

Compendium of Research in the Northwest Territories **2015**



This publication is a collaboration between the Aurora Research Institute, the Department of Environment and Natural Resources, the Government of the Northwest Territories and the Prince of Wales Northern Heritage Centre and the Department of Fisheries and Oceans. Thank you to all who submitted a summary of research or photographs, and helped make this publication possible.

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Fisheries and Oceans
Canada

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Canada



Northwest
Territories Environment and Natural Resources



Northwest
Territories Education, Culture and Employment

Forward

Welcome to the 2015 *Compendium of Research in the Northwest Territories*. I am pleased to present you with this publication, which is the product of an on-going collaboration between the Aurora Research Institute, the Department of Environment and Natural Resources, Fisheries and Oceans Canada, and the Prince of Wales Northern Heritage Centre.

This Compendium is a starting point to find out more information about research taking place in the NWT. In these pages you'll find summaries of all licensed research projects that were conducted in the territory during the 2015 calendar year. You'll also find the name and contact information for the lead researcher on each project. If there is a project that interests you, I urge you to contact the researcher to find out more about their work and results. You can also find more information online in the NWT Research Database. This is a publically-available, map-based online resource that can be accessed at <http://data.nwtresearch.com/>. The Database is continuously updated with new information, and was designed to make information about NWT research more accessible to the people and stakeholders living in our territory.

When I reviewed this year's Compendium, I noted that climate change, water quality, and contaminants were common themes for research in 2015. I was also struck by the diverse research community working on these topics across the territory. Community organizations, Indigenous governments, territorial employees, and researchers from Canada and abroad came together to study pressing questions that have implications at multiple scales, from local to global. This shows the importance of the research conducted in the NWT, not just to the people living here, but also to people from around the world.

Pippa Seccombe-Hett
Vice President, Research
Aurora Research Institute

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Introduction

This compendium offers a summary of research licences/permits that were issued in the Northwest Territories during 2015. The information contained in this book is a product of a collaboration between the Aurora Research Institute (ARI), the Prince of Wales Northern Heritage Centre (PWNHC), the Department of Environment and Natural Resources (ENR) and the Department of Fisheries and Oceans (DFO). The Compendium series began in 1984.

Licensing in the NWT

Under territorial legislation, all research in the NWT requires a licence/permit from one of four agencies, depending on the type of research being conducted:

- *Prince of Wales Northern Heritage Centre* - Archaeology;
- *Department of Environment and Natural Resources, Government of the Northwest Territories* - Wildlife;
- *Department of Fisheries and Oceans* - Fisheries; or
- *Aurora Research Institute* - all other research in the NWT.

Through the licensing process, researchers are informed of appropriate organizations, communities and other licensing/permitting agencies that should be contacted prior to conducting studies. Licensing ensures research activities are communicated to interested parties and provides opportunities for the exchange of information.

The Compendium provides a summary of all licences/permits issued in the NWT by all four licensing/permitting bodies. As each research project is represented by a short abstract, the reader is encouraged to contact the researcher for additional information and results.

How to Use This Book

This book has four main sections. Each of these sections reflects a specific licensing agency and type of licence/permit issued. Within each section, research descriptions have been grouped by subject and listed alphanumerically by the principal researcher's last name. Refer to the Table of Contents for the specific page on which each section and/or subject begins. An index is included at the end of the compendium listing all researchers in each section.

1. File Number

The file numbers shown in each of the Aurora Research Institute's subject areas refer to the file number issued to a particular researcher. It allows cross referencing with research material that may be available on file or in the ARI library. The reference numbers of the other three agencies refer directly to the permit numbers given to each researcher. When requesting information from any of these agencies on specific research outlined in the compendium, please refer to the reference number in your correspondence.

2. Regional Abbreviations

Throughout the book, reference is given to the specific land claim region(s) in which the research took place. The regions are shown on the following page. Some of the land claim regions are still under negotiation and the boundaries shown are only approximations. The abbreviations shown for each region are as follows:

DC	Dehcho	SS	South Slave
NS	North Slave	SA	Sahtú Settlement Area
IN	Inuvialuit Settlement Region	GW	Gwich'in Settlement Area

3. Glossary

A glossary of terms has been added to the Compendium. The intent of the glossary is to allow the reader to better appreciate the research descriptions.

Available in Print or Free Download

This compendium is available as a printed publication or can be downloaded from the Aurora Research Institute's website (www.nwtresearch.com). Copies can also be requested by contacting the Aurora Research Institute.

Send Us Your Comments

Whether you are a researcher or an interested member of the public, the Aurora Research Institute welcomes your comments and suggestions concerning this publication. Contact us by mail, fax, email or telephone (see address on page vi).

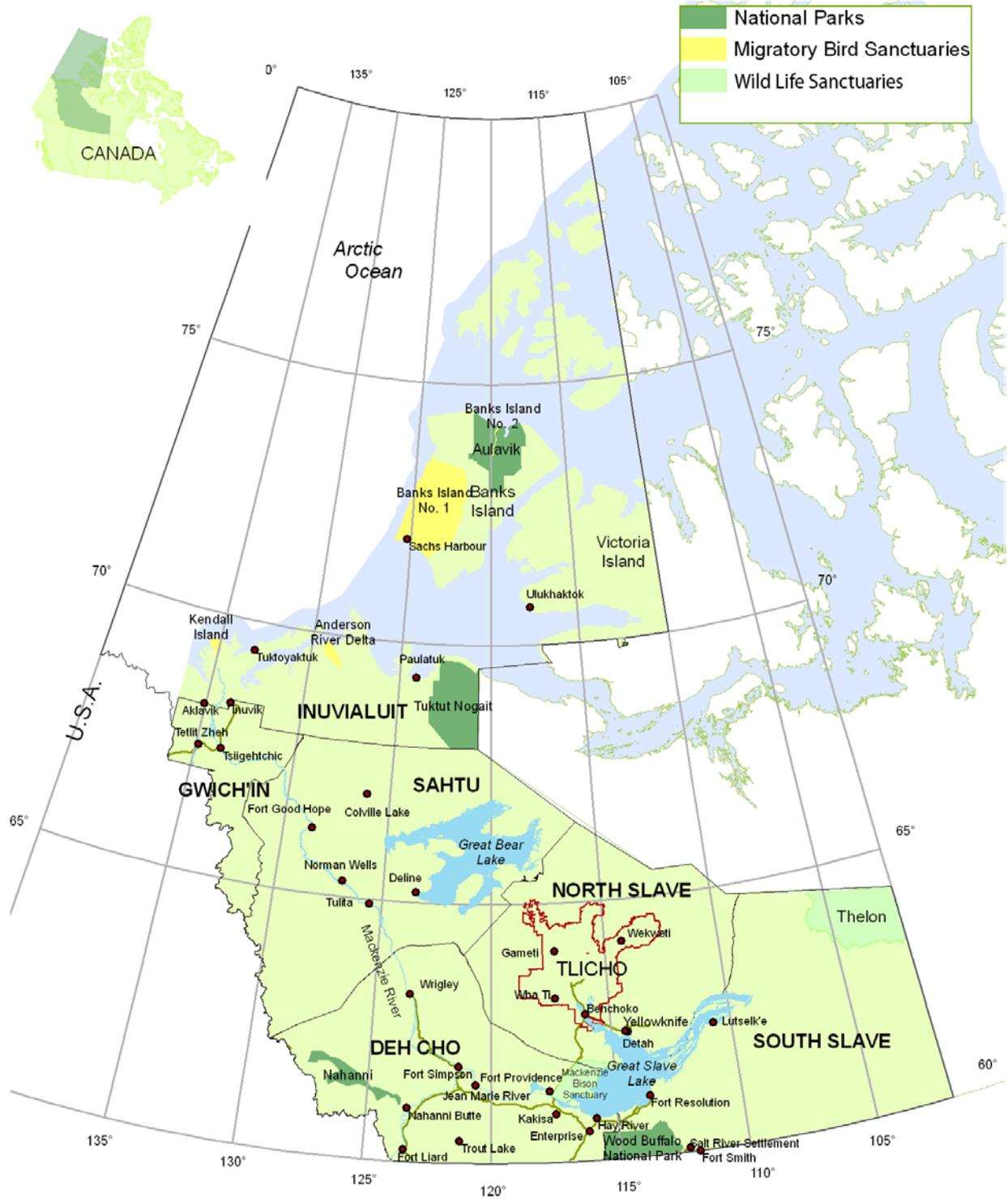


Figure 1. Land claim regions in the Northwest Territories

Aurora Research Institute

The Aurora Research Institute's mandate is to improve the quality of life for NWT residents by applying scientific, technological and indigenous knowledge to solve northern problems and advance social and economic goals.

ARI is responsible for:

- licencing and coordinating research in accordance with the NWT Scientists Act: this covers all disciplines including the physical, social, biological sciences and traditional knowledge;
- promoting communication between researchers and the people of the communities in which they work;
- promoting public awareness of the importance of science, technology and indigenous knowledge;
- fostering a scientific community within the NWT which recognizes and uses the traditional knowledge of northern aboriginal people;
- making scientific and indigenous knowledge available to the people of the NWT;
- supporting or conducting research and technological developments which contribute to the social, cultural and economic prosperity of the people of the NWT.

For more information, contact ARI at:



Aurora Research Institute

PO Box 1450

Inuvik, NT, X0E 0T0

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Fax: (867) 777-4264

E-mail: licence@nwtresearch.com

Website: nwtresearch.com

Department of Environment & Natural Resources

The Government of the Northwest Territories' Department of Environment and Natural Resources (ENR) has a mandate to promote sustainable development through the management and protection of the quality, diversity and abundance of natural resources and the integrity of the environment.

With respect to permitting for research and monitoring, ENR is responsible for issuing Wildlife Research Permits under the Wildlife Act (Section 84) for all studies on wildlife or wildlife habitat in the Northwest Territories. Wildlife includes all vertebrates and invertebrates, except fish and marine mammals.

For more information, contact ENR at:

Wildlife Division

Environment and Natural Resources

Government of the Northwest Territories

PO Box 1320

Yellowknife, NT, X1A 2L9

Fax: (867) 873-0293

Website: enr.gov.nt.ca/programs/wildlife-research

Department of Fisheries and Oceans

The Department of Fisheries and Oceans Canada (DFO) is responsible for developing and implementing policies and programs in support of Canada's scientific, ecological, social and economic interests in oceans and fresh waters. Some Fisheries management responsibilities have been delegated or transferred to other federal agencies (e.g. Parks Canada), provinces/territories and co-management groups under Land Claim agreements.

DFO Fisheries Management is responsible for issuing Commercial, Domestic, Licence to Fish for Scientific Purposes (LFSP), Exploratory, Public Display and Educational licences in the NWT. Subject to Land Claim agreements, a Commercial licence is required to sell or barter fish

All individuals fishing for scientific purposes or participating in the acts described below are required to obtain a Licence to Fish for Scientific Purposes (LFSP):

- activities involving fishing, catching or attempting to catch fish;
- activities where the potential exists for the incidental capture of fish;
- sampling or possessing fish caught in a subsistence fishery.

For further information about licensing, contact DFO at:

Licensing Officer

Central & Arctic Region

Government of Canada

Fisheries and Oceans Canada

PO Box 358

Iqaluit, NU, X0A 0H0

Tel: (867) 979-8005

Fax: (867) 979-8039

Email: XCNA-NT-NUpermit@dfo-mpo.gc.ca

Website: dfo-mpo.gc.ca



Fisheries and Oceans
Canada

Pêches et Océans
Canada

Prince of Wales Northern Heritage Centre

The Prince of Wales Northern Heritage Centre (PWNHC), a division of the Department of Education, Culture and Employment, Government of the Northwest Territories, is responsible for managing and protecting the archaeological resources of the NWT. Representing a continuous human occupation stretching back over 7000 years, archaeological sites are fragile and non-renewable and are protected from disturbance by legislation, regulation and policy in the NWT. There are currently about 6000 archaeological sites recorded in the NWT, though this number represents only a fraction of the existing sites as large areas remain unexplored for archaeological resources. A large part of the work done at the PWNHC involves reviewing land use and development permit applications. On average, 300 permits are reviewed per year, with recommendations being proffered to nine land management authorities.

With respect to permitting for research and monitoring, PWNHC is responsible for issuing NWT Archaeology Research Permits.

For more information, contact the Prince of Wales Northern Heritage Centre at:

NWT Cultural Places Program
Prince of Wales Northern Heritage Centre
4750 48th Street
PO Box 1320
Yellowknife, NT, X1A 2L9
Phone: (867) 873-7688
Fax: (867) 873-0205
Email: archaeology@gov.nt.ca
Website: pwnhc.ca

Biology

Insley, Stephen J.

Wildlife Conservation Society Canada
Whitehorse, YT
sinsley@wcs.org

File Number: 12 402 894

Region: IN

Licence No: 15670

Location: Cape Kellett

Acoustic monitoring of marine mammals and ship traffic in the Amundsen Gulf

The goal of this study was to assess the impacts of increased shipping and loss of sea ice on marine mammals in the eastern Beaufort Sea. The way the researchers were able to assess impacts was by recording the sounds of passing whales and other marine mammals. They put recorders at the western entrance to the North-West Passage shipping route, particularly in the Amundsen Gulf and Banks Island areas. Before setting up, the researchers had telephone and in-person meetings with the Sachs Harbour Hunters and Trappers Committee to discuss the project and answer all questions. Equipment for the project was purchased and tested in Whitehorse before the start of the field season. The equipment included two new underwater recorders with a computer chip that can save recorded sounds for many months. The researchers made three field trips in the spring and summer of 2015. Two recorders were placed in the water south of Cape Kellett, approximately 21 km from Sachs Harbour. One was off the edge of the sea ice in May, and the other was put in the water in August. Both were picked up in August. A third recorder was placed roughly 15 km south of Cape Kellett, and the researchers planned to leave this one in the water over the winter. The researchers are currently studying the sounds they recorded.

Insley, Stephen J.

Wildlife Conservation Society Canada
Whitehorse, YT
sinsley@wcs.org

File Number: 12 402 894

Region: IN

Licence No: 15674

Location: Darnley Bay

Darnley Bay seal monitoring

The goal of this on-going project is to monitor the long-term health and population of ringed seals (*Pusa hispida*) and bearded seals (*Erignathus barbatus*) in the Darnley Bay area of the Inuvialuit Settlement Region, NT. The project started in 2014. The researchers planned the 2015 field season with the Paulatuk Hunters and Trappers Committee by telephone and email during winter 2015. They also met with the Paulatuk Hunters and Trappers Committee in person in July 2015 to discuss the project, the way the monitoring was happening, the project budget, and to answer

all questions. The late summer, early fall time period was chosen as the best period to take samples of seals from hunters in both 2014 and 2015. The fall, and September in particular, is a good time to collect samples because there is a predictable increase in ringed seals in the immediate area. It is also an important foraging time for seals before winter. The researchers collected samples from seal hunters and sent them away for further study.

Low, George

Dehcho First Nations
Hay River, NT
jmichaellow@gmail.com

File Number: 12 402 857**Region:** DC**Licence No:** 15629**Location:** Providence Creek**Enhancement and monitoring of arctic grayling spawning habitat at Providence Creek, NWT**

No work was conducted under this licence in 2015.

Maier, Kris

Gwich'in Renewable Resources Board
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kmaier@grrb.nt.ca

File Number: 12 402 851**Region:** GW**Licence No:** 15739**Location:** Fish Creek & tributaries in the Rat River watershed (67°45'24.11"N, 136°17'50.71"W)**Examination of distribution and density of juvenile Dolly Varden char in Fish Creek (Rat River)**

The goal of this project was to find out which areas of Fish Creek are used by young Dolly Varden char, and to see if the areas of Fish Creek that are vital to the survival of these fish are being damaged or changed in any way ("habitat monitoring"). The researchers fished for young Dolly Varden using electrofishing in order to map out where young char can be found. Habitat monitoring included recording measurements about the river itself, testing the water for certain chemicals, checking for insects that live in the water when the water system is healthy, and installing remote cameras to photograph different areas of the river every hour to document change. A full project summary will be published in 2017/18, once sampling is completed in 2016.

Maier, Kris

Gwich'in Renewable Resources Board
Inuvik, NT
kmaier@grrb.nt.ca

File Number: 12 402 851**Region:** GW**Licence No:** 15740**Location:** Arctic Red River headwaters**Arctic Red River Headwaters (ARRH) fisheries assessment**

The goal of this project is to see what types of fish can be found in different locations in the headwaters of the Arctic Red River. To find this out, the researchers spent nine days fishing in various locations around the upper Arctic Red River and its tributaries. Twelve sites were electrofished to see what kinds of fish were there, and how many of each. They found fish in 11 of the 12 sites and captured fish in ten of the 12 sites. Most of the fish were Dolly Varden

(preliminary field ID), slimy sculpin and arctic grayling. Samples are currently being analyzed. If the field ID of Dolly Varden is confirmed, this will be the first time that Dolly Varden, a species at risk, were found in the Arctic Red River. The new knowledge that Dolly Varden are found in the Arctic Red River will be very important for Species at Risk planning and will help researchers with other questions they are investigating about these fish. In addition to the fishing, the research team took water chemistry samples and installed a small weather station. The weather station will help in their efforts to record and monitor what conditions are generally like in the upper Arctic Red River.

Pellissey, Jody

Wek'eezhii Renewable Resources Board
Yellowknife, NT
jpellissey@wrrb.ca

File Number: 12 402 903

Region: NS

Licence No: 15686

Location: Tłıchq Region

When do Caribou return? Impacts of wildfires on t̄d̄zi (boreal caribou)

The field research for this project took place in Whati during the second week of July 2015. The research team has not yet answered the question of when caribou return after a fire; however, they catalogued plants and animals found in areas burned out between the late 1960s and 2014. They were also able to document sites that had not been burned at all for the last 50 years. This information will help them understand what kinds of areas t̄d̄zi prefer, and when caribou return after a fire. The research team also made note of some unexpected conditions caused by the extremely dry weather, such as ash in the air from forest fires and low water levels that made it difficult to reach t̄d̄zi habitat. The research team consisted of seven elders, a cook and camp helper, and two community researchers – all are keen to continue this research. Members of the team will present their findings at the NWT Geoscience Forum at the end of November 2015.

Raverty, Stephen

British Columbia Ministry of Agriculture
Abbotsford, BC
stephen.raverty@gov.bc.ca

File Number: 12 402 902

Region: IN

Licence No: 15627

Location: Baby Island, Hendrickson Island, Mackenzie Delta

Health assessment of beluga

No research was conducted under this licence in 2015.

Ruben, Diane

Paulatuk Hunters and Trappers Committee
Paulatuk, NT
phtc@live.ca

File Number: 12 402 905

Region: IN

Licence No: 15706

Location: offshore from Tipi traditional camp (69.4306, -124.3814) and Fish traditional camp (69.4173, -123.5475)

Community-based passive acoustic monitoring of marine mammals near Paulatuk, NT

The goal of this community-based project was to make sound and video recordings, and get in-person observations, of marine mammals as they pass by Darnley Bay. The Paulatuk Hunters and Trappers Committee carried out this component of a larger, multi-year project, which is a collaboration with the Fisheries Joint Management Committee and Oceans North Canada. This community-based monitoring project was designed to link to other studies that are going on within the Tarium Niryutait Marine Protected Area, and other regional beluga research initiatives. To gather information about the marine mammals, the research team used three methods. First, they used underwater recording devices to record beluga vocalizations. Second, they used video cameras mounted on drones, and third, they collected observations from local monitors. This research was a unique opportunity to use research methods that work well at the community level. The research team are looking back on how the project went – what worked, and what did not. They realized that the underwater devices recorded many more marine animal sounds than they had expected to hear based on the observations of local monitors and what was captured on video by the drones. This included bowhead whales. The local monitor observations were critical to explaining what some of the recorded sounds meant – for example, what the belugas were doing at that moment. Knowledgeable researchers continue to analyze the sound recordings.

Simmons, Deborah L.

Sahtú Renewable Resources Board
Tulít'a, NT
director@srrb.nt.ca

File Number: 12 402 882

Region: SA

Licence No: 15597

Location: K'asho Got'İnę, Tulít'a, and Délİnę
Districts of the Sahtú Region

Sahtú Region caribou and moose study

Understanding how caribou populations might differ across the landscape is a question of interest to managers, ecologists, and Aboriginal harvesters. The main objective of this research was to bring together traditional knowledge and a technique to study the DNA of caribou which doesn't harm the animals, in order to understand how Sahtú harvesters recognize and use their knowledge of this variability in their region. The goal was to examine how caribou are similar and different to each other as you move across the landscape, and how people understand these differences and why they exist. Caribou dung was collected in collaboration with local community members during the winters of 2013-2015 in order to study caribou DNA. Local knowledge was shared in focus group meetings with the ʔehdzo Got'İnę (Renewable Resource Councils) and in on-the-land sharing sessions. Early results show that there are differences in the DNA, origin, appearance, and behaviour of caribou across the Sahtú, and in the language used to talk about them. This research is important for the conservation of boreal woodland caribou into the future. Community meetings to present and interpret results (winter 2015/2016) will allow the researchers and harvesters to continue to learn from each other and to better understand caribou. This research helps to describe caribou populations and aims to develop an approach to caribou research that balances and accommodates aboriginal and scientific ways of knowing.

Trimble, Annika

Aurora Research Institute
Inuvik, NT
atrimble@auroracollege.nt.ca

File Number: 12 402 733

Region: IN, GW

Licence No: 15624

Location: Inuvik

Northern native seed development field trials

The goal of this ongoing project is to collect seeds from northern plants, grow them in a greenhouse, and then plant them in areas that have been damaged by development or other forces. Later, the researchers go back to the areas to see how well the plants are growing. Generally, plants from the south are used in these places, but using northern plants is considered a better way to help damaged areas heal. Although the research team did not check on the three established field trial sites in 2015, they visited two new field sites and gathered information about the plants and soil there. The two new sites are both drainages that needed restoration and stabilization. Over 2000 plants were grown in the greenhouse from locally-collected seeds. These plants were then transplanted along the two drainages. The researchers will check back on the plants at the two new sites every year.

Contaminants

Berghe, Martin Van Den

Queen's University
Kingston, ON
martin.vandenberghe@gmail.com

File Number: 12 402 901

Region: NS

Licence No: 15586

Location: Giant Mine property

Characterization of arsenic species in lake sediments surrounding Giant Mine, NWT

This study had two goals. The first was to see if the arsenic found in regional lake sediments was from natural or industrial sources. Sediments are the mud, sand, and natural materials that are found at the bottom of a lake. The second goal was to see if these lake sediments are still collecting arsenic, or if they are releasing it back into the overlying lake waters. To do this, the researchers tested the amount and type of arsenic in both the sediments and the water. Using information from previous studies, they can use these test results to see if the arsenic is stable or if things are changing. Understanding what the arsenic is doing is an important part of understanding how dangerous the arsenic is to the environment. The researchers tested three different types of lakes on the Giant mine property, within 3 kilometers of the old roaster stacks. They tested the lakes in both the summer and winter, which can show how the seasons impact arsenic. The researchers found both natural and industrial arsenic in the lakes, and also found that the sediments are absorbing some of the more dangerous arsenic types which then change to become more stable. However, it appears from early results that the sediments are releasing arsenic back into the lake faster than it is being absorbed.

Blais, Jules M.

