NORTHWEST TERRITORIES

State of the Environment Report

HIGHLIGHTS 2011

Northwest Territories Environment and Natural Resources

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State of the Environment Report HIGHLIGHTS 2011

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This document summarizes findings that are fully detailed in the NWT State of the Environment Report–2011 available at www.enr.gov nt.ca.

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Message from the Minister

Understanding our environment is key to making informed management decisions about our natural resources to ensure they remain healthy and sustainable for current and future generations.

Understanding the different factors driving changes in our environment will help us achieve this goal.

The State of Environment Report provides a snapshot of our changing environment and the factors, pressures and forces driving the change.

The effects of climate change are happening faster in the Arctic than elsewhere in the world. The largest increase in average temperature in Canada is in the Mackenzie Valley. The effects of climate change, especially those due to warmer winters and heavier snowfalls, are being observed on many aspects of the NWT's environment. These effects include rising sea levels, melting ice and permafrost and the potential for longer and more intense wildfire seasons.

In addition to these changes, the NWT economy, human activities and natural fluctuations in the environment have created many changes in our northern ecosystems.

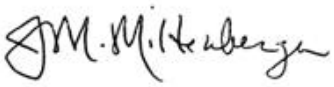
The use of environmental resources in the NWT is changing. Hunting, fishing and trapping are declining. Our wildlife populations are changing. Some migratory bird species once common in the NWT are now in sharp decline and at risk. During the past 10 years, barren-ground caribou herds in the NWT were in decline. Currently, some herds are stabilizing. These are just a few examples of the changes the full report explores.

However, as this report highlights, great work is underway throughout the Northwest Territories to conserve and protect our environment. The NWT Protected Areas Strategy and the NWT Water Stewardship Strategy are maintaining our biodiversity and ecosystem health. More environmental stewardship programs, such as the NWT Species at Risk Stewardship Program, are being developed.

The NWT State of Environment Highlights Report provides information on selected areas of focus. The full report provides detailed information on 20 Focal Points to provide an assessment of environment status, trends and initiatives. It provides an early-warning system of possible impacts resulting from environmental change. The full report can be found online at: www.enr.gov.nt.ca.

I would like to thank all the agencies and organizations who participated in the publication of this report. Your participation ensured the information is complete and compelling.

Thank you.



J. Michael Miltenberger
Minister
Environment and Natural Resources

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Provide your input

contact NWTSOER@gov.nt.ca

Copies of the NWT State of the Environment Report – Highlights 2011 can be obtained on the website at **www.enr.gov.nt.ca**

The full NWT State of the Environment Report is available at **http://www.enr.gov.nt.ca/_live/pages/wpPages/SOE_Welcome.aspx**

Additional information on the state of the NWT's environment is available on-line at:

- Canadian Biodiversity: Status and Trends Report 2010: www.biodiv.ca
- Mackenzie River Basin Board: www.mrbb.ca
- NWT Cumulative Impact Monitoring Program (Aboriginal Affairs and Northern Development Canada): www.nwtcimp.ca
- NWT Environmental Audit and Status of the Environment Report 2011. This report is produced by AANDC/CIMP every five years as mandated by the *Mackenzie Valley Resource Management Act*. Reports produced by CIMP are available on their website at: www.nwtcimp.ca

WHY DO WE NEED INFORMATION ABOUT THE STATE OF THE NWT ENVIRONMENT?

A healthy environment is important to the people of the Northwest Territories. Clean air, clean water, healthy land and healthy wildlife populations are all valued components of our environment. We want to ensure our environment remains healthy for many, many years.

Understanding our world is key to making informed decisions now and in the future.

The goal of the "NWT State of the Environment Report" is to provide information on our changing environment to help us make decisions and ensure we have a nurturing and dynamic environment now and for future generations.

The specific objectives of the "NWT State of the Environment Report" are to provide:

- an assessment of environmental status and trends in the NWT;
- data and information for territorial, national, and international state of the environment initiatives; and,
- an early-warning system of possible impacts resulting from environmental change.

The NWT is home to some of the largest remaining portions of two important global ecological areas: the boreal-taiga forest and the Arctic tundra.

The "NWT State of the Environment Report" is a web-based report providing detailed information on 20 Focal Points in our environment to help us understand our changing world.

This report includes information on the current state of our environment. It looks at what changes have occurred over time and what changes we might expect in the future. It also provides information on how the NWT compares to other parts of Canada or the world. Data and information included in the "NWT State of the Environment Report" comes from a wide range of agencies and published sources. The web-based report provides links to the original sources of information and contact information so you can find more information on each topic.

The detailed web-based "NWT State of the Environment Report" provides the basis for printed summary reports published at regular intervals. The first Highlights Report, published in 2009, summarized some of the key findings from the State of the Environment Report and presented some of the insights gained from the analysis of the information. In celebration of International Year of Biodiversity, the 2010 Highlight Report summarized information on biodiversity. It was called the "NWT State of the Environment Report – 2010 Biodiversity Special Edition".

This document is the second highlights report from the ''NWT State of the Environment Report". It reaffirms some key findings presented in the 2009 report; modifies or provides more details on other findings; and, presents new insights for 2011 and beyond.

The full "NWT State of the Environment Report" is available on-line at www.enr.gov.nt.ca.

The web-based report is updated as new information becomes available.

HOW IS THE INFORMATION ORGANIZED?

The NWT State of the Environment Report

contains 20 Focal Points organized into the following four sections: DRIVING FORCES; PRESSURES; STATE; and, STEWARDSHIP.

Driving Forces

This section includes Focal Points dealing with global driving forces that have direct or indirect effects on the NWT environment. These focal points look at changes in global climate and weather patterns; greenhouse gas emissions; human populations; and, economies. Understanding these global driving forces helps us understand some of the changes we are seeing within the NWT.

Pressures

This section includes Focal Points on human activities and some of the impacts these activities have on our environment. Focal points included in this section analyse trends in human travel; industrial development; human-caused landscape changes; and, levels of solid waste and contaminants in our environment.

State

Focal Points in this section describe characteristics of the environment we can measure. Focal Points in the State section look at the current state of our air, water, vegetation, wildlife, species at risk and genetic resources.

Stewardship

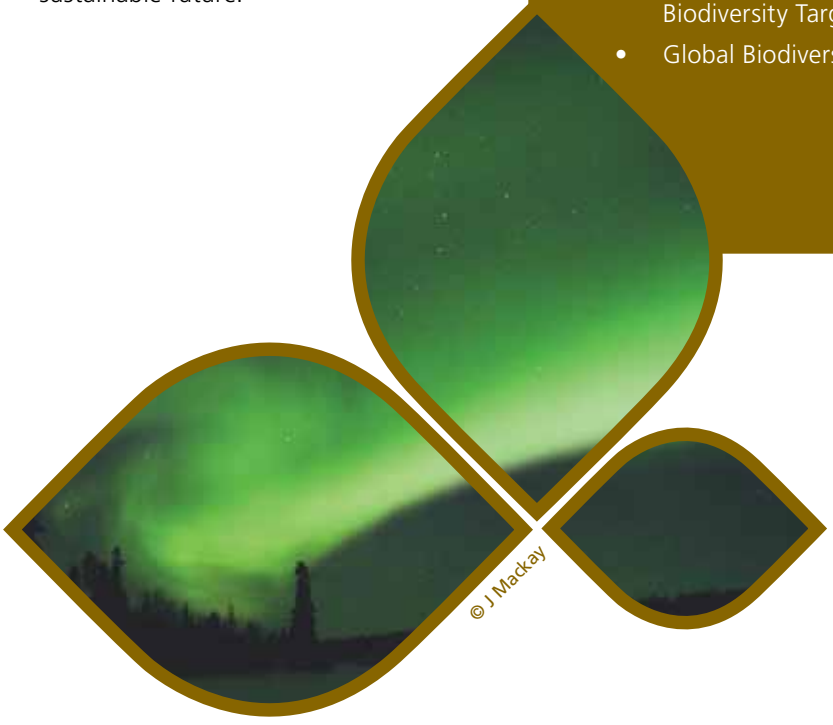
The last section on Stewardship includes Focal Points describing ways in which humans are using and caring for the natural environment. Gathering country foods, participating in traditional economies, environmental education programs and land conservation are all stewardship activities.

Indicators

Each Focal Point in the "NWT State of the Environment Report" is examined using one or more Indicators. Indicators are chosen to communicate key information on our environment in a way that is relevant to the people of the NWT. Indicators can be used to compare current conditions with desired performance; show trends over time; allow comparisons between different regions; help judge the sustainability of current practices; and, define and publicize new standards and measures for assessing progress toward a sustainable future.

Many indicators in this report are already used in the NWT, in Canada and around the world to share information and measure progress toward a sustainable future. The indicators provided in the next pages and in the full report at www.enr.gov.nt.ca may be useful to the following programs and organizations:

- NWT Environmental Audits
- NWT Cumulative Impact Monitoring Program
- Arctic Council's work on monitoring changes in the circumpolar environment
- Canada's National reports on the implementation of the Convention on Biological Diversity
- Canadian Environmental Sustainability Indicators reports
- Canada Forest Accord and the Criteria and Indicator reports on Sustainable forests
- Canadian Protected Areas Status reports
- The United Nation 2020 Biodiversity Targets
- Global Biodiversity Outlooks



AN ECOSYSTEM CLASSIFICATION FRAMEWORK FOR THE NWT

Northern ecosystems are diverse. They include forests, tundra, wetlands, bogs, lakes, rivers and oceans.

These ecosystems or landscapes can be grouped and described as smaller ecological regions (ecoregions) by using several physical characteristics at a variety of scales. The Government of the Northwest Territories (GNWT) is working with its partners on an ecologically-based ecosystem classification. This classification can provide information for environmental assessment; cumulative effects management; biodiversity monitoring and reporting; forest resource analysis and planning; wildlife habitat evaluation and conservation; and, protected areas identification.

The NWT Ecosystem Classification Program began in 2004 to revise the ecozones and ecoregions of the NWT. They were defined under the national ecosystem classification system, "A National Ecological Framework for Canada – 1996". The revision process recognizes the need to obtain updated and more relevant ecosystem classification reflecting the best current information and analytic techniques required to manage natural resources in the NWT.

Ecosystem classification revisions and mapping have been completed for some regions of the NWT: Taiga Plains; Taiga Shield; Boreal Cordillera; Taiga Cordillera; and Tundra Cordillera. Revisions of the tundra regions of the NWT including the Southern Arctic, and Arctic Islands or Northern Arctic are expected to be completed by 2012.

Ecosystem classification and mapping for the NWT is presented within an ecoregion framework for continental North America and includes four levels ranging from the very large level I ecoregions, representing ecosystems of global extent (biomes), to the relatively small level IV ecoregions, covering only a few hundred square kilometres.

Under the revised ecosystem classification, the NWT will include three level I ecoregions, nine level II ecoregions, 18 level III ecoregions and upwards of 150 level IV ecoregions.

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The "NWT State of the Environment Report" is integrating the revised NWT Ecosystem Classification to report on many indicators. The new classification for regions completed by early 2010 (Taiga Plains, Taiga Shield) were used for this report. Classifications for the Cordillera and the tundra regions will be used in 2012.

Biomes

The term "biome" is used when referring to the very large level I ecoregions as defined in the NWT Ecosystem Classification.

Ecozones

The term "ecozone" is used when referring to the large level II ecoregions as defined in the NWT Ecosystem Classification.

Eco-climatic Regions

The term "eco-climatic region" is used when referring to the level III ecoregions as defined in the NWT Ecosystem Classification.

Ecoregions

The term "ecoregion" is used when referring to the level IV ecoregions as defined in the NWT Ecosystem Classification.

More information on the NWT Ecosystem Classification can be found on-line at: www.enr.gov.nt.ca/_live/pages/wpPages/Ecosystem_Classification.aspx


Community
Mine
Pipelines
Transmission Line
All Weather Road
Winter Road
Ecozones
Northern Arctic
Southern Arctic
Boreal Cordillera
Taiga Cordillera
Taiga Plains
Taiga Shield
This map is not a legal description and is provided without prejudice.
NWTCG Project# 0909_004
Map ID: MXD-151
NWT
CANADA
NWT Drainage Basins
Arctic Ocean Seaboard
Back
Mackenzie
Thelon
Sachs Harbour
Northern Arctic Ecozone
Ulukhaktok
Tuktoyaktuk
Aklavik
Inuvik
Paulatuk
Fort McPherson
Tsiigehtchic
Southern Arctic Ecozone
Colville Lake
Fort Good Hope
Nunavut
Norman Wells
Déline
Tulita
Yukon
Taiga Cordillera Ecozone
Wrigley
Gamèti
Wekweètì
Taiga Plains Ecozone
Whati
Behchokǫ̀
Yellowknife
Ndilo
Detah
Lutselk`e
Fort Simpson
Jean Marie River
Nahanni Butte
Taiga Shield Ecozone
Boreal Cordillera Ecozone
Fort Providence
Hay River Reserve
Hay River
Fort Resolution
Kakisa
Fort Liard
Trout Lake
Enterprise
Fort Smith
British Columbia
Alberta
Saskatchewan

TRADITIONAL KNOWLEDGE AND SCIENCE – WEAVING THE STORIES TOGETHER

© K Kelly

The indigenous peoples in the NWT have used traditional knowledge and skills to sustain and support them for centuries. This knowledge and skills have helped them live in a sometimes harsh landscape. Traditional knowledge (TK) is recognized by the GNWT through the Traditional Knowledge Policy 53.03, developed in 1997. More recent planning documents include the GNWT Traditional Knowledge Policy Implementation Framework and the Environment and Natural Resources (ENR) Traditional Knowledge Implementation Plan.

The Traditional Knowledge Policy states:

"The Government of the Northwest Territories recognizes that the aboriginal peoples of the NWT have acquired a vast store of traditional knowledge through their experience of centuries of living in close harmony with the land."

While communities and TK holders are primarily responsible for ensuring protection and preservation of TK, the GNWT recognizes it can help through education and programming.

The GNWT currently provides opportunities for elders and Aboriginal youth to spend time on the land in meaningful activities where their culture and language forms can be taught. TK is not successfully transmitted when there are barriers and gaps in context. This partnership promotes cultural survival and allows the GNWT to benefit from the knowledge that is shared.

The GNWT faces the delicate task of ensuring TK is acknowledged and valued when resource management decisions are made. The development and documenting of TK protocols generated in community collaborative research initiatives is the next step in fully implementing the TK policy.

TK implementation across the GNWT can be tracked in many ways including:

- Number of resource management decisions that have relied on TK;
- Number of times communities have engaged in collaborative research with the GNWT to solve common problems; and
- Number of times TK is placed in government planning documents reflecting the emphasis on the application of TK within government;
- Number of times indigenous voices are heard and given equal footing at conferences on the environment.

For example, an indigenous sharing circle was included for the first time in a large international Arctic ungulates conference co-sponsored by the GNWT in August 2011. The sharing circle provided an important opportunity for indigenous people to their share knowledge on ungulates such as caribou, with people from around the circumpolar world.

The NWT State of the Environment Report relies on all available sources of information to develop indicators to track the changes in the NWT environment.

Some of the indicators on TK included in this NWT State of the Environment Report include:

- Trends in the proportion of indigenous people who speak an indigenous language ***(see 4 Demography)***; and
- The number of camps and educational activities where children are taught their traditional knowledge from their elders ***(see 19 Environmental Awareness)***.

Significant gains have been made in ensuring this report reflects the current state of knowledge including TK of NWT indigenous peoples.

KEY INSIGHTS FROM THE 2011 NWT STATE OF THE ENVIRONMENT REPORT:

Driving Forces

The effects of climate change are happening faster in the Arctic than elsewhere. The largest increase in average temperature in Canada is in the Mackenzie Valley.

In some years or decades, large natural fluctuations in weather will enhance the effects of climate change and may cause rapid and unpredictable changes in the environment.

The effects of climate change, especially those due to warmer winters and heavier snowfalls, are being observed on many aspects of the NWT's environment. These include rising sea levels and storm surges; melting sea ice and permafrost; changing thermokarst; changing distribution of some species; and longer fire seasons.

While the human population of the NWT is not increasing at a rapid rate, the use of fossil fuels for energy is increasing. The proportion of NWT people living in large and medium-sized communities is still increasing.

The NWT economy is less diverse than 10 years ago, and is mainly based on non-renewable resource development.

Use of Aboriginal languages continues to decline throughout the NWT. These languages are important for the preservation and transfer of Aboriginal traditional knowledge to future generations.

Pressures

During the past few years, human activities have declined throughout the NWT. The type and level of these activities change as the world economy changes.

Seismic lines and wildland fires are the main sources of landscape change in the NWT.

State

Some migratory bird species once common, such as the redknot, common nighthawk, rusty blackbird, olive-sided flycatcher, Canada warbler, horned grebe, and the barn swallow are now in sharp decline and at risk.

Barren-ground caribou herds in the NWT were in decline during the past 10 years. Herd numbers are now stabilizing, but some remain very low. Large changes in caribou numbers are also occurring elsewhere in North America and may be due to natural fluctuations related to climate.

Winter water flows are increasing in rivers in the NWT.

The flow regime of the Slave River has changed due to upstream flow regulation: spring high flows are not as high and winter low flows are higher than before the construction of the Bennett dam.

Most of the water in Great Slave Lake comes from the Slave River watershed. Dry conditions in that watershed resulted in the lowest water levels on record in Great Slave Lake. Flow regime change since construction of a dam and flow regulations on the Peace/Slave Rivers has reduced the spring high water levels of Great Slave Lake by 9 cm. The winter low water levels however have increased by 1 cm.

Some indirect effects of a warmer climate are being observed or suspected. Earlier springs may be partly responsible for changes in the timing of insect emergence, leading to declines in some bird populations that rely on insects to feed their young. Climate change also contributes to increased levels of mercury in predatory fish as longer summer seasons allow for changes in the bioaccumulation of mercury in fish.

Stewardship

The use of environmental resources in the NWT is changing. Hunting and fishing remain important but are declining. Trapping has declined. Participation in tourism activities related to the environment is low and variable. The use of country food by NWT residents living in large and medium-sized communities is low.

More environmental stewardship programs, such as the NWT Species at Risk Stewardship Program, are being developed. More protected areas are being established.

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Key information gaps in 2011

Current data on seismic lines are not available. Analyses of landscape changes and wildlife habitat rely on seismic data that is at least five years old, and may not be complete.

There is not enough long-term data from climate stations to detect changes in large parts of the NWT and to analyse the influence of natural fluctuations in weather, such as El Niño, for some regions in the NWT.

There is not enough monitoring information to know if other effects of climate change observed elsewhere in northern North America, such as changes in the timing of insect emergence or increases in shrubs at the treeline, occur in the NWT.

Additional indicators are needed to better understand the cumulative effects of changes in water flow and water quality on aquatic ecosystem health in NWT watersheds.

Available information is not sufficient to draw conclusions regarding a territory-wide rate of solid waste disposal or diversion.

The NWT is home to some of the largest remaining portions of two important biomes on the planet, the boreal-taiga forest and the Arctic tundra. NWT residents are responsible for the conservation and ecologically sustainable development of these biomes.

NWT residents, responsible governments, boards, agencies and organizations must share knowledge and insights on the environment including traditional knowledge and scientific information. With your help, future State of the Environment reports will improve and add to this knowledge and these insights.

More information on each of these findings can be found under highlight indicators in this and in the full NWT State of the Environment Report found on-line at: ***www.enr.gov.nt.ca****.*

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1 THE BIG PICTURE – A CHANGING PLANET

Global driving forces influence long-term changes at a global and Arctic scale. These changes can have significant direct and indirect effects on the NWT's environment.

Indicators

Indicators are included in the full report for this focal point. Indicators summarized in this highlight report are in bold:

1.1 **Trends in global CO_2 concentrations**

1.2 Trends in average global temperature, sea levels and snow cover

1.3 **Projected trends in temperatures and precipitation in the Arctic**

1.4 Trends in Arctic sea ice

1.5 Global demographic and economic indicators relevant to the NWT

1.6 Trends in global population numbers

1.7 Trends in global supply and demand for northern natural resources

1.8 **Projected trends in Beaufort Sea levels**

Visit www.enr.gov.nt.ca for more information on all the indicators and annual updates.

