

## ENVIRONMENT YUKON

Government of Yukon > Environment > State of the Environment Report: Introduction >

CAMPING & PARKS

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# Yukon State of the Environment

Reporting on environmental indicators - 2016

HOME

CLIMATE CHANGE

AIR

WATER

LAND

FISH AND WILDLIFE

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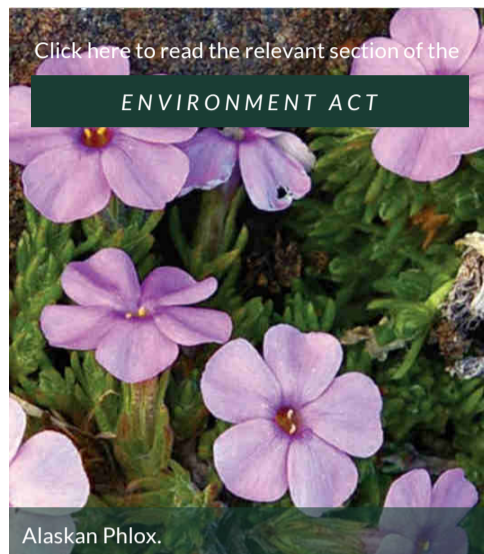
## ABOUT THE REPORT

State of the environment reports show the public how Yukon is progressing towards the goal of maintaining and improving the quality of Yukon's natural environment for this and future generations. They reflect on the status of the environment and help guide future decision-making. The reports also:

- provide early warning and analysis of potential environmental problems;
- chart the achievement of the objectives set out in the *Environment Act*; and
- provide baseline information for environmental planning, assessment and regulation.

Under Yukon's *Environment Act* the Minister of Environment must table a full state of the environment report in the legislature every three years, as well as interim reports in the intervening years. This year, the report transitioned to an accessible and interactive online version that will be periodically updated.

The report provides information on climate change, air, water, landscape, and fish and wildlife. Analysis is provided through key indicators used to monitor, describe, and interpret changes in the environment. The report uses the most recent and best information available.



Click here to read the relevant section of the

[ENVIRONMENT ACT](#)

Alaskan Phlox.

### Yukon State of the Environment Report

47

(1) The Government of the Yukon shall report publicly on the state of the environment pursuant to this Act.

(2) The purpose of a report under subsection (1) is

- (a) to provide early warning and analysis of potential problems for the environment;
- (b) to allow the public to monitor progress toward the achievement of the objectives of this Act; and
- (c) to provide baseline information for environmental planning, assessment, and regulation. *S.Y. 2002, c.76, s.47*

### Requirements for the Yukon State of the Environment Report

48

(1) The Minister shall prepare and submit to the Legislative Assembly a Yukon State of the Environment Report within three years of the date this section comes into force and thereafter within three years of the date of the previous report.

(2) The Yukon State of the Environment Report shall

- (a) present baseline information on the environment;
- (b) incorporate the traditional knowledge of Yukon First Nation members as it relates to the environment;
- (c) establish indicators of impairment of or improvement to the environment and identify and present analyses of trends or changes in the indicators; and
- (d) identify emerging problems for the environment, especially those involving long-term and cumulative effects. *S.Y. 2014, c.6, s.9; S.Y. 2002, c.76, s.48*

(3) [*Repealed S.Y. 2014, c.6, s.9*]

### Review by Council

49

Upon the establishment of a Council under section 40, it shall review a Yukon State of the Environment Report and submit a report of its review to the Legislative Assembly. *S.Y. 2014, c.6, s.10; S.Y. 2002, c.76, s.49*

### Interim report

50

(1) Commencing from the date of the first Yukon State of the Environment Report, for every period of 12 consecutive months in which a Yukon State of the Environment Report is not made, the Minister shall prepare an interim report and submit it to the Legislative Assembly.

(2) An interim report under subsection (1) shall comment on matters contained in the previous Yukon State of the Environment Report. *S.Y. 2002, c.76, s.50*

[^ BACK TO TOP](#)



Woodland Caribou near Watson Lake. David Law.

## ACKNOWLEDGMENTS

The 2016 State of the Environment Report is a collective effort involving scientific experts and specialists from government agencies and non-governmental organisations who have provided information, data and advice.

[READ MORE](#)

ENVIRONMENT YUKON

Government of Yukon > Environment > State of the Environment Report: Climate Change >

- CAMPING & PARKS
- HUNTING, FISHING & TRAPPING
- ANIMALS & HABITAT
- MANAGING AIR, WATER & WASTE
- ENVIRONMENT & YOU
- PUBLICATIONS & MAPS



# Yukon State of the Environment

Reporting on environmental indicators - 2016

- HOME
- CLIMATE CHANGE
- AIR
- WATER
- LAND
- FISH AND WILDLIFE
- DOWNLOAD REPORTS

- > AIR
- > WATER
- > LANDSCAPE
- > FISH AND WILDLIFE

## Introduction

The Yukon government recognizes that climate change is happening, that human behaviour is a major contributor, and that a coordinated response is needed.

The Intergovernmental Panel on Climate Change is the leading international body for the assessment of climate change. This panel of scientists states that:

- global climate change is the most significant threat our environment faces today;
- the human influence on the climate system is certain and growing;
- climate change is affecting the Arctic at a pace greater than elsewhere on the planet;
- impacts of climate change include atmosphere and ocean warming, reduced extents of snow and ice, a higher sea level and an increase in the frequency of heavy precipitation events. (Intergovernmental Panel on Climate Change, 2014).

In Yukon, we are already seeing the effects of climate change across all aspects of the environment. Changes have started to, and are expected to continue to, impact the distribution and abundance of vegetation, fish and wildlife in Yukon, as well as impact Yukon infrastructure, economy and communities.

The *Climate Change Action Plan* was released in 2009 and later updated in progress reports released in 2012 and 2015. Find out more on our [Climate Change Action Plan page](#).

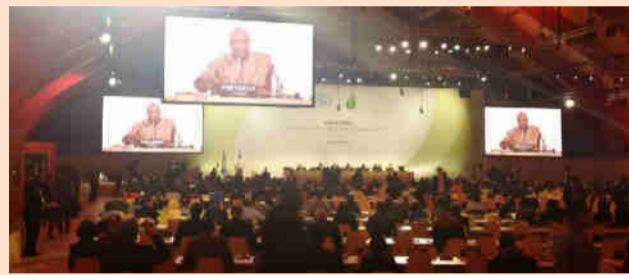


The effects of climate change are wide-reaching and touch all other areas of this report. Indicators that measure Yukon's contribution to climate change and the impacts of climate change on Yukon's environment are identified in other sections by the thermometer symbol.

### PROFILE

#### COP 21

In December 2015, Yukon government participated in the 21<sup>st</sup> Conference of the Parties to the United Nations Framework Convention on Climate Change (COP 21) in Paris. The Yukon government recognizes the importance of youth involvement in climate change issues and included Sabrina Clarke as a Youth Ambassador in Yukon's COP 21 delegation.



## Reference

Intergovernmental Panel on Climate Change (IPCC). 2014. Climate Change 2014 Synthesis Report. IPCC, Geneva, Switzerland. Available from: <http://ar5-syr.ipcc.ch/>.

## Indicators related to climate change

### AIR

Long-term temperature variation

The Arctic is warming more quickly than other regions, and the warming trend in Yukon is expected to continue.

Trends in Yukon greenhouse gas levels

Yukon's overall GHG emission levels have been decreasing since 2011. The transportation sector accounts for the largest share of Yukon's GHG emissions.

[^ BACK TO TOP](#)

### WATER

Long-term precipitation variation

Precipitation amounts change from year to year, but there is an increasing precipitation trend in Yukon.

River ice break-up dates

Yukon river ice-break up at Dawson City now occurs close to seven days earlier on average since records began in 1896.

Extreme high and low water in lakes and rivers

An increase in winter low flows has occurred across the territory over the past 50 years.

Snow accumulation

There has been a significant increase in snow water equivalent in the last several decades.

Arctic sea ice extent and volume

Arctic sea ice is melting; summer sea ice will likely disappear within decades.

[^ BACK TO TOP](#)

### LANDSCAPE

Area of fire burned annually and number of Yukon wildland fires

Dramatic fluctuations in area burned occur annually. Fires greater than 200 hectares usually represent a small percentage of all fires but account for most of the overall area burned.

Forest health

The most significant disturbance detected in the 2015 Forest Health Survey was caused by large aspen tortrix—a moth that defoliates trembling aspen.

Presence of alien and introduced species

As of November 2015, an estimated 169 alien plant species have been identified in Yukon. Twenty of these are considered invasive. Other species that have been introduced to Yukon include three mammals, four birds and two fish species.

[^ BACK TO TOP](#)

### FISH AND WILDLIFE

Density of snowshoe hares

The snowshoe hare is a keystone species in the boreal forest; changes in hare population cycles can be an early warning system for ecosystem changes due to climate change.

Winter tick surveillance

Winter ticks have not caused serious problems for Yukon wildlife. However, given their distribution across several Yukon species, they are likely here to stay.

Number of spawning Chinook salmon

The spawning escapement target for Canadian-origin Yukon River Chinook salmon was met in 2015.

Monitoring breeding waterfowl

Monitoring waterfowl presence and abundance gives a good indication of the ecological health of the area, as waterfowl depend on wetland areas for food, nesting areas and safety.

Number of species at risk in Yukon

Yukon's healthy ecosystems are a refuge to many species that are considered at risk nationally due to declines outside the territory.

[^ BACK TO TOP](#)

## ENVIRONMENT YUKON

Government of Yukon > Environment > State of the Environment Report: Air >

CAMPING  
& PARKS

HUNTING, FISHING  
& TRAPPING

ANIMALS &  
HABITAT

MANAGING AIR,  
WATER & WASTE

ENVIRONMENT  
& YOU

PUBLICATIONS  
& MAPS



# Yukon State of the Environment

Reporting on environmental indicators - 2016

HOME



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> [TEMPERATURE](#)

> [AIR QUALITY AND EMISSIONS](#)

## TEMPERATURE



Long-term temperature variation

The Arctic is warming more quickly than other regions, and the warming trend in Yukon is expected to continue.

[^ BACK TO TOP](#)

## AIR QUALITY AND EMISSIONS

Levels of particulate matter in Whitehorse

In 2014, the annual mean for particulate matter levels in Whitehorse was 6.7 micrograms per cubic metre (well below the ambient air quality standard).



Trends in Yukon greenhouse gas levels

Yukon's overall GHG emission levels have been decreasing since 2011.

The transportation sector accounts for the largest share of Yukon's GHG emissions.

Organic pollutants in air

Human-made chemicals, such as flame retardants and pesticides, are monitored at Little Fox Lake. Regulated flame retardants show a declining trend from 2011 to 2014, but new flame retardants are being detected.

[^ BACK TO TOP](#)



## ENVIRONMENT YUKON

Government of Yukon > Environment > State of the Environment Report: Air > Long-term temperature variation >

- CAMPING & PARKS
- HUNTING, FISHING & TRAPPING
- ANIMALS & HABITAT
- MANAGING AIR, WATER & WASTE
- ENVIRONMENT & YOU
- PUBLICATIONS & MAPS



# Yukon State of the Environment

Reporting on environmental indicators - 2016

- HOME
- CLIMATE CHANGE
- AIR
- WATER
- LAND
- FISH AND WILDLIFE
- DOWNLOAD REPORTS



## TEMPERATURE

### LONG-TERM TEMPERATURE VARIATION

- > SIGNIFICANCE
- > WHAT IS HAPPENING?
- > TAKING ACTION

#### Significance

Temperature and precipitation are the two most commonly used variables to demonstrate changes in climate.

Global studies, including the 2014 Intergovernmental Panel on Climate Change Fifth Assessment Report, show that the Arctic is warming more quickly than other regions.

Changes have started, and are expected to continue, to impact the distribution and abundance of vegetation, fish and wildlife in Yukon. Climate change is also expected to affect Yukon infrastructure, economy and communities.



Yukon River Valley, Whitehorse. R. Cherepak.

[^ BACK TO TOP](#)

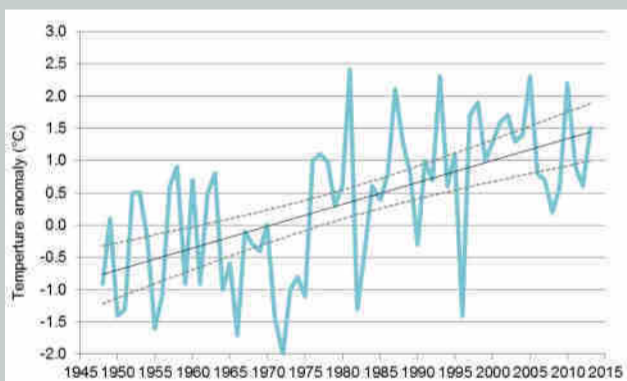
#### What is happening?

##### Annual temperature

Monitoring the temperature departures from the average over the past 30 years helps us to understand the rate and extent of changes occurring in Yukon.

- Temperature variability is measured by the departure from a baseline—the 30-year average from 1961–1990. Temperature departures are given as a percentage change from this average (Figure 1).

FIGURE 1: Yukon annual temperature variation, 1950-2015.



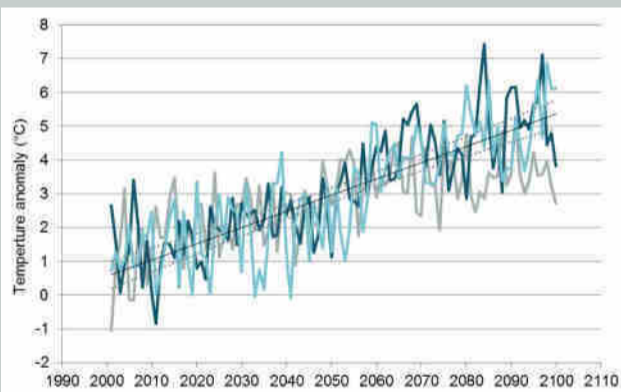
Over the past 50 years:

- Yukon annual average temperature has increased by 2°C, twice the global rate.
- Winters are warming more than other seasons, with an average increase of 4°C.

##### Projected temperature

- Global studies, including the 2014 Intergovernmental Panel on Climate Change Fifth Assessment Report, show that climate scenarios project a significant increase in temperature over the next 50 years (Figure 2).

FIGURE 2: Yukon projected annual temperature anomalies (A2, A1B, B1)



- The three different lines in Figure 2 represent three potential temperature futures based on emissions scenarios developed by Intergovernmental Panel on Climate Change.
- All scenarios show an increase in temperature and its variability.

[^ BACK TO TOP](#)

#### Taking action

The Government of Yukon partnered with the Northern Climate ExChange at Yukon College on developing a *Yukon Climate Change Indicators and Key Findings* report. This cross-sector, structured, evidence-based assessment of Yukon climate change knowledge synthesizes our current understanding, providing researchers, decision-makers and the general public with an objective overview of the climate system and any potential changes. Temperature change and projections are two indicators presented in this report.

Reducing GHG emissions in Yukon will help to reduce the long-term negative impacts of the trends presented in this indicator.



Yukon River. Richard Legner.

#### Data quality

- The data are exclusively from Environment and Climate Change Canada's Climate Trends and Variations Bulletins.
- The data spans from 1948 to present and are complete.
- Northern B.C. is included in Environment and Climate Change Canada's regional separation of the data, meaning results could be skewed towards southern Yukon.

#### References

Environment and Climate Change Canada, Climate Research Branch. 2014-2015. Climate Trends and Variations Bulletins [modified 2016 Mar 22; cited 2016 Mar 3]. Available from: <http://ec.gc.ca/sc-cs/default.asp?lang=En&n=A3837393-1>.

Intergovernmental Panel on Climate Change (IPCC). 2014. Climate Change 2014 Synthesis Report. IPCC, Geneva, Switzerland. Available from: <http://ar5-syr.ipcc.ch/>.

Streiker, J. 2016. Yukon Climate Change Indicators and Key Findings 2015. Northern Climate ExChange, Yukon Research Centre, Yukon College, Whitehorse, Yukon, Canada. Available from: <https://www.yukoncollege.yk.ca/research/abstracts/indicators>.

[^ BACK TO TOP](#)



ENVIRONMENT YUKON

Government of Yukon > Environment > State of the Environment Report: Air > Levels of particulate matter >

- CAMPING & PARKS
- HUNTING, FISHING & TRAPPING
- ANIMALS & HABITAT
- MANAGING AIR, WATER & WASTE
- ENVIRONMENT & YOU
- PUBLICATIONS & MAPS



Yukon State of the Environment  
Reporting on environmental indicators - 2016

- HOME
- CLIMATE CHANGE
- AIR
- WATER
- LAND
- FISH AND WILDLIFE
- DOWNLOAD REPORTS

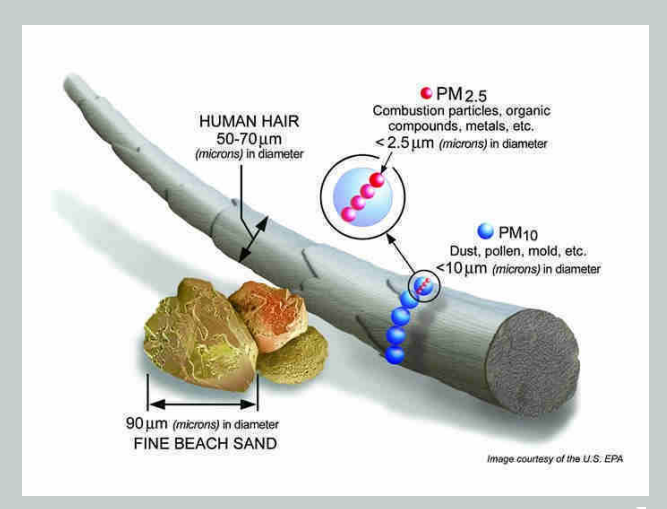
AIR QUALITY AND EMISSIONS  
LEVELS OF PARTICULATE MATTER

- > SIGNIFICANCE
- > WHAT IS HAPPENING?
- > TAKING ACTION

Significance

Particulate matter are microscopic airborne particles that come in either solid or liquid form. Small particles of concern include:

- fine particulate matter, such as those found in woodsmoke, that are smaller than 2.5 micrometers in diameter (PM<sub>2.5</sub>); and
- coarse particulate matter, such as those found near roadways and dusty industries, that are larger than PM<sub>2.5</sub>, but smaller than 10 micrometers in diameter (PM<sub>10</sub>).



Source: United States Environmental Protection Agency 2016

Health effects

The size of particles is directly linked to their potential for causing health problems. Exposure to particulate matter has been linked to a variety of health issues, including:

- aggravated asthma;
- decreased lung function;
- heart attacks and/or irregular heartbeat;
- premature death in people with heart or lung disease; and
- increased respiratory symptoms, such as irritation of the airways, coughing or difficulty breathing.

The elderly, children, and people with chronic respiratory illnesses are most at risk, but even healthy people can experience temporary symptoms.

What is happening?

Annual mean levels

In September 2014, the Government of Yukon updated the Yukon ambient air quality standards to include an annual mean standard for PM<sub>2.5</sub> of 10µg/m<sup>3</sup>.

- Measurements taken at the Whitehorse National Air Pollution Surveillance station since 2002 have not found levels in excess of the annual mean standard for PM<sub>2.5</sub>.
- The annual mean has steadily increased over the past five years. This could be due to a number of factors such as population growth, increase in use of wood as a heating source, or meteorological variations.
- Note: The NAPS monitoring station was relocated from a relatively windy site on the Yukon River to downtown Whitehorse in 2011, along with the replacement of the PM<sub>2.5</sub> monitoring instrument to a technically advanced higher-precision analyzer.

24 hour average exceedances

Number of days/year that the 24-hour Yukon standard for PM<sub>2.5</sub> was exceeded in Whitehorse

Year	Number of days 24-hour standard exceeded
2002	0
2003	0
2004	12
2005	4
2006	N/A
2007	0
2008	0
2009	15
2010	7
2011	7
2012	19
2013	2
2014	2

The Canadian Council of Ministers of the Environment (CCME) is a 14-member council of the environment ministers from federal, provincial, and territorial governments. The CCME focuses on national issues that require the collective attention of all governments.

In 2012, the CCME established the Air Quality Management System (AQMS). It is a comprehensive approach for improving air quality throughout Canada. AQMS is the product of unprecedented collaboration by government and stakeholders.

Air Zones:

AQMS requires the establishment of air zones within each jurisdiction. Air zones are geographical-based zones that will allow the provincial/territorial governments to manage local ambient air quality within their boundaries with the goal of continuous improvements in air quality. Work is underway to divide Yukon into air zones. Once these are established, the Government of Yukon will determine how ambient air quality will be assessed and reported for each air zone.

Canadian Ambient Air Quality Standards:

The current Canada-wide standards are being revised for fine particulate matter and ground-level ozone. Work is also underway to assess the health and environmental impacts of nitrogen dioxide and sulphur dioxide.

Mobile Sources:

An action plan is being developed to reduce emissions from mobile sources in the transportation sector. The plan would include addressing vehicle tampering and encouraging the conversion of fleets to electric vehicles. Priorities are to implement advanced transportation technologies and proper vehicle maintenance, to reduce emissions from diesel vehicles and engines, and to make vehicle fleets greener.

Base-level Industrial Emissions Requirements:

Performance standards will be established for new and existing major industrial sectors and some equipment types. Monitoring and public reporting is critical for transparency, accountability, and the effective implementation of AQMS. Provinces and territories, with assistance from the federal government, will be responsible for managing each air zone within their jurisdictions and reporting to their residents on air quality and the measures taken to implement AQMS.

More information can be found on the CCME website in the "Our Work" area.

Monthly comparison of PM<sub>2.5</sub>

The level of PM<sub>2.5</sub> in Whitehorse can vary greatly over a year due to local meteorological events and human activities (i.e., woodstove use, backyard burning, land clearing, etc.). Comparing particulate matter levels by month is helpful to give a picture of trends.

- During this period, winter months have higher levels of particulate matter than summer months. Heating buildings from wood or fossil fuels can drive PM<sub>2.5</sub> levels up.
- PM<sub>2.5</sub> can increase in summer months due to spring road dust and wildland forest fires.

Comparison to national average

- Whitehorse PM<sub>2.5</sub> levels have never been above the national average during this monitoring period.
- The national average for PM<sub>2.5</sub> has not exceeded the annual standard of 10 µg/m<sup>3</sup>.
- Data are available up to 2013; the 2014 national averages are not yet available from Environment and Climate Change Canada.



Transportation can result in emissions.

Taking action

- Monitoring Yukon's air quality occurs as part of the National Air Pollution Surveillance (NAPS) program, which continues to monitor the quality of ambient air in urban areas across the country. A Memorandum of Understanding is used to establish the collaborative effort of the program between the federal, provincial, territorial and some municipal governments. Jurisdictions use the air quality data compiled by NAPS to assess and report on the state of the air and to develop programs to address priority air quality issues in air zones. Data provided by NAPS also support public information tools, such as the Air Quality Health Index and the Canadian Environmental Sustainability Indicators. NAPS data is stored in the Canada-wide air quality database.
- The Department of Environment is currently conducting an air quality monitoring study in Whitehorse, in conjunction with Health Canada, the City of Whitehorse and other Government of Yukon departments (Office of Chief Medical Health Officer, Yukon Health & Social Services; Energy Mines and Resources; and Community Services). This study is collecting data from nine monitoring stations set up around the city. Data will be used to determine the levels of pollution in the various neighbourhoods, and consequently enable partners to make decisions on action that needs to be taken in high-pollutant neighbourhoods.
- Whitehorse will implement its own air quality health index (AQHI) in spring 2016. The AQHI is a scale designed to help Canadians understand the air quality around them and what it means for their health. Whitehorse National Air Pollution Surveillance (NAPS) data will be used to calculate this index.

Data quality

- NAPS data are quality-controlled, assured, and standardized by Environment and Climate Change Canada and the Yukon Department of Environment for inclusion in the Canada-wide air quality database.
- The Whitehorse NAPS station, located in downtown Whitehorse, continuously monitors particulate matter, nitrogen dioxide and atmospheric ozone.
- Air quality data collected at the NAPS station are not representative of air quality throughout Whitehorse or Yukon because of differences in geographical layout, population density and pollution sources.
- Canadian Environmental Sustainability Indicators (CESI) measure the progress of the Federal Sustainable Development Strategy, report to Canadians on the state of the environment, and describe Canada's progress on key environmental sustainability issues. The indicators, built on rigorous methodology, are added and updated as new, high quality data become available.

Exposure to particulate matter has been scientifically proven to be detrimental to both public health and the environment. Sources of fine particulate matter in the Yukon include:

Natural sources	Anthropogenic sources
Forest fires: Although the predominant air flow is westerly (from Alaska), smoke from fires in B.C. and the N.W.T. occasionally affect Yukon's air quality	Emissions from fossil fuel burning, such as transportation, electricity generation, oil and gas
Wind-blown dust from gravel roads, especially in spring	Wood burning, either for residential / commercial heating, land clearing, or backyard burning
Pollen	Waste disposal—incineration or open burning
Volcanic activity, sometimes from as far away as Asia.	Fugitive dust from vehicles, quarrying or construction

Yukon Ambient Air Quality Standards have been developed under the Environment Act to protect human health and the environment. Air pollution has the ability to affect both of these elements. The Department of Environment monitors levels of PM<sub>2.5</sub> in Whitehorse. As such, particulate matter is an effective air quality indicator.

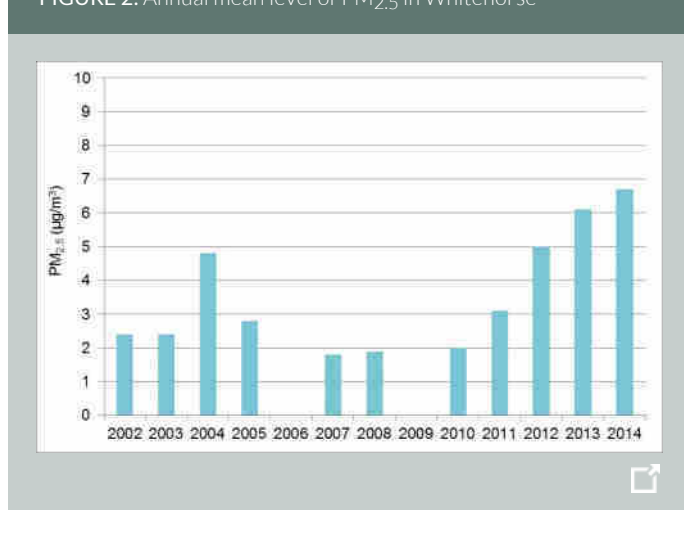
Environmental effects

Particulate matter may also affect the environment through:

- High pollution levels impairing visibility, which may affect driving, aviation, and outdoor sports or recreational activities like fishing, hiking, or camping.
- Changing nutrient and/or acidity balance in soil or water when particulate matter carried by the wind settles on the ground.
- Black carbon, a component of PM<sub>2.5</sub>, is considered a short-lived climate pollutant (SLCP). These pollutants have a relatively short lifetime in the atmosphere—a few days to a few decades—and are generally more potent than carbon dioxide in terms of their warming potential. A reduction in SLCP emissions has the potential to significantly impact the rate of climate warming changes we see in Yukon.
- Temperature inversions, when air higher in the atmosphere is warmer than air closer to the earth, can increase the impacts of particulate matter pollution. Inversions act like a cap on the atmosphere, preventing the dispersion of pollutants away from valley bottoms, where some Yukon communities are found.

^ BACK TO TOP

FIGURE 2: Annual mean level of PM<sub>2.5</sub> in Whitehorse



In 2014, the Yukon's 24-hour average standard for PM<sub>2.5</sub> changed from 30 to 28 µg/m<sup>3</sup>, in alignment with the Canadian Ambient Air Quality Standards. The table shows the number of days each year that PM<sub>2.5</sub> exceeded the 24-hour Yukon standard in Whitehorse.

Although 2012 had more exceedances throughout the year than 2014, the extent and duration of the exceedances on the two days in February 2014 resulted in a higher monthly average (Figure 3).

PROFILE  
AIR QUALITY MANAGEMENT SYSTEM



Air quality monitoring in the Hidden Valley.

FIGURE 3: Monthly comparison of PM<sub>2.5</sub> in Whitehorse, Yukon

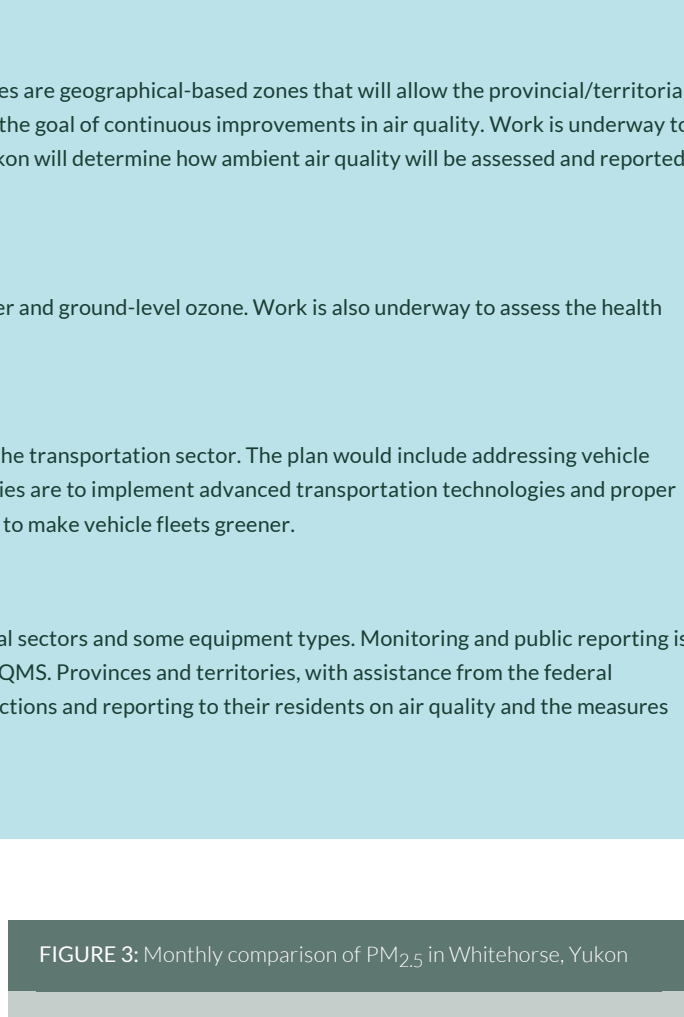
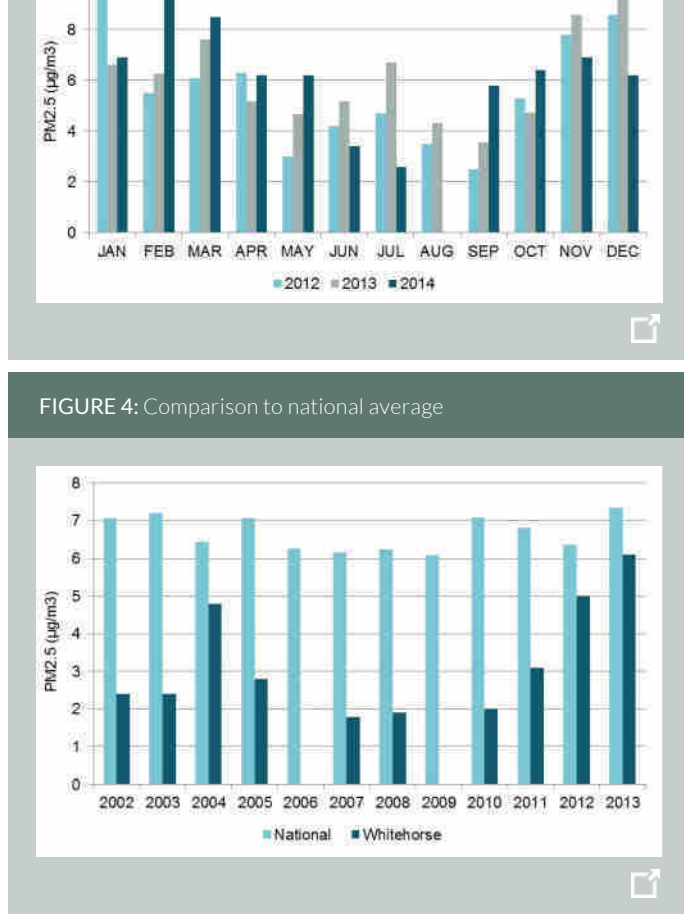
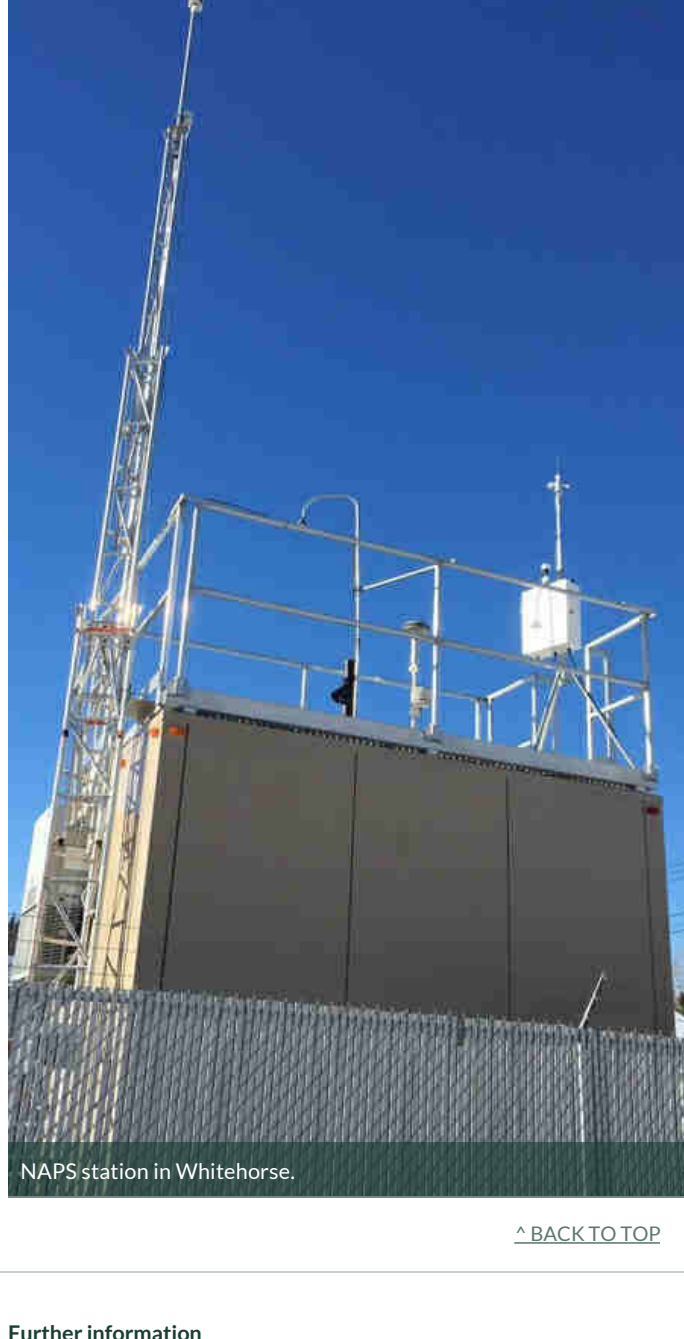


FIGURE 4: Comparison to national average



^ BACK TO TOP



NAPS station in Whitehorse.

^ BACK TO TOP

Further information

The Department of Environment: [Air Quality](#)

Canadian Lung Association: [Outdoor Air Quality](#)

References

- United States Environmental Protection Agency. n.d. Particulate Matter (PM). Basic Information. [modified 2016 Feb 23; cited 2016 Mar 3]. Available from: <http://www3.epa.gov/airquality/particulatepollution/basic.html>
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^ BACK TO TOP





# Yukon State of the Environment

Reporting on environmental indicators - 2016

## AIR QUALITY AND EMISSIONS

### TRENDS IN YUKON GREENHOUSE GAS LEVELS

> SIGNIFICANCE > WHAT IS HAPPENING? > TAKING ACTION

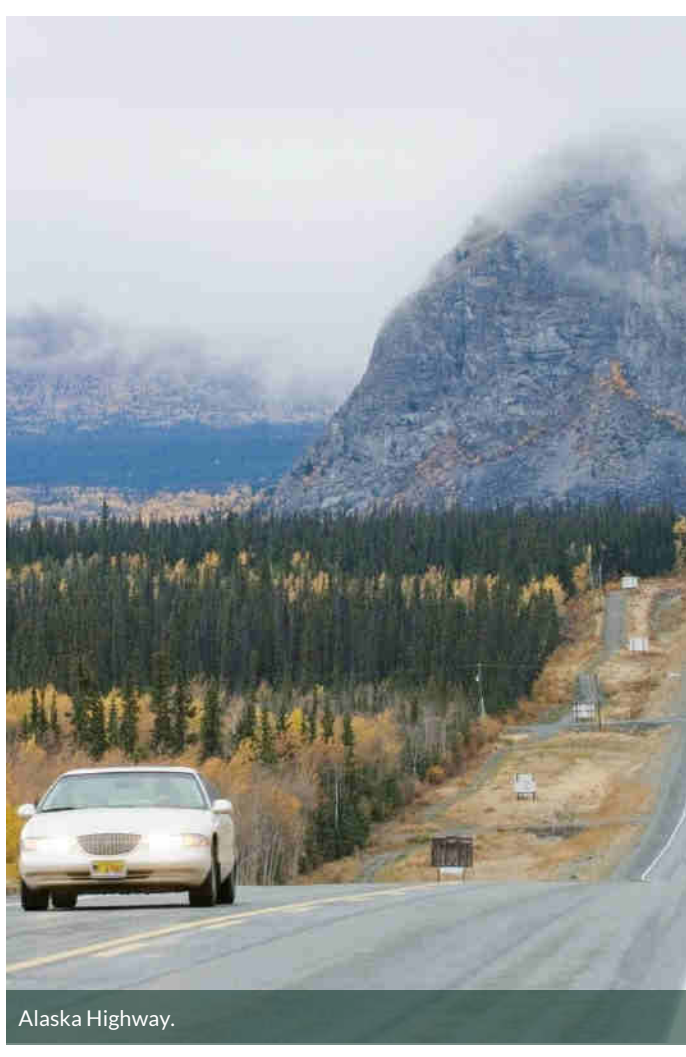
#### Significance

Greenhouse gases (GHGs) trap heat in the atmosphere, keeping the Earth's surface warmer than it would be in their absence. This process is essential for sustaining life on the planet, but burning fossil fuels has increased the amount of GHGs in the atmosphere, which enhances the warming effect. Global GHG levels are now at their highest in the last 800,000 years (IPCC 2014) as a result of human activity, resulting in climate change.

GHG emissions include carbon dioxide, methane, and nitrous oxide among others. Carbon dioxide is the principal contributor to atmospheric levels of GHGs; therefore, it is used as a basis to compare all greenhouse gases.

Carbon dioxide equivalent (CO<sub>2</sub>e) is the measure most often used to compare emissions from various GHGs based on their potential to contribute to global warming. Tracking GHG emissions (in units of kilotonnes of CO<sub>2</sub>e) allows tracking of Yukon's emissions across time, identifying the major sources of emissions and opportunities for reductions, as well as tracking Yukon's contributions to national and global emission levels.

While Yukon-generated GHG emissions are very low compared to the rest of the country, the observed and predicted rate and magnitude of [temperature change in the region](#) are among the largest. As a result, the Government of Yukon introduced measures to limit GHG emissions produced from its activities and those from key sectors, and is adapting to the changing climate in the short and long term. These measures take the unique challenges in Yukon into consideration, including long distances from production centres, high demand for heat during cold winters and an isolated electricity grid.



Alaska Highway.

[^ BACK TO TOP](#)

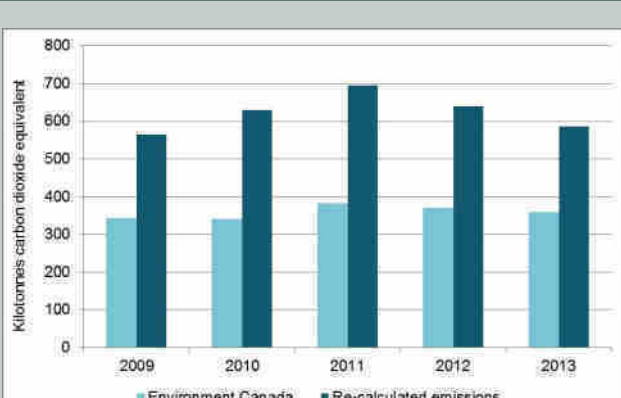
#### What is happening?