University of Ottawa
Ottawa, ON
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File Number: 12 402 847

Region: NS

Licence No: 15668

Location: Lakes and land surrounding Yellowknife

Developing new tools for assessing legacy pollutants and their ecological consequences in lakes near Northwest Territories mines

The goal of this multi-year project is to understand how the mines near Yellowknife have polluted the lakes through toxic chemicals that were carried away from the mines on the wind. To do this, the researchers took cores and water samples from a few different lakes, both close to Yellowknife and far away. The lakes that are close are likely to have had the chemicals blown into them. The lakes that are far away are helpful as they tell the researchers how many of these chemicals occur naturally in the lakes. The researchers will use the cores to see how the amount of environmental

pollution from mining activities has changed over many years. They will also analyze the water samples for pollution. The pollution might include arsenic and other metals, mercury, and polycyclic aromatic hydrocarbons; these chemicals may cause cancer. The researchers will take samples from the water and the cores to find out how the pollution has affected the plants, animals, and tiny insects that live, or lived, in the water. To date, they have found that a lake near the Giant Mine had a 1700% increase in arsenic levels when the mine was at its peak, causing some small aquatic insects to die out completely. This lake may not be typical of the other lakes, so work is ongoing.

Budziak, Jerry

Spirit Resource Management Ltd.
Calgary, AB
jbudziak@spiritrml.com

File Number: 12 402 475

Region: SA

Licence No: 15672

Location: Nota Creek C-17 well site

Phytoremediation study on the CDN forest at Nota Creek C-17 well site

The goal of this project is to see if plants can remove dangerous chemicals that have contaminated soil. This is known as “phytoremediation”. In theory, plants bring the contaminant from the soil into their leaves through their roots. The plants are then cut down and removed from the site, taking the contaminants with them. This is repeated until the soil is remediated, or cleaned up. The project team started this process in 2009 at a well site with contaminated soil, the Nota Creek C-17 well site. The results were encouraging, so they dug up contaminated soil that was still buried on the site and spread it out to be planted in 2011 and again in late 2013. In mid-June 2015, the research team went to the site and took soil samples from the contaminated soil that could be used as a comparison for soil samples taken in the future. The site was then tilled, prepared for planting, fertilized and seeded. The pre-planting samples showed that the soil was mainly contaminated by crude oil. The research team took a trip to the site in mid-August to check on the plants, and returned in mid-September to collect plant and soil samples and to harvest the growth. Depending on how well the phytoremediation worked, they will either keep planting for another year, or start working on a new batch of contaminated soil.

Chételat, John

Environment and Climate Change Canada
Ottawa, ON
john.chetelat@ec.gc.ca

File Number: 12 402 886

Region: NS

Licence No: 15675

Location: Yellowknife River, Yellowknife Bay,
Great Slave Lake

Cumulative impacts monitoring of aquatic ecosystem health of Yellowknife Bay, Great Slave Lake

The goal of this three-year project was to see how pollution spread from the old mines near Yellowknife through both the air and water, and how this pollution affected and continues to affect the plants and animals that live in the water. The researchers were studying metal contamination such as lead and arsenic. They took samples from Yellowknife Bay and the main body of Great Slave Lake near Yellowknife to see if metal contamination was from sources nearby or far away. This allows them to see where and how metal pollution travels from its source out into the environment. The research team took samples of water, sediment, fish, and small aquatic animals from Great Slave Lake. They also took samples of tree lichens from the shore. Water samples

and cores from the bottom of the lake were analyzed to see if they contained metals, and to see how the contamination had changed over the years. The researchers took samples from fish too, to see how the metal contamination may be affecting the fish, and to clarify how lead pollution might move around in the environment long after the mines have shut down. This was the third and final field program for this three year research project.

Evans, Marlene

Environment and Climate Change Canada
Saskatoon, SK
marlene.evans@ec.gc.ca

File Number: 12 402 681

Region: SA

Licence No: 15767

Location: Great Bear Lake

Monitoring of mercury, flame retardants and other chemicals in lake trout and cisco from Great Bear Lake

This project is a part of a larger, Canada-wide study about mercury concentrations in fish. The goal of this project was to see how much mercury is in lake trout and cisco from Great Bear Lake. To test the fish, the researchers asked community members to give them samples of fish over the years of 2008-2014. Most of these were large and relatively old lake trout, averaging over two feet long and about 23 years old. Overall, mercury concentrations in smaller, younger fish were low. This makes sense because mercury will continue to gather in the flesh of fish throughout their lives. The mercury level in small fish from Great Bear Lake was similar to the level found in similarly-sized fish from Great Slave Lake. For Great Bear Lake trout, more than half of the very large, old fish had mercury concentrations that were higher than the commercial fish sale guideline; these fish were generally very old (over 40 years). However, a few younger fish (18-40 years old) had these high mercury concentrations as well. Mercury levels in Great Bear Lake trout in 2014 were similar to levels seen in 1978 and 1979. Mercury levels were very low in cisco. Fish provided by Délı̄në in 2015 are still being studied.

Evans, Marlene

Environment and Climate Change Canada
Saskatoon, SK
marlene.evans@ec.gc.ca

File Number: 12 402 681

Region: SS

Licence No: 15768

Location: Great Slave Lake

Spatial and long-term trends in persistent organic contaminants and metals in lake trout and burbot from the Northwest Territories

This Great Slave Lake study is a part of the Northern Contaminants Program. It investigates how the levels of contaminants in fish change over time, focussing on fish which are important in traditional diets. In 2015, the research team focussed on lake trout from the Hay River region (West Basin) and Lutsel K'e (East Arm), and burbot from Fort Resolution on the Slave River delta. Fish were analyzed for mercury, metals and persistent organic pollutants (POPs). POPs are dangerous chemicals that stay in the environment for a long time. The researchers also studied mercury levels in northern pike at Fort Resolution and burbot at Lutsel K'e. Mercury levels remain relatively low in these fish, with no clear signs that the levels are increasing over time. Levels of POPs are also declining. A presentation on this study was given to the Akaitcho General Assembly, and a scientific paper was published in the Journal of Great Lakes Research. The

journal article brought together this research with information from the 1990s in order to discuss the impacts of pollution on food webs in Great Slave Lake.

Laird, Brian D.

University of Waterloo
Waterloo, ON
brian.laird@uwaterloo.ca

File Number: 12 402 900

Region: DC

Licence No: 15658

Location: Kakisa, Jean Marie River

Contaminant biomonitoring in the Dehcho Region: a pilot investigation of the links between contaminant exposure, nutritional status, and country food use

The overall objective of this project is to promote country food use in the Dehcho Region in a way that balances contaminant risks and nutrient benefits. That is, the researchers hope to show how to maximize the eating of healthy, nutrient-rich country food while minimizing mercury exposure. The researchers modified and tested a special survey to find out what, and how much, people are eating. The survey was designed specifically to be about country food that is preferred by Dene and Métis communities. Before they used the survey, the researchers had public consultation meetings and focus groups in two Dehcho communities (Kakisa and Jean Marie River). The meetings were to see if the survey was complete, relevant, and understandable. Because the mercury that people eat comes mainly from fish, the survey included questions about what types of fish people ate, what parts of the fish, how it was cooked, and where the fish was harvested. This information is used to understand how much mercury people may be consuming. The researchers will continue to analyze the information they collected, and are also working on a related study to determine the mercury levels in fish in the Dehcho Region. Bringing these two projects together will allow them to see how much mercury people may be exposed to, and how to make good choices about fish consumption in order to limit mercury exposure.

Laird, Brian D.

University of Waterloo
Waterloo, ON
brian.laird@uwaterloo.ca

File Number: 12 402 900

Region: DC

Licence No: 15775

Location: Jean Marie River

Contaminant biomonitoring in the Dehcho Region: investigating the links between contaminant exposure, nutritional status, and country food use

The overall objective of this research is to promote country foods in the Northwest Territories in a way that balances contaminant risks and nutrient benefits. That is, the researchers hope to show how to maximize the eating of healthy, nutrient-rich country food while minimizing mercury exposure. There are two parts to this study – the first is gathering information about what people are eating, and is described under a different licence. The second part included testing people to check their levels of mercury and other pollutants, and to check for other markers of good health. A total of 21 individuals from Jean Marie River gave their consent to participate in the project. Each participant was able to chose to take part in one or many of the different project components: a food survey, hair collection, urine collection, and blood collection. Samples are still being tested for total mercury, cholesterol and other markers of health, metals, and other dangerous pollutants. Confidential letters will be sent to each participant in the fall of 2016, and will contain details about their own health. The wording of the letters will be developed in consultation with the communities. A report will also be provided to the community at the same time, and an open house will be held

so that participants can ask questions about their own health and all community members can ask about the study in general.

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File Number: 12 402 906
Region: DC

Licence No: 15713
Location: McGill Lake south of Jean Marie River

Tracing the origin of mercury contamination in the lakes and fish of the Jean Marie River First Nation lands

This project studied how much of the mercury present in the lakes and rivers around Jean Marie River First Nation might be coming from thawing permafrost. Permafrost is known to naturally store mercury, and the mercury is released when the permafrost thaws. Studies conducted on water and fish indicate a rising level of mercury contamination, which is a health concern. This project focused on analysing how much mercury was in permafrost cores collected during previous studies in the Jean Marie River First Nation, as well as in newly collected permafrost cores from the McGill Lake area. Once the researchers knew which areas of permafrost had the most mercury, they could compare this with areas where the permafrost is most likely to thaw. They were then able to use computerized mapping to determine how water flowing over or melting from the permafrost might carry the mercury to the contaminated lakes. These results will help this, and other northern communities, better understand mercury contamination in their lakes and rivers.

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File Number: 12 402 857
Region: DC, SS

Licence No: 15614
Location: Fort Simpson, Wrigley, Kakisa, Hay River Reserve

Updating data on mercury levels in food fish species in lakes used by Dehcho communities

The goal of this on-going project is to measure mercury levels in the fish commonly used by Dehcho communities for food, to see if the levels are changing or if they are stable. This past research season, the researchers collected and sampled fish from three lakes. They collected eight northern pike, six yellow walleye and eight lake whitefish from Fish Lake, 20 burbot, 20 northern pike and 20 lake trout from Cli Lake, and 20 lake trout from Trout Lake.

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File Number: 12 402 333
Region: SA

Licence No: 15732
Location: Great Bear Lake, Délı̄në

Sampling of traditional foods in Délı̄në, NT in 2015/2016

This study was conducted as part of a program to monitor the concentrations of metals and other elements in the meat of mammals, birds and fish that make up a large proportion of the traditional diet in the community of Délı̄në. Moose, woodland caribou, spruce grouse, northern pintail, lake whitefish, and lake trout were harvested by Délı̄në community members, and samples were submitted to the Délı̄në Renewable Resources Council. The samples were checked for mercury and three naturally-occurring elements that are radioactive and which might be present from the uranium mine at Port Radium. Uranium, a major element of concern, was 'below detection' - either not present or only present in very small amounts in most samples, so it is not considered to be a hazard. Other radioactive elements were also below detection in all samples. The only contaminant of concern was mercury, which for lake trout increased with the size of the fish. Lake trout had the most mercury of all fish species, however only one fish in the three years of collections exceeded the Health Canada guidelines. Mercury is currently not a significant issue in fish harvested from Great Bear Lake near Délı̄në, with the possible exception of larger lake trout. This study found no evidence that traditional food should not continue to be an important nutritious food source.

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File Number: 12 402 338

Region: NS

Licence No: 15745

Location: Jackfish Bay, Horseshoe Island Bay,
Kam Bay

Con Mine Phase 5 EEM - periodic monitoring

The purpose of this research was to collect information about the environment, fish, and small water-dwelling insects (called 'invertebrates') in the area around Con Mine. Various government regulations require that this type of information is gathered periodically. The field program was conducted in and around the Yellowknife Bay of Great Slave Lake between July and September 2015. The research team took samples from a few different places. One was Jackfish Bay, which is downstream of the Con Mine outfall, so it was directly impacted by the mine. They also took samples from two areas not affected by the mine for comparison purposes; Horseshoe Island Bay was sampled for fish and Kam Bay was sampled for invertebrates. Ninespine stickleback, a type of small fish, were captured using seine nets and were tested to see how much pollution they could handle before they died. Other fish caught in the net were measured for length and weight, and then released. The research team collected invertebrates in Jackfish Bay and Kam Bay using special equipment, and also took samples of the water and lake bottom sediment to check for quality. The samples are still being analyzed, and a final report will be submitted to Environment and Climate Change Canada in June 2016.

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File Number: 12 402 904

Region: NS

Licence No: 15690

Location: 30 km radius of Yellowknife

Understanding regional variability in soil geochemistry in an area impacted by legacy industrial activity

The goal of this project was to take soil samples from a variety of different landscape features in a large area around the Giant Mine, in order to see how the mine may have polluted the landscape. Four main types of features were sampled: outcrop soils, forested canopy soils, wetland soils, and peat. Target areas were selected based on distance from the former Giant roaster, direction from the roaster with respect to prevailing wind direction, and location with respect to past or on-going research. A total of 174 soil samples were collected from 164 sites within a 30 km radius of Yellowknife. The samples were soil cores, which allow the researchers to see how things have changed over time because older soil is found at the bottom of the core. At some locations, multiple soil samples were collected close to each other to see if the pollution varied in a small area. The research team took cores by hammering metal tubing into the soil using a sledgehammer, or by cutting into the peat using a saw. In areas where it was not possible to take core samples, they took surface samples instead, which do not give the same long-term information. Cores and samples were frozen for transport back to Queen's University, and will be kept frozen until they are analyzed.

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Region: NS

Licence No: 15600
Location: Diavik Diamond Mine, East Island, Lac de Gras

Reclamation of disturbed sites research at Diavik Diamond Mine, NWT

Reclamation means returning the land to the state it was in before it was damaged or changed by development. Over the past 30 years, reclamation research in the north has focused on oil and gas activities and transportation corridors. No matter which industry changes the land, the disturbances are often similar. However, each industry (e.g. mining, oil and gas) has its unique byproducts that are important to consider when making decisions about which reclamation methods to use. The purpose of this research program is to develop reclamation methods that will allow plants to grow more quickly on disturbed areas at northern diamond mines. The research program will also study how to create a soil-like ground surface in places where the soil has been stripped. This new soil will be made of on-site and store-bought materials, and will help native plants return more quickly to these bare areas. In 2013 and 2014, research sites were set up at Diavik to see how grass and other plants would grow following small changes to the surface of the land, such as the addition of natural materials to the soil or the prevention of erosion. The research team also tried to plant mosses and lichens. In 2015, the research sites were visited to see how well the plants were growing. This is an ongoing research program.

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Licence No: 15606
Location: Yellowknife

Toxic legacies: community perspectives on arsenic pollution at Yellowknife's Giant Mine

This project is a large study aimed at recording oral history about the legacy of arsenic pollution from the Giant Mine. The research team made good progress towards the goals of the Toxic Legacies Project. They established a 'Communicating with Future Generations' working group

which meets monthly in Yellowknife and includes members from the NWT and Canadian governments, the Yellowknives Dene First Nation (YKDFN), the North Slave Métis Alliance, the City of Yellowknife, the Heritage Society, Alternatives North and other interested members of the public. Three youth workshops were also held. YKDFN elders met in June and discussed how important it is that people, including tourists and young people, know the YKDFN experience of the mine, the destruction of their land without consent or compensation, and the pollution and harm that was done to the people, land, and animals. A report on this workshop is forthcoming. In one meeting, the research team played the film “Into Eternity”, a Danish documentary about a nuclear waste site that touches on similar themes of warning future generations. Another documentary, this one about the Giant Mine, called “Guardians of Eternity” was screened at several locations around Yellowknife. The research team is producing a curriculum insert about Giant Mine that will be used in Grade 10 Northern Studies classes, and is also preparing signage for around the mine.

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File Number: 12 402 889

Region: DC

Licence No: 15574

Location: Ekali Lake, Sanguex Lake, Gargan Lake, McGill Lake and Deep Lake in the Jean Marie area; Trout Lake in the Samba K'e area; Kakisa and Tathlina Lake in the Kakisa area; Big Island and Mustard Lake in the Fort Simpson area

The bio-magnification of mercury within fish species of the Dehcho and their varying levels among lakes

In 2015, members of the Liidlii Kue First Nation and Ka'a'gee Tu First Nation, along with researchers from the University of Waterloo and staff from the Aboriginal Aquatic Resources and Oceans Management Program worked together to collect fish, water, sediment, and bug samples from Mustard Lake and Kakisa Lake. Samples were analyzed for levels of mercury, and to determine who eats who in the lakes' food chains. This was the third year of the study; in 2013 and 2014 Samba'a K'e Dene Band, Jean Marie River First Nation, and Ka'a'gee Tu First Nation members worked with researchers to collect similar samples from McGill, Gargan, Ekali, Sanguex, Tathlina, and Trout lakes. Results to date indicate that all lake whitefish have mercury levels that are below the commercial sale guideline, and most are also below the subsistence guideline. Mercury levels are higher in pike, and highest in walleye, but there are differences among lakes – some lakes have higher fish mercury levels than others, and this appears to depend on how much algae is in the lake. There are safe fish to eat in every lake. The project will continue in 2016 with additional lakes sampled.

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File Number: 12 402 907

Region: SS

Licence No: 15734

Location: Fort Resolution

Fort Resolution pipeline ESA I/II

An Environmental Site Assessment was conducted for the buried fuel pipeline located within the Hamlet of Fort Resolution. An Environmental Site Assessment is a special study done at the site of an existing development, to see if the development has been impacting the environment. Some people have claimed that the fuel pipeline runs underground from the dock area at the shore of Great Slave Lake to a series of government buildings, including a maintenance garage operated by the Department of Public Works and Services. It was reportedly installed in the 1960s to supply fuel to those government buildings, although the exact location and extent of the pipeline is not known.

Engineering

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File Number: 12 406 058

Region: GW

Licence No: 15623

Location: 6 km NE of the Inuvik airport

Wind energy monitoring at Inuvik High Point (2013-2015)

The goal of this ongoing project is to see if it is possible to generate electricity for the Town of Inuvik using wind power. In previous years, the research team had installed a 30 meter (100 foot) tall wind monitoring tower at Inuvik High Point. This tower measured the strength and direction of the wind over time, and recorded it for the researchers to study. The tower collapsed in late 2014, so needed to be replaced. The collapsed tower was dismantled and brought back to Inuvik by helicopter. A new, sturdier, 60m (200 foot) tall wind monitoring tower will be installed at the High Point site. In August and September 2015, the 15 anchors and guy wires that will secure the tower were installed. The anchors were secured to the bottom of 1m pits using rebar. The pits were then refilled using mineral earth. The remainder of the tower installation will take place in November 2015. The research team will bring all the tower parts and tools they need to the site by helicopter. They'll assemble and winch the tower up into place. Since the tower is quite high, special lights need to be installed. These lights will be powered by a propane fuel cell, which will need to be refilled occasionally.

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Region: NS

Licence No: 15728

Location: Berry Hill (62°36'58.32"N,
114°18'34.83"W) and CN Hill (63°24'15.5"N,
116°10'44.8"W)

Wind energy monitoring at Yellowknife (2015-2017)

The goal of this ongoing project is to see if it is possible to generate electricity for the city of Yellowknife using wind power. Plans to measure the wind energy potential at CN Hill, located in the Snare River Valley approximately 130 km from Yellowknife, are on track. In November 2015, wind monitoring sensors will be installed on the upper portion of a pre-existing Northwestel communications tower by Northwestel staff. The wind monitoring sensors measure the speed and direction of the wind. They are connected to a datalogger, which will transmit information about

wind to the research team by satellite. The sensors may need occasional maintenance, which will be provided by Northwestel. This work will be overseen by the project engineer, who has conducted all wind tower installations in the Northwest Territories and has been working on wind monitoring projects with the Aurora Research Institute since 2004. The sensors will be ready and data collection will start in November 2015. Plans to install a wind monitoring tower at Berry Hill north of Yellowknife were cancelled. No research activities will take place at Berry Hill as a part of this license.

Health

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File Number: 12 408 194
Region: NS

Licence No: 15615
Location: Yellowknife

Northwest Territory disease registry study

The goal of this project is to work with doctors and computer specialists to create new codes for doctors to use when they are recording information about diabetes in a patient's files. This will help doctors create a "diabetes disease registry", which is a list of everyone who has diabetes.

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Licence No: 15703
Location: Yellowknife

Working together to achieve healthier lifestyles in Yukon and Northwest Territories' communities

The goal of this project is to figure out what might help, or get in the way of, long-term healthy living initiatives in communities. In 2013-2014 the research team made a list and map of all the long-term healthy eating and active living programs taking place in all communities in Yukon and the Northwest Territories. This information is now available online as an interactive map (www.aicbr.ca). The purpose of the map is for communities, program coordinators, funders and others to see what healthy living programming is happening in communities, identify where there may be gaps, and identify opportunities for these programs to work together. This project is supporting the development of a Yellowknife Food Charter in partnership with the Yellowknife Farmers Market. A charter is a guarantee of rights and freedoms, and a food charter will include access to healthy food for everyone. The project also supported a community gardening workshop and Fall Harvest Fair in Ndilo, in partnership with Ecology North. Finding local, regional, and territorial partners is an extremely important part of this project, and the team continues to seek new partnerships and works very hard to maintain current partnerships by both running and attending meetings, offering small contracts, and participating in conferences.

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File Number: 12 408 193**Licence No:** 15638**Region:** IN, GW, SA, DC, NS, SS**Location:** All NWT**Physical activity monitor (PAM)**

The purpose of this research was to try and understand what improves or limits participation in physical activity, that is, how much exercise a person is getting. To understand these things, the researchers used a questionnaire to gather information from northerners using phone interviews. The questionnaire is known as the 'Physical Activity Monitor' or PAM. Different versions of the PAM have been in use since 1995. The answers to the questions show how different factors, such as individual, environmental, and social factors, affect physical activity. In 2014/15, the PAM asked how much exercise a person is getting compared to how much time is spent being inactive. It also asked about sports, general knowledge about healthy amounts of physical activity, and what prevents a person from being active. These are topics that are of interest to the Federal, Provincial and Territorial governments. Repeating the questions over time allows the researchers to measure change in both physical activity levels, and the factors that change physical activity levels. Ongoing monitoring programs like the PAM also measure whether the activity levels that are reported are enough for a healthy lifestyle. Data are still being analysed, and reports on the findings of this research will be freely available at www.cflri.ca.

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File Number: 12 408 190**Licence No:** 15639**Region:** IN, GW, SA, DC, NS, SS**Location:** All NWT**CANPLAY: Child Pedometer Study ISR project number 252**

The goal of this cross-Canada project was to measure physical activity levels of children and youth, and to study how parents respond to various opportunities for physical activity for their children. Parents (or legal guardians) of children and young adults between 5 and 19 years old were asked to complete a 15-20 minute telephone survey about the physical activity levels of their child(ren) and factors related to physical activity. For example, the parents were asked about such topics as participation in organized sports, preferences for certain activities, and how time is spent after school. Young people who were 18 or 19 were able to respond on their own behalf. Parents were also asked to allow their child(ren) to have their activity tracked over seven days. Families willing to participate were sent a pedometer, which is a small gadget that records how many steps a person takes. The pedometers were used by the parents to record the number of steps the child took each day for seven days. Data are still being analysed, and reports on the findings of this research will be freely available at www.cflri.ca.

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File Number: 12 408 206**Licence No:** 15747**Region:** IN, GW, NS**Location:** Yellowknife, Inuvik

Facilitating colorectal cancer screening access through systems analysis: A case study of the Northwest Territories

Colorectal cancer rates are high in the Northwest Territories, and often people with this disease do not live long. Colorectal cancer is a cancer in a part of the intestines. Screening rates for colorectal cancer are low, which means that most people are not getting tested to see if they have this cancer. The researchers wanted to know how to get more people tested for this cancer, which would allow the cancer to be found early and save lives. To do this, they knew they would have to understand why people are not getting tested, and how people usually make use of the medical system. The researchers interviewed about 30 health care providers across the Northwest Territories. They found that in order to ask for colorectal cancer screening, patients need to hear about it from their doctors. And even if people know about the testing, it is sometimes hard to get a colonoscopy scheduled, people might skip required later visits, and sometimes the results of the tests are not easy to find for new medical staff. The researchers found that better communication between doctors and other medical staff through, for example, electronic medical records, would help more people get tested for this disease.