Highlight Indicators

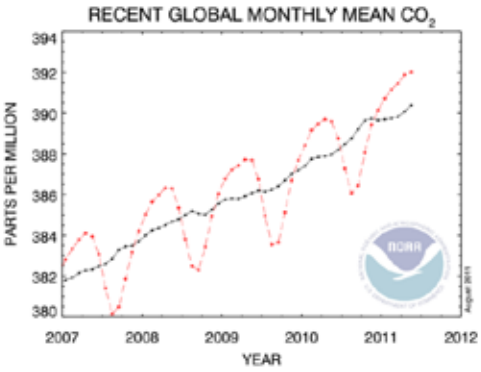
TRENDS IN GLOBAL CO_2 CONCENTRATIONS

Global atmospheric concentrations of carbon dioxide (CO_2), methane and nitrous oxide have increased markedly as a result of human activities since 1750. They now far exceed pre-industrial values determined from ice cores spanning many thousands of years. Global average mean CO_2 reached 388.54 parts per million (ppm) in 2010.

"Continued GHG emissions at or above current rates would cause further warming and induce many changes in the global climate system during the 21st century that would very likely be larger than those observed during the 20th century".

Quote from the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) - Climate Change 2007 - The Physical Science Basis Global: Summary for Policy Makers

The IPCC 2007 found at CO_2 concentrations reaching 450 ppm, average global temperatures are likely to increase by more than 2°C in the next century.



Recent monthly mean carbon dioxide (red line, ppm) globally averaged (black line) over marine surface sites. From NOAA 2011.

PROJECTED TRENDS IN TEMPERATURES AND PRECIPITATION IN THE ARCTIC

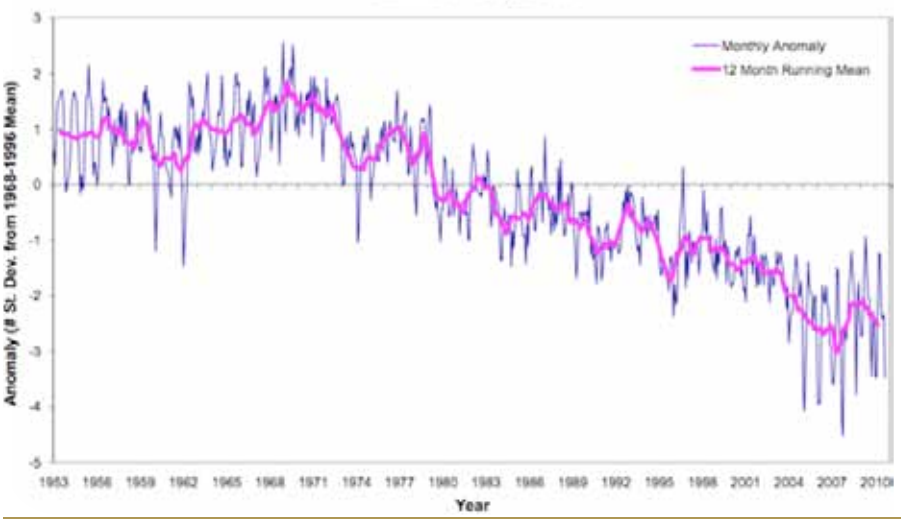
Observed changes in climate are greater and more rapid in the Arctic than elsewhere. The largest predicted increase in temperature will occur in the Arctic, where winters will be more than 7.5 °C warmer on average by 2100.

TRENDS IN ARCTIC SEA ICE

The largest reductions in sea ice occur on thick multi-year ice. Currently, the sharpest decline in Arctic sea ice minimum (September) cover occurred in 2007. In the Beaufort Sea, September 2008 broke the 1998 record for minimum sea ice extents and concentrations. Reductions in sea ice

© B Bennett

Arctic Sea Ice Extent Standardized Anomalies Jan 1953 - Sep 2010



Mean sea ice anomalies, 1953-2010: Sea ice extent departures from monthly means for the Northern Hemisphere. For January 1953 through December 1979, data have been obtained from the UK Hadley Centre and are based on operational ice charts and other sources. For January 1979 through September 2010, data are derived from passive microwave (SMMR / SSM/I). Courtesy: National Snow and Ice Data Center, University of Colorado, Boulder.

cover during the fall minimum are not occurring at the same rate everywhere.

Sea ice trend studies indicate the most rapid changes are occurring in the Arctic basin, north of Alaska, and in the Barents Sea, north Scandinavia. There is no decline yet in sea ice concentration in some areas, such as north of the Canadian Archipelago or just west of Banks Island. This is because thin first-year ice is being piled up by the normal clockwise motion of the entire Arctic ice pack called the Beaufort Gyre.

Reductions in ice cover and ice thickness result in increased vulnerability of Arctic coastal communities to storm surges and coastal erosion. Local knowledge studies indicate changes in sea ice result in increasing dangers during off-shore travels, especially in fall and spring. Reduced sea ice, earlier break-up of sea ice and more fall storms have resulted in more shore erosion in the Inuvialuit Settlement Region.

PROJECTED TRENDS IN BEAUFORT SEA LEVELS

Increases in sea levels are partly responsible for the observed and projected changes on the Mackenzie Delta ecosystem and other coastal areas in the NWT. Sachs Harbour, Tuktoyaktuk, Ulukhaktok and Paulatuk are expected to experience sea-level rise in the 21st century. At the upper end of the projections, Sachs Harbour and Tuktoyaktuk may be subjected to nearly one metre of sea-level rise. The Beaufort Sea coastline, on the mainland and elsewhere, is rich in ice and unconsolidated soils, and has been eroding quickly. It is predicted that sea level rises, working in concert with autumn storms and less sea ice, will result in increasing exposure of the Mackenzie Delta to extensive storm surges.

Key Insights

- Climate models are predicting warmer winters and more snow in the Arctic but less snow in forested areas of the NWT.
- Climate models and experts are predicting ice-free Arctic waters in the summer by 2020 or earlier.
- Demand for NWT resources will remain variable, leading to a typical boom and bust economy. This will result in changing pressures on the NWT environment from changes in human activities and land use patterns.

Find More

For more information on climate changes see: Fourth Assessment Report of the Intergovernmental Panel on Climate Change: **www.ipcc.ch/ipccreports/ar4-wg1.htm**

Canadian Ice Service: **http://ice-glaces.ec.gc.ca/**

US National Snow and Ice Data Center – daily update on sea ice: **http://nsidc.org/data/seaice_index/daily.html**

Human Activity and the Environment reports: **www.statcan.ca**

2 NATURAL CLIMATE FLUCTUATIONS

Indicators

Indicators are included in the full report for this focal point. Indicators summarized in this highlight report are in bold:

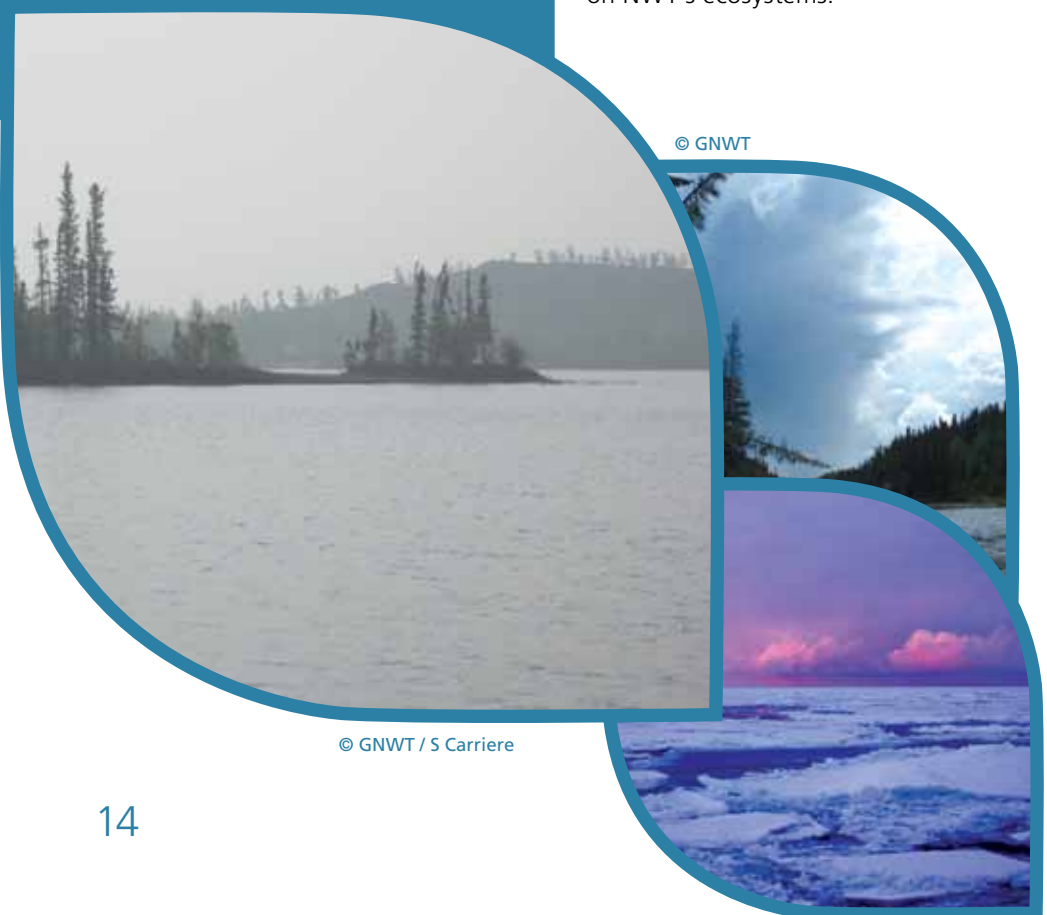
2.1 **Arctic Oscillation Index**

2.2 **El Niño/La Niña**

Visit www.enr.gov.nt.ca for more information on all the indicators and annual updates

This focal point tracks large-scale annual and decadal fluctuations in climate and weather caused by changes in patterns of ocean circulation and atmospheric pressure.

In the NWT, indices for two of these phenomena, the Arctic Oscillation (AO) and El Niño, are particularly important in understanding large natural fluctuations and changes occurring in NWT's weather from year to year and decade to decade. These large weather fluctuations are natural and began long before human-caused climate change. Natural fluctuations in weather have direct impacts on drivers of ecosystem change such as drought, forest fire, flooding, permafrost melt, forest pest outbreaks and timing of vegetation greening. Natural fluctuations need to be taken into account if we want to track the effects of human-caused climate change on NWT's ecosystems.



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Highlight Indicators

ARCTIC OSCILLATION INDEX

The AO is a pattern of variability in the atmospheric pressures of the Arctic and North Atlantic oceans, resulting in large changes in weather from year to year and decade to decade. The Arctic climate is highly variable. The AO index provides information on the natural phases of this variation. It tells us about "normal" weather conditions that can greatly vary over decades.

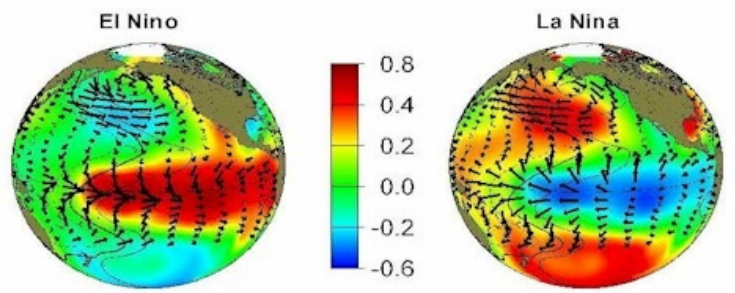
The variability in the AO is a natural phenomenon. It can reduce or amplify the effects of climate change caused by increased greenhouse gas emissions. During decades when the AO is in a positive phase, its effects are similar to those predicted from human-caused climate change. It is difficult to distinguish between the two. A positive AO is linked to weaker ocean circulation in the Beaufort Sea, which results in a change in currents across the Arctic Ocean and a decrease in old, thicker sea ice at the pole. A positive AO is also linked to warmer winter temperatures, on average, north of 60. During most of the past century, the AO has alternated rapidly between its positive and negative phases. However, in the 1970s and from late 1980s to late 1990s, the index remained "stuck" in a strong positive phase with a record high in 1990. A clearer understanding of the effects of AO on the NWT's climate is important to better predict the effects of human-caused climate change on the NWT's environment.

EL NIÑO / LA NIÑA

El Niño/La Niña are patterns of variability in the Pacific Ocean and climate. El Niño events have been shown to result in warmer winter weather, delayed freeze-up, slightly higher than normal snow fall in the southern NWT and increased spring water discharges in rivers. During the past 70 years, there have been nine strong El Niño events in 1957-58, 1965-66, 1972-73, 1982-83, 1986-88, 1991-92, 1997-98, 2002-03, and 2009-10. La Niña conditions have been in place since summer 2010.

The effects of El Niño events on the NWT's ecosystems are not well understood. Very few studies look at these large-scale changes with the NWT in mind. Long-term datasets for each of these patterns, and others, do exist for the NWT and more studies can be expected in the future. This will greatly help our efforts to plan for and adapt to a changing climate.

El Nino Southern Oscillation



El Niño/La Niña, © Image from the NASA Jet Propulsion Laboratory web page. Courtesy of Stephen Hare and Nathan Mantua, University of Washington. Surface Temperature units are degrees Celsius. Arrows are wind stress patterns.

Key Insights

- Natural fluctuations, like the Arctic Oscillation and El Niño/La Niña events, can amplify the effects of climate change in the NWT.
- More studies are needed to increase our understanding of the effects of these phenomena on the NWT's environment.

Find More

The current index can be tracked monthly on US National Oceanic and Atmospheric Administration (NOAA) website at: **www.noaa.gov**.

For information on El Niño in Canada go to **http://www.ec.gc.ca/adsc-cmda/default.asp?lang=En&n=208ED67A-1**

For information on El Niño in the Mackenzie Valley go to **http://www.ec.gc.ca/adsc-cmda/default.asp?lang=En&n=931AB89B-1**

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3 CLIMATE AND WEATHER

Indicators

Indicators are included in the full report for this focal point. Indicators summarized in this highlight report are in bold:

3.1 **Trends in observed seasonal weather compared to normal**

3.2 **Trends in length of growing season and snow cover**

Visit www.enr.gov.nt.ca for more information on all the indicators and annual updates

Climate is the average of weather over a long time.

Climate and weather are driving forces on northern ecosystems, resulting in changes in effective wildlife habitat, species composition and forest fire patterns.

Highlight Indicators

TRENDS IN OBSERVED SEASONAL WEATHER COMPARED TO NORMAL

This indicator tracks the differences in temperature and precipitation from normal values measured from 1961-1990. Both climate regions of the NWT are warming up - in every season. This is occurring in addition to the normal large annual and decadal fluctuations in weather. Exceptionally warm winters like 2005/06 and 2009/10 should be expected in the future. Observed changes in both temperature and precipitation have been larger than what is expected from natural climate variations and are consistent with predictions of climate changes due to increased greenhouse gas emissions.

Warming temperatures are most notable in winter. The warmest winter ever recorded in the Mackenzie District was in 2005/2006. The warmest winter on record in the Arctic Tundra occurred in 2009/2010. Spring temperatures are variable with a trend towards warmer weather and more variability in the last 10 years. The warmest spring on record was in 2010. The driest spring occurred in 2011.

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TRENDS IN LENGTH OF GROWING SEASON AND SNOW COVER

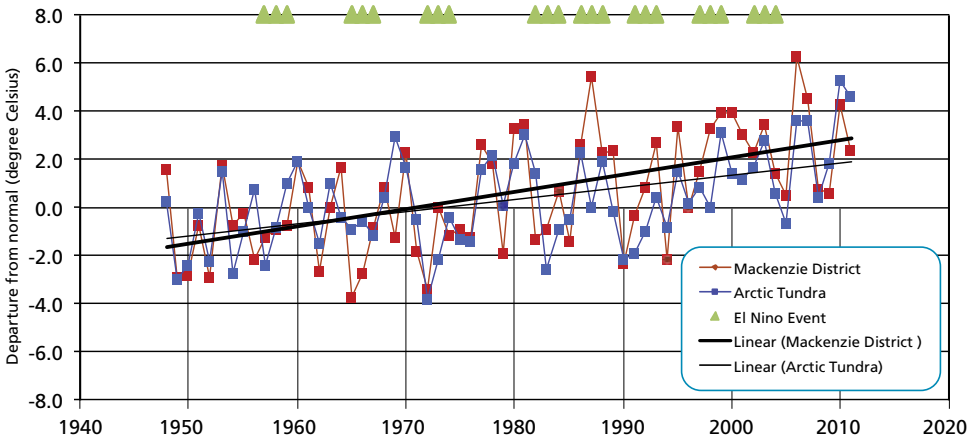
Overall, spring is arriving earlier, resulting in longer growing seasons and shorter snow seasons. It remains unclear if this is occurring in every ecozone as data is not available for analyses. The length of the data record may also not be long enough yet to detect some changes.

NWT animals have adapted to short intense summers and long periods of snow cover by migrating, hibernating or changing behaviour and food sources to optimize survival and reproduction. Plants have adapted to fire, short intense growing seasons and long, cold, dry winters.

Changes in temperature, snow cover and length of both the growing and snow seasons will have an impact on wildlife behaviour and plant growth patterns then, ultimately, on their distribution and survival. Species previously not capable of surviving in our ecosystems may find new habitats in the NWT if we have less severe snow seasons and longer growing seasons. Species adapted to cold may show population declines.

Ecozone	Growing Season	Snow Season
Arctic	No change	Shorter by 5.1 days in Spring
Taiga Shield	No change in length but an earlier growing season is noted (by 11 days)	Unknown
Taiga Plains	Longer by 9 days	Shorter by 12.3 days in Spring
Taiga Cordillera	Longer by 28 days	Unknown

Temperature in Winter



Winter temperature departures from normal (values measured in 1961-1990) in the Mackenzie District and the Arctic Tundra regions. Sources: Climate Trends and Variations Bulletin. The Bulletin is published every season by the Climate Research Division (CRD) of Environment Canada. Note: the reference normals were estimated for the period 1951-1980 in the SOE report 2009. These were revised by the CRD to 1961-1990, the standard used by the World Meteorological Organization.

Key Insights

- Precipitation in the Mackenzie District is highly variable. The wettest spring on record occurred in 2005 and the driest spring on record occurred in 2011.
- More warm winters can be expected in the future.
- The warming due to climate change is occurring in north-western North America and the Arctic. These changes are occurring faster than elsewhere in the world.

Find More

For more information go to Climate Trends and Variations Bulletins at **www.ec.gc.ca**, follow Climate links.

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4 DEMOGRAPHY – HUMANS IN THE NORTHWEST TERRITORIES

Indicators

Indicators are included in the full report for this focal point. Indicators summarized in this highlight report are in bold:

4.1 **Trends in demography in NWT ecozones**

4.2 **Trends in the use of Aboriginal languages in NWT ecozones**

Visit www.enr.gov.nt.ca for more information on all the indicators, and for annual updates

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Number of persons living in each NWT ecozone. Source: NWT Bureau of Stats.

Human population density in the NWT is one of the lowest in the world. Humans are one of the main driving forces influencing the environment. Indicators on demography are helpful in predicting how humans will drive future changes in our environment.