##### Yukon's emissions

The Government of Yukon is working with local and federal partners to achieve an accurate and consistent emissions profile for Yukon. This profile is necessary to support the effective policy development for minimizing growth in Yukon's overall GHG emissions. To date, two data sets are available to support an understanding of Yukon's overall GHG emissions from 2013, the latest data available:

- Emissions estimates by Environment and Climate Change Canada for Yukon ([Canada's Greenhouse Gas Inventory](#)), found in the *National Inventory Report 1990-2013: Greenhouse Gas Sources and Sinks in Canada*; and
- re-calculated emissions based on ([Taggart and Pearson's \(2015\) methodology](#)). *Yukon Greenhouse Gas Emissions: The transportation sector updated report 2015* found that total emission levels across all sectors, not just transportation, are higher than what is reported by Environment and Climate Change Canada in their annual National Inventory Report.

FIGURE 1: Yukon greenhouse gas emissions reported by Environment and Climate Change Canada and by a suggested methodology from Taggart and Pearson's report (2015), 2009-2013.



[^ BACK TO TOP](#)

#### National comparison

- Canada is ranked among the highest of all countries in the world in terms of per capita GHG emissions. Canadians produced 726 megatonnes (726,000 kilotonnes) of CO<sub>2</sub>e in 2013, about 25 per cent above 1990 levels (Environment and Climate Change Canada 2014).
- Yukon per capita emissions in Yukon in 2013 were 16.1 tonnes per person (Taggart and Pearson 2015). Compared to the per capita emissions of the 12 other provinces and territories as reported in the National Inventory Report, Yukon has relatively low per capita emissions putting it 8<sup>th</sup> out of 13.
- Yukon's total GHG emissions contributed 0.08 per cent towards the national total (Taggart and Pearson 2015).

PROFILE

### RIDE SHARING

Share the Ride!

In an effort to address transportation-related greenhouse gas (GHG) emissions within the territory (the dominant source of emissions in Yukon), the Department of Environment is partnering with the City of Whitehorse on a Yukon-wide ridesharing program that started in April 2016.

The on-line service will let registered users connect with others interested in saving on fuel and vehicle maintenance costs, as well as reducing their GHG emissions.

Yukon Rideshare will help make carpooling and active transportation easier and more convenient, removing some of the barriers that typically prevent individuals from exploring more sustainable and less GHG intensive options.

The platform will help both the Government of Yukon and the City of Whitehorse keep track of emissions avoided as a result of individuals carpooling, using transit or choosing more active transportation options.

Visit [Yukon Rideshare](#) to learn more.

[^ BACK TO TOP](#)

#### Taking action

The Government of Yukon partnered with the Northern Climate Exchange at Yukon College on developing a *Yukon Climate Change Indicators and Key Findings* report. This cross-sector, structured, evidence-based assessment of Yukon climate change knowledge synthesizes our current understanding, providing researchers, decision-makers and the general public with an objective overview of the climate system and any potential changes.

In 2015, the Government of Yukon published its *Climate Change Action Plan Progress Report*, building upon the leadership and commitments outlined in the 2009 *Climate Change Action Plan* and the subsequent 2012 *Progress Report*.

Since the majority of the 33 priority actions which were outlined in the previous reports are either completed or ongoing, the 2015 Progress Report includes 28 new initiatives which support our four goals:

- enhance our knowledge and understanding of climate change
- improve our ability to adapt to the impacts of climate change
- reduce our greenhouse gas emissions
- lead Yukon action in response to climate change

More detail on those new actions, as well as an update on progress on achieving previous commitments can be found in the 2015 [Climate Change Action Plan Progress Report](#).

The Department of Highways and Public Works will install a pilot monitoring system to ensure vehicles are properly maintained and operated in its heavy and medium-duty fleets. The system will track maintenance needs, speed, and idle time to make sure that vehicles are at optimum performance and efficiency; this will also help to identify opportunities for reducing fuel use and associated emissions.

PROFILE

### ENERGY SAVING INCENTIVES

Energy efficient foam and insulation in new walls.

The Government of Yukon's new Residential Energy Incentive Program encourages homeowners, homebuilders and general contractors to design, construct and retrofit homes to a high standard in energy efficiency.

Between January and July of 2015, the program enabled 34 new homes to be built to an EnerGuide efficiency rating of 85 or better. Estimated annual energy savings are 176,800 kWh with an annual cost savings of \$30,600, helping to reduce energy costs and associated greenhouse gas emissions for residents.

In addition, the Government of Yukon launched the Commercial Energy Incentive Program in May 2015. It is aimed at improving energy use in multi-family dwellings and commercial buildings.

The program helps building owners retrofit their buildings to improve energy performance and reduce energy consumption, costs and emissions. It also encourages owners to upgrade to energy efficient and long lasting LED lighting systems.

In its first summer, the program led to LED lighting upgrades in 10 commercial buildings and should result in future annual energy savings estimated at 1,188,000 kWh and annual cost savings estimated at \$142,500.

#### Data quality

Previously, the GHG emissions indicator was based on data provided by the federal department of Environment and Climate Change Canada via the *National Inventory Report*, which presents GHG information for Yukon in kilotonnes of CO<sub>2</sub>e by sector (Energy, Industrial Processes and Product Use, Agriculture and Waste). All national inventory reports are accessible [online](#).

The [Yukon Greenhouse Gas Emissions: The transportation sector](#) report published in 2015, based on tax and finance data provided by Yukon Bureau of Statistics and Department of Finance, is considered by the Government of Yukon as being the most accurate data for Yukon-wide emissions, not just the transportation sector. The Government of Yukon will continue to work with the federal departments of Environment and Climate Change Canada as well as Statistics Canada to improve data accuracy, and in the meantime, will access and report Yukon data from local sources to inform on Yukon-wide GHG emissions results.

#### References

Environment and Climate Change Canada. 2014 National Inventory Report 1990-2013: Greenhouse Gas Sources and Sinks in Canada. Pt. 3, p.35. Environmental Canada, Gatineau, Quebec, Canada.

Intergovernmental Panel on Climate Change (IPCC). 2014. Climate Change 2014 Synthesis Report. IPCC, Geneva, Switzerland. Available from: <http://ar5-syr.ipcc.ch/>.

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[^ BACK TO TOP](#)



ENVIRONMENT YUKON

Government of Yukon > Environment > State of the Environment Report: Air > Organic Pollutants in Air >

- CAMPING & PARKS
- HUNTING, FISHING & TRAPPING
- ANIMALS & HABITAT
- MANAGING AIR, WATER & WASTE
- ENVIRONMENT & YOU
- PUBLICATIONS & MAPS



# Yukon State of the Environment

Reporting on environmental indicators - 2016

- HOME
- CLIMATE CHANGE
- AIR
- WATER
- LAND
- FISH AND WILDLIFE
- DOWNLOAD REPORTS



## AIR QUALITY AND EMISSIONS

### ORGANIC POLLUTANTS IN AIR

- > SIGNIFICANCE
- > WHAT IS HAPPENING?
- > TAKING ACTION

#### Significance

Organic pollutants, such as flame retardants and pesticides, are human-made chemicals that may contaminate ecosystems. Wind and water can carry these chemicals away from their sources to reach places like the Arctic, where they have never been used before. They tend to settle in colder climates and once deposited, can enter arctic ecosystems. Many of these contaminants are toxic and can accumulate in the food chain, affecting the health of wildlife and humans.

Measuring how much organic pollutants are present in arctic air over time will provide us with information on:

- whether their concentrations are decreasing, increasing or not changing over time;
- where these chemicals have come from;
- how much of each chemical comes from which region; and
- what climate conditions influence their movement to the Arctic.

This information can inform policies that limit emissions and hopefully reduce what comes into the Arctic. Results about how organic pollutant concentrations change in air can be used to negotiate and evaluate the effectiveness of domestic and international control agreements and to assess the risks of new contaminants. The results are also used to test atmospheric models that explain contaminant movement from sources in the South to the Arctic.



Air monitoring station at Little Fox Lake. Pat Roach.

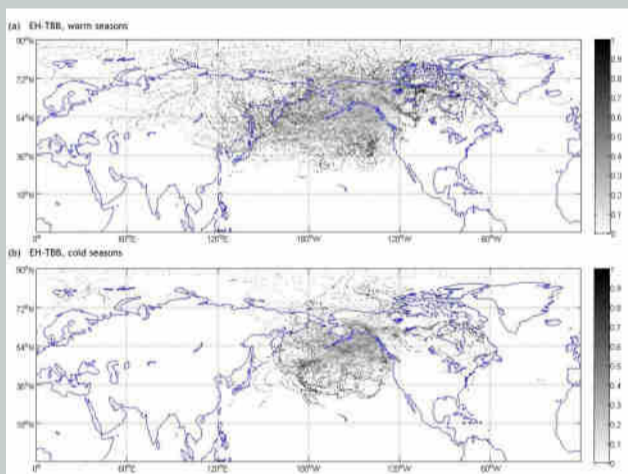
[^ BACK TO TOP](#)

#### What is happening?

- Air samples have been continuously collected at the Little Fox Lake Station in Yukon since August 2011.
- The detection of these chemicals in the remote subarctic site of Little Fox Lake demonstrates their long range transport through air and suggests that they could contribute to the chemical contamination of remote areas such as the Arctic.
- The air concentrations of two pesticides, hexachlorocyclohexane and endosulfan, are decreasing at Little Fox Lake.
- Measurement results show that globally regulated flame retardants (e.g., some of the polybrominated diphenyl ethers) have declined between 2012 to 2014. Canada regulated these flame retardants in 2008 and they have been regulated globally since 2009.
- Conversely, 10 new flame retardants that are not currently regulated were frequently detected in air at Little Fox Lake (Figure 1).

- In warm seasons, organic pollutants tend to stem from potential sources in Northern Canada, the Pacific and East Asia. In cold seasons, they mainly came from the Pacific Rim. One example of this is a new flame retardant called 2-ethylhexyl 2,3,4,5-tetrabromobenzoate (Figure 2).

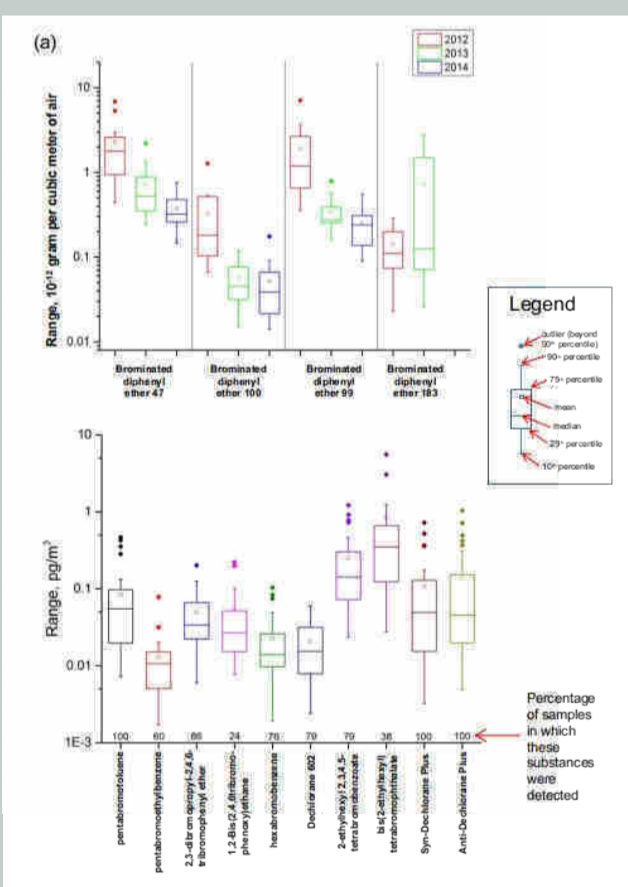
FIGURE 2: Maps showing potential source regions for one of the new flame retardants detected at Little Fox Lake, 2-ethylhexyl 2,3,4,5-tetrabromobenzoate. The maps indicate that (a) in the warm seasons most of this chemical observed at Little Fox Lake stemmed from sources in Canada, the Pacific and East Asia; (b) in cold seasons they mainly came from the Pacific Rim. Black dots on map show potential paths of movement of wind carrying this chemical reaching Little Fox Lake.



View from Little Fox Lake monitoring station. Pat Roach.

[^ BACK TO TOP](#)

FIGURE 1: (a) Regulated flame retardants at Little Fox Lake showed declining tendency from 2012 to 2014. (b) Flame retardants found in air in Little Fox Lake that are currently not regulated (Yu et al. 2015).



#### Taking action

The federal Northern Contaminants Program has measured organic pollutants in air in Yukon since 1992 during three short term studies at Tagish (December 1992 to March 1995) and Little Fox Lake (July 2002 to July 2003 and August 2007 to October 2009).

Continuous measurements are now conducted at Little Fox Lake since August 2011 to determine:

- if the air concentrations are declining for chemicals that are under domestic and international regulations, showing these regulations are effective;
- where these chemicals have come from, and how much from which region; and
- if new chemicals that are currently not under control can be carried to Yukon by wind.

The Little Fox Lake data are provided to support the Stockholm Convention on Persistent Organic Pollutants – a global treaty to protect human health and the environment from the adverse effects of these pollutants. Signatories to the convention work towards controlling how much and what kind of persistent organic pollutants humans release into the environment.

These data also support the Arctic Council's Arctic Monitoring and Assessment Programme that provides information on the status and threats to the Arctic environment, and provide scientific advice on actions to be taken to support Arctic governments in their efforts to take remedial and preventive actions relating to contaminants.

[^ BACK TO TOP](#)

#### Data quality

- Data are available for air samples taken once a month using a flow-through air sampler, which does not require electrical power to operate, at the Little Fox Lake station.
- Air concentrations of different chemicals may vary with seasons.
- The target chemical list includes pesticides and flame retardants. New chemicals are added to this list from time to time to assess chemicals that may be of concern to the Arctic environment.



Air monitoring station at Little Fox Lake. Pat Roach.

#### References

Arctic Council. n.d. Arctic Monitoring and Assessment Programme (AMAP). [cited 2016 Mar 3] Available from: <http://www.amap.no/>

Government of Canada. 2015. Northern Contaminants Program [modified 2016 Jan 25, cited 2016 Mar 3] Available from: <http://www.science.gc.ca/default.asp?lang=En&n=7A463DBA-1>

Hung, H., Y. Yu, M. Shoeib, T. Harner, A. Steffen, D. Muir, C. Teixeira, L. Jantunen, P. Fellin, P. Roach, F. Wania. 2015. Northern Contaminants Air Monitoring: Organic Pollutant Measurement. Pages 161-171 in *Aboriginal Affairs and Northern Development Canada. Synopses of Research Conducted under the 2014-2015 Northern Contaminants Program. Aboriginal Affairs and Northern Development Canada, Gatineau, Quebec, Canada.* Available from: <http://pubs.aina.ucalgary.ca/ncp/Synopsis20142015.pdf>

United Nations Environmental Programme (UNEP). 2015-2016. Stockholm Convention on POPs [cited 2016 Mar 3]. Available from: <http://chm.pops.int/default.aspx>

Yu, Y., H. Hung, N. Alexandrou, P. Roach, K. Nordin. 2015. Multiyear measurements of flame retardants and organochlorine pesticides in air in Canada's western sub-arctic. *Environmental Science & Technology* 49 (14): 8623 - 8630.

[^ BACK TO TOP](#)

## ENVIRONMENT YUKON

Government of Yukon > Environment > State of the Environment Report: Water >

CAMPING & PARKS

HUNTING, FISHING & TRAPPING

ANIMALS & HABITAT

MANAGING AIR, WATER & WASTE

ENVIRONMENT & YOU

PUBLICATIONS & MAPS



# Yukon State of the Environment

Reporting on environmental indicators - 2016

HOME

CLIMATE CHANGE

AIR

WATER

LAND

FISH AND WILDLIFE

DOWNLOAD REPORTS



> [PRECIPITATION](#)

> [LAKES AND RIVERS](#)

> [FROZEN](#)

## PRECIPITATION



### Long-term precipitation variation

Precipitation amounts change from year to year, but there is an increasing precipitation trend in Yukon.

[^ BACK TO TOP](#)

## LAKES AND RIVERS



### River ice break-up dates

Yukon river ice break-up at Dawson City now occurs close to seven days earlier on average since records began in 1896.

### Water quality index ratings

The water quality measured at seven Yukon stations is: excellent (1 station), good (4 stations), and fair (2 stations).



### Extreme high and low water in lakes and rivers

An increase in winter low flows has occurred across the territory over the past 50 years.

[^ BACK TO TOP](#)

## FROZEN



### Arctic sea ice extent and volume

Arctic sea ice is melting; summer sea ice will likely disappear within decades.



### Snow accumulation

There has been a significant increase in snow water equivalent in the last several decades.

[^ BACK TO TOP](#)



**ENVIRONMENT YUKON**
[Government of Yukon](#) > [Environment](#) > [State of the Environment Report: Water](#) > [Long-term precipitation variation](#) >

<a href="#">CAMPING &amp; PARKS</a>	<a href="#">HUNTING, FISHING &amp; TRAPPING</a>	<a href="#">ANIMALS &amp; HABITAT</a>	<a href="#">MANAGING AIR, WATER &amp; WASTE</a>	<a href="#">ENVIRONMENT &amp; YOU</a>	<a href="#">PUBLICATIONS &amp; MAPS</a>
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# Yukon State of the Environment

Reporting on environmental indicators - 2016

<a href="#">HOME</a>	<a href="#">CLIMATE CHANGE</a>	<a href="#">AIR</a>	<a href="#">WATER</a>	<a href="#">LAND</a>	<a href="#">FISH AND WILDLIFE</a>	<a href="#">DOWNLOAD REPORTS</a>
----------------------	--------------------------------	---------------------	-----------------------	----------------------	-----------------------------------	----------------------------------



## PRECIPITATION

### LONG-TERM PRECIPITATION VARIATION

[> SIGNIFICANCE](#)   [> WHAT IS HAPPENING?](#)   [> TAKING ACTION](#)

#### Significance

Temperature and precipitation are the two most commonly used variables to demonstrate changes in climate.

Monitoring the difference in annual precipitation from the average of the past 30 years helps us to understand the rate and extent of changes occurring in Yukon. Beyond the historic and projected trends for increasing precipitation, the variability of our climate is also expected to increase. This will mean an increase in extreme weather events (like storms) and greater fluctuations in precipitation (rain and snow).

Changes have started and are expected to continue to impact the distribution and abundance of vegetation, fish and wildlife in Yukon. Climate change is also expected to affect Yukon infrastructure, economy and communities, with water levels and extreme events playing a large part in this.



Fog at Samuel Glacier. Cathie Archbould.

[^ BACK TO TOP](#)

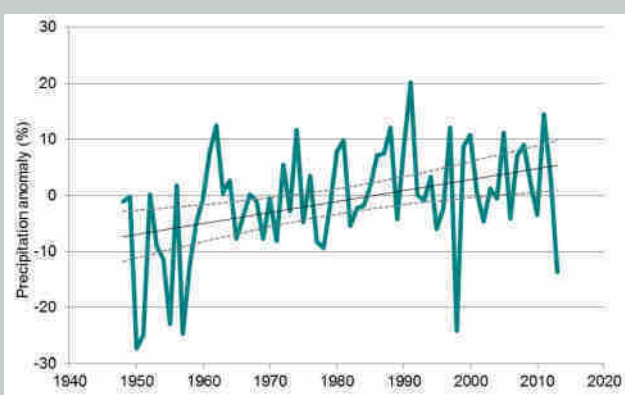
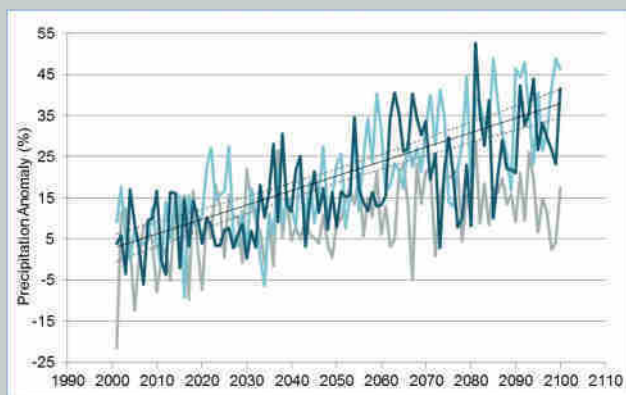
#### What is happening?

##### Annual precipitation

- Precipitation variability is measured by the departure from a baseline—the 30-year average from 1961 to 1990. Precipitation departures are given as a percentage change from this average (Figure 1).
- Precipitation has increased by about six per cent over the past 50 years.
- Summers had the largest increase in precipitation.
- There is variability in terms of where precipitation occurs in the territory, and what time of year it occurs.

##### Projected precipitation

- Global studies, including the 2014 Intergovernmental Panel on Climate Change Fifth Assessment Report, show that climate scenarios project a significant increase in precipitation over the next 50 years (Figure 2).
- The three different lines in Figure 2 represent three potential precipitation futures based on emissions scenarios developed by the Intergovernmental Panel on Climate Change.
- All scenarios show an increase in precipitation and its variability.

**FIGURE 1:** Yukon annual precipitation variability, 1950-2015

**FIGURE 2:** Yukon projected annual precipitation anomalies (A2, A1B, B1).

[^ BACK TO TOP](#)

#### Taking action

The Government of Yukon partnered with the Northern Climate ExChange at Yukon College on developing a *Yukon Climate Change Indicators and Key Findings* report. This cross-sector, structured, evidence-based assessment of Yukon climate change knowledge synthesizes our current understanding, providing researchers, decision-makers and the general public with an objective overview of the climate system and any potential changes. Precipitation change and projections are two indicators presented in this report.

Reducing [GHG emissions in Yukon](#) will help to reduce the long-term negative impacts of the trends presented in this indicator.

#### Data quality

- The data are exclusively from Environment and Climate Change Canada's Climate Trends and Variations Bulletins.
- Northern B.C. is included in Environment and Climate Change Canada's regional separation of the data, meaning the results could be skewed towards Southern Yukon.
- There is uncertainty in the identified trends for precipitation because data are collected over a large area with uneven coverage (particularly for winter precipitation), and because of differences in instrument methodology over time.

#### References

Environment and Climate Change Canada, Climate Research Branch. 2014-2015. Climate Trends and Variations Bulletins [modified 2016 Mar 22; cited 2016 Mar 3]. Available from: <http://ec.gc.ca/sc-cs/default.asp?lang=En&n=A3837393-1>.

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Storm clouds over St. Elias Mountains. Derek Crowe.

[^ BACK TO TOP](#)

**ENVIRONMENT YUKON**
[Government of Yukon](#) > [Environment](#) > [State of the Environment Report: Water](#) > [Yukon River ice break-up at Dawson City](#) >

[CAMPING & PARKS](#)
[HUNTING, FISHING & TRAPPING](#)
[ANIMALS & HABITAT](#)
[MANAGING AIR, WATER & WASTE](#)
[ENVIRONMENT & YOU](#)
[PUBLICATIONS & MAPS](#)


# Yukon State of the Environment

Reporting on environmental indicators - 2016

[HOME](#)
[CLIMATE CHANGE](#)
[AIR](#)
[WATER](#)
[LAND](#)
[FISH AND WILDLIFE](#)
[DOWNLOAD REPORTS](#)


## LAKES AND RIVERS

### YUKON RIVER ICE BREAK-UP AT DAWSON CITY

[> SIGNIFICANCE](#)
[> WHAT IS HAPPENING?](#)
[> TAKING ACTION](#)

#### Significance

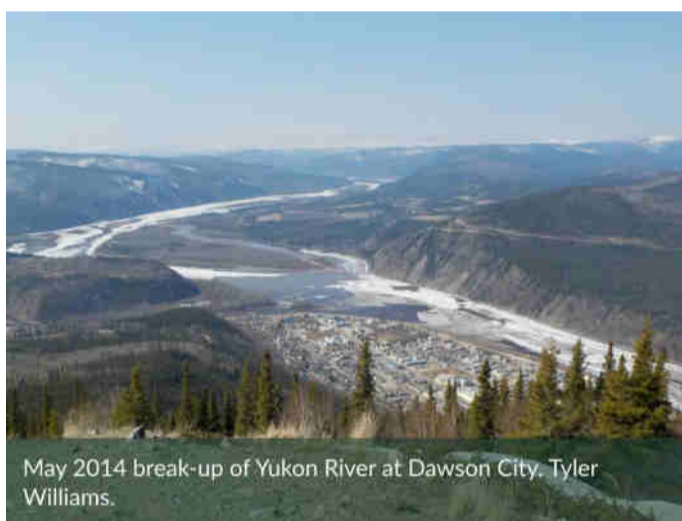
The timing of river ice break-up is one factor influencing the potential for break-up severity and associated negative impacts. In general, earlier break-ups result in a compressed runoff period, increasing the potential for severe ice jams that lead to floods.

River ice conditions also affect transportation routes, both for winter roads and wildlife corridors. Earlier river ice break-up and increased severity of ice-jamming can have detrimental impacts on communities and infrastructure.

Earlier river break-up over the past century is a strong indicator of a changing climate. Warmer spring and winter temperatures contribute to reduced thickness in river ice and earlier break-ups.



May 2014 break-up of Yukon River at Dawson City. Tyler Williams.



May 2014 break-up of Yukon River at Dawson City. Tyler Williams.

[^ BACK TO TOP](#)

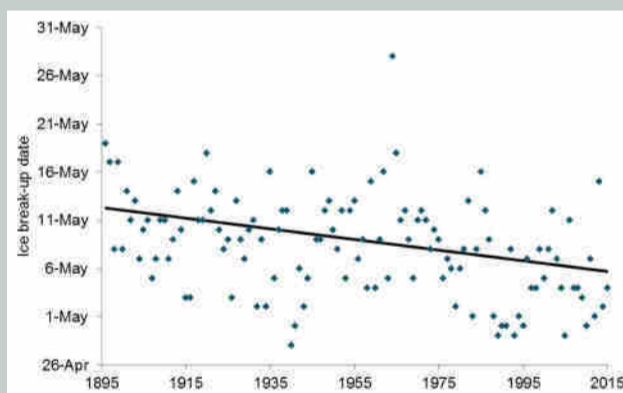
#### What is happening?

Ice break-up on the Yukon River at Dawson City now occurs close to seven days earlier on average than in 1896, when data collection began (Figure 1).

Eight of the 10 earliest recorded break-up events at Dawson City have occurred in the past 30 years.



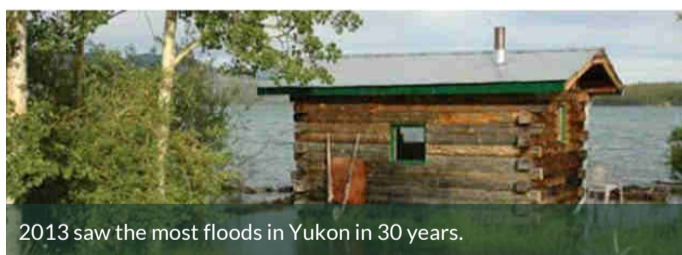
Yukon River. © Richard Legner 2013.

**FIGURE 1:** Date of ice break-up on the Yukon River at Dawson City, 1896-2015.

[^ BACK TO TOP](#)

#### Taking action

Two research projects are underway in collaboration with the [Emergency Measures Organization](#) to help Yukon communities prepare for flooding events:

- Yukon flood risk mapping: using high resolution LiDAR elevation data to identify flood prone areas near Yukon communities.
- Development of flood hazard perception stages: categorizing water level stages into severity indices ("Action Stage", "Minor Flooding", "Moderate Flooding" and "Major Flooding") that determine when and what action should be taken against an impending flood.



2013 saw the most floods in Yukon in 30 years.

[^ BACK TO TOP](#)

#### Data quality

- Yukon River ice break-up at Dawson City statistics and photo documentary are available at: <http://www.yukonriverbreakup.com/statistics>
- At first a betting tradition, the exact time and date of break-up has been recorded at Dawson since 1896.
- A tripod has been set up on the ice and connected by cable to the Danoja Zoo Cultural Centre. When the ice starts moving, it takes the tripod with it and stops the clock, thereby recording the official break-up time.

#### Further information

Visit [www.yukonwater.ca](http://www.yukonwater.ca) to find information about Yukon's water resources and how our water is used, managed and monitored.

A Government of Yukon Water Resources Branch [presentation about climate change and water](#).

[^ BACK TO TOP](#)



## ENVIRONMENT YUKON

Government of Yukon > Environment > State of the Environment Report: Water > Water quality index ratings >

- CAMPING & PARKS
- HUNTING, FISHING & TRAPPING
- ANIMALS & HABITAT
- MANAGING AIR, WATER & WASTE
- ENVIRONMENT & YOU
- PUBLICATIONS & MAPS



# Yukon State of the Environment

Reporting on environmental indicators - 2016

- HOME
- CLIMATE CHANGE
- AIR
- WATER
- LAND
- FISH AND WILDLIFE
- DOWNLOAD REPORTS



## LAKES AND RIVERS

### WATER QUALITY INDEX RATINGS

- > SIGNIFICANCE
- > WHAT IS HAPPENING?
- > TAKING ACTION

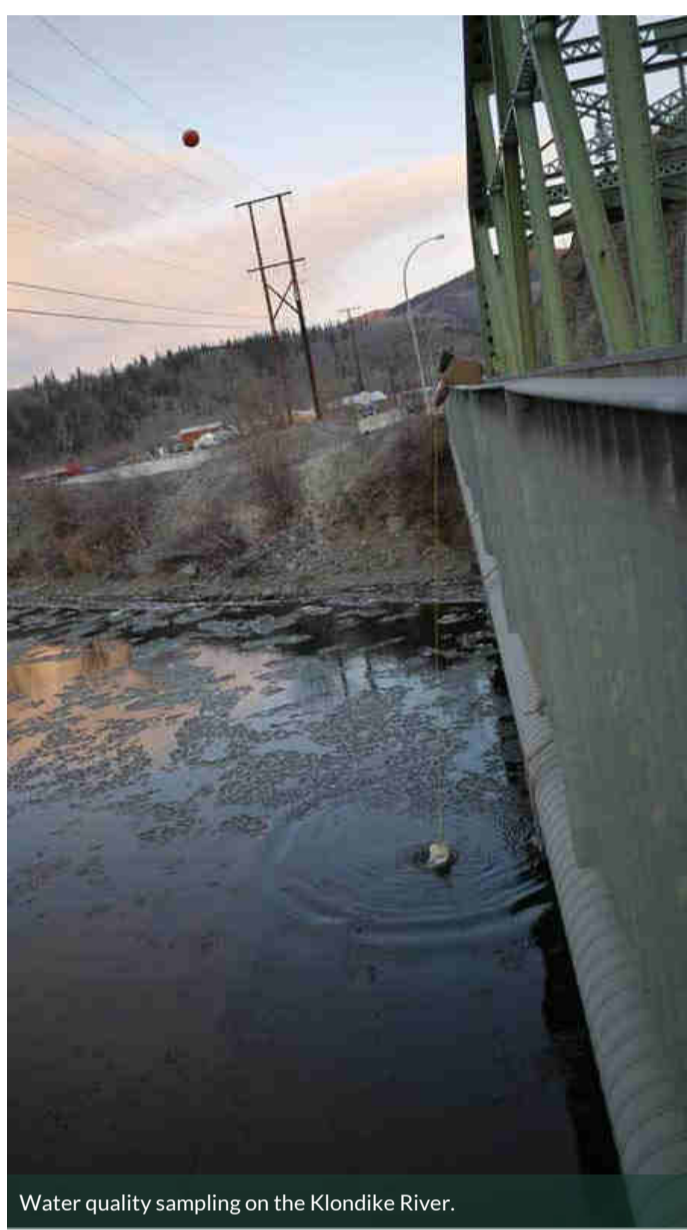
### Significance

The Water Quality Index, developed by the Canadian Council of Ministers of the Environment, summarizes complex water quality data using a scale from 0 to 100. Scores are categorized as:

Excellent (95-100)	Aquatic life is not threatened or impaired. Measurements never or very rarely exceed water quality guidelines.
Good (80-94)	Aquatic life is protected with only a minor degree of threat or impairment. Measurements rarely exceed water quality guidelines and, usually, by a narrow margin
Fair (65-79)	Aquatic life is protected, but at times may be threatened or impaired. Measurements sometimes exceed water quality guidelines and, possibly, by a wide margin.
Marginal (45-64)	Aquatic life frequently may be threatened or impaired. Measurements often exceed water quality guidelines by a considerable margin.
Poor (0-44)	Aquatic life is threatened, impaired or even lost. Measurements usually exceed water quality guidelines by a considerable margin.

The Water Quality Index provides the public with information about the status of water quality in Canada and identifies emerging trends. It condenses data about the quality of a water body to a number scale corresponding with a straightforward rating.

The Water Quality Index also indicates the suitability of streams to support aquatic life. It measures the frequency and extent to which selected parameters exceed water quality objectives at individual monitoring sites (Canadian Council of Ministers of the Environment, 2001).



Water quality sampling on the Klondike River.

[^ BACK TO TOP](#)

### What is happening?

The Government of Yukon currently tracks three-year rolling average Water Quality Index scores for seven monitoring stations. The averages provide additional confidence in ratings.

The following table shows the recorded averages for monitoring stations using the Water Quality Index colour scale above.

Table 1: Three-year rolling average Water Quality Index scores for Yukon monitoring stations

	Excellent (95-100)	Good (80-94)	Fair (65-79)	Marginal (45-64)	Poor (0-44)			
Location	2003-2005	2004-2006	2005-2007	2006-2008	2007-2009	2008-2010	2009-2011	2010-2012
Dezadeash River at Haines Junction	84.2	84.2	89.5	N/A	89.5	N/A	89.5	87.1
Klondike River above Bonanza Creek	N/A	N/A	66.8	66.6	67.4	74.2	74.2	74.2
Liard River at Upper Crossing	93.6	93.6	93.6	87.2	93.6	87.2	87.1	80.6
South McQuesten River below Flat Creek	N/A	N/A	64.4	64.3	64.0	70	69.5	70.1
Rose Creek above Anvil Creek							65.3	80.7
Yukon River at Marsh Lake Dam	N/A	N/A	100	N/A	100	N/A	100	100
Yukon River above Takhini River	N/A	N/A	100	100	100	93.6	93.6	93.6

- Average Water Quality Index ratings for the Dezadeash, Liard, Klondike, South McQuesten, and Yukon River monitoring stations remained stable during the period 2010 to 2012. Average ratings remained in the Fair to Excellent range in 2010 to 2012.
- The average Water Quality Index rating for the Rose Creek monitoring station, downstream of the historic Faro Mine complex, improved from Fair in 2009 to 2011 to Good in 2010 to 2012. This is due primarily to instances in 2009 in which metal concentrations exceeded water quality objectives. These exceedances are not captured in the most recent rolling average.

[^ BACK TO TOP](#)

### Taking action

- As guided by the *Yukon Water Strategy and Action Plan*, more long-term monitoring networks are being added to the existing list of stations. This includes the Porcupine River at Old Crow, Haggart Creek north of Mayo, and the Eagle and Ogilvie rivers along the Dempster highway. Learn more about implementation of the [Yukon Water Strategy and Action Plan](#).



Daglish Creek.

### Data quality

- Water quality data for the Water Quality Index stations can be found on the [Environment and Climate Change Canada website](#).
- The Water Quality Index measures the frequency and amplitude to which selected parameters exceed water quality objectives.
- Information on the national Water Quality Index used to report water quality data is available at <https://www.ec.gc.ca/indicateurs-indicators/default.asp?lang=En&n=68DE8F72-1>

### Further information

- Visit [www.yukonwater.ca](http://www.yukonwater.ca) to find information about Yukon's water resources and how our water is used, managed and monitored.

### References

- Canadian Council of Ministers of the Environment. 2014. Canadian Environmental Quality Guidelines [cited 2015 June 23]. Available from <http://ceqg-rcqe.ccm.ca/en/index.html>
- Canadian Council of Ministers of the Environment. 2001. Canadian water quality guidelines for the protection of aquatic life: CCME Water Quality Index 1.0, Technical Report. In: Canadian Environmental Quality Guidelines. 1999, updated 2002. Canadian Council of Ministers of the Environment, Winnipeg, Manitoba, Canada.

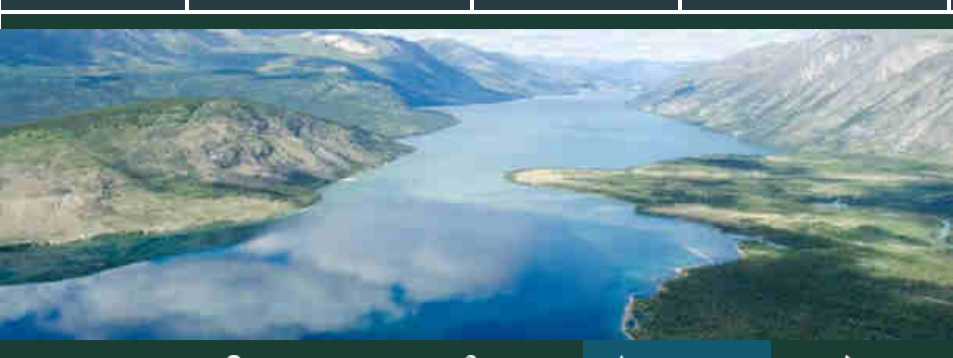
[^ BACK TO TOP](#)



ENVIRONMENT YUKON

Government of Yukon > Environment > State of the Environment Report: Water > Extreme high and low water in lakes and rivers >

CAMPING & PARKS	HUNTING, FISHING & TRAPPING	ANIMALS & HABITAT	MANAGING AIR, WATER & WASTE	ENVIRONMENT & YOU	PUBLICATIONS & MAPS
-----------------	-----------------------------	-------------------	-----------------------------	-------------------	---------------------



Yukon State of the Environment

Reporting on environmental indicators - 2016

HOME	CLIMATE CHANGE	AIR	WATER	LAND	FISH AND WILDLIFE	DOWNLOAD REPORTS
------	----------------	-----	-------	------	-------------------	------------------

LAKES AND RIVERS  
EXTREME HIGH AND LOW WATER IN LAKES AND RIVERS

> SIGNIFICANCE > WHAT IS HAPPENING? > TAKING ACTION

Significance

Water levels in Yukon, both river flows and lake levels, are susceptible to change from a range of processes, including:

- changes to the timing of snowmelt,
- the phase and magnitude of precipitation,
- permafrost thaw,
- shifts in vegetation, and
- melting glaciers.

These are just some of the processes that can alter the flows in lakes and rivers. The response in water flows to these processes may be different in different regions of the territory.

Higher flows in lakes and rivers can cause:

- Increased sedimentation and contaminants in river systems, affecting human health, drinking water and ecosystems.
- Increased flooding potential if peak flows affect populated areas, which can result in infrastructure loss and economic costs.

Low flows in lakes and rivers can cause:

- Increased concentrations of ions, such as dissolved metals, which can negatively affect aquatic ecosystems.

Changes in water flows and groundwater can affect resource development, such as hydro power production, mining practices or agriculture, as well as the availability of water for communities and other local needs.

Increased water flows in the winter, which is generally a low-flow time of year, are a climate change driven trend. It results from warming air temperatures, degrading permafrost, and in some locations, increased precipitation. This trend is expected to continue with future warming, particularly in areas of permafrost where thaw results in increased groundwater flow connections.



Takhini River flowing into Kusawa Lake.

BACK TO TOP

What is happening?

Annual river flow

Thirty-two stations across Yukon monitor for trends in annual minimum and maximum river flows:

- Yukon River: 25 stations
- Alsek River: 3 stations
- Liard River: 3 stations
- Peel River: 2 stations
- Porcupine River: 1 station

28 of 32 long-term river stations measured significant increases over time in the volume of water flowing when the river was at its minimum. No stations indicated that there were declining flows over time (Figure 1).