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File Number: 12 408 202

Region: IN, GW, SA, DC, NS, SS

Licence No: 15630

Location: All NWT

Assessment of a pilot antimicrobial resistance awareness campaign

Antibiotics are very important drugs which cure diseases in many people. However, they may be prescribed too often and may be used incorrectly, which leads to “antimicrobial resistance”. Antimicrobial resistance means that the bacteria making people sick develop a resistance to the drugs, so the drugs are not effective anymore. The researchers wanted to know if doctors were aware of this issue, and if they were giving this information to their patients. They also wanted to know how effective it would be have an information campaign about antimicrobial resistance. Therefore, the researchers asked doctors about this issue both before and after a planned information campaign about antimicrobial resistance. The researchers found that doctors were indeed aware of the problem of antimicrobial resistance, and were talking to their patients about it both before and after the campaign. After the campaign, doctors were more direct when talking to patients about throwing away leftover antibiotics. They found that doctors could do a better job talking about preventing infections, which reduces the need to prescribe antibiotics in the first place. The researchers believe that in some cases, doctors may think that pharmacists or nurses are addressing these issues with patients.

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File Number: 12 408 192

Region: SS

Licence No: 15655

Location: Fort Smith

Telling the story of diabetes care in Aboriginal communities: A proposal for a community-engaged research project in Fort Smith, NWT

In 2015, the researchers started to review the information provided by interviewees and pull out meaningful stories. A final report is anticipated in 2016.

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File Number: 12 408 200
Region: IN, GW, DC, NS, SS

Licence No: 15653
Location: Behchokò, Inuvik, Fort Smith, Hay River, Fort Simpson, Yellowknife

Translating research in elder care (TREC 2.0): advice seeking networks in residential long term care

The goal of this multi-year project is to see where and who the staff in long-term care homes turn to in order to get advice when they need help caring for elders. The project team has surveyed more than 400 staff members working in long-term care homes in the western and northern regions of Canada. The staff, who were in charge of the care of residents in the care homes, were asked who they look to for advice about resident care. The results are currently being analyzed and feedback will be provided once analysis is complete. Later, the researchers may select certain participants for interviews. These interviews are expected to be completed in 2016.

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File Number: 12 408 207
Region: IN, GW

Licence No: 15749
Location: Aklavik

Policy options to support healthy eating and active living

The goal of this project is to find out how government health policy can promote healthy eating and physical fitness. Field work in Aklavik began in September 2015, and lasted for five days. A co-researcher has been hired from the community, and the research team held meetings and interviewed community members. There are no preliminary findings at this point as there have only been five people interviewed. Another field trip is planned in late November or early January to begin the next phase of the study.

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File Number: 12 408 149
Region: IN, GW

Licence No: 15618
Location: Aklavik, Tuktoyaktuk, Fort McPherson, Sachs Harbour

Addressing community concerns about health risks from *H. pylori* infection

Helicobacter pylori (*H. pylori*) is a bacteria that lives in many people's stomachs, and causes stomach ulcers and even more serious medical problems for some of these people. The Canadian North *Helicobacter pylori* Working Group has ongoing projects in Aklavik, Tuktoyaktuk and Fort McPherson, NT and Old Crow, YT, aiming to address community concerns about *H. pylori*

infection. More than 700 people from Aklavik, Inuvik, and Fort McPherson have joined, and 665 completed a breath test for *H. pylori* infection. Of the 58% who tested positive, 234 enrolled in a treatment program and 177 completed a breath test to confirm their treatment was successful. Research staff reviewed medical charts in Tuktoyaktuk to see if people with *H. pylori* were using the medical system for their symptoms. Research staff also interviewed community members in Aklavik about their perspectives on antibiotic use. Taking all the information together, the researchers will see how *H. pylori*-related diseases impact the health care system. They will also develop culturally appropriate ways of helping to reduce this disease. The research team carried out knowledge sharing activities, including information sessions in Tuktoyaktuk and Inuvik, and a two-day planning workshop in Aklavik. The researchers are developing a video series to spread information about *H. pylori*. Research team members are still working to expand *H. pylori* community projects.

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File Number: 12 408 205

Region: NS, SS

Licence No: 15733

Location: N'Dilo, Dettah, Yellowknife, Kakisa

SOS - Summer of Smoke: a mixed-methods research examination of the health effects of a record wildfire season in Canada's Northwest Territories

The goal of the multi-year "Summer of Smoke" research project is to understand the health effects of the 2014 wildfire season. The project includes several different types of research – both interviews to gather people's experiences of the season, and then using mathematical techniques to see if more people were diagnosed with smoke-related diseases or symptoms than in other years. In order to understand if more people were experiencing smoke-related symptoms and diseases, the researchers needed a list of what diseases are caused by smoke. This list was created with the help of a wildfire researcher. The next step is to begin to search the databases at Yellowknife Health and Social Services to see how many people were treated for these diseases. For the interview component, community representatives were hired in Dettah, Ndilo and Kakisa. They participated in a two day video training workshop at the beginning of September 2015. To date, five interviews have been completed in Dettah, two in the Tłıchǫ language and three in English. Another three interviews have been completed in N'dilo. As well, the community representatives have interviewed two Yellowknife residents. Both the assessment of smoke-related disease and the interview transcription will continue, and results will come next year.

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File Number: 12 408 204

Region: IN

Licence No: 15708

Location: Hendrickson Island (69°30'0"N,
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133°37'10"W)

Beluga health and food borne parasites in the Inuvialuit Settlement Region

Beluga populations in southern waters are considered endangered. However, the population of beluga whales in the Inuvialuit Settlement Region is healthy. For this reason, the researchers wanted to study the northern population to see what level of parasites is found in a healthy

population of beluga. This will help them better understand the at-risk southern populations, and understand if the northern population starts to decline in the future. In collaboration with hunters, whale monitors, and youth from the community, the researchers examined 16 beluga harvested on Hendrickson Island between July 9 and 26. They recorded their weight, took measurements, and took samples of blood and tissue. Overall, the animals appeared to be in good health. Each major organ was examined and sampled to take back to the lab for further study. Roundworms were found in the lungs, stomach and/or kidneys of eight beluga. It is normal for wildlife to have parasites, and these parasites are not thought to pose a risk to people harvesting or consuming beluga. Some parasites, however, can be passed from beluga to people and are a health risk. Samples were taken to check for these parasites, such as *Trichinella* (roundworms) and *Toxoplasma* (microscopic parasites). A preliminary report should be available in December 2015. The results of the health assessment will be presented to the community in February 2016, and a final written report will be available by the end of March 2016.

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File Number: 12 408 199
Region: IN, GW, DC, NS, SS

Licence No: 15659
Location: Yellowknife, Inuvik, Hay River, Fort Providence, Fort Smith, Behchokò

Mapping social and structural contexts of HIV and STI vulnerability among LGBTQ+ youth in the Northwest Territories

This project focussed on the lives of young people who identify as lesbian, bisexual, transgender, queer or otherwise sexually and gender diverse (LGBTQ+). In particular, the researchers wanted to know how these young people were keeping healthy when it comes to sexually transmitted diseases, considering how the medical system may be prejudiced or uninformed. The researchers wanted to know how well-informed these youth are about sexual health in general, and sexually transmitted diseases in particular. They also wanted to know how prejudice in the young people's communities or families and at the medical clinic may be preventing the youth from getting tested or getting information about these diseases. Finally, they wanted to know how best to help these young people stay sexually healthy. Twenty interviews were conducted with medical personnel and 30 interviews were conducted with LGBTQ+ youth. The researchers found that prejudice was preventing these young people from getting the health services and information they need. The lack of support meant that LGBTQ+ youth are at a greater risk for both medical problems and mental health issues. Data is being analyzed and the research team will submit manuscripts to peer-reviewed journals by the end of 2016.

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File Number: 12 408 199
Region: IN, GW, DC, NS, SS

Licence No: 15673
Location: Yellowknife, Inuvik, Hay River, Fort Providence, Behchokò

Exploring social and structural contexts of HIV vulnerability among LGBTQ+ youth in the Northwest Territories

This study was a community-based project focused on lived experiences and vulnerability to human immunodeficiency virus (HIV) and sexually transmitted infections (STI) among lesbian, bisexual, transgender, queer and other sexually and gender diverse (LGBTQ+) youth in the NWT. The study objectives were to: 1) Explore the lived experiences of LGBTQ+ youth in the NWT, with particular attention to social and structural contexts of sexual health, HIV and STI knowledge, vulnerabilities and priorities; 2) Develop a deeper understanding of the social and structural drivers for an increased risk of HIV/STI infection; and 3) To contribute to knowledge that can inform health care services and HIV prevention programs and services that target LGBTQ+ youth in the NWT. In 2015, data collection activities were completed including 20 key informant interviews and 30 interviews with LGBTQ+ youth. Initial findings were presented at the 2016 conference of the Canadian Association for HIV Research. Findings highlight different forms of stigma (heteronormativity, perceived/enacted stigma), HIV and STI vulnerabilities (lack of safer sex knowledge, difficulties accessing safer sex resources, substance use), and coping strategies (self-acceptance, resistance, advocacy) among LGBTQ+ youth in the NWT. Data analysis is being conducted, and it is anticipated that manuscripts will be submitted to peer-reviewed journals by the end of 2016.

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Region: IN, GW, DC, NS, SS

Licence No: 15741
Location: Yellowknife, Hay River, Inuvik, Fort Smith

Visual and performance art for HIV prevention with Indigenous Youth in the Northwest Territories and Nunavut: A mixed-methods multiple case study

The researchers have not starting doing any research yet, although they plan to start in 2016 in both Nunavut and the Northwest Territories. Instead, they have been getting all the permissions they need to start. When doing research which involves gathering information from people, a group of experts known as an ethics review board must consider the research very carefully to see if it will harm anyone. The research team have received approval from the University of Toronto ethics review board. Researchers are currently in the process of organizing and planning data collection activities for this study.

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File Number: 12 408 188
Region: IN, GW, SA, DC, NS, SS

Licence No: 15587
Location: All NWT

Nursing practice in rural and remote Canada II

The objective of this ongoing project is to better understand nursing in rural and remote regions in Canada in order to contribute to policy discussions on nurses' practice, recruitment, retention, and education. The Rural and Remote Nursing II research team were busy this year. They presented several research presentations and posters at different conferences. The research team also started the projects' rural and remote nursing survey on a national level. The survey was mailed out with the assistance of the nursing regulatory bodies in every province and territory in Canada, in English and French. In total 29 nursing associations assisted with mailing over 9600

survey packages. This including sending survey packages to every practicing Registered Nurse, Nurse Practitioner, Licensed Practical Nurse and Registered Psychiatric Nurse in the Northwest Territories. The overall survey response rate was 40% with over 3800 completed surveys returned (both online and in paper). The researchers finished entering the survey information onto a computer to be able to analyze it. Study findings, along with guides how to use this information, will be posted on the study's website (<http://ruralnursing.unbc.ca>) as they become available.

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File Number: 12 408 196
Region: NS

Licence No: 15633
Location: Yellowknife

Canadian primary care sentinel surveillance network (CPCSSN) project

The goal of this ongoing research is to gather information about health care and treatment for people with chronic diseases. The information gathered includes treatments and outcomes over a long time-span. This information will help doctors and nurses determine how to best treat chronic diseases. In 2014, research agreements and data sharing agreements were set up with the Yellowknife Health and Social Services Authority. These agreements ensure that strict codes of confidentiality and privacy are followed in this project, and were required before any medical record health data could be collected. The medical records were stripped of any identifying information, and were electronic copies only. Researchers have started working with the electronic medical records, and will continue this work in 2016. Electronic medical record information has been located for close to 30,000 patients from 26 primary care providers. The data was stripped of any personal identification and studied carefully to provide feedback reports to the 26 providers in July and October 2015.

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File Number: 12 408 201
Region: NS, SS

Licence No: 15581
Location: Fort Smith, Yellowknife

Lifestyle prescriptions and supports to reduce the risk of diabetes in rural and remote communities

The aim of this study was to create healthier rural and remote Canadian communities by providing science-backed information about how to live a healthy life and support people who have type 2 diabetes. Type 2 diabetes is an epidemic in many communities. The HealthSteps™ eight-month program consists of one-on-one healthy lifestyle coaching sessions occurring every two months. Funded through the Public Health Agency of Canada, this project identified those at risk for chronic disease and provided them with the resources needed to lead a healthy lifestyle focusing on healthy eating and physical activity. HealthSteps™ was offered at two Aurora College campuses: Yellowknife and Fort Smith. In total, 27 people started the eight-month program, with 16 finishing it. When they finished the program, the participants were surveyed to see if they enjoyed the program and if they would continue with a healthier lifestyle. Twelve out of 13 who answered the survey would recommend the program to others, and ten said that they would continue with the program past the last session. Analysis of data is ongoing.

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File Number: 12 408 208

Region: IN, GW, SA, DC, NS, SS

Licence No: 15760

Location: All NWT

Performance measurement in a circumpolar context: developing indicators of health system responsiveness for maternity care

The goal of this multi-year project is to evaluate the way the health care system responds to the medical needs of pregnant woman, new mothers, and their newborn children in northern communities around the world. Since the bulk of this project was conducted late in 2015 and into 2016, there are no significant findings to report at this time. The researcher looked very carefully through existing research publications to see if there were other studies that would be useful, but did not find many that were relevant. The researcher will continue to search through unpublished research. To gather information about the response of the health care system to maternity care, an advisory panel will lead the research, and a 'delphi panel' will be selected. The 'delphi panel' will include individuals who work in maternal health across the north. They will provide information about maternity care to the research team.

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File Number: 12 408 141

Region: IN, GW, SA

Licence No: 15616

Location: Inuvik, Fort Good Hope

Attitudes towards cancer in Indigenous communities & examining uptake of screening services: the ACCESS Project

The goal of this project was to find out why people who could benefit from cancer screening services offered at medical centres and hospitals do not make use of these services. Testing for cancer can save people's lives, so the researchers wanted to see if they could help people become more comfortable with taking these tests. The research team spoke with almost 400 people in Inuvik and Fort Good Hope in sharing circles or by speaking with them one-on-one. The researchers asked two main questions. First, what do you think makes people go to cancer screening, or what makes them stay away? And second, how can we encourage people to go to cancer screening more often? This project found that more people would attend cancer screenings if three things changed. First, it would be easier to attend cancer screenings if health care workers came to the communities and offered screening tests more often. Second, it would help people feel more comfortable if both health care workers and community members spoke more often about their experiences and about cancer screening. Finally, community members would better understand the purpose of cancer screening if better long term, culturally appropriate care and information were used in policies and programs offered in communities. Results were presented to the communities in late November 2015.

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File Number: 12 408 195
Region: IN

Licence No: 15637
Location: Hendrickson Island

Beluga lung and ear health

No research was conducted under this licence in 2015.

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File Number: 12 408 166
Region: NS

Licence No: 15617
Location: Yellowknife

Review of medical travel in Nunavut and the Northwest Territories

The goal of this multi-year project is to study medical travel in the Northwest Territories and Nunavut. The research team obtained information from the Government of the Northwest Territories about all medical travel in the NWT. This file, which had all personal information stripped out of it, has information about where people travelled, what they travelled for, how much the trip cost, as well as other information. The GNWT checked the file to make sure it had no confidential information in it before they provided it to the researchers. The researchers are currently fixing minor inconsistencies within the data, and are starting to use it to answer their research questions. Preliminary analysis of the data should begin in March or April 2016.

Young, Kue

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File Number: 12 408 166
Region: IN, GW, SA, DC, NS, SS

Licence No: 15657
Location: All NWT

Survey of primary care providers and managers in the NWT

The purpose of this project is to ask 'primary care providers' about their perspectives on the air ambulance system, how well they are supported in their work, and their overall thoughts on the health care system in the Northwest Territories. A 'primary care provider' is a doctor, nurse, or a nurse practitioner. For this project, the focus was on nurses who send patients out of the communities for treatment, and physicians who receive patients coming from the communities. The research team surveyed primary care providers throughout the Northwest Territories' eight health authorities between February 1 and March 31, 2015. The director of client services from each health authority distributed the survey to doctors and nurse practitioners working in their region. Participants were invited to do the survey online. Out of the 218 primary care providers who received an invitation to participate, 68 agreed to join in the survey. At least three people from each health authority participated in the survey. Overall, just under a third of doctors and nurses finished the survey. The information was summarized into a report, and the research team continues to spread the results to interested people and organizations.

Physical Sciences

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File Number: 12 404 882

Region: IN

Licence No: 15656

Location: Flights will be conducted with a range of 300km around Inuvik

Airborne observations in support of NETCARE

The goal of the project, NETCARE, is to understand how 'aerosols' affect climate change. 'Aerosols' are tiny particles, liquid or solid, suspended in the air. Examples are pollution, ice clouds, and many other things. In order to understand how aerosols affect climate change, the researchers needed to take some very specific measurements from a plane, measurements of airborne particles in different weather and over different types of sea ice. Climate change is a very complex process and researchers need very particular types of information to be able to understand it. The research team conducted a series of successful flights over the sea ice in the spring, which is the time when there is the greatest amount of aerosols in the air. They are currently studying the information they gained and refining their technique to get even better information next time.

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File Number: 12 404 846

Region: IN

Licence No: 15602

Location: Kuujjua River, Thomsen River

Assessing the impact of small, Canadian Arctic river flows to the freshwater budget of the Canadian Archipelago

The purpose of this project is to collect water samples from small rivers and estuaries throughout the Canadian Archipelago to determine whether or not their 'chemical signatures' differ from larger North American rivers (e.g., Mackenzie River). 'Chemical signature' refers to the exact composition of water – e.g. water with a specific amount of each of a few different chemicals dissolved into it. During the second year of this three-year program, the researchers revisited river sites initially sampled during the summer of 2014. These included the Coppermine, Ellice, Back, Hayes, Kuujua, Thomsen, Cunningham, and Kangiqtugaapik rivers. Two additional rivers were also sampled: the Karasok and Koogaaluk Rivers. In addition to this work, small, inflatable boats equipped with portable, outboard motors were used to collect water samples from the regions

extending both offshore and alongshore of the river mouths. Samples were collected from 26 different locations at eight different depths, from about one foot to about 50 feet (15 meters) below the surface. A small instrument known as a CTD was also lowered over the side of the boat and through the water column to measure changes in water temperature, salinity, and pressure (this gives us the depth). A total of 194 CTD profiles were collected across the seven sites visited during the field program.

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File Number: 12 404 815

Region: SA, DC

Licence No: 15589

Location: Fort Liard, Wrigley, Tungsten

Yukon-Northwest seismic network: characterizing earthquakes and earth structures

Seven new seismograph stations were installed in northwestern Canada in the summer of 2013 to record earthquakes occurring locally, nationally, and worldwide. Seismograph stations have a very sensitive machine, a seismograph, which measures earthquakes – even those which are very soft or very far away. The information collected is being used to produce maps of the Earth's deep interior and help the researchers understand where the fault lines are and how the earth is moving along them. These stations will remain in operation until at least the summer of 2018 or longer with community approval. At each station the seismometer is buried inside an hand-dug hole. Information collected is sent by satellite through a small station powered by the sun, a battery, or from an outlet. The station installation footprint is approximately 3 meters by 3 meters (10 by 10 feet). The researchers are finding that the boundary between the rock crust of the earth and the molten core is more variable than they had thought. They are learning more about how the mountains were made by the movement of the surface of the earth over many millions of years. The surface of the earth floats over the molten core, and this movement is what causes earthquakes. The researchers are developing a way to assess what areas are at risk of having earthquakes.

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File Number: 12 404 815

Region: IN

Licence No: 15697

Location: Bar Harbour E-76 (74.258, -123.901),
Muskox D-87 (73.602, -117.453), Victoria Island
(72.901, -115.973), Nelson Head (71.39, -122.959),
Uminmak H-07 (73.609, -123.011), Parker River
(73.529, -115.876)

Teleseismic investigations of the crust and mantle structure beneath Banks Island, NWT

The goal of this project is to understand what is deep, deep underground, under Banks Island. There are two theories – one is that Banks Island was made from long-ago volcanoes under the ocean. If this were true, there may be oil and gas deposits. The other theory is that Banks Island is a part of the Canadian Shield like all of mainland Nunavut and the eastern half of the NWT. If this were true, there may be diamond mine potential. To try and figure this out, the researchers used special and very-sensitive machines that record distant earthquakes. The sensors are buried, powered by solar power or a battery, and have a small transmission station. There are 5

stations currently recording: Sachs Harbour, Paulatuk, Nelson Head, Bar Harbour, and Johnson Point. More stations will be added in 2016. Earthquakes move through different types of ground in different ways, which will allow the researchers to have a more clear idea of what is to be found deep under Banks Island. The researchers will need several years of data and some time to analyze it, and will be ready to publish in 2017, when the stations will be taken down.

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File Number: 12 404 855

Region: IN

Licence No: 15609

Location: Trail Valley Creek, Havikpak Creek

Responses of trees and shrubs to climate warming at high latitudes

The goal of this multi-year project is to understand how shrubby areas and treed areas are changing both within the forested area near Inuvik (Havikpak Creek), and at a spot between Inuvik and Tuktoyaktuk called Trail Valley Creek. Trail Valley Creek is around the treeline and there have been more and more shrubs growing there than in the past. Alder shrubs are becoming more common on the tundra, and researchers do not know what effects the shrubs may have into the future. This project will help with predictions. The research team visited ten different locations and make careful observations and measurements of the alder shrubs, the soil, the permafrost, and nearby vegetation. They also took samples of the alder to see how healthy they were, to see how and why they are spreading so fast. They will return to these same locations year after year to monitor how things change. The research team also took cores from trees to check the tree rings. A tree grows a new ring every year, and the rings are much wider in recent decades, due to a rapidly warming climate. This is in contrast to forests in the south, where climate change is having negative effects on tree growth.

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File Number: 12 404 855

Region: NS

Licence No: 15610

Location: From Rae-Edzo to the end of the Ingram Trail

Ground ice - vegetation relationships in the North Slave region

The focus of the project is trying to predict where ground ice might be, by studying how ground ice might affect the permafrost, the soil, and plants above it. An improved understanding of how ground ice affects plants and how plants affects ground ice will help scientists understand permafrost. It is also important because developers need to understand the nature of the permafrost, and any ground ice below the development, to be built safely. The researchers took cores from the permafrost in 20 different locations, and carefully studied the forest, plants, and soil at the sites. They expanded the project midway to include some areas which had been burned in the 2014 forest fire season. This sampling will allow team to link how the forest is growing with ground ice content. The research team will process the field samples at Wilfred Laurier University. The team is looking at each layer of the permafrost in the cores, and doing chemical and other tests to map out the nature of the frozen soil and ice below the surface of the earth. The research

was presented at the Yellowknife Geoscience Forum in November 2015 and the annual ArcticNet meeting in Vancouver in December 2015.

Beddoe, Ryley

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File Number: 12 404 901

Region: GW, SA

Licence No: 15754

Location: The Loon River outlet (66°28'10.1778", -128°58' 30.6264") and along the Mackenzie River between (67°27'23.2992", -131°12'15.1806") and (67°27'23.2992", -130°51'58.9932")

Climate driven permafrost degradation and its impact on slope failures

The long-term goal of this multi-year project is to study thaw slumps and landslides. Thaw slumps occur when permafrost is exposed to the sun and melts, causing a slump, which exposes more permafrost to melt and slump. This year the researcher tested out an Unmanned Aerial Vehicle (UAV, sometimes called a drone) with an attached camera to see if it would work easily and effectively for investigating thaw slumps and landslides. They picked a 500 metre (1/3 mile) stretch of the Mackenzie River, at the Hare Indian River just north of Fort Good Hope. The UAV was flown 4 times at this location, taking photographs along the river. The photographs were added to a computer program and turned into a 3D model of the study area. The researchers will use the 3D model to map out existing land slides and study them further. The researcher hopes to use the UAV to take photographs and create 3D models of much larger areas in later years, to map out thaw slumps. They will also do fieldwork including monitoring ground temperatures and taking soil samples to study melting permafrost. The researcher will report on using the UAV to map out landslides and thaw slumps at a scientific conference.