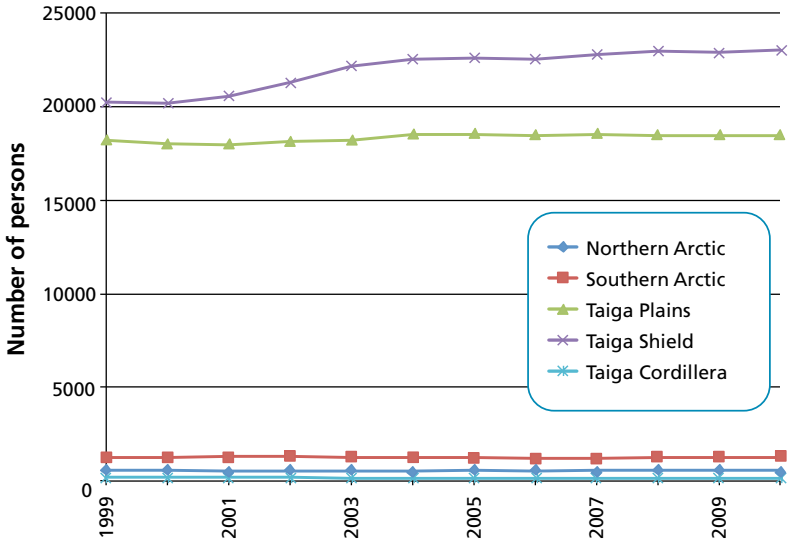
Highlight Indicators

Dene, Inuvialuit and Inuit have lived on the land in the NWT for thousands of years. Europeans arrived in the late 1700s. Today there are about 43,500 residents in the NWT and more than half are Aboriginal. The NWT's cultural links to the environment are appreciated and noted around the world.

TRENDS IN DEMOGRAPHY IN NWT ECOZONES

Population growth in the NWT has been modest. About three-quarters of NWT residents live in medium to large communities. This percentage has slightly increased since 1999. Most of the population growth occurred in the NWT's only city - Yellowknife (Taiga Shield ecozone). Since 1999, the proportion of NWT residents living in Yellowknife has slightly increased from 43% to 45%. The number of people who work in the NWT, but are not NWT residents, was not tracked in this indicator. The NWT population median age increased from 26.9 to 31.5 years during the last 20 years, although the NWT's population remains young compared to Canada's average (median age in Canada is 39.7 years). The birth rate for the NWT remains much higher than the Canadian average. Most people moving to the NWT come from other Canadian jurisdictions, mainly Alberta and Ontario. The NWT has been a net exporter of people for the past five years, when about 100-800 more people left than moved to the NWT each year.

Number of Persons Living in each NWT Ecozone



TRENDS IN THE USE OF ABORIGINAL LANGUAGES IN NWT ECOZONES

The NWT's environment is richly described and understood in the territory's nine Aboriginal languages. Each language is suited to fully transmit stories, expressions and knowledge about specific ecozones in the NWT.

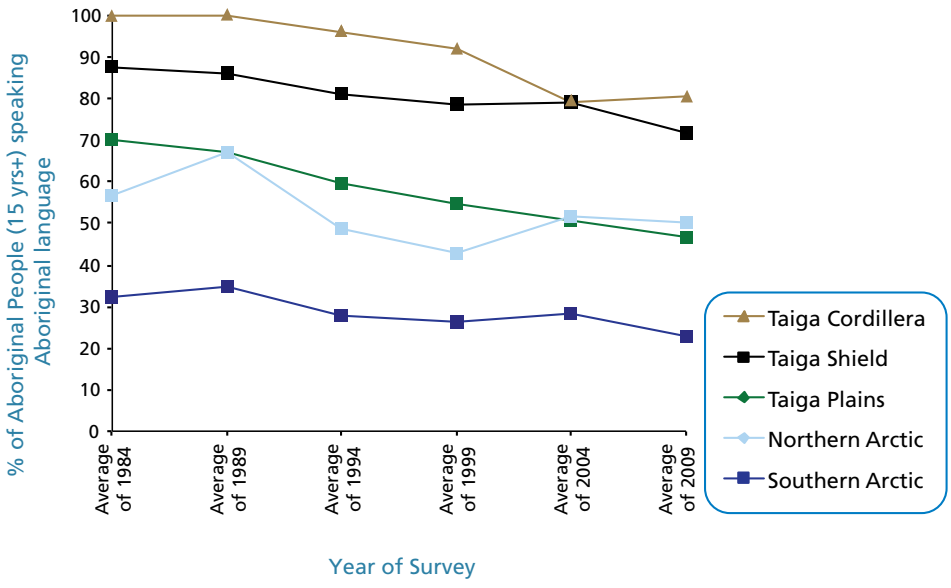
In the northern-most ecozones (Northern and Southern Arctic), less than 50% of Inuvialuit can speak their language. The percentage of Dene and Métis in the Taiga ecozones who can speak an Aboriginal language has declined by about 20% in the past 25 years. Aboriginal languages most spoken in these ecozones are Gwich'in, North Slavey, Tłıcho, South Slavey, Chipewyan and Cree.

NWT's Aboriginal Languages:
Chipewyan, Cree, Gwich'in, Inuinnaqtun, Inuktitut, Inuvialuktun, North Slavey, South Slavey, Tłıcho

The last survey in 2009 indicated an overall average of 38% of Aboriginal people in the NWT could speak an Aboriginal language. Retention and revitalization of Aboriginal languages faces a number of challenges. These challenges (e.g. value placed on dominant languages, communications technologies, etc.) must be addressed and opportunities must be realized for successful revitalization efforts. Loss of these languages or any impoverishment of words, from one generation to the next, can result in loss of environmental traditional knowledge.

Preserving languages is one way to help preserve traditional knowledge, which is recognized as an important component of the Convention on Biological Diversity.

% of Aboriginal People Speaking an Aboriginal Language



Percent of Aboriginal people who speak an Aboriginal language in each NWT ecozone. Source: NWT Bureau of Stats. NWT Labour Surveys and NWT Community Surveys.

Key Insights

- The NWT population is aging.
- The NWT population is slowly concentrating in larger communities.
- The NWT is a net exporter of people to elsewhere in Canada, mostly to Alberta.
- Use of Aboriginal languages is declining in the NWT.
- The human density in the NWT is 0.03 people/km^2. More than half of NWT's population is Aboriginal.

Find More

For current data on NWT population go to NWT Bureau of Statistics - Statistics Quarterly at **www.stats.gov.nt.ca**

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5 ECONOMY

Indicators

Indicators are included in the full report for this focal point. Indicators summarized in this highlight report are in bold:

5.1 **Trends in Gross Domestic Product**

5.2 **Trends in oil-gas and mineral production by ecozone**

- Other indicators are being developed for future reports, including an indicator on NWT's natural capital.

Visit www.enr.gov.nt.ca for more information on all the indicators and for annual updates

© S Yuill

The economy and the environment are linked in complex ways. Choices in how economic activities are carried out influence how those activities will affect the environment.

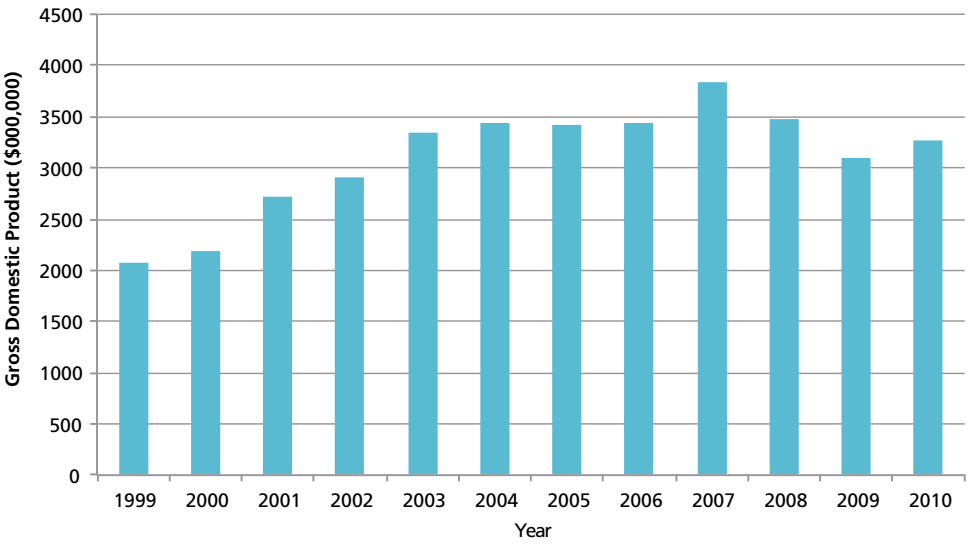
Lessons learned from around the world have demonstrated a healthy and sustainable environment is key to a healthy, sustainable economy. The economy can become a driving force for changes in the environment. These economic indicators provide information about overall changes in the NWT economy and specific changes in the oil and gas and mineral sectors, two sectors with direct impacts on the NWT environment. These indicators can be compared to similar indicators in other jurisdictions. The comparisons may provide new perspectives and offer data to analyse links between economic decisions and the present and future state of the NWT's environment.

Highlight Indicators

TRENDS IN GROSS DOMESTIC PRODUCT

GDP is a measure of the total market value of all goods and services produced in the NWT in a given year. This includes total consumer, investment and government spending plus exports minus imports. The NWT economy is largely based on the extraction of non-renewable resources. The NWT economy of the 2000s was less diverse than the economy of the 1990s. In 2010, one third of the NWT GDP was from mineral, oil and gas industries. As such, the NWT GDP is influenced by the global economy. Current and future global economic uncertainties are directly reflected in short-term financial decisions made by resource industries. This, in turn, results in a "boom and bust" pattern in the NWT economy.

Gross Domestic Product



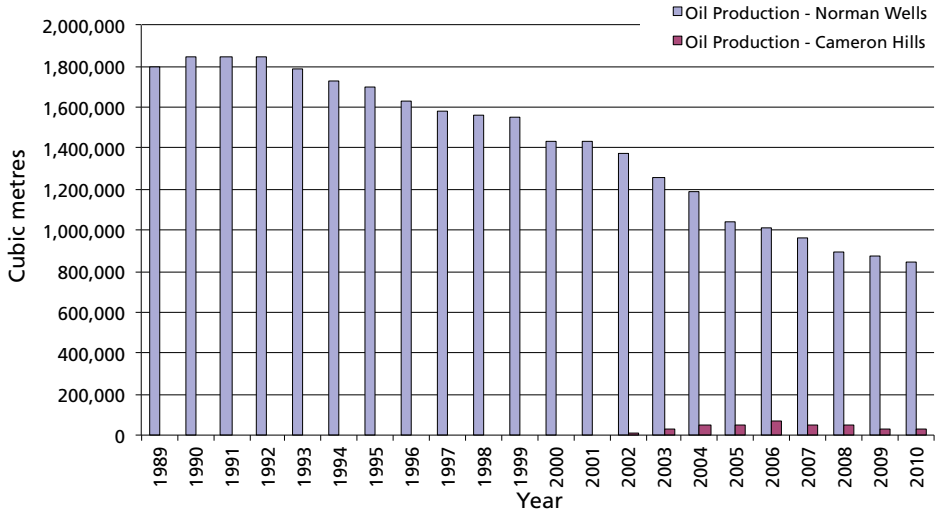
Source: Statistics Canada, from NWT Bureau of Statistics for industry-based GDP (chained to 2002).

TRENDS IN OIL-GAS AND MINERAL PRODUCTION BY ECOZONE

Today, the NWT economy is primarily driven by the diamond mining industry. In the past, mining of other minerals had a huge impact on the NWT's economy and environment. Oil and gas exploration and production is predicted to have a greater impact on the economy in the future. Tracking production in non-renewable resources provides insight into the overall direction of these economic drivers and helps our understanding of present pressures on the environment.

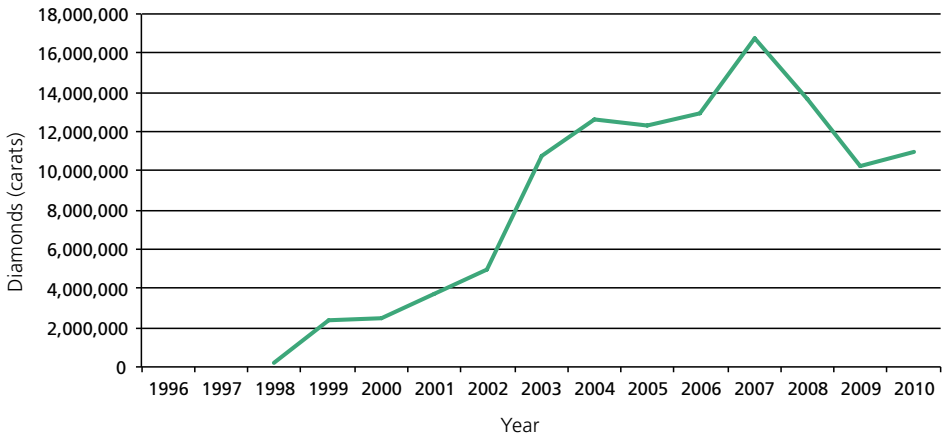
Oil and gas production as well as the number of wells drilled has declined in recent years. In the past, NWT mines produced gold, silver, uranium, tungsten and lead/zinc. Diamonds are now the main minerals mined with two mines (opened in 1998 and 2002) in the Southern Arctic ecozone, and one mine (opened in 2007) in the Taiga Shield ecozone. Diamond mining increased rapidly until 2007 before declining in 2008 with the global economic downturn.

Oil production in Taiga Plains



Oil production for NWT. Source courtesy of NWT Bureau of Statistics, with data from NEB and AANDC. Detailed data available, with analysis, on the AANDC website - Northern Oil and Gas Annual Reports at http://www.ainc-inac.gc.ca/nth/og/index-eng.asp Data complete for 2010. Note: Gas production is also in decline.

Diamonds (carats) - Southern Arctic & Taiga Shield



Key Insights

- Corporate profits account for about 25% of income-based GDP in the NWT, almost twice the national average.
- GDP has gradually declined since 2007. Oil, gas and diamond exploration and development have declined since 2007.
- The number of oil and gas wells drilled in the NWT increased to 36 in 2003 and then rapidly declined. Six new wells were drilled in 2010. About 9,000 new wells were drilled in Alberta in 2010.

Find More

More details on oil-gas and mineral production in the NWT and on future projects related to the industry can be found on the GNWT Industry, Tourism and Investment web page at **www.iti.gov.nt.ca/.**

Production of diamonds. Source: Statistics Canada – also reported by NWT Bureau of Statistics. Updated to 2010.

6 ENERGY USE

Indicators

Indicators are included in the full report for this focal point. Indicators summarized in this highlight report are in bold:

6.1 **Trends in total energy development**

6.2 Trends in electrical generation

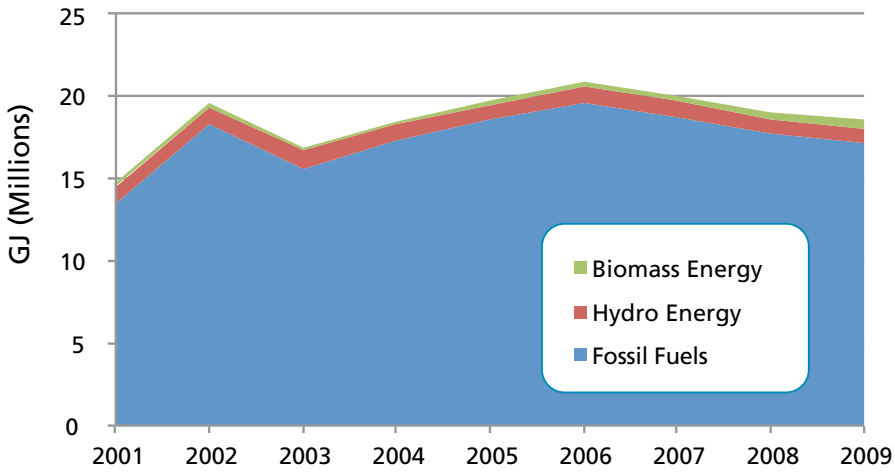
6.3 **Trends in NWT greenhouse gas emissions**

Visit www.enr.gov.nt.ca for more information on all the indicators and annual updates.

Energy use in the NWT, and elsewhere, is a driving force affecting our environment in many ways including the increase in pressures such as air pollution, human activity and landscape change.

The NWT has a role to play in reducing global greenhouse gas emissions and helping Canada meet its international commitments. Energy use per person in the NWT is nearly double the Canadian average. Fossil fuels provide the majority of energy consumed in the NWT. This high energy consumption is due to factors such as long distances between communities and long, cold winters. Currently, most energy used in the NWT is from non-renewable sources. The GNWT Ministers Energy Coordinating Committee (MECC) released an Energy Priorities Framework in 2008 with a focus on reducing imported fossil fuels; mitigating the environmental impacts of energy use; and, reducing the cost of living in the NWT. The GNWT supported this framework with a multi-year 60-million dollar commitment towards energy programs and initiatives.

Total Annual NWT Energy Consumption in Gigajoules (GJ)



Total NWT energy consumption in Gigajoules (GJ). Source: GNWT Departments of Finance and Environment and Natural Resources.

Highlight Indicators

TRENDS IN TOTAL ENERGY DEVELOPMENT

In the NWT, the demand for energy has increased by 35% since 2000. In 2009, more than 18.5 million gigajoules (GJ) of energy were consumed across the NWT compared to over 11 million GJ in 2000. Currently about seven percent of energy used in the NWT comes from renewable sources with hydro electricity and biomass as the most widely used renewable energy sources. The generation of hydro electricity, used in eight NWT communities, has dropped since 2001. This is due mainly to a reduction in demand caused by the shutting down of the Con and Giant mines. The use of wood pellets for heating purposes is on the rise and is expected to persist as the GNWT continues to promote the use of alternative energy technologies in the NWT.

The rise in energy use in the NWT during the last 10 years is consistent with increased industrial activity and GDP. Based on current trends and planned projects, it is expected the demand for energy may double by 2020. The proposed Mackenzie Gas Project (MGP) is expected to increase fossil fuel consumption even more rapidly.

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TRENDS IN NWT GREENHOUSE GAS (GHG) EMISSIONS

The most recent greenhouse gas inventory for the NWT showed 1,230 Kilotonnes (Kt) of greenhouse gas were emitted across the NWT in 2009. This is significantly lower than the 1,570 Kt emitted in 2008. This drop in emissions coincides with a decline in exploration activities and large construction projects. Most emissions in the NWT are from mining, space heating, transportation and electricity sectors. These sectors account for more than 95% of NWT emissions. Without new sources of renewable energy, NWT emissions are projected to increase dramatically if fossil fuels continue to be used to supply growing demand for energy. In addition to the Mackenzie Gas Pipeline (MGP), there are other mining developments slated to take place in the coming years. These developments could force total NWT greenhouse gas emissions projections to rise even further. Current projections indicate NWT emissions may be more than 4,000 Kt by 2030 if the MGP goes ahead and more than 2,500 Kt without the MGP. The GNWT recently adopted a new target to see emissions stabilized at or below 2005 levels by 2015 in the NWT Greenhouse Gas Strategy 2011-2015. This may help reduce overall greenhouse gas emissions in the NWT.

Key Insights

- Annual per capita energy use in the NWT (428 GJ per person) is almost double the Canadian average (227 GJ). Current projections indicate NWT energy use may double by 2020.
- NWT greenhouse gas emissions have decreased since 2005 but are projected to rise again based on planned development projects.
- NWT Greenhouse Gas Strategy 2011-2015 sets a new target for GHG emissions: Stabilize at or below 2005 levels by 2015.
- Hydro electricity generation has decreased since 2001. Heat generated from wood pellets is on the rise. The NWT currently leads Canada in the installation of commercial-sized wood pellet boilers.
- About seven percent of NWT energy is derived from renewable sources.

Greenhouse gas emission projections by sector (2010 – 2030). Source: NWT Greenhouse Gas Strategy 2011-2015. CO_2e = carbon dioxide equivalent.

