

Northwest Territories

2010 State of the Environment BIODIVERSITY

Special Edition



Cover concept: As a northern region, the Northwest Territories is often regarded as having low biological diversity– but look again. The Northwest Territories is home to fully functioning ecosystems, a surprising number of species, and unique species adapted to cold.

Ice: Brintnell–Bologna Ice field, in the Ragged Range of the Mackenzie Mountains, is the only ice field remaining in the Northwest Territories. Credit: DUC A Korpach

Northern Mountain Caribou: J Nagy

Polar Bear: P Nicklen / National Geographic Image Collection

White–crowned Sparrow: J Nagy

Cranberries on the tundra: S Carrière / GNWT

Tree line– Spruces: S Carrière / GNWT

Hudsonian Whiteface Dragonfly: P Catling

Drummond’s Bluebell–a globally rare species found on the Beaufort Sea coast: Jo Overholt

Northwest Territories

2010 State of the Environment BIODIVERSITY

Special Edition



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

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This special report on biodiversity was prepared to commemorate the 2010 International Year of Biodiversity by the Government of the Northwest Territories (GNWT) in collaboration with the NWT Biodiversity Team – 2010. Team members are listed in the Sources and Acknowledgements section.

All members contributed information, reviewed findings, and provided final approval for the content of the printed report. The GNWT would like to thank all members for their valuable contributions. Any errors and omissions in the report remain the sole responsibility of the GNWT.

Message from the Minister

NWT State of the Environment Biodiversity Report – 2010

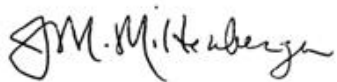
2010 is the International Year of Biodiversity and the Government of the Northwest Territories (GNWT) is celebrating this year by publishing a special Biodiversity Report.

Compared to other places in Canada, the Northwest Territories' (NWT) diversity of plants and animals is essentially unchanged. This is because our land and waters remain productive but there are some disturbing trends, such as widespread declines in some bird species.

The NWT continues to meet the 2010 United Nations' Biodiversity Goals and Targets. The Biodiversity Report provides the needed information to understand what components of the NWT's biodiversity are changing and why. This information is used to assess the success of our actions in biodiversity conservation and sustainable use in the NWT and to plan for the future.

The threats to our biodiversity are increasing and must be watched. These threats include climate change and fragmentation of our landscape. It is essential to ensure some parts of each ecosystem in the NWT remain protected throughout the NWT. The NWT Protected Areas Strategy (PAS) and the NWT Water Stewardship Strategy will help to maintain our biodiversity.

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



J. Michael Miltenberger
Minister
Environment and Natural Resources



Provide your input – contact
NWTSOER@gov.nt.ca

What is Biodiversity?

Biodiversity = the web of life

Biodiversity is the diversity of life – the plants and animals that live in the forest and tundra, the mountains, the lakes and rivers, and the skies.

Biodiversity includes:

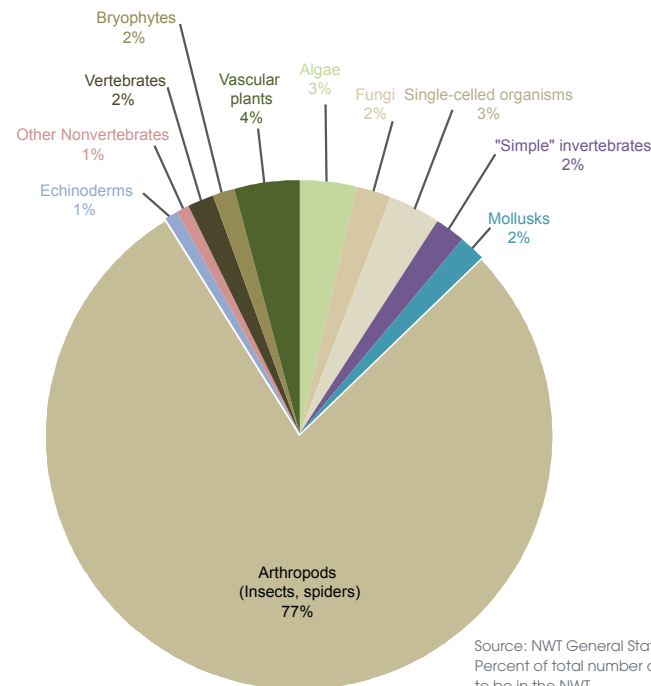
- Ecosystems – a biological community of interacting organisms and their environment
- Species – group of organisms capable of interbreeding and producing fertile offspring of both genders
- Genetic resources – genetic material of actual or potential value to human beings

Collared Pika A vertebrate mammal, member of the hare order, the lagomorphs.



J Nagy

Biodiversity in the NWT



Source: NWT General Status Ranking Program. Percent of total number of species estimated to be in the NWT

- | | |
|------------------------------------|--|
| Echinoderms (starfishes, urchins) | Fungi |
| Other Nonvertebrates | Single - celled organisms |
| Vertebrates (mammals, birds, fish) | 'Simple' invertebrates (jellyfishes, corals, sponges, worms) |
| Bryophytes (liveworts, mosses) | Mollusks |
| Vascular plants | Arthropods (insects, spiders, crustaceans) |
| Algae | |

For more information on the lesser-known species in the NWT, go to www.enr.gov.nt.ca, follow the links to the General Status Ranking Program.



P. Catling

This dragonfly is called the Hudsonian Whiteface (*Leucorrhinia hudsonica*). There are 41 known species of dragonflies and damselflies in the NWT. More than ¾

of all the species in the NWT are insects and spiders. More information on this large part of our biodiversity is gathered every year, but relatively little is known about them compared to other animals, such as the vertebrates, which include humans.



C. Cases

This species is a Brittle Star, a kind of echinoderm living on the sea floor of the Beaufort Sea. Results from studies undertaken during the International Polar Year will reveal more on the biodiversity in the Beaufort Sea.

Celebrating 2010 - International Biodiversity Year



Biodiversity is life.
Biodiversity is our life.

The NWT State of the Environment: 2010 Biodiversity Special Edition summarizes key findings on biodiversity from the web-based NWT State of the Environment Report. More information on biodiversity and other aspects of our environment can be found in the full version of the NWT State of the Environment Report on the internet at www.enr.gov.nt.ca. The web-based report is to be updated whenever new information becomes available.

More information on the 2010 United Nations Biodiversity Target can be found at www.cbd.int/2010-target/background.shtml

This report is part of the NWT's contribution to the celebration of the 2010 International Year of Biodiversity.

Biodiversity is essential for supplying the vital ecosystem services for a healthy living planet including clean water, productive soil, clean air, and food. Loss of biodiversity threatens the health of people and of ecosystems that people live in. Nature's capacity to adapt to a changing environment decreases with a lack of biodiversity, reducing nature's ability to provide those vital services. The 2010 International Year of Biodiversity celebrates the life on earth and the value of biodiversity. The NWT is a part of this celebration.

The goal of the 2010 Special Biodiversity report is to provide information on the state of NWT's biodiversity. It provides information to help us understand what components of NWT's biodiversity are changing and why. This information is used to assess the success of our actions in biodiversity conservation and sustainable use in the NWT and to plan for the future.

How is this report organized?

The report is organized using the 2010 United Nations' Biodiversity Targets and Indicators as a reporting framework listed below.

Goals and Targets

A summary of key findings, using the indicators, on how the NWT is meeting 2010 United Nations' Biodiversity Goals and Targets is presented on the next page.



Status and Trends of NWT Biodiversity

An assessment of the status and trends of the NWT wildlife populations and genetic diversity.



Ecosystem Integrity

An assessment of the integrity of NWT's ecosystems.



Status of Traditional Knowledge, Innovations, and Practices

A report on our efforts to protect traditional knowledge, innovations and practices.



Ecosystem Goods and Services, and Sustainable Use of Biodiversity

A report on how we are promoting the sustainable use of biodiversity, and an assessment of how ecosystem goods and services support the health and well-being of human communities.



Threats to Biodiversity

An examination of major threats to biodiversity, including those arising from invasive alien species, climate change, contaminants and habitat fragmentation.



Planning, Programs and Partnerships for the Future

A summary of how we are adapting to changes in our biodiversity, how we are planning to reduce threats and how we are working together to develop in an ecologically sustainable manner.

Sparrow's Egg Lady's Slipper Orchid

B. Latham

Northwest Territories Overview

Reaching the United Nations 2010 Biodiversity Targets

Status and Trends of NWT Biodiversity

Goal: Promote the conservation of species diversity

UN Targets	Indicators	NWT Key Findings
Reduce declines and monitor changes in populations of key species	<ul style="list-style-type: none"> •Trends in range extensions of mammals •Trends in birds in the NWT •Status of Dolly Varden and Bull Trout 	<ul style="list-style-type: none"> •Some mammal species are seen further north than before. •Some migratory birds are still common but have shown significant declines in populations. •Fisheries of Dolly Varden at Rat River showed loss of larger/older fish and recovery in recent years. Populations of Bull Trout appear small and fragmented.
Improve the status of species at risk	<ul style="list-style-type: none"> •Trend in Species at Risk Index 	<ul style="list-style-type: none"> •Less than 1% of NWT species are at risk of extinction in the next 100 years, but the risk is slowly increasing.
Maintain genetic diversity	<ul style="list-style-type: none"> •Status of endemic and globally rare species 	<ul style="list-style-type: none"> •Conservation measures are in place to preserve for future generations all globally rare and endemic birds and mammals in the NWT, but we still have some work to do to protect our rare plants.

Ecosystem Integrity

Goal: Promote the conservation of the biodiversity of ecosystems

UN Targets	Indicators	NWT Key Findings
Manage and protect areas of particular importance to biodiversity to maintain ecosystem integrity.	<ul style="list-style-type: none"> •Trends in extent of NWT ecosystems •Trends in Arctic sea ice •Trends in integrity of important aquatic habitats 	<ul style="list-style-type: none"> •High resolution information to detect trends in the change of land cover is not available for all areas of the NWT. •Reductions in minimum sea ice cover in the NWT are not occurring at the same rate everywhere. •Deltas and wetlands are important for biodiversity in the NWT. Biological indicators need to be developed to help monitor the integrity of deltas and other important aquatic habitats.
Conserve at least 10% of each ecological regions by 2010.	<ul style="list-style-type: none"> •Trends in protection of important ecological areas 	<ul style="list-style-type: none"> •9.5% of the NWT is protected as of 2010. Less than 4% of the Taiga Plains and Taiga Shield ecozones are in protected areas.

Status of Traditional Knowledge, Innovations, and Practices

Goal: Maintain socio-cultural diversity of indigenous and local communities

UN Targets	Indicators	NWT Key Findings
Protect traditional knowledge and the rights of indigenous and local communities over their traditional knowledge, innovations and practices	<ul style="list-style-type: none"> •Status of Traditional Knowledge in the NWT 	<ul style="list-style-type: none"> •TK is being incorporated into a wide range of initiatives; there is opportunity for further implementation. However, use of Aboriginal languages is slowly declining in the NWT. The loss of Aboriginal languages can result in loss of traditional ecological knowledge.

Ecosystem Goods and Services, and Sustainable Use of Biodiversity

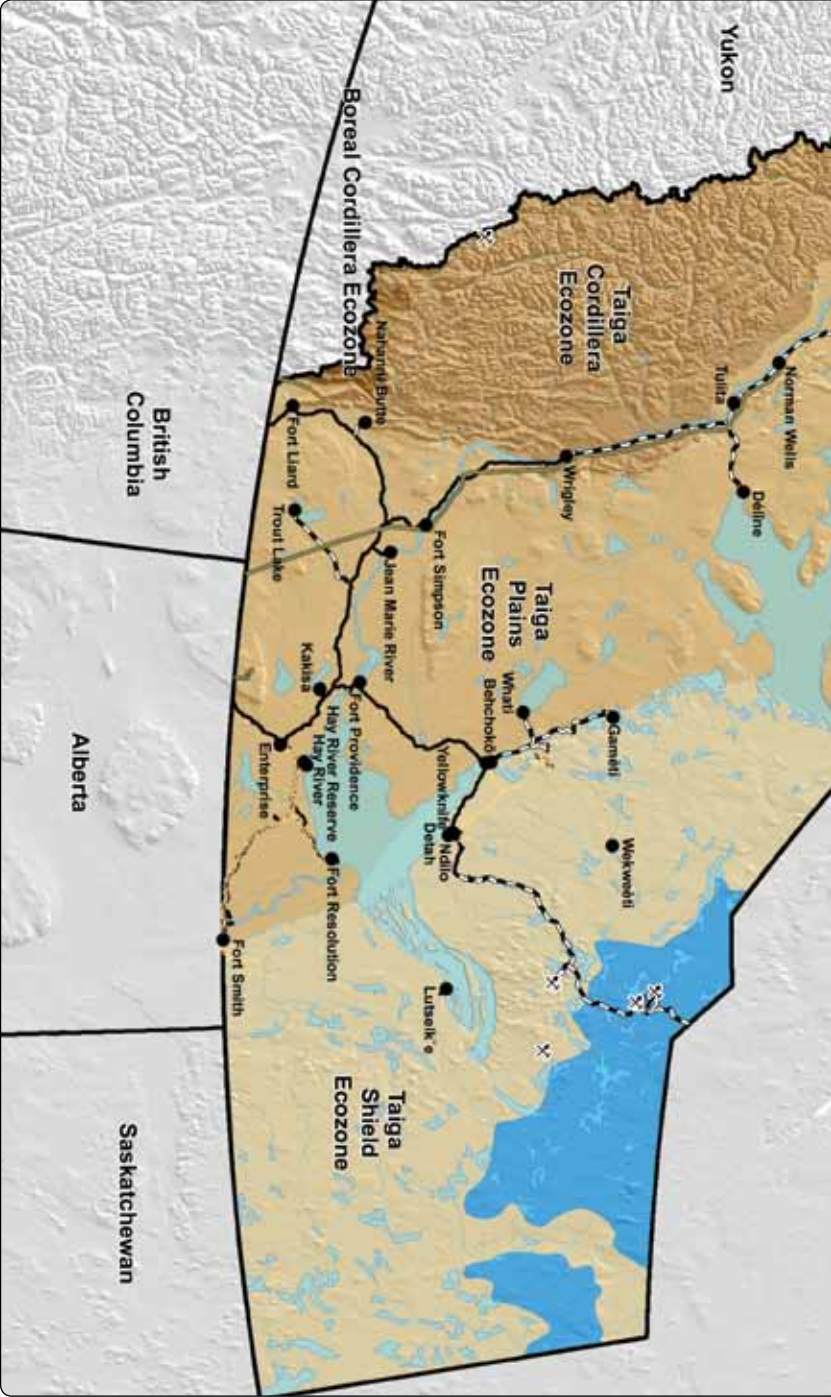
Goal: Maintain capacity of ecosystems to deliver goods and services and to support livelihoods of people, and promote sustainable use of biodiversity