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File Number: 12 404 891

Region: NS

Licence No: 15711

Location: Acasta River/Lake Region

Examining the Acasta Gneiss complex: a broader scope

No research was conducted under this licence in 2015.

Boguski, Rick

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File Number: 12 404 854

Region: SA

Licence No: 15635

Location: Mackenzie River

River ice study

The goal of this project was to use sonar to measure the ice thickness and river current of the Mackenzie River between January to July. Sonar is a way of navigating or measuring things in the water using sound waves. In January 2015, ATCO and the Sahtú Dene Council placed a

sonar device on the riverbed of the Mackenzie River, approximately 10 km upstream from Fort Good Hope. The sonar device measures ice thickness and river currents over the winter period and during the breakup of the ice cover in the spring. In July 2015, the research team tried to find the sonar device and bring it up from the riverbed, but they were not successful. The researchers used sonar to try and find the device, looking 20 km downstream from where it was originally placed, but they could not find it. Unfortunately, as a result of the failed recovery of the device, the research team got no information about ice thickness or river currents. The device was fully functional and orientated appropriately when it was first placed in the river.

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File Number: 12 404 885

Region: DC, NS, SS

Licence No: 15684

Location: Peatland areas surrounding Great Slave Lake

Planning and collection of data on boreal wildfire effects: studies of broad-scale 2014 wildfires in NWT, Canada

The goal of this project is to collect information about the effects of the 2014 wildfires in the NWT, through both fieldwork and by satellite photos and airphotos. The research team wants to learn how likely it is that the peatlands around Great Slave Lake will catch fire. In summer 2015, the project team visited five fires and visited over 175 locations, both peatland and upland, to collect information. They made maps showing which areas were upland compared to peatland from satellite images, radar and air photos. At the burned sites, the researchers collected information about how hot the forest fire was and how long it burned, post-fire moss condition, condition of the natural material that usually covers the ground, shrub condition and how much of the tree's branches and needles/leaves were burnt. They also noted how well the plants and trees had grown back after the fire, soil moisture, soil temperature, depth to frozen ground, depth of peat, tree heights, and other information. They will use these measurements to create burn severity maps. In future years, the research team hopes to study how earlier springs, longer summers and changes in water are affecting wildfires in this region.

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File Number: 12 404 707

Region: IN

Licence No: 15621

Location: The Melville South Ice Cap

Glacier mass balance of the Melville South Ice Cap

The purpose of this ongoing project is to measure how much the Melville South Ice Cap is melting, and to help predict future sea level rise from melting glaciers. Every year in the winter, there is new snowfall on the ice cap. In the summer, in recent years, all this snow has melted off, and then some ice underneath the snow also melts – the glacier is getting thinner and smaller. The research team took measurements of snow accumulation and ice melt at 24 locations on the ice cap in May, 2015. These measurements show that the ice cap did indeed get thinner in 2013 to 2014. The glacier has been thinning most years between 1960 and 2014, and the amount of thinning in 2014 was about the same as the average over the last fifty years. The last ten years have had a much greater loss of ice on average. The researchers downloaded temperature data from the

automatic weather station, and found that the summer melt season of 2014 (June 5 to September 3), had an average daily temperature of +0.3 °C and a high of +9.22 °C. Due to the warm summer, the ice cap surface lowered steadily throughout the summer by a total of about 80 cm (about 2.5 feet) – 2/3 was the previous winter snowpack and 1/3 was due to melting of the 'old' ice surface.

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File Number: 12 404 325

Region: IN

Licence No: 15678

Location: Garry Island, Illisarvik, Inuvik, Paulatuk, Red Lake, Bar C, Seal Lake, Dennis Lagoon

Permafrost and climate change, western Arctic Canada

The objective of this ongoing long-term project is to understand how climate change is affecting permafrost in the western Arctic. Permafrost temperature cables (which measure the temperature of the permafrost) were installed in Ivvavik National Park, near Margaret Lake and near Stokes Point. At Garry Island, the research team took samples from the uppermost 3 m (about 10 feet) of the ground at a series of sites down a hill slope. The samples show that there is a greater carbon content at the bottom of the hill than on the upper slopes because of soil movement down slope over thousands of years, carrying materials down hill. At Illisarvik, continued work shows that ice wedges under hills are melting, the water running down the hills, and the ground above is sinking. The active layer, which melts every summer, grew thick enough to reach the ice wedge and start it melting only in 2010. The research team also continues to monitor of ground temperatures at two locations. The Dempster Highway site, near the airport, has very warm permafrost, only slightly below freezing. This is due to the deep snow cover that accumulates there. Most other locations along the Dempster Highway have much colder permafrost.

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File Number: 12 404 859

Region: NS

Licence No: 15575

Location: 10km North of the City of Yellowknife

City of Yellowknife gold project

The goal of this project is to find out how metals like arsenic and lead might get into lake water. Multiple teams worked on Daigle and Milner lakes near Yellowknife to study the natural and man-made ways that metals spread into the environment. The program included mapping the lake floor and taking samples from the lake bottom, peat and soil. All samples collected will be analyzed for arsenic and many other elements to see how arsenic levels are different based on changing conditions in lakes. The research team also tested water quality and measured lake depth, water temperature, and dissolved oxygen before, during and after the winter drilling season. Dissolved oxygen is needed by fish to stay alive in lakes. Water quality exceeded guidelines for arsenic and total ammonia. The arsenic in these lakes comes from naturally occurring arsenic in the bedrock. The ammonia in the lakes is also natural. Water samples did not contain any fuel or oils from drilling. After drilling, fish were placed in the drilling waste water to see if it was toxic to them. One hundred percent of the fish survived in Milner Lake and 90% in Daigle Lake, likely due to higher iron content.

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File Number: 12 404 897**Region:** DC**Licence No:** 15731**Location:** Cantung Mine site**NATCL - Cantung Mine 2015 environmental effects monitoring**

As an operating metal mine in Canada, the Cantung Mine requires an aquatic monitoring program to assess the effects of metal mining effluent on fish, fisheries resources (food), and fish habitat. Effluent is liquid waste water from the mine. The monitoring program field studies and summary report is completed every 3 years. The study area includes a portion of the headwaters of the Flat River, located approximately 110 km upstream of the Nahanni National Park. The same study sites that were examined in 2006, 2009, and 2012, were again studied in 2015. The researchers compare results between areas downstream of the Flat River to areas upstream to help determine if and how the mine is affecting the aquatic environment. The research team measures things like fish population numbers, fish size, fish health, fish food, water quality, and sediment quality. A summary report of the study was completed in March 2016. Consistent with the conclusions of the previous studies at this site, current mine effluent discharge does not appear to be negatively affecting fish, fisheries resources (food), or fish habitat in the Flat River.

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File Number: 12 404 888**Region:** SS**Licence No:** 15696**Location:** Near Fort Resolution and Fort Smith**Water ecosystem monitoring using Earth observations**

The goal of this project is to figure out how best to use satellite photos to identify lake qualities, such as water temperature. To do this, the researchers need to understand the qualities of a lake on the ground and compare it to what colour the lake appears to be in the satellite images. The colour a lake is relates to how much 'suspended sediment' there is in the lake. Suspended sediments are the small particles like silt that stay suspended in water, and do not settle to the bottom, unless the water conditions change. The research team wants to be able to tell both the water temperature and the amount of suspended sediment in lakes from satellite photos. The research team took water samples from six separate sites around Fort Smith and Fort Resolution. They took water samples and measured water temperature. After some training from Department of Environment and Natural Resources staff, community members carried out the sampling. The water samples were then sent to Taiga Labs in Yellowknife for analysis. The samples were used to double check the researchers' previous understanding of how lakes with a certain water temperature appear on satellite images. They are also working to develop a way to measure suspended sediment model from the same satellite images. More data is required, especially for the suspended sediment model.

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File Number: 12 404 631
Region: NS

Licence No: 15750
Location: Bathurst caribou habitat

Satellite monitoring for assessing resource development's impact on Bathurst Caribou (SMART)

The goal of this 3-year project is to see how far disturbances coming from mining activities can reach inside the Bathurst caribou habitat. The disturbances may include the change from vegetated areas to roads, buildings, pits, and so on, the view of mining activities even from far away, the noise, air pollutions, and changes in the availability and quality of the caribou's food. The researchers measured the disturbances through field surveys and using satellite images. Field surveys were conducted at more than 100 sites near the Etaki Diamond Mine, collecting various types of measurements. For example, the researchers wanted to know how far away an animal could, for example, see a vehicle on a mining road, or see the mining camp buildings and waste piles. They found an animal could likely see a vehicle on a mining road around 1200 m (3/4 of a mile) away. The camp buildings and waste piles are much more visible to animals and can be seen from five times further away. Air pollution seems to be travelling between 1100-1800 m (3/4 of a mile to 1 mile) from various roads before settling to ground and changing the nature of the soil. Further analysis and field work are planned.

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 Cumulative Impacts Monitoring Program
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File Number: 12 404 827
Region: SA

Licence No: 15695
Location: 100km radius of Norman Wells (65
 16.86N; 126 49.88W)

Establishing a watershed framework for assessing cumulative impacts of development

The goal of this project is to study cumulative impacts on a watershed level in the Sahtú region. Cumulative impacts refer to all the changes from development, climate change, and human use in an area, when taken together. The team selected important watersheds to study, watersheds that are of interest to developers and also to the communities. They conducted fieldwork to map out water quality and assess the health of stream ecosystems. The health of stream ecosystems was measured by studying the insects that live in streams, although the research team are also taking many other measurements for use in later mapping, and testing for pollution from oil and gas developments nearby. The project team is working with the communities to make sure that the maps they are providing are useful – these maps include, for example, springs, human use of the area, groundwater information, and others. The project is also helping university students become better northern researchers. For example, the research team participated in the Sahtú Cross Cultural Research Camp, an on-the-land program in which researchers and community members get together to exchange knowledge about the land and how land is monitored, scientifically and traditionally.

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File Number: 12 404 852

Licence No: 15582

Region: NS**Location:** Kirk Lake watershed, Kennady Lake watershed**De Beers - Gahcho Kué 2014 environmental monitoring program**

The purpose of this project is to check on the environment around the Gahcho Kué mine to make sure the mine is following all guidelines and meeting targets. The researchers checked the snow levels, mapped out the lakebed for two lakes, and measured water flow and water levels at 13 locations. This is to make sure the mine isn't changing the way rivers are flowing into lakes and depositing sediments. They also checked water quality from 8 lakes and 2 streams, and collected lakebed sediment from 5 lakes to check for pollution. Tiny plants and insects that live in the water were also sampled from 5 lakes. Small insects that live in the mud close to shore were also collected from lakes and streams as well. These insects and plants show how healthy the water is for other life. The research team conducted a few different studies on fish including checking how healthy small fishes are in 5 lakes, studying fish spawning, fish movement, and tagging some fish as well. They also continued to "fish out" Kennady Lake. Fish were removed from the lake using a variety of fishing methods. They also measured dust and metal pollution, checked the plants and soils, measured air temperature, wind speed and wind direction.

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File Number: 12 404 898**Region:** SA**Licence No:** 15737

Location: Site locations include: 64°55'26.136"N 126°12'56.113"W (49.18 km from Norman Wells) 64°58'26.363"N 126°31'43.301"W (37.13 km from Norman Wells) 65°14'15.619"N 127°11'52.374"W (17.86 km from Norman Wells)

Developing remote sensing tools for mapping linear disturbances in the Sahtú region of the Northwest Territories

The goal of this research was to develop a way to carefully map out 'linear disturbances' in northern boreal forests using airphotos. Linear disturbance refers to seismic lines, roads, and other types of development that follow a line through the landscape. The research team wanted a way to map out the precise location and exact width of these disturbances without expensive field work. To achieve this, they used airphotos taken from airplanes flown over the site. They then used computerized mapping programs to automatically identify seismic lines from two things: the way the tree canopy looks, and the topography such as hills, banks, and flat areas. The next step was to collect even more detailed airphotos. Unmanned aerial vehicles (also known as drones) were flown along seismic lines in sample study sites west of Norman Wells across the Mackenzie River. The drones had cameras, which took overlapping photos of the seismic lines. The method used to detect and map the seismic lines in the imagery were compared to on-the-ground measurements to make sure that the photos represented what is actually occurring on the land. The tools developed by this project will be useful to better understand linear disturbances in the Sahtú region of Canada's Northwest Territories, and support ongoing efforts to understand the environmental effects of development in Canada's North.

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File Number: 12 404 860
Region: NS

Licence No: 15611
Location: Prince of Whales Northern Heritage Center

Investigation of ancient arctic metallurgy

In 2015, the Investigation of Ancient Arctic Metallurgy project mapped out how much time people would need to travel across the land to get copper from natural copper sources. They did this by mapping out archaeological site locations and natural copper sources, and used a computer mapping program to calculate distances. They found that the closer a site was to a source of copper, the more copper artifacts were found in the site by archaeologists. Copper artifacts at the Canadian Museum of History were also examined using X-Ray Fluorescence (which measures chemical composition without hurting the artifact) to find out which ones were European trade objects and which were Indigenous objects. Since the chemical make-up of copper varies slightly between regions in the north, archaeologists are always keen to get more information about the “chemical fingerprint” of copper artifacts from different sites. These objects were also photographed, weighed, and measured, and have been added to an interactive online map of copper objects that will become available to the public in the near future. The research team are also studying what types of copper objects people made and used long ago, from across the NWT, Nunavut, Yukon, and Alaska. They want to understand how copper, and the knowledge of how to make tools from it, spread around the north.

Dallimore, Scott
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File Number: 12 404 359
Region: IN

Licence No: 15721
Location: Mackenzie Delta, Richards Island, Tuktoyaktuk Peninsula

Terrestrial geoscience studies of earthquake (seismic) hazard in the Mackenzie-Beaufort area

The goal of this project is to study how much of a risk an earthquake would be in the Beaufort Delta area. Unfortunately, the weather conditions during the 10 day field program on northern Richards Island were very challenging. Cold temperatures, rain and high winds prevented the small boat with various marine survey instruments from getting to the camp site. Therefore, some research tasks were not accomplished. However, the research team were able to take two shallow sediment cores from a drained lake basin. Sediment cores preserve the layers in a lakebed deposit to show conditions far into the past – each layer is from a different year. These two sediment cores will be examined in the lab to see if there were tsunamis in the past. The research team were also able to fly an unmanned aerial vehicle (UAV, commonly known as a drone) with a camera and precise GPS unit along the coast. The drone took pictures and coordinates as it flew. Using this information, the researchers are able to map out permafrost and coastal features using a computerised mapping program, and produce a 3-dimensional image of the study area.

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File Number: 12 404 889

Licence No: 15700

Region: NS

Location: Gordon Lake, Camlaren Mine (62 59'05"N, 113 12'15"W), Burnt Island (63 03'52"N, 113 09'46"W), West Bay Mine (62 55'01"N, 113 13'57"W), Goodrock Mine (63 01'53"N, 113 08'06"W), Kidney Pond (62 57'26"N, 113 20'22"W)

Gordon Lake assessment project

The purpose of this project is to clean up nine mine and advanced exploration sites: Burnt Island, Camlaren, Goodrock, Kidney Pond, Murray Lake, Storm Property, Treacy, Try Me and West Bay. These sites are located 110 km northeast of Yellowknife in the Gordon Lake area. Two federal government agencies that work with contaminated sites are working together to completely 'remediate' these sites. Remediation refers to cleaning up a contaminated or damaged area and returning it to its natural state. The project team worked together carefully to plan out how to remediate each site. They conducted field work to gather information about the soil, lakebed sediment, surface and drinking water, insects living in the water, rock, and any hazardous material. They recorded information about any buildings or roads, pits excavated, and finally surveyed to see if any excavations had been previously filled in. They worked with the assistance of the Yellowknives Dene First Nation. The researchers took all this information and used it to make a draft remediation plan. A workshop with the Yellowknives Dene First Nation was held to finalize the remediation plan.

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File Number: 12 404 881

Region: NS, SS

Licence No: 15650

Location: Lac de Gras

Slave province surficial materials and permafrost study

The goal of this research program was to learn more about glacial sediment (in other words, the materials the glaciers left behind when they retreated), rocks, and permafrost. The research team took more than a thousand samples of glacial sediment, including sands and gravels, and almost two hundred rock samples from about 250 different sites. They will analyze these samples in the lab. In addition, the researchers surveyed 41 sites and installed temperature sensing equipment. This equipment will monitor the effects of climate change on frozen ground. The preliminary results were presented at the Yellowknife Geoscience Forum, and the research team expects to publish more reports through the Northwest Territories Geological Survey.

English, Michael C.

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File Number: 12 404 555

Region: NS

Licence No: 15761

Location: Yellowknife Airport site (62.456070°N, 114.531089°W), Pontoon Lake (62.553376°N, 114.017650°W), and the Wekweètì area

DOC in surface waters in the NWT: implications of a changing climate

Dissolved organic carbon (DOC) can be found in lakes, ponds, creeks, and ground water throughout the Northwest Territories. DOC plays a number of important roles within the water,

from absorbing harmful sunlight and acting as an important energy source for bacteria and other tiny lifeforms living in the water known as microbes, to influencing drinking water quality. In areas of melting permafrost, there is the possibility for large amounts of previously-frozen carbon to be released as DOC into surrounding waters. This research looks at how water quality may be influenced by a warming climate, with specific attention to DOC. To measure the range in quality and concentration of DOC, samples were collected from a number of both surface and ground water sites near thawing permafrost around Yellowknife and near continuous permafrost in Wekweètì. Experiments were also done to look at the effect of sunlight and microbes on DOC concentrations and quality. So far, the results suggest large amounts of DOC are found in the ground water, and when compared to creeks or lakes, ground water DOC is easily changed by sunlight or microbes. These results will help scientists understand DOC in the NWT, and how DOC from thawing permafrost may change water quality for humans and the ecosystem.

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File Number: 12 404 335

Region: DC

Licence No: 15748

Location: Along the Flat River Valley from Flat Lakes to the Cantung Mine

Geological mapping of the March Fault

The Selwyn Mountains in western Northwest Territories and Yukon formed around 145 million years ago, when what is now Alaska and central Yukon collided with western North America, as both tectonic plates were moving ever so slowly towards each other. The details of how the mountains grew – the different episodes of one tectonic plate being pushed up over the other, or folding onto itself, are poorly understood. The main objectives of this study are to look at rocks themselves, and the fractures in the rocks, to chart out carefully how the mountains grew. The study is focused along a regional fault line known as the March fault. A fault line is like a large crack between two areas moving in different directions. This fault has been active from long, long before the mountains were even building. The research team were able to find three different episodes of intense, mountain-building pressure in single outcrop of rocks in the Nahanni region. The middle episode is the clearest and seems to be from the time of peak mountain-building activity. It appears from looking at the microscopic make-up of the rocks that the mountains were created differently on each side of the fault.

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File Number: 12 404 880

Region: SA

Licence No: 15642

Location: Colville Hills area

Colville Hills bedrock mapping and stratigraphic studies

A team of seven scientists – five from the Geological Survey of Canada, and two from Laurentian University – did geological field work based out of Colville Lake and Norman Wells for four weeks in July and August 2015. Working with them were two Wildlife Monitors from Colville Lake, a Geology Assistant from Colville Lake, and a Wildlife Monitor from Norman Wells. Helicopter, accommodation, and food services were provided by local businesses in Colville Lake and Norman Wells. Field work involved helicopter visits or overland hiking to 150 rock outcrops on

ridges, streams, and lakeshores in the Colville Hills and Franklin Mountains. Locations and rock descriptions were recorded, photographs taken, and rock thicknesses and orientations were measured. Approximately 90 rock samples were collected, varying from fist size to slightly larger than a loaf of bread. Samples were shipped to labs at the Geological Survey of Canada in Calgary. Here, the research team will check the rocks for the remains of long-dead insects and plants, and assess the chemical composition of the rocks. This information will be used to produce new geological reports and maps of bedrock geology for the Colville Hills region (National Topographic System map areas 96K, 96L, 96M, and 96N).

Froese, Duane G.

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File Number: 12 404 744

Region: DC

Licence No: 15717

Location: 1) Cap Mountain (63.4N 123.2W), Franklin Mountains, and the ridge of the Franklin Mountains south of Cap Mountain. 2) Ridge of the Camsell Range west of Camsell Bend of the Mackenzie River (62.3N, 123.5W) 3) Nahanni Mountain (62.1N, 123.3W)

Timing of deglaciation of the Mackenzie River valley 60-67 dg N

The objective of this project was to collect samples from 'glacial erratic' boulders in the Dehcho region. Glacial erratics are rocks that were carried on top of glaciers for hundreds or thousands of kilometers, and then left behind when the glaciers melted. The samples of the boulders will be tested for when they were dropped to the ground by the glacier, in order to chart out when the glaciers melted away in the region. The method used to establish the date is known as "cosmogenic exposure dating", and measures how long the outside surface of the boulder has been exposed to cosmic rays from outer space. The field sites accessed were all located at the ridge-tops of the Franklin Mountains east of Wrigley. The field sites were accessed by helicopter from Fort Simpson. In total, the research team collected 14 samples for cosmogenic exposure dating. The samples are currently being analyzed at the Terrestrial Cosmogenic Nuclide Exposure Facility at Dalhousie University in Halifax, Nova Scotia. The results are expected in late June 2016.

Gingras, Murray K.

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File Number: 12 404 864

Region: SA

Licence No: 15601

Location: Eastern Mackenzie Mountains, Central Mackenzie Valley, Directly West of Norman Wells

Sedimentology and ichnology of the Cambrian Mount Clark and Mount Cap formations, Northwest Territories

The goal of this project is to study the behaviour of very early animals that lived around 500 million years ago, during what is known as the "Cambrian explosion." The explosion in question was the rapid evolution of different kinds of animals. In fact, most groups of animals alive today can trace their ancestry to this time. During a three-week field season, the research team visited five rock outcrops from two rock formations: the Cambrian Mount Clark Formation, and the Mount Cap

Formation. They collected rocks from these locations and later, took special photographs that show evidence of how the fossil animals were acting. For example, the researchers could see ancient footprints from shallow marine beaches, which then hardened into sandstone. The researchers are now charting out how the different ways of making a living in the world we see today, arose during the Cambrian explosion. The research team also visited a nearby, related area within the Dodo Canyon. During the Cambrian explosion, this was a tidal area close to an ancient sea. This area is not well known, geologically, but is a very thick deposit that was created by sediments eroding in from possibly many directions. The researchers took samples to try to figure out the nature of this deposit and how it developed.

Gordon, Andrew B.T.

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File Number: 12 404 877

Licence No: 15583

Region: IN

Location: Aklavik, Pump Lake, Tower Lake

Water quality assesment of Pump Lake and chain lakes in Aklavik

The goal of this project is to make sure that the chain lake system downstream of the Aklavik sewage lagoon is filtering the coliform bacteria out of the water. Coliform bacteria should be mostly gone from sewage water before it goes back into the environment. The researcher took samples from a few of the lakes in the chain, as well as from the sewage lagoon itself. The water treatment system seemed to be working as the upstream lake had little to no coliform present and as the water makes its way downstream the coliform numbers decrease with distance from the lagoon. However, the lagoon had a large amount of coliform present, due to daily sewage dumping. The researcher also tested other aspects of water quality, including alkalinity, acidity, carbon dioxide, dissolved oxygen, hardness, nitrate, and salinity. To get the samples, the researcher took a snowmobile to the lakes, then chiselled a hole in the ice. Once the hole was made it was left to settle before taking a sample. Before the sample was taken the containers were rinsed with the water from the hole to get any contaminants out of the container if there was any. Once the sample was taken they were frozen until the samples reached Inuvik, where they were analyzed.