	Units	2010	2015	2020	2025	2030
Demand Sectors						
Residential	Kt CO_2e	81	79	78	77	74
Commercial	Kt CO_2e	228	222	221	215	219
Transportation	Kt CO_2e	764	1,031	1,022	1,089	1,178
Mining Sector	Kt CO_2e	94	126	192	221	252
Supply Sectors						
Electricity Generation	Kt CO_2e	442	498	556	694	835
Oil and Gas	Kt CO_2e	115	87	63	41	28
Total	**Kt CO_2e**	**1,725**	**2,043**	**2,133**	**2,337**	**2,587**

Find More

GNWT Industry Tourism and Investment: Energy Page, go to **http://www.iti.gov.nt.ca/energy/**

Stats Canada: Report on Energy Supply and Demand in Canada and Stats Canada CANSIM Database, go to **http://www.statscan.ca/**

NWT Greenhouse Gas Strategy 2011 – 20115: go to **http://www.enr.gov.nt.ca/_live/documents/content/GHG_Strategy_2011-15.pdf**

7 HUMAN ACTIVITIES

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Indicators

Indicators are included in the full report for this focal point. Indicators summarized in this highlight report are in bold:

7.1 Trends in air traffic

7.2 Trends in road traffic

7.3 **Trends in shipping in the Northwest Passage**

7.4 **Trends in land uses requiring a permit in the NWT**

Visit www.enr.gov.nt.ca for more information on all the indicators and annual updates.

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Changes in human activity trends can be used to look at changes in short-term disturbance to wildlife and the environment.

This focal point provides indicators on human activities, including human travel, which may cause short term disturbances to the environment. Indicators related to medium and long-term effects from human activities on the environment are found in the Landscape Changes focal point.

Highlight Indicators

TRENDS IN SHIPPING IN THE NORTHWEST PASSAGE

From the 1980s on, voyages through the Passage became an annual event. The number of transits increased from four per year in the 1980s to 20 per year in 2009-2010. A record number of vessels (22) transited through the Northwest Passage in 2010.

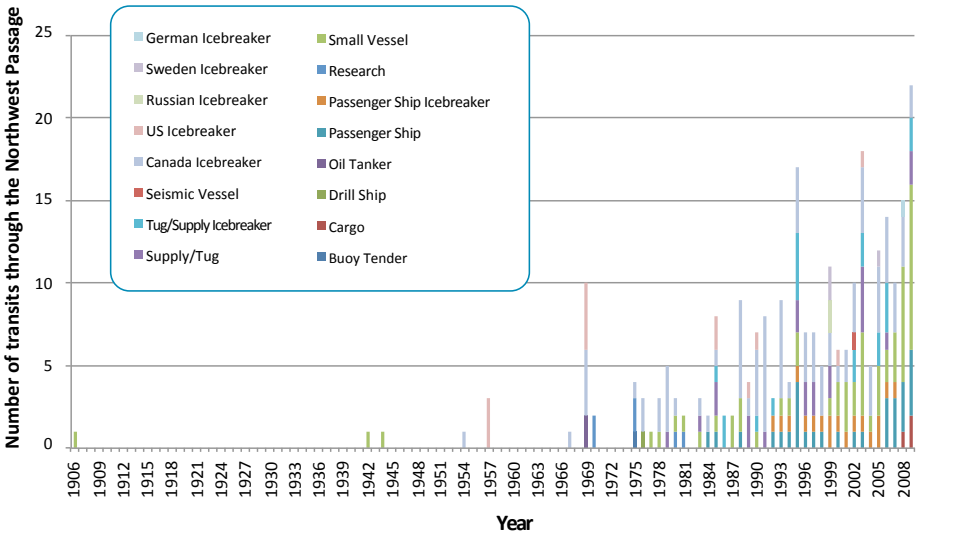
In 2009, the Arctic Council developed a first-ever comprehensive Arctic Marine Shipping Assessment and made several recommendations to ensure environmental protection in fragile Arctic waters.

Some of the findings are:
There is a need for planning and effective regulation in areas of high risk. Significant threats from shipping include release of oil, ship strikes of whales, introduction of invasive species, ship emissions and noise.

TRENDS IN LAND USES REQUIRING A PERMIT IN THE NWT

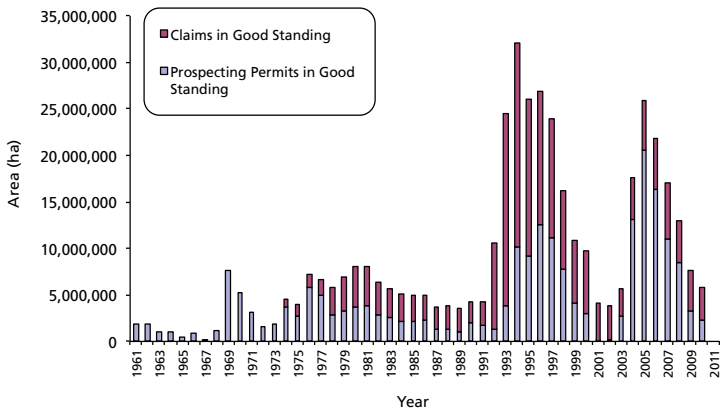
Tracking mineral and oil-gas licences provides insights on 'where' industrial activities occur each year. Tracking land use permits provides insights on 'what' types of activities occur each year. Together, this information produces an indicator allowing us to track changes in activity levels and potential for disturbance, across the NWT. Tracking the location of development activities, and the types of permits that are applied for annually, also provides insight on potential cumulative effects which may result from current and potential future developments. The total land under mining (mineral) lease, typically for active mines, is very small compared to land under prospecting permits and mining claims. The Mackenzie Valley and the Beaufort Sea have been the location for the majority of oil and gas activities in recent years.

Transits through the Northwest Passage



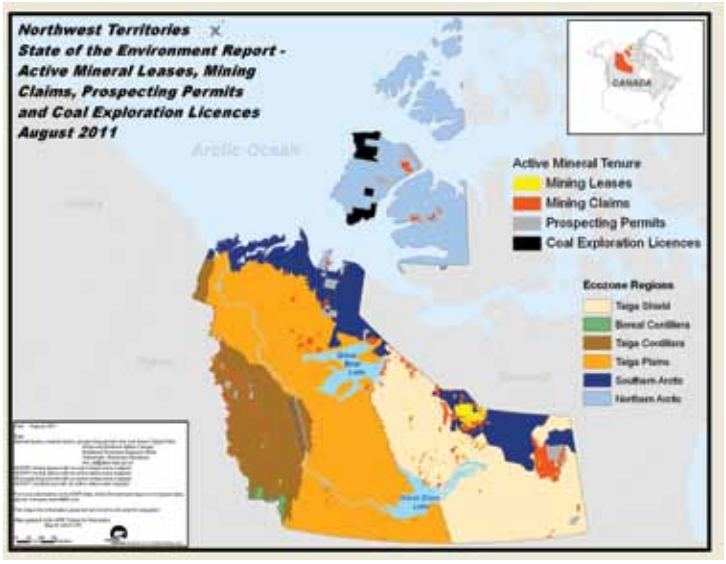
Transits through the Northwest Passage by type of ship.
Source : NORDREG; Data complete for 2010.

Area of Land (ha) with Rights for Prospecting



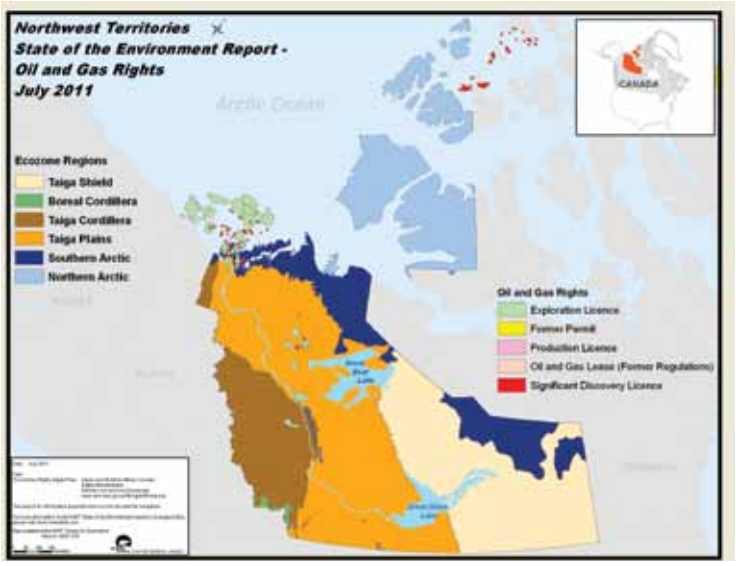
Area of land (ha) with rights for prospecting and with mineral claims per year for the NWT from 1961-2010. Source: Original data from AANDC. Includes Nunavut prior to 2001. Data up to December 2010. 1,000.000 ha = 10,000 km².

Active Prospecting Permits, Mining Claims and Production Leases



Active prospecting permits, mining claims and production leases. Source: SID Online GIS AANDC. Downloaded August 2011.

Oil and Gas Rights



Oil and gas rights. Source: SID Online GIS AANDC. Downloaded July 2011.

Key Insights

- Road traffic in the NWT is very low but slowly increasing.
- Since 2008, air traffic has declined at all three major airports in the NWT (Inuvik, Norman Wells, and Yellowknife).
- The number of complete ship transits of the Northwest Passage has increased from four a year in the 1980s to 20 a year in 2009-2010.
- Land under mineral and prospecting claims and oil and gas exploration permits increased in 2005 to new records in some ecozones before rapidly declining in 2007-2010.

Find More

Arctic Marine Shipping Assessment: **www.pame.is/amsa**

For more information on land administration in the NWT go to **http://nwt-tno.inac-ainc.gc.ca/la-lwb_e.htm** .

For more information on industrial development in the NWT go to: **http://www.iti.gov.nt.ca/miningoilgas/** and Indian and Northern Affairs, Northwest Territories Region at **http://nwt-tno.inac-ainc.gc.ca/index_e.htm**.

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8 LANDSCAPE CHANGES

Indicators

Indicators are included in the full report for this focal point. Indicators summarized in this highlight report are in bold:

8.1 Road density and other linear features

8.2 **Seismic line density**

8.3 **Area of commercial forest harvest**

Visit www.enr.gov.nt.ca for more information on all the indicators and annual updates.

Find More

For more information on the National Energy Board, go to **http://www.neb.gc.ca/**.

For more information on the Dehcho Land Use Plan and visible seismic lines obtained from satellite images for the Dehcho, go to **http://www.dehcholands.org/home.htm**

Find more on NWT's forest resources at **www.enr.gov.nt.ca**

Human activities can change landscape features for a long time and can impact the natural environment in many ways. Linear features such as roads, power transmission lines, seismic lines and pipelines create new corridors that influence human and animal movement patterns.

Compared to jurisdictions in southern Canada, human-caused landscape changes in the NWT have been small but are still measurable. Landscape changes not due to human activities, such as changes caused by climate and natural forest fires, are found in the focal points on Climate, Vegetation, and Permafrost.

Highlight Indicators

SEISMIC LINE DENSITY

This indicator measures seismic line density, in km/km^2, in each terrestrial ecoregion of the NWT. Seismic lines are the single largest landscape disturbance caused by humans in the NWT. In many parts of the NWT, they are the only indication of human disturbance in large areas of otherwise undisturbed forest land. Data for this indicator is obtained from the National Energy Board (NEB). The version of this data used is dated June 2010. There is a five-year lag in the data included. Seismic line data goes back to 1958. An unknown number of additional seismic lines were created in the NWT between June 2005 and today. As well, an unknown proportion of the old seismic lines included in the data set used for this indicator may have re-grown and may not be as visible on the landscape. As a result, the density estimates presented in this report should be considered as minimum baseline numbers representing all seismic lines permitted from 1958 to 2005.

The Mackenzie Delta and Richards Island Coastal Plain in the Southern Arctic Ecozone have the highest seismic line densities at 6 km/km^2 and 2.38 km/km^2 respectively. Other areas of high seismic impact are the Liard Valley and Cameron Hills. The highest seismic line densities measured using a dataset for 1958 to 1999 was 1.25 km/km2 in the Cameron Hills. The eco-region with highest seismic line densities has shifted from the Cameron Hills to the Mackenzie Delta.

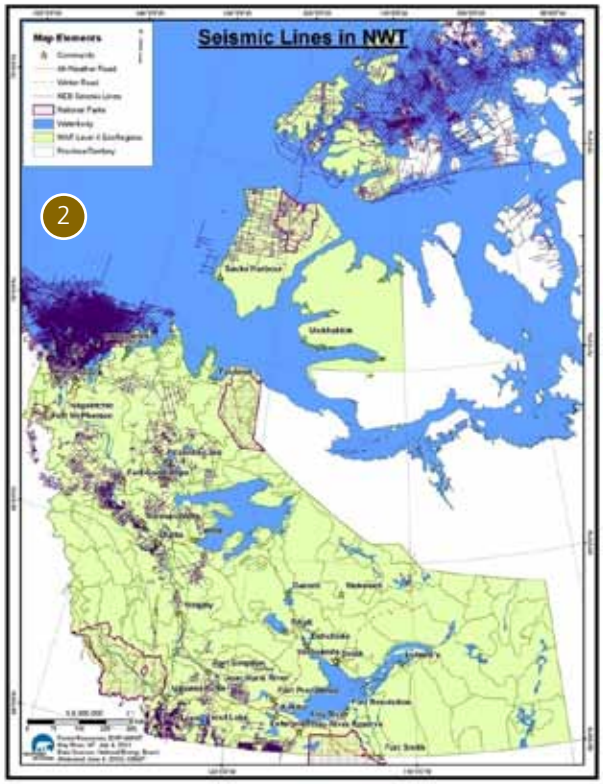
AREA OF COMMERCIAL FOREST HARVEST

This indicator tracks the forested area harvested commercially for timber each year in the NWT. Volume of local fuel wood use is estimated at 20,000 to 30,000 m^3 per year and is not included in this indicator. Commercial timber harvesting has occurred in many places in the NWT, usually in localized areas and in small volumes. Typical commercial harvest operations are small-scale local businesses harvesting volumes of 500 m^3 to 10,000 m^3 of wood per year. The total area harvested for commercial timber in the NWT (2007) was 51 hectares (ha). This can be compared to Yukon at 12 ha, Alberta at 54,981 ha and British Columbia at 197,599 ha.

Small scale commercial timber harvesting for saw logs and fuel wood will continue to occur at a local level. Almost all of

the building lumber used in the NWT is shipped from southern brokers but there is a small amount of lumber produced for local uses in several communities.

The GNWT has implemented a biomass strategy to encourage the use of wood and wood products as an economical and 'green' energy source and to reduce reliance on fossil fuels. The GNWT is actively converting heating systems in government buildings to pellet boilers, which has driven the demand for wood pellets up. There are also recent developments identifying values associated with home heating from "green" sources, such as fuelwood, wood pellets or ethanol, which will have an impact on trends in commercial harvesting. Given recent increases in fuel prices, more people may be looking toward using wood as a source of fuel. This may increase commercial harvesting for fuel wood or other forms of biomass energy. Increasing transportation costs may also drive more demand for local wood products.



1. Seismic line density (km per km²) per ecoregion level IV in the NWT. Ecoregion definition is discussion on page 6 of this report. Analysis by Forest Management, ENR.

2. Seismic lines data used to calculate seismic density in the NWT. Source: NEB. Data obtained in June 2010, but some lines established between 2000 and 2010 may be missing.

Key Insights

- Average road density has not changed since 2009, and remains low at 0.22 km/km².
- Seismic lines are still the single largest landscape disturbance caused by humans in the NWT.
- As of 2005, the highest seismic line densities (6 km/km²) are measured in the Mackenzie Delta, followed Richards Island Coastal Plain at 2.38 km/km².
- Other areas of high seismic impact are the Liard Valley and Cameron Hills. The highest seismic line densities measured using a dataset for 1958 to 1999 was 1.25 km/km² in the Cameron Hills. The eco-region with highest seismic line densities has shifted from the Cameron Hills to the Mackenzie Delta.
- Commercial forest harvest is very small scale in the NWT. Recent developments identifying values associated with home heating from "green" sources, such as fuelwood, wood pellets or ethanol, will have an impact on trends in commercial forest harvesting.

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9 SOLID WASTE

Indicators

Indicators included in the full report for this focal point. Indicators summarized in this highlight report are in bold:

9.1 **Trends in percentage of beverage containers returned for reuse and recycling**

9.2 **Trends in Single-use Retail Bag distribution**

Go to www.enr.gov.nt.ca for more information on all the indicators, and for annual updates.

Other indicators will be developed with future expansion of the waste reduction and recovery program.

Solid waste creates significant pressure on the environment. For most materials thrown away, a replacement is produced using raw materials and more energy. Open burning of waste causes an increase in air pollution, water pollution and GHG emissions.

Improper solid waste disposal also attracts wildlife, often leading to increased wildlife mortality, while increasing demands for more waste disposal sites adversely affect habitat. Waste reduction and diversion can reduce some of these negative impacts associated with solid waste in the environment. Information on waste generation, diversion and disposal in the NWT is limited and insufficient to be used as a reliable indicator of trends for this focal point. Information on some types of solid waste is now collected as part of new programs that redirects waste into recycling processes.

SOLID WASTE IN YELLOWKNIFE – A SNAPSHOT

Yellowknife, home to nearly half the NWT population, is a significant source of waste in the territory. As such, available data can offer a broad-stroke snapshot of the state of waste in the largest NWT community. The diversion rate provided assumes that all materials such as tires, batteries, scrap metal and yard waste are diverted in the same year they enter the landfill, when in practice these items may be diverted over a longer time frame. It also assumes a 100% recycling rate for all materials shipped to external recycling facilities, with no subsequent disposal of material leaving the Yellowknife facility.

Disposal

In 2010, the City of Yellowknife disposed of approximately 27,000 tonnes of waste, or approximately 1.35 tonnes of waste per person per year, from industrial, commercial, institutional and residential sources.

Diversion

In 2010, in addition to beverage containers diverted from landfills (discussed further in indicator 9.1), the City of Yellowknife diverted approximately 12% of the materials that entered the landfill (approximately 4000 tonnes of waste).

In September 2009, the City of Yellowknife initiated a pilot project to explore the potential for a Centralized Compost Facility to divert organic materials, which make up 26.1% of the waste stream, from the landfill. To date, this facility has diverted approximately 265 tonnes of organic waste and 75 tonnes of shredded boxboard and paper. The City of Yellowknife also currently diverts materials such as scrap metal, (including vehicles and white goods), paper products, steel/tin cans, vehicle batteries, mixed plastics and tires. It is also working toward greater segregation and diversion of wood waste.

Highlight Indicators

TRENDS IN PERCENTAGE OF BEVERAGE CONTAINERS RETURNED FOR REUSE AND RECYCLING

Over five and a half years of operation of the Beverage Container Program, NWT residents have returned nearly 135 million containers for reuse and recycling. This represents a return rate of approximately 83% of all beverage containers sold. Starting in February 2010, the Program expanded to include milk and milk substitute containers. Eighty-one percent of the more than 30 million containers distributed in 2010/11 were returned to NWT depots.

By reusing industry standard glass beer bottles and recycling aluminum and PET (#1 plastic) containers in the NWT, the Beverage Container Program prevents an average of 2,876 tonnes of GHG emissions annually, equivalent to taking 564 vehicles off the road. The rate of container returns in the NWT is comparable to other deposit-refund programs for beverage containers across Canada.

TRENDS IN SINGLE-USE RETAIL BAGS (SRB) DISTRIBUTION

On January 15, 2010, ENR implemented Phase I of the Single-use Retail Bag Program (SRBP), requiring all grocery stores to charge customers a 25¢ surcharge for each SRB requested at the check-out counter. On February 1, 2011, the SRBP was amended, and all retail stores were required to collect the SRB surcharge.

Between January 15, 2010, and June 30, 2011, using information provided by retailers and distributors ENR estimated that NWT residents reduced their SRB use by 5.1 to 5.7 million bags. Considering only grocers were required to comply with the SRBP for the majority of this period, this represents 60-67% reduction in use relative to pre-program estimates. Seventy-one NWT businesses have ceased to provide SRBPs altogether. The GNWT is the first jurisdiction in Canada to regulate the distribution of single-use paper, plastic and biodegradable bags.

Key Insights

- Information on waste generation, diversion and disposal in the NWT is insufficient to be used as a reliable indicator of trends.
- About 83% of the 30 million beverage containers sold annually in the NWT are returned for reuse and recycling.
- Since the SRBP began, ENR estimates that NWT residents prevented the use of more than 5.1 to 5.7 million SRBs.
- Through its compost pilot project and by increasing the types of materials accepted for recycling, the City of Yellowknife is reducing the amount of waste that ends up in the landfill.

