

event was well attended, reflecting the strong interest of the arctic indigenous communities in an issue that has considerable potential to affect their lives in positive and negative ways.

The OGA will be an important first step in establishing a circum-polar political context for the future of oil and gas development in the Arctic.

For more information visit www.amap.no

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Photo: Steve Amstrup/US Fish & Wildlife Service

Polar bear mother and cubs on the pack ice in the Beaufort Sea.

Bear legislation

Legislation to protect polar bears in Alaska and Chukotka in north-east Russia is being crafted by Republican Alaska Senator Ted Stevens, chairman of the US Senate Commerce Committee.

The US and Russia first agreed to a conservation plan, the US-Russia Polar Bear Agreement, in October 2000 to protect the shared polar

bear population. This new legislation is seen as the next stage in this process.

Conservationists hope it will prompt Russian authorities to implement their part of the Agreement.

Charles Johnson of the Alaska Nanuq Commission, said: "We know that polar bears are being harvested at alarming numbers in

Chukotka. These numbers are unsustainable. The enactment of the Agreement is critical for the long-term survival and conservation of our population of polar bears."

According to the US Fish and Wildlife Service, the legislation will establish a common legal, scientific and administrative framework. The Agreement calls for the development of binding harvest limits and places restrictions on hunting. Current law allows for Alaska native subsistence harvests. Illegal harvesting also occurs in Chukotka. Unless changes are made on both sides, there could be a decline in the population.

Marshall Jones, deputy director of US Fish and Wildlife Service, said: "The Agreement addresses a particular concern, which is the widely different harvest provisions and practices on the US side and the Russian side of the population."

"The bottom line is that both the United States and Russian Governments appear to want to protect the polar bear population, but the US Congress needs to give approval first."

The Polar Bear Agreement also prohibits the harvest of denning bears and females with cubs.

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Mackenzie update

Imperial Oil executives recently announced that the company and its partners in the Mackenzie Gas Pipeline are ready to move to public hearings, content that sufficient progress has been made in negotiations with northern aboriginal groups over financial rewards, rights to jobs and business opportunities.

But the Deh Cho First Nations and many socio-cultural and environmental groups are still not on board with the project.

In an interview with the Canadian Broadcasting Corporation (CBC), Herb Norwegian, Deh Cho Grand Chief, said his people won't give in to pressure from government, industry or fellow aboriginals. Norwegian said: "If it means one group is going to destroy the way of life of another group, I think we have

a pretty serious problem, just so that we could cater to a multinational corporation."

This next step in the regulatory process has also prompted many other energy companies, not involved with the pipeline, to move forward with their own projects. This could escalate development in the North beyond the impact of the pipeline.

Pete Ewins, of WWF-Canada, said: "It seems ironic that without completed land use plans for the region, with rapid climate change having such huge impacts on this region of great concern to aboriginal people, and with Canada having significantly increased its greenhouse gas emissions, Canada should be considering such a huge, \$7.5 billion hydrocarbon energy project. It will undoubtedly accel-

erate further arctic oil and gas development."

"In the Canadian North there is an opportunity to do it right and conserve important cultural and ecological areas first. The Mackenzie Gas Development and related projects amount to a grab for land and resources that neglect people and wildlife. We must first implement the NWT Protected Areas Strategy (PAS) effectively," said Ewins.

WWF and its partners will maintain pressure on the Government and project proponents to abide by the PAS and complete proper land use planning. Public hearings could begin in late January 2006, and be completed by October 2006.

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Killer whales most toxic

Initial scientific results show Norwegian killer whales are the most toxic mammals in the Arctic.

Previous research awarded this dubious honour to the polar bear, but a new study shows that killer whales have even higher levels of PCBs, pesticides and a brominated flame retardant.

The results are based on blubber samples taken from killer whales in Tysfjord, a fjord in arctic Norway. This is the first time the findings of the research, carried out by the Norwegian Polar Institute (NPI), and partly funded by the Norwegian Research Council, have been revealed.

Dr Hans Wolkers, a researcher with NPI, said: "Killer whales can be regarded as indicators of the health of our marine environment. The high levels of contaminants are very alarming. They clearly show that the arctic seas are not as clean as they should be, which, in particular, affects animals at the top of the food chain."

WWF funded Dr Wolkers to carry out new research from this November to further monitor the levels of dangerous contaminants in the killer whales, including another brominated flame retardant called deca-BDE, used in electronic goods and coatings for household products such as carpets. The findings of this research are expected next year.

The appearance of a potentially dangerous brominated flame retardant in the killer whales is of particular concern, because – unlike PCBs and the most harmful pesticides – most hazardous brominated flame retardants are not currently banned. Brominated flame retardants can affect animals' neurological function, behaviour and reproduction.

Brettania Walker, toxics officer with the WWF International Arctic Programme, said: "This new killer whale research re-confirms that the Arctic is now a toxic-sink. Chemicals in everyday products are contaminating arctic wildlife. We must replace hazardous chemicals with safer alternatives whenever these are available."

Helen Bjørnøy, the Norwegian Minister of Environment, said: "The toxic contamination of killer whales clearly shows the result of an unsustainable use of chemicals internationally. This is one of the greatest global environmental threats. The EU ministers now have the possibility to strengthen the chemicals legislation in Europe, and I urge them to use it. It is imperative that the REACH regulation

becomes a tool to stop using the most dangerous chemicals."

Killer whales are found throughout arctic Norway, including Svalbard and the Barents Sea, but congregate in the Tysfjord area to feed on spawning herring during the winter. This offers an excellent opportunity to sample them in an efficient way. *See feature page 19–20.*

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Satellite decision pending

A decision about whether the European Space Agency (ESA) will launch a second satellite to monitor arctic ice is set to take place in early 2006.

ESA's first CryoSat Mission, designed to gather and analyse data on sea ice thickness in the Arctic, ended in failure in October due to technical problems.

CryoSat was set to make a significant contribution to the understanding of climate change and its effects on the Arctic.

From an altitude of just over 700 km and reaching latitudes of 88 degrees, CryoSat was designed to monitor precise changes in the thickness of the polar ice sheets and floating sea ice.

It would have made observations over a three-year lifetime and should have provided further evidence of rates at which ice cover may be diminishing.

The Khrunichev Space Centre in Russia launched the CryoSat satellite. It was the first time the ESA had used a Russian space centre. The Russian State authorities have established an investigating commission to further analyse the reasons for the failure.

According to Dr Franco Bonacina from ESA, a decision about whether to launch a second CryoSat mission will be made early in 2006.

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The short-lived Russian rocket carrying the Cryosat satellite disappears into the clouds. The failed Cryosat Mission was designed to measure the sea ice thickness in the Arctic.

Photo: European Space Agency

Caribou numbers decline

Surveys of caribou in the Northwest Territories, Canada, has revealed a drastic drop in the numbers of some herds.



Photo: Anne Gunn, GNWT

A population survey by the Department of Environment and Natural Resources in Canada's Northwest Territories (NWT) has revealed an 80 percent decline in the Bluenose West caribou herd.

The survey found the number of animals in the Bluenose West herd had dropped to 20,800 from just under 99,000 animals in 1987. The Government also estimates the Cape Bathurst herd has declined to 2,400 from an estimate of 17,500 in 1992. The Bluenose East herd has declined to 66,600 in 2005 from an estimate of 104,000 in 2000.

Dr Ray Case, biologist with the Department of Environment and Natural Resources, said: "We are very confident in the results. There was an extensive effort to make sure we located all of the groups and counted the caribou."

"Some aboriginal hunters were

originally sceptical about the results. Since then we have had discussions with them and they agree that in all likelihood caribou are in a period of decline.

"The Inuvialuit, Gwich'in and Sahtu co-management boards have recommended that we re-survey the herds. It is not that they doubt the numbers, but they want to ensure that we are monitoring the situation very closely, as they are extremely concerned."

This decline also appears to be affecting other caribou herds across North America, including the Beverly herd and the Porcupine herd, suggesting that there are factors working at a subcontinental level.

Case said: "The information we have indicates that climate factors are major drivers of the caribou population cycle. However, we may not be able to infer that history will

repeat itself, as based on what climate scientists have been saying, changes in climate appear to be different than in the past."

Case and colleagues' key message is that caribou cycles are natural and expected, but what humans do when caribou decline is very important and can effect how their numbers increase when conditions improve.

In an interview with the Canadian Broadcasting Corporation, NWT Environment Minister Michael Miltenberger said that he hopes the new study will prove that regulations are needed to protect the caribou.