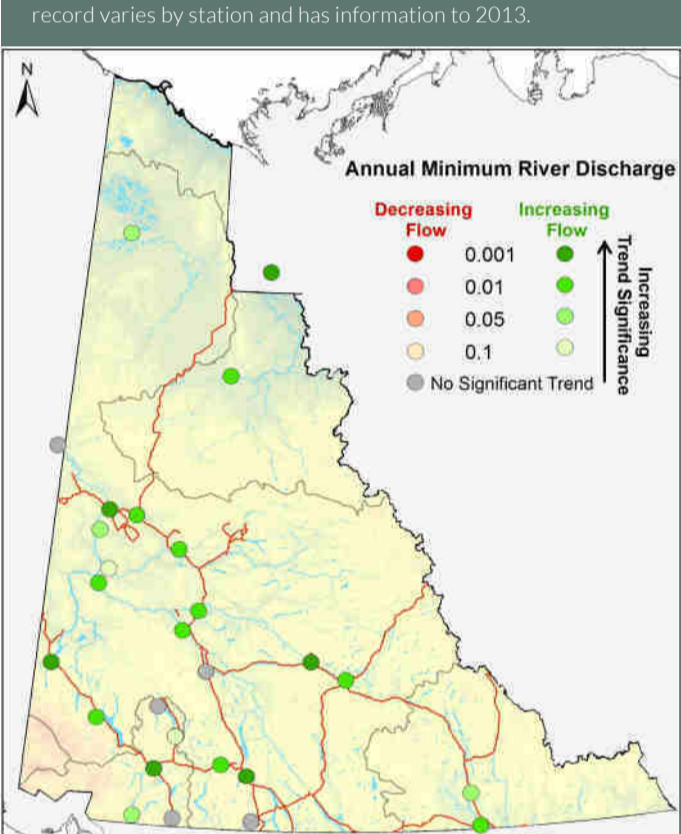
Stations with increasing low flow trends (Figure 1) had a median trend fit of +10 per cent per decade.

Figure 2 shows that most (33 of 34) long-term river stations did not show a significant trend for maximum river flow.

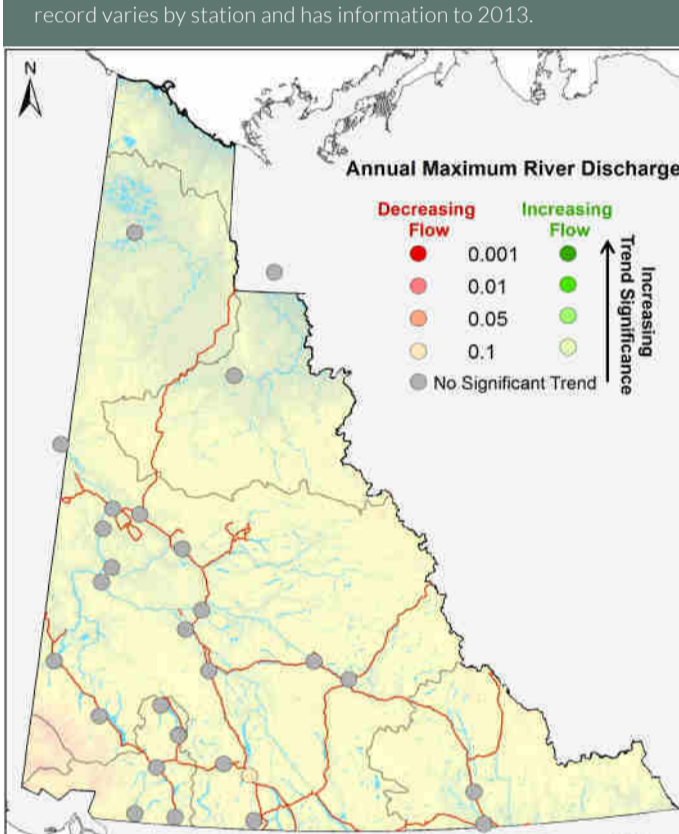
The Whitehorse station measured a significant decrease in annual peak flow volumes (Figure 2), but it has flow volumes which are affected by the Whitehorse dam.

The majority of stations examined are large rivers (29 of 34 are greater than 1,000 km<sup>2</sup>).

FIGURES 1-2: Annual minimum and maximum river flow. Period of record varies by station and has information to 2013.



FIGURES 1-2: Annual minimum and maximum river flow. Period of record varies by station and has information to 2013.



BACK TO TOP

Annual lake levels

In Yukon, there is monitoring for trends in the annual minimum and maximum water levels at six Yukon lakes:

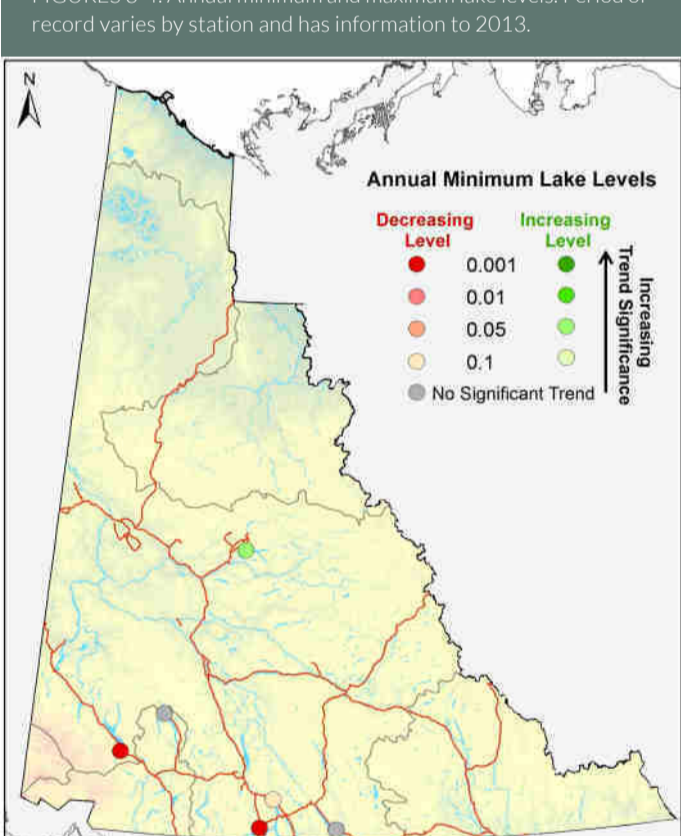
- Bennett Lake
- Kluane Lake
- Marsh Lake
- Mayo Lake
- Aishihik Lake
- Teslin Lake

Three lakes (Bennett, Kluane and Marsh Lake) showed significant declines in low water levels over time (Figure 3); Marsh Lake levels are influenced by the control structure associated with the Whitehorse dam.

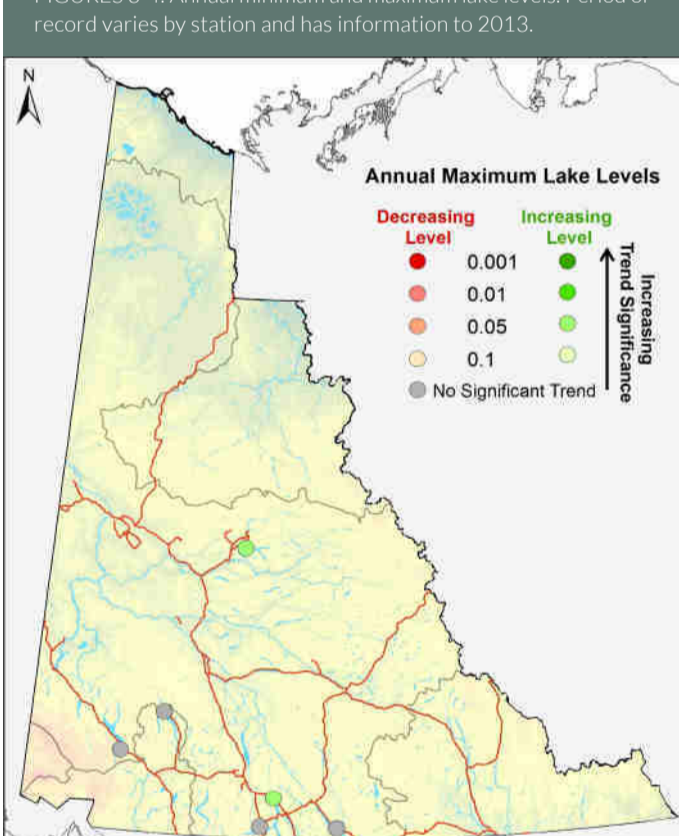
Marsh Lake showed a significant increasing trend in high water levels of 0.5 cm per decade (Figure 4); Marsh Lake is a regulated system because of the Whitehorse dam, but the control structure has a minimal effect during periods of high water levels.

Mayo Lake showed significant increases in both low and high water levels; these levels are influenced by the Mayo dam.

FIGURES 3-4: Annual minimum and maximum lake levels. Period of record varies by station and has information to 2013.



FIGURES 3-4: Annual minimum and maximum lake levels. Period of record varies by station and has information to 2013.

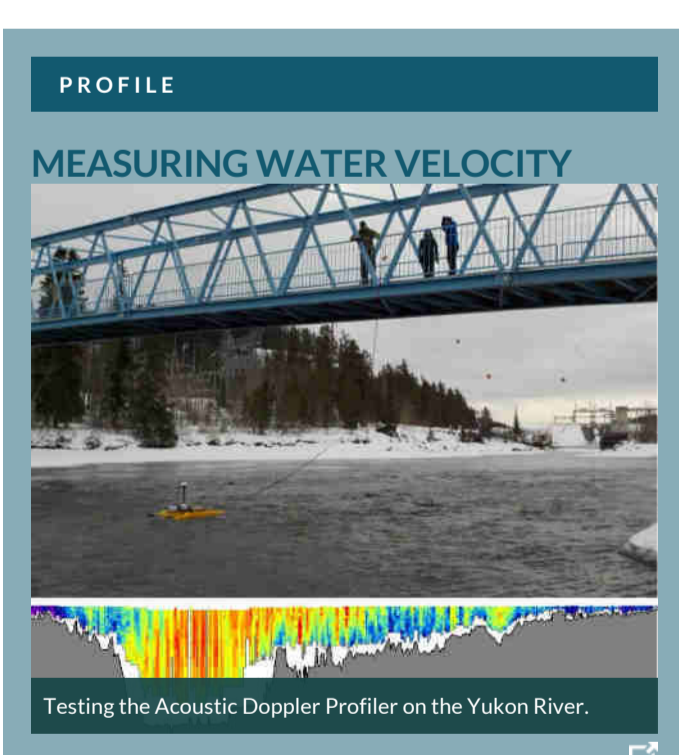


BACK TO TOP

Taking action

Two research projects are underway in collaboration with the Emergency Measures Organization to help Yukon communities prepare for flooding events:

- Yukon flood risk mapping: using high resolution LiDAR elevation data to identify flood prone areas near Yukon communities.
- Development of flood hazard perception stages: categorizing water level stages into severity indices ("Action Flooding", "Minor Flooding", "Moderate Flooding" and "Major Flooding"), that determine when and what action should be taken with an impending flood.



BACK TO TOP

The traditional way that the Department of Environment's Water Resources Branch has measured discharge (volume of flow) in the creeks and rivers we monitor is to wade into the water and measure the depth and velocity at various points across the water column, and use this information to calculate the total flow. One of the biggest challenges is that when the water levels rise, the creeks become impossible or dangerous to wade into. Therefore, we became unable to get measurements at the high flow water levels that are often of the most interest. Previous alternatives to wading into the water were often elaborate, expensive, time-consuming, and did not always produce quality data. The new instrument Water Resources Branch will start using in spring 2016 is a type of Acoustic Doppler Profiler. The sensor is mounted on a pontoon that floats across the water; it shoots high frequency sound waves into the water column which are reflected off particles in the water. Using the Doppler Effect (the same effect you notice when the pitch of an ambulance siren moving towards you sounds different then when it's moving away from you) the sensor can determine how fast the water is moving throughout the water column. The sensor produces a visual of this (see the figure), where different colours show different velocities. It also maps out the precise shape of the stream bottom and so is able to produce high resolution data which is used to calculate the total flow. This technology will produce better data, it will reduce the time needed to perform a measurement, and it will keep field workers safer.

Data quality

- The Water Survey of Canada conducts long-term measurements of large rivers and lakes. They provide summaries of annual peak high and low water based on daily mean values and water levels.
- The Water Survey of Canada provides public access to hydrometric data.
- All stations included in the analysis are active sites that have at least 30 years of peak flow data. The oldest station on record began collecting data in 1943.
- Data from the Water Survey of Canada is typically released two years after data collection; currently data is available to 2013.
- The majority of stations have a current number (less than 5 per cent) of missing years in the record.

Further information

- Visit [www.yukonwater.ca](http://www.yukonwater.ca) to find information about Yukon's water resources and how our water is used, managed and monitored.
- A Government of Yukon Water Resources Branch [presentation about climate change and water](#).



Measuring water levels on Boulder Creek.

References

Environment and Climate Change Canada. n.d. Water Survey of Canada Historical Hydrometric Data. Available from: [www.wateroffice.ec.gc.ca](http://www.wateroffice.ec.gc.ca)

Helsel, D.R., D.K. Mueller, and J.R. Slack. 2006. Computer Program for the Kendall Family of Trend Tests: U.S. Geological Survey Scientific Investigations Report 2005-5275. U.S. Geological Survey, Reston, Virginia U.S.A. Available from: <http://pubs.usgs.gov/sir/2005/5275/pdf/sir2005-5275.pdf>.

BACK TO TOP



**ENVIRONMENT YUKON**

Government of Yukon &gt; Environment &gt; State of the Environment Report: Water &gt; Arctic sea ice extent and volume &gt;

[CAMPING & PARKS](#)
[HUNTING, FISHING & TRAPPING](#)
[ANIMALS & HABITAT](#)
[MANAGING AIR, WATER & WASTE](#)
[ENVIRONMENT & YOU](#)
[PUBLICATIONS & MAPS](#)


# Yukon State of the Environment

Reporting on environmental indicators - 2016

[HOME](#)
[DOWNLOAD REPORTS](#)


## FROZEN

### ARCTIC SEA ICE EXTENT AND VOLUME

[> SIGNIFICANCE](#)   [> WHAT IS HAPPENING?](#)   [> TAKING ACTION](#)

#### Significance

Sea ice melt is the most apparent global indicator of climate change, and is especially relevant for the circumpolar North. As the Earth's energy alters, most of the energy goes into the oceans and the remainder into ice, soil and the atmosphere. The Arctic Ocean is a confluence of these three elements.

Arctic sea ice is melting, indicated by changes in the extent of ice across Arctic and northern oceans as well as changes in the thickness (volume) of that ice. Less and less ice is surviving from one year to the next, and the ice that is lasting for more than one season is thinning significantly.

The net result, if this trend continues, is that summer sea ice will melt out in the Arctic within the next decade or decades. This has wide ranging implications for the Arctic and the globe, including sea level rise, increased coastal erosion, damage to human infrastructure and negative impacts on species that depend on sea ice.



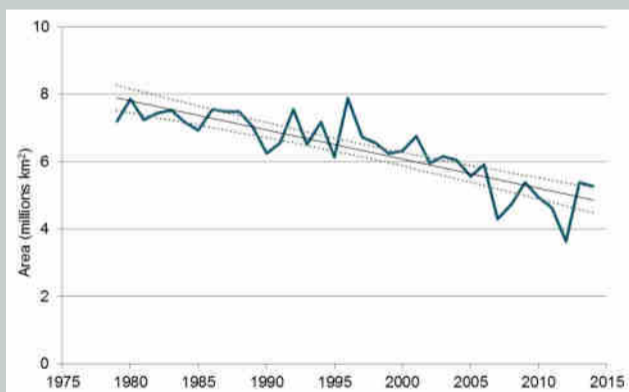
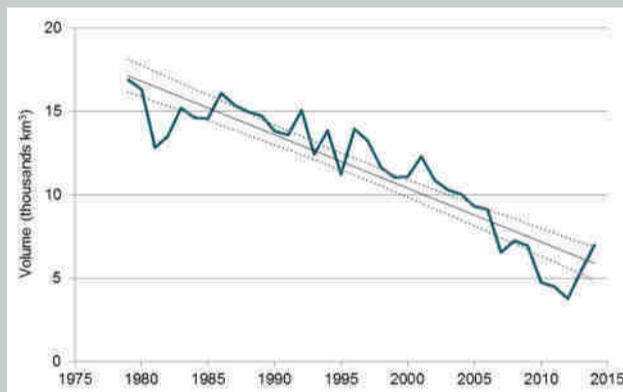
Ice on the Beaufort Sea.

[^ BACK TO TOP](#)

#### What is happening?

- Arctic sea ice is melting, reducing both the area that it covers every year and its overall volume.
- Sea ice melt appears to be accelerating, with most of the melt occurring in the past decade.
- Figure 1 shows the annual extent (area) in September (in millions of square kilometers) of Arctic sea ice with at least 15 per cent ice concentration.

- September sea ice loss averages 90,000 km<sup>2</sup> per year, although there is significant variability from one year to the next.
- Figure 2 shows the annual Arctic September sea ice volume (in thousands of square kilometers).
- Approximately 300 km<sup>3</sup> of sea ice volume is lost per year. Existing sea ice is becoming thinner.

**FIGURE 1: Arctic September Sea Ice Extent**

**FIGURE 2: Arctic September Sea Ice Volume**

[^ BACK TO TOP](#)

#### Taking action

The Government of Yukon partnered with the Northern Climate ExChange at Yukon College on developing a *Yukon Climate Change Indicators and Key Findings* report. This cross-sector, structured, evidence-based assessment of Yukon climate change knowledge synthesizes our current understanding, providing researchers, decision makers and the general public with an objective overview of the climate system and any potential changes. Sea ice extent and volume are two indicators presented in this report.

Reducing [GHG emissions in Yukon](#) will help to reduce the long-term negative impacts of the trends presented in this indicator.



Beaufort Sea, ice along Herschel Island shoreline.

#### Data quality

- Since sea ice has such a wide annual variation in distribution, it is typical to compare data from a particular month over time. Most often September is used as sea ice reaches its minimum extent each year in September.
- The National Snow and Ice Data Centre gather satellite data to make calculations for sea ice extent. You can find this data [online](#).
- For sea ice volume, data is made available by the University of Washington Pan-Arctic Ice-Ocean Modeling and Assimilation System (PIOMAS) [online](#).

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National Snow and Ice Data Center. 2015. Sea Ice Index, Version 1. University of Colorado, Boulder, Colorado, U.S.A. Available from: <http://nsidc.org/data/g02135.html>

Polar Science Center, Applied Physics Laboratory. 1979-2016. PIOMAS Daily Ice Volume Data, 1979-present [cited 2016, Mar 3]. University of Washington, Seattle, Washington, U.S.A. Available from: <http://psc.apl.uw.edu/research/projects/arctic-sea-ice-volume-anomaly/data/>

Streiker, J. 2016. Yukon Climate Change Indicators and Key Findings 2015. Northern Climate ExChange, Yukon Research Centre, Yukon College, Whitehorse, Yukon, Canada. Available from: <https://www.yukoncollege.yk.ca/research/abstracts/indicators>.

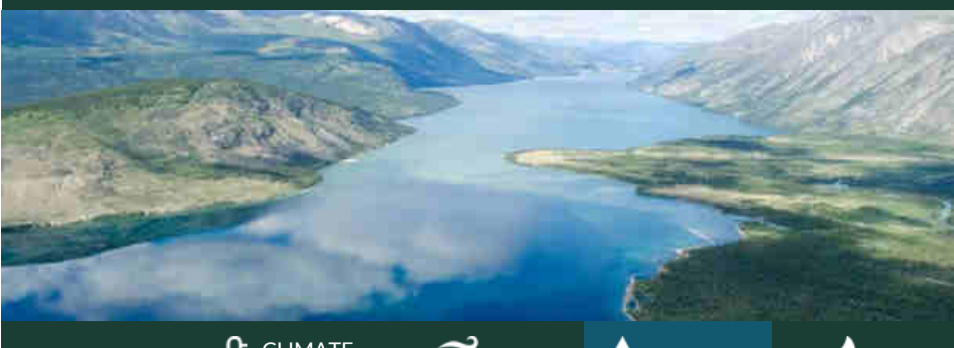
[^ BACK TO TOP](#)



ENVIRONMENT YUKON

Government of Yukon > Environment > State of the Environment Report: Water > Snow accumulation >

- CAMPING & PARKS
- HUNTING, FISHING & TRAPPING
- ANIMALS & HABITAT
- MANAGING AIR, WATER & WASTE
- ENVIRONMENT & YOU
- PUBLICATIONS & MAPS



# Yukon State of the Environment

Reporting on environmental indicators - 2016

- HOME
- CLIMATE CHANGE
- AIR
- WATER
- LAND
- FISH AND WILDLIFE
- DOWNLOAD REPORTS

## FROZEN

### SNOW ACCUMULATION

- > SIGNIFICANCE
- > WHAT IS HAPPENING?
- > TAKING ACTION

### Significance

The accumulation of snow is determined through measuring the snow water equivalent at survey stations across Yukon. This is a measurement of the liquid water volume held within a snowpack that can be available when melted.

- Larger snowpacks (with more water) contribute to an increased likelihood of **higher spring flows**. Therefore, measuring the snow accumulation through snow water equivalent is a major component of spring flood forecasting.
- The size of snowpack can also influence the timing and severity of **river ice break-up**.
- Larger snowpacks (deeper snow) act to further insulate the ground surface from cold winter air temperatures and can further promote permafrost thaw.
- Many other processes also have the potential to be influenced by changes in snow water equivalent including wildfire risk, shifts in vegetation, soil thermal regimes, and transportation.
- Warming spring air **temperatures** over the past several decades leads to earlier snowmelt, and this trend is expected to continue.
- Climate change projections generally indicate an increase in winter precipitation over a shorter snowfall period, and a higher proportion of precipitation occurring as rainfall. These contradicting processes to snow accumulation may induce a complex response that may vary significantly by region and over time.



Wolf Creek snow survey.

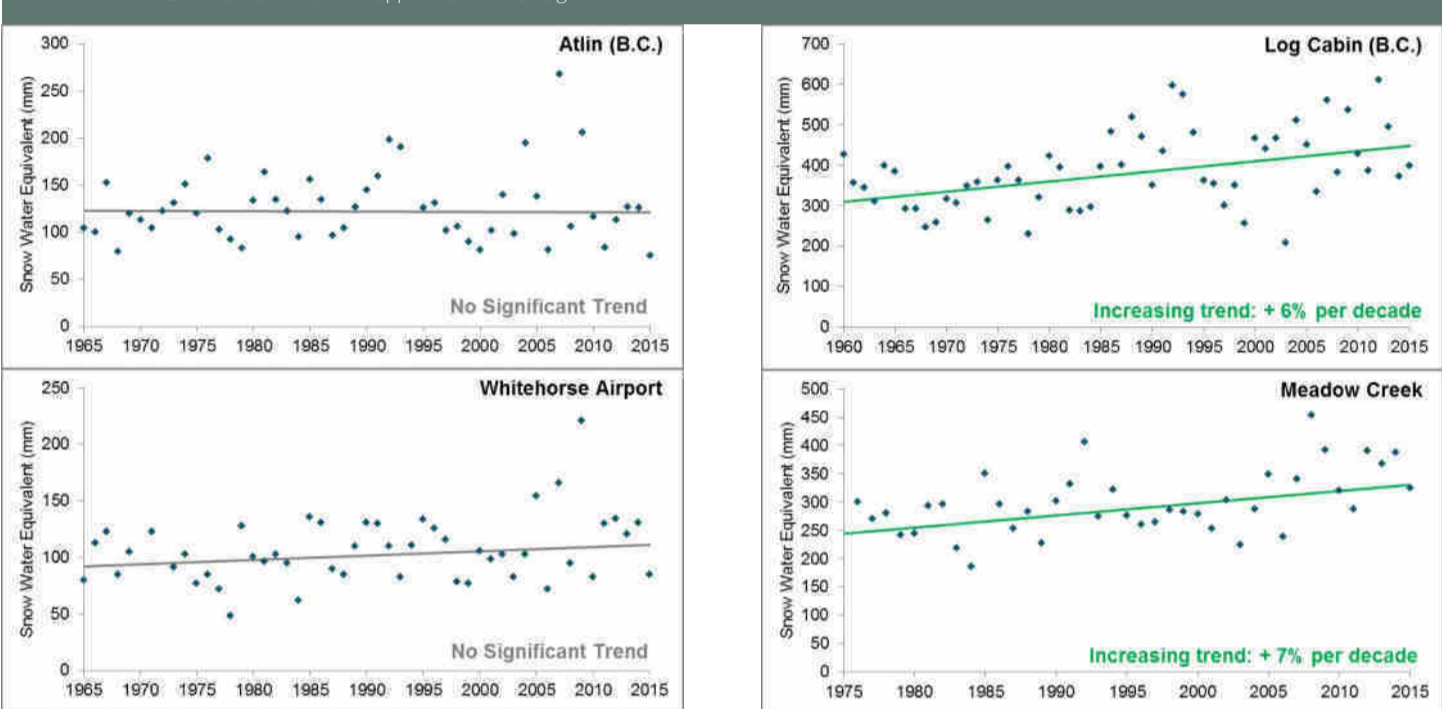
[^ BACK TO TOP](#)

### What is happening?

There has been a significant increase in the snow water equivalent, ranging from increases of six to 10 per cent per decade, measured at six of the 14 long-term snow survey stations analysed. There are no stations with long-term records available in the far north of the territory. None of the sites measured showed significant decreasing trends.

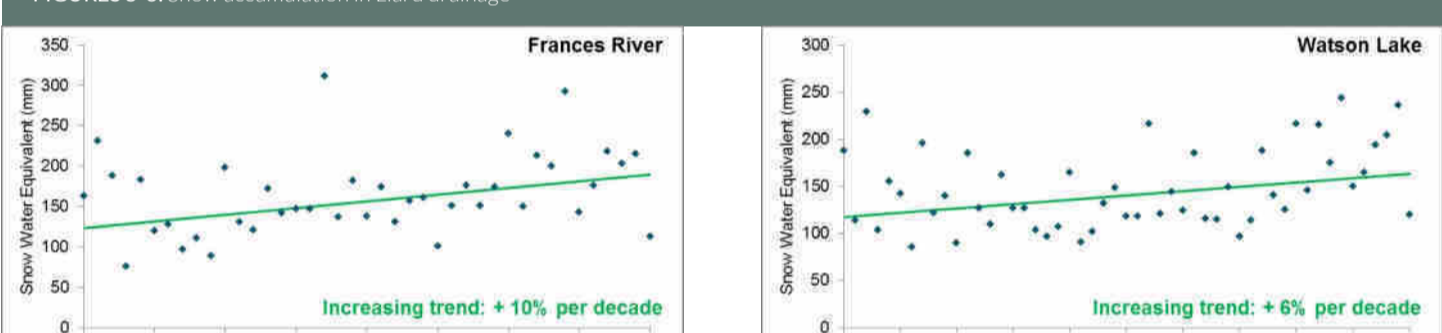
The significant increase in snow accumulation in the last several decades indicates an increase in **winter precipitation**. Sites with increasing trends in snow over time occurred in the Mayo-Dawson region and towards the Yukon-B.C. border.

FIGURES 1-4: Snow accumulation in upper Yukon drainage



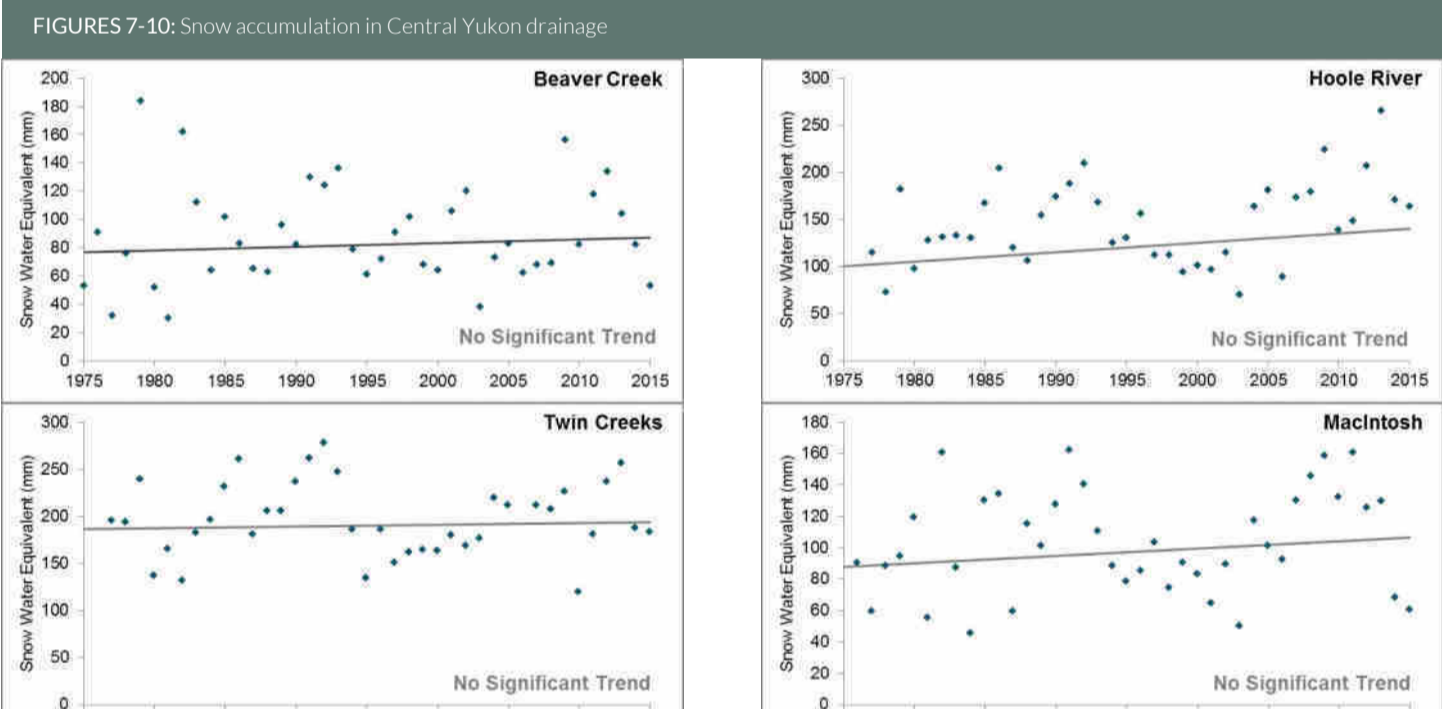
- The stations at both Log Cabin and Meadow Creek showed significant increasing trends in snow accumulation; these were +6 per cent and +7 per cent per decade, respectively.

FIGURES 5-6: Snow accumulation in Liard drainage



- The stations in the Liard drainage showed the most significant trends. Frances Creek station had a 10 per cent increase per decade and Watson Lake station had a six per cent increase per decade.

FIGURES 7-10: Snow accumulation in Central Yukon drainage

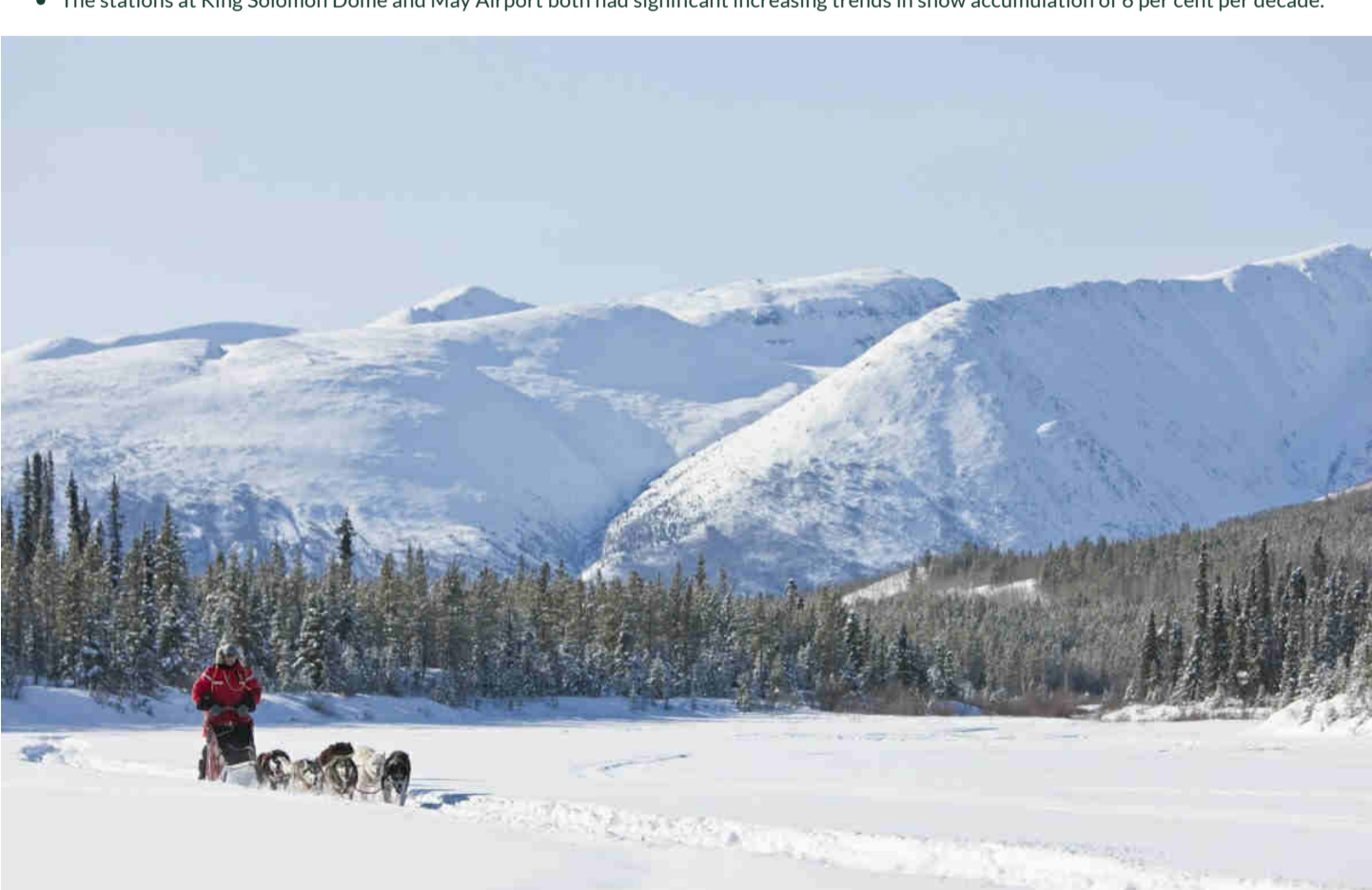


- There were no significant trends noted at any of the Central Yukon stations.

FIGURES 11-14: Snow accumulation in Lower Yukon - Peel drainage



- The stations at King Solomon Dome and May Airport both had significant increasing trends in snow accumulation of 6 per cent per decade.



Dog mushing in Ibx Valley. F. Mueller.

[^ BACK TO TOP](#)

### Taking action

The Department of Environment's Water Resources staff continue to collect data, as do their partners in Yukon's remote areas including private contractors and staff from the Department of Energy, Mines and Resources. Water Resources compiles and quality controls all snow accumulation data.



Snowmobiling at Fish Lake, Marten Berkman.

[^ BACK TO TOP](#)

### Data quality

- Access archived snow survey bulletins: [http://www.env.gov.yk.ca/air-water-waste/snow\\_survey.php](http://www.env.gov.yk.ca/air-water-waste/snow_survey.php)
- Current snow survey data from across Alaska and Yukon can be viewed on an [interactive map](#) made available through a United States Department of Agriculture webpage.
- There are currently 52 snow survey stations located across Yukon, with an additional four in adjacent areas of Alaska and British Columbia that are used by Water Resources. Most areas of Yukon have good spatial coverage with the exception of the far north, where stations are sparse.

### Further information

- Visit <http://www.yukonwater.ca> to find information about Yukon's water resources and how our water is used, managed and monitored.
- A Government of Yukon Water Resources Branch [presentation about climate change and water](#).

### References

Helsel, D.R., D.K. Mueller and J.R. Slack. 2006. Computer Program for the Kendall Family of Trend Tests: U.S. Geological Survey Scientific Investigations Report 2005-5275. U.S. Geological Survey, Reston, Virginia, U.S.A. Available from <http://pubs.usgs.gov/sir/2005/5275/pdf/sir2005-5275.pdf>.

[^ BACK TO TOP](#)



## ENVIRONMENT YUKON

Government of Yukon > Environment > State of the Environment Report: Land >

CAMPING & PARKS	HUNTING, FISHING & TRAPPING	ANIMALS & HABITAT	MANAGING AIR, WATER & WASTE	ENVIRONMENT & YOU	PUBLICATIONS & MAPS
-----------------	-----------------------------	-------------------	-----------------------------	-------------------	---------------------



# Yukon State of the Environment

Reporting on environmental indicators - 2016

HOME	CLIMATE CHANGE	AIR	WATER	<b>LAND</b>	FISH AND WILDLIFE	DOWNLOAD REPORTS
------	----------------	-----	-------	-------------	-------------------	------------------

	<a href="#">&gt; PLANNING</a>	<a href="#">&gt; LAND USE ACTIVITIES</a>	<a href="#">&gt; SOLID WASTE</a>	<a href="#">&gt; FORESTS</a>	<a href="#">&gt; WETLANDS</a>	<a href="#">&gt; INVASIVE SPECIES</a>
--	-------------------------------	--	----------------------------------	------------------------------	-------------------------------	---------------------------------------

### PLANNING

#### Population of Yukon

Yukon's population is on the rise. Population density is only 0.1 people per square kilometer.

#### Regional land use planning

There are seven planning regions identified in Yukon with plans completed for one region.

#### Forest resource management plans

Forest resource management plans are in place for the Tr'ondëk Hwëch'in, Teslin Tlingit, and Champagne and Aishihik Traditional Territories.

#### Community and local area planning

In order to plan for long-term sustainability, all eight Yukon municipalities have official community plans and there are local area plans for eight of Yukon's unincorporated communities.

#### Status of parks and protected areas

Land identified for conservation purposes in Yukon amount to a total of 63,275 km<sup>2</sup> of the territory. Of that, 61,486 km<sup>2</sup> or 12.7 per cent are protected lands.

[^ BACK TO TOP](#)

### LAND USE ACTIVITIES

#### Environmental and socio-economic assessments

The Yukon Environmental and Socio-economic Assessment Board assessed 190 project proposals in 2014. The majority of project assessments were received in the Whitehorse and Dawson City areas.

#### Recreational land use

In 2015, the Government of Yukon's campgrounds included 41 campgrounds and 12 day-use recreation sites. Yukon residents are increasingly using territorial campgrounds.

[^ BACK TO TOP](#)

### SOLID WASTE

#### Waste handled at the Whitehorse Waste Management Facility

The total amount of waste diverted from the Whitehorse landfill by composting and recycling has increased by 85 per cent since 2012.

[^ BACK TO TOP](#)

### FORESTS

#### Area of fire burned annually and number of Yukon wildland fires



Dramatic fluctuations in area burned occur annually. Fires greater than 200 hectares usually represent a small percentage of all fires but account for most of the overall area burned.

#### Fire ignition points

Human caused fires are clustered near settlements and roads; in most cases, the area burned by human caused fires is small in relation to the area burned by naturally occurring fires.

#### Forest health



The most significant disturbance detected in the 2015 Forest Health Survey was caused by large aspen tortrix—a moth that defoliates trembling aspen.

[^ BACK TO TOP](#)

### WETLANDS

#### Wetlands

There have been a number of wetland initiatives carried out by the Government of Yukon over the last 15 years, including wetland classification, best practices, environmental assessment, inventory, management planning for specific wetlands, and monitoring of environmental change.

[^ BACK TO TOP](#)

### ALIEN AND INTRODUCED SPECIES

#### Presence of alien and introduced species



As of November 2015, an estimated 169 alien plant species have been identified in Yukon. Twenty of these are considered invasive. Other species that have been introduced to Yukon include three mammal, four bird, and two fish species.

[^ BACK TO TOP](#)



## ENVIRONMENT YUKON

Government of Yukon > Environment > State of the Environment Report: Land > Population of Yukon >

- CAMPING & PARKS
- HUNTING, FISHING & TRAPPING
- ANIMALS & HABITAT
- MANAGING AIR, WATER & WASTE
- ENVIRONMENT & YOU
- PUBLICATIONS & MAPS



# Yukon State of the Environment

Reporting on environmental indicators - 2016

HOME

CLIMATE CHANGE

AIR

WATER

LAND

FISH AND WILDLIFE

DOWNLOAD REPORTS



## PLANNING

### POPULATION OF YUKON

> SIGNIFICANCE

> WHAT IS HAPPENING?

#### Significance

Human population can have an impact on the state of the environment based on:

- how many people there are (population growth);
- where those people live (population distribution); and
- how close together they are (population density).

Keeping track of these three population indicators can help in analyzing and predicting the impact that human activities can have on the environment.