UN targets	Indicators	NWT Key Findings
Maintain capacity of ecosystems to deliver goods and services	<ul style="list-style-type: none"> •Status of sustainable sources for ecosystem goods and services 	<ul style="list-style-type: none"> •Formal renewable resource co-management systems stemming from land claim agreements are in place in 60% of NWT. There are declines in all herds of barren ground caribou in the past decade. Recovery efforts are increasing.
Maintain resources that support sustainable livelihoods, local food security and community health	<ul style="list-style-type: none"> •Trends in country food use 	<ul style="list-style-type: none"> •NWT residents still show a high reliance on country food as a daily source of energy.

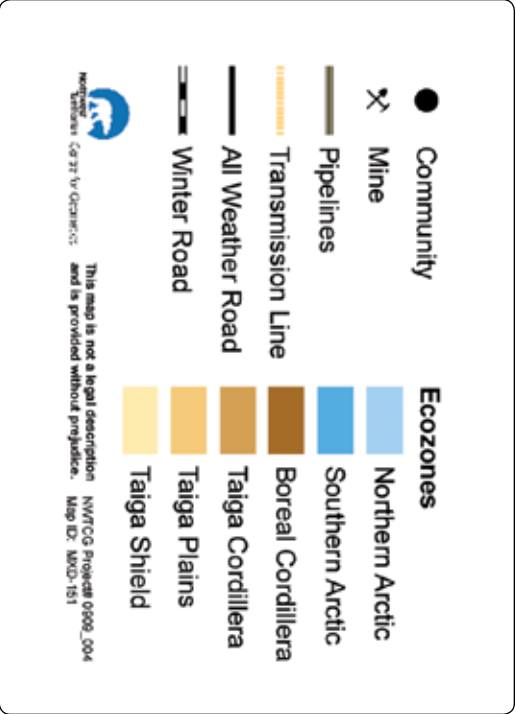
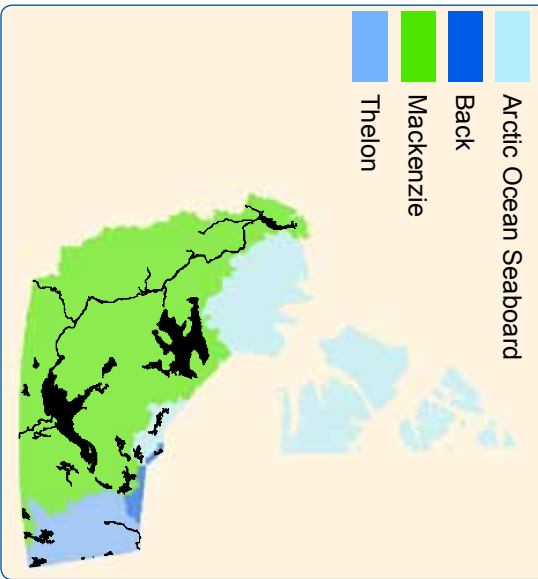
Threats to Biodiversity

Goal: Reduce pressures from habitat loss, unsustainable water use, invasive species, pollution, and climate change

UN Targets	Indicators	NWT Key Findings
Decrease rate of loss and degradation of natural habitats	<ul style="list-style-type: none"> •Status of fragmentation due to human activities in forested areas 	<ul style="list-style-type: none"> •Fragmentation due to human activities has reached more than 40% density in 4 forested ecoregions, or about 2% of forested NWT.
Monitor the effects of climate change and maintain or enhance resilience of biodiversity to adapt to climate change	<ul style="list-style-type: none"> •Trends in observed effects of climate change 	<ul style="list-style-type: none"> •The rate of change in temperature and precipitation is faster than what climate change models have predicted. Climate change is increasing the pressures of other changes in land use and disturbance on our biodiversity.
Prevent the spread or eliminate invasive alien species that threaten ecosystems or species	<ul style="list-style-type: none"> •Trends in invasive alien species 	<ul style="list-style-type: none"> •NWT has seen few invasive alien species to date. However, a changing climate and additional industrial development will increase the potential for more invasive species.
Reduce pollution and its impacts on biodiversity	<ul style="list-style-type: none"> •Trends in Arctic contaminants 	<ul style="list-style-type: none"> •Country foods continue to be a safe and healthy food choice for northerners. Levels of most contaminants are declining slowly, but some contaminants may be increasing (mercury in fish), and new compounds, like flame retardants, are being detected. Change in mercury levels may be due to climate change.



NWT Drainage Basins







Trends in range
extensions of mammals

Moving Mammals

67

Number of species of
terrestrial mammals in the NWT.

10

Number of species
of marine mammals found in
the marine waters of the NWT.

Change in the northern
environment may favour
expansion of southern
animals and other species
into NWT ecosystems.

This indicator tracks mammals that
are changing their range, mostly
due to human activities causing
changes to habitat and climate.

Change in the northern environment
may favour extensions of southern animals
to move north into NWT ecosystems.
Changes in species composition in
NWT ecosystems provide an indicator
of ecosystem change, including
habitat and climate change.

Thousands of years ago when glaciers
receded from the NWT, wildlife moved
back. However in recent years, people are
reporting seeing more species of mammals
that they have rarely or never seen in the
past. These observations are helpful to
increase knowledge about NWT mammals.
Overall it appears that some species are

seen further north than before. This slow
movement northward is not occurring
at a constant rate. Some years more
observations of range expansions are
reported than in other years. This may be
due to a variety of reasons such as milder
winters, hot summers, and increased
reporting. Vagrancy, where animals are
seen a long distance from where they
normally occur, is normal in mammals.
Individuals, especially young ones, will try

new territories and explore new habitats,
and can travel further than expected.
It remains difficult to detect when there
is an increase in vagrancy or when
populations are established in a new
area, to confirm a range extension.

Mule deer Range extension into the NWT:
Mule deer were in the Fort Smith area by
1959. Information on this species in the
NWT is scarce.



Meikle

Elk Range extension into the NWT: residents reported
occasional elk south of Great Slave Lake, Liard area and
Nahanni National Park Reserve.



G Court



Interested community members in the North have a great role to play in monitoring range extension by recording and reporting details on animals that are “out of place”.

Cougar Extension from Taiga Plains (south) into Taiga Plains (north): Documented in fur records as early as 1919 in the extreme southern edge of the NWT. Between 1 to 9 have been sighted every year since 1990. Some individuals are seen as far north as the North Slave and unconfirmed reports are noted in the Sahtu, and near Inuvik and Aklavik.



G Court

White-tailed Deer Range extension from Taiga Plains (south) into Taiga Plains (north) and Taiga Shield ecozone: Unknown when they first arrived in the NWT. First reported in the 1940s in the Dehcho, then in the 1970s in Hook Lake area, and from Fort Liard to Fort Simpson. For many years they have been intermittently observed in Hay River area and along Slave River. The northernmost harvested deer is now north of the Arctic Circle, near Fort Good Hope along the Mackenzie River (Taiga Plains).



J Nagy



B Cress / Illinois

Raccoon Vagrant into the NWT: Only one individual was reported from Fort Smith in 2003. The nearest population is near Fort McMurray, AB.

For More Information

Vagrant = species occurring infrequently and unpredictably in the NWT. These species are outside their usual range and may be in the NWT due to unusual weather occurrences, an accident during migration, or unusual behaviour by a small number of individuals.

New – range extension into NWT = species newly seen in the NWT, for which there is evidence of recent range extension. This definition helps to track “true” new species to the NWT, as their pattern of distribution changes.

Range extension within NWT = species already present in the NWT, for which there is evidence of recent extension into habitats or ranges not previously occupied during a period reasonable for the species. This definition helps to track changes in mammal distributions in the NWT due to, for example, population increases, climate change, or habitat changes. Reductions in range size of NWT mammals can be tracked using Species at Risk indicators.

Find more on the NWT State of the Environment Report – Wildlife Focal Point at www.enr.gov.nt.ca. Report all new or unknown species at NWTSOER@gov.nt.ca.



M Harris

Coyote Range extension from Taiga Plains to Taiga Shield ecozone: Species present in low numbers mainly in the South Slave region. At least one family group has established itself in Yellowknife since 2001.



Disquiet

Disquieting summers – decline

283 species of birds
can be observed in the NWT.

Some migratory birds, although still commonly seen in the NWT every summer, have shown rapid declines in populations.

In the two major biomes of the NWT, the tundra and the taiga-boreal forest, live 283 species of birds. The vast majority of these migrate outside the NWT in winter; only about 6% of these species live in the NWT year-round, such as the common raven and ptarmigans.

Birds are important components of all NWT ecosystems. Ducks, geese, grouse, and ptarmigan are essential food sources for many northern families. Waterfowl hunting and gathering of eggs in spring are part of people's traditional links to the land and many families will travel seasonally to good bird hunting areas every year. Hunters track the numbers and health of these resources closely.

Song birds, shorebirds, and woodpeckers are key components of NWT ecosystems, as they are major predators of insects, including insect pest species; they contribute to plant seed dispersal and they are food for other animals. Woodpeckers also create homes for other birds and for some mammals. Falcons, eagles, owls, and other raptors, are top predators. Some birds, such as ravens, help in nutrient cycling by scavenging and cleaning up after a kill. Monitoring populations of top predators tells us about the health

Olive-sided Flycatcher, an aerial insectivore, has declined by 79% since 1968 based on breeding bird surveys.



Tim Zurowski

of ecosystems, as they are susceptible to pollutants and to changes in the populations of their prey. Monitoring the status of fishing-eating birds (loons, pelicans) and of marine birds (sea ducks) helps us understand changes in aquatic and marine ecosystems.

Some migratory birds, although still commonly seen in the NWT every summer, have shown significant declines in populations. Most of these species have declined by more than half the numbers seen in the 1960s-70s.

Common Nighthawks are aerial insectivores and have declined by about 50% in the past 10 years based on data from the wintering grounds. The reasons are unclear but declines or changes in availability of insect populations are suspected.



J Duxbury

Declines in migratory birds

Trends in birds in the NWT



Not all populations of migratory birds are declining, but for many species there is growing concern that declines are indicative of some widespread changes in our ecosystems. For example, there is evidence that most shorebirds nesting in the Arctic are declining, some shorebirds in the taiga/boreal forest are also declining, and many boreal bird species that specialize in aerial feeding on insects are also declining. Further studies are needed to determine the main reasons for these losses in population numbers.

A collaborative approach between countries and regions is essential in understanding why some migratory birds are declining across North America, so that threats can be reduced and populations can recover from their long-term declines. Management and conservation strategies, such as the North American Bird Conservation Initiative, are implemented by all agencies responsible for the management of birds in the NWT, Canada, as well as in the US and Mexico.

Northern Pintail populations have declined by approximately 40% since the 1960s. The reasons for this decline are unclear, but include wetland habitat change, and low breeding success.



J Nagy

Snow Bunting populations fluctuate annually but overall they have declined by 41% in the past 40 years. The reasons for their decline are not known, but climate change is suspected. Less food is available during the peak of nesting as insect emergence occurs earlier with earlier springs. Some species of migratory birds may not be able to migrate earlier and take advantage of earlier insect peak emergence.



USFWS

For More Information

How are birds monitored?