Miltenberger said that his department would take measures to protect the Bluenose and Cape Bathurst herds within the next month.

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Gold of Yakutia Republic

Lars Kristofersen, CEO of WWF-Sweden, has been awarded the Golden Medal of the Ministry of Nature Conservation of the Yakutia Republic in Russia for his conservation work in the region.

For the past ten years, WWF-Sweden has collaborated with the Ministry to help create a network of protected areas that now comprise 30 percent of Yakutia.

Yakutia is the largest republic in Russia and home to grizzly bears, polar bears and the



critically endangered Siberian white crane. The largest biological station in the Russian Arctic, the "Lena Nordenskiöld", lies near the Indigirka River in Yakutia.

Half of the Republic is north of the Arctic Circle and mostly inaccessible. The coastal areas of this region are some of the least explored and mapped areas of the world.

WWF presented the first Gift to the Earth to Yakutia in 1996, as part of the Living Planet Campaign. The Gift was given in recognition of the Republic's protection of an area of virgin Siberian forest and tundra twice the size of Germany.

Ola Jennersten, programme director of WWF-Sweden, was awarded the Silver Medal of the Ministry of Nature Conservation of Yakutia.

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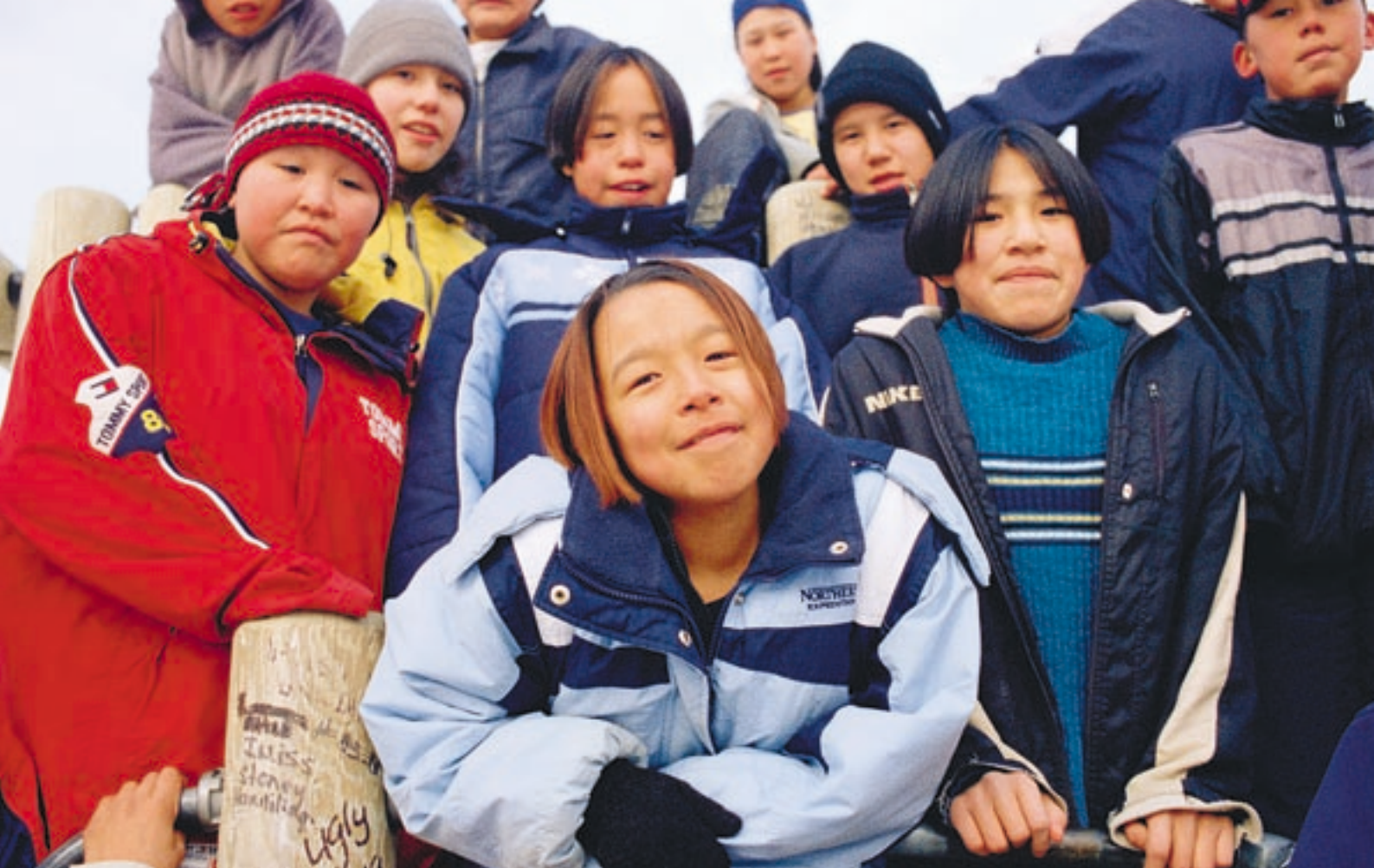


Photo: Bryan & Cherry Alexander Photography / www.arcticphoto.co.uk

*Inuit children
from the
seventh grade
at the
Ataguttaluk
school in
Igloolik,
Nunavut,
Canada*

Northern youth take a stand

The young of the Arctic are speaking out on issues that will affect their future. Jenn Sharman of the Arctic Indigenous Youth Alliance (AIYA) in Canada, and Verner Wilson of Alaska Youth for Environmental Action (AYEA) in Alaska, report on the growing youth movement to build a sustainable future in the Arctic.

Drilling in protected areas, new oil and gas pipelines, and the lack of action on climate change are some of the major issues that young people around the Arctic are concerned about.

Today's decision-makers will not be around to see the eventual outcomes of their actions. Instead it will be today's youth, a group traditionally excluded from the decision-making process, who have to cope with the ramifications of those actions.

In August 2005, Drew Cason, a senior at West High School in Anchorage, Alaska took part in the International Youth Eco-Forum on climate change in Iceland. In an article he wrote for the *Anchorage Daily News*, Cason says: "I learned a lot about the effects of global warming around the Arctic, especially in Alaska. As a teenager, I may

be a bit more concerned about these issues, because I will be around to witness and live with some of the more devastating effects of global warming."

Cason encourages Alaskans to support alternative energy initiatives and to urge the Alaskan Government to follow the lead set by California and Oregon in passing laws to reduce carbon emissions. Cason is one of many northern youth who are coming together to advocate a sustainable future that also includes the traditional beliefs of northern indigenous people.

In Russia, at the 2001 International Youth Conference on the Indigenous Peoples and The Environment of the North, Siberia and the Far East, young people urged the Russian Government to protect their traditional environment and traditional way of life. In

Canada and in Alaska northern youth groups are expressing similar concerns about the effects of development. Indigenous youth in Canada's Northwest Territories formed the Arctic Indigenous Youth Alliance (AIYA), an organisation that seeks to connect the vision of the youth with the wisdom of the elders, and to relate traditional knowledge and values to issues of development and globalisation.

AIYA has worked hard to raise awareness about the potential impacts of the proposed Mackenzie Gas Project (see p. 8), and has heard widespread concern from youth and elders across the Northwest Territories about the proposed project. Many youth are concerned that the project is part of a larger process, which is seeing indigenous culture overwhelmed by an industrialised culture. They worry about



► the implications for their traditional languages and cultures.

In June 2005, four members of AIYA travelled to the Beaufort Delta to hold community meetings about the proposed Mackenzie Gas Project. In the communities of Inuvik, Tuktoyaktuk, Paulatuk and Aklavik, many youth had never heard about the pipeline. Erin Freeland, a Youth Alliance member, says: "This is perhaps one of the most frustrating things about the present system: those who will live with the consequences are not consulted, not informed."

Brent Wolki, AIYA board member from Tuktoyaktuk, says: "I spoke with my great-grandmother in Paulatuk about the development. She said: 'I don't want the pipeline to go through because it will affect our way of living and life for the future of our children, also it will affect my favorite caribou.'"

In Alaska, six teenagers founded Alaska Youth for Environmental Action (AYEA) in 1998. The programme has blossomed into a network of more than 1,000 youth in 23 communities throughout the state, and has worked on a number of environmental issues, including the struggle to stop drilling in the Arctic National Wildlife Refuge. AYEa is a program of the National Wildlife Federation.