Grogan, Paul

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File Number: 12 404 687

Licence No: 15613

Region: NS

Location: Daring Lake

Biogeochemical controls on the structure and functioning of low arctic ecosystems

The goal of this long-term project is to understand what the effect will be of increases in snowfall on the tundra. An increase in snowfall is predicted to happen due to climate change. The research team previously installed snow fences near Daring Lake, NWT, in the Barrenlands tundra. The snowfence caused much deeper snow to accumulate, allowing the researchers a peak into the future if increases in snowfall start to happen naturally. They found that evergreen shrubs grew much more quickly, and due to this growth, there was a large depletion of the carbon from the soil. They found that after about a decade of deep snow, the average cold season soil temperatures were substantially warmer, by between 1-4°C. In addition, about half the carbon normally stored in the soil and plants was released to the atmosphere, and carbon was released much more rapidly from the plants growing on the site than before. This research indicate that

there will be a snowball effect from increased snowfall. Increases in carbon in the atmosphere will cause a greater snow depth, and the greater snow depth allows the soil to warm and vegetation to grow rapidly, releasing more carbon. That is, winter climate change is likely to cause a globally significant release of carbon from tundra soils into to the atmosphere.

Gruber, Stephan

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File Number: 12 404 878

Region: NS

Licence No: 15608

Location: Yellowknife, Lac de Gras, Ingraham Trail, and the Tibbitt to Contwoyto Winter Road

Quantifying permafrost thaw

The goal of this study is to measure and understand how permafrost is thawing. In this first year, team members (including four students) have worked in and around Yellowknife and in the Lac de Gras area between July and September. Working in collaboration with the Northwest Territories Geological Survey and Sub-Arctic Surveys Ltd. in Yellowknife, the research team selected 43 sites for permafrost investigations. There, small instruments to measure ground temperatures were placed in the soil. The instruments keep track of the temperatures and the information can be read in future years without disturbing the soil. Each site has been measured and described: What type of soil is there? What type of vegetation? Is it wet or dry? This helps to understand how permafrost in differing places behaves differently. The researchers also recorded the elevation of the land surface, so in future years they can check if the land is sinking due to melting ground ice. Samples of permafrost soil have been taken and are analysed in the Taiga laboratory, Yellowknife. This helps to understand how water quality can change when permafrost thaws. In and around Yellowknife, team members measured the elevation of roads and other surfaces. By measuring again later, they can find out where permafrost is thawing fast and infrastructure may need repair.

Hansen, Ken

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File Number: 12 404 797

Region: SA

Licence No: 15736

Location: Bounded by: 65.3N, -126.9 W (NW Corner), 64.6 N, -125.6W (SE Corner)

Fish inventory study in EL494

When a development is planned, the developer is usually required to gather information about the environment before they start to build. This is because once the development starts, the developers and regulators need to know what conditions were like before (called the 'baseline') in order to see if things have changed. Therefore, the goal of this project was to continue to study and catalogue the fish in the lakes, rivers, and streams around Husky's exploration activity within the exploration block EL494. The research team focused on the lakes and rivers that might be used in the development, although very high water made sampling too dangerous in some of the selected locations. They used a backpack electrofishing unit to catch fish in the rivers and streams, and nets, minnow traps and beach seines in the lakes and ponds. Every fish was identified and some measurements were taken, for example length and weight. At locations where a large number of fish were caught, a representative sample was weighed. However in these

instances, all fish of cultural and economic importance were weighed. Fish were released back into the general area where they were captured. A total of 174 fish were captured. Finescale dace were the most common, at 83% of the total catch. The researchers also caught Lake chub, Arctic grayling, and some northern pike.

Hansen, Ken

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File Number: 12 404 797

Region: SA

Licence No: 15752

Location: The area of study is bounded by: 65.3 N, -126.9 W (NW Corner) 64.6 N, -125.6 W (SE Corner)

EL462 & EL463 2013-2015 surface and groundwater monitoring program

The objective of this study was to collect surface water samples from a number of sampling locations near exploration activities. The samples will be used to evaluate the quality of water both flowing onto and off of the various developments. The research team took water quality samples from 27 locations including 16 rivers, streams, or creeks, and 11 lakes, ponds, or sloughs. They also collected data from 8 thermistor locations. Thermistors are special instruments that monitor and record the temperature of the permafrost. The research team was unable to sample groundwater wells due to frozen well bores. Finally, the researchers used information from machines which record water flow changes ('hydrometric stations') and information they collected about how much water is flowing through the streams, to calculate seasonal changes of water flow during the open water season and to estimate water discharge rates. Results of the program have been submitted to the Sahtú Land and Water Board and are available on the registry.

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File Number: 12 404 883

Region: IN

Licence No: 15669

Location: South-west of Tuktoyaktuk, Bounded by:
 NW-Corner: 133°50'0"W 69°30'0"N, NE-Corner:
 132°40'0"W 69°30'0"N, SW-Corner: 134°10'0"W
 68°25'0"N, SE-Corner: 133°0'0"W 68°25'0"N

PermaSAR: development of a method to detect subsidence by means of D-InSAR in permafrost regions

The aim of this ongoing project is to develop a new method to measure the ground surface moving up and down (known as subsidence) when the permafrost below it freezes or thaws. The method uses radar, a technology that uses radio waves to measure the distance between objects. As the thawing and freezing of permafrost is responsible for problems, such as streets breaking apart and buildings getting cracks and even collapsing, it is essential to understand how this works and to share the information widely. Scientists, economists, community planners and politicians need to be able to identify areas where there is the potential for subsidence, to avoid severe damage. The research team went to Trail Valley Creek twice – once in June and again in August 2015. They measured the height of the ground each time using a radar. To double check that the radar was correct, they also measured the subsidence using a measuring stick. Between early June

and late August the ground subsided around 2-3 cm (that is, dropped about one inch) on average. The project has shown that the ground surface does change seasonally, and that radar can indeed be used to measure it. In future years, the research team will make use of this radar technology to find areas where the ground is moving.

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File Number: 12 404 713
Region: IN, GW

Licence No: 15571
Location: Mackenzie River near Tsiigehtchic at:
67°27'21"N, 133°45'11"W

The arctic great rivers observatory

This project studies the six largest rivers that flow into the Arctic Ocean: in North America the Mackenzie and Yukon, and in Russia the Ob', Yenisey, Lena, and Kolyma. The concentration of naturally occurring chemicals, such as carbon, nitrogen, and phosphorus, in these rivers were measured. The aim is to obtain current information about the flow of these chemicals to the ocean, to help understand how climate change is impacting Arctic rivers. This is a 5 year project, mid-way through the fourth year of sampling, which began in May of 2014. The research team collects samples every second month. Laboratory analyses are underway, and results are being posted on a public website (<http://arcticgreatrivers.org>) so the public has free access to the information. During the summer, samples are collected using a motor boat, just upstream of the Tsiigehtchic ferry crossing. During the winter, samples are collected at the same location, using an ice auger to obtain a water sample from the mid-point of the river. For each sampling trip, 8 litres (about two gallons) of water are taken, which is transported back to Inuvik for further processing in the lab. A hand-held water meter is used to measure water temperature, pH, conductivity, and dissolved oxygen concentration.

Hood, Alexandra E.

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File Number: 12 404 808
Region: NS

Licence No: 15579
Location: Snap Lake Mine

De Beers Canada Snap Lake Mine environmental monitoring

The goal of this ongoing project is to monitor the environmental effects of the Snap Lake Mine. DeBeers have been collecting wildlife data for the Snap Lake area since 1999. The wildlife effects monitoring program is a requirement of the Mine's Environmental Agreement and Land Use Permit. A wildlife effects monitoring plan was prepared for the Mine in 2004. The program is designed to detect, monitor, and measure environmental effects that may impact wildlife habitat, changes to wildlife behaviour and distribution, and wildlife deaths associated with the mine activities. The annual monitoring program is intended to provide information for the mine's environmental management system so the mine can change their plans as needed to protect wildlife and wildlife habitat. The program also contributes to regional monitoring information that may then be used to assess cumulative effects of mining on wildlife. Cumulative effects refers to effects from all the changes to the environment, such as roads, mines, and climate change.

Hulse, Peter

CASP

Cambridge, Cambridgeshire
clive@polarsphere.co.uk**File Number:** 12 404 884**Region:** IN**Licence No:** 15681**Location:** Banks island (73 14'11.20"N, 129 39'04.49"W) Smoking Hills (69 48'49.42"N, 126 48'10.72"W)**Canadian arctic islands project**

CASP (formerly known as Cambridge Arctic Shelf Programme) has a longstanding research interest in the geological evolution of the Canadian Arctic Islands. For the past seven years the research team has conducted research on Axel Heiberg and Ellesmere islands in Nunavut. Some of the goals of this study is to pursue our research further and to better link the palaeo-environmental evolution of Nunavut with the one of the Northwest Territories.

Kelly, ErinDepartment of Environment and Natural Resources, Water Resources Division
Yellowknife, NT
erin_kelly@gov.nt.ca**File Number:** 12 404 838**Region:** IN, GW, SA, DC, NS, SS**Licence No:** 15598**Location:** Aklavik, Inuvik, Fort McPherson, Tsiigehtchic, Fort Good Hope, Norman Wells, Tulit'a, Fort Providence, Fort Simpson, Trout Lake, Behchokò, Yellowknife, Fort Resolution, Fort Smith, Lutsel K'e, Hay River, Kakisa**Community-based water quality monitoring in the Northwest Territories**

The Department of Environment and Natural Resources worked with 22 northern communities and other partners on a large-scale program to monitor water quality. This program hopes to answer questions from the communities about water quality and the water system, and build community capacity. Monitoring equipment was set up at over 40 sites across the NWT. Community members were trained to use a series of equipment. They were trained to place water quality loggers, which sit in the water and automatically take measurements every 2 hours. They were trained how to take water samples by hand for later analysis, such as chemical composition and nutrients. Community members also used two special measuring devices. The first is a 'Polyethylene Membrane Device' which measures oil and gas chemicals. These sit in the water for up to 30 days. The second is a 'Diffusion Gradient in Thin film'. These also sit in the water, but only for 2-5 days. They measure dissolved toxic metals. The information collected from all these sampling techniques will be analyzed in labs from Yellowknife to Trent University in Ontario. When the analysis is complete, the research team will map it out to see if there are important changes across time and space, to see how healthy the Mackenzie River Basin is, and to see if any water quality guidelines are not being met.

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Region: NS**Location:** Acasta River (65°10'2.44"N,
115°33'45.56"W)**Geology of the Acasta Gneiss Complex: decoding of early earth evolution**

The Acasta Gneiss Complex is a geological formation along the Acasta River in NWT. Underneath it lay the oldest rocks on the surface of the earth. The rocks are a variety of different colours from light to dark and are made of different chemicals. The lighter types of this rock are relatively well studied. These date as far back as around 4.03 billion years ago, namely the oldest rock in the world. On the other hand, the darker version of the rock is still poorly understood in all respects. The purpose of this summer project was to study the geology of the lesser-known darker rock. Previous works showed that the darker rocks occur in distinct areas surrounded by the lighter rock or have the lighter rock intruding or cutting into it. This suggests that the darker rocks are even older than the lighter rocks. This idea is still under debate and needs more research. The dark coloured rocks are distributed over the Acasta Gneiss Complex area, and are more common than previously thought. The research team will continue to study these rocks, including the chemical make-up of the rocks. This research will also help to clarify some questions about the very early years of the earth.

Krizan, Julia

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File Number: 12 404 803**Region:** IN**Licence No:** 15701

Location: Panarctic Satellite F-68 well site at
Satellite Bay, Prince Patrick Island, NWT
(77°17'27"N, 116°55'10"W)

Remediation of the abandoned panarctic satellite F-68 wellsite at Satellite Bay, Prince Patrick Island, Northwest Territories

Panarctic Satellite F-68 is an abandoned wellsite located near Satellite Bay at the northern end of Prince Patrick Island, NWT. The well was drilled in 1971 by BP Exploration Canada Limited and abandoned shortly afterwards without much clean-up. There are a variety of contaminated materials across the site, including soil polluted by fuel and metals and solid wastes, including used drums, scrap metal and other debris. Talisman Energy Inc. plans to remediate, or clean up, the site. They will keep most of the contaminated materials on the site, but will remove some for disposal elsewhere. The work started in 2008 and continued during the summer of 2015. The research team included wildlife monitors and field assistants from Ulukhaktok, Aklavik, Inuvik and Tuktoyaktuk, NWT. Camp providers and an Inuvialuit aviation company were also contracted. The research team completed a series of studies to help guide the remediation. This includes studies of the soil to find contamination, the waste to determine how much there is, the drums to see what is in them, the waste water to see how much is polluted, and the water supply to find safe drinking water. They found and filled in 'seismic shotholes', which are holes in the ground from early oil and gas exorption. Finally, they made a map of the area and took airphotos using a drone.

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File Number: 12 404 897**Region:** SS**Licence No:** 15605**Location:** Hanging Ice Lake

A comparative analysis of *Acorus Americanus* and *Acorus Calamus* and their application in traditional aboriginal medicine

No research was conducted under this licence in 2015.

Lacelle, Denis

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File Number: 12 404 782

Region: IN

Licence No: 15680

Location: Banks Island

Effects of permafrost disturbances on terrestrial and aquatic ecosystems, Banks Island, NWT, Canada

The goal of this project was to study the effect that thawing and disturbed permafrost might have on lakes and streams, and the animals and plants that live in and near the water. The researchers conducted fieldwork near Sachs Harbour to study 'thermokarst' – which is the way that permafrost can melt unevenly to produce water-filled hollows across the landscape. They wanted to see how thermokarst might impact – now and into the future – the whole water system, including water flow, sediment in water, the chemical make-up of the water in nearby lakes and streams, and the living insects and plants in the lakes and streams. In order to study these topics, the researchers took samples and cores from slumping areas, to see how much ground ice was present. They collected water samples from various streams, rivers, and lakes in southern Banks Island that were close to slumps or other disturbances. Water samples will be analyzed in a lab for water quality, presence of sediment and to see what kind of small animals and plants are present. The research team will also check the lake bottom cores to learn more about climate change in the last 2,000 years.

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File Number: 12 404 621

Region: NS

Licence No: 15584

Location: Daring Lake Tundra Ecological Research Station

Toward predicting future tundra carbon balance

In 2015 the research team enjoyed another busy and successful field season of studies on the carbon balance of arctic tundra sites near Daring Lake, NWT. Carbon balance refers to how carbon, an important greenhouse gas, is stored in the soil, the water, the air, and all living things. The goal of this ongoing project is to increase the understanding of how carbon gas moves between the soil, water, air and living things in tundra environments. Previously, the research team installed instrument towers and research 'plots' at four tundra sites to monitor weather, carbon gas, and vegetation. These plots continue to show that the tundra is a sink – that is, actively absorbs and holds carbon – for atmospheric carbon dioxide. In 2015, the research team checked the sites in the late-winter/spring to study how snow cover and gas exchange. They returned in the summer to measure carbon dioxide from two local ponds and started a new measurement program to understand what happens to the carbon stored in plant material as it decomposes on the ground. The researchers placed special bags with dead leaves in a few

different locations. They will return in the spring and weigh the bags to see how much of the plants have rotted away – and therefore how much carbon was released.

Lamoureux, Scott F.

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File Number: 12 404 567

Region: IN

Licence No: 15687

Location: Johnson Point, Banks Island
(72°46'29"N; 118°27'55"W)

Watershed delineation of permafrost disturbance on eastern Banks Island, NWT: a geomatic approach for predicting water quality impacts

In the previous year of this ongoing project, the research team mapped out the watersheds around Johnson Point, eastern Banks Island. A watershed is an area where all the streams and creeks end up flowing into the same river or sea. The research team then added thaw slump locations to the watershed maps, using satellite imagery. Thaw slumps occur when permafrost is exposed to the sun and melts, causing a slump, which exposes more permafrost to melt and slump. As the goal of this study is to test how thaw slumps might affect water quality downstream, the researchers needed to map out how to get water samples downstream of a thaw slump. Using these maps, they were able to take water samples downstream of some thaw slumps and test the samples for various chemicals and other properties. They found that watersheds with thaw slumps have poorer water quality. That is, they have a much higher amount of sediment and other dissolved materials than water from the watersheds with no thaw slumps. A comparison of 2015 satellite images with 2008/09 images reveals that there has been a large increase in the number and size of thaw slumps in this area. Results from this project are in the process of being published and will be available from the NWT Discovery Portal.

Lantz, Trevor

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File Number: 12 404 758

Region: GW, IN

Licence No: 15649

Location: Mackenzie Delta

A multi-scale assessment of cumulative impacts in the northern Mackenzie basin

The Northern Mackenzie Basin is an area of enormous ecological and cultural significance that is changing in response to more frequent disturbances (natural and human-caused), and regional temperature increases. These changes are impacting regional ecosystems, but the effects of multiple disturbances working together (this is known as 'cumulative effects') are extremely poorly understood. In this project, satellite and air photos were combined with field observations to document the extent and cause of changes. In 2015 research focussed on vegetation change in the Tuktoyaktuk Coastlands. Satellite images and aerial photographs of the region show that cover of tall shrubs has increased in most areas of the Tuktoyaktuk Coastland, making this one of the most intensely greening regions in the Arctic. The researchers sampled soil across the Tuktoyaktuk Coastlands in areas growing more or less of a cover of tall shrubs. It appears that the only thing that prevents this growth is waterlogged soils. Another component of this project relates to muskrats in the Mackenzie Delta. The researchers had air photos taken of the delta, and looked for muskrat push-ups on 3300 lakes. The research team wanted to know what made some lakes more attractive for muskrats, so they took water samples from 44 lakes and tested

the lakes for water quality, temperature, and lake depth, and collected water, sediment, and underwater plant samples.

Lantz, Trevor

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File Number: 12 404 758

Region: IN

Licence No: 15714

Location: Near Sachs Harbour: 72.0196N,
125.2154W Sand Hills Moraine: 71.774N,
124.283W Johnston Point: 72.7374N, 119.0246W

Landscape change on Banks Island

Arctic landscapes that are rich in ground ice are highly sensitive because climate change can kick off disturbances with significant impacts to the land, plants, and animals. Recent mapping indicates that the ice-rich deposits on Banks Island have the highest level of permafrost disturbances in the Canadian Arctic. There are two objectives of this project. First, the researchers will use air and satellite photos and field sampling to document the rate and extent of landscape change on Banks Island. Second, they will set up permanent monitoring sites to track changes in vegetation and permafrost conditions. The Sachs Harbour Hunters and Trappers Committee helped to identify and establish five community monitoring sites near town. The sites are all different: some are in areas where the permafrost has made polygons, others are in grassy areas, uplands, or near water. The research team took careful measurements and observations at these sites on the plants, permafrost, air and ground temperature, and soil. A ground temperature sensor was installed under a building at Sachs Harbour. Ground and air temperature will be logged every 2 hours for the whole year. The researchers are also studying how underground ice wedges melt and change the land above, for example by forming polygons or meltwater pools.

Lee, Claudine

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File Number: 12 404 839

Region: NS

Licence No: 15573

Location: Waterbodies within the EKATI claim block

EKATI Engineering and Environmental Monitoring Programs

The main objectives for research in 2015 were first to determine if the Ekati Diamond Mine is having an effect on the surrounding lakes and rivers, or the air quality and second gather information about areas where the mine may expand in the future. For the first goal, the researchers used three monitoring programs to check for changes in the water and to test air quality. These programs are designed to detect potential changes in the way water moves through the water system, changes to the quality of the air, plants, soil, water, and lakebed sediment, and any changes to the small plants and animals that live in the water and keep it healthy. For the second goal, the researchers studied current conditions at Lac du Sauvage, lakes and streams near a part of the mine known as the Sable development, and the outlet of Lac de Gras. They recorded information about the whole water system including lakes, rivers, and rain or snow, the climate and weather, water quality, sediment quality, the small plants and animals that live in the water include those right close to the bottom, fish habitat, and fish communities in the surrounding

area. Results of the programs have already been published or will be made publically available through Dominion Diamond Ekati Corporation.

Lesack, Lance

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File Number: 12 404 485
Region: IN, GW

Licence No: 15683
Location: Mackenzie Delta

Biogeochemistry of lakes in the Mackenzie Delta

This project is on-going and the long-term goal is to study the lakes in the Mackenzie Delta as a whole 'ecosystem' to see how climate change might impact the Mackenzie Delta and other arctic deltas. 'Ecosystem' refers to how all the living beings and the non-living elements of the earth (weather, soil, etc.) form a functioning system. The researchers had two goals in 2015. The first was to study how some bacteria are able to 'eat' methane to stay alive, within the waters among Delta lakes. The second goal is to measure how much methane gas is escaping from Delta lakes to the atmosphere. Methane is an important greenhouse gas which usually stays below the surface of the earth – so if the bacteria can consume more of it, less will go into the air and contribute to global warming. Fieldwork took place just after ice-out in June. Water samples were collected every few days from six lakes near Inuvik to check for the methane-consuming bacteria and to measure methane escaping from the lakewaters to the atmosphere. The researchers are still testing, but it seems that most of the under-ice methane quickly escapes to the atmosphere after ice-out. The amount of methane consumed by bacteria is strongly influenced by the methane levels in the lakes before the ice melts.

Levesque, Keith R.

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File Number: 12 404 822
Region: IN

Licence No: 15693
Location: The Beaufort Sea/Mackenzie Shelf/Amundsen Gulf. SE boundary: 70° 35.935'N, 127° 22.981'W SW boundary: 69°49.495'N, 137°36.064'W NW boundary: 71°12.412'N, 137°55.332'W NE boundary: 71°43.702'N, 125°10.654'W

Addendum to ArcticNet licence # 15213

This ongoing project aims to study changes due to global warming in the living things in the Beaufort Sea and the water itself close to the coast. To study this, the research team took samples from aboard the Canadian research icebreaker CCGS Amundsen. The Amundsen spent four weeks in the Beaufort Sea/Amundsen Gulf, to recover the seven 'moorings' or floating research instruments set into the water in 2014. Three of these moorings were placed back in the water as part of a new project building on this one. The information about the ocean's currents, temperatures, and more from the mooring program will be very useful for understanding how future development and government regulations will impact the Beaufort Sea. Two additional ArcticNet moorings were placed in the water as part of its long-term oceanic observatories project. The researchers also took samples of the water and sea life, samples of the sea ice, and cores from the sea bed. The research ship records information about the ocean and weather

continuously as well. Overall, information from this project will help the researchers to understand the impacts of climate change on the Canadian High Arctic.

Mamet, Steve D.

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File Number: 12 404 868

Region: SA

Licence No: 15744

Location: Canol Heritage Trail (63.246164N,
130.029783W to 63.475206N, 129.361818W)

Long-term ecological and geomorphological investigations in the alpine tundra of the Mackenzie Mountains, NWT

The goal of this project was to study recent permafrost thaw and see if the treeline is shifting due to climate change in the western Mackenzie Mountains. The researchers measured the permafrost active layer (the part of the permafrost that melts every summer) at eight sites and the specific small-scale weather conditions at five sites. The 1990–2015 weather record from the five weather stations in the immediate area shows an increase of about 1.3°C in annual permafrost temperature. Warming appears to have thawed permafrost, varying from four centimetres (about 2 inches) per decade in low sites, to nearly 12 centimetres per decade (about five inches) at higher elevations. Surprisingly, permafrost mounds at the lowest elevation site had thawed and collapsed catastrophically in the last two years. As temperatures rise and permafrost thaws, Arctic landscapes will change, sometimes quickly. The current plant and animal residents may find themselves unable to adapt. The treeline was the other major focus of this research. Warmer temperatures could mean that more trees can grow farther north or further upslope in mountainous areas. In 2014, the researcher planted tree seeds in some areas to see if they would grow. It appears that the trees can most easily grow on south-facing mountain slopes. The treeline is not shifting much as there are limits on the spread of seeds.