The distribution and density of Yukon's population may have an impact on [where land use activities take place](#); however land use is also determined by opportunities for development. For information on Yukon's economy, visit the [Yukon Bureau of Statistics](#). Land use activities are managed through environmental assessments and land use planning.



People enjoying the Dawson City Music Festival.

[^ BACK TO TOP](#)

#### What is happening?

Overall Yukon's population density is very low. On the 2011 census, there were 0.1 people for every square kilometer in Yukon.

Table 1: 2015 Population, growth, and density of Yukon communities.

	2015 population	Population growth from 2014 (per cent change)	2011 Population density (people per square kilometer)
BEAVER CREEK	121	5.2%	3.8
BURWASH LANDING	107	-4.5%	3.2
CARCROSS	504	7.9%	20.3
CARMACKS	557	-1.1%	13.6
DAWSON CITY	2,067	0.4%	40.7
DESTRUCTION BAY	50	19.0%	2.6
FARO	375	-2.1%	1.7
HAINES JUNCTION	895	-1.4%	17.2
MAYO	477	-3.0%	213.2
OLD CROW	258	-2.3%	17.3
PELLY CROSSING	378	-4.8%	10.4
ROSS RIVER	411	2.8%	17.1
TAGISH	262	-3.3%	8.6
TESLIN	480	2.1%	65.7
WATSON LAKE	1,469	-4.2%	131.3
WHITEHORSE / MARSH LAKE	28,872	0.6%	7.5
YUKON TOTAL	37,343	0.2%	0.1

Yukon's population is not distributed evenly across the territory. There are many more people residing in southern Yukon, with approximately 77 per cent living in the Whitehorse / Marsh Lake area. The population density of this area, however, is still low at 7.5 people per square kilometer because the area boundaries incorporate Whitehorse and all surrounding areas (Ibex Valley, McPherson/Grizzly Valley, Marsh Lake and Mount Lorne).

Overall, Yukon's population is on the rise. Over the past 10 years (2005 to 2015), the population increased by 6,121 people, or 16.4 per cent. Over the past year (2014 to 2015), the total Yukon population increased by 92 people, or 0.2 per cent. The increase in population is mostly due to changes in the Whitehorse/Marsh Lake area.

Yukon's community populations have been fairly stable since 1990. One exception is Faro, as the population was tied to the operation of the Faro mine that closed in April 1993, reopened in August 1995 and then closed permanently in January 1998.

For more information on Yukon community socio-economics visit the [Government of Yukon Socio-Economic Web Portal](#).

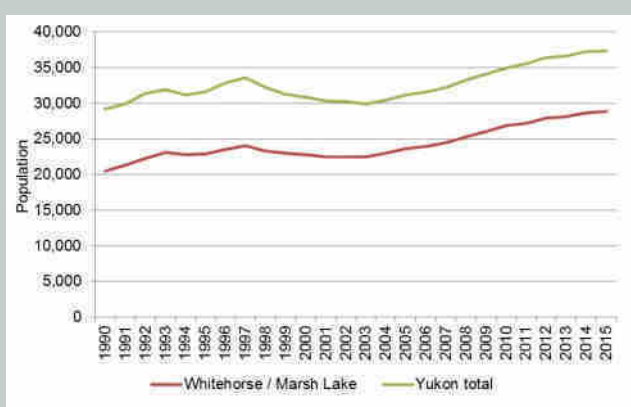


Haines Junction.

#### Data quality

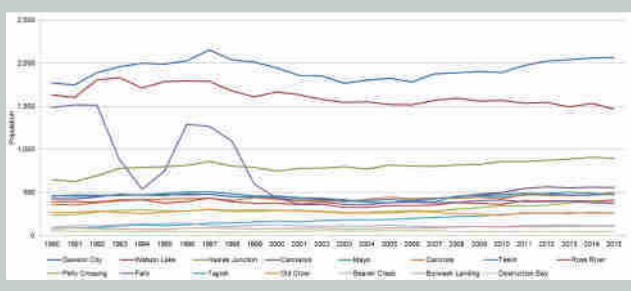
Population density is calculated during the Statistics Canada census; therefore, the most current data is from 2011. For the census, Statistics Canada divides data into 37 geographic census subdivisions that are different from the community divisions that Yukon Bureau of Statistics uses for population estimates. For this reason, use population density information with care.

FIGURE 1: Population of Whitehorse compared to total population in Yukon.



\* Due to a change in methodology in 2015, revised figures for the period from April 2011 to December 2014 are not strictly comparable to figures prior to that period.

FIGURE 2: Yukon community populations, 1990-2015.



\* Due to a change in methodology in 2015, revised figures for the period from April 2011 to December 2014 are not strictly comparable to figures prior to that period.

[^ BACK TO TOP](#)



Street fair in Whitehorse.

[^ BACK TO TOP](#)



ENVIRONMENT YUKON

Government of Yukon > Environment > State of the Environment Report: Land > Regional land use plans >

CAMPING & PARKS	HUNTING, FISHING & TRAPPING	ANIMALS & HABITAT	MANAGING AIR, WATER & WASTE	ENVIRONMENT & YOU	PUBLICATIONS & MAPS
-----------------	-----------------------------	-------------------	-----------------------------	-------------------	---------------------



# Yukon State of the Environment

Reporting on environmental indicators - 2016

HOME	CLIMATE CHANGE	AIR	WATER	LAND	FISH AND WILDLIFE	DOWNLOAD REPORTS
------	----------------	-----	-------	------	-------------------	------------------

## PLANNING

### REGIONAL LAND USE PLANS

[> SIGNIFICANCE](#)  
 [> WHAT IS HAPPENING?](#)  
 [> TAKING ACTION](#)

### Significance

Developing long-term management plans through public processes helps governments recognize and balance competing views about how lands and natural resources should be used.

Plans are tools that support effective management and are important obligations arising from land claims agreements. Regional planning is intended to reflect the Traditional Knowledge, experience and recommendations of residents, as well as incorporate science and broad socio-economic and environmental interests.

[^ BACK TO TOP](#)

### What is happening?



<b>NORTH SLOPE</b> Regional Land Use Planning Status	<p><b>Status:</b> N/A</p> <p><b>Background:</b> The Yukon North Slope is part of the Inuvialuit Settlement Region. As such, the provisions set out in the Inuvialuit Final Agreement speak to how land use planning processes are to be undertaken. The Final Agreement provides for the Inuvialuit to be effectively involved in all bodies, functions, and decisions pertaining to land and wildlife management in the Inuvialuit Settlement Region.</p>
<b>NORTH YUKON</b> Regional Land Use Planning Status	<p><b>Status:</b> Current 2009</p> <p><b>Background:</b> In 2009, the Vuntut Gwitchin First Nation and Yukon government approved the North Yukon Regional Land Use Plan. It provides a sustainable development framework for land management, while addressing the key issues of oil and gas development in Porcupine caribou herd habitat and development impacts in wetlands. The plan also recommends protected area status for the Whitefish Wetlands and the Summit Lake-Bell River area. It identifies important traditional use and wildlife areas that were mapped from local and traditional knowledge.</p>
<b>PEEL WATERSHED</b> Regional Land Use Planning Status	<p><b>Status:</b> On Hold</p> <p><b>Background:</b> There is a staking moratorium across the Peel Watershed regional land use planning region, which expires on January 1, 2018. Work on existing mineral claims is allowed.  Land use planning will continue for the Peel Watershed Region once the final outcome from the Peel court challenge is known and the Parties agree on a path forward.</p>
<b>DAWSON</b> Regional Land Use Planning Status	<p><b>Status:</b> On Hold</p> <p><b>Background:</b> The Dawson Planning Commission produced and consulted on a Resource Assessment Report and Plan Alternatives.  In December, 2014, the Yukon government, Vuntut Gwitchin and Tr'ondak Hwech'in agreed to pause the Dawson planning process until after the Peel court process reaches its ultimate conclusion and the Parties agree to a path forward for planning in the Yukon.</p>
<b>NORTHERN TUTCHONE</b> Regional Land Use Planning Status	<p><b>Status:</b> Not started</p> <p><b>Background:</b> This region's planning boundaries have not been established.</p>
<b>WHITE RIVER</b> Regional Land Use Planning Status	<p><b>Status:</b> N/A</p> <p><b>Background:</b> Regional planning as envisioned in the Yukon Final Agreements will not occur in the White River Core Area. White River First Nation does not have a Final Agreement.</p>
<b>KLUANE</b> Regional Land Use Planning Status	<p><b>Status:</b> Not started</p> <p><b>Background:</b> In September 2011, the Yukon Land Use Planning Council recommended the Klwane Region as a priority planning region and work has begun on a Terms of Reference for a planning commission.</p>
<b>TESLIN</b> Regional Land Use Planning Status	<p><b>Status:</b> On hold</p> <p><b>Background:</b> The initial Teslin planning process was suspended in 2004 before a Draft Plan was produced. In September 2011, the Yukon Land Use Planning Council recommended the Teslin Region as a priority planning region and work has begun on a Terms of Reference for a planning commission.</p>
<b>WHITEHORSE</b> Regional Land Use Planning Status	<p><b>Status:</b> Not started</p> <p><b>Background:</b> This region's planning boundaries have not been established.</p>
<b>KASKA</b> Regional Land Use Planning Status	<p><b>Status:</b> N/A</p> <p><b>Background:</b> Regional planning as envisioned in the Yukon Final Agreements will not occur in the Kaska Traditional Territory. The Kaska First Nations do not have a Final Agreement.</p>

- There are seven planning regions in Yukon, with plans completed for one region.
- No regional land use planning processes are currently being undertaken in Yukon. Various projects are underway to lend clarity to how regional land use planning will be conducted in the future.

[^ BACK TO TOP](#)



**ENVIRONMENT YUKON**

Government of Yukon &gt; Environment &gt; State of the Environment Report: Land &gt; Forest Resource Management Planning &gt;

[CAMPING & PARKS](#)
[HUNTING, FISHING & TRAPPING](#)
[ANIMALS & HABITAT](#)
[MANAGING AIR, WATER & WASTE](#)
[ENVIRONMENT & YOU](#)
[PUBLICATIONS & MAPS](#)


# Yukon State of the Environment

Reporting on environmental indicators - 2016

[HOME](#)
[CLIMATE CHANGE](#)
[AIR](#)
[WATER](#)
[LAND](#)
[FISH AND WILDLIFE](#)
[DOWNLOAD REPORTS](#)


## PLANNING

### FOREST RESOURCE MANAGEMENT PLANNING

[> SIGNIFICANCE](#)
[> WHAT IS HAPPENING?](#)

#### Significance

Forest management is a combination of planned forest-related activities, ranging from forest protection, health and conservation to forest harvesting and renewal.

The *Forest Resources Act* outlines the planning process, purpose, and scope of forest resources management plans in accordance with Chapter 17 of First Nations Final Agreements.

Forest inventory projects enable annual allowable cut review and timber supply analysis to support implementation of forest resource management plans. The inventory data and subsequent timber supply review is used to identify a sustainable rate of harvest for a forest planning area.

There are three levels of [Yukon forest planning](#): forest resources management plans, timber harvest plans and site plans. These plans lead to sustainable use of forests and define the land base and practices used in forest management.

In support of forest planning implementation, forest inventory projects enable an annual allowable cut review and timber supply analysis. The inventory data and subsequent timber supply review is used to identify a sustainable rate of harvest for a forest planning area (known as an Annual Allowable Cut).

#### PROFILE

### DO FOREST HARVESTING TECHNIQUES IMPACT CARIBOU HABITAT?



Bull caribou.

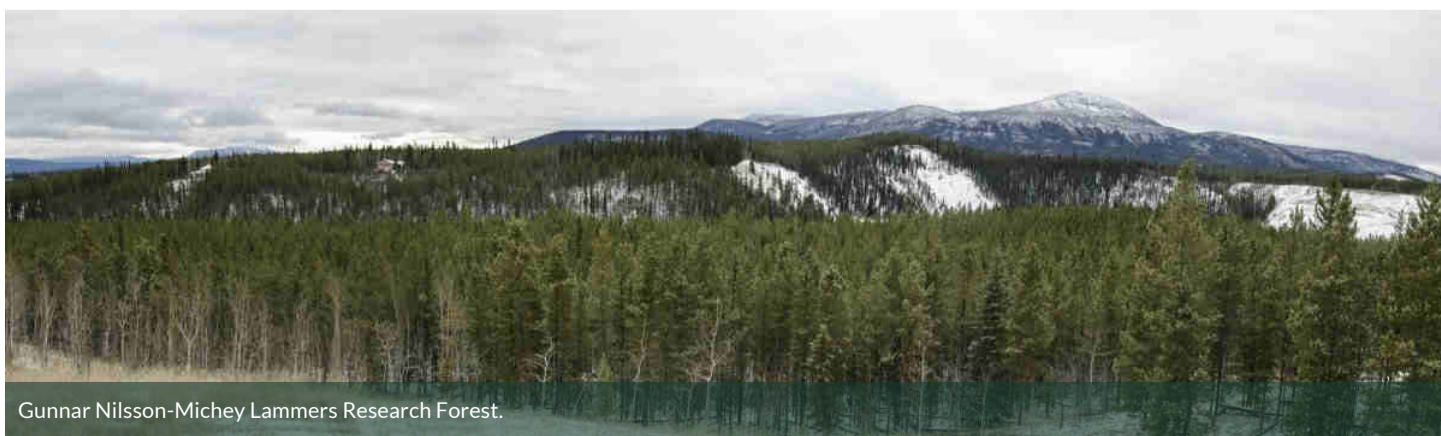

[^ BACK TO TOP](#)

Since 2009, the departments of Energy, Mines and Resources and Environment have been working on a long-term study about how different forest harvesting techniques may impact caribou habitat. The Variable Retention Harvesting Study, led by Forest Management branch, focusses on the growth of caribou lichen in the Lewes Marsh area south of Whitehorse. EMR Communications prepared this video in cooperation with staff from Forest Management branch and Yukon Environment. Please click on this link to view: <https://www.youtube.com/user/emryukongovernment>

#### What is happening?

- Plans have been completed for the Tr'ondëk Hwëch'in, Teslin Tlingit, and Champagne and Aishihik Traditional Territories.
- In 2013, the Champagne and Aishihik First Nations and the Government of Yukon signed a renewed three-year implementation agreement that enables the parties to continue working collaboratively under the Strategic Forest Management Plan in the Champagne and Aishihik Traditional Territory.
- Work is underway to produce a forest management plan in the Whitehorse/ Southern Lakes planning area. The process includes participation from the Carcross/Tagish First Nation, the Kwanlin Dün First Nation and the Ta'an Kwäch'än Council.
- The Department of Energy, Mines and Resources is working with Kaska to finalize a forest resources management plan for southeast Yukon.
- Forest inventory projects were underway at the end of 2013 in the Haines Junction, Whitehorse and Southern Lakes regions, with one planned for the Dawson Region.

Forest Resources Management Plans	Status
Champagne and Aishihik Traditional Territory Strategic Southwest Forest Management Plan	Current 2004
Dawson Forest Resources Management Plan	Current 2013
Forest Management Plan for the Teslin Tlingit Traditional Territory	Current 2006
Integrated Landscape Plan For the Champagne and Aishihik Traditional Territory	Current 2011
Southern Lakes Forest Resources Management Plan	Underway
Southeast Forest Resources Management Plan	Underway

[^ BACK TO TOP](#)


Gunnar Nilsson-Michey Lammers Research Forest.

[^ BACK TO TOP](#)



ENVIRONMENT YUKON

Government of Yukon > Environment > State of the Environment Report: Land > Community and local area planning >

- CAMPING & PARKS
- HUNTING, FISHING & TRAPPING
- ANIMALS & HABITAT
- MANAGING AIR, WATER & WASTE
- ENVIRONMENT & YOU
- PUBLICATIONS & MAPS



# Yukon State of the Environment

Reporting on environmental indicators - 2016

- HOME
- CLIMATE CHANGE
- AIR
- WATER
- LAND
- FISH AND WILDLIFE
- DOWNLOAD REPORTS



## PLANNING

### COMMUNITY AND LOCAL AREA PLANNING

- > SIGNIFICANCE
- > WHAT IS HAPPENING?

#### Significance

Long-term planning helps to define a community's vision for the future and how it can move forward in that direction. Plans provide guidelines and policies to balance competing views for land use, and make sure that future development and growth occur in an orderly manner.

Planning provides property owners and local residents with the opportunity to influence the decisions about the use of land in their community while ensuring that broader public interests are taken into consideration, such as those identified through Yukon and First Nation government legislation and policies.

Yukon has eight municipalities that are required by the *Municipal Act* to develop official community plans. These documents guide land use and development within their boundaries. A local area plan is a similar document that is prepared for areas outside of municipalities. While there is no legislative requirement for developing these, the governments of Yukon and First Nations have been working on developing local area plans to ensure the orderly and goal-oriented development of unincorporated communities in Yukon.

Values workshop for the development of the Carcross Local Area Plan.



[^ BACK TO TOP](#)

#### What is happening?

##### Official Community Plans

- All eight Yukon municipalities have official community plans.
- The most recent update was for the *Faro Official Community Plan* in 2014.



Carcross.

Table 1: Status of planning for municipalities in 2015

Official Community Plans	Approved
Faro	2014
Carmacks	2013
Haines Junction	2013
Dawson	2012
Teslin	2010
Watson Lake	2010
Whitehorse	2010
Mayo	2006

##### Local Area Plans

Local area planning is done for unincorporated communities and typically includes private, Yukon and Settlement Lands. As official community plans, local area plans include policies and maps that designate areas for different uses, such as Residential, Recreational or Industrial.

With the exception of the Carcross/Tagish First Nation Self-Government Agreement, local area plans are not required by law. However, once a plan has been developed, plan provisions can be enforced through legislation and policies, such as the *Subdivision Act* and the *Area Development Act*.

The *Subdivision Act* requires any subdivision to conform to a local area plan. The *Area Development Act* stipulates the development of development area (zoning) regulations that must be based on the policies of an applicable local area plan. Besides dividing areas into specific classes of land use such as Downtown Residential, Public Use or Light Industrial, zoning regulations also state how a parcel can be developed, such as the number of dwellings, their height, use and setback from property lines. Zoning regulations are enforced through development permits.

In the past, zoning regulations have been developed without first developing a local area plan. Today, the governments strive to develop local area plans before developing zoning regulations in order to ensure the best use of land over time.

- In 2014, eight local area plans were in place. Plans are currently underway for three areas, with the Marsh Lake plan in its final development stage (Table 2).
- For up-to-date information about local area plans and to access completed plans, visit the Department of Energy, Mines and Resources [website](#).



Fox Lake Local Area Plan, public meeting.

Table 2: Status of local area plans and development area (zoning) regulations for unincorporated communities in 2015

Development Area	Local Area Plan (date of approval)	Zoning Regulation (date of approval or last comprehensive update)
<b>Carcross</b>	2014	1976
<b>West Dawson/Sunnydale</b>	2013	1990
Golden Horn	2004	2011
Watsix Eetí	Part of Golden Horn Local Area Plan	2011
Hotsprings Road	2002	2005
Deep Creek	2001	2011
Hamlet of Ibex Valley	2001	2010
Hamlet of Mount Lorne	1995	2006
<b>Marsh Lake</b>	Underway	for M'Clintock Place
M'Clintock Place	Part of future Marsh Lake Local Area Plan	1996
<b>Fox Lake</b>	Underway	None
<b>Tagish</b>	Underway	None
Remote Recreational Lots (Lake Bennett and Tagish Lake)		2014
Mayo Road		2013
Little Teslin Lake Recreation		2010
Jackfish Bay		2000
Grizzly Valley		1996
Klondike Valley		1992
Mendenhall		1990
Pine Lake		1990
Bear Creek		1983
Destruction Bay		1980
Dempster Highway		1979
Ross River		1978
Whitehorse Periphery		1978

NOTE: Bolded areas indicate where joint planning is occurring between the governments of Yukon and First Nations.

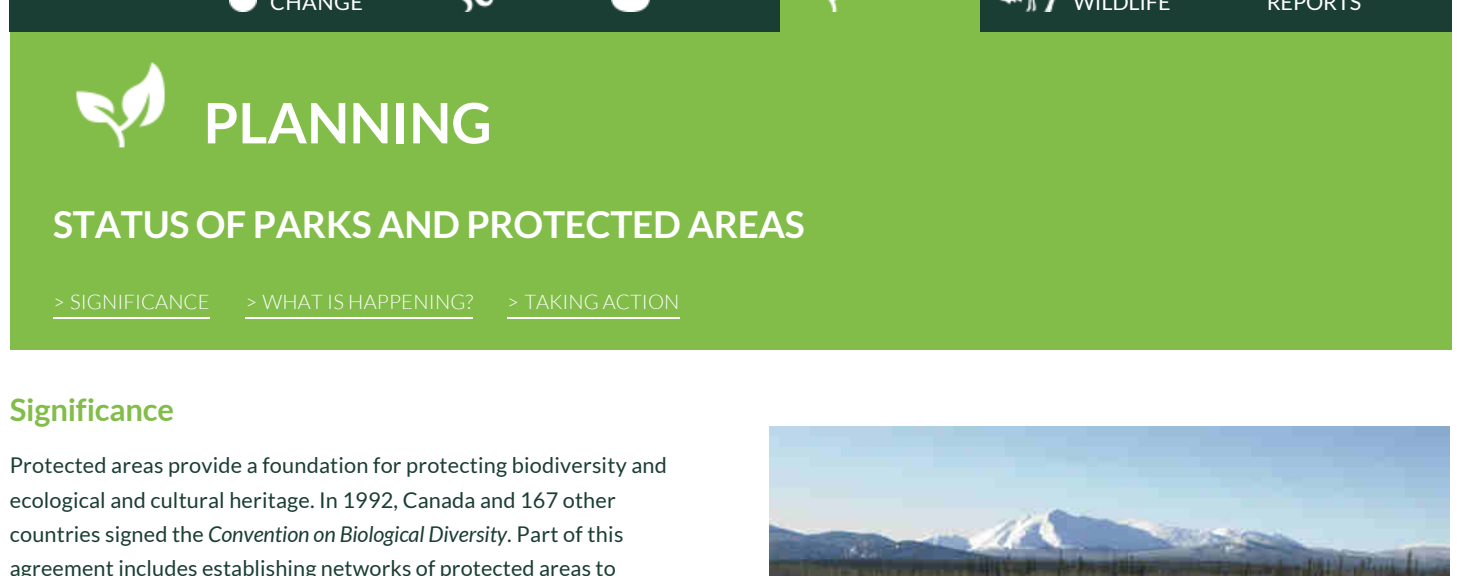
[^ BACK TO TOP](#)

#### References

Yukon Department of Energy, Mines and Resources. 1988-2015. Local area plans [modified 2015 Dec 29; cited 2016 Mar 3]. Available from: <http://www.emr.gov.yk.ca/landplanning/local-area-plans.html>.

[^ BACK TO TOP](#)





# Yukon State of the Environment

Reporting on environmental indicators - 2016

## PLANNING

### STATUS OF PARKS AND PROTECTED AREAS

> SIGNIFICANCE | > WHAT IS HAPPENING? | > TAKING ACTION

#### Significance

Protected areas provide a foundation for protecting biodiversity and ecological and cultural heritage. In 1992, Canada and 167 other countries signed the Convention on Biological Diversity. Part of this agreement includes establishing networks of protected areas to conserve biodiversity.

The International Union for the Conservation of Nature defines a protected area as "A clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values" (Dudley 2008). Canada supports this definition.

In its simplest terms, the definition of a protected area means that the land is withdrawn from resource development—mining, oil and gas, logging and land dispositions—and that conservation is the primary objective of the area.

Many protected areas in Yukon were first recognized as special management areas in First Nation Final Agreements. More recently, protected areas are being identified through the regional land use planning processes. Yukon has several types of protected areas: national parks and reserves, national wildlife areas, territorial parks, habitat protection areas and special management areas.

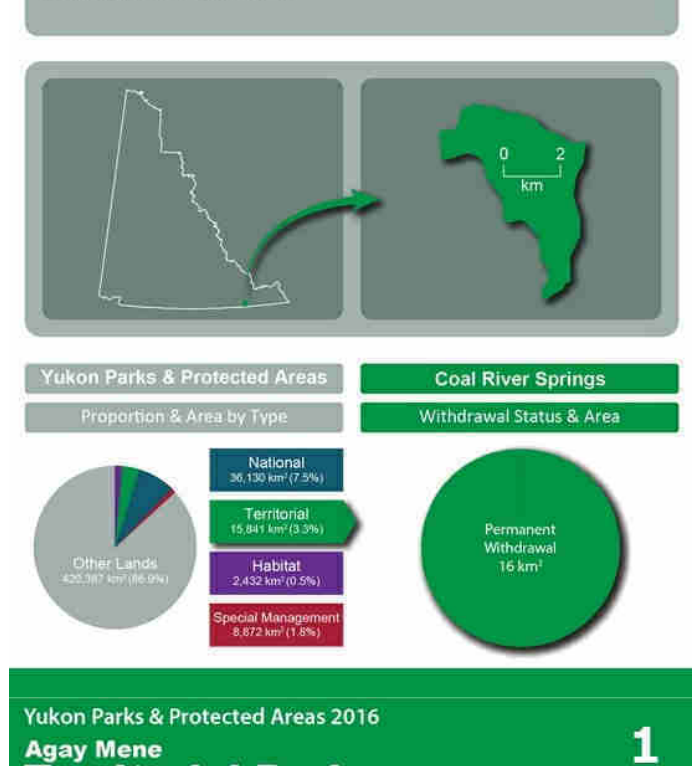


Lewes Marsh Habitat Protection Area

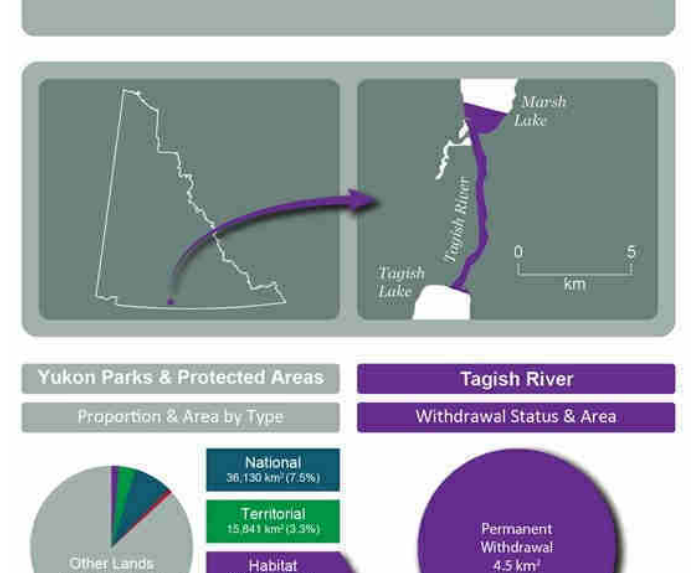
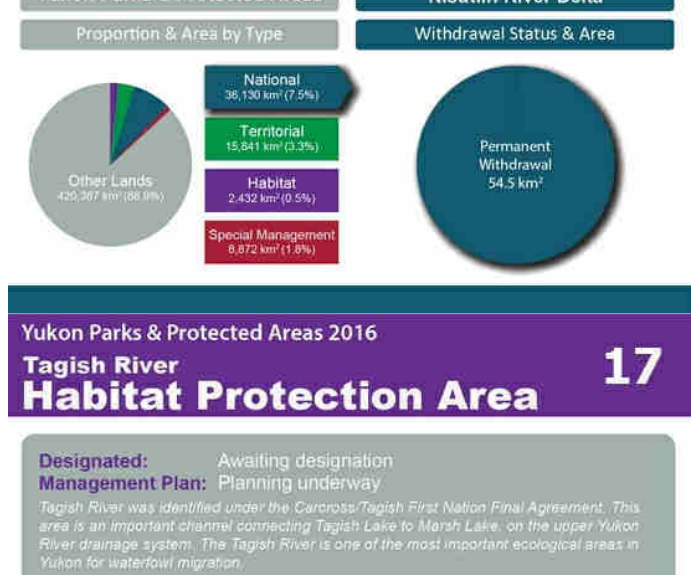
[BACK TO TOP](#)

#### What is happening?

Land identified for conservation purposes in Yukon amount to a total of 63,275 km<sup>2</sup> of the territory, or that, 61,486 km<sup>2</sup> or 12.7 per cent are protected lands. This amount includes territorial parks, habitat protection areas, national wildlife areas, and special management areas. The previous update in the 2014 State of the Environment Report cited the total amount as 16.8 per cent. That number included protected areas identified in the January 2014 Peel Watershed regional land use plan. As the plan is now a subject of court proceedings, this 2016 State of the Environment report does not include the Peel Watershed protected areas. It is anticipated, pending final outcomes of the regional planning process, that additional protected areas will be identified in the peel watershed region.



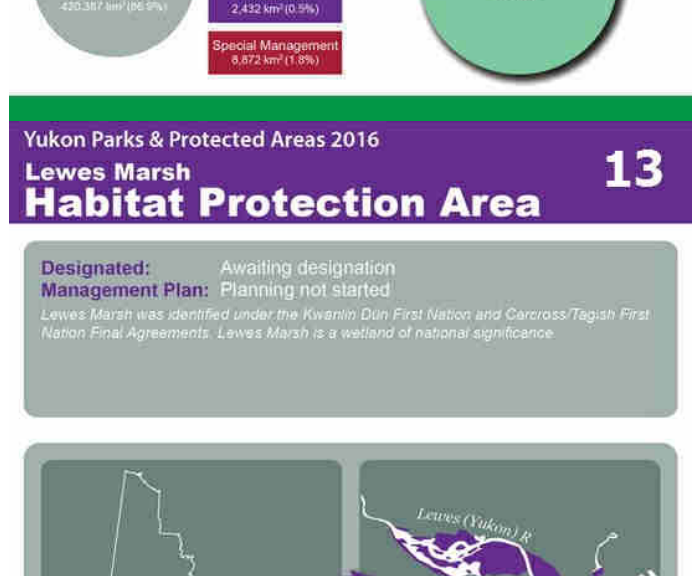
#### Yukon Protected Areas



#### Yukon Parks & Protected Areas 2016

##### Coal River Springs Territorial Park 3

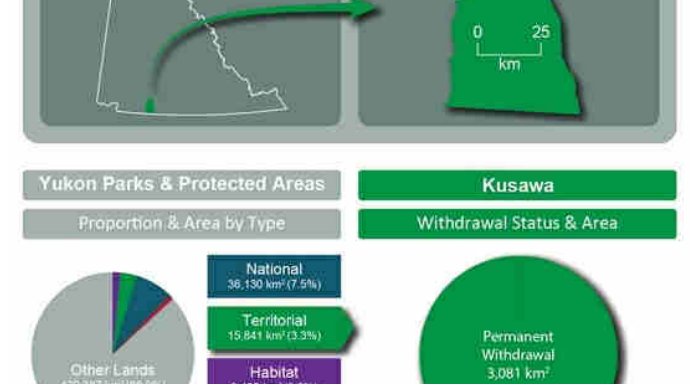
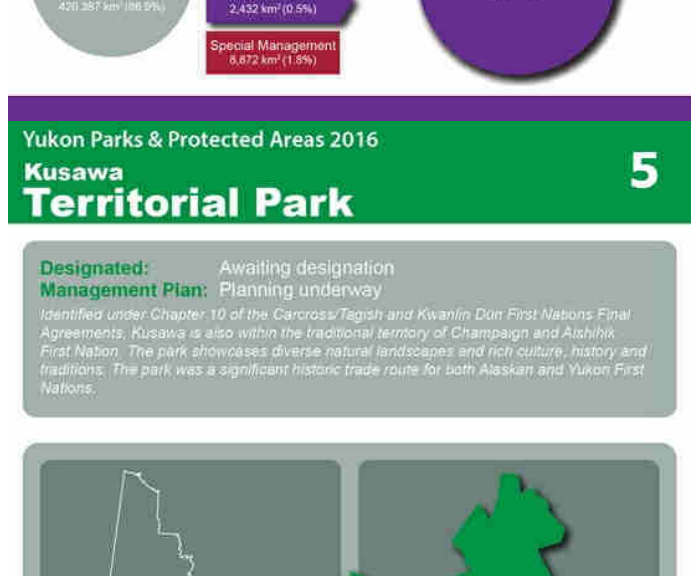
**Designated:** 1991, Parks and Land Certainty Act  
**Management Plan:** Draft interim management guidelines 2008  
 Created through the combined efforts of the Yukon Government, the Last First Nation and the National Government of Canada. Coal River Springs is a unique mosaic of territorial and national significance. Coal river springs flow year-round creating limestone tube services and a riparian habitat in a high alpine area.



#### Yukon Parks & Protected Areas 2016

##### Nisutlin River Delta National Wildlife Area 25

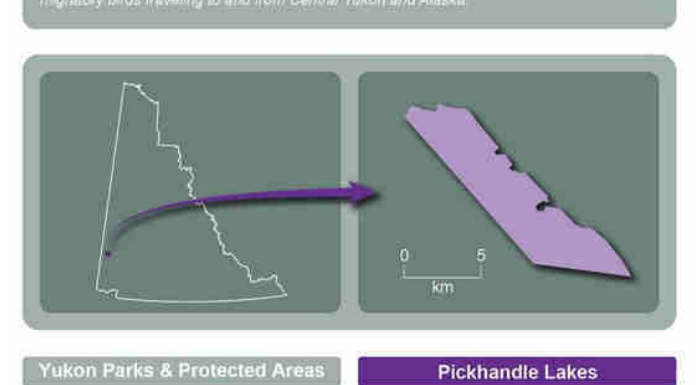
**Designated:** 1995, Canada Wildlife Act  
**Management Plan:** Current as of 2014  
 The Nisutlin River Delta National Wildlife Area is an important staging area for waterfowl on the Pacific Flyway. It includes the mouth of the Nisutlin River, the most extensive freshwater delta in Yukon. This area has great significance to the Tutchin First Nation and is identified for protection under Chapter 10 of the Inuvialuit Final Agreement.



#### Yukon Parks & Protected Areas 2016

##### Agay Mene Territorial Park 1

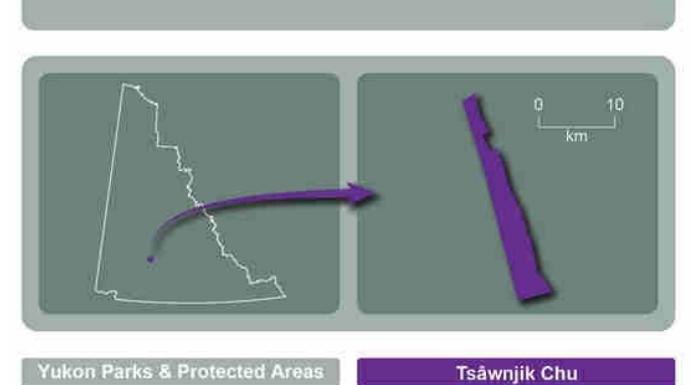
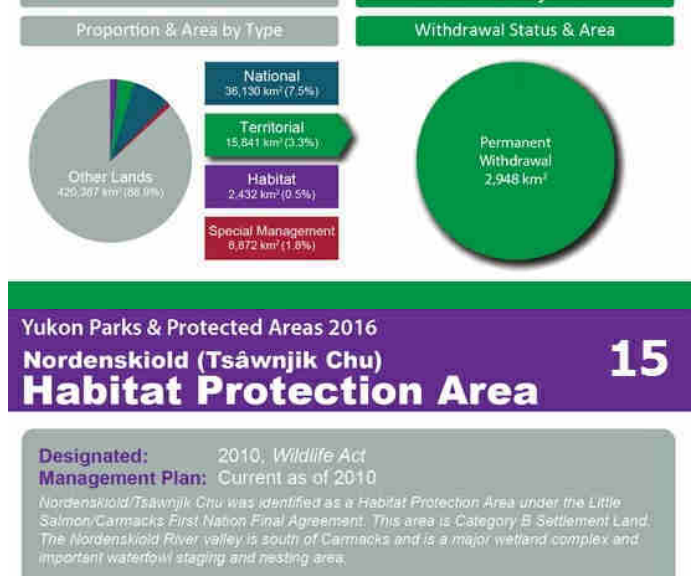
**Designated:** Awaiting designation  
**Management Plan:** Planning not started  
 Agay Mene Park's system of lakes and waterways support traditional activities of hunting, fishing and trapping and the seasonal harvest of both Kusawa First Nation and Tlingit First Nation. The Park provides a diverse natural landscape and rich cultural, history and traditions. The park was a significant historic trade route for both Kusawa and Tlingit First Nations.



#### Yukon Parks & Protected Areas 2016

##### Tagish River Habitat Protection Area 17

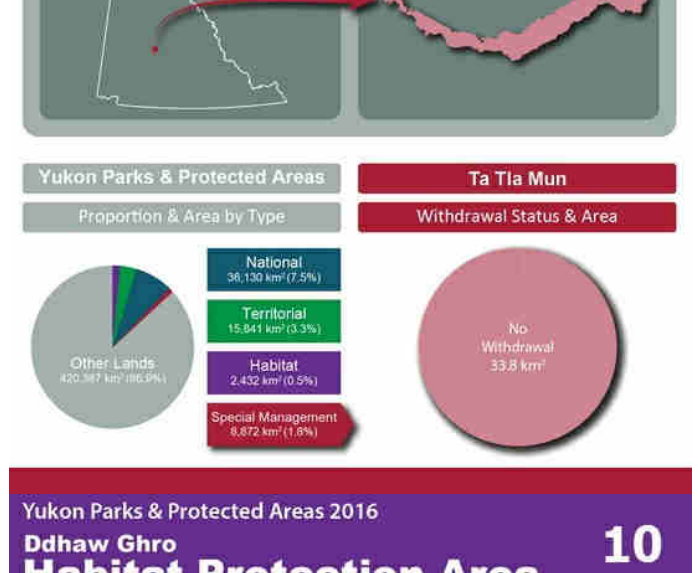
**Designated:** Awaiting designation  
**Management Plan:** Planning underway  
 Tagish River was identified under the Carcross/Tagish First Nation Final Agreement. This area is an important staging area for waterfowl on the Pacific Flyway. This area is one of the most important ecological areas in Yukon for waterfowl migration.



#### Yukon Parks & Protected Areas 2016

##### Lewes Marsh Habitat Protection Area 13

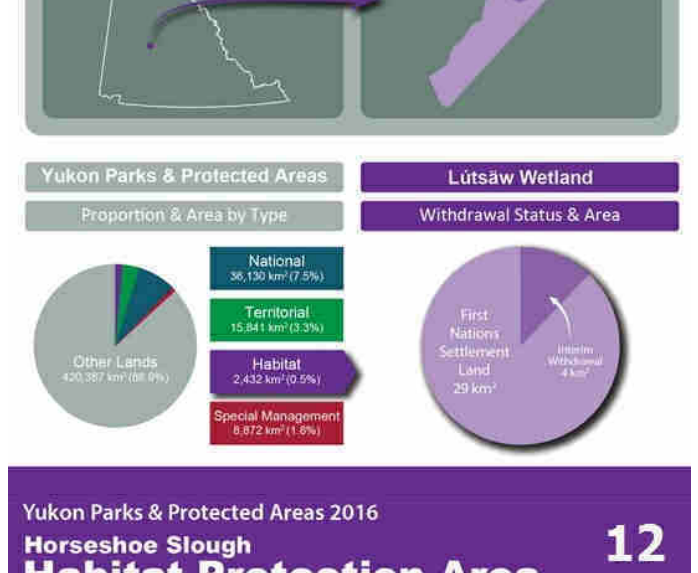
**Designated:** Awaiting designation  
**Management Plan:** Planning not started  
 Lewes Marsh was identified under the Inuvialuit Final Agreement and Carcross/Tagish First Nation Final Agreement. Lewes Marsh is a unique mosaic of territorial and national significance.