The Breeding Bird Survey (BBS) tracks species on their breeding grounds. The NWT/Nunavut Bird Checklist tracks sightings of birds to help increase knowledge of the distribution, abundance and breeding status of birds in the NWT's ecosystems. The Christmas Bird Count (CBC), a monitoring program over 100 years old, collects data on birds at their wintering sites across North America. As most NWT birds migrate south for winter, the population trends of these species are determined from data collected at CBC sites in southern Canada and the United States. Ducks and geese are monitored on their breeding grounds by the US Fish and Wildlife Service as part of the North American Waterfowl Management Plan. Banding programs at Willow Lake (Tulita), Stagg River (Behchoko), and Mills Lake (Fort Providence) help track the migratory route of NWT waterfowl.

Some monitoring programs have been designed to collect data on birds requiring special attention in the NWT and elsewhere. Shorebirds are tracked by the Program for Regional and International Shorebird Monitoring (PRISM). Monitoring of raptor nesting sites in the NWT is done using the NWT-NU Raptor Database.

Find more on the NWT State of the Environment report - Wildlife Focal Point at www.enr.gov.nt.ca



J Rausch

Red Knots The *rufa* subspecies population have declined by 70% over the last 15 years probably due to depletion of horseshoe crabs, an essential food source along their migration route in the Atlantic. The *islandica* subspecies has declined by 15%, probably due to the effects of shellfish harvesting on their wintering grounds in Europe.



Change in fish populations in

101 species

of fish live in our rivers
and lakes and in the NWT's
section of the Beaufort Sea
and Arctic Ocean.

About half of the fish species
in the NWT are marine – they
live exclusively in the ocean.

Bull Trout and Dolly
Varden are particularly
good fish species
to monitor.

Char species, such as Dolly Varden
and Bull Trout, can be used to monitor
changes in both the Arctic Ocean and
freshwater ecosystems. Dolly Varden
and Bull Trout are particularly good
fish species to monitor because they
have life history stages that occupy
different habitats during their lifetime,
for example sea-run fish link lakes, rivers,
estuaries and near shore habitats. Each
species' life stage is exposed to the same
environmental stressors, but may respond
differently to these stressors. Observations
on various responses increase our
understanding of cumulative effects.

This indicator tracks the status of river
chars (Dolly Varden and Bull Trout) using
changes in abundance and population
structure such as length and age.
Hybridization is also monitored as the
occurrence of hybrids might signal
significant environmental change.

The sea-run Dolly Varden in the Rat River
is the only population that has been
periodically studied for population size
over the past 10 years. In 1998, the
population numbered about 15,000.
Prior to 1999, there was evidence from
the fisheries data at Rat River of loss of
larger/older fish, suggesting population-
level effects. Recovery in later years
(e.g., 1999 and 2000) suggests that
these populations are less disturbed.

Preliminary work suggests that most
populations of Bull Trout in the NWT are
relatively small, widespread, and perhaps
fragmented.

Dolly Varden are present as sea-run
(anadromous) fish in the coastal waters of the
Beaufort Sea in the western Arctic primarily
west of the Mackenzie Delta during ice-off
periods (i.e., summer and early autumn).
Offshore distribution is poorly known, but
adults and juveniles mainly occur in nearshore
waters in marine areas. Dolly Varden use
habitat in freshwater streams for spawning,
overwintering, rearing, feeding and resting.
This species is primarily adapted to flowing
waters and associated with groundwater
springs. These groundwater sources are
essential for northern populations because
they maintain winter habitat and provide
high-quality spawning habitat. However, these
areas are rare in most streams. In the NWT
sea-run Dolly Varden occupy drainages of the
Big Fish, Rat and Vittrekwa rivers (near Fort
McPherson).



P. Vescei / DFO

The most southern location of the Dolly Varden is
the Gayna River near Norman Wells. This river also has
a population of Bull Trout. It is the only known site in the
NWT where both species occur.

N. Mochmar

in fish populations in ocean-freshwater systems

Status of Dolly Varden
and Bull Trout



Bull Trout from the interior of North America only use freshwater systems to carry out their life cycle. They are distributed in the western portion of the NWT, in the rivers draining from the Mackenzie Mountains south of the Sahtu Settlement Area. To date, the northernmost record of Bull Trout is in the Gayna River. This is the only location where Bull Trout and northern Dolly Varden are known to occur together. Bull Trout use similar habitats to those of Dolly Varden in high-gradient freshwater streams, however, populations are also found in larger slow-flowing rivers such as the Mackenzie River itself, and occasionally in lakes. Although sample sizes are low, data suggest that non-migratory (stream-resident), and migratory (adfluvial, and fluvial) populations occur in the NWT. Non-migratory fish are smaller once sexually mature and grow slower than migratory fish.

There is presently no evidence (genetic or morphological) for hybridization of Dolly Varden and Bull Trout in the NWT. The genetic integrity of the two species is intact.

Virtually all stressors that are known to affect fish populations generally have been documented outside the NWT as affecting chars, a group which appears to be particularly susceptible to both local (e.g., exploitation) and pervasive (e.g., climate change) stressors as well as individual and cumulative effects of stressors. Accordingly, appropriate care in addressing conservation,

For More Information

For more information on fish studies in the NWT contact Fisheries and Oceans Canada at info@dfo-mpo.gc.ca.

For the state of char in the Arctic (in Arctic Report Card 2009), go to www.arctic.noaa.gov/reportcard

Find more on the NWT State of the Environment report - Wildlife Focal Point at www.enr.gov.nt.ca

management and stressors of both chars and their ecosystems is required, particularly as wide-reaching changes may occur throughout the North in the future.

People can help track changes in fish populations in the NWT. The Department of Fisheries and Oceans Canada is looking for information on any new fish species in the NWT, especially on salmon entering the Mackenzie River drainage. The Department, in partnership with Aboriginal organizations in the NWT, is conducting studies on fish.



P Vescei/DFO

Rat River The most studied population of Dolly Varden in the NWT is in the Rat River.

N Mochnacz



Trend in Species
At Risk Index

Tracking the risk of

10 mammals, 13 birds, 2 fish, and 2 amphibians occurring in the NWT have been assessed as a species/subspecies at risk in Canada,

....and no NWT species of plants or insects have been assessed as a species at risk in Canada.

The effects of the loss of just one species can have an irreversible impact on whole northern ecosystems.

The Species at Risk Index (SARI) tracks the probability of losing entire species during the next 100 years from our northern ecosystems. When the probability of extinction for entire species increases, the SARI increases. When the probability of extinction for species decreases, the SARI decreases.

The loss of entire species is a global concern. As in all northern regions, the NWT is home to fewer species than more temperate and tropical regions, but each species is well adapted to the harsh and variable northern environment. Short food webs and life at the limit of survival make northern ecosystems fragile. The effects of the loss of just one species can have irreversible impacts on whole northern ecosystems. The SARI provides an overall look at how species in the NWT are doing.

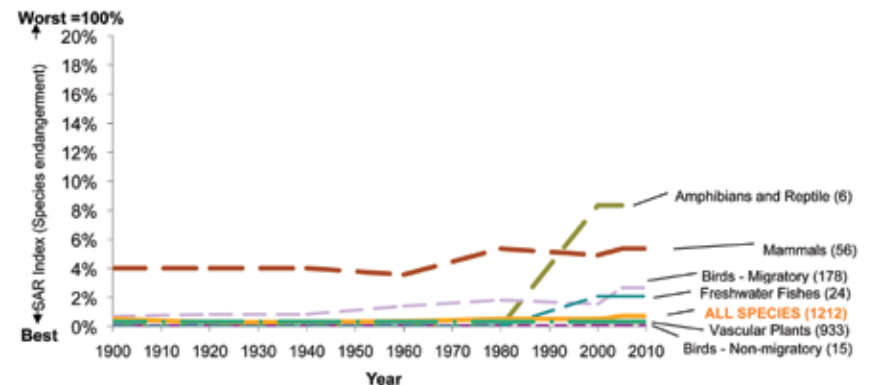
Peregrine Falcon, a recovering species. Bio-accumulation of insecticide had reduced their capacity to produce viable eggs.



S Mathews

As of 2010, the NWT's SARI tells us that less than 1% of our species are at risk of extinction in the next 100 years. So the vast majority of species in the NWT are not at risk of extinction. Many NWT species that are 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.

Species at Risk Index - Northwest Territories



SAR Index SARI is calculated by ENR, based on status assessments following the Committee on the Status of Endangered Wildlife in Canada. Assessments prior to 1970 are based on literature and local knowledge of past species numbers and trends. The SARI for amphibians and reptiles is higher than for other groups because a high proportion (one third) of the species present in the NWT are at some risk of extinction. The total number of species tracked for each group is noted in parentheses.



D. Bleitz

Eskimo Curlew A NWT species probably extinct

of the risk of losing species

Trend in Species
At Risk Index



The United Nations 2010 target calls for a reduction in the rate of biodiversity loss. Only one species in the NWT may have been lost forever. The Eskimo Curlew was hunted for food on its wintering grounds in the southern United States, and very few have been observed for the past 50 years. A century ago this species of shorebird nested in very large numbers on the tundra in the NWT but now it may be extinct – lost from the entire planet.

The risk of extinction of NWT species is slowly worsening. Recent assessments of frogs and toads, of arctic-nesting shorebirds, and of birds that are aerial insect feeders have shown that the numbers are rapidly declining. The reasons for these declines are not fully known, and include diseases in amphibian populations and loss of wintering habitats for our migratory birds. Lessons from the past, however, show that when threats are stopped or reduced, northern species can increase in numbers.

There are new challenges facing species in the NWT, including increasing threats due to climate change.



Kris Kendall

Northern Leopard Frog a species of special concern. Most populations in western Canada have been reduced due to diseases and habitat change. NWT populations are small and isolated.

To help ensure that no species become at risk of extinction due to human activities in the NWT, the *Species At Risk (NWT) Act* came into effect in 2010.

For More Information

Probability of extinction for a species is measured by a score of species endangerment. The highest score (4) goes to 'Endangered' species, species that are at risk of disappearing in the next 100 years.

The lowest score 0 goes to species that are not at risk of disappearing in the next 100 years.

For more information on species at risk in Canada: www.cosewic.gc.ca.

For more information on species at risk in the NWT www.enr.gov.nt.ca/.



J Nagy

Peary caribou, a sub-species of caribou endangered by a changing climate. Icing events in warmer winters prevent them from reaching their food.

Find more on the NWT State of the Environment report - Species at risk Focal Point at www.enr.gov.nt.ca

Wolverine tracks This species is of special concern in western Canada. It is vulnerable to disturbance.

R Mulders



Status of endemic and
globally rare species

Maintaining rare biodiversity

The unglaciated parts of the Mackenzie Mountains are one of the most biodiversity-rich parts of the NWT.

Our list of existing insects and plants in the NWT is incomplete.

NWT ecosystems are home to types of plants and animals that exist nowhere else in the world; these species are called "endemics". Other species found in the NWT also exist elsewhere, but are globally rare – these species are only known to exist in a few sites in the entire world.

Endemic and globally rare species are important genetic resources to protect. They could be important for future use in medicine, agriculture or to human well-being in general. Endemic species exist only in the NWT, so their conservation for future generations is entirely up to us.

Much of the NWT was covered by ice during the last Ice Age, which ended about 8,000 years ago. As a result, for the most part, NWT's ecosystems are quite young on an evolutionary time scale and very few rare species are found here. However, large tracts of land in the northern and western part of the NWT remained free of ice during the last 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 Ice Age. Some of these species are rare today, and form

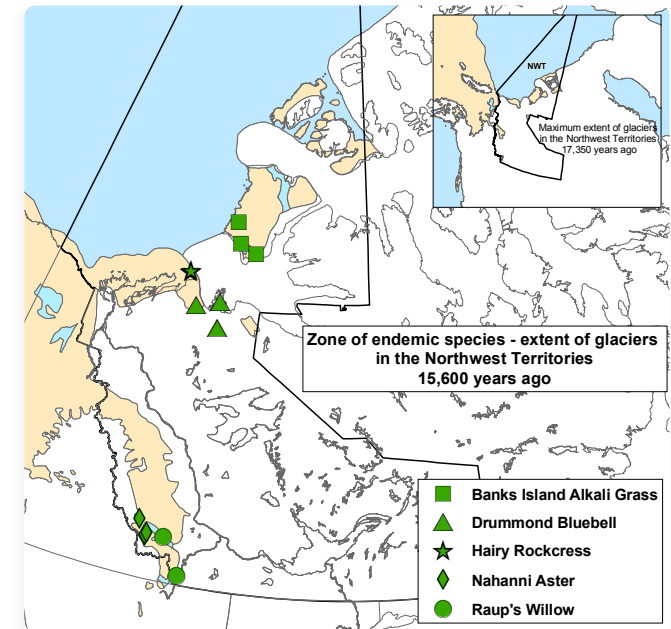
a special component of our genetic resources. Beringia is one of the regions with the highest number of endemic species in Canada. The NWT's five rarest plant species are found in Beringia.

One species of bird, the Whooping Crane (*Grus americana*), is rare and endemic to North America. The NWT is home to about 90% of its wild breeding population. Most of its nesting grounds in

the NWT are in Wood Buffalo National Park. The NWT is also home to 40-60% of the two sub-species of mammals that are rare in the world, the Peary caribou (*Rangifer tarandus pearyi*) and the Wood Bison (*Bison bison athabasca*).