Marsh, Philip

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File Number: 12 404 378

Region: IN

Licence No: 15622

Location: Trail Valley Creek and Havikpak Creek

Hydrology of high latitude watersheds

The climate of the Inuvik region is changing rapidly, and will continue to change in the coming decades as a result of human released greenhouse gases. As examples of this change, since Inuvik was formed in the late 1950's the number of winter days with average temperature below -40C has gradually decreased and over the last few years there have been very few days with such low temperatures. The number of summer days with average temperatures over +20C has increased dramatically too. The amount of rain in the summer and snow in the winter has also been gradually changing. The result is that more shrubs are growing on the tundra north of Inuvik, the permafrost is melting, and lake and river levels are changing. There are also examples of lakes rapidly draining due to melting permafrost. Everyone is wondering – how will the snow, the lakes and the rivers change in the coming decades. What will they be like 50 years from now?

In order to answer these questions, researchers have been studying the snow, lakes and rivers at a location north of Inuvik since the 1970's. In 2015, researchers from around the world studied

this site using many types of new equipment, including drones. The information they gathered will be used to help predict what this area will be like in the future.

McGeer, Jim

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File Number: 12 404 874
Region: NS

Licence No: 15742
Location: Thor Lake, and along the highway 4
(Ingraham Trail) east and west of Yellowknife

Understanding the potential impact of rare earth elements in aquatic systems in the NWT

No research was conducted under this licence in 2015.

McGregor, Robyn

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File Number: 12 404 879
Region: GW

Licence No: 15641
Location: The proposed Mackenzie Valley
Highway alignment

2015 Mackenzie Valley Highway hydrotechnical field investigation

A hydrotechnical assessment provides the information about rivers and water movement needed to plan and design roads in such a way that the water system will not be impacted. The goal of this project was to provide a hydrotechnical assessment along 181 kilometers of the proposed highway route through the Gwich'in Settlement Area. The researchers conducted two field seasons – one in the summer of 2014 when the water was low and one in the spring of 2015 when the water was at its highest. A hydrotechnical assessment was completed on all 198 water crossings along the road. The water crossings were identified from special air photos that map out the landscape very precisely. The researchers were double-checking the original plan, which has seven bridges and 191 culverts. They confirmed the need for all seven bridges, and gathered the information needed to select the right culvert size to allow the 191 other streams to flow as before. The researchers also found that there is a flooding risk near the northern portion of the road, likely from ice jams along the Mackenzie River, and some crossings showed signs of slope failure and instability. The road builders must take care to deal with these issues.

McGregor, Robyn

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File Number: 12 404 879
Region: SA

Licence No: 15730
Location: Mackenzie Valley Winter Road

Geotechnical and hydrotechnical field investigation, Norman Wells to Canyon Creek

No research was conducted under this licence in 2015.

McMechan, Margot

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File Number: 12 404 894

Region: DC

Licence No: 15725

Location: Mount Coty, Petitot River, Liard River

Uplift history of Fort Liard area

The goal of this project was to study 'uplift' of the region around and including Fort Liard. Uplift refers to when the surface of the earth is pushed up over the areas around it due to forces deep underground. The researchers spent three days in the field looking at exposed bedrock and collecting samples from 3 different areas: Mount Coty, the Liard Valley hillside upstream from Fort Liard, and the Petitot River upstream from Fort Liard. They travelled to the sample sites by boat and on foot. In order to study the uplift and the geological history of the Fort Liard area, the researchers collected ten rock samples. They took six samples of sandstone, which will tell them how old the rocks are using a special test using radioactive elements in the rock. They also took four samples of shale to test for how likely it is to find oil and gas in the ground. One or two of the sandstone samples will also be tested to see if the researchers can find the original source areas of the grains of sand that later hardened into the sandstone. The results of these tests will not be available until March 31, 2015.

Olefeldt, David

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File Number: 12 404 892

Region: DC

Licence No: 15716

Location: Scotty Creek research camp area
 (61°17'N 121°17'W); near Trout Lake (60°23'N
 122°24'W); 62°36'N 122°36'W; 61°11'N 120°5'W;
 62°26'N 121°16'W; 61°24'N 121°27'W, and 61°9'N
 119°55'W

Effects of fire on peatland permafrost stability and carbon cycling

The goal of this ongoing project is to understand how forest fires affect permafrost peatlands. In the first year of the project the researchers conducted field work and gathered data to address two main questions: does fire accelerate permafrost thaw in peatlands and to what degree? And, how does fire and thawing permafrost affect water quality downstream, including carbon in the water? The researchers measured the soil moisture, temperature, and active layer thickness (the portion of permafrost that melts every summer) in several permafrost plateaus that vary from one to forty years in time since fire. They will study the information they gathered over the winter to get a better understanding of permafrost thaw in relation to fire. To address the second question, two streams that collect water from permafrost plateaus were studied carefully. The research team monitored for water level and flow. Water samples collected from these streams will be analysed for water chemistry including carbon, acidity, pollution, and other qualities.

Ootes, Luke

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File Number: 12 404 564
Region: NS, SS

Licence No: 15612
Location: Great Slave Lake, Union Island area,
 Taltheilei Narrows

Provenance of the East Arm basin

The East Arm Basin is a large region around the East Arm of Great Slave Lake, NWT. The rock under the surface of the earth here is made up of ancient seabeds hardened into rock, ancient volcanic eruptions, and other types of rock, ranging in age from 1.85 billion to 2 billion years old. Geologists catalogue rocks into formations or units, which helps them study the rocks and understand the history of the earth over billions of years. These rock units have historically been separated into four distinct units, from oldest to youngest, the Union Island and Wilson Island groups, Great Slave Supergroup, and Et-Then Group. The research team wanted to check that these units are correct. They mapped out the rocks in the area and collected rock samples from outcrops. These samples will be analyzed in laboratories to determine the age of the rocks and what the rocks were formed out of (for example, an ancient beach might harden into sandstone). Resolving geological questions about the area will help better understand how it evolved in its ancient environment and how it relates to similar aged rocks around the world. The research group consists of geologists from the NWT Geological Survey, the Geological Survey of Canada, the University of Alberta, St. Mary's University, and the University of California Riverside.

Orcutt, Beth N.

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File Number: 12 404 893
Region: IN

Licence No: 15724
Location: Inuvik, Lower Delta, North Richards
 Island

Studies of methane release from lakes in the Mackenzie Delta and on Richards Island

The goal of this project is to measure methane concentrations in frozen lakes continuously throughout the winter using special remote sampling devices. The researchers want to understand how much methane is released from Arctic lakes to the atmosphere when the ice melts each spring. Methane is a potent greenhouse gas that may increase global warming, and more methane may be released from Arctic lakes under warming conditions. In August 2015, the investigators placed nine sampling devices in eight different lakes in the Mackenzie River delta and North Richards Island regions. They also took lake water samples for later comparison. The eight lakes included four lakes in the Inuvik region, two lakes in the outer delta near Farewell Lake (Manta and Swiss Cheese Lakes), and two lakes on North Richards Island. The remote sampling system consisted of a milk crate filled with plastic sampling devices and sensors, which were placed on the lake bottom at a depth that should remain in open water during ice cover. In some cases, a weighted rope connected to the milk crate was strung out to the lakeshore and staked. The systems will be recovered in summer 2016.

Osawa, Akira

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File Number: 12 404 876
Region: SS

Licence No: 15757
Location: Along Highway #5 between the Park
 boundary west of Fort Smith and Angus Tower, and

the intersection between Highway #5 and the road that leads to Thebacha Campground.

Structure, carbon dynamics, and silvichronology of boreal forest

The goal of this project is to study how carbon – an element which exists as a gas in the air but also as a part of living things – moves between trees, animals, the air, and the earth. The researchers took samples from jack pine and black spruce forests around Wood Buffalo National Park to study carbon in these forests. They measured tree size in permanent research ‘plots’, collected decaying plant material from the forest floor, and estimated of root growth. To understand how quickly the trees grow, the research team took cores from the trees to check the tree-rings growth. A big change from the original plan was necessary, because two of their study plots burned by the natural forest fire that took place in late June. Nearly all measurement devices in those plots were lost. These two plots were abandoned. Instead, a new study plot was set up nearby in a forest that did not burn. This will allow the long-term measurements of the area to continue. The research team will also start to monitor how new and young jack pine trees grow after fire in an area that burned this year.

Osinski, Gordon

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File Number: 12 404 701

Region: IN

Licence No: 15707

Location: Tunnunik Impact Crater (72 deg 30' N,
114 deg 0'W)

Geology of the Tunnunik impact structure, Victoria Island, NWT

Craters, also known as ‘meteorite impact structures’, are created where asteroids or comets have struck the surface of the Earth in the past. They are one of the most common geological landforms in the solar system. Approximately 185 impact craters have been documented to date on Earth, of which around 30 are in Canada. The goal of this project was to carry out the first detailed studies of the Tunnunik impact structure located near Collinson Inlet in northwestern Victoria Island. While in the field, the research team mapped the structure and collected samples for follow-up laboratory work. Over the course of 6 weeks they mapped the entire structure, producing the first geological map of this crater. Breccias – rocks broken up and deposited by the impact – were documented in dozens of locations around the structure. The research team also documented evidence for hydrothermal activity, which occurs when ground waters are heated by the impact of the asteroid or comet and then flow through the fractured rocks, potentially forming hot springs. The researchers also conducted the first ever survey of the underground structure of the crater.

Panayi, Damian

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File Number: 12 404 779

Region: NS

Licence No: 15661

Location: Bluefish Lake, Prosperous Lake,
Yellowknife River

NTPC Bluefish Hydro Repairs

Recently, a new dam and spillway was constructed at the Bluefish Hydro Plant on the Yellowknife River between Bluefish Lake and Prosperous Lake. This project had two main goals. The first was to document the spawning of fish coming into the Yellowknife River where it flows out of Bluefish Lake from the Bluefish Hydro dam. A second goal was to see if fish are using an artificial 'shoal' or spawning area, created as to compensate for the impact to the river from the construction of the dam. The researchers also checked on local populations of small fish on a portion of the Yellowknife River directly below the new dam face and spillway, and tested for mercury levels in slimy sculpin in a recently flooded area of Bluefish Lake that resulted from the creation of the new dam. Throughout the program, water levels, temperatures, and flows were also monitored on the Yellowknife River. Results from this study will be presented in an annual report to the Mackenzie Valley Land and Water Board and the Department of Fisheries and Oceans, which will be submitted by March 31, 2016.

Pehrsson, Sally J.

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File Number: 12 404 504

Region: SS

Licence No: 15682

Location: 60°00N, 61°00N, and 104°00W,
108°00W

South Rae Project

Geologists are trying to explain how the rocks in outcrops were brought back to the surface of the earth, and if any mineral deposits were formed during these processes. The geologists are also studying the movement of the glaciers that once covered the land. Geologists from the Geological Survey of Canada and the Northwest Territories Geological Survey recorded information about the rocks, the soils and the sediments at the bottom of lakes. Small samples were collected with a hammer or a shovel to bring back to the laboratories to be analyzed for their mineral compositions. It appears that the rocks currently exposed at the surface were actually very deep in the crust of the earth 1900 million years ago. The research team also found that more than one period of glaciation occurred and that in general the glaciers were moving towards the west and retreated towards the east. The glaciers moved the soil and deposited it along the way. They found some material of value, like gold grains, in the glacial deposits and they're trying to find out where they came from. They also found some deposits that might be worth mining later at the bottom of lakes. The geologists are currently writing reports and making maps to display their results and interpretations.

Phillips, Marcus R.

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File Number: 12 404 826

Region: IN

Licence No: 15599

Location: Inuvik, Delta near Inuvik, Central Delta area, Illisarvik, Garry Island, Fish Island

Soil carbon in the Mackenzie Delta region

This ongoing project looks at how natural systems influence how much and what kind of carbon is in the soil of the Mackenzie Delta region. These systems include build-up of soils by floods, freeze-thaw churning, and soil gradually moving downhill. The carbon in the soil is essential for soil and plant health, but as a gas, it is an important factor in climate change. During 2013 - 2015

the researcher traveled to locations throughout the Mackenzie Delta and in the rolling hills to the east, both north and south of treeline. At these locations the researcher examined and took samples of soil profiles and permafrost. Over 1500 samples have been collected, processed at the Aurora Research Institute in Inuvik, and are currently being analyzed at laboratories in Ottawa. The researcher found more carbon in the permafrost at the bottoms than at the tops of slopes, and that more of the carbon is near the top of the permafrost in soils on the rolling hills than in the delta, where the carbon is more evenly spread out with depth. The laboratory analysis of samples is ongoing, and full results are expected by fall 2017.

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File Number: 12 404 890

Region: GW

Licence No: 15705

Location: 1. 66°32'27.86"N 136° 7'15.85"W 2. 66°39'40.49"N 136°18'7.97"W 3. 66°41'42.60"N 136°23'15.36"W 4. 66°49'21.65"N 136°22'56.20"W 5. 66°56'51.59"N 136°21'28.93"W 6. 67°13'5.05"N 135°25'26.65"W 7. 67°13'37.41"N 135°27'58.15"W

Organic carbon accumulation under *Picea* sp. (*Picea glauca*, *P. mariana*) stands along its range northern boundary

The goal of this project was to see how spruce forests might function to take carbon gas – an important greenhouse gas – out of the air and store it, and how the forests might also prevent the landslides and erosion that are considered likely with climate change. Analysis is ongoing but early results show that there are large differences in how much carbon is stored in the soil under closed forests, open canopy forests and tundra. It appears that more carbon is released from forest soil in warm but wet weather, which is part of the reason why tundra soils, which are cooler, have more carbon stored in them. Forests appear to help stabilize the soil on steep slopes exposed to strong winds, particularly on stony soils. Forests also seem to act like a sponge for carbon, which is an important way to counteract climate change. This stresses the importance of keeping local forests intact as an environmental asset, especially as forests are also important to wildlife. Only further analyses to be completed later this year will round up the whole picture and a complete report will be provided then to the Aurora Research Institute as well as to local First Nations communities who were extremely supportive during the field research campaign.

Pisaric, Michael

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File Number: 12 404 640

Region: IN, GW

Licence No: 15595

Location: Husky Lake; Burn area south of Inuvik; Noell Lake area; Campbell Dolomite Upland, Dempster Highway/Peel Plateau

Examining the impacts of climate and environmental change on aquatic and terrestrial ecosystems of the Mackenzie region, NWT

The goal of this ongoing study is to see how climate change is affecting the lakes and landscape of the Mackenzie region. The researchers are working in the Peel Plateau, where they took lake sediment cores and water samples from numerous lakes. The sediment cores collected were

about 50 cm in length, and the researchers can use them to see how things have changed over the years by looking separately at each layer in the core. Ice cover on the lakes in April was typical of other years, ranging from ~80-100 cm in thickness. There was also a lot of overflow on the lakes this year, probably due to the warmer spring. The cores and samples are still being analyzed, including by a graduate student looking at impact of road dust from the Dempster Highway on nearby lake systems. Similar to last season, the water samples indicate lakes nearest the Dempster Highway have several chemical differences to other lakes further away. The researchers are also working in west of Husky Lakes near the community of Fort McPherson. A lake there is being consumed by a permafrost megaslump and partially drained in July. A community member from Fort McPherson travelled with the research team to the site so they could report back to elders in the community who were concerned about this event.

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File Number: 12 404 887

Region: GW

Licence No: 15694

Location: Along the Dempster Highway

ARCTICFIRE

The purpose of this study, which is a component of the “ARCTICFIRE” project, is to study the long-term effect of forest fires on permafrost soils and forests growing on permafrost along with the Dempster Highway. The researchers measured permafrost depth, soil temperature, number and size of trees, and plant cover at research sites along the Dempster Highway in both the Northwest Territories and Yukon. They also measured how much carbon dioxide, methane and nitrous oxide gasses were being released from the soil. These gasses are naturally released from the soil, but they are greenhouse gasses and can contribute to climate change. Soil samples were collected from the forests for carbon and nitrogen analysis at a later date. The forest sites chosen were from areas that burned in the early 1900s, in 1969, 1990 and 2012. The northernmost site was close to Vadzaih Van Tshik Campground in Inuvik and the southernmost sites were south of Eagle Plains in Yukon. Early results show that forest fires do indeed increase the thawing of permafrost. The average permafrost depth was 1 m in the old forests and 0.28 m in recently burned forests. Young forests released more carbon dioxide than old forests. The effect of forest fires on permafrost in the area will continue to be studied in later years, and project ends in 2018.

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File Number: 12 404 823

Region: IN

Licence No: 15652

Location: East Channel lakes area, Inuvik and Reindeer Station lakes area

The ecology and paleoecology of benthic macroinvertebrates in the Mackenzie Delta region

The goal of this project is to understand how the very tiny creatures called ‘invertebrates’ that live in the lakes in and around the Mackenzie Delta might be impacted by how and if water flows between these lakes. The researchers are interested in how the lakes are now, compared to how things were long ago. To do this, they took lakebed sediment cores from 15 lakes, which will allow them to understand conditions in the past. They also took water samples to see which

invertebrates are present in lakes across the Mackenzie Delta from Aklavik to Inuvik and downstream to Richards Island, and from the nearby upland region around of Reindeer Station. Near Inuvik, invertebrates were sampled in five lakes with different levels of connection to the river for the 3rd year of a projected five years. Taking samples over five years allows the researchers to see what differences there are, depending on how high the water is in the spring. In total, 36 lakes were sampled for water chemistry, invertebrates, and lake sediments. Preliminary results from samples collected in 2013 and 2014 show that the amount of water that might flow into a lake from the delta has a strong effect on what invertebrates live in the water of the lake.

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File Number: 12 404 570
Region: DC

Licence No: 15631
Location: Scotty Creek

Understanding and predicting the impacts of permafrost thaw on water resources and ecosystems

The goal of this project is to understand how melting permafrost will change water systems at the southern edge of the permafrost, especially around two important disturbances: seismic lines and wildfires. The research team gained important information about how water moves between the surface and ground, and how water is stored in areas with thawing permafrost where there are many wetlands. They learned about how ground temperatures are changing, and how ground water moves among permafrost plateaus, bogs and channel fens, the three most common land covers in the southern margin of permafrost, and they also learned about how on-going permafrost thaw will change this system. After field work, the research team started working on improving the way that scientists predict the effects of melting permafrost, and how fast permafrost will melt and change due to global warming. The researchers will test out their new predictions by comparing to their field results and then share it with other scientists. The predictions cover 1) the rate and pattern of permafrost thaw and the resulting land cover change (land cover refers to the plants and soil above the permafrost), and 2) how the storage of water within and flow from such land covers will change when the permafrost thaws.

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File Number: 12 404 680
Region: IN

Licence No: 15619
Location: Brock River, Hornaday River

Geology of the Brock Inlier

The goal of this project project was to carefully study a part of a very unusual geological feature. This feature is 1,200 to 800 million years old, and can be found in a larger geological unit called the Brock Inlier, located just east of Darnley Bay, Northwest Territories. The Brock Inlier contains the largest gravitational and magnetic anomaly detected in North America. This means the area has strange compass readings, and gravity doesn't behave as expected. This suggests dense rocks below the surface that may contain metals. The research team used detailed satellite imagery, photographs, and field work to learn what type of rocks are there and how large. The research team examined excellent exposures of limestone-type rocks along the Hornaday River,

which is allowing them to learn more about a warm, shallow sea that occupied this area and the broader region some 800-900 million years ago. Part of the research team conducted a special type of underground survey that shows the rock layers deep in the ground. Early results suggest that a big, possibly metallic body exists around 2 km below the surface of the earth. The results of these ongoing studies will be shared with developers, scientists, and the general public.

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File Number: 12 404 896

Region: SA

Licence No: 15729

Location: Transect between Haines Alaska and Great Bear Lake

The Mackenzie Mountains earthscope project

The goal of the Mackenzie Mountains Earthscope Project is to understand the geological processes leading to the formation and continuing upward movement of the Mackenzie Mountains. The 2015 field season was devoted to reaching out to as many community members as possible, and identifying potential locations where the research team could place earthquake sensing equipment and GPS instruments. In August, team members Jeff Freymueller and Derek Schutt visited Yellowknife and Norman Wells to meet with government and other departments, learn about possible educational opportunities, and meet with interested parties. They also visited several potential research sites on lakes between Macmillan Pass and Great Bear Lake. The research team is preparing further educational and partnership materials that will include maps, photographs, and other information about potential research site locations. These will be submitted to all interested parties for permissions and consultation.

Smith, Rod

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File Number: 12 404 337

Region: IN

Licence No: 15665

Location: Banks Island

Geo-mapping for energy and minerals program proposed fieldwork: western Arctic project: Banks Island

The purpose of this project is to check if there might be diamonds on Banks Island. From July 3-21, 2015, the Geological Survey of Canada set up a basecamp at Johnson Point, Banks Island. The research team visited a few research sites by helicopter and collected 32 rock samples, each weighing about 15-30 kg (30-70 pounds). They tested the rocks to see if they have minerals that indicate the possibility of diamonds. Samples were collected from streams, different glacial deposits, and from an ancient (older than 3 million years) river deposit called the Beaufort Formation that was previously believed to only be found on western Banks Island. Of the 19 days of planned fieldwork, 9 were lost due to poor weather. Samples collected in the field have now been sent to laboratories for analysis. This research project also installed small, simple instruments in two off-shore basins near Sachs Harbour that will record changes in temperature and chemistry of the water for a year. They will be removed, and the information collected, next summer. Planning is now under way for another field season on Banks Island in 2016 where the

focus will shift from looking for diamonds to general geological mapping of the bedrock in northern and southeastern Banks Island.

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File Number: 12 404 657

Region: IN, GW, SA, DC

Licence No: 15636

Location: Jean Marie River, Fort Simpson, Wrigley, Tulit'a, Norman Wells, Fort Good Hope, Tsiigehtchic, Inuvik, Tuktoyuktuk

Permafrost monitoring and collection of baseline terrain information in the Mackenzie Valley Corridor, NWT

The purpose of this long-term project is to gather yearly information about about the temperature of the ground, and the active layer of permafrost. The active layer is the part of the permafrost that melts every summer. Permafrost monitoring sites throughout the Mackenzie corridor from Fort Simpson to the Mackenzie Delta (Inuvialuit, Gwich'in, Sahtú, Dehcho regions), were visited in August and September 2015 to collect information from sensors. Two Inuvik residents provided guiding services and transportation by boat in the Inuvialuit and Gwich'in regions. This research adds to existing information, some of which stretches back more than 15 years, to help scientists have a more complete idea of current permafrost conditions and their fluctuations over time. Having good, long-term records supports land management decisions. Permafrost continues to get warmer in the region although the rate of increase has been slower in recent years. The active layer continues to get thicker – that is, more of the permafrost melts every year in the summer and freezes again in the winter, although this varies depending on location. Continued data collection is planned to better assess the impact of climate change on the permafrost environment. A detailed report is in preparation and will be sent to relevant organizations in the region.

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File Number: 12 404 806

Region: DC

Licence No: 15592

Location: Smith Creek: 63°09'28"N, 123°14'59"W

The frontline of permafrost thaw: a transect of eddy covariance towers across the southern Taiga Plains to better understand changing regional carbon and water budgets

The goal of this project is to understand how the weather is changing in the Northwest Territories. The research team started to construct a weather tower at the Smith Creek research site near Wrigley, NT. Once complete, it will be a part of an growing network of weather towers that measure carbon (an important greenhouse gas), water and temperature change as it relates to rapidly changing permafrost conditions. The tower was constructed in June 2015, and the measuring instruments will be installed in April 2016.