#### Yukon Parks & Protected Areas 2016

##### Kusawa Territorial Park 5

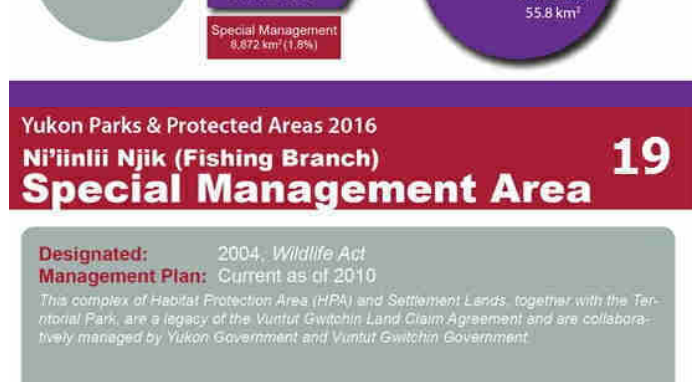
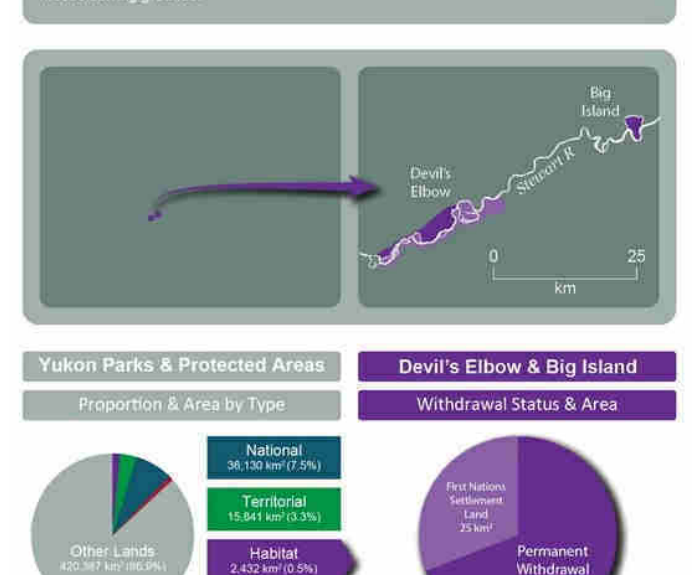
**Designated:** Awaiting designation  
**Management Plan:** Planning underway  
 Kusawa Territorial Park was identified under the Inuvialuit Final Agreement. The park provides a diverse natural landscape and rich cultural, history and traditions. The park was a significant historic trade route for both Kusawa and Tlingit First Nations.



#### Yukon Parks & Protected Areas 2016

##### Kluane National Park 23

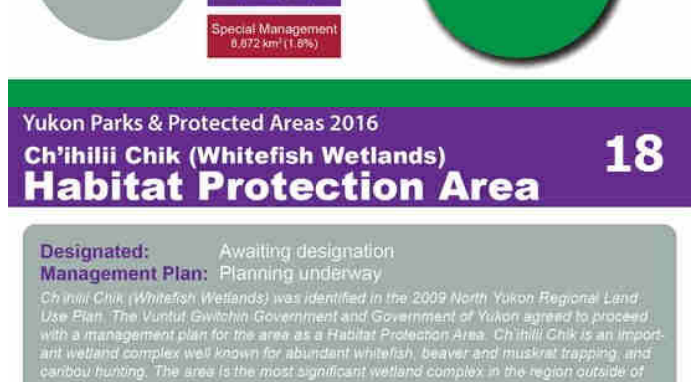
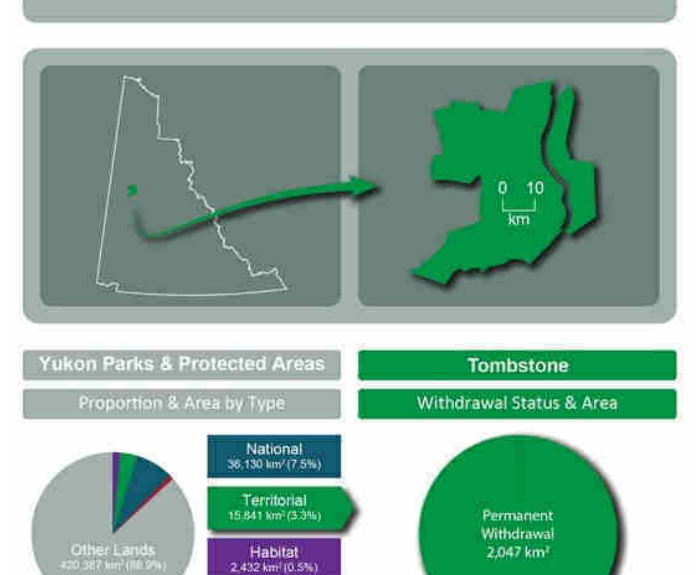
**Designated:** 1972, Canada National Parks Act  
**Management Plan:** Current as of 2010  
 Established as a prime sanctuary in 1947, Kluane National Park is one of the most important wilderness areas in Canada. It is a unique mosaic of territorial and national significance. The park is a significant historic trade route for both Kusawa and Tlingit First Nations.



#### Yukon Parks & Protected Areas 2016

##### Asi Keyi Territorial Park 2

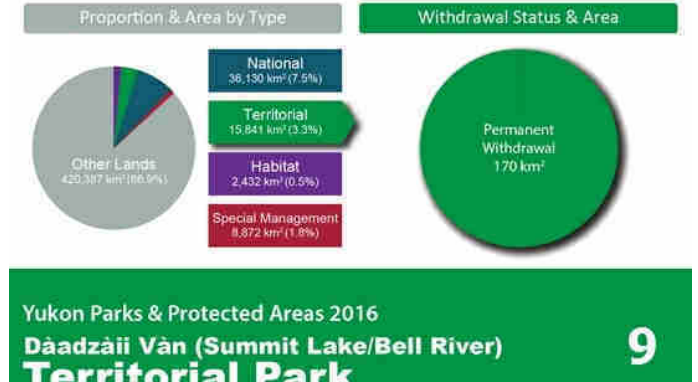
**Designated:** Awaiting designation  
**Management Plan:** Planning underway  
 Asi Keyi Park was identified under Chapter 10 of the Inuvialuit Final Agreement and is a part of the Inuvialuit Final Agreement. Asi Keyi Park is a unique mosaic of territorial and national significance. The park is a significant historic trade route for both Kusawa and Tlingit First Nations.



#### Yukon Parks & Protected Areas 2016

##### Chetwyche Chi (Pickhandle Lakes) Habitat Protection Area 16

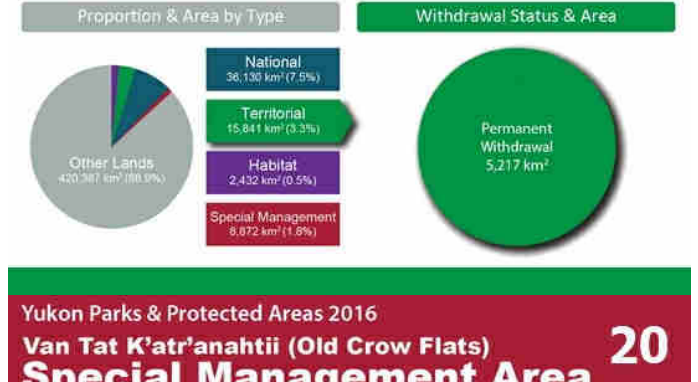
**Designated:** Awaiting designation  
**Management Plan:** Planning underway  
 Chetwyche Chi (Pickhandle Lakes) was identified under the Inuvialuit Final Agreement. The area is a unique mosaic of territorial and national significance. The park is a significant historic trade route for both Kusawa and Tlingit First Nations.



#### Yukon Parks & Protected Areas 2016

##### Nordenskiöld (Taswujik Chu) Habitat Protection Area 15

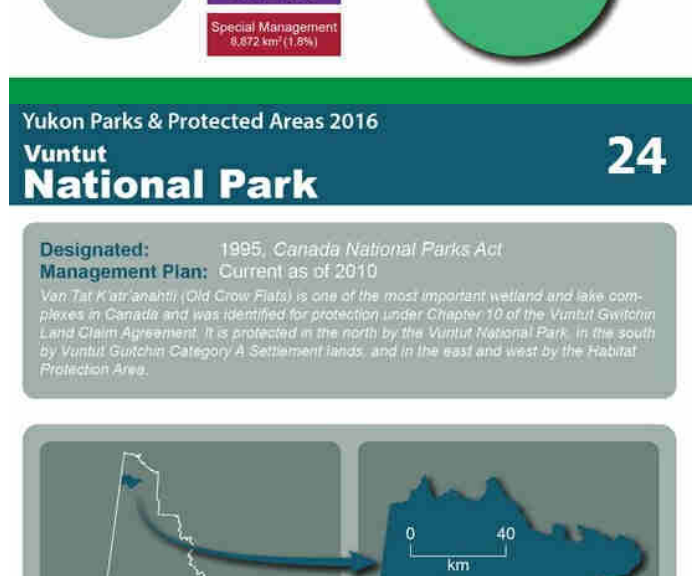
**Designated:** 2010, Wildlife Act  
**Management Plan:** Current as of 2010  
 Nordenskiöld (Taswujik Chu) was identified as a habitat protection area under the Inuvialuit Final Agreement. The area is a unique mosaic of territorial and national significance. The park is a significant historic trade route for both Kusawa and Tlingit First Nations.



#### Yukon Parks & Protected Areas 2016

##### Ta Tla Mun Special Management Area 21

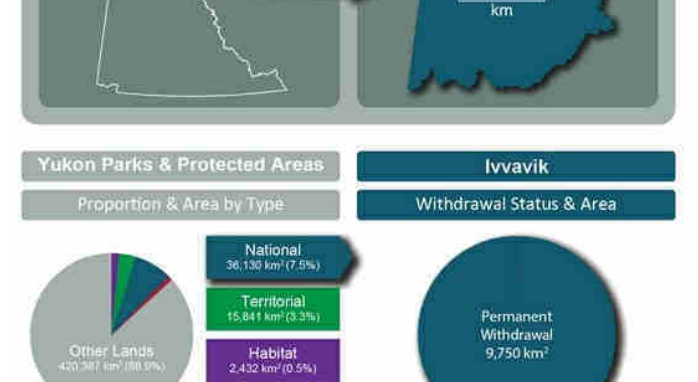
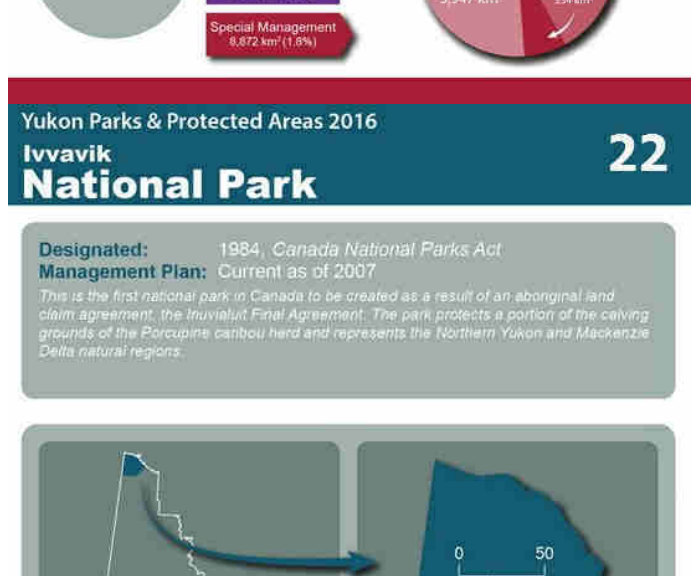
**Designated:** Awaiting designation  
**Management Plan:** Current as of 2013  
 The Ta Tla Mun Special Management Area became established with the signing of the Inuvialuit Final Agreement. The area is a unique mosaic of territorial and national significance. The park is a significant historic trade route for both Kusawa and Tlingit First Nations.



#### Yukon Parks & Protected Areas 2016

##### Lutsaw Wetland Habitat Protection Area 14

**Designated:** 2006, Wildlife Act  
**Management Plan:** Current as of 2013  
 Lutsaw Wetland was identified under the Inuvialuit Final Agreement. The area is a unique mosaic of territorial and national significance. The park is a significant historic trade route for both Kusawa and Tlingit First Nations.



#### Yukon Parks & Protected Areas 2016

##### Dhawi Ghro Habitat Protection Area 10

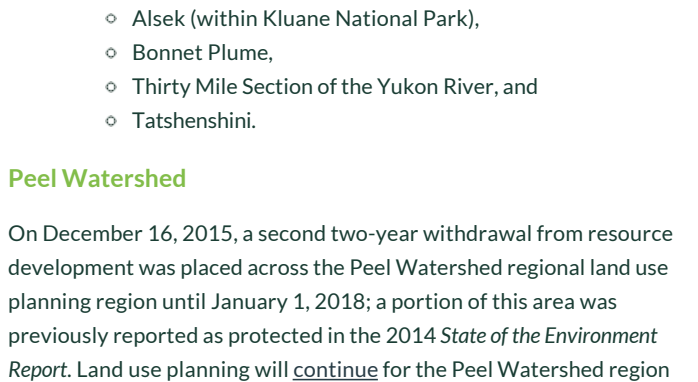
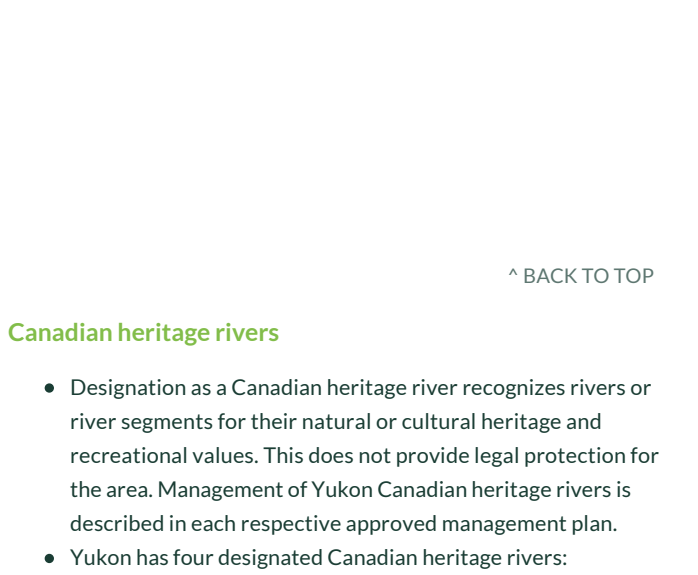
**Designated:** Awaiting designation  
**Management Plan:** Planning underway  
 Dhawi Ghro was identified under the Inuvialuit Final Agreement and the Inuvialuit Final Agreement. The area is a unique mosaic of territorial and national significance. The park is a significant historic trade route for both Kusawa and Tlingit First Nations.



#### Yukon Parks & Protected Areas 2016

##### Horseshoe Slough Habitat Protection Area 12

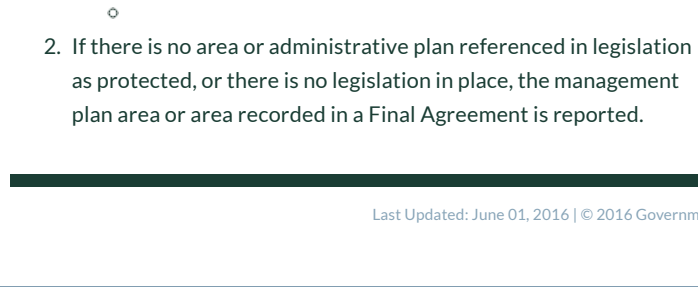
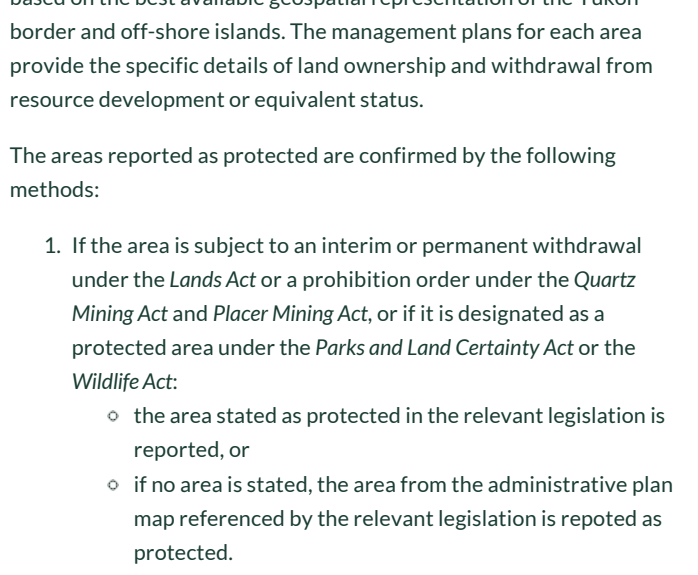
**Designated:** 2011, Wildlife Act  
**Management Plan:** Current as of 2007  
 Horseshoe Slough was identified as a habitat protection area under the Inuvialuit Final Agreement. The area is a unique mosaic of territorial and national significance. The park is a significant historic trade route for both Kusawa and Tlingit First Nations.



#### Yukon Parks & Protected Areas 2016

##### Devil's Elbow & Big Island Habitat Protection Area 11

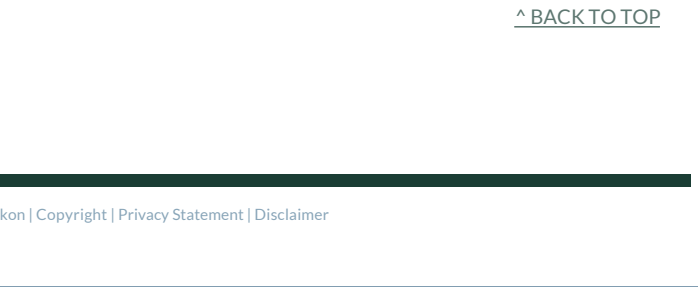
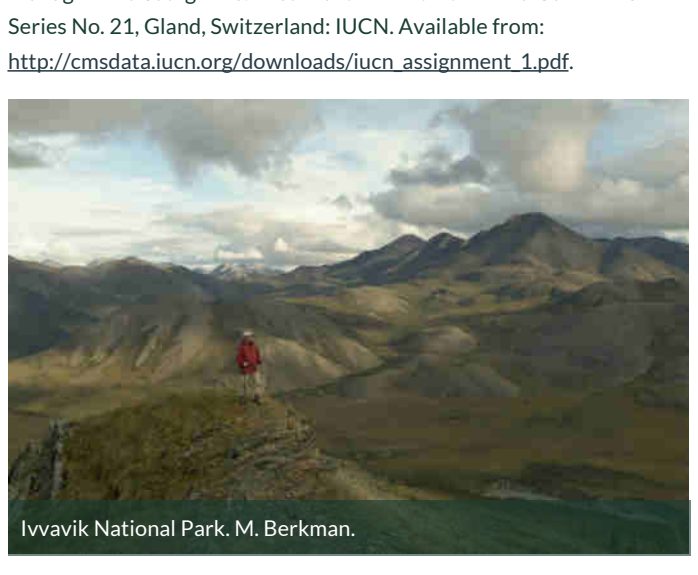
**Designated:** 2011, Wildlife Act  
**Management Plan:** Current as of 2012  
 Devil's Elbow and Big Island were identified under the Inuvialuit Final Agreement and the Inuvialuit Final Agreement. The area is a unique mosaic of territorial and national significance. The park is a significant historic trade route for both Kusawa and Tlingit First Nations.



#### Yukon Parks & Protected Areas 2016

##### Tombstone Territorial Park 8

**Designated:** 2004, Parks and Land Certainty Act  
**Management Plan:** Current as of 2009  
 Tombstone Territorial Park was identified under the Inuvialuit Final Agreement. The area is a unique mosaic of territorial and national significance. The park is a significant historic trade route for both Kusawa and Tlingit First Nations.



#### Yukon Parks & Protected Areas 2016

##### Ni'ihli Njik (Fishing Branch) Special Management Area 19

**Designated:** 2004, Wildlife Act  
**Management Plan:** Current as of 2010  
 Ni'ihli Njik (Fishing Branch) was identified under the Inuvialuit Final Agreement and the Inuvialuit Final Agreement. The area is a unique mosaic of territorial and national significance. The park is a significant historic trade route for both Kusawa and Tlingit First Nations.



#### Yukon Parks & Protected Areas 2016

##### Ch'ihihi Chik (Whitefish Wetlands) Habitat Protection Area 18

**Designated:** Awaiting designation  
**Management Plan:** Planning underway  
 Ch'ihihi Chik (Whitefish Wetlands) was identified under the Inuvialuit Final Agreement. The area is a unique mosaic of territorial and national significance. The park is a significant historic trade route for both Kusawa and Tlingit First Nations.



#### Yukon Parks & Protected Areas 2016

##### Ni'ihli Njik (Fishing Branch) - Ecological Reserve 6

**Designated:** 2003, Parks and Land Certainty Act  
**Management Plan:** Current as of 2010  
 Ni'ihli Njik (Fishing Branch) - Ecological Reserve was identified under the Inuvialuit Final Agreement and the Inuvialuit Final Agreement. The area is a unique mosaic of territorial and national significance. The park is a significant historic trade route for both Kusawa and Tlingit First Nations.



#### Yukon Parks & Protected Areas 2016

##### Ni'ihli Njik (Fishing Branch) - Wilderness Preserve 7

**Designated:** 2003, Parks and Land Certainty Act  
**Management Plan:** Current as of 2010  
 Ni'ihli Njik (Fishing Branch) - Wilderness Preserve was identified under the Inuvialuit Final Agreement and the Inuvialuit Final Agreement. The area is a unique mosaic of territorial and national significance. The park is a significant historic trade route for both Kusawa and Tlingit First Nations.



#### Yukon Parks & Protected Areas 2016

##### Daadzaii Van (Summit Lake/Bell River) Territorial Park 9

**Designated:** Awaiting designation  
**Management Plan:** Planning underway  
 Daadzaii Van (Summit Lake/Bell River) was identified under the Inuvialuit Final Agreement and the Inuvialuit Final Agreement. The area is a unique mosaic of territorial and national significance. The park is a significant historic trade route for both Kusawa and Tlingit First Nations.





## ENVIRONMENT YUKON

Government of Yukon > Environment > State of the Environment Report: Land > Number, type, and location of environmental and socio-economic assessments >

CAMPING & PARKS

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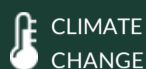
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# Yukon State of the Environment

Reporting on environmental indicators - 2016

HOME



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## PLANNING

### NUMBER, TYPE, AND LOCATION OF ENVIRONMENTAL AND SOCIO-ECONOMIC ASSESSMENTS

[> SIGNIFICANCE](#)   [> WHAT IS HAPPENING?](#)   [> TAKING ACTION](#)

#### Significance

Environmental and socio-economic assessment is a process that identifies the potential environmental and socio-economic effects of proposed activities before they are carried out. The Yukon Environment and Socio-economic Assessment Board ([YESAB](#)) carries out assessments in Yukon.

When a potential effect is identified and deemed substantial (referred to as a significant adverse effect) assessors recommend measures to reduce, control or eliminate those effects. If the significant adverse effects of a project cannot be mitigated, the board makes a “do not proceed” recommendation. The appropriate government or regulatory body makes the final decision, which can accept, reject, or vary the recommendation.

The number, type, complexity and location of projects assessed by YESAB can indicate development pressures on environmental and socio-economic values, such as:

- impacts on wildlife and their habitat,
- impacts on air and water quality,
- impacts on fish and fish habitat, and
- permanent land conversion.

However, the assessment of a project does not mean a proponent carries out the project. Many proposed projects may never move into development and therefore have no environmental impact. Other project activities may not trigger an environmental and socio-economic assessment.

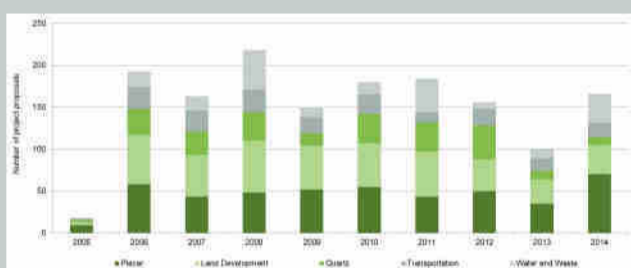
[^ BACK TO TOP](#)

#### What is happening?

In 2014, YESAB assessed 190 project proposals.

Five common sectors that submit project proposals for assessment are placer mining, land development, quartz mining, transportation, and water and waste (Figure 1).

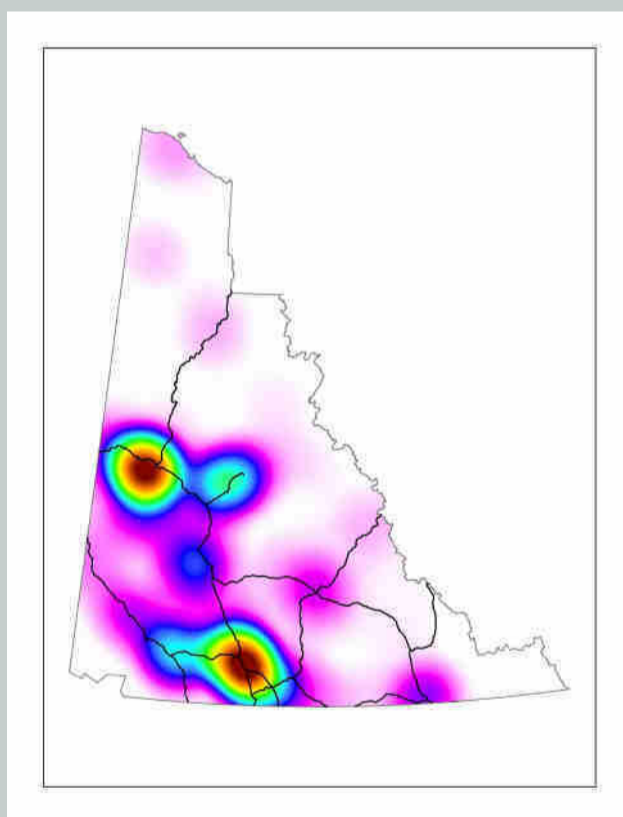
FIGURE 1: Number of project proposals for the five common sectors, 2005-2014.



Source: YESAB, 2015

- The projects proposed in each of these sectors may impact the environment in varying degrees, depending on the individual project activities and its location.
- From 2005 to 2014, YESAB recommended terms and conditions to mitigate or eliminate adverse effects for 84 per cent of the project proposals they received. Of the 1,989 projects assessed from 2005 to 2014, the board recommended 3 per cent not proceed.

FIGURE 2: Density of proposed projects across Yukon in 2014



Source: YESAB, 2015

- The majority of project assessments in 2014 were received in the Whitehorse and Dawson City areas (Figure 2).
  - Whitehorse has the highest population density in Yukon. This results in a large number of project submissions for residential and commercial activities such as access roads, subdivisions, road upgrades and lot enlargements.
  - Dawson City is a well-known mining district with a long history of placer mining. A significant number of assessable project activities related to placer mining take place within the district. In 2014, 37 per cent of YESAB’s project submissions came from the placer mining sector.

[^ BACK TO TOP](#)

#### Data quality

- Access YESAB’s full assessment statistics on their [website](#).
- This section does not include information on the projects reviewed by the Executive Committee of YESAB. There have been six Executive Committee level screenings completed since 2005. Information about those projects is available on the YESAB [Online Registry](#).
- The density map (Figure 2) does not include wilderness tourism projects in Kluane National Park if they do not involve physical developments. This represents 100 projects, or about five per cent of total project load.

[^ BACK TO TOP](#)



**ENVIRONMENT YUKON**
[Government of Yukon](#) > [Environment](#) > [State of the Environment Report: Land](#) > [Recreational land use](#) >

[CAMPING & PARKS](#)
[HUNTING, FISHING & TRAPPING](#)
[ANIMALS & HABITAT](#)
[MANAGING AIR, WATER & WASTE](#)
[ENVIRONMENT & YOU](#)
[PUBLICATIONS & MAPS](#)


# Yukon State of the Environment

Reporting on environmental indicators - 2016

[HOME](#)
[CLIMATE CHANGE](#)
[AIR](#)
[WATER](#)
[LAND](#)
[FISH AND WILDLIFE](#)
[DOWNLOAD REPORTS](#)


## PLANNING

### RECREATIONAL LAND USE

[> SIGNIFICANCE](#)   [> WHAT IS HAPPENING?](#)   [> TAKING ACTION](#)

#### Significance

The Government of Yukon operates and maintains roadside campgrounds. These provide outdoor recreation opportunities such as fishing, hiking, boating and wildlife viewing. Recreational land use may have a negative impact on the environment “when the level of visitor use is greater than the local environment’s ability to cope with this use within the acceptable limits of change” (United Nations Environmental Programme (UNEP), n.d.).

For statistical purposes, the Government of Yukon tracks the number of people using Government of Yukon campsites.



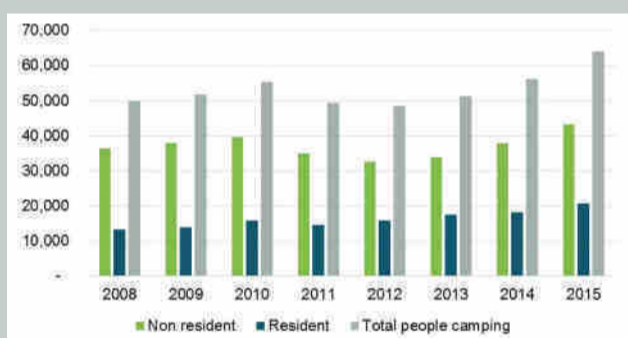
Talus Lake backcountry camp site after storm.

[^ BACK TO TOP](#)

#### What is happening?

- In 2015, the Government of Yukon’s campgrounds included:
  - 41 existing campgrounds; and
  - 12 existing day-use recreation sites.
- There are more than twice as many non-resident campers as Yukoners camping in the territorial campgrounds (Figure 1).
- Since 2012, there has been an increasing use of campgrounds by both resident and non-residents.
- Development of new campgrounds redistributes the concentration of visitors and helps to mitigate the effect of recreational land use at any one site.
- A new campground will be open in May 2016 at Conrad on Tagish Lake.
  - Conrad will add 29 vehicle sites and six walk-in sites.
  - This increases campground capacity by 19 per cent within two hours driving distance of Whitehorse (6 per cent territory-wide).
- An additional 22 sites were built within three existing campgrounds in time for the May 2016 opening of the campground season.

FIGURE 1: Number of people camping, 2008-2015.


[^ BACK TO TOP](#)

#### Taking action

Construction on Conrad Campground began in 2015 and it will be open to the public in the spring of 2016. The campground will help meet the growing demand for overnight camping sites near Whitehorse for both Yukoners and visitors.

The Government of Yukon is working collaboratively with the Carcross/Tagish First Nation to ensure that the development of Conrad campground is consistent with the objectives of the adjacent Conrad Historic Site, where the small town of Conrad City supported the Venus silver mine in the early 1900s.



View from the Conrad Campground.

[^ BACK TO TOP](#)

#### Data quality

- The Department of Environment’s Parks Branch track the level of use through campground registrations.
- Registered visitors are calculated by: number of recorded visitors + (number of unrecorded registered parties × average number of visitors per party). This number includes repeat users.
- Learn more about [Government of Yukon campgrounds](#).
- There are other campsites operated throughout the territory including Kathleen Lake Campground in Kluane National Park and Reserve and several private RV campgrounds. Data from these sites are not included.

#### References

United Nations Environmental Programme (UNEP). n.d. Tourism’s Three Main Impact Areas [cited 2016 Mar 3]. Available from: <http://www.unep.org/resourceefficiency/Business/SectoralActivities/Tourism/FactsandFiguresaboutTourism/ImpactsofTourism/EnvironmentalImpacts/TourismsThreeMainImpactAreas/tabid/78776/Default.aspx>

[^ BACK TO TOP](#)



## ENVIRONMENT YUKON

Government of Yukon > Environment > State of the Environment Report: Land > Waste handled at the Whitehorse Waste Management Facility >

CAMPING & PARKS	HUNTING, FISHING & TRAPPING	ANIMALS & HABITAT	MANAGING AIR, WATER & WASTE	ENVIRONMENT & YOU	PUBLICATIONS & MAPS
-----------------	-----------------------------	-------------------	-----------------------------	-------------------	---------------------



# Yukon State of the Environment

Reporting on environmental indicators - 2016

HOME	CLIMATE CHANGE	AIR	WATER	LAND	FISH AND WILDLIFE	DOWNLOAD REPORTS
------	----------------	-----	-------	------	-------------------	------------------



## SOLID WASTE

### WASTE HANDLED AT THE WHITEHORSE WASTE MANAGEMENT FACILITY

> SIGNIFICANCE > WHAT IS HAPPENING? > TAKING ACTION

#### Significance

Solid waste disposal in landfills can pose environmental and health risks as well as land use planning challenges. Waste is costly to manage, whether it is sent to landfills, diverted through recycling and composting, or shipped outside the territory for treatment.

Landfill closure liability is a new Public Sector Accounting Board principle that requires owners of landfills to account for the full costs of the closure and post-closure of a landfill. In Yukon, this has put financial pressure on municipalities to incorporate the new liability, but has also provided an incentive for waste diversion as a means of lengthening the life of a landfill.

The City of Whitehorse enacted a *Solid Waste Action Plan* in 2013, aiming to divert 50 per cent of its waste by the end of 2015. Current diversion is 35 per cent, representing a 46 per cent increase in diversion since 2012 before the action plan was in place. While unable to meet the 50 per cent goal by the end of 2015, the City maintains the goal of reaching 50 per cent waste diversion.

#### PROFILE

### LONG-TERM STUDY OF SOIL AMENDMENTS IN NORTHERN SOILS



Yukon agricultural test plots.

[^ BACK TO TOP](#)

In partnership with the City of Whitehorse, the Government of Yukon's Agriculture Branch initiated a long-term trial at the Yukon Government Research Farm in 2010 to test the effectiveness of soil amendments in northern soils.

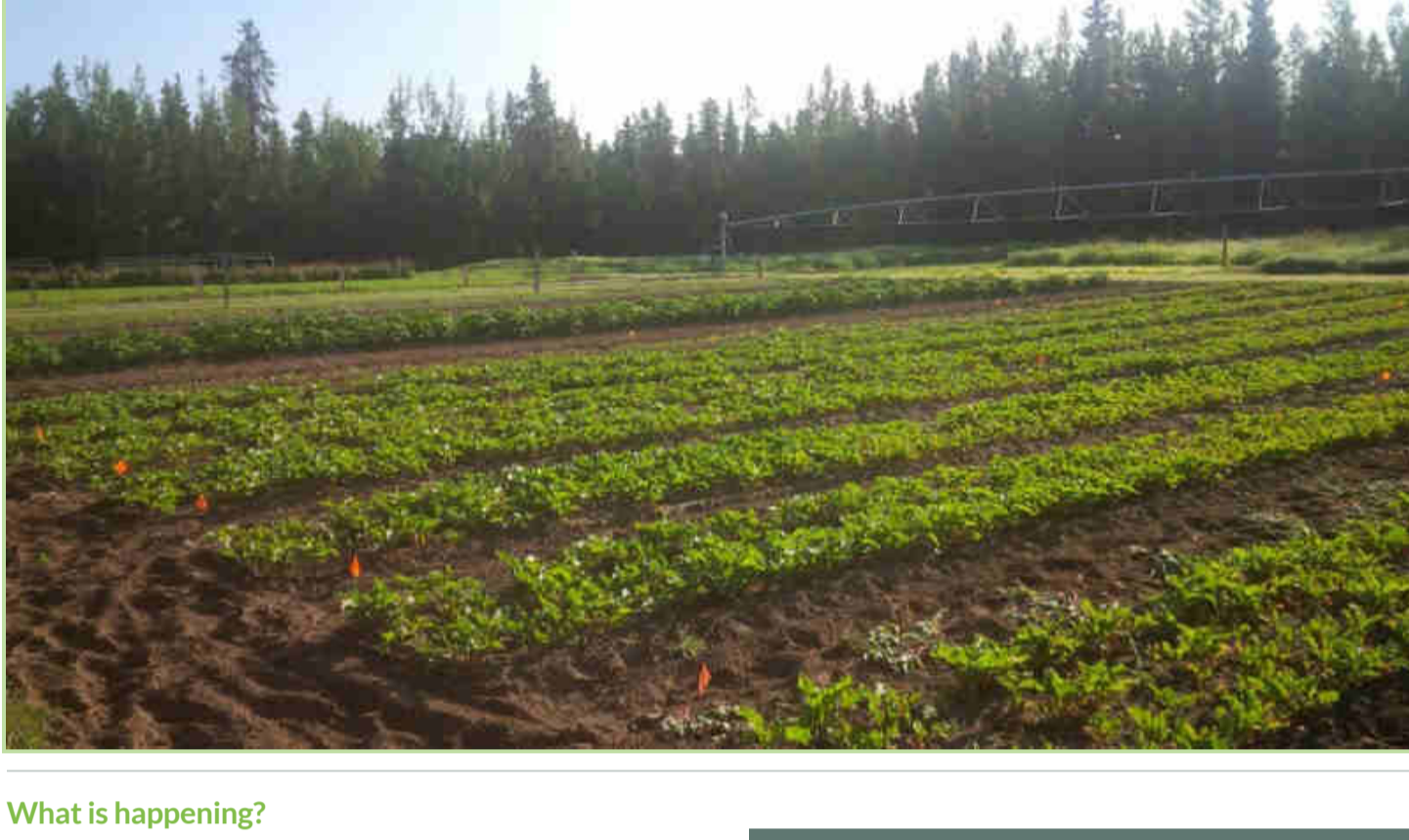
Soil amendments are added to improve soil properties (such as nutrients, fauna/flora, or carbon) so that vegetables and other crops can produce more. Common soil amendments include fertilizers, manures and compost. Producers must decide which amendments to use and consider the transportation and application of products, the availability of local products, and the varying costs of shipping, using and buying amendments. Local soil amendments are limited; one of the products readily available is compost from the City of Whitehorse.

The soil amendment trial being conducted at the research farm evaluates the city compost alongside synthetic fertilizer and organic fertilizer. Other amendments were added in combination with the main treatments including calcium, biochar and humic acid. Different vegetables were grown in rotation each year starting with beets in 2010, carrots in 2011, kale in 2012, and snap peas in 2013, repeating the rotation in 2014 with beets, followed again by carrots in 2015.

Other Canadian research concluded that organic amended plots usually lag behind synthetic plots until the third year. Yukon growing conditions followed this trend. As expected, the synthetic fertilizer plots had the highest yields in the first two years and the organic fertilizer plots yielded similar results by the third year. The compost plots yielded substantially less than the other treatments in the first few years of the trial.

In 2014, the fifth year of the research, the compost amended plots started to achieve production levels approximately 20 per cent less than synthetic fertilizer treatments. In 2015, the compost treatment had equal yields to both the synthetic and organically amended plots, indicating that the addition of city compost over time is a valuable soil amendment. This is the first year with results indicating that compost is on par with other amendments.

The trial will continue to evaluate compost and commercial soil amendments to add to our understanding of northern soil amendments. The addition of lime, humic acid or biochar does not have any impact on yields based on this research.



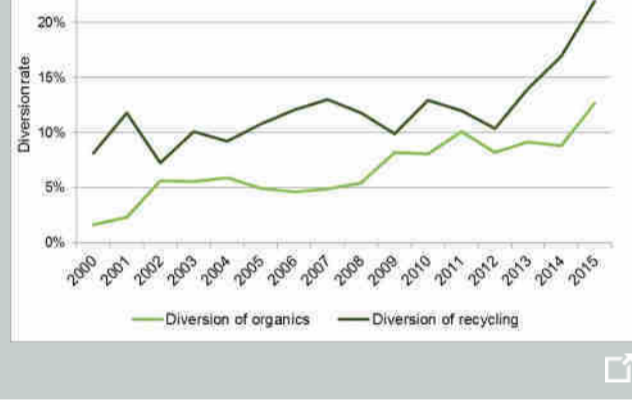
#### What is happening?

The City of Whitehorse monitors the amount of waste handled by the waste management facility. This includes waste that enters the landfill and waste that is diverted away from the landfill through composting or recycling (Figure 1).

Waste that enters the landfill come from three major sources:

- domestic or household waste and the industrial, commercial, and institutional (ICI) sector;
- construction and demolition; and
- waste from outside city limits. Since 2006, the City of Whitehorse has accepted waste from outlying communities on a fee-for-service basis in order to lessen the landfill burden on those communities.

FIGURE 2: Diversion rate of organic and recycling materials from the City of Whitehorse Waste Management Facility



- Increases in the diversion rate can be attributed to the City's 2013 *Solid Waste Action Plan*, which focused on the diversion of cardboard and organics from the commercial sector in 2014/15.

FIGURE 1: Type and amount of waste handled at the City of Whitehorse Waste Management Facility



- The total amount of waste per person in Whitehorse that is landfilled has decreased by 12 per cent in one year—from 0.67 tonnes per person in 2014 to 0.60 tonnes person in 2015.
- Since 2000, the amount of waste landfilled at the Whitehorse Waste Management Facility has increased by 36 per cent. This can be attributed to housing development resulting in more construction and demolition waste as well as accepting waste from outside city limits.
- The most recent information for Canada-wide waste per person is from 2012, when the amount of waste landfilled was 0.72 tonnes (Statistics Canada, 2015b). Comparatively, Whitehorse waste per person in 2015 was 0.77 tonnes and is now 0.60 tonnes.
- Between 2012 and 2015, the overall percentage of Whitehorse waste diverted from the landfill through recycling and composting increased from 19 to 35 per cent (Figure 2). This represents a large increase since the average diversion from 2000 – 2012 was 17 per cent.