AYEA believes it is unfortunate that American and Alaskan corporate interests and politicians are close to succeeding in their plans to drill in the Arctic Refuge. It is unfortunate not only for the indigenous Gwich'in Indians, who view it as their sacred land, but also unfortunate for today's children and future generations.

Verner Wilson, of AYEa, says: "Drilling in the Arctic Refuge will create a precedent, which may call for drilling in other national lands. In our generation we may see drilling in other national parks or areas critical for habitat and wildlife if we do not change America's oil dependent energy policy.

"We would rather benefit by looking to the future and move forward to an environmentally conscious energy independence through avenues such as renewable energy. We hope the youth in our generation will join us in this vision."

Jenn Sharman

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Verner Wilson

Alaska Youth for Environmental Action, National
Wildlife Federation

To learn more about AYEa, go to: ayealnwf.org



Indigenous communities in one of the most remote regions in Russia are witnessing climate change. In the spring of 2005, Tero Mustonen and a team from Snowchange, visited Nizhnikolymsky in the Russian Arctic to learn more.

Climate stories from the Russian Arctic

The Nizhnikolymsky region lies in the Russia Arctic in the far north-east of the Sakha Republic. Splintered by the great Kolyma River and its tributaries, it covers 87,100 square kilometers, but its population is only around 5,600. It is, in fact, one of the most remote regions on earth.

Most roads in the area are made of ice, and supplies are transported by river and air. Outside the main settlements, the region is tundra and woodland, and home to an abundance of wildlife. It's also home to many different indigenous peoples, including Dolgans, Evenk, Even, Yukagir, Chukchi, Yakut and Nenets. The main economies are traditional reindeer herding, hunting and fishing.

In the spring of 2005, the Snowchange team visited local communities and indigenous peoples to document oral histories, traditional knowledge and conduct research on ecological and climate changes in the region.

We visited Cherskiy, the regional capital, and smaller satellite communities, such as Andrejuskino and Kolymaskaja along the Kolyma River. Our team worked with elders, retired

reindeer herders and other people who have migrated to live in urban settlements.

Alexei Gavrilovich Tretjakov, an Even reindeer herder, believes the climate is getting warmer. Ground is 'sinking', he says, because it is wetter than before. There are more floods in the region and lakes have disappeared as the ground becomes water-logged, he says. He has also seen the arrival of sable in the area. Sable is traditionally a species of taiga habitats, but has now spread northwards to the tundra regions. It has replaced squirrel in the border areas between taiga and tundra.

In Andrejuskino, local community leaders voiced their concern about the flooding that has impacted their community. Andrejuskino depends on ice roads for medical services, supplies and other crucial humanitarian services; it is 12 to 18 hours away from Cherskiy by car. The thinner river and lake ice, as well as the unpredictable and swift changes in winter conditions, are impacting community life, they say.

The Snowchange team focused on Nutendli, a Chukchi settlement along the Kolyma River, close to the Arctic Ocean. The settlement is in the process of 're-traditionalisation'. Nutendli has



Photos © Tero Mustonen



The Snowchange project organised community interviews and workshops in north-east Yakutia, Russia. Pictured here, elders and community representatives with the Snowchange team members, Embla Oddsdottir (middle), Johann Asmundsson (right) and Tero and Kaisu Mustonen (left).

Nomadic reindeer herders at camp in Halartsa. Local Indigenous people have reported increased flooding, severe weather variations and melting permafrost in north-east Yakutia, Russia.

Indigenous children are the key to the long-term survival of the nomadic indigenous cultures of north-east Yakutia, Russia.

a nomadic school where local elders teach the younger generation, with help from a State-sponsored teacher.

The approach to learning in Nutendli is unique. Every child has his or her own reindeer, and their parents help the children take care of them. During the summer, children take part in reindeer herding and other traditional activities, such as fishing. This practical approach enables them to learn about their own culture and language in action.

Vyatcheslav Kemlil, the leader of Nutendli, says he wants to teach children all aspects of reindeer herding, and the Chukchi language. He says that it is "easy" to become a herder, but that one must also learn about nature, and from other elders with more experience. He wants his children's generation to be well educated and capable of living the traditional way of life.

Nutendli is an indigenous 'service hub' to the surrounding nomadic reindeer camps. Weather plays a crucial role in the daily life of the community.

This means the impact of a changing climate has become a priority.

While the Snowchange team were there, we worked with the community to document "star lore", weather and climate observations. And we organised joint ceremonies and exchanged stories.

The dramatic changes that are being witnessed in Nutendli were summed up by Vyatcheslav at the recent Snowchange Conference in Alaska:

"We watch the weather and notice changes. Lakes are flooding the banks, small rivers are become larger. On grazing grounds, I come across unknown plants. There are many dwarf willows growing on the tundra. We use them for bonfires. When I was a kid we had to search hard for the willows. Today, I don't need to look hard at all.

"New fish species can be observed in the Kolyma River. Marine species are showing up. We used to migrate north slowly to reach the sea. Now we reach it very fast because of the mosquitoes that

bother the reindeer. We observe new streams and very little ice on the sea. We are observing lots of single polar bears wandering along the shore. We have had four cyclones in the fall and lots of snow. It is very difficult to ensure that there is enough food for the reindeer."

Nomadic reindeer herding is a traditional way of life in the Nizhnikolymsky region. Weather plays a crucial role in daily life. The impacts of climate change, therefore, are crucial.

The Snowchange team visited Halartsa, one of the nomadic winter camps. We heard more stories about melting permafrost and sinking ground. Yet these stories contrasted with the powerful and resilient words of one of the traditional healers in Halartsa: "This has been going on since time began – people in the towns may suffer and wither away eventually, but our way of nomadic life will go on forever."

Snowchange worked with three kinds of indigenous communities in the Nizhnikolymsky Region on our visit: towns, settlements and reindeer camps. We hope that the work in 2005 is the start of a long-term collaboration with the people there. We hope that our work has helped document important and disturbing reports of climate change impacts, such as permafrost melting. And that it provided a strong sense of communities 're-traditionalising', returning to the land, and being in control of their own destinies again.

Nutendli and other communities are planning an epic ski trip to Alaska in 2007 to highlight positive social change, including creating awareness of problems associated with domestic abuse and alcoholism. At this time of change, the healing has already begun.

This article was written by Tero Mustonen of Snowchange (www.snowchange.org), with contributions from Snowchange members Kaisu Mustonen, Jyrki Terva, Vyatcheslav Shadrin, Tamara Andreeva, Embla Oddsdottir, Johan Asmundsson, and the communities of the Nizhnikolymsky region. The research team wishes to thank all of the participants in their workshops in Yakutia, and the supporters of their work. The Snowchange project in Yakutia has been expanded with help from the WWF International Arctic Programme, and the Ministry of Foreign Affairs, Finland. The University of the Arctic, the University of Akureyri, Iceland, Vladimir Vasiliev in Yakutsk and the Institute of the Problems of the Indigenous Peoples of the North, based in Yakutsk, Yakutia, have also provided support.

Arctic melt accelerating

For the fourth consecutive year, scientists using satellite data have tracked a stunning reduction in arctic sea ice at the end of the northern summer.

Stephanie Renfrow of the National Snow and Ice Data Centre, reports.

Scientists from the National Snow and Ice Data Centre (NSIDC), the National Aeronautics and Space Agency (NASA) and the University of Washington in Seattle, have concluded that based on the persistence of near-record low sea ice extents, arctic sea ice is likely on an accelerating, long-term decline.

Dr Julianne Stroeve of NSIDC, said: "Considering the record low amounts of sea ice this year leading up to the month of September, 2005 will almost certainly surpass 2002 as the lowest amount of ice cover in more than a century."

If current rates of decline in sea ice continue, the summertime Arctic Ocean could be completely ice-free well before the end of this century.

This record covers the period 1978 to the present. A recent assessment of trends throughout the past century indicates that the current decline also exceeds past low ice periods in the 1930s and 1940s.

With four consecutive years of low summer ice extent, confidence is strengthening that a long-term decline is underway. Dr Walter Meier, NSIDC researcher, said: "Having four years in a row with such low ice extents has never been seen before in the satellite record. It clearly indicates a downward trend, not just a short-term anomaly."

In addition, however, this year brings with it some new anomalies.

The winter recovery of sea ice extent in the 2004–2005 season was the smallest in the satellite record. Cooler winter temperatures allow the sea ice to "rebound" after summer melting. But with the exception of May 2005, every month since December 2004 has set a new record low ice extent for that month.