Conservation measures are in place to preserve for future generations all globally rare and endemic birds and mammals in the NWT, but we still have

The map shows the location of ice sheets for a few hundred years (about 15,000 years ago) after the ice started to retreat and the location of some rare plants in the NWT.
GNWT 2010 ©



Mountain Sorel sampling Beringia is part of the areas with the highest number of rare species in the NWT.

Conserving rare biodiversity - a rare responsibility

Status of endemic and globally rare species



some work to do to protect our rare plants. For example, the new *Species At Risk (NWT) Act* will serve as a tool to assess in detail the conservation needs of the NWT's species and put appropriate conservation measures in place. Also, the NWT Protected Areas Strategy, through its "Special Features" analysis, provides an excellent tool to ensure that our globally rare and endemic plants are identified for conservation.



Whooping crane a globally rare species - Nesting populations in the NWT are only in Wood Buffalo National Park and just north of it, in the Taiga Plains.



Drummond Bluebell A globally rare species - Only found at three sites in the northern NWT near the Beaufort Sea and 7 sites in Nunavut and Alaska.

Hairy Rockcress The only known location in the world where this species exist is in the NWT - Cape Bathurst in the Southern Arctic. This species is in an area protected under the Paulatuk Community Conservation Plan.



For More Information

Go to ENR's Species at Risk webpage for information on conservation efforts of rare and endemic species at www.enr.gov.nt.ca/.

Go to the NWT Protected Area Strategy webpage for more information on Special Features and the extent to which they are captured in established and proposed areas for conservation at www.nwtpas.ca/.

NatureServe Canada provides information on rare species in Canada at www.natureserve-canada.ca/.

Species endemic to the NWT exist only in the NWT, so their conservation for future generations is entirely up to us.

Find more on the NWT State of the Environment report - Genetic Resources Focal Point at www.enr.gov.nt.ca.



Nahanni Aster An endemic plant found only in the Nahanni National Park Reserve



Trends in extent
of ecosystems

Ecosystems - Divers

About **20%** of the NWT is covered by lakes, rivers and wetlands.

About **1/3** of the NWT is covered by forests.

Only **1%** of the NWT is permanently covered by snow and ice.

Land cover information is essential for sustainable management, planning and monitoring environmental change.

Concern over the state of the earth's ecosystems has resulted in an increased need for accurate land cover information. Land cover information is essential for sustainable management, planning and monitoring environmental change. Vegetation information is important to establish baseline information that may be used to examine ecosystem integrity and changes to vegetation patterns at the landscape level. Monitoring changes in land cover is required to meet commitments made to international agreements on climate change and biodiversity. This information is useful for a variety of reporting purposes, particularly on a Canadian basis. It is also important to monitor, and to track cumulative impacts.

Some jurisdictions in Canada have complete high resolution satellite land

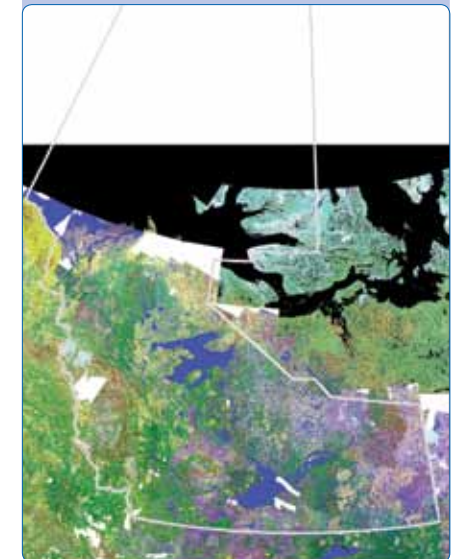
Forests In the NWT, resource-based economies are growing, including oil and gas exploration and extraction, and mining. Most exploration and development activities will be in the forested ecozones, particularly in the Taiga Plains along the Mackenzie River and near NWT communities.



D Downing / GNWT

Sustainable Development of Forests (EOSD) classified Landsat coverage of Canada for the forested areas of NWT. Land cover information for the northern regions of NWT is incomplete and is from the Northern Canada Land Cover Classification Product.

This information shows how land cover and vegetation communities are distributed across the NWT landscape. Currently, high resolution information necessary to detect trends in the extent of land cover is not available for all areas of the NWT.

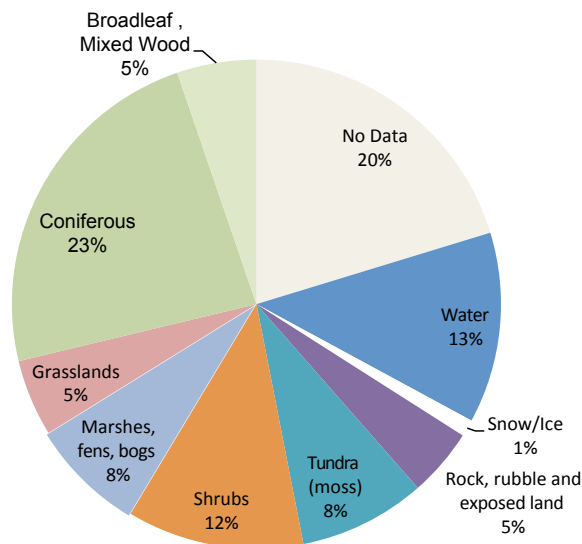


cover information, and obtain new detailed air-photo based vegetation inventories every 10 years. The NWT agencies have high resolution satellite information for about ¾ of its surface; a large portion of the Northern Arctic ecozone was not surveyed at this resolution. In addition, the NWT agencies have air photos only for localized areas, and it is not updated on a regular basis. The land cover shown here is from the Earth Observation for

Tundra Peat Polygon In addition to using satellite imagery, the NWT Ecosystem Classification Group is taking thousands of angled air photos and verifying land cover on the ground.

ity covers this Land

Trends in extent
of ecosystems



Source: EOSD and Northern Canada Land Cover Classification Product.

Land cover types are diverse. The water land cover includes lakes and rivers, but not the ocean.

For More Information

The dataset used to track land cover in the NWT, for the southern NWT Ecozones, is from EOSD, a joint program of the Canadian Forest Service and the Canadian Space Agency. It was developed as part of a forest monitoring system for Canada. EOSD is designed to provide, over the long term, using space-based earth observation data, products for forest inventory, forest carbon accounting, monitoring of sustainable development, and landscape management. Inputs from EOSD are an important data source in the National Forest Carbon Accounting Framework and Canada's new plot-based National Forest Inventory. The dataset used to track land cover on the Northern Arctic and Southern Arctic ecozones are from the Northern Canada land cover product produced by Canada Centre for Remote Sensing. Both datasets are based on Landsat satellite imagery.

Find more on the NWT State of the Environment report - Landscape Changes at www.enr.gov.nt.ca

Find more on the NWT Ecosystem Classification report at www.enr.gov.nt.ca.

Since 2005, the NWT Ecosystem Classification Group has been classifying the NWT into ecologically meaningful units, called ecoregions, based on climate, physiography, and vegetation forms. The work is producing baseline information on NWT ecosystems and is being used by the State of the Environment Report to track the status and trends of many environmental indicators, including biodiversity.

Treeline Many species of trees and shrubs are at their northern range limit in the NWT. The effects of climate change on the treeline in the NWT are not yet well understood but it is recognized that changing temperature and precipitation patterns could affect the natural ranges of many tree and shrub species.

CO' Brian



Trends in Arctic sea ice

Update on a Frozen

The minimum extent of sea ice in the Arctic occurs every September. The September ice extent decreased by **11.2** percent per decade since 1979.

Some areas in the Beaufort Sea and between the western Arctic islands do not yet display detectable declines in sea ice because ice is pushed up in this region by currents such as the Beaufort Gyre.

Sea ice trend studies for the Canadian Arctic indicate that while some areas show significant negative trends, other areas do not yet display detectable trends or are increasing.

Changes in global climate are predicted to be greater and more rapid in the Arctic than elsewhere. Observations of September minimum sea ice cover provide an indication of climate changes in the Beaufort Sea. Sea ice is an important habitat component for Arctic wildlife and an important factor affecting local and global climate. Changes in the formation of Arctic ice are affecting the NWT environment in a complex way.

Large reductions in the extent of thick multi-year sea ice have occurred in recent summers. To date, the sharpest decline in summertime sea ice (minimum) cover occurred in 2007. The minimum

extents for multiyear sea ice have occurred in 2008 and 2009. Winter sea ice continues to form every year.

Reductions in minimum sea ice cover in September are not occurring at the same rate everywhere. The most rapid declines are occurring in the Arctic basin, north of Alaska, in the Barents Sea, in the southern Beaufort Sea and north of Scandinavia. Sea ice trend studies for the Canadian Arctic, however, indicate that while some areas show significant negative trends, many areas do not yet display detectable trends. This is primarily due to ice being piled up in this area by the normal clockwise motion of the entire Arctic ice pack called the Beaufort Gyre and transpolar drift. The reduction in sea ice extent is accompanied by decreased thickness, which in turn makes the ice more mobile.

Arctic Cod The effects of changes in sea ice on marine ecosystems and biodiversity in the Beaufort Sea are being studied. There are many knowledge gaps. For example, what will be the effect of reduced sea ice on key fish species (e.g. Arctic Cod), an important part of the marine food web in the Beaufort Sea?

Beaufort Gyre and other currents in the Arctic Ocean.

Image © <http://www.aquatic.uoguelph.ca/oceans/ArcticOceanWeb/Currents/frontpagecur.htm>



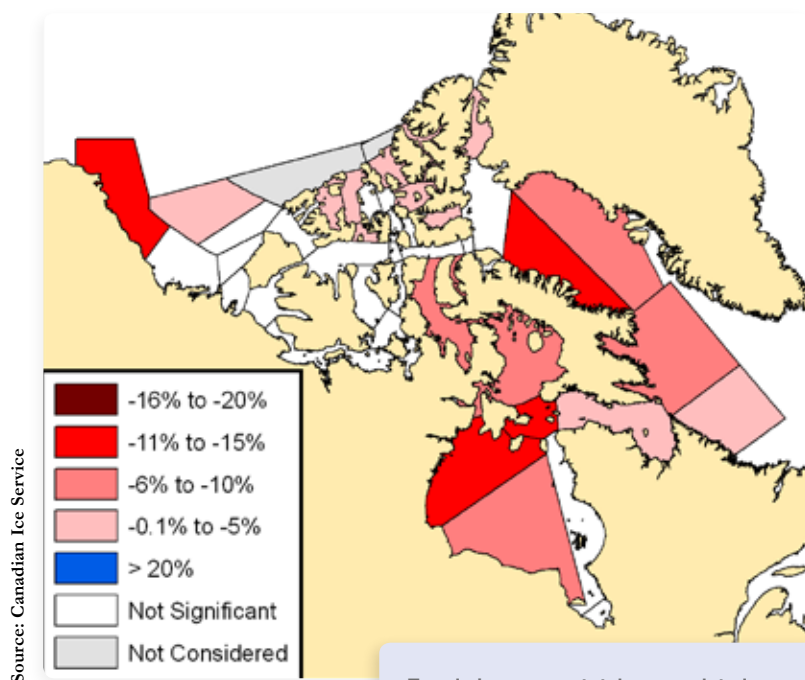
Gradiner/Bluhm UAF/NOAA/COML

Cases

Sea Ice Reductions in ice cover and ice thickness are resulting in increased vulnerability of Beaufort coastal communities to storm surges and coastal erosion.

on a frozen Ecosystem

Trends in Arctic sea ice



Trends in summer total accumulated coverage for all ice types combined, 1966-2008. Trends are expressed as a percent change per decade. In much of the Arctic Islands, there is no change. However in the Beaufort Sea there is less ice.

For More Information

More information on studies conducted in the Beaufort Sea can be found at www.ipy-cfi.ca.

More information on sea ice can be found on the Canadian Ice Service web page at www.ice-glaces.ec.gc.ca/ and the US National Snow and Ice Data Center at nsidc.org.

More on Inuit links to sea ice at www.naho.ca/inuit/english/documents/unikkaaqatigiit012_000.pdf.

Find more on the NWT State of the Environment report - Big Picture – A Changing Planet at www.enr.gov.nt.ca



University of Manitoba

Food Chain near Polynya A polynya is an area surrounded by ice that has open water or very thin ice almost year-round. All polynyas are rich in marine biodiversity. The most important area in the Beaufort Sea for biodiversity is the Cape Bathurst polynya between Cape Bathurst on the mainland and Banks Island. In recent years, very warm winters and changing sea ice distribution resulted in the formation of the polynya two months earlier than normal, and a delay in the re-freezing of the area until late in fall.

Thin Ice Local knowledge studies indicate that changes in sea ice are resulting in increasing dangers during off-shore travels to access biological resources such as seals, and other wildlife, especially in fall and spring.



Cases



Cases

Polar Bears So far, a decrease in sea ice has been linked to possible declines in the South Beaufort population of polar bears and to increased sightings of killer whales in the same region.



Trends in integrity of
important aquatic habitats

Water linking biodiversity

NWT is home to many deltas important for biodiversity.