The Yukon government is responsible for 16 public solid waste facilities in rural communities through the Department of Community Services, while the Department of Highways and Public Works manages three facilities that are not for public use.

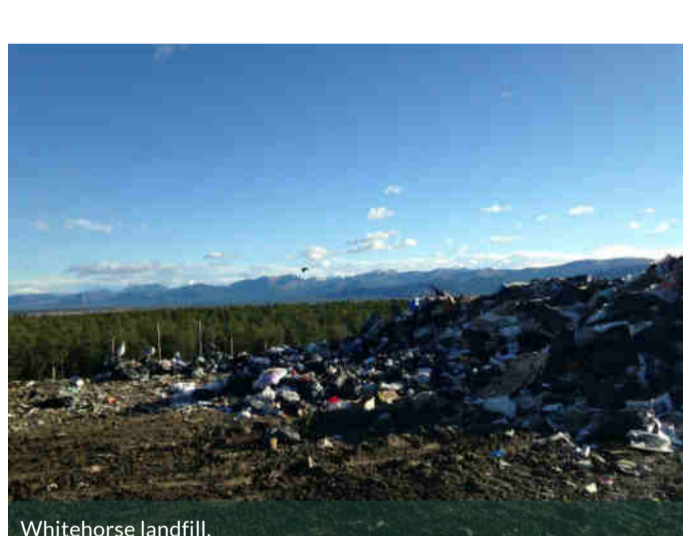
In 2015, the Yukon government continued to advance responsible solid waste management Yukon-wide. Some key actions included:

- Establishing an agreement with the Town of Watson Lake to regionalize waste management in the area, allowing for the decommissioning of the Upper Liard facility. Agreements like these create consistent levels of service for residents and lighten the environmental footprint in the area. A similar agreement also exists with the City of Dawson and its surrounding region. Groundwater monitoring will continue at the closed Upper Liard facility for 25 years to ensure the quality of the groundwater in the area.
- Gates, site attendants and hours have been established at community solid waste facilities in Destruction Bay, Champagne and Ross River. Greater controls at rural transfer stations promote proper use of the facilities and mitigate the potential for inappropriate dumping. Patrons are more likely to separate and divert waste with the help of attendants, while attendants are also there to help educate the public about responsible waste management both at the facility and at home. Community meetings enabled local involvement and engagement to help develop and implement these improved systems, including residents' input in establishing the operating schedules for each facility.
- The Yukon government also works with local champions and NGOs in unincorporated areas. This type of partnership helped achieve some significant milestones in 2015, including a successful compost pilot project with the Marsh Lake Solid Waste Society and the Mt. Lorne Solid Waste Society reporting more than 50 per cent diversion.
- In the spring of 2015, the Yukon government coordinated a workshop for all solid waste facility operators throughout the territory. This provided a forum for operators to network and turn their minds toward common issues. Partnerships with municipalities, First Nations and organizations like the Association of Yukon Communities continue to enable progress and increase the level of consistency in solid waste services throughout the territory.
- In 2015 alone, various municipalities were provided access to \$100,000 of Building Canada Funds to improve solid waste infrastructure. Beginning in 2015, the Yukon government allocated \$333,000 over three years to assist outlying communities with the cost of groundwater monitoring at municipal landfills. This is in addition to operational funding already used for similar monitoring programs at the Yukon government's solid waste facilities in unincorporated communities.
- Recycling credit was also increased in 2015. At the request of processors, the Yukon government allocated approximately \$600,000 in diversion credit payments, more than double the amount allocated in 2014. These payments come at product-specific rates and are based on commodity values described by the processors. These diversion credits are just one part of a comprehensive, territory-wide recycling program, as the Yukon government also pays for the transportation of recyclable materials from unincorporated communities, to the processors, as well as core funding to community recycling depots and providing opportunities to divert all forms of recyclables at a number of rural transfer stations.
- The Yukon government is now finalizing its review of the Beverage Container Regulation and the Designated Materials Regulation. The changes being proposed would modernize both programs and facilitate higher diversion of potentially harmful materials from landfills. Proposed changes include applying a recycling surcharge to more beverage containers, more tire sizes, and selected electronic and electrical products. If implemented, these changes would bring Yukon more in line with the rest of Canada.

[^ BACK TO TOP](#)

#### Taking action

- In 2014, the City of Whitehorse launched a pilot program for organics collection from multi-unit residential buildings and businesses, and is in the planning phase for a residential grocery service for recyclables. Five out of the six major grocery stores are now having organics collected and diverted.
- Other initiatives include offering one-on-one assistance to businesses to identify what diversion options and the creation of a waste-sorting app called "What Goes Where?"
- Organics from food service providers, cardboard and clean wood have become controlled waste under the City of Whitehorse's *Waste Management Bylaw*, which means that they are no longer welcome in the landfill and must be sorted.
- The composting facility at the City of Whitehorse Waste Management Facility was upgraded between 2012 and 2015 with the help of Build Canada Fund and Gas Tax. The City is now applying for organic status of its compost product and had record sales (roughly \$30,000) in 2015.



Whitehorse landfill.

[^ BACK TO TOP](#)

#### Data quality

- The Whitehorse population estimates are based on total Whitehorse area (excluding Marsh Lake but including people residing outside city limits) and were obtained from the Yukon Bureau of Statistics.
- The 2012 population for calculating the Canada-wide waste per person is an average of the four quarter estimates from Statistics Canada (2015a). The quarterly estimates are based on the 2011 census.

#### References

Statistics Canada (2015a). Table 051-0005 - Estimates of population, Canada, provinces and territories, quarterly (persons). CANSIM [modified 2015 Jun 9; cited 2016 Jan 19]. Available from: <http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=0510005&stabMode=dataTable&srchLan=-1&p1=-1&p2=9>.

Statistics Canada (2015b). Table 153-0041 - Disposal of waste, by source, Canada, provinces and territories, every 2 years (tonnes), CANSIM [modified 2015 Jun 9; cited 2016 Jan 19]. Available from: <http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=1530041&stabMode=dataTable&srchLan=-1&p1=-1&p2=9>.

#### PROFILE

### OCCURRENCE AND FATE OF PHARMACEUTICAL AND PERSONAL CARE PRODUCT IN WHITEHORSE



Hundreds of ducks using the long-term storage pond.



(L) Algae, heavily fed on by dabbling ducks. (R) High concentrations of *Daphnia*, an invertebrate.

[^ BACK TO TOP](#)

The Whitehorse sewage lagoon has a significant bird population. In 2015, Devon Yacura conducted an assessment of pharmaceutical and personal care products (PPCPs) to measure the effect on the environment at Whitehorse's wastewater treatment centre—the Livingstone Trail Environmental Control Facility. This research is a first for Yukon wastewater treatment plants.

Tests performed on samples of water, sludge, aquatic invertebrates and algae revealed what chemicals were present, when they were present and how they were absorbed into the environment.

The PPCPs with the highest concentrations in the water were:

- acetaminophen (150 µg/L);
- caffeine (100 µg/L); and
- ibuprofen (10 µg/L).

The PPCPs with the highest concentrations in sludge, aquatic invertebrates and algae were two antimicrobials:

- triclosan (93 µg/g in sludge; 36 ng/g in aquatic invertebrates; 210 ng/g in algae); and
- triclocarban (31 µg/g in sludge; 29 µg/g in aquatic invertebrates; 47 ng/g in algae).

These chemicals are ubiquitous and are found in many household products including soaps, toothpaste, deodorants, cosmetics, detergents, and many plastic products. Estrogens and synthetic perfumes also had low concentrations in all of the samples.

At the Whitehorse lagoon, PPCPs are removed very efficiently—either equalling or exceeding standards from other facilities. The study also found that PPCP concentrations were significantly lower in spring than in summer and fall. Triclocarban was the only PPCP found to bioaccumulate in living organisms.

The baseline information from this study can be used for future monitoring and identification of trends at the treatment facility, positioning Yukon as a leader in the field of pharma-ecology.

Devon Yacura, Master's Candidate, University of Alberta/Yukon College, Department of Renewable Resources

[^ BACK TO TOP](#)



ENVIRONMENT YUKON

Government of Yukon > Environment > State of the Environment Report: Land > Yukon wildland fires greater than 200 Hectares >

- CAMPING & PARKS
- HUNTING, FISHING & TRAPPING
- ANIMALS & HABITAT
- MANAGING AIR, WATER & WASTE
- ENVIRONMENT & YOU
- PUBLICATIONS & MAPS



# Yukon State of the Environment

Reporting on environmental indicators - 2016

HOME

CLIMATE CHANGE

AIR

WATER

LAND

FISH AND WILDLIFE

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## PLANNING

### YUKON WILDLAND FIRES GREATER THAN 200 HECTARES

- > SIGNIFICANCE
- > WHAT IS HAPPENING?
- > TAKING ACTION

#### Significance

Wildland fire is a natural and necessary phenomenon in Yukon. Under the right conditions, such as hot weather and low forest fuel moisture, Yukon's forests can support high-intensity wildland fires on the landscape. These fires often occur naturally and have the potential to spread quickly, covering large areas. The plant and wildlife communities of Yukon are well adapted to periodic wildland fire disturbances. For example, the life cycle of lodgepole pine forests, whose cones open up after exposed to significant heat from fire, usually starts and ends with a crown fire. Wildland fires help maintain healthy ecosystems and create forest mosaics that enhance biodiversity.

Fire management agencies across Canada monitor both the number of fires and the area impacted by wildland fires. Dramatic fluctuations in the area burned occur annually. Nationally, wildland fires greater than 200 hectares in final size represent a small percentage of the total yearly number of fire ignitions; however, fires greater than 200 hectares also account for most of the area burned and as such are an indicator of environmental change. Monitoring wildland fire trends in the Yukon is essential to understanding forest health and ensuring there are appropriate resources in place to protect human life and values at risk to fire.

The frequency and intensity of fires is expected to change with a changing climate (Wotton et al. 2010, Flannigan et al. 2009). Climate change factors, such as projected longer fire seasons, changes in precipitation and temperature, and additional stresses to forest and vegetation (e.g., drought, flooding, insects and diseases) reinforce the importance of monitoring wildland fires.

Ensuring accurate baseline information is necessary to monitor environmental change. Monitoring trends in wildland fires also helps wildland fire management agencies to be prepared and have appropriate resources in place and ready to respond to wildland fires as necessary.



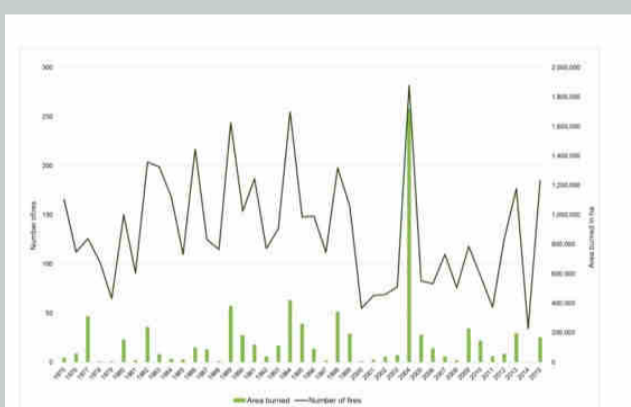
Campaign fire near Watson Lake.

[^ BACK TO TOP](#)

#### What is happening?

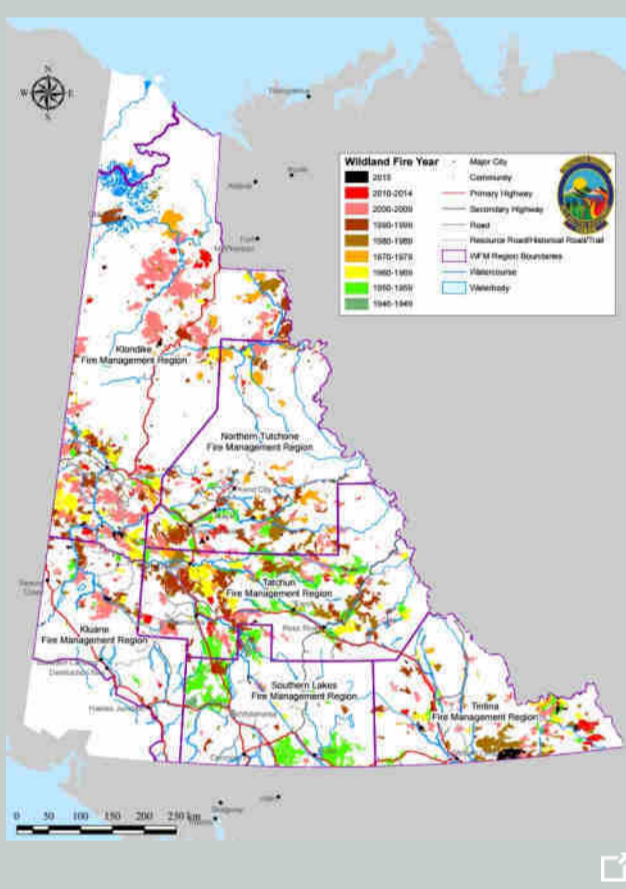
Fires greater than 200 hectares in final size represent a small percentage of all fires, but account for most of the area burned (Figure 1).

FIGURE 1: Yukon number of fires greater than 200ha and area burned, 1975-2015



- Since 1985, Yukon has had an average of 137 fire starts, which have burned an average of 171,840 ha every year. The total number of yearly ignitions and area burned varies significantly by year.
- The 2004 forest fire season in Yukon saw unprecedented temperatures, unusual lightning storms and lack of rainfall over a prolonged period, which resulted in a record-breaking number of fires and area burned. Read a review of the [2004 wildland fire season](#).
- In 2015, there were 187 fires that burned just under 170,000 ha. The fire season had a busy spring, with nearly 100 fires before June 2015. This was precedent setting for Yukon.

FIGURE 2: Yukon wildland fires greater than 200ha, 1946-2015



- Figure 2 demonstrates that the vast majority of Yukon has been affected by fire since 1946. In fact, all conifer forests in Yukon are a result of a previous wildland fire.
- Fire distribution across the landscape in any given year is dependent upon availability of forest fuels and appropriate burning conditions.

[^ BACK TO TOP](#)

#### Taking action

To help balance the necessary role fire plays in maintaining healthy forests and reduce the unwanted negative consequences associated with wildland fires, Yukon has adopted FireSmart principles.

FireSmart provides a systematic approach for homeowners and communities to identify and reduce the risk of loss due to wildland fire. As we choose to extend our lifestyle and communities further into forested areas, we become more exposed to the danger of wildland fire.

For further information on FireSmart visit:

- [FireSmart Canada](#)
- [Yukon FireSmart Program](#)



After a fire.

[^ BACK TO TOP](#)

#### Data quality

There are two online data repositories for the area of wildland fires:

- [Canadian Wildland Fire Information System](#)
- [Canadian Interagency Forest Fire Centre daily situation report](#)

Yukon's Wildland Fire Management Branch collects data on reported fires during the fire season, which extends from April 1 to September 30, yearly. The data is compiled daily during the fire season and finalized by the following January.

- The final fire perimeters are either collected by staff using GPSs or they are established using remote sensing technologies (i.e., satellite mapping). Capturing appropriate satellite images (e.g., cloud-free) of the area impacted by the wildland fire can take up to a year.
- Minor gaps can occur as not all fires are detected and reported.
- One limitation of using final fire perimeters for fire size is that it does not exclude islands of unburned vegetation residing within the final fire perimeter, nor bodies of water.
- Using the 200 ha size threshold minimizes these data gaps, as fires greater than 200 ha occurring in remote wilderness areas are more likely to be detected. Fires smaller than this threshold do not significantly contribute to the total annual area burned.

[^ BACK TO TOP](#)

#### References

Wotton, B.M., Nock, C.A. and Flannigan, M.D. 2010. Forest fire occurrence and climate change in Canada. *International Journal of Wildland Fire* 19:253-271.

Flannigan, M.D., B.J. Stocks, M.R. Turetsky, and B.M. Wotton. 2009. Impact of climate change on fire activity and fire management in the circumboreal forest. *Global Change Biology* 15: 549-560.



Fireweed often thrives after an area has burned.

[^ BACK TO TOP](#)



State of Environment Report: Land

Government of Yukon > Environment > State of the Environment Report: Land > Fire Ignition points >

CAMPING & PARKS	HUNTING, FISHING & TRAPPING	ANIMALS & HABITAT	MANAGING AIR, WATER & WASTE	ENVIRONMENT & YOU	PUBLICATIONS & MAPS
-----------------	-----------------------------	-------------------	-----------------------------	-------------------	---------------------



# Yukon State of the Environment

Reporting on environmental indicators - 2016

HOME	CLIMATE CHANGE	AIR	WATER	<b>LAND</b>	FISH AND WILDLIFE	DOWNLOAD REPORTS
------	----------------	-----	-------	-------------	-------------------	------------------



## PLANNING

### FIRE IGNITION POINTS

> [SIGNIFICANCE](#) > [WHAT IS HAPPENING?](#) > [TAKING ACTION](#)

#### Significance

This indicator shows the spatial distribution of forest fire ignition points and whether the ignition was the result of lightning or anthropogenic (person) causes.

Spatially displaying fire-cause ignition points can illustrate distribution patterns that can be used to identify areas that are likely to experience more frequent wildland events.

The area burned by anthropogenic fires is small in relation to the area burned by lightning fire ignitions. This is because anthropogenic fires generally occur near settlements and roads where they are quickly detected and easily extinguished. The outline of the Alaska Highway is easily traceable on a map of points of ignition for forest fires. Tracking this indicator is an important communication tool used to demonstrate public responsibility in fire prevention.

With a changing climate and an expanding human footprint, it is reasonable to expect that the frequency of ignitions will increase. If ignitions occur during periods of elevated fire danger, due to [temperature](#) or [precipitation](#) considerations, the severity and extent of wildland fires across the Yukon could change.



Lightening caused fire in Dawson District. Sonny Parker.

[^ BACK TO TOP](#)

#### What is happening?

FIGURE 1: Yukon wildland fire history: Anthropogenic caused fires 1946-2015

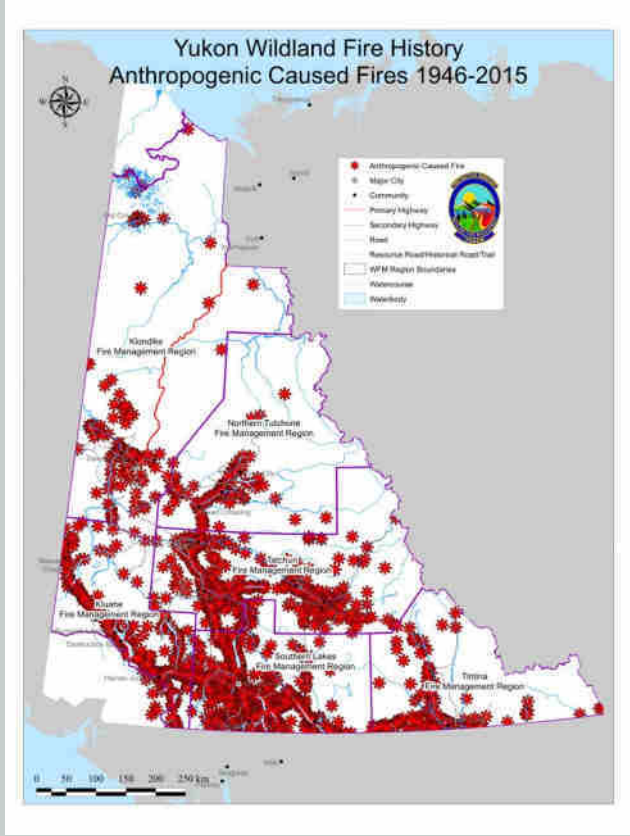
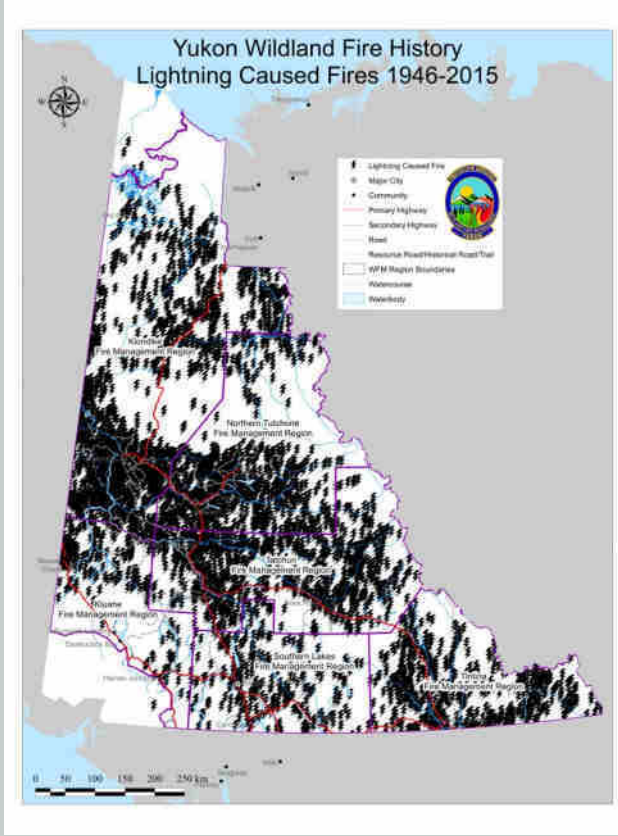


FIGURE 2: Title: Yukon wildland fire history: lightning caused fires 1946-2015



- There are dramatic variations in the number and location of wildland fire ignitions that occur annually. Generally speaking, anthropogenic fires occur along transportation corridors or near communities (Figure 1).
- Lightning ignited wildland fires are biased towards forested areas and show a wider distribution across Yukon (Figure 2).
- In 2015, 15 per cent of the fires that started were anthropogenic, resulting from escaped campfires, open burning, equipment use, and so on.
- The other 85 per cent of the fires ignited in 2015 had lightning origins.

[^ BACK TO TOP](#)

#### Taking action

Yukon's Wildland Fire Management Branch investigates the cause of every reported fire in Yukon. The point of ignition in latitude and longitude and the cause of the fire are recorded by staff and form a fire record for Yukon. This information helps guide wildland fire prevention activities, continuous improvement of the fire detection program and complements our understanding of Yukon's fire regimes.



Watson Lake 2015. Aerial ignition to remove volatile forest fuels.

[^ BACK TO TOP](#)

#### Data quality

- Yukon's Wildland Fire Management Branch collects data on reported fires during the fire season, which extends from April 1 to September 30 each year. The data is compiled daily during the fire season and finalized by the following January.
- Wildland fire ignitions occurring in Yukon are reported publically each day via the Canadian Interagency Forest Fire Centre [website](#)
- Minor gaps can occur as not all wildland fires are detected and reported.
- The fire environment (e.g., type of forest), seasonality (at what point during the fire season does the fire occur) and fuel moisture (e.g. long-term drought) can and will impact the fire size and severity.



Whitehorse district fire, 2009.

[^ BACK TO TOP](#)

#### Further information

- [Yukon Wildland Fire Management website](#)
- [Energy, Mines and Resources Forestry website](#)
- [Canadian Wildland Fire Information System](#)
- [Canadian Interagency Forest Fire Centre daily situation report](#)



## ENVIRONMENT YUKON

Government of Yukon > Environment > State of the Environment Report: Land > Forest Health >

[CAMPING & PARKS](#)
[HUNTING, FISHING & TRAPPING](#)
[ANIMALS & HABITAT](#)
[MANAGING AIR, WATER & WASTE](#)
[ENVIRONMENT & YOU](#)
[PUBLICATIONS & MAPS](#)


# Yukon State of the Environment

Reporting on environmental indicators - 2016

[HOME](#)
[DOWNLOAD REPORTS](#)


## PLANNING

### FOREST HEALTH

[> SIGNIFICANCE](#)   [> WHAT IS HAPPENING?](#)   [> TAKING ACTION](#)

#### Significance

Native forest insects and diseases have an essential role in the ecology of forests because they help forest ecosystems change and regenerate. However, when forest health agents impact large areas of commercially viable forests, they are considered pests ([Natural Resources Canada](#), n.d.).

In 2009, the Yukon Forest Management Branch implemented a risk-based approach to forest health monitoring that is consistent with the Canadian Council of Forest Ministers [National Forest Pest Strategy](#). The objectives of the approach are:

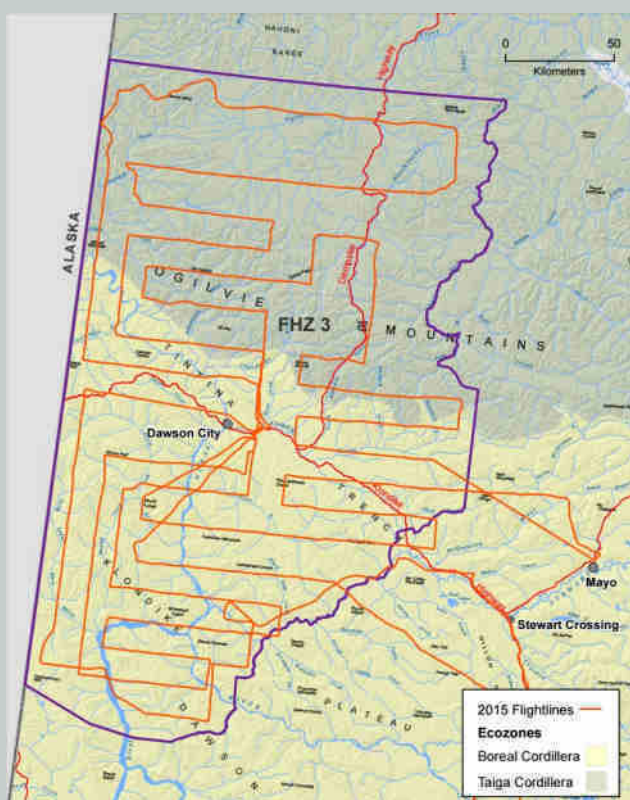
- to provide a Yukon-wide overview of forest health issues;
- to focus monitoring activities on high-risk forest health agents in high value forest regions; and
- to contribute to the *National Forest Pest Strategy* goals.

This report presents the most significant disturbance detected by the Forest Management Branch's annual forest health survey. The survey is performed in a different area (forest health management zone) each year.

#### What is happening?

In 2015, the Forest Management Branch performed an aerial survey and supporting ground surveys in Forest Management Zone 3, a large area surrounding Dawson City (Figure 1).

FIGURE 1: Forest Management Zone 3 showing the flightlines for the 2015 survey.



For a full assessment of Yukon forest health issues, see the [Yukon Forest Health Reports](#). The 2015 report is published and available March 2016.



The most significant biotic disturbance in 2015 was caused by [large aspen tortrix](#)—a moth that defoliates trembling aspen.



Damage can result in severe defoliation, branch dieback, and gnarly, stunted tree forms. If the outbreak continues for multiple years in a row there can be extensive tree mortality.

- The 2015 survey found that there was a significant increase in the area defoliated by large aspen tortrix. The affected area went from no recorded defoliation in 2009 to 44,237 ha defoliated in 2015.
- Aspen stands throughout Zone 3 were also affected by snow and ice damage, classified as aspen decline due to reoccurrence. This aspen decline was the most common abiotic disturbance, but flooding also caused some damage.

[^ BACK TO TOP](#)

#### Taking action

- Given the size of the forest landscape, Yukon is divided into five forest health regions or zones. Zone boundaries are based on high level strategic planning areas.
- At least one forest health zone is surveyed every year. This means that each zone is assessed at least once every five years and trends or changes are documented in the [Yukon Forest Health Reports](#). Other responses, such as ground surveys and other management options, may be triggered by what they find.

[^ BACK TO TOP](#)



Moderate to severe defoliation caused by large aspen tortrix.

#### Data quality

- The Forest Management Branch has surveyed forest health at a landscape level since 2009 to identify both biotic and abiotic disturbances.
- Yukon's survey standards are adopted from the British Columbia government and are based on traditional Canadian Forest Service surveys. This provides for a consistent evaluation of disturbances over time.
- In 2015, Forest Health Monitoring Zone 3 was flown using a 12km grid (Figure 1), and disturbances (biotic and abiotic) were sketchmapped to hard copy maps. Information from these maps was transferred to a mapping program.
- There is no sampling protocol that is specific to large aspen tortrix. In this case, the survey adopted a method used for a similar defoliator, the forest tent caterpillar. The usefulness of this protocol will be evaluated based on observed 2016 population levels.

#### References

Natural Resources Canada. n.d. Forest pest management [modified 2016 Jan 14; cited 2016 Mar 3]. Available from: <http://www.nrcan.gc.ca/forests/fire-insects-disturbances/pest-management/13361>.

[^ BACK TO TOP](#)



ENVIRONMENT YUKON

Government of Yukon > Environment > State of the Environment Report: Land > Wetlands >

CAMPING & PARKS	HUNTING, FISHING & TRAPPING	ANIMALS & HABITAT	MANAGING AIR, WATER & WASTE	ENVIRONMENT & YOU	PUBLICATIONS & MAPS
-----------------	-----------------------------	-------------------	-----------------------------	-------------------	---------------------



# Yukon State of the Environment

Reporting on environmental indicators - 2016

HOME	CLIMATE CHANGE	AIR	WATER	LAND	FISH AND WILDLIFE	DOWNLOAD REPORTS
------	----------------	-----	-------	------	-------------------	------------------



## WETLANDS

### WETLANDS

- > SIGNIFICANCE
- > WHAT IS HAPPENING?
- > TAKING ACTION

### Significance

Depending on the type, wetlands can be essential for maintaining water flows, flood protection, purifying water, recharging/discharging groundwater, and providing habitat for fish and wildlife. Some wetlands support traditional subsistence and cultural activities and provide for recreation. Wetlands also provide a number of additional valuable functions including:

- slowing the flow of water, thereby reducing erosion;
- providing habitat for plants that help stabilize stream banks and shorelines;
- creating and fertilizing floodplains;
- supporting the food chain;
- enhancing aesthetics; and
- serving as a rich arena for education.

The Government of Yukon uses the [Canadian Wetlands Classification System](#) (1997) that includes five classes of wetlands: bogs, fens, swamps, marshes and shallow open water. These classes are determined by soil, vegetation, water and other ecological characteristics. The classification system provides a practical and consistent framework for the characterization and description of wetlands throughout Yukon and Canada that can be used by specialists and non-specialists alike. Wetland classification can be used by proponents to communicate with [assessors](#) and by land managers to identify habitat that may warrant special consideration in [planning initiatives](#).

The Canadian Wetland Classification System is a scientific classification and does not address environmental, social or economic importance to a wetland. It is used for naming and describing various kinds of wetlands for use during environmental assessments, regulatory applications, conservation area planning and planning of infrastructure projects.

For more information on the classes of wetland, please refer to these [factsheets](#) produced by Ducks Unlimited Canada.

The largest concentrations of wetlands in Yukon are located in areas underlain by continuous permafrost in central to northern Yukon. Smaller wetlands and wetland complexes are scattered throughout the territory. Wetland mapping has not been carried out in Yukon and the full extent of wetlands is not known, in particular the extent of peatlands. Wetlands are important for a disproportionately high number of species compared to many other habitats (Environment and Climate Change Canada, n.d.) which is reflected in a number of protected areas in Yukon.



Ice wedge polygons caused by freezing and thawing, Yukon North Slope.

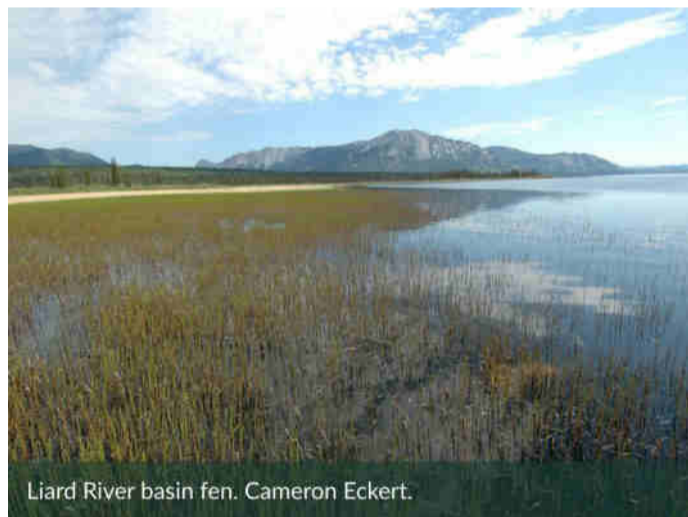
[^ BACK TO TOP](#)

### What is happening?

- As needed, wetland inventory is conducted to support various governments and non-government projects and planning processes.
- There are a number of important wetlands identified as "significant" in the Government of Yukon's key wildlife area database held within the on-line [Lands Viewer](#) map tool.
- Many of our existing [protected areas](#) include important wetland habitat.
- There are bird monitoring programs in place in a number of wetland complexes recognised for their value to migratory birds which can provide an indication of wetland ecological health (i.e., [waterfowl monitoring](#).)



MacMillan River bog. Jamie Kenyon.



Liard River basin fen. Cameron Eckert.



Little Atlin Lake marsh. Cameron Eckert.



Shallow water wetland, Watson Lake. Cameron Eckert.

[^ BACK TO TOP](#)

### Taking action

#### The Government of Yukon's Wetland Management Policy

One of the recommendations in the *Yukon Water Strategy and Action Plan* (2014) is to develop a wetland policy for Yukon. A number of wetland initiatives carried out by the Government of Yukon over the last 15 years include: wetland classification, best practices, environmental assessment, inventory, management planning for specific wetlands, and monitoring of environmental change.

The Government of Yukon, led by the Department of Environment and an interdepartmental working group, has begun developing a wetland management policy that will enable the government to improve its ability to manage wetlands and consider their functions and values in planning and decision-making. It will provide an overarching, consistent approach to how the Government of Yukon manages wetlands across the territory.

#### Wetland Reclamation Guide

The Government of Yukon, led by the Department of Energy, Mines and Resources, is developing a guide for wetland reclamation for the placer mining industry.

The wetland reclamation guidance document is intended to provide assistance to placer miners who are required to develop a wetland reclamation plan in accordance with an approval and/or licence. However, this guidance document may also provide useful information to all placer miners working in wetland areas who are undertaking progressive wetland reclamation activities.

This guidance is also intended to assist assessors and regulators to provide consistent advice and direction during the assessment and licensing of placer mining operations in wetland areas.



Aishihik Lake wetland complex.

[^ BACK TO TOP](#)

### References

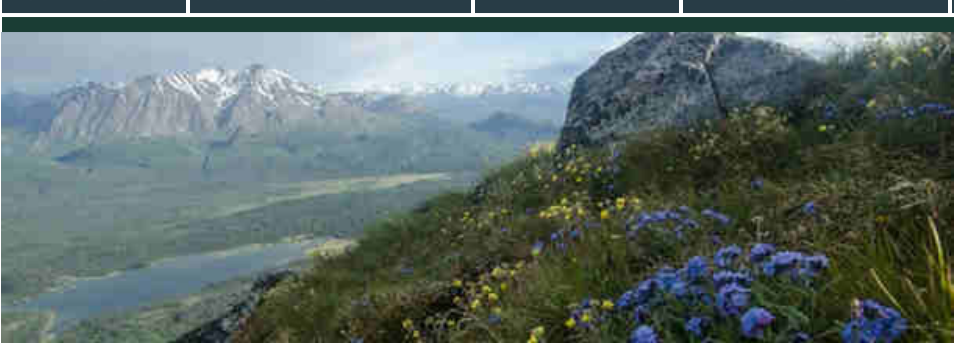
Ducks Unlimited Canada. n.d. Yukon Wetlands. Ducks Unlimited Canada, Stonewall, Manitoba, Canada. Available from: [http://www.env.gov.yk.ca/animals-habitat/documents/ducks\\_unlimited\\_wetland\\_factsheet.pdf](http://www.env.gov.yk.ca/animals-habitat/documents/ducks_unlimited_wetland_factsheet.pdf)

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[^ BACK TO TOP](#)





# Yukon State of the Environment

Reporting on environmental indicators - 2016

## ALIEN AND INTRODUCED SPECIES

### PRESENCE OF ALIEN AND INTRODUCED SPECIES

> SIGNIFICANCE | > WHAT IS HAPPENING? | > TAKING ACTION

#### Significance

Plants, animals and microorganisms introduced outside their normal range by humans are considered introduced alien species. Not all alien species are harmful to an ecosystem, and some are introduced on purpose (e.g., for conservation, in gardens, to increase hunting or fishing opportunities, etc.).

Invasive species are alien species whose introduction has an environmental, economic or social cost. (CBD Secretariat n.d.). The impacts of invasive species include loss of biodiversity, reduced property value or reduced quality and abundance of resources to humans, including loss of plants traditionally used by First Nations.

Increases in resource exploration and development and increases in backcountry pursuits will likely increase the range and number of invasive species. A changing climate is also a factor in the increase and spread of alien and invasive species (Streicker 2016).

#### PROFILE

#### EARLIEST AND MOST RECENT INTRODUCTIONS



Common Plantain. Bruce Bennett.

[^ BACK TO TOP](#)



European Mountain-ash is often used in landscaping. Yukon Invasive Species Council.

The earliest report of an introduced species was a collection made by William Healey Dall in about 1868 along the Yukon River. He collected Common Plantain (*Plantago major*), a species known for its medicinal properties that could have been introduced by early traders.

The most recently reported introduction was of European Mountain-ash (*Sorbus aucuparia*) which was flowering and in fruit on Bert Law Island in Whitehorse. The mountain-ash was likely spread through bird droppings.

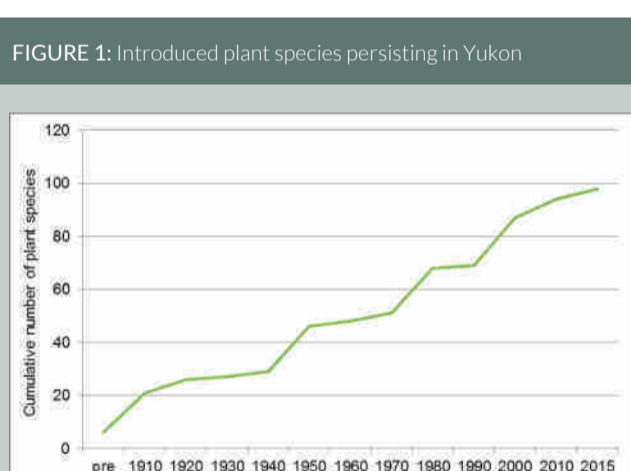
[^ BACK TO TOP](#)

#### What is happening?

##### Plants

- As of November 2015, an estimated 169 alien plant species have been identified in Yukon. Of these, 97 are currently believed to be present, 32 are believed to be absent, and the presence of 40 additional species is unknown (Figure 1).
- Twenty of these plant species are associated with human disturbance. By looking at the results of surveys in the communities (particularly Dawson City and Whitehorse), along major highways (particularly the Alaska and Klondike highways), and along major rivers (such as the Yukon and Teslin river), a trend in the number of introduced species naturalized is shown (Figure 1).

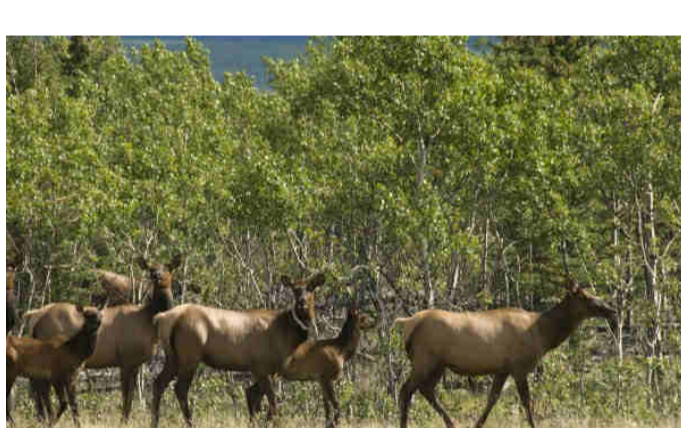
FIGURE 1: Introduced plant species persisting in Yukon



Source: Yukon Conservation Data Centre, 2015.