Professor Roger Barry, Director of NSIDC, spent time in the Laptev Sea in mid-September, on an arctic icebreaker. The ship entered only one area of continuous ice to the

east of Severniya Zemlya, one of the most northern island chains of Russia.

Barry mused about the possible effects of the sea ice decline, including the impact on arctic animals. "We saw several polar bears quite close to the ship," he said. "Polar bears must wait out the summer melt season on land, using their stored fat until they can return to the ice. But if winter recovery and sea ice extent continue to decline, how will these beasts survive?"

Since 2002, satellite records have also revealed that springtime melting is beginning unusually early in the areas north of Alaska and Siberia. The 2005 melt season arrived even earlier, beating the mean melt onset date by approximately 17 days, this time throughout the Arctic.

In addition, arctic temperatures have increased in recent decades. Compared to the past 50 years, average surface air temperatures



Little auk

Photo: Curtin Egevang/ARCTIC.COM

Auk clue to climate impact

A study of little auks will provide a valuable insight into how climate change is impacting arctic species. Ann Harding and colleagues report.

"Numerous studies show that drastic climate change is currently taking place in the Arctic, with melting sea ice, shrinking glaciers, warmer air temperatures, thawing permafrost, longer growing seasons, and cascading effects on individual species. The rapidly melting arctic sea ice is predicted to have a large impact on the oceanographic circulation patterns in the Greenland Sea, with changes in the origin, strength and distribution of the different water masses affecting the associated

marine ecosystem. In order to understand how such ecosystem changes will affect top marine predators, we are studying the little auk (*Alle alle*), a high arctic seabird that has a very specialised zooplankton diet.

The little auk is the most abundant seabird species in the Atlantic (the total population is estimated at 12 to 20 million pairs), with the largest colonies located between 70 to 80 degrees North on the arctic islands of Greenland and Spitsbergen.

The little auk belongs to the auk family, with its closest relatives being the guillemots (*Uria* species) and the razorbill (*Alca torda*). Little auks lay their single egg in enclosed rock crevices in talus slopes, and colonies can be found on the coast or on mountain slopes as far as 30 kilometer inland. These small black

and white seabirds are highly social, and their vast colonies are spectacular. Mass synchronised flights, gathering several thousands of individuals over the breeding colony, are a prominent feature of little auk breeding behavior. Birds in flight are often extremely vocal, with somewhat hysterical 'trilling' calls that add to this intense spectacle of movement and activity.

Little auks also play an important role in the arctic ecosystem by transporting large amounts of nutrients from the sea to the land. It has been estimated that birds at one colony in Spitsbergen add about 60 tons of nutrient-rich excreta per square kilometre of colony area. As a result, areas next to large little auk colonies support important concentrations of vegetation and attract many insects and herbivores.

from January through August, 2005, were two to three degrees Celsius (3.6 to 5.4 degrees Fahrenheit) warmer than average across most of the Arctic Ocean.

Dr Mark Serreze of NSIDC, said: "The year 2005 puts an exclamation point on the pattern of arctic warming we've seen in recent years.

"The sea ice cover seems to be rapidly changing and the best explanation for this is rising temperatures."

The trend in sea ice decline, lack of winter recovery, early onset of spring melting, and warmer-than-average temperatures suggest a system that is trapped in a loop of positive feedbacks, in which responses to inputs into the system cause it to shift even further away from normal.

One of these positive feedbacks centres on increasingly warm temperatures. Serreze explained that as sea ice declines because of warmer temperatures, the loss of ice is likely to lead to still-further ice losses. Sea ice reflects much of the sun's radiation back into space, whereas dark ice-free ocean absorbs more of the sun's energy. As sea ice melts, Earth's overall albedo, the light reflected away from the planet, decreases. The increased absorption of energy further warms the planet.



Photo: Bryan & Cherry Alexander Photography / www.arcticphoto.co.uk

2005 has the lowest recorded amount of arctic sea ice cover in more than a century.

Dr Ted Scambos, NSIDC lead scientist, said: "Feedbacks in the system are starting to take hold. Moreover, these feedbacks could change our estimate of the rate of decline of sea ice. Right now, our projections for the future use a steady linear decline, but when feedbacks are involved the decline is not necessarily steady – it could pick up speed."

On his arctic cruise, Barry saw another example of a factor that contributes to changes in the Arctic. Barry said: "Warm water flowing from the Atlantic is persisting in the

Siberian Arctic in a layer 100 to 400 meters, or 109 to 437 yards, below the surface." Heat is probably transferring upward from this layer, helping to maintain open water conditions.

Scientists point out that a longer record of data will continue to help them better understand both the influences and the remarkable changes that they are now seeing.

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Little auks feed almost entirely on tiny zooplankton that are caught during wing-propelled dives. Parent little auks carry these zooplankton back to their chick at the colony in a throat pouch which can hold over 15,000 individual prey items. Different zooplankton communities are associated with the different water masses in the Greenland Sea. More importantly, the energy content of individual zooplankton differs among species, with larger species generally providing more energy to predators than smaller ones. Changes in the species composition of zooplankton communities associated with changes in oceanographic conditions in the Greenland Sea will, therefore, directly affect the energy flow to little auks, with potential impact on their reproduction and survival.

The little auk's small size and relatively high-energy expenditure also make them particularly sensitive to local variability in prey. High

energy demands are due to their high wing loading (low wing surface area to body size) and long foraging distances. These little birds may, therefore, have little ability to spend more energy on foraging if local food availability decreases.

We are comparing the breeding and feeding ecology of populations of little auks foraging in highly contrasted oceanographic conditions. Projects funded by the Norwegian Research Council, National Science Foundation and Norwegian Polar Institute are studying little auk colonies on the west coast of Spitsbergen, and the French Polar Institute (IPEV) and WWF is funding a study of little auks in east Greenland. 2005 was the official start of this collaborative effort, with teams conducting boat-based surveys to quantify local oceanographic conditions, zooplankton availability and the distribution of feeding birds on both sides of the Greenland Sea.

Teams at each study colony also collected information about how hard parent little auks were working, how successfully they were breeding, how fast chicks were growing and what prey species parents were feeding their chicks. These data will be used to quantify the physiological and behavioural response of birds to different foraging conditions, and assess their flexibility to changes in food availability.

Information gathered from both regions will ultimately allow us to model the response of little auk populations to predicted change in the arctic marine environment associated with climate change.

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Nina Karnovsky, Pomona College, USA
Geir Wing Gabrielsen, Norwegian Polar
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A remote refuge in the Bering Sea

Last summer, the WWF's Margaret Williams visited St Matthew and Hall Islands, in the northern Bering Sea, two of the most remote outposts of the Alaska Maritime National Wildlife Refuge. This is her report.

One of the greatest challenges in Bering Sea conservation and resource management is the tremendous scale of the area. The ecoregion encompasses nearly one million square miles of marine, coastal, and island ecosystems. A place of superlatives, it is home to the world's largest concentrations of northern fur seals, some of the planet's largest bird colonies and is the location of the world's longest salmon migration up the Yukon River.

Other remarkable migrations to the area take place too; the arctic tern's 10,000-mile journey from Antarctica each year; the albatross' circumnavigation of the Globe, transiting the Bering Sea; and the great whales journey from Mexico, the south Pacific and elsewhere to feed on the sea's bounty.

Another superlative in the ecore-

gion is represented by one of the protected areas established to conserve the remarkable resources in Alaska's waters: the Alaska Maritime National Wildlife Refuge. Known as the most remote and far flung refuge in the US' national system, Alaska Maritime is composed of 2,500 islands and coastal units.

It is home to thousands of marine mammals and approximately 40 million seabirds; 80 percent of Alaska's seabird colonies are found there. Many of Alaska Maritime's units are scattered around the Bering Sea ecoregion, making the Refuge an important partner in conservation. It is also an important part of the region's economy, attracting tourists and protecting coastal and marine landscapes on which many communities and commercial entities

depend.

This year I had the chance join an expedition to St Matthew and Hall Islands, in the northern Bering Sea, two of the most remote outposts of the Refuge. Sponsored by the Alaska Maritime National Wildlife Refuge, the expedition team, led by refuge biologists Art Sows and Heather Renner, was composed of Refuge staff, university scientists, representatives from The Nature Conservancy and WWF, and two representatives of the Pribilof Islands, another very important unit of the Refuge.