Find More

Information on waste reduction and recovery in the NWT is available at **www.icarenwt.ca**.

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10 CONTAMINANTS

Indicators

Indicators are included in the full report for this focal point. Indicators summarized in this highlight report are in bold:

10.1 **Trends in cadmium and mercury in caribou kidneys**

10.2 **Trends in environmental remediation of contaminated sites**

10.3 **Trends in spills of hazardous material**

10.4 **Status of mercury in fish**

Visit www.enr.gov.nt.ca for more information on all the indicators and annual updates.

Contaminants are substances that can cause harm to humans and other living organisms.

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The NWT has very low levels of contaminants and pollution compared to many parts of the world. It is important to people in the NWT to know that their environment and their food are safe and healthy.

Highlight Indicators

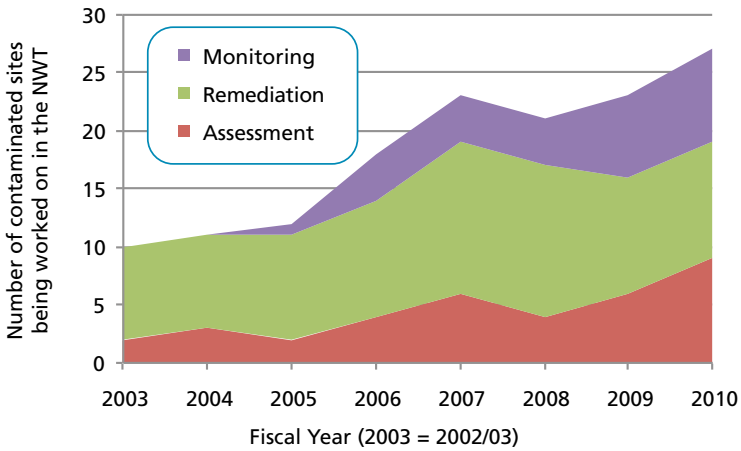
TRENDS IN CADMIUM AND MERCURY IN CARIBOU KIDNEYS

Cadmium and mercury in the environment come from both natural and industrial sources. These metals are absorbed by vegetation and move up the food chain when herbivores, such as caribou and moose, eat it. Both metals can accumulate in caribou liver and kidneys. High levels of heavy metal accumulation could cause health problems for caribou and people eating caribou. Levels in barren-ground caribou are currently low. Ongoing monitoring of levels and changes in contaminants in caribou is an important part of a national contaminants monitoring program for Arctic wildlife and the environment to ensure this food source remains safe and healthy. Terrestrial mammals in the NWT generally have lower concentrations of pollutants than animals from more southern species or species that are part of the marine ecosystem. The level of contaminants in terrestrial mammals is expected to remain low, although the global trend of increasing mercury levels warrants ongoing long-term monitoring. Researchers are discovering new contaminants in the North, such as polybrominated diphenyl ethers found in flame retardants and fabric treatments. The Northern Contaminants Program tests for a range of contaminants. If new pollutants of concern are detected or increase, they will be monitored to understand how they are brought to the North and their effect on the Arctic environment. Any new contaminant appearing in the NWT with the potential to affect wildlife and/or concern people will be included in the State of the Environment Report.

TRENDS IN ENVIRONMENTAL REMEDIATION OF CONTAMINATED SITES

Most work and costs related to the environmental remediation of abandoned military sites, oil and gas exploration camps and mines in northern Canada

Contaminated Sites being worked on in the NWT



have reverted to the federal government. Changes in the number and types of contaminated sites provide insights on pressures on the environment from past human activities. The number of class 1 sites being assessed increased after the 1990s when the federal government assumed responsibility for many abandoned mines and exploration sites. This followed private sector bankruptcies due to falling mineral prices. The number of new sites to assess and remediate should decline in the future as sites active during the past half century, such as old DEW line sites, military posts and past mining ventures, are remediated.

TRENDS IN SPILLS OF HAZARDOUS MATERIAL

ENR has maintained a database of hazardous material spills reported in NWT since 1971. In 2010, 276 spills were reported (77 less than 2009). Sixty percent of those spills were small (less than 100 litres). Mining and petroleum spills are decreasing while spills from other parties, such as government, private individuals and others, are increasing. Transportation spills are also increasing. About 40% of the spills reported involved fuel oil. ENR recently released the Homeowner's Guide to Oil Tanks to help reduce spills due to furnace fuel tanks failures. The Guide provides homeowners with some simple, practical steps to minimize the risk of a spill.

The number of contaminates sites being assessed, under remediation, and monitored in the NWT in 2003-2010. Source: AANDC, Northern Contaminated Sites Program and Federal Contaminated Sites Action Plan (2005-current).

STATUS OF MERCURY IN FISH

Contaminants such as mercury are being monitored in predatory fish in the NWT. Predatory fish (lake trout, pickerel, burbot and northern pike) are sampled because they have a greater potential for bioaccumulation of contaminants. Increased levels of mercury in fish have resulted in Public Health Advisories for some lakes in the NWT. The increase of mercury in predatory fish is due to long range contaminants from other countries such as China. Climate change also contributes to increased levels as longer summer seasons allow for changes in the bioaccumulation of mercury in fish. Older and larger fish tend to have increased mercury due to biomagnification over time. During the last 35 years, temperatures have increased in the Mackenzie Basin approximately 1°C per decade. Trends show levels of mercury and other contaminants are increasing at a greater rate in smaller lakes than in larger water bodies, such as Great Slave Lake and Great Bear Lake. This data is used to influence international policies on contaminants. Contaminants in the NWT will continue to be monitored to ensure northerners are well informed of levels in fish. It is also important to continue monitoring trends of contaminants in fish over time to understand why changes are occurring. International policy on mercury use could influence this trend. The Northern Contaminants Program is compiling mercury data collected during the last 18 years to support international policy discussions.

Key Insights

- Mercury and cadmium in the kidneys of barren-ground caribou in the NWT remain very low and do not pose a health risk to either caribou or people who eat caribou.
- The number of contaminated sites assessed in the NWT has increased after the 1990s when the federal government assumed responsibility for many abandoned mines and exploration sites. Costs reached a peak of $70 M in 2010. The number of new sites should decline in future.
- The number of spills of hazardous material has increased in the last decade.
- Climate change contributes to increased levels of mercury in predatory fish as longer summer seasons allow for changes in the bioaccumulation processes.

Find More

More details on INAC's Northern Contaminated Sites Program can be found at **http://www.ainc-inac.gc.ca/ps/nap/consit/index_e.html**. This webpage provides more information on the remediation activities at each site.

For more information on Northern Contaminants Program go to **http://www.ainc-inac.gc.ca/nth/ct/ncp/index-eng.asp**

Public Health Advisories can be found at **http://www.hlthss.gov.nt.ca/**

Get the pamphlet "Homeowner's Guide to Oil Tanks" go to **www.enr.gov.nt.ca** or call (867) 873-7654 for a free copy.

11 WATER

Indicators

Indicators included in the full report for this focal point. Indicators summarized in this highlight report are in bold:

Water Quantity

11.1 **Trends in winter flow in NWT rivers**

11.2 **Trends in Slave River flows**

11.3 **Trends in Great Slave Lake levels**

Water Quality

11.4 **Trends in turbidity and arsenic in the Hay River**

Aquatic Ecosystems

11.5 Status of delta ecosystems – muskrat habitat changes

Go to www.enr.gov.nt.ca for more information on all the indicators, and for annual updates.

The NWT is renowned for its clean and abundant water resources made up of lakes, rivers and their deltas, wetlands, permafrost, groundwater, and glaciers.

All life depends on water. Water resources are not limitless; there are increasing pressures on these resources through climate change and human actions. Aquatic ecosystems are made up of water, sediments, living organisms and their interactions. If one of these components is impaired, the overall health of the aquatic ecosystem may be compromised.

Highlight Indicators

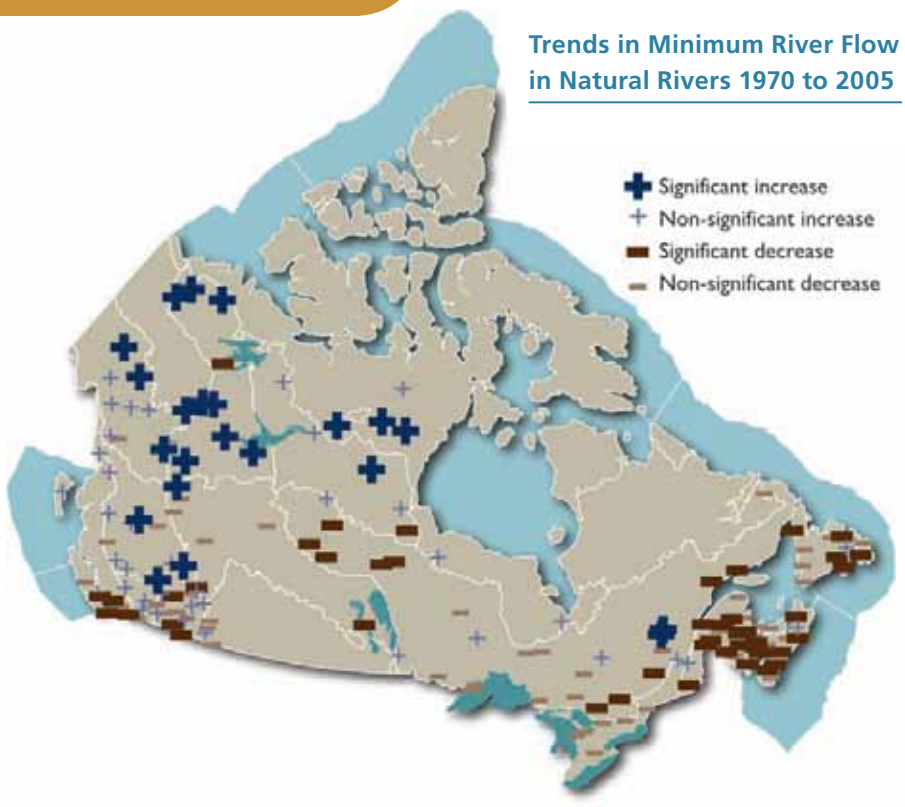
TRENDS IN WINTER FLOW IN NWT RIVERS

In NWT rivers, water flow is usually the lowest in winter. Winter water flow has shown increasing trends across all ecozones, and for large and small basins alike. Possible reasons for increasing winter flows could be increased autumn rainfall and/or warmer autumn and winter temperatures that delays ground freezing.

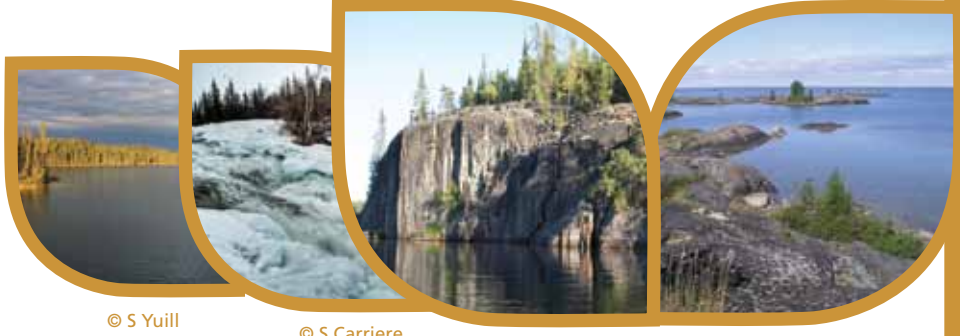
TRENDS IN SLAVE RIVER FLOWS

Total annual flows in Slave River show large variability and a slightly decreasing trend. The lowest total annual flow was experienced in 2010 after several years of extremely dry conditions in the northern regions of BC, Alberta and Saskatchewan. Extreme lows also occurred previously in 1980, 1981, and 1995. The flow regime of the Slave River has changed since the Bennett Dam was constructed on the Peace River and the Williston Lake reservoir began operations for hydro-electricity generation. Natural flows entering the Peace and Slave River system downstream of the Bennett Dam will dampen the effects of the Williston reservoir operations.

Trends in Minimum River Flow in Natural Rivers 1970 to 2005



Trends in minimum river flow in natural rivers (1970-2005). Source: Reproduced from the "Canadian Biodiversity: Ecosystem Status and Trends Report"



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TRENDS IN GREAT SLAVE LAKE LEVELS

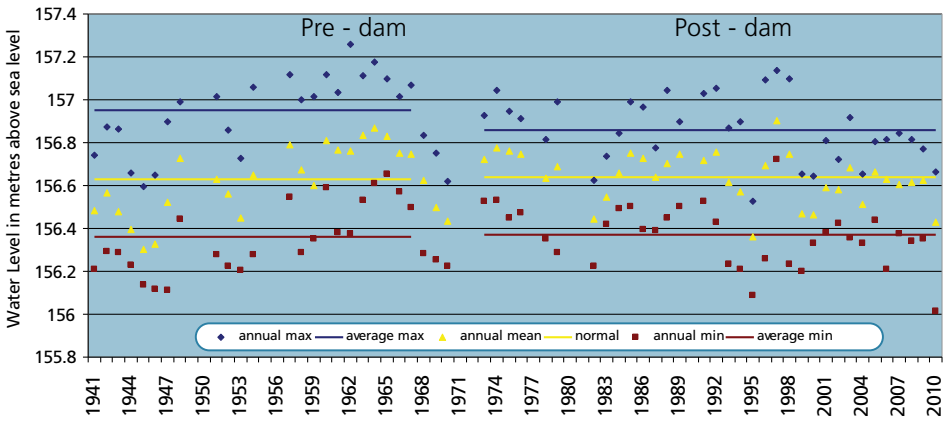
Water levels in Great Slave Lake are influenced by the Slave River. Although the total volume of the Slave River has not been changed by the operations of the Williston Reservoir, the flow regime change has reduced the average high level of Great Slave Lake by 9 cm. The average annual water level and the average annual low water level have both increased by 1 cm since flow regulations began on the Peace/ Slave Rivers. Annual variations in levels are due to winter snowpack/spring melt and summer rainfall throughout the watershed.

Over 65% of the Great Slave Lake watershed is outside the NWT, in the northern areas of British Columbia, Alberta, and Saskatchewan. Precipitation amounts in these regions greatly affect the levels of Great Slave Lake.

TRENDS IN TURBIDITY AND ARSENIC IN THE HAY RIVER

Water quality is monitored in the Hay River. Arsenic is measured as a "chemical of concern", as it can be toxic to aquatic organisms when present in high concentrations. It enters the aquatic ecosystem naturally through weathering of rock. Activities such as mining can accelerate the inputs, either through increased weathering as rock is broken up and fresh surfaces are exposed to the elements, or through use of arsenic in the milling process. Concentrations of arsenic in the Hay River are relatively low, and considered safe for all stages of aquatic life.

Great Slave Lake Water Level: Annual Mean and Extremes



Annual maximum, minimum and mean water levels for Great Slave Lake were plotted for 1941 to 2010. The 2010 water levels were the lowest on record. Source: Water Survey of Canada Hydat website, graphs and analysis are by AANDC

Key Insights

- Winter water flow for NWT rivers has increased.
- Total annual volume of flow in the Slave River has not been changed by the operations of the Williston Reservoir but the flow regime of the Slave River has changed, with a decrease in daily flows during spring and summer and a twofold increase in winter.
- The 2010 Slave River water levels were the lowest on record after several years of extremely dry conditions in the whole watershed.

Find More

For information on the NWT Water Stewardship Strategy and 2011 – 2015 Action Plan go to **http://www.enr.gov.nt.ca/_live/pages/wpPages/water.aspx**

Water Survey of Canada, Hydat Webpage **http://www.wateroffice.ec.gc.ca/**

AANDC Slave River Environmental Quality Monitoring Program - **http://www.ainc-inac.gc.ca/ai/scr/nt/ntr/pubs/SRE-eng.asp**

AANDC Water Resources Division monitoring - **http://www.ainc-inac.com/ai/scr/nt/env/wr/mn/index-eng.asp#local**

The State of the Aquatic Ecosystem Report 2003 by the Mackenzie River Basin Board, available on the MRBB website at: **www.mrbb.ca/information/34/index.html**

For a presentation on projected sea level rises in Nunavut go to **http://www.arcticnet.ulaval.ca/pdf/talks2010/JamesThomas.pdf.**

For more information on global climate change go to the Intergovernmental Panel on Climate Change at **http://ipcc-wg1.ucar.edu/wg1/wg1-report.html**

STATE

12 AIR

Indicators

Indicators included in the full report for this focal point. Indicators summarized in this highlight report are in bold:

12.1 **Criteria Air Contaminants Indicator**

Visit www.enr.gov.nt.ca for more information on all the indicators and annual updates

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Tracking levels of air pollutants provides an indication of the quality of the air and the impacts of emissions from both industrial and community development.

The air surrounding us is called "ambient" air. It contains mostly nitrogen and oxygen, with a small amount of carbon dioxide and water vapour. It also contains trace amounts of air pollutants such as particles ('dust') and other gaseous chemicals. Naturally occurring levels of particles and chemicals in the air are called "background levels". However, human activities and unusual natural events such as forest fires can raise the levels of particles and chemicals above these background levels and cause pollution. Research has linked the presence of air pollutants to human health issues such as breathing difficulties and heart problems, as well as negative effects on property, vegetation, land and water.

Highlight Indicator

CRITERIA AIR CONTAMINANTS INDICATOR

This indicator tracks Criteria Air Contaminants (CACs) to monitor air quality. CACs are the common trace particles and gases found in ambient air that monitoring programs target most often. CACs include total suspended particulate (TSP), particulate matter 10 microns or less in diameter (PM10), particulate matter 2.5 microns or less in diameter (PM2.5), and gaseous pollutants, including sulphur dioxide (SO_2), nitrogen oxides (NOx), carbon monoxide (CO) and ground level ozone (O_3). National and territorial standards establish limits for the maximum amount of particles and gases that can be in ambient air. Actual measured concentrations are compared to these standards to determine the quality of air.

Concentrations of CACs in the NWT are expected to be very low, with readings at or close to what would be considered typical background values.

Monitoring to date generally confirms the expected very low readings for most air contaminants measured in NWT communities, with concentrations well below established air quality standards. Notable exceptions include the influence of forest fire smoke on PM2.5 concentrations and spring and summer dust events from residual gravel on the roads following thaw or on unpaved roads, which produce occasional very high PM10 concentrations.

Industrial development is likely to increase in the NWT with the continued exploitation of mineral, oil and gas resources. It is reasonable to assume air emissions associated with these activities will also increase. Currently the vast majority of industrial activity is occurring in remote areas and the potential risk to community air quality and residents is low. However, the potential for localized environmental impacts is present and, if the activity becomes sufficiently intense and widespread, the cumulative emissions could begin to affect regional air quality, including the air in communities.

Increased industrial activity would also likely trigger increased community growth in the form of commercial

Key Insights

- Air quality is generally good in the NWT.
- Poor air quality readings occur during forest fires and during spring-summer when dust levels are high.

and residential developments and emissions associated with these activities (i.e. increased space heating, power demands, vehicles, etc) would have a more direct impact on community air quality. The challenge will be to effectively manage industrial and community growth to ensure economic benefits for the residents of the NWT while ensuring the impacts of emissions from this development activity do not result in unacceptable impacts to air quality. Since combustion sources are a large source of CAC emissions, efforts to improve energy efficiency or use alternative energy sources to reduce greenhouse gas production can also have the co-benefit of reducing CAC emissions.

Find More

Information from all air monitoring activities, along with some historical perspective and trend analysis, is presented annually in an NWT Air Quality Report at **http://www.enr.gov.nt.ca/_live/pages/wpPages/Air_Quality.aspx** under 'Air Quality Program'.

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13 PERMAFROST

Indicators

Indicators are included in the full report for this focal point. Indicators summarized in this highlight report are in bold:

13.1 **Ground temperature in permafrost zones**

13.2 **Trends in active layer thickness in the NWT**

13.3 **Trends in thermokarst in the NWT**

Visit www.enr.gov.nt.ca for more information on all the indicators and annual updates.