Great Bear Lake is the largest lake entirely within Canada.

The lake's surface area is **31,000** km².

Great Slave Lake is the deepest lake in North America at more than **600** metres.

Deltas and wetlands provide important habitat for many species found in the NWT.

We all depend on clean water. Biodiversity enables aquatic ecosystems to provide services such as clean water. Aquatic ecosystem monitoring is a tool to ensure the health of an aquatic ecosystem including its biodiversity. To ensure ecological integrity and human health, ecosystem monitoring is important. Aquatic ecosystem monitoring includes selected indicators of water quality and water quantity as well as biological indicators such as invertebrates, fish, mammals, and aquatic plants.

Deltas are important aquatic habitats in the Mackenzie River Basin and they highlight the strong link between water quality, water quantity and biodiversity. Fish and aquatic mammals breed, rear young, and overwinter in our deltas.

Deltas and nearby area are important places for local people to harvest

furbearers such as beaver, muskrat and marten. Deltas require flooding to sustain high biodiversity. Nutrient rich sediment accompanying a flood ensures high plant productivity and continued development of the outer delta landforms. The landforms are essential for providing feeding, staging and breeding habitat for thousands of waterfowl. Wetlands provide a significant range of ecosystem services such as groundwater recharge and discharge;

water retention and recovery; and the removal and detoxification of excess nutrients and pollutants. Wetlands also protect upland areas from storms and flooding.

NWT partners are developing a NWT Water Stewardship Strategy to guide efforts to keep NWT waters clean, abundant and productive guarding ecosystems against impacts that accumulate over time from multiple sources, including climate change. Multiple partners need to collaborate to improve knowledge and understanding of northern aquatic ecosystems and to improve the use of biological indicators in monitoring the integrity of important aquatic habitat, such as deltas. At present, primarily water quality and quantity are measured.

Water quality is determined by the amount of nutrients, minerals, micro-organisms, chemicals, metals and other substances in water and sediments. These substances may be from natural sources or pollutants from human activities. During high water periods such as spring freshet and summer rainstorms,



2

D. Mulders

The Ramparts River and wetlands (Ts'ude niline Tu'eyeta)

The Ramparts River meanders through significant wetlands and traditional places before it enters the Mackenzie River. The Ramparts is presently a candidate protected area under the NWT Protected Areas Strategy. This diverse area provides vital habitat for many mammals and birds including moose, waterfowl and aquatic furbearers. The wetlands are an important hunting, trapping and fishing area for people from Fort Good Hope.

Parks Canada/John David McKinnon

1

Whooping Crane Wetlands, Wood Buffalo National Park, Ramsar Site The whooping crane summer range is in Wood Buffalo National Park. This wetland area is designated through the Ramsar Convention on Wetlands signed by Canada in 1971.

Linking biodiversity

Trends in integrity of important aquatic habitats



sediment loads are normally higher and so rivers may become cloudy. High metal concentrations such as copper and iron from the surrounding environment can be associated with these sediment loads.

Water quantity fluctuates naturally with seasons. Over the course of the year, levels of water need to be high enough to maintain river flows and oxygen levels sufficient to support biodiversity. Changes to water levels and river flows can be caused by dams built by animals, such as beavers, or humans. Climate change can influence water quantity. For example, permafrost melting in the Mackenzie Delta

is causing ponds to drain, which can have negative effects on aquatic biodiversity.

Biological indicators of aquatic ecosystem integrity include algal biomass, diversity of invertebrates, and bioaccumulation of contaminants in fish. These indicators provide information about the health of the aquatic ecosystem. By regularly monitoring such indicators, changes in the ecosystem can be identified.

For example, changes in environmental quality may be reflected by changes in abundance of sensitive species of benthic (water bottom) invertebrates.

For More Information

For indicators on water quality and water quantity, consult the Mackenzie River Basin Board's **summary** State of the aquatic Ecosystem Report 2003 at www.mrb.ca/. For the full version of the report go to www.swa.ca/Publications/AquaticEcosystem.asp.

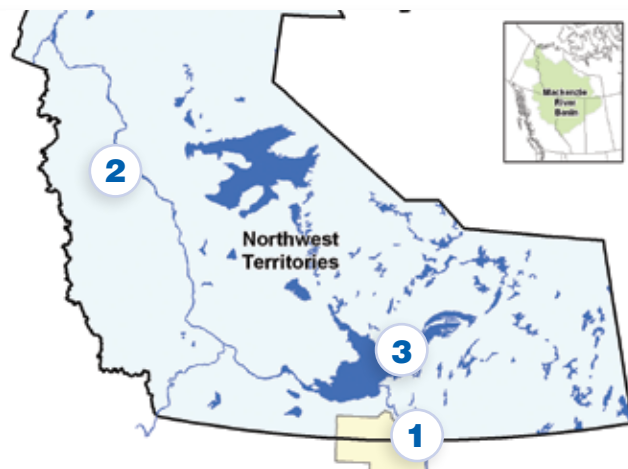
For Canadian Water Quality Guidelines go to www.ec.gc.ca/ceeeg-rcqe/English/ceeg/water/default.cfm.

For Environment Canada and INAC Hydrometric network, go to www.wsc.ec.gc.ca/.

For information on the Ramparts River and Wetlands, and the Protected Areas Strategy go to www.nwtpas.ca.

For information on Drinking water quality, go to www.maca.gov.nt.ca/operations/water/homepage.asp.

Find more on the NWT State of the Environment report at www.enr.gov.nt.ca



The Slave River Delta

Many species of birds nest or stop over the Slave River Delta during migration; four major continental migratory bird flyways cross this area.



Creating a protected

The percentage of protected areas in the NWT is increasing.

Since 2003, the amount of land in the NWT in established protected areas and Conservation Zones in land use plans has increased from **6.7%** to **9.5%** in 2010, totalling 128,000 km² of the NWT land base (including fresh water).

Protected areas and land use plans are important tools for conserving biodiversity.

This indicator tracks the amount of land set aside for conservation through protected areas and land use plans. Protected areas and land use plans are important tools for conserving biodiversity, ecological processes, and special natural and cultural values. Reporting on protected areas and land use plans reflects actions that society has taken to maintain a healthy and productive environment. Tracking stewardship and progress is part of the Convention on Biological Diversity, an international agreement signed by Canada in 1992.

Since 1999, the NWT has had a Protected Areas Strategy (PAS). It is a partnership among communities, federal, territorial and Aboriginal governments, environmental non-governmental organizations, and industry. The partners

work together to establish a network of protected areas across the NWT. The PAS does not set a target for the percentage of land that should be protected, but rather has the goals to protect: (1) special natural and cultural areas; and (2) core representative areas within each ecoregion where resource-based development is not permitted.

Amount of land protected in the NWT: 9.5% (as of 2010) This is 128,000 km².

	% of the NWT portion
Northern Arctic	14.9
Southern Arctic	20.4
Taiga Shield	3.0
Taiga Plains	4.0
Cordillera	20.5

Additional areas in the NWT are currently being considered for protection. Two National Park Reserves are under interim protection. In the PAS process, four candidate National Wildlife Areas are under interim protection and other areas are at various stages of the process established through the PAS. The boundaries of all

proposed areas are subject to change and not all may become areas protected by legislation or conservation zones under land use plans. New areas may also be identified, but the focus at this phase of the PAS is to assess and establish already identified areas.



Parks Canada/John David McKinnon

Wood Buffalo National Park The largest National Park in Canada and one of the largest parks in the world at 44,807km². Established in 1922, the Park has also received international designations including becoming a UNESCO World Heritage Site in 1983 and contains wetlands that have been designated a Ramsar site. The Park contains about 86% of the summer nesting habitat for the Whooping Crane, an endangered species.

Edézhzhíe The Edézhzhíe working group released their Recommendation Report in November 2009, including a proposed final boundary that was 57% of the original size of the Candidate Area.

Protected areas network

Trends in protection of important ecological areas



For More Information

Special places and common lands – all need protection. The PAS incorporates the best conservation science methods and traditional knowledge to ensure a network of culturally and ecologically representative areas is protected.

For more information on the NWT PAS please visit www.nwtpas.ca.



Moose in the Thelon The Thelon Game Sanctuary was created by Order in Council in 1927 and is the largest wildlife refuge in Canada, covering 52,000km². The Sanctuary protects a variety of animals, including moose, muskoxen, wolves and grizzly bears.

Established protected areas and approved Land Use Plan Conservation Zones larger than 10km² in the NWT are mapped here. These include the Thelon Wildlife Sanctuary, National Parks, National Park Reserves, Protected National Historic Site, the 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.

Find more on this indicator in the NWT State of the Environment Report – Protected Areas and Land Use Planning Focal Point at www.enr.gov.nt.ca



Saoyú -?ehdacho In 2009, two large areas were added to the network: the establishment of Saoyú -?ehdacho in the Sahtu as a Protected National Historic Site (5,550 km²) and the expansion of the Nahanni National Park Reserve (from 4,766 km² to approximately 30,000 km²).



Traditional knowledge,
innovations and practices

A Tradition of Know

About $\frac{1}{2}$ of the NWT's population is Aboriginal.

Nine Aboriginal languages are spoken in the NWT. Use of Aboriginal languages is slowly declining in the NWT. Loss of these languages, or loss of fluency from one generation to the next, can result in loss of traditional ecological knowledge.

Traditional Knowledge (TK) is a valid and essential source of information about the natural environment and its resources, the use of natural resources, and the relationship of people to the land and to each other.

Many studies use specialized techniques to gather information from a TK perspective. Inventories of works and stories help in sharing local knowledge by transferring oral concepts to the printed form or the interactive Internet form. Interview techniques are one of the most efficient and accepted ways to study TK and local knowledge on very specific issues, questions or subjects. Primary responsibility for the preservation and promotion of TK lies with Aboriginal communities.

Organizations in the NWT, including the GNWT, recognize that programs and services should be designed and delivered in a manner consistent with the

beliefs, customs, knowledges, values and languages of the people being served. GNWT departments and agencies will document, acknowledge, and report on TK initiatives on a regular basis.

Camping The Aboriginal peoples of the NWT have acquired a vast store of TK through their experience of centuries of living in close harmony with the land.



D. Allaire

TK is knowledge and values, which have been acquired through experience, observation, from the land or from spiritual teachings, and handed down from one generation to another.

Examples of how organizations in the NWT are integrating TK in programs and services:

- The Gwich'in Renewable Resources Board is recording and mapping Gwich'in Elders' knowledge through their Gwich'in Environmental Knowledge Project.
- Traditional knowledge is part of the monitoring of cumulative impacts through the NWT Cumulative Impact Monitoring Program.
- The new Science Agenda for the Government of the Northwest Territories makes particular recommendations to enhance TK research as part of the research needs in the North.
- The Sahtu Renewable Resources Board is studying TK and caribou
- Tłı̨chǫ people are gathering TK to develop an ecological classification system for their land
- Inuvialuit communities are gathering TK on the effects of climate change on their use of the land and sea ice and on wildlife.



J. Nagy

Grey Jay Helping to clean up after a hunt.

Knowledge Innovations

Traditional knowledge,
innovations and practices



The GNWT incorporated TK into a number of projects, including environmental monitoring, and the management of our wildlife and forest resources. However, there is opportunity for further implementation. The GNWT TK Policy Implementation Framework identifies the following key priorities:

- Better overall coordination of TK Policy implementation;
- More consistent orientation, awareness, and training opportunities relating to TK;
- Development of stronger and more effective collaborative relationships with the holders of TK, through their Aboriginal governments, cultural institutes, and resource management agencies;
- Greater acknowledgement and promotion of successful TK initiatives;
- Ongoing departmental support and guidance to staff with respect to TK implementation issues;
- Clear commitment of the resources required to implement the TK Policy; and
- Measures to monitor and report on TK implementation initiatives.



R Gau

Seal Skin Interviews with hunters and trappers have provided valuable information on changes in wildlife and their habitat, and how these changes are reflected in people's social life and activities on the land.

For More Information

For more information the GNWT TK Implementation Plan and the GNWT TK Policy, go to www.enr.gov.nt.ca, follow Our Environment, then Traditional Knowledge links.

More information on NWT Cumulative Impact Monitoring Program can be found at www.cimnwt.ca.

Canoe TK is best preserved through continued use of the land and waterways and by practical application. Traditional practices promote respect for the land and wildlife.



D Allaire

Find more on Traditional Knowledge in the NWT State of the Environment Report – Demography and Environment Awareness focal points at www.enr.gov.nt.ca.



Rescan

Rat Root Knowledge of traditional medicine may be declining



Status of sustainable sources for ecosystem goods and services

Co-management for

60% of the NWT has formal renewable resource co-management systems stemming from land claim settlement agreements.

Hunting, fishing and trapping are important activities for many northerners. For Dene, Métis and Inuvialuit, these activities are essential to cultural identity, forming a link to the artistic, spiritual, and social fabric of daily life. In northern Canada, sustainable use of wildlife is seen as a personal responsibility, as a form of respect owed to the entire community and to future generations.

Sustainable use of biodiversity is an important part of all land claim agreements in the NWT. These agreements are enshrined in federal legislation and establish a formal co-management system.