To reach the islands, we boarded the *Tiglax*, the Refuge's trusty research vessel, on St Paul Island, and sailed north for nearly 24 hours. At the helm was the jovial and highly knowledgeable Captain Kevin Bell, who delivered one team and their supplies to St Matthew,

WWF partners for safer shipping in Be

The risk of oil spills in the Bering Sea is a reality, so it is time to ensure adequate measures are in place to minimise the threat, argues Margaret Williams.

WWF, along with partners in the Shipping Safety Partnership (SSP), recently celebrated a major victory when the US Congress agreed to restore the federal fund that pays for the clean up of oil spills, such as the one created by the grounding of the freighter *Selendang Ayu* in December, 2004.

The *Selendang Ayu*, a Malaysian freighter, ran aground 1,300 kilometres south-west of Anchorage in the Aleutian Islands, creating Alaska's worst oil spill since the *Exxon Valdez* in 1989.

The OSLTF was established following the 1989 *Exxon Valdez* oil spill and had been maintained by a five-cent-per-barrel tax on oil. However, that tax expired in 1994. With no further revenue source and

a series of demands draining the fund, the \$800 million in remaining funds was projected to run out completely in 2009, leaving coastal communities and resource

managers around the country wondering how the costs of clean up and restoration would be possible.

WWF-US convinced state and congressional leaders of the need to

WWF's priority actions for advancing shipping safety in the Bering Sea include advocating for:

- Modification of the language of the Oil Spill Liability Trust Fund (OSLTF) to allow use of funds for prevention, rather than just response;
- Establishment of a new cargo fee by which cargo ship owners will contribute to the OSLTF, which is currently funded only by oil shippers;
- A comprehensive vessel traffic risk assessment that would characterise vessel traffic, identify areas of special conservation concern, and suggest risk-reduction measures;
- Establishment of round-the-clock vessel tracking system;
- Stationing of high power rescue/ salvage tugs along the Aleutian traffic route; and
- Routing agreements that will protect sensitive Bering Sea wildlife and habitats.

and another batch to Hall Island.

For two weeks, each group conducted a series of research projects. The St Matthew crew conducted a fox survey and assessed the degree to which the tundra ecosystem has rebounded in the 30 years since the death of the last reindeer. On Hall Island, our group conducted a productivity and population assessment of several seabird species that serve as bellwethers for the status of forage fish and plankton in the near shore and offshore environments.

We also recorded observations of other island life, such as the endemic singing vole (it really does sing) and the strangely shy arctic foxes that scouted our camp daily. Evie Witten of the Nature Conservancy discovered a sample of an endemic species of *Artemisia* – a first for the records on Hall Island natural history. Our group also included two researchers from the University of Alaska – Fairbanks, Sasha Kitaysky and Mike Shultz whose research on stress hormones in birds required ingenuity and long days at the bird cliffs. Finally, using GPS and walking around the small island

several times, our group created a map of the islands.

To spend two weeks on an island as remote and untouched as Hall Island (which has never been inhabited, built upon, bombed, subjected to introduced species, or overgrazed by reindeer) was a remarkable opportunity. Indeed, the Refuge and places like these are critical pieces in the dynamic and difficult conservation arena.

However, this Refuge is threatened. In August, the National Wildlife Refuge Association published a report, listing Alaska Maritime as one of six of the nation's 545 national wildlife refuges that are threatened. The disastrous shipwreck of the *Selendang Ayu* contributed in large part to this unfortunate recognition.

This year WWF has been working on some of those issues. We have been actively engaged on shipping issues, in Washington DC as well as Alaska. We initiated a new programme on climate change, Climate Witness, to gather community observations on climate change and bring their stories to the public. And we are supporting



Photo: Dean Kidaw/USFWS

community-based science programmes in several coastal communities, to enable Bering Sea residents to monitor and record change in this amazing and expansive ecoregion.

Margaret D. Williams
Director, WWF Bering Sea Ecoregion
Programme

Guillemot on sea cliffs, St. George Island, Alaska.

ring Sea

restore the Oil Spill Liability Trust Fund (OSLTF), the source of monies used in oil spill remediation throughout the United States.

After a couple of months of active outreach, WWF was extremely pleased to see the introduction of legislation re-instating and raising the cap on the OSLTF. Although this particular bill (the Oil Spill Liability Trust Fund Maintenance Act) was not passed the legislative language, for which WWF had advocated, was retained and the measure was included in the nation's Energy Bill, passed in August, 2005.

Restored funding aside, the threat of another disastrous oil spill still lurks in the Bering Sea ecoregion. The body of the *Selendang Ayu* still rests where it ran aground and broke on nearby Unalaska Island, and more than 20 percent of oiled beach segments still have oil on them, despite efforts to clean them.

The prevention of shipping accidents and associated oil spills must be achieved to ensure a healthy Bering Sea ecosystem. This means insisting on regulations that will truly improve the safety performance of the more than 3,000 vessels that traverse the sea each year.

In striving for safer shipping in the Bering Sea ecoregion, WWF is expanding beyond the impacts associated with vessel traffic in the Aleutian Islands and Great Circle Route. This year, WWF's Bering Sea Ecoregion team has joined forces

with the WWF International Arctic Program to assess the extent and type of cruise tourism activities in the Bering Sea and to identify potential areas where cruise practices can be improved, especially in the most sensitive marine areas, for example, by promoting best practice in fuel conservation, waste management systems, and wildlife viewing practices.

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The Shipping Safety Partnership

The Shipping Safety Partnership (SSP) is an informal partnership of interest groups and individuals sharing the common goal of improving shipping safety along the primary North Pacific cargo shipping routes, in particular along the Great Circle Route through the Aleutian Islands and southern Bering Sea. This coalition of

commercial fishing organisations, conservation groups, tribal, municipal and village governments, state and federal agencies, academic institutions, and citizens of coastal communities, was formed in response to the disastrous *Selendang Ayu* grounding and oil spill off Unalaska Island in December

2004. The policy agenda of the SSP is focused on calling for measures to reduce the risk of groundings, collisions, and oil and cargo spills from the several thousand merchant vessels that transit the Bering Sea each year. For more information, visit www.alaskaoceans.net/sao/ssp.htm

Polar bear — a toxic indicator?

Polar bears hold a key to understanding the health risk of environmental pollutants. Linda Homewood reports.

A University of Florida (UF) researcher, who is aiming to better understand how industrial pollutants in arctic ecosystems might impact humans, has zeroed in on how effectively polar bears are able to rid themselves of environmental toxins consumed in the food they eat.

Bears can completely eliminate only one of five of the tested classes of industrial contaminants they are exposed to, a finding that's bad news for the bears and other species who share their environment, according to Margaret James, PhD, an environmental toxicologist at UF.

James says: "The polar bear has quite an efficient system for metabolising these pollutants. If they can't do it, then it's unlikely that other animals or persons can."

The UF study, published in the October issue of the journal *Drug Metabolism and Disposition*, could help researchers learn more about

the effects of pollutants on humans living in the Arctic, who share the same staple diet as the bears. Because polar bears are mammals with a diet similar to the native Inuit, they may serve as good surrogates for studying human populations also exposed to the pollutants.

Studying liver tissue samples obtained from the bears, James found that the animals were surprisingly efficient at metabolising one of the five types of industrial chemicals studied — those produced by a 'burning process', which are similar to the compounds that form when meat is cooked on a grill. The other four pollutants, she determined, could not be fully excreted.

James says: "This suggests that other species will metabolise the pollutants more slowly. When they are not sufficiently excreted the levels go up."

James, chairwoman of the department of medicinal chemistry at UF's College of Pharmacy, became interested in studying pollutants nearly 30 years ago. Around that time, researchers first began to understand that industrial byproducts were carried to the Arctic by trade winds and then settled in the sub-zero temperatures, making them more likely to accumulate in the food chain.

James faced one obstacle in her research: how could a Florida researcher obtain a polar bear for scientific study? Her break came in 2003, when Canadian colleagues Stelvio Bandiera, PhD, professor of biomolecular and pharmaceutical chemistry at the University of British Columbia in Vancouver, and Robert Letcher, PhD, at Environment Canada in Ottawa, donated liver tissue samples from three adult male bears to UF. The bears came from a legally controlled hunt in 1993 by the Inuit native to the Canadian Arctic.