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Permafrost is an important ecosystem component in the NWT as it affects water, landforms and the ecology of northern environments.

In the northern NWT, permafrost can be 100-m thick. Permafrost is also present under the Beaufort Sea. The amount of ice within permafrost has an effect on what happens to the environment or any structures built on permafrost if it thaws. The melting of ice-rich permafrost causes land to move and develop into a landscape where lakes enlarge, peatlands collapse and land can slide or slump. These changes result in a thermokarst landscape.

Highlight Indicators

GROUND TEMPERATURE IN PERMAFROST ZONES

This indicator measures the ground temperature characteristics of permafrost in the NWT. Monitoring permafrost temperatures provides planners, resource managers and engineers with valuable information on ground thermal regimes across the NWT. Increasing air temperatures, changes in vegetation or increased snow cover can cause permafrost temperatures to rise and, in some cases, permafrost to thaw.

In general, the further one goes north, the ground is colder and the thickness and aerial extent of permafrost increases. Mean annual ground temperatures in tundra environments of northern NWT are below -6° C, and permafrost may be several hundreds of metres thick. The transition from continuous to discontinuous permafrost roughly coincides with the position of the subarctic boreal-tundra transition.

Permafrost temperatures across the NWT are increasing in response to current climate warming. In the Mackenzie Delta region, permafrost ground temperatures have warmed by as much as 2°C since the early 1970s.

Current research indicates cumulative impacts of disturbance or ecological change will compound the impacts of climate warming on the thermal stability of permafrost. Disturbance of the forest cover in the southern discontinuous permafrost zones of NWT can sufficiently alter the surface energy balance to stimulate the degradation of permafrost under contemporary climate conditions. Thermal modeling has shown the majority of permafrost warming at abandoned oil and gas infrastructure in the western Arctic can be attributed to the proliferation of tall shrubs and snow accumulation rather than rising air temperatures. This study shows shrubbier tundra and enhanced snow cover is more likely to accelerate the warming of permafrost anticipated with climate change.

TRENDS IN ACTIVE-LAYER THICKNESS IN THE NWT

In areas underlain by ice-rich permafrost, the deepening of the active-layer can cause surface subsidence, which in turn can affect surface micro-relief, infrastructure and ecology. Deepening of the active layer can release nutrients trapped in permafrost and may affect biogeochemical cycling. A deeper active-layer will increase the water storage capacity and provide greater amounts of soil for plant roots. With continued climate warming or disturbance, the active-layer may not freeze back completely in winter. If these conditions persist the permafrost will degrade. Slower freezing of the active-layer can impact winter land access and the length of the winter operating season. An unfrozen layer of soil between permafrost and the frozen ground surface can continue to convey water throughout the winter, impacting winter streamflow and chemistry and potentially contributing to the development of icings. It is anticipated active-layer thickness will increase with climate warming. Significant increases in thaw penetration from 2000 to 2055 are projected. However, the rates of increase will be influenced by the ice content of underlying permafrost and feedbacks with changing vegetation cover and soil moisture.

TRENDS IN THERMOKARST IN THE NWT

Increases in the aerial extent of thermokarst are detected using various remote sensing techniques including sequential analyses of aerial photographs or high resolution satellite imagery. There are few longitudinal studies of thermokarst in the NWT. These studies show the rates and extent of collapsed peatlands and retrogressive thaw slumping has increased over the last half of the 20th century. Disturbance such as fire can have a dominant impact on thermokarst processes at a local scale.

Key Insights

- Permafrost temperatures across the NWT are increasing.
- Thawing permafrost releases nutrients affecting water and snow and may bioaccumulate in the food chain.
- With climate change and ground disturbance, the active-layer may not freeze back completely in winter. Slower freezing of the active-layer results in changes in winter transportation and in winter streamflow and chemistry and may contribute to the development of icings.

Find More

Natural Resources Canada compiles ground temperature data from across the Canadian North; these data can be accessed at **www//GTNP.org.**

14 VEGETATION

© B Bennett

Vegetation provides habitat for wildlife and ecosystem services such as food, fuel and many other products to humans. Vegetation defines landscapes in people's minds. The NWT has large sections of two of the earth's biomes: Taiga and Tundra.

Indicators on vegetation and factors affecting vegetation, such as fire and insect disturbances, can help track changes in the health and integrity of taiga and tundra ecosystems. Indicators on vegetation responses to stresses like pollution and to some land uses provide early warning of changes in northern ecosystems which are harder to measure.

Indicators

Indicators are included in the full report for this focal point. Indicators summarized in this highlight report are in bold:

14.1 Land cover type by ecozones

14.2 Position of treeline

14.3 **Annual area burned and number of fires**

14.4 **Trends in alien plant species**

14.5 Status of species harmful to forests in the NWT

Visit www.enr.gov.nt.ca for more information on all the indicators and annual updates.

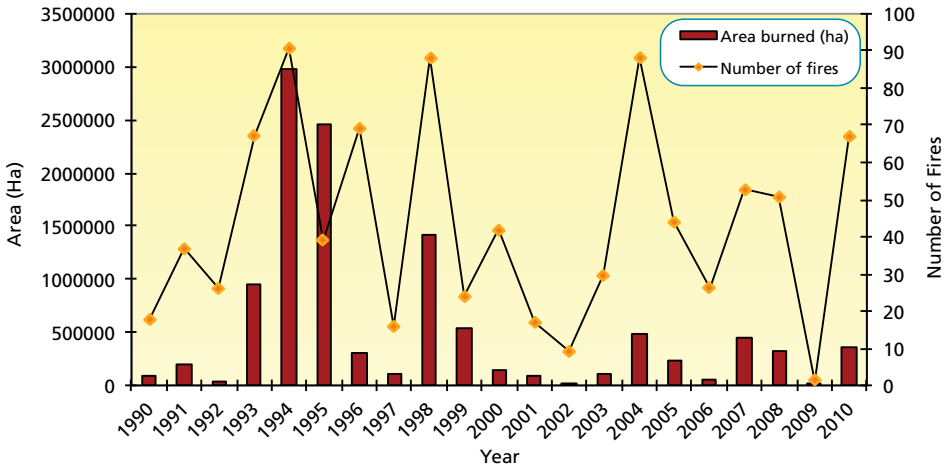
Highlight Indicators

ANNUAL AREA BURNED AND NUMBER OF FIRES

This indicator measures the annual number of wildland fires and area impacted by wildland fires greater than 200ha. Forest fire is a natural phenomenon. It is the major stand-renewing disturbance in boreal and taiga forests around the world. The forests of western North America will support high-intensity fires under the right conditions such as low fuel moisture, low relative humidity, high winds and little precipitation. These fires often occur naturally and have the potential to spread quickly. Fluctuations in area burned and the number of fires occur annually.

It is logical to assume the frequency and intensity of fires will change as climate changes. A longer fire season, associated with changes in precipitation and temperature, coupled with additional stresses to forest and vegetation such as drought, flooding, insects and disease, reinforce the importance of monitoring this indicator.

Fires Greater than 200Ha



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Area burned and number of fires greater than 200 ha in the NWT. Source: GNWT, ENR, Forest Management

TRENDS IN ALIEN PLANT SPECIES

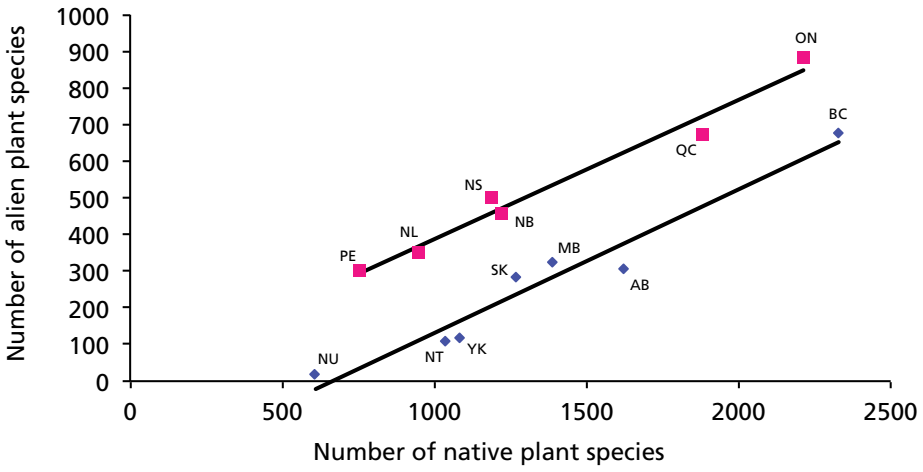
This indicator tracks long-term changes in plant communities due to the introduction and spread of alien plant species in NWT ecosystems. Changes in the number of alien species in the NWT are monitored as their presence and abundance may affect the status of wild species native to the NWT. Plant species are introduced to the NWT as food crops, habitat remediation tools, landscaping varieties or, simply, unintentionally. The majority of introduced (alien) plant species cause no damage to natural ecosystems because they need constant human assistance to survive and do not spread. The NWT's climate prevents many species from establishing themselves in NWT ecosystems. Some introduced plant species have, however, succeeded in spreading in some habitats, mainly those already disturbed by human activities. Some introduced plant species can spread and cause harm to natural habitats and out-compete native plant species.

So far, there are no known alien plant species with a high level of invasiveness in the NWT.

In 2010, 116 alien plant species were known to occur in the NWT. In 2005, 94 alien plant species were known to occur here. These are mostly found in or near communities, near roads and along disturbed areas such as cut-lines, pipelines and mine sites.

Of these 116 species, few have demonstrated they can invade natural habitats. White and yellow sweet clovers are increasingly common in the NWT from the Alberta border up to Norman Wells and Inuvik. These species are widespread in communities and along roads. There are reports they have been found outside man-made habitats in the NWT, but these reports need confirmation. These species are now known to invade river margins and sandy/muddy natural habitats in Alaska and Yukon.

Alien and Native Plant Species



In areas where there is greater native plant diversity (number of plant species), more species of alien plant species are also usually found. The NWT has about the number of alien plant species expected for a northern jurisdiction considering the number of native species present here. This occurs because if an area is rich in native plant species, it tends to be "better" for exotics. Conversely, if it is poor in native plants, it is worse for exotics. For example, in British Columbia, a province rich in plant species, 23% of vascular plants are alien species, whereas in the NWT with less plant diversity, only 10% of vascular plants are alien species.

Key Insights

- Large annual dramatic fluctuations in area burned and number of fires are the norm in the NWT.
- Increases in fires and in fire intensity are predicted under a warming and drying climate change scenario, but these have not yet been observed in the NWT. A longer fire season is expected.
- About 10% of plants occurring in the NWT are alien (not part of our natural ecosystems). This is expected as it is observed in other jurisdictions in western and northern Canada. Some of these alien plants are moderately invasive.
- The number of alien plants and forest pests are expected to increase in the NWT with increasing human activities. Mountain pine beetle is not in the NWT.

Find More

Please visit Forest Management web pages for more information: **www.enr.gov.nt.ca/_live/pages/wpPages/Our_Forest.aspx** A complete list of all alien plant species known to occur in the NWT can be found in the NWT Species Infobase at **www.enr.gov.nt.ca.**

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15 WILDLIFE

Indicators

Indicators are included in the full report for this focal point. Indicators summarized in this highlight report are in bold:

Wildlife population fluctuations

15.1 Trends in willow ptarmigan and grouse in tundra-taiga ecosystems

15.2 Trends in small mammals and hares in NWT ecosystems

15.3 Trends in Dall's Sheep in mountain ecosystems

Caribou

15.4 **Trends in barren-ground caribou population size in tundra-taiga ecosystems**

Change in wildlife distribution

15.5 Trends in range expansions of mammals

15.6 Trends in number of introduced and alien mammals, birds and fish.

Wildlife Health

15.7 Trends in winter tick in moose

Birds

15.8 **Trends in migratory bird populations**

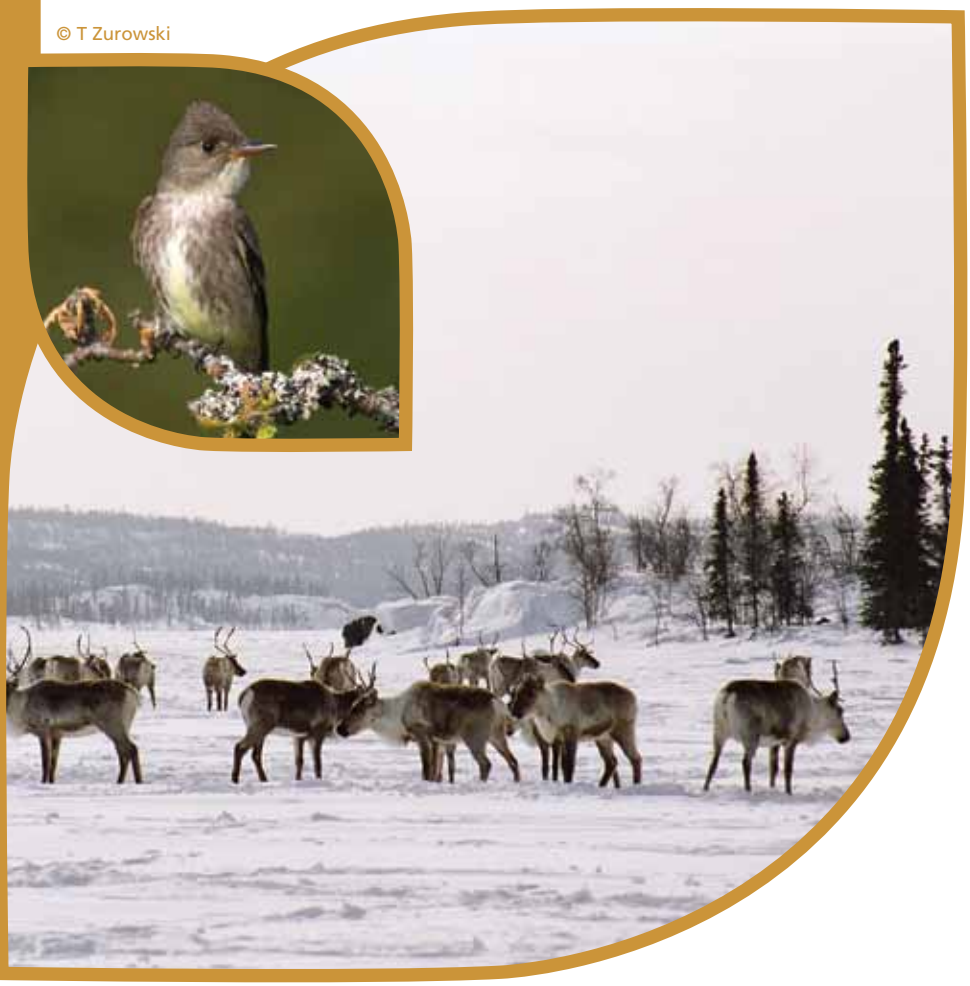
Fish

15.9 State of Dolly varden and bull trout

Visit www.enr.gov.nt.ca for more information on all the indicators and annual updates.

The Northwest Territories is one of the few remaining regions in the world with herds of wild migratory caribou, muskoxen, healthy populations of top predators and rich northern biodiversity. Wildlife is one of the main links between people and the environment.

Some northern wildlife species experience large natural fluctuations in population numbers over time. These population cycles are the "heartbeat" of NWT ecosystems. A change or a decline in these cycles could indicate a change in the environment which should be examined. Caribou are a major focus species and one of the indicators provides information on barren-ground caribou populations. Indicators on birds and fish provide information on changes and declines for these groups of species of particular importance to NWT people. Trends in the number of new species in the NWT, as well as species that are expanding their ranges to new areas within the NWT, are tracked as such changes are predicted to occur with a warming climate.



Highlight Indicators

TRENDS IN BARREN-GROUND CARIBOU POPULATION SIZE IN TUNDRA-TAIGA ECOSYSTEMS

This indicator measures the trend in population sizes of barren-ground caribou *(Rangifer tarandus groenlandicus)* herds in the NWT. Barren-ground caribou in the NWT, as in Alaska and other jurisdictions, are managed at the herd level, with herds defined by fidelity to distinct calving grounds. Nine migratory caribou herds have part or their entire range in the NWT. All herds for which data was available were declining in 2006. Herds were also in decline elsewhere in North America. Recent barren-ground caribou surveys indicate the Tuktoyaktuk Peninsula, Bluenose-West, Bathurst, Beverly, and Qamanirjuaq herds remain in decline; the Cape Bathurst herd remains small but is now stable; the Porcupine herd has increased; and the Bluenose-East herd is stable. Some factors affecting caribou are difficult to control (i.e. natural fluctuations related to normal climate cycles), but human activities can be managed. When herds are declining or at low numbers, they are less resilient to environmental change and hunter harvest than when herds are increasing or at high numbers. This information allows managers and users to identify which management actions are appropriate to ensure caribou remain for future generations. In 2006, the NWT produced a five-year strategy for increased barren-ground caribou monitoring and management actions. The strategy was updated for 2011-2015.

TRENDS IN BIRD POPULATIONS

This indicator tracks population declines in NWT bird species migrating to other jurisdictions in winter. At least 20 bird species, although still commonly seen in the NWT every summer, have shown significant declines in populations. Most of these species have declined to less than half the number seen in the 1960s-70s. The reasons for these declines are still unclear, but because these trends are similar across each species' range, the major threats are thought to be widespread. These declines are noted in particular for species that eat insects while flying. Potential threats are being investigated and include pollution, habitat loss on the wintering/staging areas, insect controls leading to declines in insect populations and climate change.

© GNWT / M Stacey

Key Insights

- All herds for which data was available, were declining in 2006. Herds were also in decline elsewhere in North America. These declines may be due to natural fluctuations related to normal climate cycles.
- Recent barren-ground caribou surveys indicate the Tuktoyaktuk Peninsula, Bluenose-West, Bathurst, Beverly, and Qamanirjuaq herds remain in decline; the Cape Bathurst herd remains small but is now stable; the Porcupine herd has increased; and, the Bluenose-East herd is stable.
- Some wildlife diseases and parasites are changing and moving northward.
- Changes in distribution of mammals and birds are being tracked as the climate is changing.
- At least 20 bird species, although still commonly seen in the NWT every summer, have shown significant declines in populations. Most of these species have declined to less than half the number seen in the 1960s-70s. The reasons for these declines are still unclear.

Find More

For a copy of "A Barren-ground Caribou Management Strategy for the Northwest Territories for 2011-2015" go to **www.enr.gov.nt.ca**.

For more information on the NWT General Status Ranking Program go to **www.nwtspeciesatrisk.ca.**

16 SPECIES AT RISK

Indicators

Indicators are included in the full report for this focal point. Indicators summarized in this highlight report are in bold:

16.1 Species At Risk Index

16.2 **Trends in NWT populations of species at risk in Canada**

16.3 Status of Peary caribou in a changing climate.

16.4 Status of peregrine falcon in a less contaminated world.

16.5 Status of polar bear with changing sea ice

16.6 Status of woodland caribou in a changing landscape

Visit www.enr.gov.nt.ca for more information on all the indicators and annual updates.

The vast majority of species in the NWT are secure and not at risk of extinction. Many NWT species categorized as "at risk" on national or international lists are at greater risk elsewhere in Canada or the world, but the NWT has responsibility for conserving large portions of their remaining populations.

In 2010, at the 10th meeting of the Conference of the Parties for the Convention on Biological Diversity in Japan, the international community adopted a revised strategic plan for biodiversity which included the Aichi Biodiversity Targets for 2011-2020. Nations committed to halt biodiversity loss by 2020.

Loss of biodiversity is a global concern. The United Nation declared 2011 to 2020 the Decade on Biodiversity. During this decade, we are called to prevent the extinction of known species at risk and to improve of the conservation status of species most in decline by 2020. Species at risk indicators are one way to measure progress towards this target for 2020 and beyond. To help ensure no species become extinct due to human activities in the NWT, the *Species At Risk (NWT) Act* came into effect in 2010.