Renewable resources boards are the main instruments for wildlife management in each settlement area and provide recommendations for managing fish, wildlife and plants. These boards have equal members from Aboriginal groups and government.

Principles of sustainable harvesting are detailed in each agreement. These principles include:

- Affirm rights to harvest;
- Conservation and protection of wildlife and wildlife habitat;
- Respect for traditional customs and practices;
- Involvement of settlement beneficiaries in all wildlife management activities;
- Integration of planning and management for all land and water use;
- Fair dealing between beneficiaries and non-beneficiaries.

Trapping The number of trappers in the NWT is stable after a decline in the past 20 years. Trapping records are variable as many northern populations of furbearers, such as muskrat, fox, lynx, ermine, squirrel, fisher, and otter show natural cycles in numbers. There is an increase in harvests of marten.



Beluga Marine mammals harvest is declining, and includes beluga whales for subsistence in the Mackenzie Estuary. The decline is not due to reduction in stock size. Populations are stable.

Fishing Most NWT people fish for subsistence. The number of fishing licence sold in the NWT is declining. Commercial fishing on Great Slave Lake has declined. There is no commercial take of marine fishes in the Beaufort Sea.



Although Ringed Seal remain numerous, harvests are now about 10% of the harvest levels of 1960's and 1970's. Present day harvest is for subsistence and handicrafts. There is strong evidence that seal body condition and reproduction are declining along with the ecosystem given changes in sea ice and seal prey.

DFO

G. Erasmus / GNWT

Bruce Ashley

Management for Sustainable Use

Status of sustainable sources for ecosystem goods and services



In the NWT, adaptive management of harvested species is based on the best available information, including traditional and local ecological knowledge. This informs on the best actions needed to ensure sustainable use of all harvested species in the NWT.

Co-operative planning actions are increasing. Management plans are being completed or updated for each cross-boundary herd of barren-ground caribou through multi-jurisdictional processes. Management strategies have been developed for barren-ground caribou and bison, and formal management planning is being implemented for boreal caribou, grizzly bear and polar bear. Fisheries management plans exist for dolly varden and arctic char. A watershed management plan for Great Bear Lake is complete, and one is being developed for Great Slave Lake. *The North American Waterfowl Management Plan* lays out the actions to use waterfowl in a sustainable fashion across North America, including the NWT.



Caribou Caribou and many other northern species have large natural cycles in numbers. There are declines in all herds of barren-ground caribou in last decade. Barren-ground caribou hunting was reduced in recent years to allow recovery of herds. Some herds are now stable due to management actions, but are still low in numbers.



For More Information

The formal co-management system in the NWT fully addresses all the principles and guidelines set out under the United Nations Convention on Biological Diversity for the sustainable use of biodiversity. Learn more on the Addis Ababa Principles and Guidelines at www.cbd.int/sustainable/addis.shtml

For more information on programs related to sustainable use of biodiversity in the Northwest Territories go to the report Biodiversity Action Plan: Major Initiatives on Biodiversity at www.enr.gov.nt.ca.

- Inuvialuit Settlement Region
- Gwich'in Settlement Area
- Sahtu Settlement Area
- Tlicho Wek'èezhi Management Area

Find more in the
NWT State of the
Environment Report
– Use of Renewable
Resources focal point
at www.enr.gov.nt.ca.



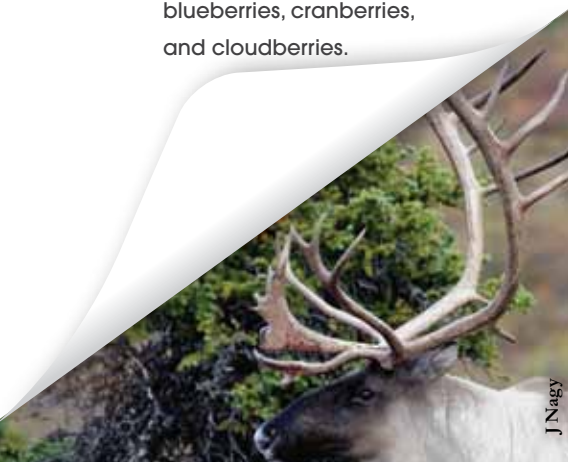
Preparing Seal Skin Harvesters keep track of the resource. The co-management system has been in place in some areas of the NWT since the 1980s.



Trends in country food use

About **40-60%** of NWT people living in small communities in every ecozone rely on country food for at least 75% of their meat and fish

NWT's most common country foods are caribou, moose, ducks, geese, seals, hare, Grouse, Ptarmigan, lake trout, char (dolly varden), inconnu (conny), white fish, pike, burbot (lake cod), blueberries, cranberries, and cloudberries.



J Nagy

Woodland Caribou in the Mackenzie Mountains
Caribou are one of the most used country foods for many people in the NWT.

Resources from the land are closely linked to Aboriginal social, cultural and spiritual values.

Northern communities and people, are key components of their environments. The northern environment has shaped the society and economy of northern cultures and furthermore, northern communities have affected the health of their environments. Due to this relationship, a northern community's health and well-being are directly dependent upon the quality of the environment in which its people are living.

Resources from the land are closely linked to Aboriginal social, cultural and spiritual values. Hunting, fishing and trapping are important activities for many northerners and provide a significant portion of a household's food and income. For Dene, Métis and Inuvialuit, these activities are regarded as an essential part of cultural identity, forming a link to the artistic, spiritual and social fabric of daily life.

Dene law

- Share all the big game you kill;
- Share fish if you catch more than you need for yourself and there are others who don't have any;

Source: Dehcho First Nations

The most direct link between people and their environment is through food. The NWT is rich in mammal, bird and fish populations, as well as plants that have been used for medicine for generations. These populations continue to sustain Aboriginal peoples in the NWT.

Loss of access and reduction in abundance in country food are two of the most direct ways people would

Walking Down to Camp Residents in small-medium communities rely more on country food than residents in the largest community, Yellowknife.



K Hickling

Country Food to Healthy People

Trends in country food use



note a change in the state of their biodiversity. People who harvest NWT resources actively monitor the health of wildlife populations to ensure sustainable use. Changes in the use of country food can impact both the state of the environment and stewardship actions.

Changing climate is predicted to have a significant impact on the ability of NWT people to access country food, to be able to store, dry, freeze and hence conserve, this food, and to be able to predict animal behaviour and weather patterns to successfully harvest this food.

The sustainable use of these important resources is essential to future generations. The GNWT, with the collaboration of Aboriginal governments and authorities responsible for wildlife management in the NWT, is currently drafting a new *Wildlife Act* that will provide for modern ways to manage these resources in an innovative fashion based on co-management principles.



Drying Meat NWT residents show a high reliance on country food as a daily source of energy and essential nutrients.



Cranberries About 25% of people from small-medium sized communities in the forested ecozones of the NWT gather berries. About 10% of these people also gather other plants. About 15-25% of people from communities in the tundra ecozones gather berries. The percentage of people from Yellowknife involved in these activities was slightly lower; still, 13% of people in Yellowknife gathered berries in the surveyed year (2002).

For More Information

For more information on NWT's Social Indicators, go to NWT Bureau of Statistics at www.gov.nt.ca.

For more information on the co-management system, go to the NWT Biodiversity Action Plan – Major Initiative on biodiversity at www.enr.gov.nt.ca.

Find more in the NWT State of the Environment Report – Use of Renewable Resources at www.enr.gov.nt.ca



Arctic Grayling Considering the relatively low quality and high cost of market food available in most small communities in the North, country food and the land sustaining this resource are essential to the health of NWT's people.



Status of fragmentation
due to human activities
in forested areas

Almost pristine – tracking frag

Wildland fires and seismic lines are the two main causes of landscape changes in the Northwest Territories

Features on the landscape will affect movement of wildlife, with some animals using the linear features as transportation corridors, and other animals avoiding the openings.

Habitats in the NWT are naturally fragmented. For example, forests are part of a natural mosaic of wetlands, peatlands, and areas burned by wildland fires that is always changing. Biodiversity in the NWT has adapted to this level of natural fragmentation. The fragmentation densities calculated in this indicator result from human activities and should be considered in addition to the natural fragmentation of the landscape.

Land use activities impact the natural environment in many ways. Some activities remove vegetation and add to the fragmentation of the natural landscape for many generations. Large herbivores, such as caribou, are known to avoid



D Downing/GNWT

b

Sector b A group of ecoregions in the Sahtu show 20-40% fragmentation due to seismic lines and wells: Coville Hills, and Arctic Red Plains and North Mackenzie Plains ecoregions.

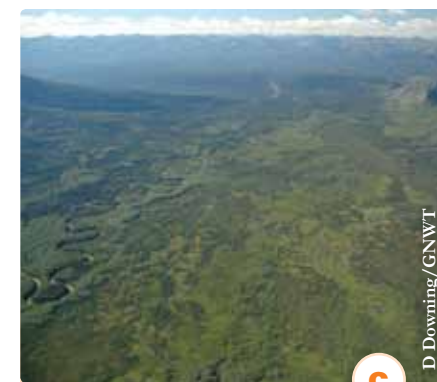
these areas. As more development of infrastructure and of renewable and non-renewable resources occurs in the NWT, management agencies are monitoring cumulative impacts of fragmentation on the NWT's biodiversity.

This indicator calculates the fragmentation density in each of the NWT's forested ecoregions. These ecoregions are subdivisions of the NWT's larger ecozones. Ecoregions have distinctive ecological factors, including climate, physiography, vegetation, soil, water and fauna. Each ecoregion can be

considered unique and if fragmented, it cannot be replaced elsewhere.

There is more fragmentation due to human activities in some forested areas in the NWT: the southern NWT, near the Mackenzie River in the Sahtu, and in the Mackenzie Delta. Most high fragmentation densities are due to seismic lines.

Many agencies including government, First Nations and industry are working together to develop coordinated mechanisms for tracking and reporting on landscape changes that can affect biodiversity.



D Downing/GNWT

c

Sector c In the Liard Upland and Liard Plains, features such as seismic lines, wells sites, and roads result in 30-60% fragmentation.



D Downing/GNWT

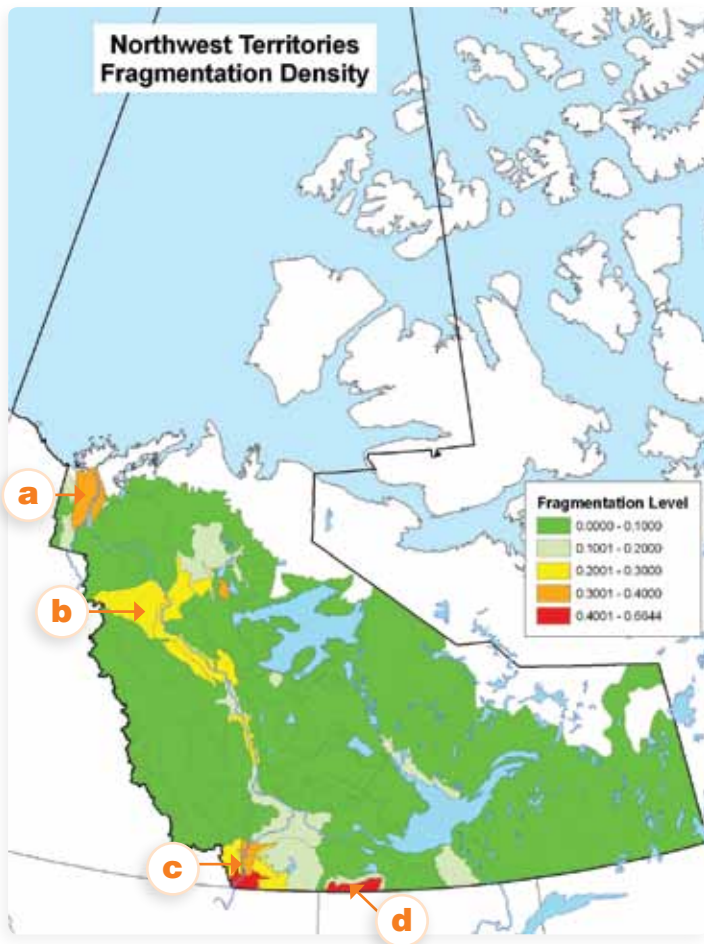
a

Sector a Mackenzie Delta ecoregion: human features result in 30-40% fragmentation in the Mackenzie Delta mostly from seismic lines, winter roads, and gas wells.

Pristine

Fragmentation of NWT ecosystems

Status of fragmentation
due to human activities
in forested areas



Feature Type and Buffer

Fragmentation density levels were determined by buffering features using a certain distance (buffer radius) and calculating the total buffered area of all features in each ecoregion. Overlapping buffer areas were only calculated once, then the total buffered area was divided by the total area of each ecoregion. Feature types and the size of the buffer radius are tabled in the section "Sources and Acknowledgements", p36.

Find more on this indicator in the NWT State of the Environment Report - Landscape Changes focal point at www.enr.gov.nt.ca.

Find more on ecoregions and NWT Ecological Classification at www.enr.gov.nt.ca.



Caribou was selected to estimate fragmentation density because it is a highly valued ecosystem component.