##### Mammals

- There are 72 regularly occurring mammal species in Yukon; of these, three are introduced beyond their native range.
- No mammals are considered invasive in Yukon.
- The House Mouse is an alien species from Europe that was introduced accidentally or has spread from southern populations.
- A few feral horses are known to be present in Yukon at the time of this report.
- Elk, though native to southeast Yukon, were introduced to south-central Yukon to reduce hunting pressure on moose and caribou.



Elk. J Bergold.

##### Birds

- There are four introduced bird species out of the 240 bird species that regularly occur in Yukon: Rock Pigeon, House Sparrow, Eurasian Collared Dove, and European Starling.
- These species were introduced accidentally or have spread from southern populations.
- These four species occur in low numbers and are not expected to have a large impact on native species (Yukon Invasive Species Council n.d.).



House Sparrow. Cameron Eckert.

##### Freshwater fishes

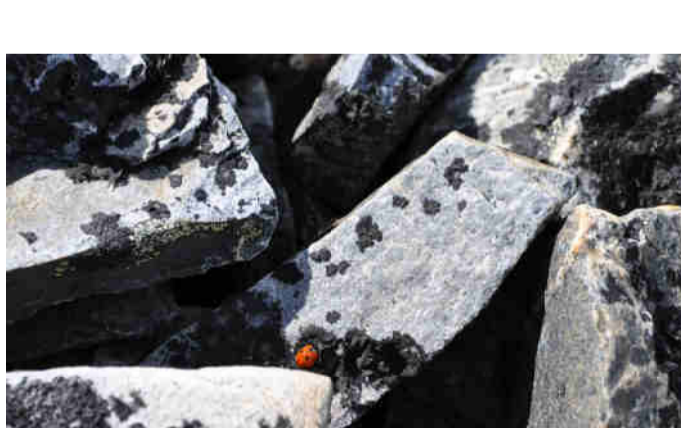
- Most Yukon lakes and waterways appear to be free of invasive or introduced species.
- Out of the 38 regularly occurring species of freshwater fish, two are introduced:
  - Goldfish is an alien species that occurs in Yukon and was either introduced accidentally or spread from southern populations.
  - Threespine Stickleback is native in B.C. and Alaska but was accidentally introduced into two pothole lakes with fish stocking programs in the 1970s.
- Several fish species, though native in some rivers or lakes in Yukon, were intentionally released in other areas to enhance fishing opportunities (Table 1).

Table 1: Native Yukon fish species introduced to other places in Yukon

Species:	Native to:	Introduced in:
Arctic Char	Two lakes in Ivavik, northern Yukon	Southern Yukon
Bull Trout / Dolly Varden	Yukon and Liard drainages	Pothole Lakes
Kokanee	Alesek drainage	Scout Lake
Rainbow Trout	Alesek drainage	Yukon River

##### Invertebrates

- Less is known about alien invertebrates in Yukon.
- The Conservation Data Centre currently has about 3,500 invertebrate species recorded in their database; 26 are known to be introduced and believed to be present. It is likely that more introduced species are present but not detected.
- There are several alien earthworms that are believed to live year round in Yukon (i.e., the night crawler, or dew worm). The Red Wiggle is commonly used for composting, but is not known to overwinter in Yukon outside cultivation.
- The Seven-spotted Lady Beetle is commonly used to control aphids in greenhouses and has been found in remote places as Keno Hill. It is now believed to be persisting in the wild.



Seven spotted lady beetle. Kelcy Tousignant.

[^ BACK TO TOP](#)

#### Taking action

The Yukon Invasive Species Council works to address the threats posed by invasive species through prevention, early detection and rapid response, control and management, research, and education. Council members come from different governments, industry and the public.

The Fisheries Program at the Department of Environment asks Yukoners to report aquatic invasive species. They actively promote [information](#) at boat launches throughout the Yukon.



Threespine Stickleback. NOAA Fisheries, Auke Bay Laboratories.

## STOP AQUATIC INVASIVE SPECIES

**HELP PROTECT OUR WATERS**

**CHECK**  
and remove mud, weeds and aquatic life

**DRAIN**  
water from bilges, pumps, coolers and buckets

**CLEAN**  
boots and gear by freezing, drying, or power washing

**Don't move water, fish, plants or aquatic life from one waterbody to another**

Report possible invaders to  
1-800-661-0408 ext.5721 or fisheries@gov.yk.ca

#### Data quality

- Through the Spotter's Network, there is a formal protocol for invasive alien species data collection within Yukon.
- The Yukon Conservation Data Centre makes data publicly available to anyone wishing to access information on species or ecosystems of conservation concern. This includes lists of species, range maps and identification guides.
- The Department of Environment provides additional information about Yukon's [aquatic invasive species](#) and [invasive plants](#).

#### References

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Streiker, J. 2016. Yukon Climate Change Indicators and Key Findings 2015. Northern Climate ExChange, Yukon Research Centre, Yukon College, Whitehorse, Yukon, Canada. Available from: <https://www.yukoncollege.yk.ca/research/abstracts/indicators>.

Yukon Conservation Data Centre. n.d. Rare species database [modified 2015 Dec 23; cited 2016 Mar 3]. Available from: [www.env.gov.yk.ca/cdc](http://www.env.gov.yk.ca/cdc)

Yukon Invasive Species Council. n.d. Yukon Invasive Species [modified 2016 Feb 20; cited 2016 Mar 3]. Available from: <http://www.yukoninvasives.com/index.html>

[^ BACK TO TOP](#)



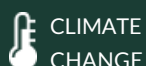
**ENVIRONMENT YUKON**

Government of Yukon &gt; Environment &gt; State of the Environment Report: Fish and Wildlife &gt;

[CAMPING & PARKS](#)
[HUNTING, FISHING & TRAPPING](#)
[ANIMALS & HABITAT](#)
[MANAGING AIR, WATER & WASTE](#)
[ENVIRONMENT & YOU](#)
[PUBLICATIONS & MAPS](#)


# Yukon State of the Environment

Reporting on environmental indicators - 2016

[HOME](#)

[DOWNLOAD REPORTS](#)

[> PLANNING](#)
[> MAMMALS](#)
[> FISH](#)
[> BIRDS](#)
[> SPECIES AT RISK](#)

## PLANNING

### Species-based management plans

There are eight species-based management plans that are current or being worked on. These address conservation or population management concerns for an animal, fish, or bird populations.

### Community-based fish and wildlife work plans

Community-based fish and wildlife work plans are developed to address local fish and wildlife management concerns in a coordinated manner within a Traditional Territory.

[^ BACK TO TOP](#)

## MAMMALS

### Caribou population and distribution

Both of the barren-ground caribou herds that occur in Yukon are increasing in size. Of the 26 woodland caribou herds in Yukon, one is increasing in size, 12 are relatively stable and three are declining.

### Caribou mercury levels

Monitoring shows that the concentration of mercury in the kidneys of the Porcupine caribou herd continues to be low.

### Density of snowshoe hares

The snowshoe hare is a keystone species in the boreal forest; changes in hare population cycles can be an early warning system for ecosystem changes due to climate change.

### Winter tick surveillance

Winter ticks have not caused serious problems for Yukon wildlife. However, given they have been identified on several Yukon species, they are likely here to stay.

[^ BACK TO TOP](#)

## FISH

### Number of spawning Chinook salmon

The spawning escapement target for Canadian-origin Yukon River Chinook salmon was met in 2015.

### Sustainability of lake trout fisheries

Healthy lake trout populations reflect the general health of an aquatic ecosystem. Lake trout harvest in most Yukon lakes continues to be sustainable; catch and possession limits for four lakes were reduced in April 2015 to allow depleted populations to rebuild.

### Fish mercury levels

There is a correlation between the length of a fish and its mercury concentration. Most fish from Yukon's lakes have mercury levels well below Health Canada's maximum limit.

[^ BACK TO TOP](#)

## BIRDS

### Monitoring breeding waterfowl

Monitoring waterfowl presence and abundance gives a good indication of the ecological health of the area, as waterfowl depend on wetland areas for food, nesting areas and safety.

### Trumpeter Swan population monitoring

Trumpeter swans were considered endangered in the 1970s. Monitoring efforts shows that their numbers continue to increase in Yukon.

### Lead surveillance in wild birds

Scavenging birds and waterfowl may ingest sources of lead—like bullets, shot and lead fragments—because of their feeding behaviours. The Government of Yukon is gathering information to better understand how birds are being affected by lead and how it varies by species.

[^ BACK TO TOP](#)

## SPECIES AT RISK

### Number of species at risk in Yukon

Yukon's healthy ecosystems are a refuge to many species that are considered at risk nationally due to declines outside the territory.

[^ BACK TO TOP](#)



**ENVIRONMENT YUKON**
[Government of Yukon](#) > [Environment](#) > [State of the Environment Report: Fish and Wildlife](#) > [Species-based management plans](#) >

- [CAMPING & PARKS](#)
- [HUNTING, FISHING & TRAPPING](#)
- [ANIMALS & HABITAT](#)
- [MANAGING AIR, WATER & WASTE](#)
- [ENVIRONMENT & YOU](#)
- [PUBLICATIONS & MAPS](#)



# Yukon State of the Environment

Reporting on environmental indicators - 2016

- [HOME](#)
- CLIMATE CHANGE
- AIR
- WATER
- LAND
- FISH AND WILDLIFE
- [DOWNLOAD REPORTS](#)



## PLANNING

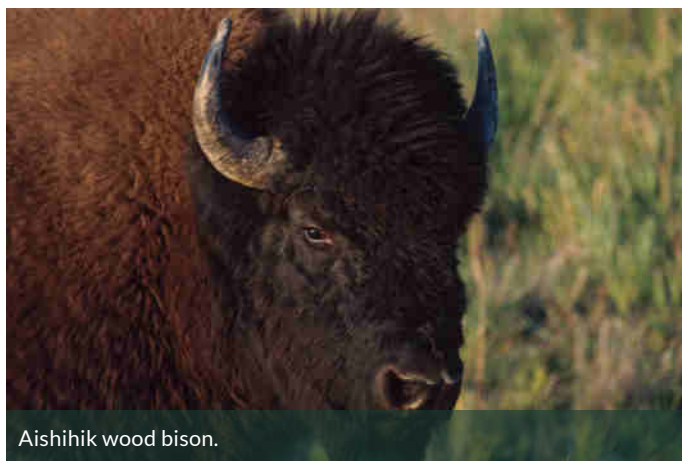
### SPECIES-BASED MANAGEMENT PLANS

- [> SIGNIFICANCE](#)
- [> WHAT IS HAPPENING?](#)
- [> TAKING ACTION](#)

### Significance

Species management plans address conservation or population management concerns for fish or wildlife populations. They are used to help to develop or revise approaches to managing a population and regulating human interaction with these species.

Management plans are developed in response to local or territorial population management needs or as required through the federal species at risk legislation. Tracking the implementation of management plans helps to demonstrate commitment to continued action on population management needs.



Aishihik wood bison.

[^ BACK TO TOP](#)

### What is happening?

The following species management plans are in place or in progress:

Plan	Approved	Status	Summary
<i>Management Plan for Elk in the Yukon</i>	2008	Being updated	This publicly developed plan sets goals for free-ranging elk in southwest Yukon.
<i>Management Plan for the Aishihik Wood Bison Herd in Southwestern Yukon</i>	2012	Current	This plan provides a broad framework guiding the management of the herd in a manner consistent with recovery of a species at risk, while addressing local concerns and interests.
<i>Yukon Wolf Conservation and Management Plan</i>	2012	Current	This plan guides wolf conservation and management throughout Yukon, ensuring that the roles of wolves and their prey species are respected.
Dezadeash Lake Management Plan	No	Underway	This plan guides management of fish populations and their habitat at Dezadeash Lakes. The plan is being developed in partnership with Champagne and Aishihik First Nations, Alsek Renewable Resource Council, and the Government of Yukon.
Mandanna Lake Management Plan	2013	Current	This plan was approved in 2003 as a requirement from the Little Salmon/Carmacks First Nation Final Agreement. The plan was reviewed and updated in 2013. The plan guides the conservation of freshwater fish and the respect for traditional and current uses of the lake.
Grizzly Bear Conservation and Management Plan	No	Underway	Government of Yukon and the Yukon Fish and Wildlife Management Board are working in partnership to develop a Grizzly Bear Conservation and Management Plan for Yukon to address local management issues and to meet federal and international obligations.
<i>Management Plan for Yukon Amphibians</i>	2013	Current	This plan provides a broad framework guiding the management of amphibians in Yukon. The Western Toad is listed as a Species of Special Concern under the federal <i>Species at Risk Act</i> .

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) determines the national status of wildlife using science and traditional knowledge. If COSEWIC assess a wildlife species as at risk, the Government of Canada may list the species under the *Species at Risk Act* (SARA), at which time a national management plan or recovery strategy is required.

- There are [35 species](#) in Yukon that have been assessed as 'at risk'. Of these, 18 are listed under the federal *Species at Risk Act*. Some of these have national species management plans or recovery plans in place. These plans can be found by searching the [SARA public registry](#) or checking the [status of SARA documents](#).
- The *Management Plan for Yukon Amphibians*, *Management Plan for the Aishihik Wood Bison Herd in Southwestern Yukon*, and the *Grizzly Bear Conservation and Management Plan* were developed in part to address the national status of the species.

[^ BACK TO TOP](#)

### Taking action

View the [species management plans](#).



Wolves play an important role in Yukon's ecosystems.

#### PROFILE

### MANAGEMENT PLAN FOR ELK IN YUKON



Female elk.



In 2015, the *Management Plan for Elk in the Yukon* (2008) was being reviewed and updated. This review was initiated largely in response to concerns from the agriculture community over increasing conflict between elk and agriculture in the Takhini Valley. The aim of this plan is to maintain self-sustaining populations of elk on the landscape to provide wildlife viewing and harvest opportunities, while acknowledging and addressing concerns related to elk-agriculture conflicts, collisions between elk and vehicles, and impacts of elk on other species and ecosystems.

The review was led by the Department of Environment with input from First Nations, renewable resources councils, the Yukon Fish and Wildlife Management Board, the Yukon Fish and Game Association, the Agriculture Branch, and agriculture associations.

A draft plan was released for public review in the fall of 2015 and a revised plan is expected for spring 2016.

[^ BACK TO TOP](#)



ENVIRONMENT YUKON

Government of Yukon > Environment > State of the Environment Report: Fish and Wildlife > Community-based fish and wildlife work plans >

- CAMPING & PARKS
- HUNTING, FISHING & TRAPPING
- ANIMALS & HABITAT
- MANAGING AIR, WATER & WASTE
- ENVIRONMENT & YOU
- PUBLICATIONS & MAPS



# Yukon State of the Environment

Reporting on environmental indicators - 2016

- HOME
- CLIMATE CHANGE
- AIR
- WATER
- LAND
- FISH AND WILDLIFE
- DOWNLOAD REPORTS

## PLANNING

### COMMUNITY-BASED FISH AND WILDLIFE WORK PLANS

- > SIGNIFICANCE
- > WHAT IS HAPPENING?
- > TAKING ACTION

#### Significance

Strategic work planning helps to identify long-term and cooperative management solutions that ensure healthy fish and wildlife populations.

Community-based fish and wildlife work plans are one way that the Government of Yukon, First Nation governments and renewable resources councils come together to decide the priority fish and wildlife management issues for an area and propose cooperative approaches for addressing these issues. Tracking the implementation of these work plans is one measure of effective fish and wildlife management.



Cow moose with two calves. [^ BACK TO TOP](#)

#### What is happening?

- There are three community-based fish and wildlife work plans in place and one work plan in progress.
- These plans consider science, traditional and local knowledge in their development and implementation.
- The *Southern Lakes Regional Wildlife Assessment and Recommendations* was developed by governments (First Nations, Yukon, Canada, and British Columbia) to recover and conserve wildlife populations and their habitat in the Southern Lakes area.



Vuntut Gwitchin Traditional Territory Community-based Fish and Wildlife Work Plan	Na-Cho Nyäk Dun Traditional Territory Community-based Fish and Wildlife Work Plan	Little Salmon/Carmacks Traditional Territory Community-based Fish and Wildlife Work Plan
<p><b>Approved:</b> 2013</p> <p><b>Status:</b> Current</p> <p><b>Summary:</b></p> <p>This work plan addresses issues related to fish and wildlife populations and monitoring, managing human-wildlife conflicts, harvest and education, and habitat in the Vuntut Gwitchin Traditional Territory.</p> <p><b>Workplan:</b></p>	<p><b>Approved:</b> 2014</p> <p><b>Status:</b> Current</p> <p><b>Summary:</b></p> <p>This work plan addresses issues related to habitat, moose, freshwater fish, caribou, and monitoring and stewardship in the Na-Cho Nyäk Dun Traditional Territory.</p> <p><b>Workplan:</b></p>	<p><b>Approved:</b> 2012</p> <p><b>Status:</b> Current</p> <p><b>Summary:</b></p> <p>This work plan addresses issues related to fish and wildlife populations, habitat, harvest and information gaps in the Little Salmon/Carmacks Traditional Territory.</p> <p><b>Workplan:</b></p>

Champagne & Aishihik Traditional Territory Community-based Fish and Wildlife Work Plan	Yukon Southern Lakes Area Regional Assessment of Wildlife
<p><b>Approved:</b> N/A</p> <p><b>Status:</b> In Progress</p> <p><b>Summary:</b></p> <p>Work planning is currently underway for the Champagne &amp; Aishihik Traditional Territory.</p>	<p><b>Approved:</b> 2012</p> <p><b>Status:</b> Current</p> <p><b>Summary:</b></p> <p>The <i>Southern Lakes Regional Wildlife Assessment and Recommendations</i> is the first joint effort by governments (Canada, British Columbia, and First Nations) to recover and conserve wildlife populations and their habitat in the Southern Lakes area.</p> <p><b>Reports:</b></p>

#### Taking action

- Collaborative work planning is now underway for the *Champagne and Aishihik Traditional Territory Community-based Fish and Wildlife Work Plan*.
- Many fish and wildlife surveys have been completed in priority areas because of issues identified through community based planning.

PROFILE

### CARIBOU AND SHEEP RANGE ASSESSMENTS NORTHWEST OF CARMACKS

Dall's sheep.

Through the 2012 *Little Salmon/Carmacks Traditional Territory Community-based Fish and Wildlife Work Plan*, the community expressed concerns about cumulative effects of mining projects resulting from the late 2000s staking rush and a proposed mine in the area.

In response, the Government of Yukon spent the past four years conducting an intensive study of the Klaza caribou herd using satellite collars and multiple aerial surveys to identify the status of this herd and its important seasonal habitats.

These studies have culminated in the newly completed range assessment for the Klaza caribou herd that summarises what we know about the herd, evaluates risks and makes a series of recommendations for mitigating cumulative effects.

Similarly, the Government of Yukon conducted six surveys of sheep and sheep habitat in the Dawson Range northwest of Carmacks to evaluate the status of the population and map seasonal habitats. These have been summarised in a range assessment for this sheep population that, like the caribou range assessment, is aimed at evaluating risks and mitigating cumulative effects.

[^ BACK TO TOP](#)



ENVIRONMENT YUKON

Government of Yukon > Environment > State of the Environment Report: Fish and Wildlife > Caribou population and distribution >

- CAMPING & PARKS
- HUNTING, FISHING & TRAPPING
- ANIMALS & HABITAT
- MANAGING AIR, WATER & WASTE
- ENVIRONMENT & YOU
- PUBLICATIONS & MAPS



# Yukon State of the Environment

Reporting on environmental indicators - 2016

- HOME
- CLIMATE CHANGE
- AIR
- WATER
- LAND
- FISH AND WILDLIFE
- DOWNLOAD REPORTS



## MAMMALS

### CARIBOU POPULATION AND DISTRIBUTION

- > SIGNIFICANCE
- > WHAT IS HAPPENING?
- > TAKING ACTION

#### Significance

Caribou are important ecologically and culturally. Many people in Yukon rely on caribou for subsistence and spiritual well-being. Conserving and protecting key caribou habitat—rutting areas, migration corridors and winter range—is important for herd health and abundance.

Caribou herds that cross jurisdictional boundaries require a coordinated approach to their management. For example, the Porcupine caribou herd has a range which covers Yukon, Alaska, and the Northwest Territories.



Woodland caribou. Cameron Eckert.

[^ BACK TO TOP](#)

#### What is happening?

There are two subspecies of caribou in Yukon: woodland and barren-ground caribou.

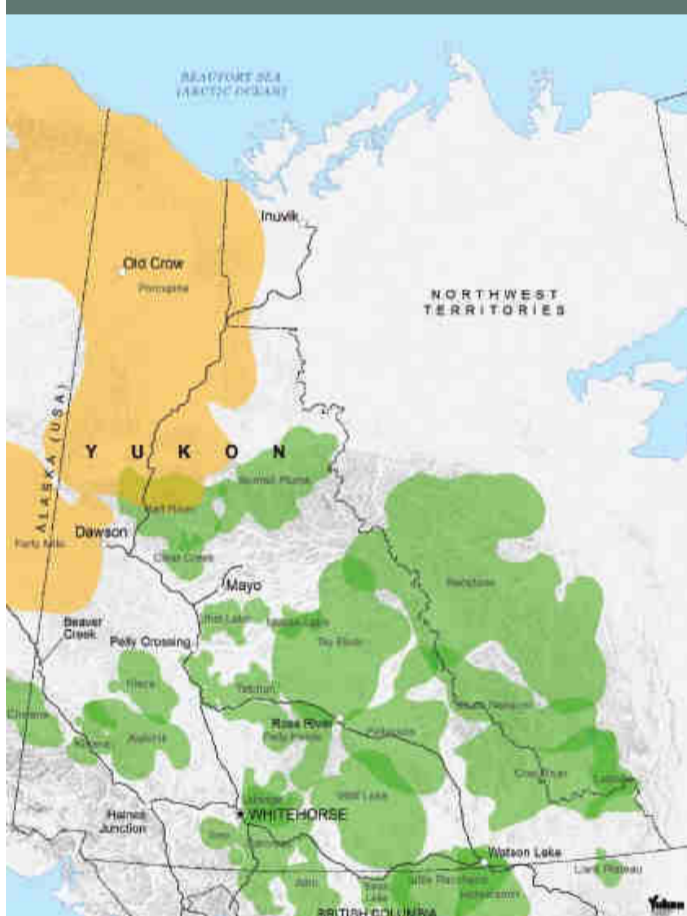
##### Woodland caribou

- In 2002, the Committee on the Status of Endangered Wildlife in Canada designated all woodland caribou in Yukon as a Species of Special Concern.
- Of the 26 woodland caribou herds present in Yukon, one is increasing in size, 12 are considered relatively stable and three are declining.
- The declines in herds in Yukon and across the circumpolar north may be due to environmental changes, natural population cycles, or human influences such as harvest and development.
- Population trends are unknown for 10 of the woodland caribou herds.
- The Ibx caribou herd is expanding its range to the north and west. Information collected by the Department of Environment and by members of the public indicates that this herd is now being seen in areas where it has not been observed for many decades, particularly west of Kusawa Lake.

##### Barren-ground caribou

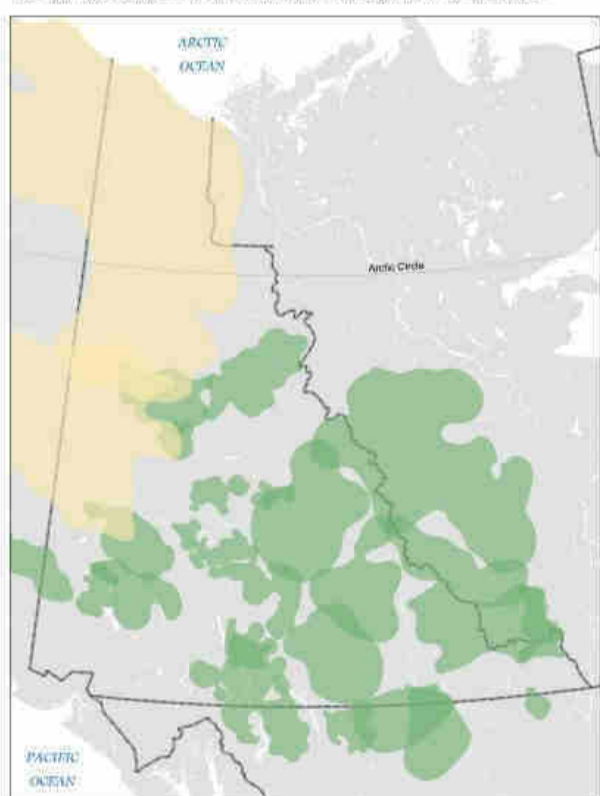
- In Yukon, both of the barren-ground caribou herds, Fortymile and Porcupine, are increasing in size.
- In the winter of 2012/13, the Fortymile caribou herd dramatically increased its Yukon range, substantially expanding its recent range both east and north. This movement of Fortymile caribou into Yukon was unprecedented and it remains to be seen whether it will be a regular or one-time occurrence.

FIGURE 1: Distribution of caribou herds in Yukon, 2014



#### YUKON CARIBOU HERD RANGES 2014

Move your mouse cursor over the map or table to explore caribou herd ranges and statistics.



CARIBOU HERD	POPULATION ESTIMATE	SURVEY TECHNIQUE*	LAST SURVEYED	TREND
<b>WOODLAND CARIBOU</b>				
Aishihik	2,050	Estimate (5)	2009	Stable
Atlin	800	Estimate (2)	2007	Stable
Bonnet Plume	5,000	Expert Opinion	1982	Unknown
Carcross	800	Estimate (2)	2008	Stable
Chisana	700	Estimate (5)	2013	Stable
Clear Creek	900	Estimate (2)	2001	Unknown
Coal River	450-700	Estimate (1)	2008	Stable
Ethel Lake	300	Estimate (2)	1993	Stable
Finlayson	3,100	Estimate (2)	2007	Declining
Hart River	2,200	Estimate (2)	2006	Unknown
Horseshoe/ Little Rancheria	1750	Estimate (2)	1999	Declining
Ibex	850	Estimate (2)	2008	Increasing
Klaxa	1180	Estimate (5)	2012	Stable
Kluane	180	Estimate (5)	2009	Stable
Laberge	100-300	Estimate (2)	2003	Unknown
Labiche	450-700	Estimate (1)	1993	Unknown
Liard Plateau	150	Estimate (1)	2011	Stable
Moose Lake	300	Estimate (2)	1991	Unknown
Pelly Herds	1000	Estimate (3)	2002	Unknown
Redstone	10,000	Estimate (1)	2012	Stable
South Nahanni	2,100	Estimate (5)	2009	Stable
Swan Lake	600-800	Estimate (2)	2007	Unknown
Tatchun	500	Estimate (1)	2000	Stable
Tay River	3,750	Estimate (2)	1991	Unknown
Wolf Lake	1,500	Estimate (2)	1998	Unknown
<b>BARRENGROUND CARIBOU</b>				
Fortymile	51,000	Estimate (4)	2010	Increasing
Porcupine	197,000	Estimate (4)	2013	Increasing

\*Survey Technique  
 (1) Total Minimum Count (2) Stratified Random Quadrat (3) Extrapolation (4) Direct Photocount (5) Mark/Resight

[^ BACK TO TOP](#)

#### Taking action

- The Department of Environment monitors several caribou herds each year in order to assess overall status and trends.
- A recovery plan for woodland caribou populations has been developed under the federal *Species at Risk Act*.

#### Data quality

- Caribou herd population status is usually determined through aerial surveys.
- The Government of Yukon has modified its approach over the past few years to use aerial surveys in combination with collared or marked animals.
- This approach has increased the precision of population estimates as well as provided additional information on seasonal ranges and habitat use.



Collared caribou are key for monitoring the Fortymile caribou herd. Scott Cameron.

[^ BACK TO TOP](#)



## ENVIRONMENT YUKON

Government of Yukon > Environment > State of the Environment Report: Fish and Wildlife > Caribou mercury levels >

CAMPING & PARKS

HUNTING, FISHING & TRAPPING

ANIMALS & HABITAT

MANAGING AIR, WATER & WASTE

ENVIRONMENT & YOU

PUBLICATIONS & MAPS



# Yukon State of the Environment

Reporting on environmental indicators - 2016

HOME

CLIMATE CHANGE

AIR

WATER

LAND

FISH AND WILDLIFE

DOWNLOAD REPORTS



## MAMMALS

### CARIBOU MERCURY LEVELS

[> SIGNIFICANCE](#)   [> WHAT IS HAPPENING?](#)   [> TAKING ACTION](#)

#### Significance

Contaminants such as heavy metals can persist in the environment and can have serious health implications for wildlife and for people—especially those who depend on traditional foods. In Canada, mercury is a risk to Canadian ecosystems and human health (Environment and Climate Change Canada 2016).

Many contaminants found in the North were never used in the region or have been banned or restricted for many years. Transported here by wind and water, they tend to settle in areas with colder climates.

Caribou feed on lichen that can directly absorb airborne contaminants, such as mercury. The annual changes in mercury in Porcupine caribou may reflect changes in atmospheric mercury levels or changes in the environment (e.g., temperature, precipitation and wind) that affect how mercury moves from the air to caribou forage.

#### Edited Video



Arctic Caribou and Moose Contaminant Program.

[^ BACK TO TOP](#)

#### What is happening?

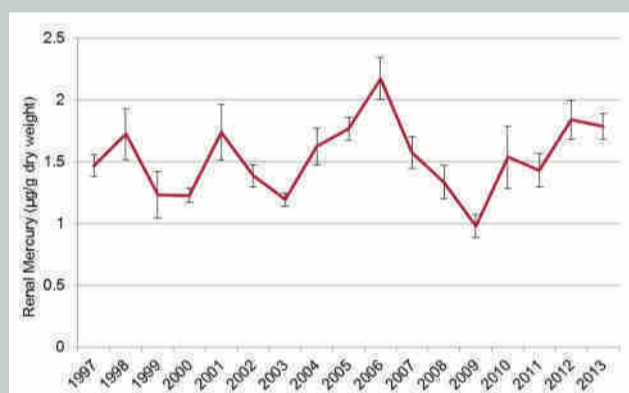
- In 2013, samples were collected from 20 Porcupine caribou.
- The average mercury concentration in the livers was 1.8 µg/g dry weight.

While mercury fluctuates over time in caribou organs, over the long term it has remained stable in the Porcupine caribou herd.

#### Yukon Health advisories:

- Meat (muscle) from Yukon caribou is a healthy food choice, as heavy metals are only present in very low concentrations.
- Intake of kidney and liver from Yukon caribou should be restricted depending on the herd (e.g., a maximum of 32 Porcupine caribou kidneys per year).

Figure 1: Average mercury concentrations found in samples of the Porcupine caribou herd



[^ BACK TO TOP](#)

#### Taking action

The federal [Northern Contaminants Program](#) has measured mercury levels in the Porcupine caribou herd since 1994 to determine if these populations remain healthy (in terms of contaminant loads) and whether they remain a safe and healthy food choice for northerners.

In 2015, the Porcupine caribou data were part of a dataset submitted by the Northern Contaminant Program to the United Nations Environmental Programme. The data was provided to support the [Minamata Convention](#)—a global treaty to protect human health and the environment from the adverse effects of mercury. Signatories to the convention work towards controlling how much mercury humans release into the environment.

The [AMAP Assessment 2015: Human Health in the Arctic](#) has now been released. This assessment of Arctic human health impacts of contaminants and other stressors was conducted between 2012 and 2014 by an international group of over 60 experts. Recommendations from the report were delivered to Arctic Council Ministers at their meeting in Iqaluit in April 2015.



Caribou along Dempster Highway. Mary Gamberg.

[^ BACK TO TOP](#)

#### Data quality

- Data are available (for the most part) for kidneys only. This does not reflect the amount of mercury in the muscle (meat) of the animal.
- Mercury concentrations can be affected by the gender of the animal as well as season of collection.
- Generally, this program collects samples in the fall.
- Annual variation in mercury concentrations is common.

#### References

Environment and Climate Change Canada. 2016. Canadian Mercury Science Assessment [modified 2016 Mar 8; cited 2016 Mar 29]. Available from: <http://ec.gc.ca/mercure-mercury/default.asp?lang=En&n=A2D7E54F-1#BR-Sec2>.

Gamberg, M. 2013. Arctic caribou contaminant monitoring program. Pages 257-266 in *Aboriginal Affairs and Northern Development Canada. Synopsis of Research Conducted under the 2012-2013 Northern Contaminants Program*. Aboriginal Affairs and Northern Development Canada. Gatineau, Quebec, Canada. Available from [http://publications.gc.ca/collections/collection\\_2014/aadnc-aadnc/R71-64-2013-eng.pdf](http://publications.gc.ca/collections/collection_2014/aadnc-aadnc/R71-64-2013-eng.pdf)

Northern Contaminants Program. 2015. Northern Contaminants Program [modified 2016 Jan 25; cited 2016 Mar 3]. Available from: <http://www.science.gc.ca/default.asp?lang=En&n=7A463DBA-1>.

United Nations Environmental Programme (UNEP). 2015. Minamata Convention on Mercury [cited 2016 Mar 3]. Available from: <http://www.mercuryconvention.org/>.

[^ BACK TO TOP](#)



ENVIRONMENT YUKON

Government of Yukon > Environment > State of the Environment Report: Fish and Wildlife > Density of snowshoe hares >

CAMPING & PARKS	HUNTING, FISHING & TRAPPING	ANIMALS & HABITAT	MANAGING AIR, WATER & WASTE	ENVIRONMENT & YOU	PUBLICATIONS & MAPS
-----------------	-----------------------------	-------------------	-----------------------------	-------------------	---------------------



# Yukon State of the Environment

Reporting on environmental indicators - 2016

HOME	CLIMATE CHANGE	AIR	WATER	LAND	FISH AND WILDLIFE	DOWNLOAD REPORTS
------	----------------	-----	-------	------	-------------------	------------------

## MAMMALS

### DENSITY OF SNOWSHOE HARES

> SIGNIFICANCE

> WHAT IS HAPPENING?

> TAKING ACTION

### Significance

Snowshoe hare is a key component of the boreal ecosystem. In Yukon, hares make up almost 50 per cent of available food for predators (Figure 1). Their abundance regulates the predator populations that rely on them for food. They also have a significant impact on the plant communities that they eat, and other small mammals that predators eat when snowshoe hare numbers are low.

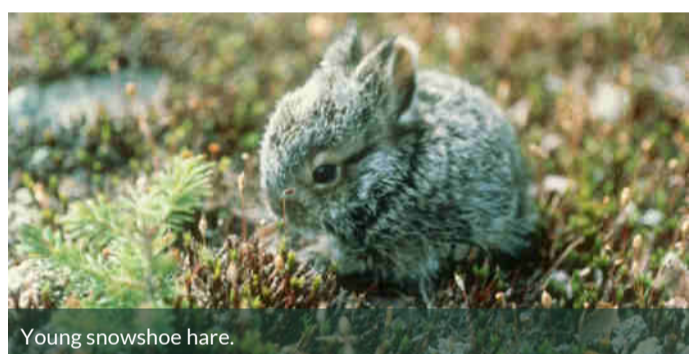
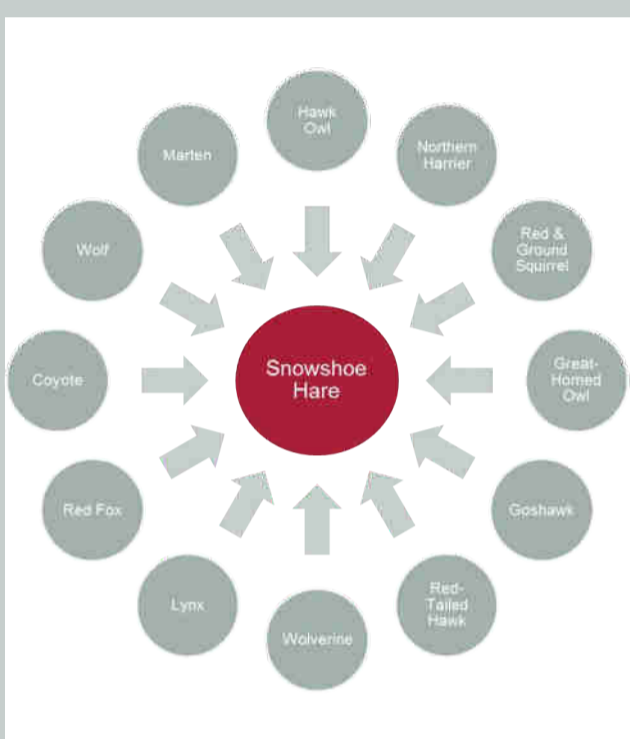
The number of snowshoe hares fluctuates in 9–10 year cycles throughout the boreal ecosystem. The dominant driver of this process is predation. The cycles appear to be in sync across Yukon.

Because snowshoe hare are one of the most important components of boreal food webs, monitoring their numbers is valuable. Long-term data on their abundance can provide information on the population fluctuations of their key predators, such as lynx, which is a valued furbearer to trappers.

The timing and size of the snowshoe hare population peaks help biologists see where trends are headed when assessing potential changes in the boreal ecosystem, such as predator abundance, alternative prey abundance (e.g., arctic ground squirrels or grouse) or browse intensity (impact on shrubs). This information is valuable to research programs, park and forest management, and as baseline information for environmental assessments.

Monitoring of snowshoe hare numbers provides a continuous record of the response of this key ecosystem component to changes over time. The consequences of climate change on boreal ecosystem dynamics are difficult to predict, and biologists rely on long-term monitoring programs to detect and understand these responses.

FIGURE 1: Predators of snowshoe hare



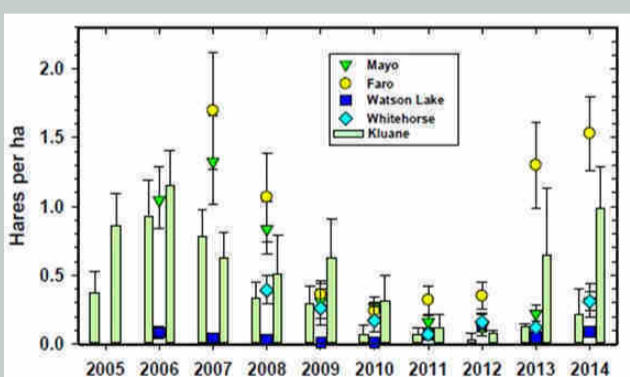
Young snowshoe hare.

[^ BACK TO TOP](#)

### What is happening?

The Community Ecological Monitoring Program (CEMP) monitors snowshoe hare density at undisturbed forested sites in different regions of Yukon.

FIGURE 2: Population density estimates for snowshoe hares in CEMP areas, 2005–2014. Mark-recapture data from Kluane are given as histogram bars, and estimates from fecal pellet counts at other areas are given as points (95 per cent confidence limits). Note that the data from fecal pellet counts integrate hare density over the previous year.



- 2006 was the last peak in the snowshoe hare cycle; another peak should occur in 2015 or 2016.
- The amplitude of the snowshoe hare cycle has been diminishing over the last 30 years in Yukon, demonstrated by research in the Kluane area going back to 1973 (Krebs et al. 2015).
- The reason for this change is currently unknown. Because the snowshoe hare cycle is mostly driven by predation pressure, the answer may be related to changes in predation success. Snow conditions are likely to change with climate change and this may affect the hunting success of both avian and terrestrial predators of snowshoe hare.
- CEMP also monitors lynx abundance via winter track counts. Their abundance fluctuates with snowshoe hare abundance. Lynx numbers appear to be increasing in all areas as the hare numbers have increased in recent years. However, lynx abundance was higher than expected for the last low of the hare cycle in Kluane, indicating potential predation pressure on alternative prey populations.

[^ BACK TO TOP](#)

### Taking action

- The Community Ecological Monitoring Program (CEMP) has five stations for ongoing monitoring in Yukon's boreal forests. There are stations near Faro, Kluane, Mayo, Watson Lake and Whitehorse.
- CEMP produces an [annual report](#) and analysis of their data. Access to this information is provided by the Department of Environment's Biodiversity Programs.



Snowshoe hare in winter.

[^ BACK TO TOP](#)

### Data quality

CEMP estimates the number of snowshoe hares by live trapping, marking and releasing individuals at the Kluane monitoring station. They also count fecal pellets yearly at all monitoring stations to come up with an estimate of how many hares are in each area.

Hare density is calculated by dividing the number of hares by the number of hectares in the monitoring area.

Data from most CEMP areas are available from 2005 onwards. Monitoring has occurred in the Kluane area since 1973, but the protocols and additional areas were developed in 2004, so comparisons can only occur from 2005 onwards.

### References

Krebs, C.J., R. Boonstra, S. Boutin, A.R.E. Sinclair, J.N.M. Smith, B.S. Gilbert, K. Martin, M. O'Donoghue, and R. Turkington. 2014. Trophic dynamics of the boreal forests of the Kluane Region. *Arctic* 67, Supplement 1:71-81.