Highlight Indicator

TRENDS IN NWT POPULATIONS OF SPECIES AT RISK

Twenty-eight species or subspecies in the NWT have been assessed as species at risk in Canada according to Committee on the Status of Endangered Species in Canada (COSEWIC). Five of these species – whooping crane, wood bison, bowhead whale, peregrine falcon and grey whale - have increasing populations in the NWT. Nine species - Peary caribou, red knot (rufa subspecies), boreal caribou, common nighthawk, Dolphin-Union barren-ground caribou, northern mountain caribou, polar bear, Dolly Varden and northern leopard frog - have declining populations. Previously common species of insect-feeding birds, such as the common nighthawk, olive-sided flycatcher, rusty blackbird, Canada warbler and barn swallow, are becoming less common. These bird species have declining populations throughout North America. The trend in NWT populations is uncertain. The recent trends in NWT populations of eight species at risk cannot be reliably determined.

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Species at Risk	Percent of global distribution in Canada	Percent of Canadian distribution in the NWT	Recent trends in NWT population(s)
Endangered in Canada			
Whooping Crane	Almost 100% (breeding distribution)	90%	↗
Peary Caribou	100%	40%	↘
Red Knot (*rufa* subspecies)	100% (breeding distribution)	10%	↘
Eskimo Curlew	?	?	Probably no bird left
Ivory Gull	10% (breeding distribution)	0% (historical nesting site only)	?
Threatened in Canada			
Wood Bison	100%	60%	↗ for most herds
Boreal Caribou	100%	10%	? → in northern regions ? ↘ in southern regions
Common Nighthawk	40% (breeding distribution)	10%	? ↘
Olive-sided Flycatcher	50% (breeding distribution)	10%	?
Canada Warbler	80% (breeding distribution)	Less than 1%	?
Shortjaw Cisco	90%	unknown	?
Northern Wolffish	20%	uncertain distribution	?
Special Concern in Canada			
Bowhead Whale	30%	30%	↗
Peregrine Falcon	10%? (breeding distribution)	20-30%	↗
Grey Whale	10%	Less than 1%	↗
Grizzly	10-20%	20%	? ↗
Wolverine	20%	10-20%	? →
Rusty Blackbird	Almost 100% (breeding distribution)	10%	? →
Horned Grebe	80% (breeding distribution)	10%	? →
Dolphin-Union Barren-ground Caribou	100%	40%	↘
Northern Mountain Caribou	100%	20%	? ↘
Polar Bear	50%	10%	? ↘
Dolly Varden (northern form)	50%	50%	? ↘
Northern Leopard Frog	60%	2%	? ↘
Western Toad	40%	Less than 1%	?
Red Knot (*islandica* subspecies)	40% (breeding distribution)	20%	?
Short-eared Owl	10-30% (breeding distribution)	10%	?
Yellow Rail	10% (breeding distribution)	1%	?

? = uncertain; ? ↘ = uncertain but maybe in decline

Note: As of 2011, no species have been assessed or listed under the Species At Risk (NWT) Act.

Key Insights

- Current threats to species at risk in the NWT include climate change, loss of habitat, prey declines, diseases and over-hunting. Reducing the impacts of these threats in the future will prove as challenging as in the past.
- Five out of 28 species at risk show increasing population trends in the NWT portion of their range. Nine out of 28 species at risk are declining in the NWT.
- The recent trends in NWT populations of eight species at risk cannot be reliably determined.

Find More

For more information on the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) go to **www.cosewic.gc.ca.**

For more information on the new *Species At Risk (NWT) Act* and on process set up to assess the status of species at risk in the NWT go to **www.nwtspeciesatrisk.ca**.

© G Court

17 GENETIC RESOURCES

Indicators

Indicators are included in the full report for this focal point. Indicators summarized in this highlight report are in bold:

17.1 **Status of endemic and rare species in the NWT**

- Other indicators are being developed for future reports.

Go to www.gov.enr.nt.ca for more information on all the indicators, and for annual updates.

© GNWT / S Carriere

The NWT is home to a number of rare species and "endemic" species that exist nowhere else in the world. Tracking the status of rare and endemic species in the NWT provides information on how well we are conserving genetic resources, which may be important for future use in medicine or agriculture or to human well-being in general.

Arctic species' adaptations to harsh climates are important to conserve as part of the NWT's contribution to the world's biodiversity. Indicators on genetic resources are tracked at national and international levels.

Highlight Indicator

STATUS OF ENDEMIC AND RARE SPECIES IN THE NWT

Much of the NWT was covered by ice during the last Ice Age, which ended about 8,000 years ago. This means the NWT's ecosystems are quite young in an evolutionary time scale. However, large tracks of land in the northern and western part of the NWT remained free of ice during the Ice Age. These special places are called glacial refugia. In northern North America, these areas are part of a region called Beringia and harbour many species that survived during the last glaciation. Some of these species are rare today and form a special component of our genetic resources.

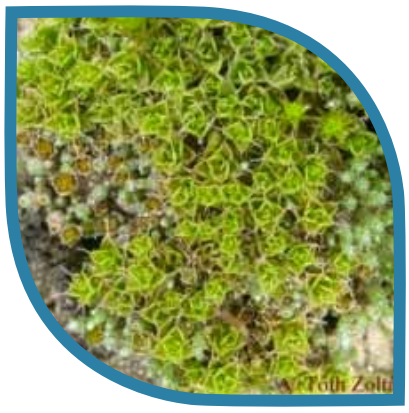
Two species of vascular plants, endemics, are found nowhere else on earth. The Hairy Rockcress (*Braya pilosa*) is found only on Cape Bathurst. The Nahanni Aster (*Symphyotrichum nahanniense*) is found only near hot springs in the Nahanni National Park Reserve.

Since 2009, two more species have been added to this indicator.

© RD Bull

Banks Island Alkali Grass (*Puccinellia banksiensis*), a grass rare in the world, is found only on Banks Island and two other sites in Alaska and Nunavut. It is a newly described species.

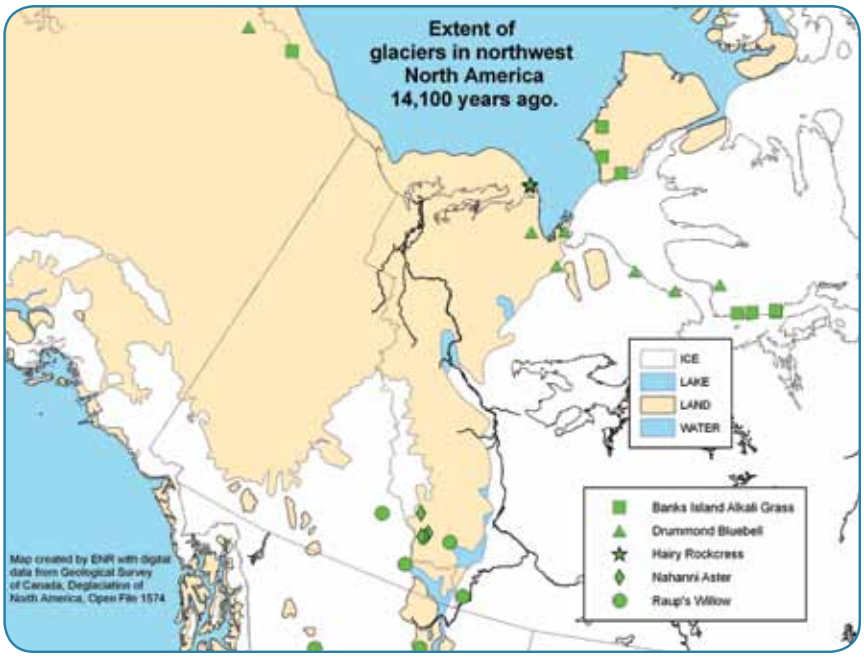
© T Zoltanne



The Velenovsky's Hilpertia Moss (*Hilpertia velenovsky*) is rare in the world. It is found at one site in the Nahanni National Park Reserve and in other sites in Nunavut, British Columbia, China, Russia, Czech Republic, Hungary, Poland and Yugoslavia.

Key Insights

- NWT is home to seven species and two subspecies that are endemic or rare in the world.
- Two species of vascular plants endemic to the NWT are found nowhere else on earth: Hairy Rockcress (*Braya pilosa*) and Nahanni Aster (*Symphyotrichum nahanniense*). Almost the entire breeding population of the whooping crane nests in the NWT.
- Endemic species exist in the NWT only so their conservation for future generations is entirely up to us.



Almost every year, new species, mostly plant and insect, are recorded in the NWT. Some of these are new to science and have not been completely described yet. Many rare species in the NWT are found in glacial refugia in north-western NWT. This region, shared with Yukon and Alaska, is host to an important set of species that have survived the last Ice Age and form a special part of our genetic resources. More inventories and studies, including efforts from local natural enthusiasts, will result in additional new and rare species.

Find More

For more on rare or endemic species, go to the NWT General Status Ranking Program at **www.enr.gov.nt.ca**, following Our Wildlife link.

18 USE OF RENEWABLE RESOURCES

Indicators

Indicators are included in the full report for this focal point. Indicators summarized in this highlight report are in bold:

18.1 Trend in volume of commercial timber harvest

18.2 Trends in hunting and fishing

18.3 **Country food use in NWT ecozones**

18.4 Trends in trapping

18.5 **Trend in Ecotourism**

18.6 **Trend in visitors to NWT Territorial and National parks**

Visit www.enr.gov.nt.ca for more information on all the indicators and annual updates.

© K Hickling

The use of renewable resources such as wildlife, fish and plants has always been important to the people of the NWT.

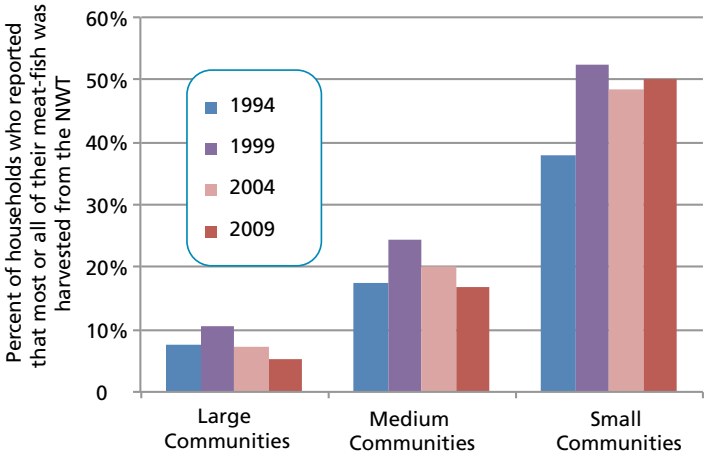
Hunting, fishing, trapping and recreational use remain important components of traditional lifestyles and economies. Residents and visitors from outside the NWT associate important social, spiritual and environmental values to renewable resources. Sustainable access to, and use of, renewable resources is important for current and future generations.

Highlight Indicators

COUNTRY FOOD USE IN NWT ECOZONES

This indicator tracks the percentage of NWT residents reporting that most (more than 75%) meat and fish they consumed was harvested in the NWT. The most direct link between people and their environment is through food. The NWT is rich in mammal, bird and fish populations. These species have sustained Aboriginal peoples in the NWT for thousands of years.

In small communities, about half of NWT households show a high reliance on country food as a daily source of energy and essential nutrients. Considering the relatively low quality and high cost of market food available in most small communities in the North, country food and an environment that sustains this resource is essential to the health of the NWT's people. A reduced use of country food is noted in the NWT's medium and large communities. If the NWT's population continues to increase and people continue to move from small to larger communities, the use of country food may decrease in the future. People in larger communities appear to have less access, time or inclination to harvest country food than people living in smaller communities. Our changing climate is predicted to have a significant impact on the ability of NWT people to access country food; to store, dry, freeze and conserve this food; and, to be able to predict animal behaviour and weather patterns to successfully harvest this food.



Household meat and fish diet in NWT Communities

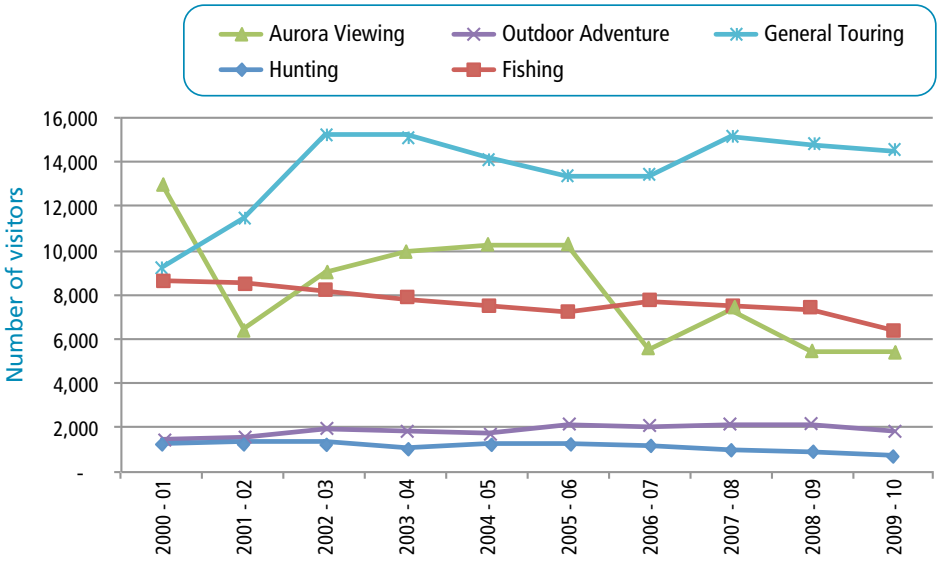
Use of country food in the NWT. Source: NWT Bureau of Statistics.

© J Mckay

TREND IN ECOTOURISM

Interest in visiting the NWT is based on a healthy, functioning natural environment. Most visitors come to the NWT to experience its natural environment or to enjoy experiences in outdoor settings. Non-consumptive tourism is the category most likely to increase in the NWT. Fishing and hunting tourism is declining, a trend noted across North America. Aurora viewing is declining due to international events. Outdoor adventure tourism is growing internationally. As intact natural environments become less common in other locations, the NWT may become an even more attractive ecotourism destination for people from outside of the NWT and Canada.

Vistors and Tourism Activities



Number of visitors per tourism activity. Source: ITI, GNWT

TREND IN NUMBER OF VISITORS TO TERRITORIAL AND NATIONAL PARKS

Overall, visitor numbers to territorial and national parks in the NWT have been stable during the past decade (2000-2010). In 2010, about half of the visitors were from elsewhere in Canada, about 40% were from within the NWT and about 10% were from the United States and elsewhere in the world.

Key Insights

- Exact volumes of timber cut during seismic exploration projects are not tracked. Estimates of timber cut in the last decade during seismic exploration has been at least an order of magnitude greater than the volume cut by commercial timber harvest operations.
- About 40% of NWT residents hunt or fish.
- About half of NWT households in small communities use mostly country food as a daily source of energy and essential nutrients.
- Less than 20% of households in medium-large communities use mostly country food
- Fishing and hunting tourism is declining but non-consumptive tourism is stable or increasing.
- A ban on commercial fishing was signed for the Canadian waters of Beaufort Sea in April 2011. No commercial fishing in this region occurred before the ban.

Find More

For more information on NWT tourism go to **www.spectacularnwt.com**

For more trend information on traditional activities related to the environment go to **www.stats.gov.nt.ca** Follow Traditional Activities link.

19 ENVIRONMENTAL AWARENESS

Indicators

Indicators included in the full report for this focal point.

19.1 **Environmental education experiences for youth**

19.2 **Participation in environmental programs**

Visit www.enr.gov.nt.ca for more information on all the indicators and annual updates.

© GNWT

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People in the North, and around the world, are facing unprecedented pressures on their natural environments. We need environmentally aware populations to ensure balanced, thoughtful decisions on these complex environmental issues.

Creating a population that is well-informed on environmental issues is becoming increasingly challenging. Changing demographics, advancing technology and global perspectives all compete for our attention and awareness. The NWT faces additional challenges as whole generations spend less time on the land. Retaining and sharing the environmental knowledge, culture and traditional lifestyles of Aboriginal peoples and NWT residents is vital to all factors of our environment: economic; cultural; and, social.

Measuring levels of environmental awareness in a population can be very difficult. Direct exposure to the natural environment or a particular place is a strong factor in determining concern for that environment or place. This level of exposure or opportunities for increased environmental awareness can be measured by a series of indicators. Similarly, participation in environmental programs that reduce the impacts of human actions on the environment can be measured as a proxy for changes in environmental awareness.

Highlight Indicators

ENVIRONMENTAL EDUCATION EXPERIENCES FOR YOUTH

As stewards of our environment, Northerners have a responsibility to educate themselves about the importance of environmental sustainability and pass that knowledge on to current and future generations. Parents and communities have an important role to play in transferring knowledge about the environment, including traditional knowledge. Involving youth in activities helps them become aware of natural processes and acquire and enhance bush skills. This is important to ensure current and future generations maintain a strong connection to the land.

Increasing formal environmental education opportunities for youth should result in enhanced knowledge about current and future issues. Formal environmental education opportunities can also increase peoples' knowledge about the environment and actively engage them in the decision-making process. Such opportunities offered in the NWT are primarily designed for elementary to college-level students. ENR also uses a number of tools to reach adults. A new resource in the NWT, Dechinta Bush University Centre for

Research and Learning, offers university-credited educational experiences. The following highlights some of the many environmental education programs and activities that include ENR involvement.

- Take A Kid Trapping Program
- Tundra Science Camp
- Dehcho Youth Ecology Camp
- AANDC Science Camp
- Forest Fire Ecology Camp
- National Wildlife Week activities
- Rivers to Oceans Day activities
- World Water Day activities
- Curriculum-based programming
- Career Day programming
- Environment and Natural Resources Technology college program
- Sahtu in the Schools wildlife veterinarian/researcher tour
- ENR's Green Team's monthly environment quiz in Bear Facts

Providing staff to deliver live programs is a challenge in many communities as the partners involved in delivery are already often at capacity. This gap is met by a number of environmental publications developed and distributed by ENR and its partners. The following highlights some of the many environmental education publications which include ENR involvement.

- Caribou and People: A Shared Future DVD
- Project Caribou website and educator's guide
- Bear Aware Colouring Book for elementary students
- Trees of the NWT brochure
- Wildlife Sketches

PARTICIPATION IN ENVIRONMENTAL PROGRAMS

This indicator tracks changes in behaviours reflected by participation in programs designed to reduce energy use. As awareness of the environment increases, participation in energy conservation programs should also increase.

In 2008, at least nine different energy conservation programs were available to homeowners, businesses, non-profit organizations and communities in the NWT. In 2011, there are now 10 programs, including the single-use retail bag program. Support provided by other programs include subsidized energy audits, energy efficiency rebates for appliances and materials, support for use of alternative energy technologies, and advice on community and homeowner energy planning and use.

© GNWT

© GNWT

Key Insights

- Formal education opportunities and environmental publications, as measured here, can complement important family and community-based learning opportunities. All work together to create environmentally aware populations. Opportunities are offered throughout the NWT.
- Interest in energy efficiency and alternative energy technology programs is expected to increase.

Find More

- Take A Kid Trapping: **http://www.iti.gov.nt.ca/fursagriculturefisheries/kidtrapping.shtml**
- Dechinta Bush University: **http://dechinta.ca/**
- Arctic Energy Alliance: **http://www.aea.nt.ca/**
- Ecology North: **http://ecologynorth.ca/oldsite/Home_Page.html**
- University of the Arctic: **http://www.uarctic.org/Frontpage.aspx?m=3**
- ENR Climate Change Programs: **www.nwtclimatechange.ca**

20 PROTECTED AREAS AND LAND USE PLANNING

Indicators

Indicators are included in the full report for this focal point.

20.1 **Trends in protected areas and land use plans**

Visit www.enr.gov.nt.ca for more information on all the indicators and annual updates.

© S Doerr

Legislated protected areas and conservation zones are key components in an overall network of protected areas that serves the long-term interests of NWT residents and all Canadians.

They are key tools for conserving biodiversity, ecological processes and special natural and cultural values. Reporting on protected areas and land use plans reflects actions society has taken to maintain a healthy and productive environment.