In her research, James concentrated on five types of chemical contaminants known by the acronym POPs, for persistent organic pollutants. They include

methoxychlor, a compound used as a substitute for the pesticide DDT when it was banned, and which WWF recommended as an addition to the Stockholm Convention; TCPM, an industrial compound found in the Arctic, but of unknown origin and toxicity; PCP, used as a wood preservative; and PCBs, industrial chemicals used for many years in electrical applications. All of these substances, with the exception of TCPM, are regulated or banned, but they persist in the environment.

Polar bears break down these fat-soluble chemicals in two steps, each of which makes the substances more water-soluble and therefore easier to excrete, said James. The first step, however, results in a compound that is more chemically reactive and therefore more harmful to living cells, with the potential for reproductive or neurological damage. The second phase, often slower than the first, determines how successfully the animals eliminate the toxins, she said.

In 2001, the world population of polar bears was estimated to be between 21,500 and 25,000, of which some 15,000 were in Canada. There has been a decline in some sub-populations, which some blame on environmental pollution.

People throughout the world continue to be exposed to chemical pollutants long after they are created and released into the atmosphere, James said. Her immediate research goal is to help scientists gain a better understanding of exactly how these compounds are eliminated from the body. Her long-range goal is to provide governments and regulatory agencies with scientific findings regarding the safety or potential risks of the environmental chemical pollutants that will guide future decisions about the use and the disposal of these compounds.

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A curious polar bear stands up for a better look, Cape Churchill, Canada

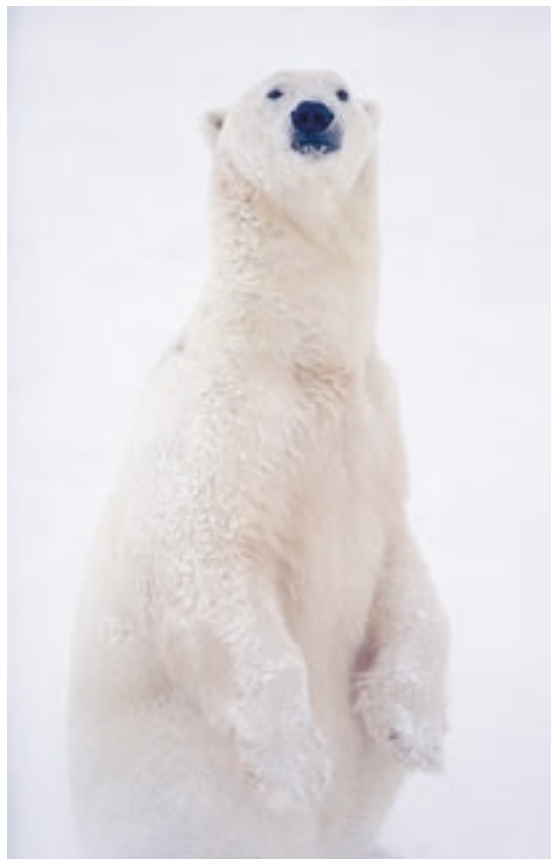


Photo: Bryn & Cherry Alexander Photography / www.arcticphoto.co.uk



Surfacing orca or killer whale (*Orcinus orca*), Tysfjord, north-western Norway.

Photo: Hans Wolkers

Killer whales' toxic load

Norwegian killer whales are some of the most toxic mammals in the Arctic according to new research. Hans Wolkers, a researcher with the Norwegian Polar Institute, carried out research in 2002 and in the early winter of 2005, in Tysfjord, Norway.

A crisp and clear autumn morning welcomes us when we leave our little cabin and walk a few hundred meters to the harbor where our rubber boat, a 'zodiac', is parked for the night. This year is just like any other year in the Tysfjord area of northern Norway: although not a single wrinkle disturbs the sea's features, we know that just meters below this pristine surface one of nature's big displays is going on. Millions of herring, heavy with roe and milt, have migrated into the fjords ready to spawn. Thanks to special conditions in the fjords, favoring eggs and juveniles, the herring have repeated this migration for many decades. But, for the herring, mating is a risky business. Factory ships efficiently empty the

fjords of herring and there's another threat for the spawning fish: killer whales.

Killer whales are skilled hunters with a taste for the fatty fish. They follow the herring schools from the high Arctic, all the way into Norway's fjords. In a hunting strategy called 'carousel feeding', groups of collaborating killer whales herd the herring in a tight school. The ball of panicking herring is subsequently stunned with mighty slams of the whales' flukes and the fish are eaten one by one.

The Arctic is one of the last remote wilderness areas of our planet and mainly consists of clear ocean surrounded by a frozen, mountainous landscape. But its pris-

tine appearance is misleading. Deep in the green waters, toxic chemicals do their devastating work. Pollution, originating from lower latitudes, is transported by air and sea currents into the arctic marine environment. Consequently, killer whales' food has become contaminated. In the coming weeks, we will analyse fat tissue from killer whales and their prey species to assess the whales' exposure to toxic contaminants.

It is still dark when we reach our zodiac and start loading our equipment. In the Arctic, days are short this time of year and only a tiny light band on the horizon signals a new day. Cameras, sound recording equipment, and a biopsy gun are all essential tools for our team of three. Without a stutter, our 115-horse ➤

► power engine starts and slowly we leave the harbor. While a subtle pink colors the horizon, we scan the fjord for any signs of killer whale activity.

Suddenly we spot a large group of seagulls at a few hundred meters. Slowly we move closer and then we see the killer whales in action for the first time. The sea is boiling as a group of at least eight killer whales frantically work for their meal.

With sharp turns and lots of tail splashing, a school of herring is herded together and attacked. The green water shines with thousands of floating scales; evidence of a herring slaughter somewhere in the green deep. On the surface, floating herring are a welcome snack for screaming seagulls.

Although our boat floats in the middle of the activity, the killer whales are totally concentrated on their hunt and completely ignore us. This is an excellent opportunity to get some samples. Quickly, I load the modified caliber .22 gun with a red hollow-pointed dart. Just when I'm ready to aim a large male comes up to take a quick breath, exposing his large dorsal fin and back for a couple of seconds. Just enough time to get a shot. A modest 'bang' and the dart flies out, hitting the grey saddle patch right in the middle. The whale doesn't even flinch when I pull the attached line to get the dart out, and continues to work on his meal. The first sample is taken. With a small net we also sample a few dozen dead herring to test the

whales' food for pollutants.

Norway has a history of marine mammal hunting, and killer whales were taken as well. Catch records of this species exist since the late 1930s; between 1938 and 1980 an average of 57 whales were killed. The last big culls occurred in 1969, 1970 and in 1979 when around 230 animals were killed on average as a response by the Norwegian Government to a presumed competition of killer whales with the herring fisheries. Unfortunately, in spite of the wealth of samples, no published studies, including contaminant studies, on these animals are available.

These days, the whales are a lot safer, at least from hunters. A large whale watching industry now generates income for local communities, and the killer whales' amazing behaviour has been the focus of several nature documentaries.

Today's threat comes from a less visible source: pollution. This is a continuing threat to the health of marine animals as well as humans harvesting food from the sea. Many chemicals that end up in the Arctic are fat-soluble and degrade only slowly. The arctic marine environment is particularly vulnerable to these pollutants because it acts as a final contaminant sink and consequently contains a major portion of these compounds. Due to bioaccumulation processes, marine predators, such as killer whales, are accordingly exposed to relatively

high chemical concentrations, possibly leading to adverse health effects.

Although the most harmful contaminants, such as PCBs, have been banned, they are still abundantly present due to their persistence and pose a long-term threat to wildlife and humans. There is growing concern about the increase of new chemicals such as polybrominated flame retardants in wildlife. Chemically, these compounds are similar to PCBs, but are still used and produced in everyday household appliances. Recent studies have indicated that these 'PCBs of the 21st century' double their concentration in the environment every five years.

Chemical results of the samples we have taken reveal a shocking reality: the herring has five to ten times higher pollution levels than polar cod from the high Arctic. For the killer whales things are even worse. Massive amounts of pollutants have accumulated in their blubber tissue, even more so than in polar bears. This gives killer whales the gloomy record as the most polluted arctic predator. Compared to other animals from the Barents area, all contaminant levels measured are substantially higher. Even the notoriously polluted white whales from the Canadian Gulf of St. Lawrence, thought to suffer heavily from contaminant exposure, show substantially lower contaminant levels than the Norwegian killer whales.

Particularly striking are the high toxaphene concentrations in the killer whales, an indication that the whales and their prey species spend quite some time in the eastern Svalbard area, notorious for toxaphene pollution. Brominated flame retardants are also well represented.