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File Number: 12 404 806
Region: DC

Licence No: 15603
Location: Scotty Creek

Influence of changing active-layer thickness on permafrost peatland trace gas exchanges and carbon balance

The goal of this project is to understand how disappearing permafrost influences carbon (an important greenhouse gas which also exists in the water, land, and every living thing), water and temperature change between the land surface and the atmosphere. The researchers used a scientific technique that measures how air and gasses move up and down through the atmosphere, using an instrument high in the air on a tower. The researchers were able to assess how effective the tower was and write a scientific journal article on this topic and how to improve the measurements in the future.

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File Number: 12 404 806
Region: GW

Licence No: 15604
Location: Trail Valley Creek and Havikpak Creek

Quantifying carbon fluxes and budgets of boreal forest-tundra landscapes under the influence of rapidly changing permafrost regimes

The goal of this project is to record how carbon gas, a greenhouse gas which is involved in climate change, moves from the earth to the atmosphere and back again. Unfortunately, research under this licence was not able to progress in 2015 due to technical problems with the special instrument used to record the movement of air and gas. Two sites were selected to have a special instrument installed – Havikpak Creek and Trail Valley Creek. The instrument, known as an ‘open-path gas analyzer’ did not function at either site. Both had to be sent to the manufacturer, Campbell Scientific, in Logan, UT, USA. The units arrived back at the sites in late August for re-installation.

Staats, Molly F.

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File Number: 12 404 837
Region: IN, GW

Licence No: 15578
Location: Tuktoyaktuk, Paulatuk, Sachs Harbour

EarthScope transportable array

The goal of the EarthScope project is to study earthquakes and volcanoes in North America, with a view to understanding how the continent was created over millions of years, and how it continues to change. To do this, researchers have installed and continue to install special earthquake sensors across North America. Sometimes these sensors, installed at research stations, need to be visited for maintenance, and sometimes the researchers add new stations. In 2015, the research team did not need to visit the stations at Sachs Harbour, Paulatuk, or Inuvik, and several other stations as they are functioning well. A new station was planned for Tsiigehtchic but the research team were unable to access the location due to bad weather and road conditions. Thus the site was not visited in 2015, and that station will be installed next field season (2016).

Stevens, Kevin J.

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File Number: 12 404 895**Region:** NS**Licence No:** 15727

Location: Giant Mine 62.4997° N, 114.3586° W
Frame Lake 62.4422° N, 114.3975° W

Impacts and remediation of wetland vegetation affected by development in northern areas

The goal of this research was to see how developments, such as mines, might affect wetland plants, with a special focus on the relationship between plant roots and the microbes in the soil. Research was conducted at three mines – the Giant Mine, the Tundra Mine, and the Colomac Mine. At all three mines, the researcher visited sites that had been affected by the mine to collect plant and soil samples for later assessment, and to carefully study the plant communities. The researcher also took samples to a greenhouse and allowed the plants to continue to grow, in order to study the plants and root microbes more closely. The researcher also visited nearby areas which were not affected by the mine as a reference point. There were specific questions around each mine. At Giant Mine, the researcher was interested in whether the water quality from the mine had impacted the plants. At Tundra Mine, the researcher was studying the potential for using native vegetation to plant in areas that the mine had impacted, in order to help them return to a natural state. At Colomac Mine, the researcher took samples to determine effects of oil and gas pollution on plants and the microbes around their roots.

Tank, Suzanne E.

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File Number: 12 404 785**Region:** GW**Licence No:** 15685

Location: Area bounded by the following coordinates: 67°11'19 to 67°19'12 N, and 135°02'21 to 135°45'35 W. Excluding Gwich'in private land.

The effect of permafrost slumping on carbon delivery from land to water

The goal of this ongoing project is to study the effects of retrogressive thaw slumps on streams of the Peel Plateau. Thaw slumps occur when the permafrost melts, allowing the ground to slump and expose more permafrost, which then melts and slumps. The research team measured water quality and chemistry of streams impacted by thaw slumps. They focused on several types of carbon in the water. Carbon is an important greenhouse gas, and it is stored in large amounts but in different forms in the permafrost. The research team is trying to understand how carbon moves from the melting permafrost into the water, where it can affect the plants and animals that live in the water. To achieve this, water was measured upstream, downstream, and from the outflow of active thaw slumps near streams on the Peel Plateau. From June to August, 2015, eight thaw slumps were visited numerous times to measure water quality and stream discharge, and collect water samples for later analysis. The research team reported what they found with the Gwich'in Renewable Resources Council in Fort McPherson and presented results at the ArcticNet conference in Vancouver. Local wildlife monitors were hired through the Tetlit Gwich'in Renewable Resources Council for the sites that were accessed on foot.

Wells, David A.

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File Number: 12 404 809

Region: NS

Licence No: 15667

Location: Lac de Gras

Diavik aquatic effects monitoring program

Diavik Diamond Mines must conduct environmental monitoring programs around the mine, as required by various licenses and authorizations. The program to monitor water quality Lac de Gras is known as the Aquatic Effects Monitoring Program. The purpose of the program is to see if there are either short or long-term effects in the lakes around the mine as a result of the mine. This monitoring program must also test its own predictions about how much of an impact the mine will have, and make and test recommendations to make the mine safer for the lakes. The environmental assessment of the mine selected some features of the lake to focus future monitoring efforts on, including water chemistry, lakebed sediment chemistry, how many fish and plants are in the lake, the insects which live in the lake, fish, fish habitat, and the human use of fisheries resources in Lac de Gras. The 2015 data has not been assessed to date. The final report will be available at www.wlwb.ca.

Whalen, Dustin

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File Number: 12 404 798

Region: IN

Licence No: 15607

Location: Ellice Island, Garry Island, Pelly Island, Hooper Island, Kendal Island, Tuktoyaktuk, Toker Point, McKinley Bay South, Russell Inlet, Topkak Point, Tuft Point, Cape Dalhousie, Cape Bathurst, Taglu Island, Kumak Channel, Napoiak Channel, Reindeer Channel

Coastal geoscience research in the Beaufort Sea and nearshore sediment dynamics of Tuktoyaktuk Harbour

One purpose of this project is to monitor how quickly the shorelines are eroding at certain sites along the Beaufort Sea. The research team revisited fourteen sites in the NWT and eight sites in the Yukon, and established a new research site at Cape Bathurst as well. Of all of the sites visited in 2015, portions of the Pelly Island coast appeared to have receded the most losing almost 40 m between June and August 2015. In contrast, the coastline on Pullen Island has seen consistent erosion at a rate of seven meters in 2015. Tuktoyaktuk Island has been eroding quickly, both from waves and from melting. However, the island did not erode much in 2015 due to the lack of storm surge activity. The only erosion on Tuktoyaktuk Island was due to melting, around two meters per year, an amount consistent with the trend over the last few years. This research also included a separate component measuring water quality, the effect of water quality changes on marine mammals, and how seabed sediments move across the ocean floor. This research is carried out using special instruments deep into the ocean on the seabed floor within the marine protected area of Kugmallit Bay and close to Tuktoyaktuk.

White, Brenda M.

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File Number: 12 404 899

Region: SA

Licence No: 15738

Location: The Central Mackenzie Valley,
 Northwest Territories, within latitude 64°45N to
 65°25N and longitude 126°40W to 127°30W

Environmental studies for EL470 - 5yr

ConocoPhillips acquired EL470 South of Norman Wells in 2011. Environmental studies and consultations were completed before, during, and after exploration activities as required by law, to support two winter drilling programs: two vertical wells in 2012/13 and two horizontal wells 2013/14. A single research study was conducted in 2015 – a surface water quality program. The research team sampled water at 25 locations. Eleven were watercourses such as rivers, streams, and creeks. The researchers also took samples from 14 waterbodies (lakes/ponds/sloughs). The samples were collected to supplement the surface water quality programs from 2012, 2013 and 2014. The purpose of this surface water quality program is to understand normal variations in water quality during the annual “open water” (ice-free) period; and to evaluate if there are any changes in surface water quality during site operations. The water samples were carefully collected, properly preserved and packaged for shipping to an accredited laboratory for analysis. The research team is preparing a report to summarize the findings which will be submitted to the Sahtú Land and Water Board before December 31, 2015 and then posted to the online registry.

Wolfe, Stephen A.

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File Number: 12 404 549

Region: NS

Licence No: 15628

Location: Ingraham Trail and Tibbitt to Contwoyto
 Winter Road

North Slave permafrost study: characterizing and predicting discontinuous permafrost for climate change adaptation

The purpose of this research was to see how the temperature underground changes when there is a forest fire over permafrost. Field work was conducted between March and September, 2015 in the Great Slave region along Highways 3 and 4, and the Tibbitt to Contwoyto Winter Road to Lac De Gras. Ice and water samples from winter overland flow and freezing of water (aka “icings”) were collected in March, and continued in June and September. In addition, the research team measured the temperature at a number of sites including active-layer temperatures from forest and peatland sites (the active layer is the part of the permafrost that melts every summer and freezes every winter). They also measured ground temperatures from winter road and burn sites. These measurements were used to understand ground temperature changes and the effects of fire permafrost conditions. New monitoring sites were set up at Lucky Lake, east of the Discovery Mine site, and along the Ingraham Trail near Tibbitt Lake, in recently burned areas. Ground ice investigations and monitoring continued in relation to recent thaw slumping along the Yellowknife River. Two monitoring sites within tundra areas were removed and discontinued.

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File Number: 12 404 711

Region: IN

Licence No: 15651

Location: Noell Lake catchment

Noell Lake ice study - hydro-ecological responses of arctic tundra lakes to climate change and landscape perturbation

To improve the knowledge on lake ice and its effect on lake water quality, the researchers developed an example automated ice buoy/subsurface mooring system which measures weather, lake ice, and water quality. The system was first placed in Noell Lake in the fall of 2010 for testing over multiple years. In the fall of 2014, the researchers added new water quality instruments and the system was returned to Noell Lake, and allowed to freeze in under the winter ice cover. The new instruments were geared to provide new information on the conditions under the lake ice. The summer of 2015 was the final field season, and the researchers retrieved the system. They are still studying the measurements collected, however, it is clear that when the system functioned properly, it recorded the information the researchers designed it to. Information recorded will allow the researchers to assess how lake ice effects water quality and the availability of food for the fish and other animals that live in the lake, in both the winter, and during the ice-free season.

Social Sciences

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File Number: 12 410 839
Region: SS

Licence No: 15719
Location: Hay River

Visualizing Canada's urban north (Hay River, NWT)

The goal of this research project is to understand how development and urbanization plans in Hay River from the 1960s onwards are experienced by today's residents, with a focus on downtown Hay River and the residents of the High Rise. In the summer of 2015, the research team travelled to Hay River to begin their field work. They collected photographs and interviewed residents. Cameras were installed on all four corners of the Hay River High Rise and will run for 12 months. These images are to create artistic work about northern urban life. The research team conducted ten taped interviews with tenants of the High Rise to document people's paths to and within the community. Two Hay River residents were hired to assist with the photographs. The research team will return in the summer of 2016 for a month, as the cameras failed to take pictures. Results from interviews have been used to compose public interest stories about northern life. For example, the researchers published a piece in Northern Public Affairs which is now available in all NWT libraries and online. The photos are still being analyzed.

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File Number: 12 410 979
Region: IN

Licence No: 15698
Location: Inuvik, Tuktoyaktuk

Inuvialuktun Modal Suffixes

The project is about the meaning and use of a specific part of the Ummarmiutun and Siglitun languages called 'modal suffixes'. Examples are 'hungnaq' and '?uk?au' in Ummarmiutun, 'yungnaq' and 'yuksau' in Siglitun, and 'must' and 'should' in English. Several community members shared a lot of knowledge about this abstract part of their languages. In English, 'must' can be used in commands (She must leave!) and to make a guess (She must have left). But in Ummarmiutun and Siglitun, 'hungnaq'/'yungnaq' (anihungnaqtuq, leave-hungnaq-she) are used only in guesses, and '?uk?au'/'yuksau' (aniyuksauyuq, leave-yuksau-she) are used only for commands and obligations. Sometimes in Siglitun, you can use 'yuksau' if you make a guess based on something you have heard. The research team recorded stories and produced plain

language explanations of the Uummarmiutun grammar. Research outcomes – booklets, stories and teaching materials – are available online at www.uquahiq.wix.com/inuivialuktun.

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File Number: 12 410 1033

Region: IN, GW

Licence No: 15726

Location: Aklavik

Aklavik community garden project

Gardening in the Arctic presents certain challenges compared to the less isolated and warmer climates in the south, but gardening has the potential to help address food insecurity. In the summer of 2014, and in collaboration with the Ehdiiat Gwich'in Band, an Aklavik Community Gardens "Getting Started" workshop was hosted in the community. In 2015, the Aklavik Community Gardens Project provided materials, education, and support for people to start gardens on their home properties. A total of 28 people participated in gardening, and 41 individuals attended at least one garden workshop during the summer of 2015. The Hamlet of Aklavik provided 18 raised bed plywood garden boxes to community members, and the Ehdiiat Gwich'in Band provided four raised bed garden boxes. There was also a series of four workshops and two community garden planning meetings. All of these events were open to the public. One result of this project was the formation of a Facebook group called "Aklavik Community Gardens". The page and the gardening group were renamed the "Peel River Garden Society" in 2016 (<https://www.facebook.com/groups/aklavikgarden/>).

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File Number: 12 410 991

Region: DC, NS, SS

Licence No: 15677

Location: Yellowknife, Hay River, Fort Resolution

Northern spaces: resource governance in the southern Northwest Territories

This research is about how water policy and programs in the NWT deal with uncertainty. In June of 2015, eleven interviews were conducted in Yellowknife, Hay River, and Fort Resolution. The interviews were about water management in the NWT, and how the NWT Water Stewardship Strategy and other water initiatives in the territory deal with political and ecological uncertainty. Political uncertainty includes the lack of comprehensive land claim agreements in southern areas of the NWT, as well as ongoing negotiations of transboundary water agreements. Ecological uncertainty includes the effects of climate change and the downstream location of the NWT in relation to energy development activities in northern Alberta. The interviews were recorded and transcribed (typed out) by a student research assistant at Acadia, and are currently being reviewed. The researcher remains in contact with some of the people who were interviewed, and is discussing ongoing collaborations with them. This collaboration could include telephone conversations, in-person meetings, or workshops in 2016 or beyond. The in-person meetings would take place in Yellowknife, Fort Resolution, or Edmonton, and would focus on community-based monitoring; specifically, how community-based monitoring measures and deals with political and ecological uncertainty.

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File Number: 12 410 1027

Region: IN, NS

Licence No: 15692

Location: Yellowknife, Sachs Harbour, Inuvik

Representation and replication: the digital presentation of archaeological artifacts, a community case study for Banks Island, NWT

The goal of this project is to work with Sachs Harbour community members, especially youth, to make replicas or copies of archaeological artifacts stored in a museum, and to record elders' stories about the artifacts. In 2015, Inuvialuit elders and youth from Sachs Harbour travelled to the Prince of Wales Northern Heritage Centre in Yellowknife. The research team wanted to document the elders' knowledge of archaeological objects in the museum's collections, and to involve youth in digitally documenting archaeological artifacts that were excavated on Banks Island but are now stored at the heritage centre. During this visit, the researchers conducted a series of focus groups and interviews to see how the elders and youth felt about different kinds of archaeological replicas. Archaeological replicas are copies of ancient artifacts, including 3D models, 3D prints, and handmade replicas. Researchers later interviewed 16 adults in Yellowknife, Sachs Harbour, and Inuvik, and asked them to respond to both original archaeological material from Banks Island and the collection of replicas that were made for this study. Interviewees included Sachs Harbour elders, Inuvialuit community members, other local residents, archaeologists, and current and former PWNHC staff. Initial findings suggest that there is a strong interest in emerging 3D technologies, but also a high diversity of opinion about the specific roles archaeological replicas should play.

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File Number: 12 410 944

Region: SA

Licence No: 15551

Location: Fort Good Hope

Aboriginal youth stories of culture, identity, community & place: a rural/urban educational youth exchange through performing arts & technology

Education for Aboriginal students across Canada is in need of regeneration and renewal. It has become a national priority and there is increasing demand for teachers who understand that there may be differences in how to teach and work with Aboriginal students. Teachers must engage students in ways that are rooted in Indigenous ways of knowing, and teach history in a way that shows and counteracts past inequities, nurtures educational successes and finds practical solutions for meeting the diverse educational needs of Aboriginal learners. A more successful school system for Aboriginal students will help to repair and renew Aboriginal-Canadian relations, and be good for the economy and the environment. The goal of this project is to see how partnerships between university researchers and aboriginal community schools can help nurture the educational experiences and successes of Aboriginal learners. The research team will set up partnerships with three diverse aboriginal community schools, and will work with these schools to develop curricula that will be taught using arts, digital technology and youth exchange. The partners will build capacity within the communities to make use of the new curricula, and will spread the

word to other schools. Project partners will work together to provide leadership for the research, and conduct the research.

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File Number: 12 410 1006

Region: IN, GW, NS, SS

Licence No: 15620

Location: Fort Smith, Hay River, Yellowknife,
Inuvik, Tuktoyaktuk

Improving NWT community response to sexual violence against women and girls

The goal of this two-year project was to find out about the mental health and health care needs of NWT women who have been sexually assaulted, and the services that respond to their needs. The project team conducted confidential interviews with ten women from five NWT communities, and almost 40 interviews with service providers in six NWT communities. The project team also studied other Canadian jurisdictions that are doing a good job of meeting the needs of women who have been sexually assaulted. The final report, called "Hush Hush No More - Sexual Assault in the NWT", has been sent to policy-makers including MLAs and Deputy Ministers in the GNWT. There were many recommendations gathered from the interviewees. One was that the NWT must break the silence and talk in families, amongst service providers, and in the public about sexual assault. They recommended that a dedicated sexual assault crisis line be set up. They wanted to see an NWT public awareness and prevention campaign about sexual violence, and generally more available information in schools about sexual assault, abuse, rape and consent. Interviewees recommended that sexual assault court cases should be closed to the public, and that service providers should collaborate more effectively. Finally, they recommended more training for service providers, both about how to support women who have experienced sexual assault and how to prevent sexual assault.

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File Number: 12 410 1018

Region: IN, GW, NS

Licence No: 15646

Location: Inuvik, Yellowknife, Tuktoyaktuk, Aklavik

Aboriginal governance in the US and Canadian north: institutional design and conflict management

The goal of this project is to document how Aboriginal governments are set up, and how they deal with conflicts across the north both in Canada and the US. In 2015-2016, the researcher collected archival reports and government documents from the NWT Archives at the Prince of Wales Northern Heritage Centre, and publicly available reports from the Aurora Research Institute. The researcher also interviewed government officials, policymakers, and Indigenous leaders in Yellowknife and Inuvik. The results are currently being prepared for publication and final reports.

Dobias, Jacob

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File Number: 12 410 1029
Region: NS

Licence No: 15704
Location: Yellowknife

Valuation of water resources and water security in northern Canada

The purpose of this project was, first, to see if it's important to take culture and history into account when creating water management systems and policy, and second, to see how well the NWT is doing on that score. The researcher found that culture, context and history were all very important in water resources management. Since they are so important, these values were included in talks and official government documents in the NWT. This is important in order to make sure all views are included in decision-making. It was found that the NWT made a successful water management strategy. This was because all parties listened to each other in the dialogue and work, and tried to include different values. This shows that there are more holistic ways of looking after water resources. The NWT's water strategy is innovative and should be used by others as an example of best practices.

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File Number: 12 410 1025
Region: SS

Licence No: 15688
Location: Hay River

Shifting towards food sovereignty and agrarian citizenship? A case study of how the Northern Farm Training Institute is attempting to redefine the food system in Hay River, Northwest Territories

Food sovereignty is a global movement that is fighting for people to have the right to make their own food choices, and to have healthy, culturally appropriate food that was grown locally using environmentally sound practices. It focuses on power inequalities on a large scale. Some people have criticized the approach, saying it can romanticize the local and ignore gender, ethnic or class inequalities that may characterize communities. The point of this research was to find practical ways to promote food sovereignty in Hay River while not ignoring local inequalities. The researcher studied the Northern Farm Training Institute in Hay River, NWT. This organization works to shift food systems towards more local, sustainable and just practices. The researcher studied how the institute developed strategies to address power imbalances that impact the community's control over the food system. The researcher also looked at power imbalances between various social groups within the NWT, such as settler residents, new residents from other parts of Canada or abroad, and Indigenous people. This case study shows that the institute's approach is addressing both the larger scale power imbalances between the global food regime and the community of Hay River, as well as power imbalances based on education, socio-economic position, and ethnicity that are particularly significant in this community.

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File Number: 12 410 1035
Region: IN, GW, SA, DC, NS, SS

Licence No: 15751
Location: All NWT

Shifting organizational culture in an integrated electrical utility

The Northwest Territories Power Corporation (NTPC) is a large company with many employees. The company wants to make sure the 'culture' of the company is respectful and their employees feel valued and happy. They have done some research in the past to figure out how best to change the company culture. The goals of this project include, first, to validate the research on this topic conducted in 2014, second, to ask about previous attempts to change the company culture and any pitfalls experienced, and third, to identify what was successful about previous attempts to change the culture. The researchers gathered information through one-on-one interviews and surveys with employees of NTPC. The researchers used the information they gathered to create new strategies which NTPC will employ to close the gap between how things currently are and how they would like things to be in the future.

Fletcher, Alana

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File Number: 12 410 971**Region:** SA**Licence No:** 15710**Location:** Déline**Re/mediating indigenous environmental justice: resource extraction, divergent risk perception, and economic equality in the north**

No research was conducted under this licence in 2015.

Fliesser, Ulrike E.

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File Number: 12 410 995**Region:** NS**Licence No:** 15662**Location:** Yellowknife**Tourism in the Northwest Territories**

The purpose of this research was to study tourism in Yellowknife. The researcher stayed in Yellowknife twice – once in May/June 2015, and again in September/October 2015. Almost 20 interviews were conducted with tourism providers, government employees in different departments and others involved in aspects of the tourism industry. The researcher visited the Legislative Assembly Library to examine the tourism-related materials there with the assistance of the librarians. The researcher also explored Yellowknife extensively on foot, by bus and by car, and attended tourist events and favourite restaurants. In addition, the researcher accepted an invitation to attend the annual general meeting of the Northern Frontier Visitors Centre, and visited the Centre a number of times. Finally, the researcher visited numerous galleries and gift shops, and chatted informally with proprietors, personnel, artists and suppliers.

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File Number: 12 410 1014**Region:** IN, GW, DC, NS**Licence No:** 15591**Location:** Délı̄nę, Inuvik, Fort Simpson

Understanding and addressing males' boating safety practices in the Northwest Territories

The goal of this research is to find out why boating safety practices may be ignored by men, and how best to change their behaviour in order to save lives. Research was conducted in Inuvik, Délı̄ne, and Fort Simpson. There was concern about boat safety amongst community members in all three communities. However, each community wanted a different approach to address these concerns. In Inuvik, community members wanted a safe boating social media and poster campaign. In Délı̄ne, they wanted a northern-focused version of the Pleasure Craft Operator Card course offered, and a boat safety "app" created for mobile phones. In Fort Simpson, they also wanted the Pleasure Craft course, but additionally wanted signs warning of the dangers of drinking and boating. This research will continue.

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File Number: 12 410 582

Region: DC, NS

Licence No: 15715

Location: Fort Simpson, Yellowknife

Cultural safety and physical activity in the NWT

No research was conducted under this licence in 2015.