Regional land use plans specify which land use activities are allowed in a given area. Generally, regional land use plans designate some areas where development is prohibited. These areas are Conservation Zones. An approved land use plan is legally binding. However, legislation requires land use plans be reviewed every five years and allows for changes at that time.

The GNWT, through its Sustainable Development Policy, recognizes the need for conservation areas to maintain special values related to wildlife and wildlife habitat; unique or representative ecosystems; prime forests; productive agricultural soils; heritage; recreational; tourism; scientific; and, aesthetic resources. The NWT Protected Areas Strategy, a partnership of communities, governments, environmental non-governmental organizations and industry, has been working together since 1999 to establish protected areas across the NWT.

Highlight Indicator

TRENDS IN PROTECTED AREAS AND LAND USE PLANNING

There are currently 129,230km^2 of land (including fresh water) in the NWT in established protected areas and Conservation Zones (9.6% of the NWT land base). This includes the Thelon Wildlife Sanctuary, National Parks, National Park Reserves, Pingo Canadian Landmark, Gwich'in Conservation Zones and Heritage Conservation Zones, Migratory Bird Sanctuaries, Territorial Parks, Territorial Park Reserves and areas protected under land claim agreements. Interim land withdrawals are not included. Only areas larger than 10 km^2 are included.

	May 2011	
Type of area	**Size (km2)**	**% of NWT land base**
Areas with no development (permanent surface and subsurface protection)[a]	98,080	7.3
Areas with no development (surface and subsurface protection subject to periodic review)[b]	6,100	0.4
Areas with surface protection (permanent)[c]	23,150	1.7
Water only areas with no development (permanent)[d]	4,450	0.2[e]
Total	**131,780**	**9.6[e]**

Footnotes

a National Parks, Nahanni National Park Reserve, National Historic Site, Thelon Wildlife Sanctuary, and Ezǫdzìtì (an area protected under the Tłı̨chǫ Agreement)

b Conservation Zones larger than 10 km^2 in the approved Gwich'in Land Use Plan (including Heritage Conservation Zones)

c Migratory Bird Sanctuaries larger than 10 km^2 (not including overlaps with National Parks), Territorial Parks larger than 10 km2, Doi T'oh (CANOL Trail) Territorial Park Reserve, Kelly Lake (an area protected under the Sahtu Dene and Metis Comprehensive Land Claim Agreement), and Pingo Canadian Landmark

d Waters of Husky Lakes and Liverpool Bay (an area protected under the Inuvialuit Final Agreement)

e Liverpool Bay is excluded from the percentage of the NWT land base because it is marine.

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Key Insights

- Since 2003, the amount of land in the NWT in established protected areas and conservation zones has increased by 39,340 km^2, or from 6.7% to 9.6% of the NWT.
- The amount of land protected by ecozone varies from 3% to 20%.
- Protected areas planning and land use planning are underway and will increase land protected to conserve biodiversity and representative samples of ecosystems.

The NWT Protected Areas Strategy Establishment Action Plan 2010-2015 was produced in June 2010. The goal is to enhance the implementation of the Protected Areas Strategy in a coordinated and co-operative way. As sites move through the Protected Areas Strategy process, there needs to be continual co-operation amongst various stakeholders. This co-ordination and co-operation must happen at the candidate area working group level before establishment and at the government level during establishment. It must continue after establishment as sites move towards management and monitoring.

While communities have identified 23 culturally and ecologically significant areas across the NWT through the PAS; only 10 of these areas remain active and only one has achieved permanent protection. PAS partners have completed assessments on several of these areas and they are expected to be protected within the next few years. The federal government has committed to establishing six National Wildlife Areas by 2013. The GNWT has sponsored two areas, one as a Candidate Critical Wildlife Area under the *Wildlife Act* and one as a Candidate Cultural Conservation Area under the *Territorial Parks Act*. The GNWT is also evaluating two other proposals received for sponsorship.

In addition to areas proposed under the Protected Areas Strategy, Parks Canada has identified additional areas of interest for two new National Parks, which have interim protection. Land use plans are being developed for the Sahtu Settlement Area, Dehcho Territory and Tłı̨chǫ settlement lands. The Inuvialuit have established a Marine Protected Area in the Beaufort Sea.

Find More

For more information on the NWT Protected Areas Strategy visit **www.nwtpas.ca**

For more information on the Gwich'in Land Use Plan visit **http://www.gwichinplanning.nt.ca**

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Amount of land protected

Ecozones	Size (km^2)	% of NWT portion of ecozone
Northern Arctic	31 480	14.9
Southern Arctic	33 780	20.4
Taiga Shield	9 800	3.0
Taiga Plains	19 290	4.0
Cordillera	33 880	20.5

Note that Great Bear Lake and Great Slave Lake are included in total ecozone size. Marine areas are excluded.

NEXT STEPS

The full report on the 2011 NWT State of the Environment, including more indicators and detailed analysis, is published on-line at www.enr.nt.ca. Indicators are updated on the website annually or as new information becomes available. Each indicator in the on-line full version of the report is date stamped.

A highlight report will be published every four years with new insights and updates as available.

The list of indicators for each focal point is reviewed regularly. More indicators are being developed and additional information will be available each year. Some indicators were not included in the 2011 report due to lack of available information or to allow for further consultation on the list of indicators. Some indicators in the 2011 report relied on old or incomplete information. Next steps include updating and expanding this information for future reports.

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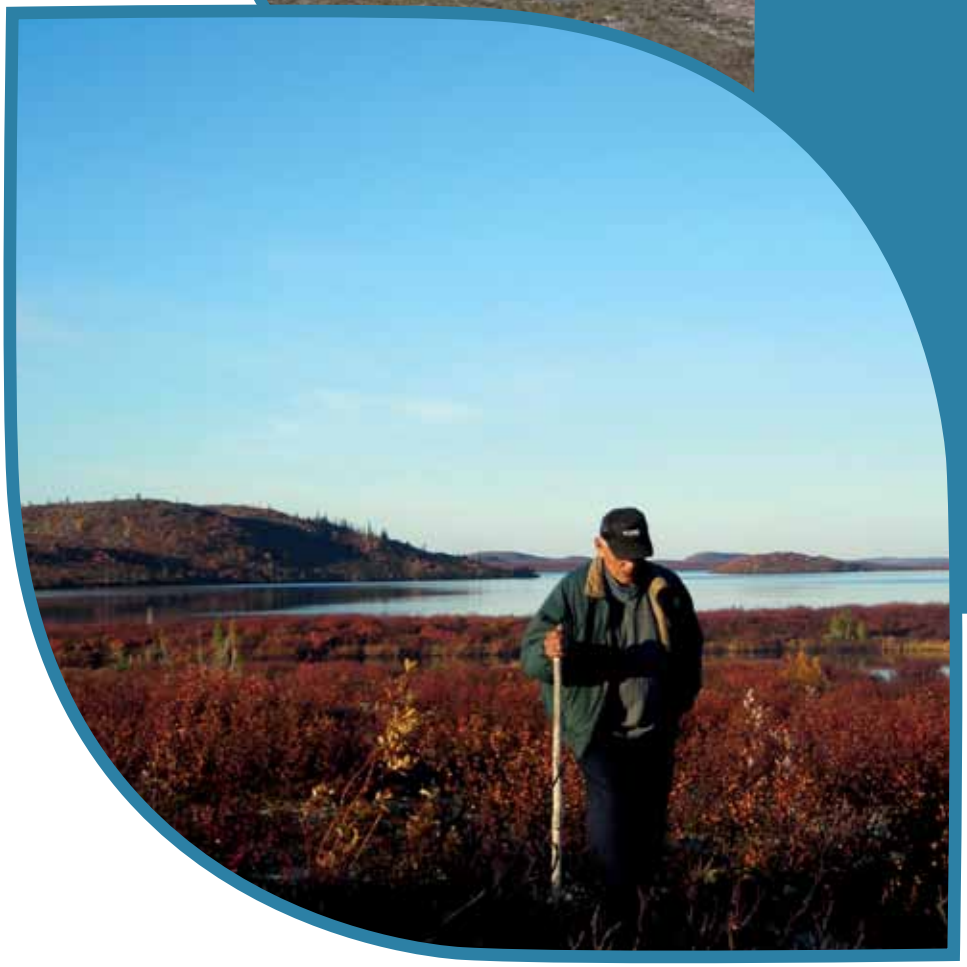

YOUR INPUT

Please contact us for more information on the NWT State of the Environment Report. Your input is important. Your suggestions on additional indicators and your insights on how the NWT's environment is changing are appreciated.

You have an important role to play in monitoring our environment.

Contact us at NWTSOER@gov.nt.ca.

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SOURCES AND ACKNOWLEDGEMENTS

The 2011 Highlights of the "NWT State of the Environment Report" was prepared by a team with members from each Division of the Department of Environment and Natural Resources (ENR), Government of the Northwest Territories (GNWT).

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The Team would like to acknowledge the help of many reviewers and experts who provided substantial information, data and analysis. Their contributions are acknowledged in the following section. All errors and omissions remain the sole responsibility of the Team.

Driving Forces

1. BIG PICTURE: A CHANGING PLANET

Global CO_2 in the atmosphere is from National Oceanic and Atmospheric Administration (NOAA). Information on trends in Arctic temperature and precipitation is summarized from the Fourth Assessment Report of the Intergovernmental Panel on Climate Change – Climate Change 2007 – The Physical Science Basis published by the World Meteorological Organization and the United Nations Environment Programme. Information on Arctic sea ice is based on satellite data compiled by the US National Snow and Ice Data Centre, and more detailed analyses by Dr. Steve Howell, University of Waterloo, Trudy Wohlleben, Canadian Ice Service, Environment Canada, and peer-reviewed by Dr. D. Barber, University of Manitoba, and Adrienne Tivy, International Arctic Research Center, University of Alaska, Fairbanks. Analysis and data on the projected trends in Beaufort Sea levels are from Earth Sciences Sector (ESS) Climate Change Geoscience Program of Natural Resources Canada (NRCan). Calculations made by Thomas James, Geological Survey of Canada, NRCan, based on the methods described in a study generated by the Nunavut Climate Change Partnership; peer-reviewed by Don Forbes. This indicator is ESS contribution number 20110177.

2. NATURAL CLIMATIC FLUCTUATIONS

Information and analysis for this focal point is from the National Oceanic and Atmospheric Administration (NOAA) and Environment Canada web pages. Analysis of the effects of natural climate fluctuations on weather in the NWT is from Bonsal B., Shabbar A. 2011. Large-scale climate oscillations influencing Canada, 1900- 2008, a technical report produced for Canadian Biodiversity: Ecosystem Status and Trends 2010 report available at **www.biodivcanada.ca**.

3. CLIMATE AND WEATHER

Information on weather trends is obtained from the Climate Trends and Variations Bulletin published by the Climate Research Division of Environment Canada (EC). Peer-review and details on changes in analyses since winter 2010/11 are provided by Bob Whitewood, Climatologist, EC. Information on growing season and snow cover is from a study produced for Canadian Biodiversity: Ecosystem Status and Trends Report 2010 by Climate Research Division, EC.

4. DEMOGRAPHY: HUMANS IN THE NWT

Information on demography and on Aboriginal languages is from the NWT Bureau of Statistics – Quarterly reports.

5. ECONOMY

GDP values for the NWT are obtained from the GNWT Bureau of Statistics. Production volumes for minerals, including diamonds, are obtained from Natural Resources Canada, as summarized by Statistics Canada. Production of oil and gas is obtained from NWT Bureau of Statistics, with additional detailed data from National Energy Board and Aboriginal Affairs and Northern Development Canada (AANDC).

6. ENERGY USE

The data for this indicator are obtained from the NWT Taxation Database at GNWT, Department of Finance and the NWT Power Corporation. Interpretation

of the information is provided by ENR. Data on emissions are obtained from Environment Canada emissions inventories, which is a record of the greenhouse gas emissions emitted and their sources in the NWT.

Pressures

7. HUMAN ACTIVITIES

Data and information on ship transits in the Northwest Passage is compiled, with additional notes, by NORDREG, Marine Communication Traffic Services Centre, Officer-in-charge, Jean-Pierre Lehnert, Iqaluit, NU. Zones of marine activity and information from the Arctic Marine Shipping Assessment are from the Arctic Council, CAFF/PAME. Data on the land rights issued and allocated to mineral, oil-gas development and associated activities was obtained from Aboriginal Affairs and Northern Development Canada (AANDC), SID Online with additional information and analysis from Northwest Territories Region, Mining Recorder's Office and Northern Oil and Gas Directorate. Peer-reviewed by Marie Adams, Rose Greening, Melissa Bard, AANDC.

8. LANDSCAPE CHANGES

Seismic line data are obtained from the National Energy Board. Level 4 ecoregions shapefiles are from the NWT Ecosystem Classification Working Group. The version of this data used is dated June 2010. There is a five-year lag in the data that is included. Seismic line data goes back to 1958. Maps are created by Forest Resources, ENR, GNWT, Hay River. Area of commercial forest harvest is obtained from available records of timber cutting permits and licences issued from 1975 to present by Forest Management, ENR, GNWT.

9. SOLID WASTE

Information was gathered from ENR's Beverage Container Program and Single-use Retail Bag Program. The snapshot of solid waste in the NWT is based on information compiled by Michelle Hannah, ENR, from Statistics Canada, and consultant reports to the City of Yellowknife, EC and ENR. Diep Duong, Gerald Enns and Patrick Hough reviewed the information.

10. CONTAMINANTS

Information on cadmium and mercury in caribou is obtained from research conducted under the National Northern Contaminants Program, with field sampling done with assistance from ENR, Aurora College, the Sahtu Renewable Resources Board, local hunters, and other partners. Details on environmental remediation of contaminated sites are obtained from AANDC, Northern Contaminated Sites Program and from the Federal Contaminated Sites Action Plan. Data and information on mercury in fish in the NWT are from Northern Contaminants Program Synopsis Reports with specific data from a study by Dr. Marlene Evans (EC), and from Public Health Advisories issued by GNWT-Health and Social Services. Text drafted by Lorna Skinner, AANDC.

11. WATER

Data on river flows and on lake water levels are obtained from the Water Survey of Canada Hydat website with analyses by Bob Reid, Water Resources Division, AANDC and from the Canadian Biodiversity: Ecosystem Status and Trends 2010 Report.

State

12. AIR

Air quality data are obtained from the NWT Air Quality Monitoring Network. Two of the NWT monitoring stations (Inuvik and Yellowknife) are designated as part of the National Air Pollution Surveillance (NAPS) program. Air quality monitoring data from our Yellowknife station are used in the Canadian Environmental Sustainability Indicators reports.

13. PERMAFROST

Text and insights for on permafrost indicators are drafted by Dr. Steve Kokelj, AANDC, with additional information and peer-review by Steve Wolfe, AANDC, Dr. Bill Quinton and Dr. Mike English from Sir Wilfrid Laurier University. Data on ground temperatures are from Natural Resources Canada (NRCan). Data on active layer thickness are from the Circumpolar Active-Layer Monitoring Program (CALM). The CALM protocols are being adapted for community-based monitoring of the active layer and will be published by the NWT Cumulative Impact Monitoring Program for future guidance. Information on thermokarst is obtained from NRCan. Future changes in land-sliding and thaw slumping can now be tracked using a recent NRCan baseline landslide inventory.

14. VEGETATION

Information on fire is obtained from the GNWT, ENR, Forest Management Division, the agency responsible for providing forest fire management services on forested areas in the NWT. The NWT reports data on fire to the Canadian Interagency Forest Fire Centre

annually. Data and information on alien plant species is collated from NWT residents and visiting experts, as well as information summarized from the NWT General Status Ranking Program and projects undertaken for the Risk Analysis of Invasive Alien Species in the NWT funded in part by the Alien Invasive Species Partnership Program, EC.

15. WILDLIFE

Barren-ground caribou population information is obtained from ENR, GNWT. Surveys are conducted by biologists, with involvement of community members and in partnership with neighbouring wildlife agencies. Surveys of the Beverly, Ahiak and Qamanirjuaq herds are led by the Government of Nunavut. Surveys of the Porcupine herds are led by the Alaska Department of Fish and Game and Yukon Department of Environment. Information on migratory bird populations is obtained from Christmas Bird Counts mostly in southern Canada and US, Breeding Bird Surveys in southern Canada and US, from US Fish and Wildlife Service aerial surveys of waterfowls, COSEWIC reports, and summary analyses of bird trends done for the report Canadian Biodiversity: Ecosystem Status and Trends 2010. Indicator on birds was peer-reviewed by Donna Mulders, Jennie Rausch, Vanessa Charlwood, Myra Robertson, EC, Yellowknife, NT.

16. SPECIES AT RISK

Information on population trends of species at risk in the NWT is derived from status reports produced by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), with updates from NWT's Species at Risk Committee, and from ENR, GNWT, EC and wildlife co-management boards. Peer-reviewed by Robert Gau, ENR.

17. GENETIC RESOURCES

Information on endemic and rare species in the NWT is from the NWT General Status Ranking Program with additional information on global status ranks from NatureServe Canada. Official lists of NWT species are have been compiled by the NWT General Status Ranking Program since 2000. Updates on new species are possible only with the contribution of NWT residents, visiting specialists, entomologists, and botanists and, tourists, and NWT residents interested in NWT biodiversity. New discoveries are the result of increased monitoring and studies on lesser-known species in the NWT. Peer-reviewed by Robert Gau, ENR.

Stewardship

18. USE OF RENEWABLE RESOURCES

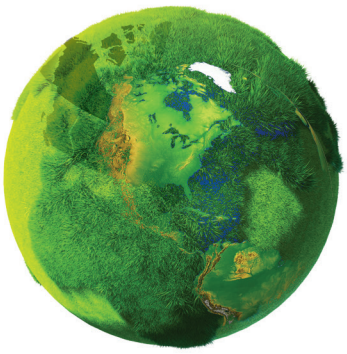
Country food use was summarized from NWT Bureau of Statistics – Quarterly reports, the 2002 NWT Regional Employment and Harvesting Survey, and the 2004 and 2009 NWT Community Surveys. Raw data and peer-review was provided by Vishni Peeris, Jill Herbert, NWT Bureau of Statistics. Ecotourism data are from Industry, Tourism and Investment (ITI), GNWT Visitor Exit Survey, annual surveys at airports, license plate counts on NWT ferries and surveys of road travelers. Visitor tally counts at visitor centres, and campground, fishing and hunting licences and permits are also used as indicators of trends in visitor volumes. Data on visitors to National Parks in the NWT are provided by Parks Canada: Nina Squires (Nahanni National Park Reserve), Barb Brittain (Western Arctic Field Unit) and Janna Jaque (Wood Buffalo National Park). Data on visitors at Territorial Parks are provided by Kera Pena, ITI, GNWT.

19. ENVIRONMENTAL AWARENESS AND EDUCATION

Information on environmental and cultural camps was solicited from within ENR. Additional information on other opportunities was collected from organizations and agencies involved in education and the environment, and the Internet. The list of environmental education opportunities is not exhaustive. It will be updated regularly. Information on environmental awareness programs and levels of participation was summarized from surveys among program providers. Information tallied and text drafted by Stephanie Yuill, ENR. Peer-reviewed by Brenda Hans, Prince of Wales Northern Heritage Centre, and by Beatrice Lepine, Traditional Knowledge Specialist, Field Support Unit, ENR.

20. PROTECTED AREAS AND LAND USE PLANNING

The geo-referenced data for the indicator on protected areas and land use planning are obtained from the Protected Areas Strategy Secretariat, NRCan, the Canada Centre for Remote Sensing, The Atlas of Canada, the Centre for Geomatics (GNWT), the Gwich'in Land Use Planning Board, AANDC (Comprehensive Claims Branch), the Sahtu GIS Project, and the Sahtu Land Use Planning Board. The Protected Areas Strategy Secretariat, Land and Water Division ENR, GNWT compiled the data, drafted the text and calculated each reported indicator value. Peer-reviewed by Karen Hamre, PAS Managing Director.



Northwest Territories Environment and Natural Resources

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