Powell, T., M. O'Donoghue, T. Jung, V. Loewen, S. Gilbert, S. Taylor, A. Fontaine, C. Krebs, R. Boonstra, S. Boutin, A. Kenney. 2014. The Community Ecological Monitoring Program Annual Data Report 2014. Yukon Department of Environment, Whitehorse, Yukon, Canada.

[^ BACK TO TOP](#)



## ENVIRONMENT YUKON

Government of Yukon > Environment > State of the Environment Report: Fish and Wildlife > Winter tick surveillance >

CAMPING & PARKS

HUNTING, FISHING & TRAPPING

ANIMALS & HABITAT

MANAGING AIR, WATER & WASTE

ENVIRONMENT & YOU

PUBLICATIONS & MAPS



# Yukon State of the Environment

Reporting on environmental indicators - 2016

HOME

CLIMATE CHANGE

AIR

WATER

LAND

FISH AND WILDLIFE

DOWNLOAD REPORTS



## MAMMALS

### WINTER TICK SURVEILLANCE

> [SIGNIFICANCE](#) > [WHAT IS HAPPENING?](#) > [TAKING ACTION](#)

## Significance

Winter ticks (*Dermacentor albipictus*) are one-host external parasites that can be found on cervids such as elk, mule deer, and moose in Yukon. These parasites can negatively affect host health when present in large numbers, with moose being especially vulnerable because they do not remove larval ticks by grooming. In some regions of Canada, winter ticks can be responsible for severe disease and mortality in moose.

To date, data suggests that winter ticks are not a major disease concern for Yukon cervids. By studying the distribution and occurrence of winter ticks in Yukon, we are monitoring how ticks may affect Yukon's wild cervid populations, and how tick host and geographical distribution may change over time.

Monitoring wildlife parasites such as winter ticks is important because it provides information on the distribution and potential impact of these parasites on wildlife such as moose, which are a key harvest species in Yukon.

Winter ticks do not carry diseases of concern to humans or wildlife, nor do they negatively affect the meat of harvested animals. Winter ticks do not feed on people and are rarely found on domestic animals.



Mule deer. Cameron Eckert.

Weather may be an important factor in the tick-cervid relationship. Warmer temperatures in the summer and winter may support larger populations of cervids that carry ticks, and allow larval ticks to survive longer in the environment. A changing climate could influence vegetation patterns and winter temperatures, and may influence distribution and presence of wildlife parasites like winter ticks.

[^ BACK TO TOP](#)

## What is happening?

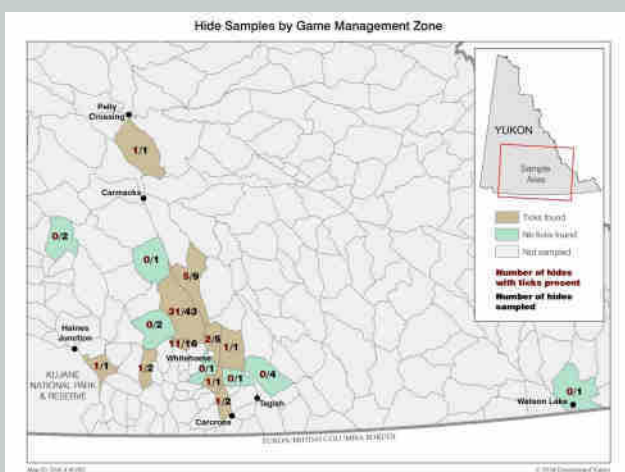
Winter ticks affect different species in different ways.

- In early autumn, elk and deer groom off larval ticks, which reduces tick numbers and minimizes negative health impacts.
- Moose only begin to groom off ticks once adult ticks are present in late winter, which can lead to high numbers of ticks on individual moose. Moose can experience severe disease associated with blood and hair loss from heavy tick infestations.

Since 2012, the Animal Health Unit has examined cervid hides to monitor tick host and geographical distribution over time (Figure 1).

Hides examined for winter ticks between 2011 and 2015		
Species	Number of samples	Hides found with winter ticks
Mule deer	38	55% (21)
Moose	3	-
Elk	46	74% (34)
Caribou	6	-

FIGURE 1: The known distribution of winter ticks based on hides examined to date (collected between 2011-2015)



- Winter ticks are established on elk in Yukon. Winter ticks in Yukon may have originated from translocation of elk from central Alberta, and/or by range expansion from northern British Columbia and Alberta (Leo et al. 2014).
- Winter ticks have been found on cervids in 9 out of the 15 game management zones where hides have been examined.
- The Animal Health Unit uses an index from 0 to 10 to describe the severity of winter tick infestation on the hides that they sample. All of the Yukon hides examined to date have low infestation levels (indexed at 1 or 2 out of 10).

[^ BACK TO TOP](#)

## Taking action

The [Animal Health Unit](#) continues to monitor for winter ticks through assessment of cervid hides. Elk hides are a mandatory harvest submission, while deer, caribou and moose hides are submitted voluntarily.

- So far, all of the hides examined have been from Southern Yukon (see figure 1) which has provided good baseline data on winter ticks in this region. In order to understand what is happening in other parts of Yukon, more hides from other areas are needed for this surveillance.



Adult winter tick on an elk.

## Data quality

The Animal Health Unit uses a standardized hair transect method to evaluate the level or severity of tick infestation. The method can be used on hides, unskinned animals or live animals, which increases the number of animals that can be examined. The Animal Health Unit has used the adapted hair transect protocol on hides collected since 2011.

## References

Leo, S., W. Samuel, M. Pybus, and F. Sperling. 2014. Origin of *Dermacentor Albipictus* (Acari:Ixodidae) on Elk in the Yukon, Canada. *Journal of Wildlife Diseases* 50(3):544-551.

[^ BACK TO TOP](#)



**ENVIRONMENT YUKON**
[Government of Yukon](#) > [Environment](#) > [State of the Environment Report: Fish and Wildlife](#) > [Number of spawning Chinook salmon](#) >

[CAMPING & PARKS](#)
[HUNTING, FISHING & TRAPPING](#)
[ANIMALS & HABITAT](#)
[MANAGING AIR, WATER & WASTE](#)
[ENVIRONMENT & YOU](#)
[PUBLICATIONS & MAPS](#)


# Yukon State of the Environment

Reporting on environmental indicators - 2016

[HOME](#)

CLIMATE CHANGE

AIR

WATER

LAND

FISH AND WILDLIFE

[DOWNLOAD REPORTS](#)


## FISH

### NUMBER OF SPAWNING CHINOOK SALMON

[> SIGNIFICANCE](#)
[> WHAT IS HAPPENING?](#)
[> TAKING ACTION](#)

#### Significance

Chinook salmon are a key food source for bears, eagles and other predators and they bring nutrients from the ocean to freshwater and terrestrial ecosystems. Salmon are important culturally, socially and economically in Yukon.



Salmon in the Takhini River.

Chinook salmon returns vary considerably due to a number of factors, including:

- the strength of returning age classes,
- in-river harvest,
- offshore unintentional by-catch in the pollock fishery,
- predation,
- disease,
- water levels,
- temperature, and
- environmental variables, e.g., climatic events such as the Pacific Decadal Oscillation, El Niño, and La Niña.

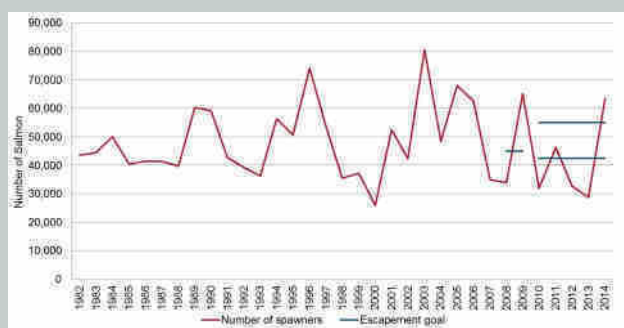
The international Yukon River Salmon Agreement has formally been in place since 2002 to help rebuild and conserve Canadian-origin salmon stocks and to define harvest allocations to Canadian and U.S. fisheries. The [Yukon River Panel](#) established a spawning conservation target for the number of Chinook salmon returning to spawn in the Canadian portion of the Yukon River.

The goal is for an escapement (number of fish reaching spawning grounds) of 42,500 to 55,000 fish; this is tracked by the federal government through Fisheries and Oceans Canada.

[^ BACK TO TOP](#)

#### What is happening?

- In 2015, the spawning conservation target for Yukon River Chinook was met, with a preliminary estimate of approximately 82,500 fish reaching their spawning grounds in the Yukon (Figure 1).
- This was the fourth time in the last nine years that the spawning escapement target was met, and one of the highest escapements on record.
- The 2015 drainage-wide run size (i.e., the number of Chinook salmon that entered the river) was not particularly strong. As such, the high spawning escapement was only made possible through closures to the commercial, domestic and recreational fisheries, and significant harvest restrictions in subsistence and First Nation fisheries in Alaska and Yukon.

**FIGURE 1:** Number of Chinook salmon spawning in the Canadian portion of the Yukon River, excluding the Porcupine River drainage.


Source: *Yukon River Salmon Season Summary and Season Outlook*. Note: Returns in 2015 are preliminary.

[^ BACK TO TOP](#)

#### Taking action

To maintain a healthy number of spawning salmon even in this time of low productivity, fisheries managers in Yukon and Alaska have undertaken a range of actions, including:

- full or partial closures of commercial, domestic and recreational fisheries,
- closing key staging or salmon spawning areas to angling,
- decreasing mesh sizes, and
- reducing fishing times.

In addition, Yukon First Nations have placed voluntary restrictions or avoided subsistence harvesting activities in years of low returns.

The [Yukon River Panel](#), established by the Yukon River Salmon Agreement, recommends spawning goals, reviews management strategies and conservation objectives, and funds restoration and enhancement projects focusing on Canadian-origin salmon stocks.



Children releasing salmon into Wolf Creek.

[^ BACK TO TOP](#)

#### Data quality

Estimates of the total number of salmon that return to their spawning grounds in Yukon are based on sonar passage estimates in Eagle, Alaska and harvest estimates from fisheries upstream of the sonar in both Alaska and Yukon.

In addition, a number of counting projects in the upper Yukon River watershed are used to monitor the number of adult salmon that reach specific spawning tributaries. These projects also evaluate the proportion of adult female to male salmon, and the size and age of fish returning to spawn.

#### References

The United States and Canada Yukon River Joint Technical Committee. 2001-2015. *Yukon River Salmon Season Summary and Season Outlook*. Alaska Department of Fish and Game, Anchorage, Alaska, U.S.A. [cited 2016 Mar 3]. Available from:

<http://yukonriverpanel.com/salmon/publications/joint-technical-committee-reports/>.

Yukon River Panel. 2008. *Salmon* [cited 2016 Mar 3]. Available from: <http://yukonriverpanel.com/salmon/>.







ENVIRONMENT YUKON

Government of Yukon > Environment > State of the Environment Report: Fish and Wildlife > Mercury levels in fish from Laberge and Kusawa Lakes >

CAMPING & PARKS	HUNTING, FISHING & TRAPPING	ANIMALS & HABITAT	MANAGING AIR, WATER & WASTE	ENVIRONMENT & YOU	PUBLICATIONS & MAPS
-----------------	-----------------------------	-------------------	-----------------------------	-------------------	---------------------



# Yukon State of the Environment

Reporting on environmental indicators - 2016

HOME

CLIMATE CHANGE

AIR

WATER

LAND

FISH AND WILDLIFE

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## FISH

### MERCURY LEVELS IN FISH FROM LABERGE AND KUSAWA LAKES

> SIGNIFICANCE > WHAT IS HAPPENING? > TAKING ACTION

#### Significance

Contaminants such as heavy metals can persist in the environment and can have serious health implications for wildlife and for people—especially those who depend on traditional foods. In Canada, mercury is a risk to Canadian ecosystems and human health (Environment and Climate Change Canada, 2016).

Most mercury in Yukon lakes and rivers comes from natural sources such as volcanoes, erosion and forest fires. Industrial sources and fuel burning can also release mercury that can travel to the north from industrial areas in the south through the movement of large air masses (Yukon Department of Environment 2014). Fish may absorb this mercury and pass it on to the humans who eat them.

Climate change can influence mercury concentrations in some lakes. Yukon is experiencing increased runoff and precipitation, some from thawing permafrost. These changes influence how lakes naturally process mercury—either through adding mercury to the water or increasing food sources for the lake bacteria that process mercury (Chételat et al. 2015).

Most fish from Yukon lakes and rivers have mercury levels well below Health Canada's maximum limit and consumption of these fish does not need to be limited.

The Kluane First Nation's food security strategy involves understanding the nutritional value, levels of environmental contaminants, and Traditional Knowledge surrounding important food fish species. In this 2015 study, the lake trout under 900 mm and all lake whitefish caught by First Nations fishers and Kluane Lake Fishing Derby participants had mercury concentrations below the subsistence consumption guideline (0.2ppm) and the commercial sale guideline (0.5 ppm).

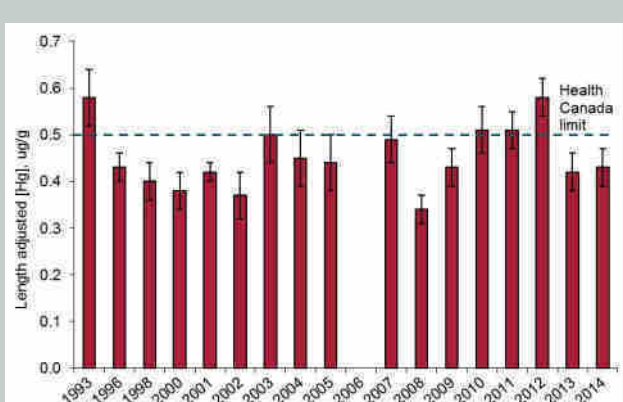
#### What is happening?

Two lakes are monitored by the [Northern Contaminants Program](#) for mercury and other contaminants in southern Yukon, Lake Laberge and Kusawa Lake. If mercury levels are high in sampled fish, a fish consumption advisory will be issued.

- Fish mercury concentrations for both lakes are below Health Canada's guideline of 0.5 µg/g.
- The monitoring shows a correlation between fish length and mercury concentration, which is why consumption advisories are based on the length of the fish.

#### Lake Laberge

FIGURE 1: Length adjusted mercury concentrations in Lake Laberge trout (1993-2014).



- The mean mercury level since monitoring started is 0.49 ± 0.22 µg/g for Lake Laberge.
- There are no significant trends in Lake Laberge fish mercury levels.
- Mercury levels exceeded Health Canada's guideline four times in the past 21 years.

#### Taking action

The Northern Contaminants Program works towards reducing and, where possible, eliminating contaminants in traditional/country foods, while providing information that assists individuals and communities make informed decisions about their food use.

The Government of Yukon provides information in a variety of ways:

- The [Yukon Fish Health Handbook](#), published in 2014, provides information about the benefits of eating fish, food safety, mercury, and fish parasites.
- Up-to-date information is also published in [Yukon Fishing Regulations Summary](#) to reach anglers directly.

#### Fish consumption advisories:

- In general, Yukon adults do not need to limit consumption. However, eating lake trout or burbot that are less than 60 cm (24 inches) in length gives a higher certainty for limiting mercury exposure.
- Women of childbearing age and children under 12 should limit their consumption of large Yukon lake trout and burbot according to the following guidelines:
  - Fish shorter than 40 cm (about 2 lbs): unlimited consumption.
  - Fish measuring between 40 and 60 cm (about 2 to 6 lbs): limit to three to four meals/week.
  - Fish longer than 60 cm (>6 lbs): limit to one or two meals/week.

The [AMAP Assessment 2015: Human Health in the Arctic](#) has now been released. This assessment of Arctic human health impacts of contaminants and other stressors was conducted between 2012 and 2014 by an international group of over 60 experts. Recommendations from the report were delivered to Arctic Council Ministers at their meeting in Iqaluit in April 2015.

#### Data quality

- The Northern Contaminants Program has monitored fish for mercury and other contaminants since 1993 (Lake Laberge) and 1996 (Kusawa Lake) in order to advise fish consumption levels.
- This study is long-term so annual sampling is projected for well into the future.
- The data on mercury concentrations are adjusted for the fish length in order to be able to compare fish. This helps to account for age and body mass differences.
- The samples include trout.

For more details, or for information on the other contaminants that the Northern Contaminants Program monitors, see their [website](#).



Emerald Lake.

#### PROFILE

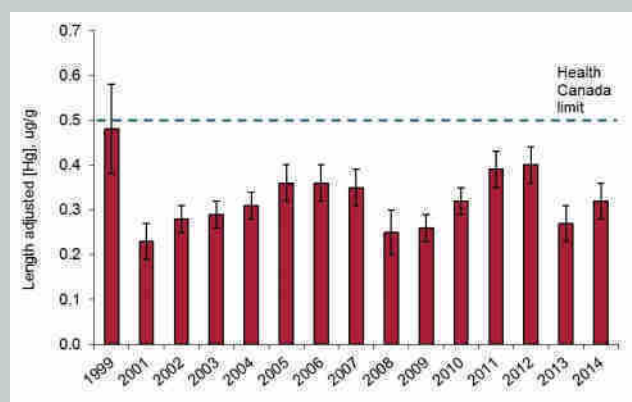
### CONTAMINANTS, NUTRIENTS AND THE TRADITIONAL VALUE OF FOOD FISHES IN KLUANE LAKE



Researchers and Kluane First Nation youth researchers sampling fish muscle tissue for analysis. Arctic Institute of Community-Based Research.

#### Kusawa Lake

FIGURE 2: Length adjusted mercury concentrations in Kusawa Lake trout (1996-2014).



- The mean mercury level since monitoring started is 0.39 ± 0.24 µg/g for Kusawa Lake.
- There is some indication of trends for Kusawa Lake fish mercury levels. After a significant drop in 2001, levels increased until 2007. Mercury levels dropped again in 2008 and climbed until 2012 (Figure 2).



^ BACK TO TOP



Twin Lakes campground.

^ BACK TO TOP

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^ BACK TO TOP



## ENVIRONMENT YUKON

Government of Yukon > Environment > State of the Environment Report: Fish and Wildlife > Monitoring breeding waterfowl >

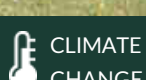
CAMPING & PARKS	HUNTING, FISHING & TRAPPING	ANIMALS & HABITAT	MANAGING AIR, WATER & WASTE	ENVIRONMENT & YOU	PUBLICATIONS & MAPS
-----------------	-----------------------------	-------------------	-----------------------------	-------------------	---------------------



# Yukon State of the Environment

Reporting on environmental indicators - 2016

HOME



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## BIRDS

### MONITORING BREEDING WATERFOWL

[> SIGNIFICANCE](#)   [> WHAT IS HAPPENING?](#)   [> TAKING ACTION](#)

#### Significance

Yukon is the summer breeding home for more than 30 species of waterfowl and provides critical staging areas for birds migrating in the spring and fall.

Specific threats to Yukon waterfowl include:

- Removal of standing dead wood (i.e., snags, standing dead trees) from areas along lake and river margins by commercial or small scale timber harvest removes potential nesting cavities and sheltering areas for waterfowl.
- Changes in water regimes due to climate change or human activities (e.g., hydroelectric projects) may change the timing of ice formation and/or spring break-up. This has the potential to alter migration stopover sites for waterfowl either by preventing access (no open water in spring time) or by changing the accessibility of food (if water is too deep, waterfowl may not be able to reach submerged vegetation).
- Disturbance of waterfowl due to increased human recreational activity (e.g., dogs running loose, boating, etc.) has detrimental effects on foraging efficiency and body fat acquisition. It is especially important during spring migration when there is often less time and less space (due to ice cover) for birds to acquire the resources they need to ensure successful reproduction.



Waterfowl and gulls in flight.

This indicator provides information about waterfowl through an example of a diving duck (Lesser/Greater Scaup) and a dabbling duck (Mallard) in two survey areas in Yukon.

Monitoring waterfowl presence and abundance gives a good indication of the ecological health of an area, as waterfowl depend on wetland areas for food, nesting areas, and cover from predators.

[^ BACK TO TOP](#)

#### What is happening?

There are two long-term survey areas for Yukon waterfowl:

- Old Crow Flats is Yukon's largest wetland for waterfowl and is considered globally significant. This 12,122 km<sup>2</sup> area is almost completely free of development. It is used by the Vuntut Gwitchin First Nation for hunting, trapping and other cultural activities.
- The Yukon Southern Lakes region features highly productive inlets and outlets of numerous large lakes that provide important waterfowl staging areas.

Overall, waterfowl populations in Old Crow Flats and the Southern Lakes region are stable, though there is annual variation in populations among species.



Mallard hen on Hidden Lakes. Jamie Kenyon.

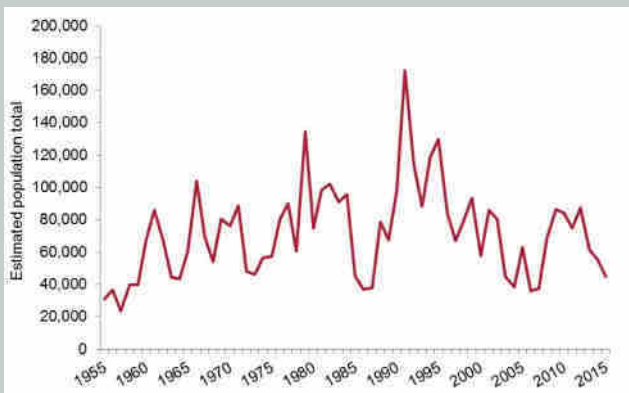
#### Diving ducks-Lesser and Greater Scaup

Diving ducks are named by their habit of diving for food. As well, they generally nest close to the water's edges. The presence and abundance of diving ducks are indicators of water health.

Lesser and Greater Scaup are two diving duck species that are grouped for the purpose of this monitoring analysis since they are almost impossible to distinguish during aerial surveys. Scaup are in decline across North America with estimated populations approximately 43 per cent below the *North American Waterfowl Management Plan* (2012) conservation goal of 6.3 million.

- At Old Crow Flats, the 2015 combined Lesser and Greater Scaup total adult population estimate was 44,627, 25 per cent less than the estimate from 2014. This is also 61 per cent less than the long-term average (1955-2014) of Scaup in this area (Figure 1).

FIGURE 1: Adult population estimate for Lesser and Greater Scaup at Old Crow Flats



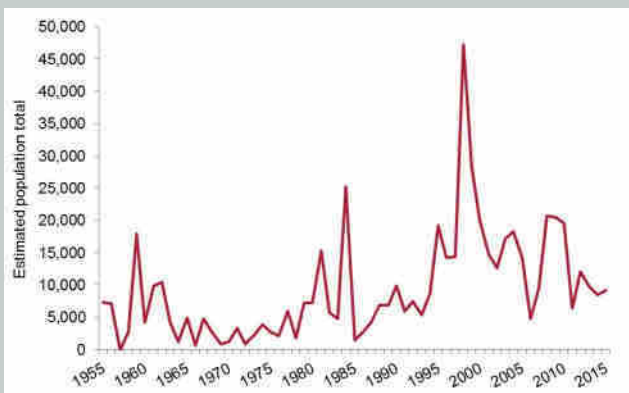
#### Dabbling ducks-Mallard

Dabbling ducks walk well on land and can nest far from the water's edge. They feed on grass and seeds on land, as well as algae, plants and insects in the water. The presence and abundance of dabbling ducks are indicators of the health of a wetland area.

Mallard is a common dabbling duck that is also extensively hunted in Canada; therefore, their populations are monitored. Across North America, Mallard populations are 26 per cent above the North American Waterfowl Management Plan target.

- At Old Crow Flats, the 2015 Mallard total adult population estimate was 9,154, seven per cent more than the 2014 estimate. There is an overall increasing trend for Mallards (Figure 2).

FIGURE 2: Adult population estimate for Mallard at Old Crow Flats



#### Taking action

The *North American Waterfowl Management Plan* sets conservation goals for waterfowl across the continent; Yukon surveys contribute to information for continent-wide population monitoring.

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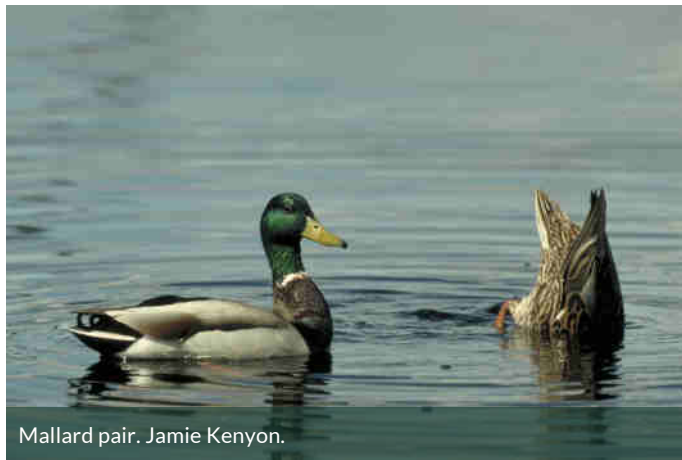
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- The Southern Lakes ground surveys also show that Lesser and Greater Scaup are in decline. Although from 2012-2013 there was a 28 per cent increase in the breeding pairs of Scaup counted, since the start of the survey in 1991 there has been a decreasing trend.



Lesser Scaup. Cameron Eckert.

- The Southern Lakes ground survey shows that there is a modest long-term increasing population trend (over 15 years) for Mallards. Additionally, from 2012 to 2013 the breeding pair population of Mallards observed increased by 20 per cent.



Mallard pair. Jamie Kenyon.

[^ BACK TO TOP](#)

#### Data quality

Surveys are conducted annually in the Old Crow Flats wetland. In the Southern Lakes region, wetlands are surveyed along roadsides.

#### Old Crow Flats

- [U.S. Fish and Wildlife Waterfowl Population Status](#)
- The annual aerial surveys are carried out on one day; count results may be influenced by weather conditions.

#### Southern Lakes ground survey

- [Cooperative Yukon Roadside Waterfowl Breeding Population Survey](#)
- The survey consists of counts in a sample of wetlands, conducted four or five times from early May to mid-June.
- This ground survey tracks trends only, not population estimates.
- Ground surveys provide better accuracy for identification at the species level, but are limited by the requirement for road/foot access and are not suited to population estimates. Aerial surveys cover larger areas and are better suited for population estimates.

[^ BACK TO TOP](#)



**ENVIRONMENT YUKON**
[Government of Yukon](#) > [Environment](#) > [State of the Environment Report: Fish and Wildlife](#) > [Trumpeter Swan population monitoring](#) >

[CAMPING & PARKS](#)
[HUNTING, FISHING & TRAPPING](#)
[ANIMALS & HABITAT](#)
[MANAGING AIR, WATER & WASTE](#)
[ENVIRONMENT & YOU](#)
[PUBLICATIONS & MAPS](#)


# Yukon State of the Environment

Reporting on environmental indicators - 2016

[HOME](#)
[CLIMATE CHANGE](#)
[AIR](#)
[WATER](#)
[LAND](#)
[FISH AND WILDLIFE](#)
[DOWNLOAD REPORTS](#)


## BIRDS

### TRUMPETER SWAN POPULATION MONITORING

[> SIGNIFICANCE](#)   [> WHAT IS HAPPENING?](#)   [> TAKING ACTION](#)

#### Significance

The Committee on the Status of Endangered Wildlife in Canada designated Trumpeter Swans as a species of Special Concern in April 1978. Their status was re-examined and they were found to no longer be at risk in April 1996, largely based on surveys of Trumpeter Swan breeding grounds in northern Canada and Alaska (COSEWIC 2011).



Trumpeter Swan in flight. Cameron Eckert.

[^ BACK TO TOP](#)

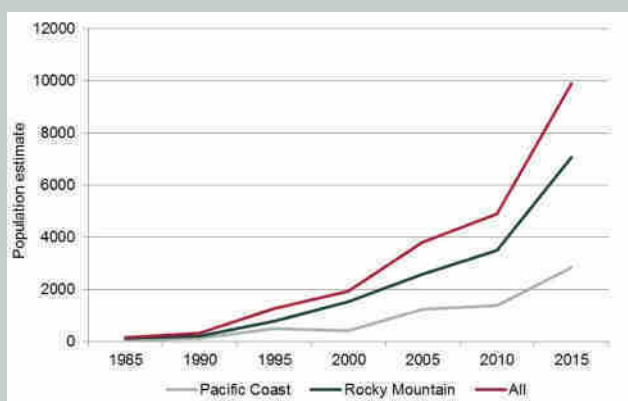
#### What is happening?

- Yukon has two swan populations—the Rocky Mountain Population and the Pacific Coast Population, surveyed since 1985 in Yukon and northern B.C.
- The Pacific Coast Population breeds mainly in Alaska, but also in Yukon and northwestern British Columbia.
- The Rocky Mountain Population breeds mainly in Alberta, western Saskatchewan, southern Yukon, and the Northwest Territories.

**FIGURE 1:** Distribution of Trumpeter Swan populations in Yukon and northern B.C. Blue squares are Pacific Coast Population. Purple squares are Rocky Mountain Population.



**FIGURE 2:** Preliminary population estimates for Yukon and northern B.C. Trumpeter Swans.



- The 2015 estimate for the Canadian portion of the Rocky Mountain Population was 16,143, an 80 per cent increase compared to the 8,950 estimate for 2010.
- The 2015 estimate for the Canadian portion of the Pacific Coast Population was 2,979, a 106 per cent increase compared to the 1,443 estimate for 2010.
- All Canadian areas of the Rocky Mountain and Pacific Coast Populations exhibited growth since the 2010 survey.

[^ BACK TO TOP](#)

#### Taking action

- Surveys coordinated by Environment and Climate Change Canada in Yukon contribute to national and international trend and population estimates for Trumpeter Swans.
- The Government of Yukon operates the [Swan Haven Interpretive Centre](#), where visitors can view and learn about M'Clintock Bay on Marsh Lake, an important staging area for migrating swans, waterfowl, gulls and shorebirds.



Trumpeter Swans © Environment Canada, Jim Hawkings

[^ BACK TO TOP](#)

#### Data quality

- Continued monitoring of this species occurs through the [North American Trumpeter Swan Survey](#). Yukon contributes survey information of its swan populations to the continent-wide monitoring.
- The [North American Trumpeter Swan Survey](#) is conducted across Trumpeter Swan breeding grounds every five years. Surveys have been conducted since 1968.
- The survey was originally designed as a complete census, i.e., counting all the birds across the entire range. By 1995, increases in the Trumpeter Swan population made a complete census unfeasible and a stratified random sampling approach was adopted, i.e., randomly selecting map grids to survey which are likely to have breeding swans.

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[^ BACK TO TOP](#)



## ENVIRONMENT YUKON

Government of Yukon > Environment > State of the Environment Report: Fish and Wildlife > Lead surveillance in wild birds >

[CAMPING & PARKS](#)
[HUNTING, FISHING & TRAPPING](#)
[ANIMALS & HABITAT](#)
[MANAGING AIR, WATER & WASTE](#)
[ENVIRONMENT & YOU](#)
[PUBLICATIONS & MAPS](#)


# Yukon State of the Environment

Reporting on environmental indicators - 2016

[HOME](#)
[DOWNLOAD REPORTS](#)


## BIRDS

### LEAD SURVEILLANCE IN WILD BIRDS

> [SIGNIFICANCE](#) > [WHAT IS HAPPENING?](#) > [TAKING ACTION](#)

#### Significance

The Department of Environment's Animal Health Unit is determining if there is evidence of lead exposure in Yukon's wild birds by opportunistically sampling bird livers. Lead poisoning is considered a chronic disease in birds, however sick or dead birds from lead poisoning are rarely found.

Targeted groups include scavenging birds and waterfowl as they are more likely to ingest sources of lead due to their feeding behaviours:

- Lead shot and bullets can be ingested by scavengers and waterfowl. Lead shot is no longer used for hunting waterfowl, but lead ammunition is still commonly used for hunting upland birds.
- Offal piles from hunted animals (i.e., moose, sheep and goats) often contain lead fragments that can be consumed by scavenger birds.
- Lead fishing sinkers can be ingested by loons or waterfowl.

If lead levels in bird livers remain high or trend upwards, it may indicate that lead shot and bullets, lead fragments and lead fishing sinkers represent a persistent environmental source of contamination.



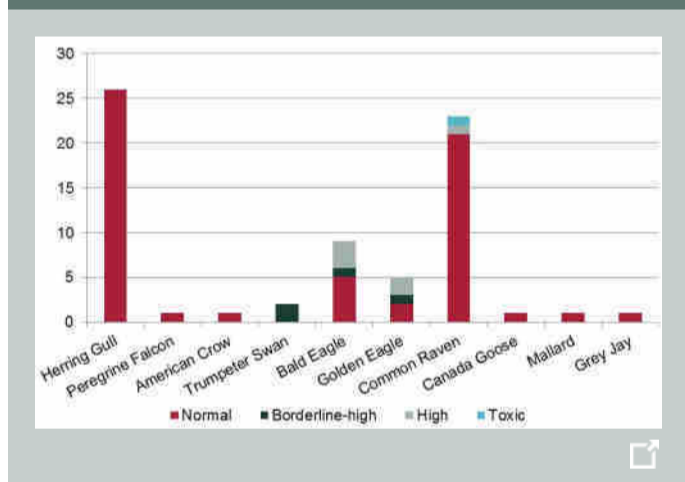
Bald Eagle. Cameron Eckert.

[^ BACK TO TOP](#)

#### What is happening?

- Lead testing is complete for 70 wild birds to date, creating a baseline of information collected since 2013.
- As more samples are gathered, the data will be analyzed to explore trends based on species, locations and other measures of avian health.

FIGURE 1: Presence of lead and toxicity in sampled wild birds



Source: Environment Yukon

#### Taking action

- The Department of Environment's Animal Health Unit is responsible for health monitoring and diagnosis of disease in both wildlife and domestic animals.
- By opportunistically monitoring lead levels in target birds, the Animal Health Unit hopes to better understand how birds are being affected by lead and how it varies by species.



Common Raven. Cameron Eckert.

[^ BACK TO TOP](#)

#### Data quality

- Data are collected by opportunistic sampling of the livers of wild birds that have been found dead or some that were euthanized as they were not considered candidates for rehabilitation.
- Currently, most samples come from southern Yukon in areas where human population is highest.
- A laboratory analyzes the samples to determine the concentration of lead in parts per million (ppm) of wet weight detected in each liver sample. These levels determine whether the bird has a normal (up to 0.5 ppm), borderline-high (0.5 ppm to 2 ppm) high (2 ppm to 10 ppm), or toxic (more than 10 ppm) lead level.



Peregrine Falcon. Cameron Eckert.

[^ BACK TO TOP](#)



## ENVIRONMENT YUKON

Government of Yukon > Environment > State of the Environment Report: Fish and Wildlife > Number of Species at Risk in Yukon >

CAMPING & PARKS	HUNTING, FISHING & TRAPPING	ANIMALS & HABITAT	MANAGING AIR, WATER & WASTE	ENVIRONMENT & YOU	PUBLICATIONS & MAPS
-----------------	-----------------------------	-------------------	-----------------------------	-------------------	---------------------



# Yukon State of the Environment

Reporting on environmental indicators - 2016

[HOME](#)

CLIMATE CHANGE

AIR

WATER

LAND

FISH AND WILDLIFE

[DOWNLOAD REPORTS](#)


## SPECIES AT RISK

### NUMBER OF SPECIES AT RISK IN YUKON

> [SIGNIFICANCE](#) > [WHAT IS HAPPENING?](#) > [TAKING ACTION](#)

#### Significance

Species at risk are naturally occurring plant and animal species that are in danger of extinction or extirpation—those species that have disappeared from Yukon.

Loss of any species contributes to a loss of biodiversity—the variety of life that exists on our planet—which is occurring at an increasing rate internationally. The United Nations recognized the international concern for loss of biodiversity by declaring a [Decade on Biodiversity](#) (2011-2020) to promote an overall vision of living in harmony with nature.

Major reasons why many species are at risk in Canada include:

- competition from alien invasive species,
- habitat loss,
- a changing climate,
- genetic and reproductive isolation,
- environmental contamination,
- overharvesting, and
- disease.

Tracking the number of nationally assessed species at risk that occur in Yukon indicates where there might be species vulnerability. However, a national rating does not necessarily mean that there is local conservation concern for that species in Yukon. Yukon's healthy ecosystems are a refuge to many species that are considered at risk nationally.



Collared pika. John Meilke.

[^ BACK TO TOP](#)

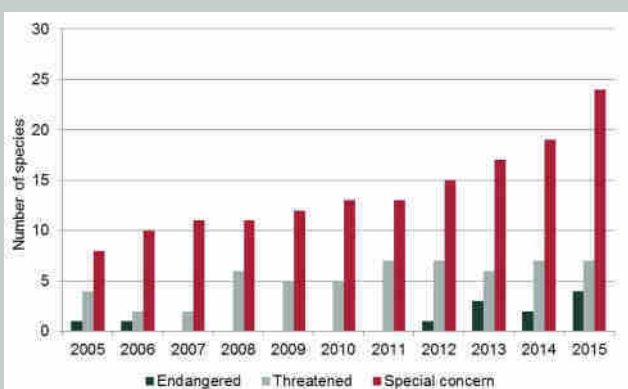
#### What is happening?

The [Committee on the Status of Endangered Wildlife in Canada \(COSEWIC\)](#) assesses species at risk across Canada to rank them as:

- **Endangered:** A species facing imminent extirpation or extinction.
- **Threatened:** A species likely to become endangered if limiting factors are not reversed.
- **Special Concern:** A species with characteristics that make it particularly sensitive to human activities or natural events.
- **Extirpated:** A species that is extinct from an area where they used to exist.
- **Extinct:** A species that no longer exists.

To date, COSEWIC has identified 721 species or populations at risk in Canada, of which 35 occur in Yukon in 2015. The number of species at risk in Yukon has increased over time (Figure 1). Generally, this is due to further assessment of species in Yukon rather than conservation threats to species.

FIGURE 1: Number of COSEWIC assessed species in Yukon, 2005-2015



- Yukon Draba and the Squanga Whitefish are endemic to Yukon—they are not found anywhere else on earth.
- Yukon is home to most of the world's population of collared pika (50 per cent of its total range) and Yukon podistera (90 per cent of its total range). Both were assessed as special concern based on the potential effects of climate change on their alpine populations.
- For a comparison of species at risk between jurisdictions, see Environment Canada's [indicator](#).

(1) Yukon podistera. Cannings. (2) Yukon draba. Martin Owen.



[^ BACK TO TOP](#)

#### Taking action

- The [Yukon Conservation Data Centre](#) collects and shares information on at risk plants, animals, lichens and ecological communities in Yukon, including those that have not been formally assessed.
- The Yukon government contributes to national species at risk recovery plans in partnership with other governments and groups in the territory. Yukon government technical experts are on recovery planning teams organized by Environment Canada to share knowledge of the local situation.

#### PROFILE

### RARE BUMBLE BEE FOUND IN STEWART CROSSING



Gypsy Cuckoo Bumble Bee. Sheila Colla.

[^ BACK TO TOP](#)

The Gypsy Cuckoo Bumble Bee (*Bombus bohemicus*) is a nest parasite of the Western Bumble Bee and its close relative. Because most of the host bees have declined significantly, and because parasites are inherently rarer than their hosts, the Gypsy Cuckoo Bumble Bee has become exceedingly rare in the southern part of its range. In the rest of Canada, it was last seen in Québec in 2008 despite many focused searches. In 2014, this species was the first insect assessed from northern Canada by the Committee on the Status of Endangered Wildlife in Canada as endangered.

The Gypsy Cuckoo Bumble Bee seems to have been reasonably common in Yukon in the past. Researchers hoped to find similar densities today because its hosts are still common, but surveys did not find an individual bee for four years. In 2014, one was found near Stewart Crossing and identified in 2015 by Canadian bee expert, Cory Sheffield, at the Royal Saskatchewan Museum. Recent (2010) surveys in Alaska have also recorded this species.

#### Data quality

- For more information on Yukon's species at risk including a complete list of species, visit the [Department of Environment's species at risk page](#).
- COSEWIC has yet to assess every Yukon species that might be at risk.

#### References

Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2015. Wildlife Species Search [modified 2016 Jan 26; cited 2016 Mar 3]. Available from: [http://www.cosewic.gc.ca/eng/sct5/index\\_e.cfm](http://www.cosewic.gc.ca/eng/sct5/index_e.cfm)

[^ BACK TO TOP](#)