It is difficult to predict contaminant-induced effects as a result of this toxic exposure in the killer whales, but with levels as high as those seen in these killer whales, the chances that their immune system is being compromised and their reproduction impaired, are realistic. Future monitoring and additional studies to assess possible effects will be of utmost importance.

Hans Walkers

Researcher, Norwegian Polar Institute

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Killer whale facts

Killer whales are big dolphins and can weigh more than six tons. They inhabit most of the world's oceans including the Atlantic, Pacific, and Indian Oceans and they are one of the few marine mammal species inhabiting both arctic and antarctic waters. Killer whales seem to prefer colder areas, possibly because of the abundance of food there.

With their characteristic black and white patterns, killer whales are among the best known cetaceans and are true icons of the world's oceans. They are amazingly adaptable, and specialise on food sources

locally available, from small fish to large mammals. Even deer and moose have been reported to end their life in the jaws of killer whales. These adaptable creatures are famous for taking advantage of temporary large prey densities, such as during the seal pupping season in Patagonia or spawning herring along the coast of Norway. It has been estimated that thousands of killer whales might be present in Norwegian coastal waters when herring are abundant.

Along the west coast of North America, two different killer whale populations with

different feeding strategies, 'residents' and 'transients', have been identified. Like the Norwegian killer whales, residents stay mainly along the coast consuming fish as a major portion of their diet, while the transient killer whales frequent coastal waters as well as the open ocean with their diet consisting almost exclusively of marine mammals.

Because of their position at the top of the food chain, the health of killer whale populations can be considered the ultimate indicator of marine ecosystem health.

Linking Mesopotamia to the Arctic

Satellite tracking helps plot the path of the lesser white-fronted goose. WWF's Petteri Tolvanen reports.

Contrary to other arctic goose species regularly occurring in Europe, the general migration direction of the European and western Siberian populations of the endangered lesser white-fronted goose, *Anser erythropus*, is south-east or south. The main staging and wintering sites of the species are in the former Soviet Union, in the Caspian Region, and in the Middle East.

In these areas, the control of hunting, as well as the conservation of wetlands, is less advanced than in western Europe. This is one of the most important reasons for the globally threatened status of the species, while most other arctic goose populations, wintering in western Europe, are thriving. The historical range of the goose covers whole sub-arctic Eurasia, but nowadays the distribution is patchy, and all the populations show a declining trend.

The world population of the lesser white-fronted goose (around 25,000 individuals at mid-winter) is divided genetically into two parts of roughly equal size, a western and an eastern flyway population, with a geographic divide on the Taimyr Peninsula, Russia. The western flyway population migrates from the breeding grounds in Russia, via north-western Kazakhstan, to the still very poorly known wintering areas in the Caspian region and Middle East. The eastern flyway population winters mainly in China.

In addition to the major divide between the western and eastern flyway populations, the critically endangered Fennoscandian population, presently numbering only 20–30 pairs, breeds both in the Nordic countries and on the Kola Peninsula in Russia, although in the latter case, the total numbers of pairs are unknown.

High mortality rate due to hunting and poaching is assessed to be the most important single threat for the species, and it is alone sufficient to explain the present continuous decline of the goose popula-

Connected to the Arctic



tions. This has become evident based on ringing and satellite tracking programmes. Spring hunting of adult birds exerts particularly harmful effects on the population. To fight off this threat, as well as the other threats, like loss and deterioration of habitats, the first essential step is to reveal the key staging and wintering sites. Satellite tracking is a powerful tool in this work.

Migration mapped

In the summer of 2004, the Fennoscandian Lesser White-Fronted Goose Conservation Project (a joint effort between WWF Finland and BirdLife Norway), and the Goose, Swan and Duck Study Group of Northern Eurasia, started a project to track, by satellite transmitters, the migration route of the geese breeding in the polar Urals, Russia. Before this project, the flyway of the western main population was already relatively well known as far south as to the autumn staging area in the Kostanay region in north-western Kazakhstan. But the route further south of Kazakhstan was very poorly known.

In July 2004, Vladimir V. Morozov and his colleagues

➤ **Lesser white-fronted goose.**



➤ from the Goose, Swan and Duck Study Group of Northern Eurasia, caught three geese and equipped them with transmitters. One of the transmitters worked throughout the migratory journey, and revealed a number of formerly unknown staging and wintering sites. The most important and most surprising finding was that the bird spent the whole mid-winter as far south as the Mesopotamian Marshes in eastern Iraq. The next very challenging step, which is crucial for the conservation of the species, is to start goose inventories in the area. The transmitter still worked during the whole spring migration, and in the end of May 2005 the bird safely returned to the breeding area. For the first time ever, the whole migration route and all major stopover and wintering sites of a single lesser white-fronted goose were mapped.

New international LIFE project for the conservation of lesser white-fronted geese on the European flyway

An international EU LIFE Nature project, titled 'Conservation of the Lesser White-fronted Goose on European migration route' started in April 2005. The project aims to improve and monitor the conservation status of the critically endangered Fennoscandian lesser white-fronted goose population, and to put in to practice the international action plan for the lesser white-fronted goose, published by European Commission in 1996.

The LIFE project is run by WWF Finland, with nine more partners in Finland, Norway, Estonia, Hungary and Greece. In addition to the financial contribution of the EU and the project partners, the project is co-financed by the Finnish and Estonian Ministries of Environment.

In the potential breeding grounds in the Fennoscandian tundra, the LIFE project aims to locate the most important breeding areas, and to secure favourable conservation status of these areas. At the staging and wintering sites, the project aims to eliminate the most important threats for the species, such as high mortality due to hunting and poaching, loss of original feeding and roosting habitats, and human disturbance. The project also aims to fill in the gaps in knowledge for example by satellite tracking, and to identify further needs for lesser white-fronted goose conservation measures along the flyway.

The Fennoscandian lesser white-fronted goose population is so small that it is already on the verge of extinction, and so there is an urgent need to protect the population more effectively. As a whole, the European flyway is insecure for the species; the annual monitoring of the spring staging areas shows a continuous decline in the numbers of individuals.

The LIFE project targets the wild Fennoscandian breeding population. In Sweden, a re-introduced population is breeding, and this

population migrates to the Netherlands for winter.

The reintroduced population is regarded as a potential genetic threat to the wild population, because hybridisation with the white-fronted goose *Anser albifrons* and greylag Goose *Anser anser* has occurred during the captive history of the Swedish and Finnish captive lesser white-fronted goose stocks used or planned to be used in the reintroduction. They also form a threat because the small non-pedigree and ill-managed captive populations might have accumulated deleterious mutations with untested effects in the wild. When introduced into small wild population, these alleles might become quickly fixed by genetic drift and accelerate the extinction of the wild Fennoscandian population.

Petteri Tolvanen
WWF Finland

Further information is available at:

■ Portal for the lesser white-fronted goose, including day-to-day satellite follow up results of the Iraq lesser white-fronted goose:

www.piskulka.net

■ Conservation of the lesser white-fronted goose on European migration route LIFE project:

www.wwf.fi/lwfg

■ WWF Newsroom, WWF tracks lesser white-fronted goose to Iraq:

http://www.panda.org/news_facts/newsroom/news.cfm?uNewsID=17052

Snow Amazing: Cool Facts and Warm Tales
Ann Love, Jane Drake, Mark Thurman
(illustrations)
Tundra Books
80 pp
ISBN 0-88776-670-6

This delightful book is packed with a rich array of facts, stories, images and questions from around the Arctic. It's a 'must' for any parent interested in their children's appreciation of the beauty and diversity of countries with snow, but also a very good tapestry of 'snow-things' for any grown-up who doesn't already know it all.

The book is set up as a series of short profiles of the many facets of snow and how nature and people



adapt to them. Each topic is given two to four pages, making a lovely, short but very informative and well-illustrated burst of informa-

tion and story. I particularly liked the old Russian folktale *The Little Snow Girl*, and the section on four experts who have made amazing research discoveries of ecology under the snow.

After all that marvel and awe, I got to the final two pages and was brought back wisely by the authors to the realities of what our species is doing to snow and the Arctic – melting it quickly via global warming.

I read at bedtime to my young daughters and found it to be a very exciting and well-balanced book that led to good conversations and dreams.