Fragmentation density levels are in km^2 by km^2 . Ecoregion information for the non-forested areas of the NWT is not yet available, and is not included on this map. See information box for more details. A level of $0.6 \text{ km}^2/\text{km}^2$ means that in an ecoregion, an animal, such as a Caribou, has 60% chance of being within a buffer zone near a human feature. © GNWT 2010. Details for sectors are provided with photos.

D Downing / GNWT

d

Sector D On the Cameron Plateau and Upland ecoregions seismic lines and well sites, and roads result in 40-66% fragmentation in addition to fires that are part of natural disturbance regime.



Trends in observed effects of climate change

A climate of un

Winter temperatures are increasing in the NWT.

In the tundra areas of the NWT, the growing season has lengthened by **5** days.

In the forested areas the growing season has lengthened by **9** days and the snow season shortened by **12** days since 1950.

Snowfall is low in the Arctic, but it has increased by about **20-40%** compared to the 1950-1980.



GNWT / J Nagy

Peary Caribou The Endangered Peary Caribou decline dramatically during icing events that prevent access to their food in winter.

Natural climate fluctuations, such as El Niño, enhance the effects of continued warming in the Arctic.

The variable weather and extreme climate of the NWT are part of our environment. This indicator tells us how this variability is changing or becoming less predictable.

Seasonal average temperatures vary greatly between years in the NWT. However, in addition to these large fluctuations, temperatures in the past 15 years have been warmer now than during 1950-1980. Warming temperatures are most notable in winter and spring. The Inuvialuit have noticed higher temperatures in all seasons and winter lows are not as extreme as before.

Precipitation also varies greatly between years across the NWT. The greatest changes are occurring during winter in the Arctic (tundra areas of the NWT), where snowfall has increased by up to 40%, but the season with snow cover has shortened by 5 days in the Arctic compared to the 1950-1980s. The Inuvialuit have noticed that precipitation is harder to predict.



G Court

Moving North Some species that are common in southern Canada are extending their range into the NWT. The best known of these range extension is for the Black-billed Magpie. This species is now found as far north as the Sahtu. A warming winter climate best explains these rapid range extensions.

They have also noticed more freezing rain in the winter in the Southern Arctic (Inuvik and Paulatuk). Precipitation in the forested areas of the NWT is highly variable, and in contrast to the Arctic, winter snowfall in most parts of the forested areas of the NWT is declining.

The rate of change in temperature and precipitation is faster than what climate change models have predicted. Normal climatic variations do not fully explain these warming winters and changes in precipitation. There is evidence that natural climate fluctuations, such as El Niño, enhance the effects of continued

warming in the Arctic in some years causing rapid and less predictable changes in northern ecosystems.

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. Our plants have adapted to fire, short intense growing seasons, and long cold and dry winters. Changes in temperature, snow cover, and the length of both the growing and snow seasons will have an impact on plant and wildlife behaviour and growth patterns, and ultimately on their distribution and survival. Species previously not capable of surviving in our ecosystems may extend in the NWT if we have less severe snow seasons and



© M Oldham / GNWT

River The Mackenzie River is ice-free earlier and minimum flows in winter are higher. How these changes are affecting fish and aquatic organisms is unclear.

Uncertainties

Trends in observed effects
of climate change



longer growing seasons. Species adapted to cold may show population declines.

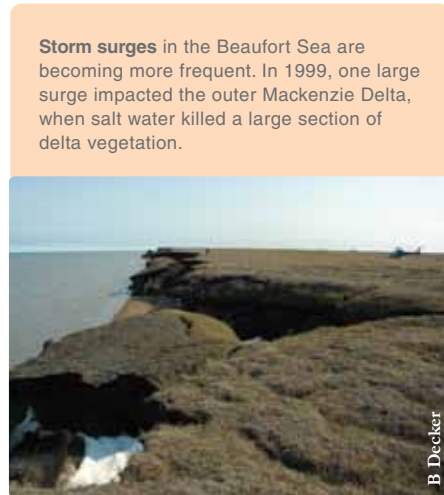
The effects of changes in our climate on biodiversity are being tracked. Studies show that some changes are measurable but subtle. Other studies show that a warming climate is enhancing, in a cumulative fashion, the effect of other changes in land use and disturbance on our biodiversity.

A *Climate Change Adaptation Strategy* has been developed for the NWT. Detailed adaptation plans for forests and biodiversity have been initiated.



© GNWT / A Veitch

Parasites A nematode was recently discovered in Dall's sheep in the NWT (2001). A climate-parasite model predicts that with climate warming areas further north would be suitable for more types of parasites. The effects of changes in parasites and disease loads in northern wildlife need to be monitored.



B Decker

Storm surges in the Beaufort Sea are becoming more frequent. In 1999, one large surge impacted the outer Mackenzie Delta, when salt water killed a large section of delta vegetation.



J Nagy

Mismatch in the timing of food availability Climate change is making insect emerge earlier in spring. This food (insects) is available earlier than the peak breeding period for some species of migratory birds nesting in the Arctic and boreal forest. This mismatch in the timing of insect emergence and bird breeding period is thought to be one cause of bird population declines. Lesser Scaup populations have declined in the last decades.



GNWT / D Downing

Permafrost and Tundra Degrading permafrost increases slumping, which results in changes in tundra vegetation, including more shrubs. Thaw slumps are changing the ecology of Arctic ponds. Tundra biomass is increasing – including more shrubs in some areas. Plants are producing leaves earlier. Taiga trees are dying on the edge of peat plateaus where the permafrost is melting.



P Nicklen

Polar Bear Changes in sea ice in the South Beaufort Sea may be linked to more polar bears coming on land during the fall open-water period, increasing travel distances and people-bear conflicts. This population of bear is the only one possibly in decline in the NWT.

Find more in the NWT State of the Environment Report - Climate Fluctuations, Weather and Climate, Permafrost, and Species at Risk focal points at www.enr.gov.nt.ca.



Downing / GNWT

Fire Season Since the 1990s fires are occurring earlier in spring and later in summer, making the "fire season" longer. Climate change models are predicting an increase in forest fires in the next decades. However, in the NWT, the number of fires and the area burned each year remain variable with yet no increasing trends.



Invaders of the North

None of our species of mammals are alien to the NWT. Some species are moving from the south, such as white-tail deer and elk, possibly due to climate change or habitat changes, but none of these are considered alien, as they have not been introduced by humans.

We do not know of any aquatic invasive species in the NWT.

Invasive alien species are recognized as one of the most harmful threats to native ecosystems and species.

In southern Canada, and elsewhere in the world, invasive plants and animals have become the second greatest threat to biodiversity after habitat loss. Although the NWT has seen few invasive alien species to date, we should not be complacent. With changing climate and the potential for additional industrial development, invasive species of plants and animals have a higher chance of becoming established in the NWT.

All NWT residents can help by learning more about these species and

Scentless Chamomile An alien plant from Europe, is now found along all highways in the Northwest Territories.



M Oldham / GNWT

House Sparrow This bird will take over nesting holes and chase away other species of birds from an area. This sparrow only occurs in or near communities in the NWT. Three known alien birds are already in the NWT – one of them is invasive: the House Sparrow. The other two, rock pigeon and European starling, are invasive further south but so far have not spread widely enough to become a problem in the NWT.



Gordon Court



M Oldham / GNWT

NWT Road Plants introduced to North America as cattle feed are being introduced to the NWT along roads. Plant seeds spread by hitching a ride on vehicles

s of the North Northwest Territories

Trends in invasive
alien species



following simple steps to reduce their introduction and spread in the NWT.

- Report species that are new to you or seem “out-of-place” to the nearest wildlife officer or at NWTSOER@gov.nt.ca.
- Practice nature-friendly gardening and landscaping – Use weed-free soil, and consider local plants for your landscaping.
- Stop Seeding Invaders– research the source of your seed mixes and request invasive-free ones.
- Clean Yourself at the Door -clean your vehicles and equipment before using them in the NWT.

NWT organizations are sharing information and monitoring invasive alien species in the NWT. An analysis on the pathways of entry of alien species into the NWT has shown that most introductions of alien species are not intentional and occur along our road system. Intentional introductions of alien plant species occur during re-vegetation efforts after development. Programs to control invasive alien species introduction and prevent their spread into NWT ecosystems are being developed.

White Sweet Clover and Yellow Sweet Clover Invade roadsides, streets, and the edges of rivers. They attract wildlife near communities and roads, and displace our colourful Fireweed and make our roads less attractive. So far 106 known alien plant species are already established in the NWT – 12 of these are considered invasive because they can invade and change natural habitats. The white and yellow sweet clovers are the most problematic alien plant species.



Alien species are animals and plants that have been introduced by humans, sometimes unintentionally, in areas outside of their natural range. Most alien species were introduced to North America from Europe or Asia. Some alien species are beneficial to humans, as they are used for food, crop and other uses.

Invasive alien species are alien species that are capable of causing significant harm to our environment, economy or to society. Species that can cause harm to our environment, economy or society but that are not alien species are usually called pests.



M Oldham/GNWT

Find more in the NWT State of the Environment Report – Vegetation and Wildlife focal points at www.enr.gov.nt.ca.

Amber marked birch leafminer This species infests leaves of birches in southern NWT and causes them to turn yellow-brown early in August. The leafminer, also a type of sawfly, has been noticed in the NWT only since 1994, when it was probably introduced from the south with infested landscaping trees. So far 11 known alien insects are already in the NWT – at least two of them are considered invasive aliens: Larch Sawfly and Amber-marked birch Leafminer.



Keeping an eye on A

Studies in the 1970-80s in Canada indicated that there was a wide spectrum of substances, reaching unexpected levels in the Canadian Arctic ecosystems, many of which had no Arctic or Canadian sources.

About **100** POPs and **25** metals have been measured in wildlife and the environment to provide baseline information on levels and distribution of contaminants in northern Canada.

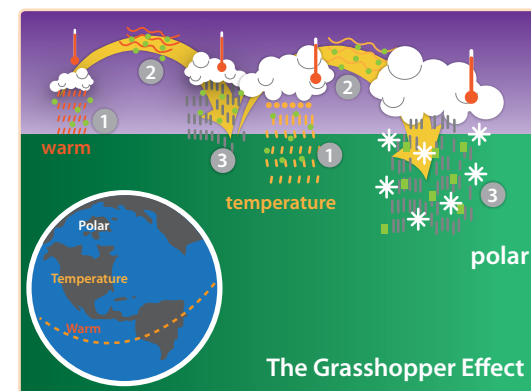
Traditional/country foods continue to be a safe and healthy food choice for northerners.

The Arctic has emerged in recent decades as an early warning indicator for the Earth's environment. Though far removed from the industrial centres that generate pollution, contaminants (pollutants) travel to the Arctic by long-range transportation through the atmosphere, oceans and rivers. The long range transportation of contaminants to the Arctic is called the "grasshopper effect".

The good news is that levels of most contaminants are declining slowly across the circumpolar Arctic. Traditional/country foods continue to be a safe and healthy food choice for northerners.

However, some contaminants may be increasing in certain species, such as mercury concentrations in fish, and new compounds, like flame retardants used on furniture and other consumer products, are being detected in the environment. This emphasizes the need for ongoing monitoring.

Some changes observed in contaminant levels in Arctic biodiversity may be linked



The Grasshopper effect: the long range transportation of organic contaminants (OC's) to the Arctic

- 1 In warm temperatures OC's evaporate
 - 2 OC's move in the air by winds to colder places
 - 3 In cold temperatures OC's condense and fall to earth
- Contaminants

to climate change. For example, the effects of melting permafrost on the release rate of mercury into the environment is being investigated as mercury naturally occurs in all soils.

The Northern Contaminants Program (NCP) is a federal program established in 1991 in response to concerns about human exposure to elevated levels of contaminants in wildlife species that are important to the traditional diets of northern Aboriginal peoples. The overall objective of the

program is to reduce and, where possible, eliminate contaminants from the Arctic environment while providing information to Northerners about contaminants in country foods. The NCP is working towards achieving this objective through scientific and traditional knowledge studies and monitoring to influence the development and implementation of global agreements to reduce and/or eliminate the production, use, and release of contaminating substances into the environment.

DFO

Beluga Levels of most contaminants are declining slowly across the circumpolar Arctic.

Arctic contaminants

Trends in Arctic
contaminants



The results of this research also form the basis for assessing human health risks associated with contaminants in country foods, which is used by national and regional health authorities to develop dietary advice.

Contaminant levels (metals, POPs and radionuclides) were monitored in most major barren-ground caribou herds across the North during the 1990's to provide a baseline of what types and levels of contaminants were present, but most were found at very low levels. Follow-up monitoring of 31 elements in select herds in the 2000's found levels to remain low, and overall were considered to be background levels and not of concern for caribou or human health.

Monitoring contaminant levels over time is needed to assess changes in the levels or types of contaminants present, to provide insight into possible differences in levels of some elements between male and female animals, and to track levels of key contaminants, such as cadmium and mercury.