Pete Ewins
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Forthcoming arctic meetings & events

Arctic Council events

CAFF Management Board Meeting

WHERE: Helsinki, Finland • WHEN: 13 – 15 February • CONTACT: email: caff@caff.is

Arctic Council Senior Arctic Officials meeting

WHERE: Syktyvkar-Komi Republic, Russia • WHEN: 26 – 27 April • CONTACT: email: ac-chair@mid.ru

CAFF XI Biennial Meeting

WHERE: Northern Finland • WHEN: 6 – 8 June • CONTACT: caff@caff.is www.yllassaaga.com/en

Conferences and workshops

Alaska Forum on the Environment

WHERE: Anchorage, Alaska • WHEN: 6 – 10 February • CONTACT: www.akforum.com/

13th Ocean Sciences Meeting – A Joint Meeting of ASLO, TOS, and AGU

WHERE: Honolulu, Hawaii • WHEN: 20 – 24 February • CONTACT: www.agu.org/meetings/os06/

Symposium "The Greenlandic Environment: Pollution and Solutions"

WHERE: Arctic Technology Centre, Sisimiut, Greenland • WHEN: 21 – 23 February
CONTACT: www.arktiskcenter.gl/UK/ARTEK-feb06-UK.pdf

Images of the North Conference

WHERE: Reykjavik, Iceland • WHEN: 24 – 26 February
CONTACT: www.akademia.is/imagesofthenorth/NORTHWORKSHOP

Community Workshop: "Arctic Navigation and Communications for High-Latitude Ocean Research"

WHERE: Seattle, Washington • WHEN: 27 February – 1 March • CONTACT: email: craig@apl.washington.edu

36th Annual International Arctic Workshop

WHERE: Boulder, Colorado • WHEN: 16 – 18 March • CONTACT: instaar.colorado.edu/meetings/AW2006

Convention on Biological Diversity COP8

WHERE: Curitiba, Brazil • WHEN: 20 – 31 March • CONTACT: www.biodiv.org/doc/meeting.aspx?mtg=COP-08&tab=0

Arctic Science Summit Week 2006

WHERE: Potsdam, Germany • WHEN: 22 – 29 March • CONTACT: www.assw2006.de/

International Conference on Alpine and Polar Microbiology

WHERE: Innsbruck, Austria • WHEN: 27 – 30 March • CONTACT: www.alpine-polar-microbiology2006.at/

7th Nordic-Baltic Conference on Environmental Health

WHERE: Copenhagen, Denmark • WHEN: 24 – 25 April • CONTACT: www.smf.dk/nordic.html

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

<http://www.arcus.org/Calendar/upcomingEvents.shtml> • <http://www.iasc.no/SAM/samtext.htm>

Kids Book of the Far North

Ann Love, Jane Drake, Jocelyne Bouchard
(Illustrator)

Kids Can Press

pp 48

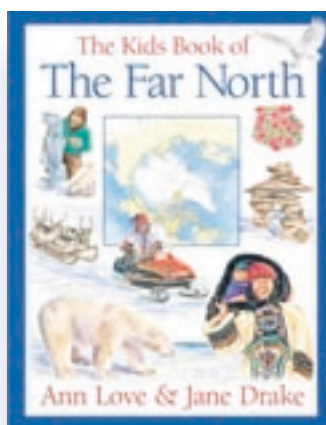
ISBN: 1550745638

Ages 9–12

There are many mysterious and unknown places in the world. For me the North, and particularly the Russian North, held this mystery. What we know of these places as children, and even as adults, is often vague and informed by clichés and stereotypes.

The *Kids Book of the Far North* is an excellent way to introduce young people to the reality of the arctic world and arctic life. It takes a contemporary and thoughtful look at life in the Arctic and includes an abundance of well-researched information that is appropriately written for a younger audience.

The book looks at conservation



issues and small sidebars entitled 'Eco Watch' pose great questions that encourage young people to think about conservation issues and the way that humans interact with their environment. There are 'day-in-the-life' stories that give an account of what daily life is like for a young person in the North, and there is detailed information about

Inuit, Saami, Nenets, Inupiat, and Yupik cultures as well as stories from elders.

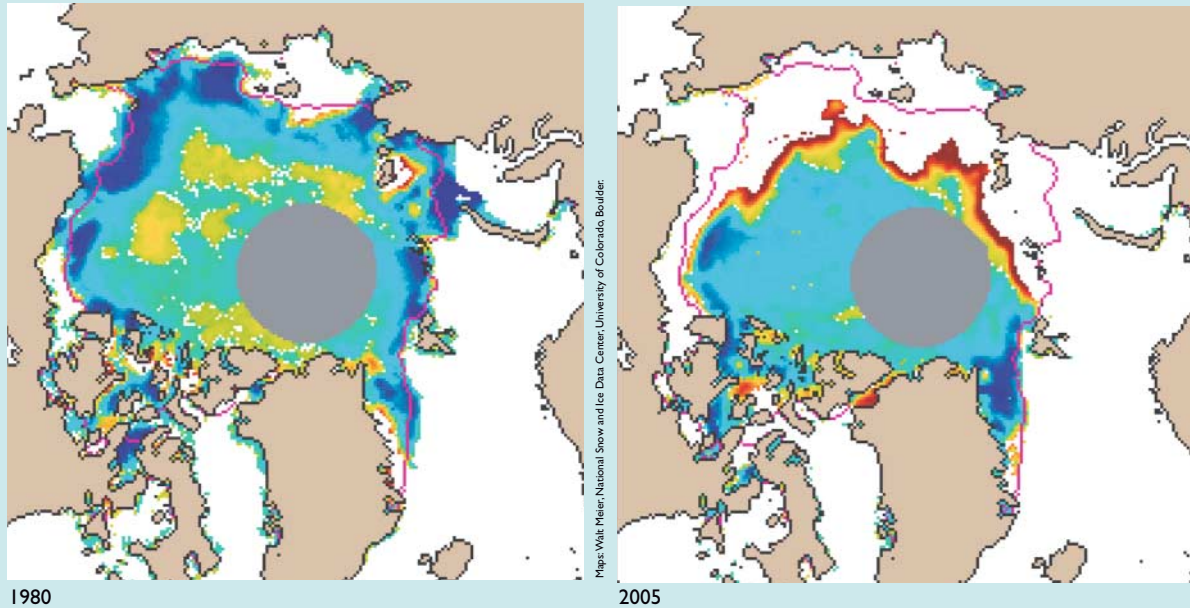
As *Kids Book of the Far North* shows, the northern environment is not a 'wasteland' but a thriving ecosystem and home to many people. Living in the North also offers its own unique set of challenges. It would not normally occur to most people, young or old, from a warmer climate that a northern community that is built on permafrost cannot simply pipe their water and waste underground.

Full-colour illustrations, maps, timelines and photographs nicely supplement the facts about wildlife and arctic living. For a young person, the *Kids Book of the Far North* is an excellent overview of the arctic environment and northern culture and lifestyle.

Nigel Allan
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Sea ice extent – 1979 to 2005

Minimum sea ice concentration anomalies (five-day mean)



**1979–2000
mean minimum
sea ice edge**

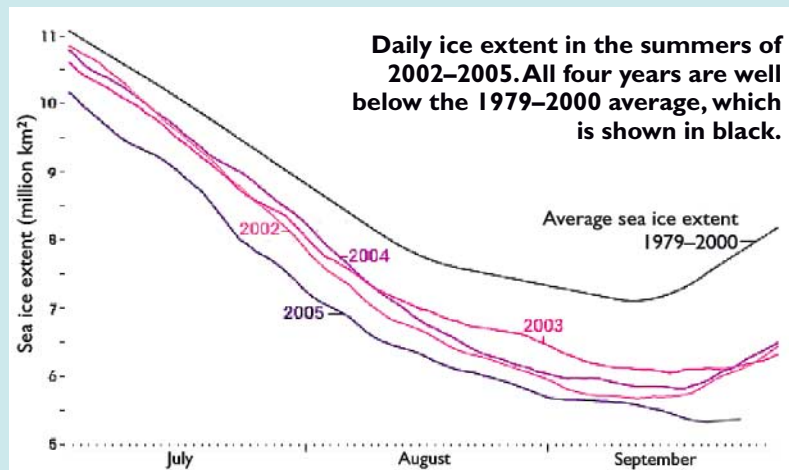
>50%



The colour bands show differing levels of sea ice concentration. Blue indicates areas where concentration is more than the long-term mean; red shows areas where concentration is less than the long-term mean.

<-50%

**Sea ice concentration
anomalies**



Graph: National Snow and Ice Data Center, University of Colorado, Boulder

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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.