There are 4 major groups of contaminants currently being monitoring in the environment of northern Canada:

Metals are naturally occurring elements (e.g., arsenic, mercury), some can be released into the environment by industrial activity. Whereas some are nutrients (e.g., iron) essential to healthy wildlife, other metals (e.g., arsenic, mercury) cadmium, sulphur) can cause harmful effects. Metals are accumulated in the liver and kidney of animals.

Radionuclides are radioactive materials that can be found naturally in the environment (e.g. uranium) or result from human activities (e.g. cesium).

Persistent organic pollutants (POPs) are manufactured chemicals. They do not breakdown easily, accumulate in the fatty tissues of animals, and concentrations can biomagnify as you move up the food chain. Animals with lots of fat, including seals, whales, and polar bears, tend to have higher concentrations, which could potentially affect their health and be transferred to humans who consume these animals.

Emerging contaminants are a group of new man-made chemicals being used worldwide that have been recently found in the Arctic. They share many characteristics of POPs such as persistence in the environment, the ability to be transported long distances, and the possibility to accumulate in the food web and affect plant, animal or human health. The compounds include chemicals such flame retardants used in consumer products.

For More Information

For more information, people can contact the NWT Regional Contaminants Committee, with representatives from various governments and aboriginal organizations, which acts as a liaison between the NCP and communities across the NWT.

For more information on the Northern Contaminants Program at www.aicn-inac.gc.ca/nth/ct/ncp/index-eng.asp.

Find more in the NWT State of the Environment Report – Contaminants and Air focal points at www.enr.gov.nt.ca.



S Kurz

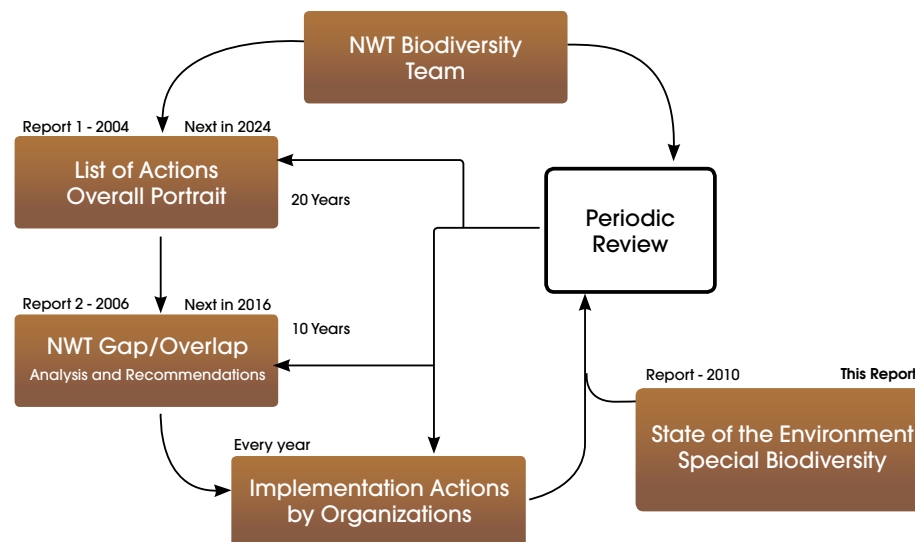
Monitoring Northerners are contributing to the monitoring of contaminants in caribou and other terrestrial wildlife species.

The Department of Environment and Natural Resources, GNWT with the collaboration of the *NWT Biodiversity Team* has been planning and coordinating activities related to biodiversity since 2004. The first task was to publish a comprehensive list of all biodiversity actions in the NWT. Then the Team performed a gap and overlap analysis, looking at

The present report provides insights on how NWT's biodiversity is doing. The report is a first assessment of the status and trends of biodiversity in the NWT. This is based on more detailed information published

The NWT Biodiversity Team is always open to new members. The next task will be to annually update findings on the state of biodiversity as part of the web-based *NWT State of the Environment Report*, then using these findings, the Team will perform another gap and overlap analysis on biodiversity actions by 2016, and publish a new comprehensive list of actions by 2024.

Using the planning process, the results of *State of the Environment Report - 2010 Biodiversity Special Edition* are guiding the people of the NWT on future teamwork to ensure that we are developing in a way that leaves to future generations a nurturing and dynamic world, rich in its northern biodiversity.

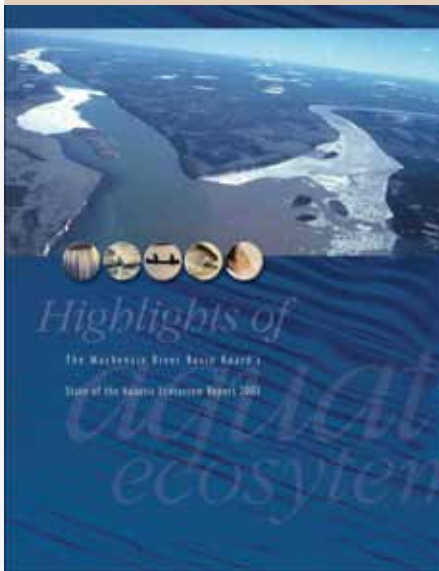


Future – beyond 2010

Planning for the future
- beyond 2010

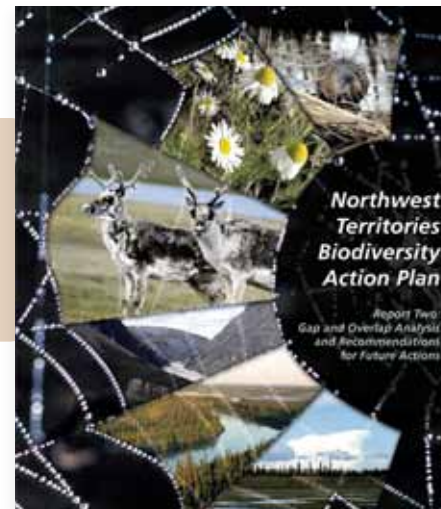


Mackenzie Basin State of the Aquatic Ecosystem Report – First report in 2003, with reviews every five years, published by the Mackenzie River Basin Board.



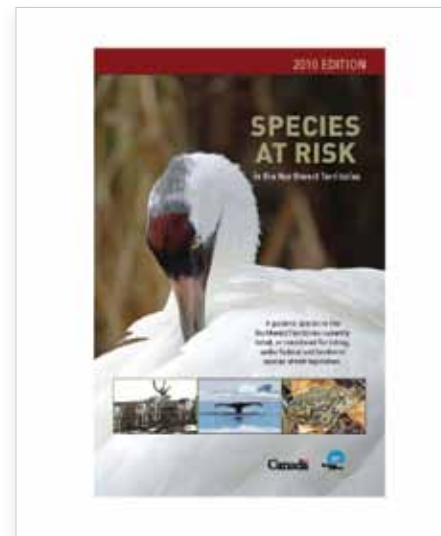
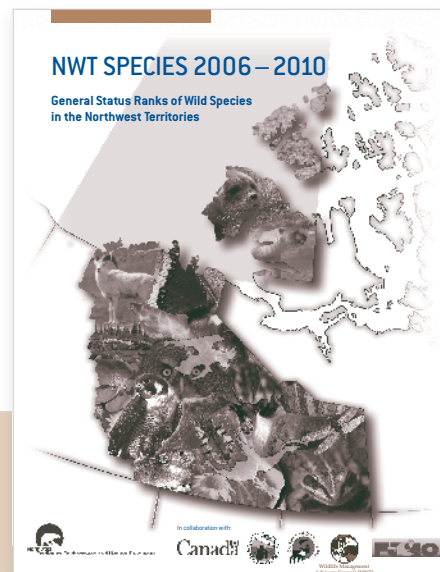
Since the publication of the first report of the NWT Biodiversity Action Plan in 2004 that listed current actions on biodiversity in the NWT, many agencies and groups have undertaken new initiatives.

The Biodiversity Action Plan Report 2 provided a gap analysis on actions needed for the NWT to meet International obligations.



The NWT has contributed information for the Arctic Council's report "Arctic Biodiversity Trends – selected indicators of change" published specially for the International Year of Biodiversity. Find more on <http://www.arctic-council.org/>.

The biological status of species in the NWT are ranked every 5 years using protocols developed for the General Status Ranking Program in the NWT, and across Canada. The next report will be published in 2011.



The new *Species at Risk (NWT) Act* will ensure that no species becomes extinct in the NWT due to human activities. Information on each species at risk in the NWT is published in a booklet updated every 2 years.

Sources and Acknowledgements

Your input is important. Your suggestions on additional indicators and your insights on how the NWT's biodiversity and environment are changing will be appreciated.

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

Contact us at
NWTSEOR@gov.nt.ca.

The Northwest Territories State of the Environment Report - 2010 on Biodiversity special edition was prepared by the Government of the Northwest Territories (GNWT) in close collaboration with the NWT Biodiversity Team (2010). The Team has members from organizations and governments with responsibilities and interests in biodiversity management in the Northwest Territories.

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The ecological regions (ecoregions) used to organize the findings in this report are based on the work performed in 2005-2009 by the NWT Ecosystem Classification Group. They are continuing to review, revise and improve our understanding of NWT's ecological regions. Future reports will be based on the updated ecological region maps for the NWT. For more information see: www.enr.gov.nt.ca/_live/pages/wp-Pages/Ecosystem_Classification.aspx

Status and Trends of NWT Biodiversity

Information on mammals and rare plants is from Environment and Natural Resources (ENR), Government of the Northwest Territories (GNWT). Information on birds are summaries written for the Canada's Ecosystem Status and Trends Report, and studies by Bird Studies Canada, Environment Canada (EC), and the US Fish and Wildlife Service. Information on species at risk is from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). Source of the Glaciation digital data for the rare biodiversity map is Dyke et al. 2005 Geological Survey of Canada, Deglaciation of North America, Open File 1574.

Ecosystem Integrity

Land cover information is from the Canadian Forest Service and the Canada Centre for Remote Sensing. Information on sea ice is from Tivy et al. (2010) Journal of Geophysical Research and the Canadian Ice Service and was reviewed by Dr. D Barber, University of Manitoba. Information on water links to biodiversity is from Parks Canada, the Mackenzie River Basin Board, R. Reid, Indian and Northern Affairs



S Carrière/GNWT

Monitoring is important

gements and Ackno

Canada (INAC), and EC. Information on protected areas is from the NWT Protected Areas Strategy Secretariat.

Goods, Services and Sustainable Use of Biodiversity

Data on trends in fishing, hunting, and trapping are from Industry, Tourism and Investment, GNWT. Data on the use of country food are from the NWT Bureau of Statistics, GNWT.

Status of Traditional Knowledge, Innovations, and Practices

Information on traditional knowledge is from ENR, GNWT, and all renewable resources boards.

Threats to Biodiversity

Features used to estimate fragmentation are from the National Energy Board, the Centre of Remote Sensing, National Road Network, INAC, and the GNWT Feature database. Semi permanent features include transmission lines, winter roads, all season roads, local roads, pipelines, wells, mines, and communities. Source data for seismic lines are from the National Energy Board. The latest version of this data was released in 2009. Seismic lines in this data set were cut between 1958 and 2000. Buffers were estimated based on peer-


reviewed publications and expert opinions from ENR, GNWT. Map developed for this report by the NWT Centre for Geomatics © 2010. Source of ecoregion information: NWT Ecological Classification at www.enr.gov.nt.ca. Seasonal change due to climate change are from trends provided by the Climate Research Division, EC, based on a study produced for Canada's Ecosystems Status and Trends Report. Inuvialuit observations of climate change

are from a study by Inuvialuit communities "Unikkaaqatigiit – Putting the Human Face on Climate Change: Perspectives from the Inuvialuit Settlement Region". Permafrost findings are from studies by Dr. S Kokelj, INAC, and by Dr. W. Quinton, University of Wilfred Laurier. Information on species moving north is from ENR, GNWT. Information on diseases, parasites and contaminants is from Dr. S Kutz, E. Jenkins (University of Saskatoon), and Dr. B Elkin

(ENR, GNWT). Information on polar bear and Peary caribou are from COSEWIC reports. Information on the fire season is from Forest Management, ENR, and Canada's Ecosystems Status and Trends Report. Information on the 'mismatch hypothesis' is from DeVink et al. (2008) Auk (125), Tulpand Schekkerman (2008) Arctic (61) and other peer-reviewed papers.

Feature Type	Buffer Radius (meters)	Year of Data
City (Pop >5000) ⁴	10000	2007
Mine - active ³ , Medium Towns (Pop <5000) ⁴	3000	2009
All weather roads ²	2000	2008
Mines – under maintenance ³ , Oil-gas wells – active ¹ , Winter roads ² , Power stations ⁴ , Small Towns (Pop <1000) ⁴ Lodge ⁴	1000	2009 2008 2007
Seismic lines ¹ , Mines – non active ³ , Power line ⁴ , Canol Trail ⁴	500	Before 2000 2009 2008 2003
Pipeline (below ground) ⁵	300	About 2000
Oil-gas wells – non-active ¹	250	2009

¹Location data from National Energy Board; ²National Road Network; ³Indian and Northern Affairs Canada and NWT Geoscience Office; ⁴NWT Centre for Geomatics. ⁵Government of the Northwest Territories. Buffer are from expert opinion and peer-reviewed papers.



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