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File Number: 12 410 976

Region: SS

Licence No: 15593

Location: Łutselk'e, Whitefish Lake

Picturing the Thelon River: Restor(y)ing Denesoline relations en route to the headwaters

The goal of this research is to document how Denesoline knowledge, uses, and connections to the Thelon have adapted, and are adapting, to historical and contemporary changes. Another goal is to re-affirm the importance that Łutsel K'e places on protecting, respecting, and living on their lands. This project was conducted under a collaborative research agreement between the Łutsel K'e Dene First Nation and the University of Waterloo. The researcher held two workshops and interviewed almost 40 people to record their life stories. The workshops included elders, land users, community representatives and youth who were asked to share stories and knowledge about their direct experience with the Thelon, or to share knowledge passed down to them by ancestors. The researcher also asked about positive and negative encounters with, and the impacts of, visitors to the Thelon and other traditional lands. Workshops and interviews were audio-recorded and transcribed, with copies shared with the Łutsel K'e Traditional Knowledge Archives. The researcher held a half-day research analysis and reporting workshop with the Łutsel K'e Wildlife Lands and Environment Committee in May 2015, with six representatives from Łutsel K'e. At this meeting, representatives agreed to schedule the final project component – a knowledge exchange land camp – in March 2016.

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File Number: 12 410 1012
Region: NS

Licence No: 15588
Location: Yellowknife

A single step begins the journey: supporting women who are homeless through transition

The purpose of this research is to assist the Centre for Northern Families in changing their organizational culture. The centre wants to support women who are homeless as they transition from the emergency shelter to owning or renting private market housing in the community. Information was gathered from women who have first-hand experience with homelessness, including those who live at the shelter. The research also focused on the experiences and success stories of women who transitioned from the shelter to the community, and how to help women with this transition. The researcher also looked at what can be learned from shelters in Canada and beyond that have successfully helped women transition to independent living. Through this research, the experience of these women can shape how housing and support services are delivered at the shelter. Having more women leave the shelter for their own housing would reduce overcrowding and improve the financial situation at the centre. A change in the organizational culture of the centre will also help to attract qualified staff and build their capacity to offer quality, consistent service for shelter residents.

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File Number: 12 410 916
Region: NS

Licence No: 15626
Location: Cassidy Point at Aurora Village Lodge

Developing a cultural safety intervention for clinicians: a pilot study

There are currently inequities in health and health care access for Indigenous peoples in the NWT. Teaching health professionals about the importance of providing culturally safe care and the need to tackle systemic racism in health care is critical to address these inequities. In 2014, the Department of Health and Social Services piloted its first cultural safety training intervention with a group of health care staff living and working in the NWT. This goal of this research is to evaluate how successful the pilot training was. The research objectives are to assess the pilot training intervention, and to make recommendations about the intervention's design, content, and delivery. One-on-one interviews were conducted by telephone and in person with eight people who participated in the pilot. To date, the interviews have been transcribed and coded. This interview information, along with questionnaires given out at the pilot training, will be used to draft recommendations on how to improve the training intervention. This project is currently in the analysis phase of the research and should be complete in 2017.

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File Number: 12 410 906
Region: IN, GW, SA, DC, NS, SS

Licence No: 15576
Location: All NWT

Rural and northern community response to intimate partner violence

The goal of this five year project was to assess how effective front-line workers are in dealing with intimate partner violence in NWT communities. This was the fourth year of the study, and during this year two community narratives (or stories) were developed using information collected from two very different NWT communities – one very isolated, and one with more resources. Two focus groups were held with six participants in each, and thirteen additional individual interviews were conducted. Data collection and analysis are now complete, and the results are being shared with organizations and individuals who can use it. “Our Hands are Tied” is the central problem identified by frontline workers. This speaks to the frustration of frontline workers who can only do crisis intervention and not prevention, especially considering how remote their communities are, how few resources they have, and how much the communities accept violence against intimate partners which leads to silence. Education and awareness, assessment and screening, social support, stable and adequate funding, coordinated response strategies, and community healing may help front-line workers in remote communities and reduce intimate partner violence.

Harrison, Hazel

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File Number: 12 410 1023**Region:** IN, GW**Licence No:** 15671**Location:** Inuvik**Smoking cessation survey**

No research was conducted under this licence in 2015.

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File Number: 12 410 1005**Region:** IN, GW, SA, DC, NS, SS**Licence No:** 15559

Location: Inuvik, Norman Wells, Délı̄ne,
Yellowknife, Wrigley, Trout Lake, Hay River
Reserve

A critical review of the Northwest Territories Protected Areas Strategy Program

No summary was submitted for this licence. This project is not in compliance with licensing requirements.

Holtby, Dana

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File Number: 12 410 1026**Region:** NS**Licence No:** 15689**Location:** Yellowknife**CanNor and the Community Readiness Initiative: mining and discourses of development in the north**

Mining and oil and gas developments have long been at the heart of Canadian northern development planning. The negative impacts that these industries bring to northern Indigenous communities are well-known, and are also increasingly recognized by the government. The

Canadian government piloted a program called the “Community Readiness Initiative”, which acknowledges that communities face increased social pressures when mines come to town. The goals of the initiative include preparing communities to best take advantage of the anticipated boom in mining by clarifying both the opportunities people will have in the communities, and the resources the communities will need to handle the boom. The initiative gathers the information it needs through community consultations, a household survey, and the creation of ‘Community Readiness Maps’. There are three goals to this research project. First is to see if the Community Readiness Initiative is working how it is supposed to. The second goal is to see how the Canadian government talks about the impact of northern development on northerners. The third goal is to find out how Nunavut residents feel about the future of mining in their territory. The researcher conducted 16 interviews with key informants from the Federal Government, the Government of Nunavut, the Kitikmeot Regional Inuit Association, and employees of a mine company. The research will be summarized in a thesis in 2016.

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File Number: 12 410 882

Region: NS

Licence No: 15753

Location: Ndilo, Dettah, Yellowknife

Risk communication and trust in decision-maker action: lessons from First Nations, Inuit and Métis case studies in Canada

The goal of this project was to understand how First Nations, Inuit, and Métis people in Canada trust government decision-makers when they are explaining risk. A case study was used to do this, and involved members of the Yellowknives Dene First Nation who were asked how much they trusted regulators when they proposed a way to clean up the arsenic pollution from the Giant Mine. The researchers used a project methodology that looked at trust, confidence and cooperation. People were interviewed, focus groups were held, and a questionnaire was used to gather information. They found that people do not trust the government, because they thought that the government is focussed on making money at the expense of Indigenous people’s welfare. There were concerns expressed about the remediation plan and whether it would be funded long-term, as well as unresolved issues about the operation of Giant Mine in the past (fear, fairness and loss) that were discussed. Participants spoke of arsenic poisoning of community members and their fear for future generations. They felt a profound sense of injustice associated with Giant Mine. Although they incurred little benefit from the mine, they have been disproportionately exposed to arsenic and have lost traditional harvesting areas to both the mine and the growth of Yellowknife. The researcher will use this information to communicate with the Yellowknives Dene First Nation about future health monitoring.

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File Number: 12 410 1041

Region: IN

Licence No: 15765

Location: Inuvik, Tuktoyaktuk

Inuit & scientific knowledge and non-renewable and renewable energy development

The goal of this project is to understand how residents of the Inuvialuit Settlement Region (ISR) and Nunavut are involved in decision-making about energy development. In particular, the

researchers wanted to learn how Inuit/Inuvialuit knowledge is used by decision-makers to assess risks related to offshore development. The research team conducted interviews with decision-makers, government employees, employees of land claims organizations, and community members. Interviews were held in Inuvik and Tuktoyaktuk in the ISR, and Iqaluit, Clyde River, and Pond Inlet in Nunavut. The interviews are still being analyzed and the results will be shared with interviewees and relevant institutions in both regions. It appears that there are clearer rules about integrating the perspectives of residents and Inuit/Inuvialuit knowledge in oil and gas development in the ISR than in Nunavut. In both regions, residents expressed a range of views about offshore oil and gas exploration, with harvesters expressing the most reservations and concerns about potential impacts on wildlife. Residents in both territories were dissatisfied with current consultation practices, and raised concerns about the potential of offshore development to provide real economic benefits to the local communities. Next steps for this project include sharing detailed results with communities in both regions, further analysis of the interviews, and preparing publications.

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File Number: 12 410 1024
Region: DC

Licence No: 15679
Location: Fort Providence

Investigating the empowerment of teachers and students at northern Canadian schools through telecommunication technology

The Connected North Initiative is an educational tool using two-way video that aims to keep kids in school in the north. The goal of this project is to see if the Connected North Initiative is currently having an impact on teaching and learning in both northern and southern schools, and how the program could be improved. The researcher gathered information about the initiative's impact using surveys, focus groups, interviews, and videos. Overall, the Connected North initiative was found to have a positive impact on education. It seems to be particularly good at allowing students to share their culture, a topic which keeps students engaged and teachers empowered. Both students and teachers found it to be of high value, appreciated this exciting new way to liven up course material, and are eager to continue working with the system. The researcher also found benefits for the professional development of the teachers. Different schools had different experiences with the technology, and offered suggestions for improvement. The researcher will use the collected information to make recommendations to the Connected North program as it continues to expand. It is hoped that the program will help more students graduate from secondary and post secondary education programs.

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File Number: 12 410 306
Region: IN, GW, SA, DC, NS, SS

Licence No: 15625
Location: All NWT

Comparative research on older adult abuse - networking to prevent older adult abuse

The goal of this research is to see if there have been changes in public awareness and responses to older adult abuse due to a program started in 2010 that was called "The NWT Network to Prevent Abuse of Older Adults". The researchers surveyed almost 650 older adults and

interviewed almost 60 people from 15 NWT communities. Although no one is keeping track, the problem of older adult abuse hasn't diminished since 2010. The organizations that are meant to help older adults say the number of people needing their help hasn't changed, but that there is a greater concern about the safety of vulnerable older adults. There is some good news from this project, as residential school supports, regular socio-cultural and intergenerational activities, and other programs are making some difference in addressing abuse. The NWT Network is not widely known but is a valuable source of information and relationships. This research suggests that continued education, awareness, advocacy, and community-based activities should be the main focus of the NWT Network in the future.

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File Number: 12 410 955

Licence No: 15570

Region: IN, GW, SA, DC, NS, SS

Location: All NWT

F.O.X.Y. participatory action research project

Fostering Open eXpression among Youth (FOXY) is a project that encourages a new way of talking with young women about sexual health, sexuality, and relationships. The project has offered workshops for hundreds of young people, and uses new ways of communicating with young people, such as through the arts and digital story telling. The goal of this current project was to see how successful FOXY has been. The research team surveyed over 250 youth who had participated in sexual health education workshops this year, to see how successful the program was. Any identifying features were removed from the surveys, and the information will be used for the program's annual evaluation report that is due in March 2016. Overall, participants say that they are satisfied with the program, that they felt they had gained knowledge about sexual health, and that they are more likely to adopt safer sexual health behaviors.

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File Number: 12 410 1036

Licence No: 15755

Region: IN

Location: Aklavik, Inuvik, Tuktoyaktuk

Examining community adaptation readiness in the Inuvialuit Settlement Region, Northwest Territories

No research was conducted under this licence in 2015.

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File Number: 12 410 998

Licence No: 15762

Region: NS

Location: Ndilo

Climate Change and Our Lands in film: a N'dilo youth community wellness project

In 2015, Kalemi Dene School, the Yellowknives Dene First Nation and the Institute for Circumpolar Health Research entered a partnership to study climate change impacts on health. The goal of the project was for high school students to create a climate change adaptation strategy in the form of a documentary film. Student researchers used a 'participatory action video research methodology'. Participatory action research is a way of studying a topic by including community members in the research, and focussing on creating change together. The students received training in documentary film production and interview skills. Also, there were weekly seminars on climate change science, traditional knowledge and climate change policy. Students conducted seven interviews in total, and had creative control over all aspects of the research process. They received three credits in communications and technology. The students produced a documentary film, "Climate Change and Our Lands in Film". Just as importantly, students developed various skills and the capacity to conduct research and maintain their roles as stewards of the land.

Mantla, Rosa

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File Number: 12 410 999**Region:** NS**Licence No:** 15577**Location:** Tłıchq Region**The history of Tłıchq peoples' last names**

No research was conducted under this licence in 2015.

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File Number: 12 410 1032**Region:** DC, NS, SS**Licence No:** 15723**Location:** Yellowknife, Fort Providence, Fort Resolution**Linking sport research and policy**

Sport Canada is a Federal program. One of the goals of the program is to increase the participation of Aboriginal people in sports, and to increase their access to sports. The purpose of this project was to see whether offering traditional Inuit and Dene games to Aboriginal youth might be a good way meet this goal. A total of 18 participants took part in this research. Specifically, ten adults (including coaches, administrators, and elders) and eight youth athletes took part in either a group interview or a one-on-one interview. All interviews were audio-recorded and then transcribed word-for-word. Transcripts were analyzed and common themes were identified. Preliminary findings from the interviews suggest that participation in traditional games can increase the participation of Aboriginal peoples in sport in five main ways. These sports promote cultural pride, encourage interaction with elders, support a connection to the land, and help young people develop personal characteristics. Finally, traditional sports promote physical literacy. As a result of this project, the research team has developed a relationship with representatives from the Northern Games Society. The research team is currently working with research participants and representatives from the Northern Games Society to confirm their findings.

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File Number: 12 410 1022
Region: SA

Licence No: 15664
Location: Tulít'a

Tulít'a histories, relationships with land and resource extraction in the Mackenzie Valley

This research project was looking at the relationships that Tulít'a Dene and Métis peoples have with the land, and how they feel about oil and gas development, considering their past and present experiences. The three principal research questions were: how do Tulít'a Dene and Métis understand and relate to the land and 'hydrocarbons' (oil and gas)? How is past and present oil and gas development remembered by Dene and Métis people? And finally, how do memories of past oil and gas development and recent hydraulic fracturing exploration impact how people see current and future development in this region? To answer these questions, the researcher interviewed 22 people in Tulít'a and took two trips on the land in the area surrounding Tulít'a with research participants. Research participants shared creation stories, Dene prophecies, and family and community histories of early oil and gas development (particularly early Imperial Oil activities in the 1920s and the construction of the Canol pipeline in the 1940s). They also shared experiences of political and economic changes from oil and gas development, and their perceptions of recent hydraulic fracturing exploration and the impacts this has had in the community. The researcher also searched several archives for information. Results will be included in a doctoral dissertation which will be shared with community organizations, as well as a plain language summary.

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File Number: 12 410 1042
Region: IN, GW

Licence No: 15766
Location: Inuvik

Pacific Northwest economic region - roadmap to resilient, net-zero buildings and deep energy retrofits

No research was conducted under this licence in 2015.

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File Number: 12 410 1030
Region: SS

Licence No: 15709
Location: Fort Smith, along the Slave River and
 Cassette Islands (near Fort Fitzgerald, AB)

Cassette Islands project

In recent years many Smith's Landing First Nation land users and elders have noticed changes in the environment. They have seen declining plant and animal populations, the appearance of new species, significant changes in seasonal patterns, changes in the properties of snow and ice, and extreme weather fluctuations. The Tthëbayághe Nué Bekahuneka (the Cassette Islands Climate Change Research Project) was developed to have youth work with elders and western scientists to document climate change observations and community impacts. The Cassette Islands were chosen as a focal site because they were once an important harvesting place. The

youth assisted in data collection by helping to conduct interviews and surveys with elders and land users, and then held a wrap-up sharing circle with nine Thebacha area elders and land users. All participants agree that the climate is changing and that there have been significant changes to traditional harvesting and livelihoods on the land. At the same time, themes of resilience and adaptation emerged from the stories, reminding researchers how Indigenous people have been adapting to change for millennia. Those same skills are expected to help the people of Thebacha and Thebathi weather the storm of our current climate change. The main challenge will be ensuring that future generations possess the on-the-land skills that contribute to this ability to adapt.

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File Number: 12 410 650

Region: IN

Licence No: 15699

Location: Ulukhaktok

Cultural meaning of food and food security

The goal of this project is to document knowledge about beluga in Ulukhaktok. In July and August 2015, the researchers worked with local partners and two local researchers to conduct 26 in-depth interviews with community members. The research team asked interviewees about their knowledge of beluga whale behaviour and ecology, how to hunt beluga, and meat-muktuk preparation. The research team surveyed an additional 100 people about how people share, with a particular interest in how country foods, including beluga, are shared. These interviews and surveys are currently being transcribed (typed out) and analysed.

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File Number: 12 410 1044

Region: IN, GW

Licence No: 15776

Location: Aklavik, Inuvik, Fort McPherson,
Tsiigehtchic

Cultural and environmental history of northern food hazards

No research was conducted under this licence in 2015.

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File Number: 12 404 863

Region: IN, GW, SA, DC, NS, SS

Licence No: 15632

Location: All NWT

Policy opportunity windows: enhancing research uptake in practice! (POWER UP!)

The goal of this ongoing Alberta-NWT project is to understand if and how new health policies might help prevent chronic disease by getting people to be more active, eat better, and lose weight. The research team focused on sharing information with the public, with people who work in healthcare and education, and with people who write and approve government policies. To

gather information, the research team surveyed people by telephone and asked them about their knowledge, attitudes and beliefs about healthy living. They also surveyed policy makers, employees from various school districts and school boards, and people who work for newspapers and magazines, municipalities, and the territorial government. As well, project partners created an online survey that was sent to the Senior Administrative Officer in each community in the NWT. The research team continues to analyze all the information that was gathered. In the future, they will collect stories from policy makers about how changing public policy can prevent obesity and chronic disease.

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File Number: 12 410 1039

Region: NS

Licence No: 15763

Location: Yellowknife

A search for sustainable energy future for the Northwest Territories: the role of policy integration

The goal of this project was to determine if the renewable energy policy framework for the Northwest Territories satisfies a certain set of rules, or 'criteria', for policy integration. For example, does the policy cover everything it should, did it include a review of all possible energy sources, and is it true to itself throughout with no inconsistencies? The researcher found that the NWT renewable energy policy framework is comprehensive, and is aimed at reducing the cost of living and doing business in the NWT, where the cost of energy is a major expense. The policy assessed various energy alternatives, which were discussed with the general public through a type of consultation known as "Energy Charrettes". The likely reason for the policy being integrated is that the NWT government is a consensus government. Consensus governments don't change policies as quickly as party-based systems. Long-term policy solutions become possible, which is important for issues like renewable energy that require a long-term approach. There is also better information exchange in a consensus government. Policy solutions supported by the Cabinet are upheld in most cases, so someone with a new policy can often get it adopted by finding allies among Cabinet members.

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File Number: 12 410 1021

Region: NS, SS

Licence No: 15663

Location: Yellowknife, Behchokò, Fort Smith

Land-based initiatives in Canada's north: moving towards cross-cultural understanding of the importance and meaning of on-the-land trips

The goal of this project was to study on-the-land programs, and what they mean to participants, across the north. The researcher interviewed 11 Indigenous individuals about the significance of land-based programming in their lives. The researcher found that interviewees shared a similar, culturally determined philosophy towards land-based practice. This philosophy acknowledges the connection and relationship with the land itself as central to a person's mental health and wellbeing. It became obvious from the interviewees that the way formal land-based programs were designed was important for supporting individual and community resilience in the face of continued health challenges across the north, especially among youth. The interviewees

described how land-based education, health and healing, and stewardship are deeply connected and overlapping. They mentioned many benefits of on-the-land programs, including cultural revitalization, healthy nutrition, physical fitness, self-confidence, sense of identity, relaxation, personal well-being, language transmission, strengthened interpersonal relationships, enhanced learning, and environmental stewardship. Some challenges that were identified included cross-cultural barriers when people are planning the camps and what the outcomes should be, adequate funding and resources, wilderness logistics and safety concerns, the intensity and unique challenges involved in land-based work, and colonial disruption of land-based skills and knowledge transmission (for example, knowledge sharing through oral history).

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File Number: 12 410 1028

Region: SA

Licence No: 15702

Location: Délı̄ne

Self-determination in Délı̄ne: cultural and linguistic revitalization in a legal and spatial context

The goal of this project was to study the transition of the community of Délı̄ne as it became self-governing. The researcher recorded many stories from the community about their hopes for the new agreement. The researcher also studied relevant history to provide context to the stories. This included a partial history of governance and colonialism in Délı̄ne, from time immemorial to the beginnings of land claim agreements. The researcher also examined the legal structure of the Canadian state and how the government negotiated land claims and self-government agreements, and some of the legal obstacles that Indigenous communities face. Finally, the researcher identified four different ways of thinking about the future of self-government and intercultural bureaucracies in Délı̄ne. These different ways of thinking can be told as overlapping stories repeated by many people. People may talk about self-government as a bubble in which “culture” occurs, or as a series of opportunities for Dene values to transform Canadian structures. The researcher was told that bureaucracy is a skill, and that Dene can learn to be “strong like two people,” or that self-government was prophesied by ?ehtse’o Ayha. A final thesis will be shared with the community in September 2016.

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File Number: 12 410 394

Region: NS, SS

Licence No: 15743

Location: Yellowknife, Behchokò, Lutsel K’e

Resource royalties distribution and community development

The purpose of this project was to see how people feel about the distribution of royalties and profit shares chosen by Aboriginal communities. Royalties and profit shares refer to the money that developers must pay to Aboriginal communities and other governments. The researcher surveyed people in aboriginal communities in Canada by phone and on line. Responses were collected in Ontario (15), New-Brunswick (one) and the Yukon (one). The surveys show that communities are dealing with many issues when they make decisions about how to distribute royalties. For example, some issues are how to make decisions and how to inform all community members. Although more than half of the people surveyed said they consulted community members at the

beginning of the process, communication between participating communities remained an issue once the money started to be distributed. However, all communities that have responded to the phone survey feel that the distribution of royalties has been beneficial. A few respondents (less than one in ten) said they would prefer individual payments. More than half felt that investing royalties in long-term community projects or trust funds has already been beneficial to their communities, for example, for health care or education. This way, they feel that the revenues from the royalties will last once the agreement has ended and will benefit generations to come.

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File Number: 12 410 1020**Region:** SS**Licence No:** 15660**Location:** Fort Smith**Indigenizing science classes at Aurora College (Thebacha Campus)**

No research was conducted under this licence in 2015.

Saxon, Leslie A.

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File Number: 12 410 210**Region:** NS**Licence No:** 15759**Location:** Behchokò, Whatì, Gamètì, Wekweètì, Yellowknife**Tłıchq̓ on-line and print dictionary**

The goal of this project is to produce a Tłıchq̓ dictionary in both print form and on-line. In 2015, minor revisions were made in the on-line database (in other words, changes were made to the computer code but not the Tłıchq̓ words). The research team began planning to review the dictionary and to form a dictionary committee in Tłıchq̓ communities.

Schmidt, Glen G.

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File Number: 12 410 988**Region:** NS**Licence No:** 15666**Location:** Yellowknife**Social work supervision: emerging needs**

No research was conducted under this licence in 2015.

Shiri, Ali

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File Number: 12 410 1008**Licence No:** 15568

Region: IN**Location:** Paulatuk, Ulukhaktok, Sachs Harbour, Tuktoyaktuk, Inuvik, Aklavik**Digital library north: creating a path for information access in Canada's north**

The Digital Library North is a collaborative project between the Inuvialuit Cultural Resource Centre and researchers at the University of Alberta. It is designed to make Inuvialuit books, reports, and files available to the geographically-dispersed population of the Inuvialuit Settlement Region through the internet, while making sure that confidential files are protected. The research team incorporated local and traditional knowledge in the design, implementation and sustainability of the project. In addition to suggestions from the Inuvialuit collaborators about what to include in the digital library and how to create it, the research team also took a step back and looked at what is going on in the Inuvialuit region and how the library could meet people's needs. The research team has made a list of potential library users, communities, stakeholders, information providers and information resources through surveys and interviews, and will take this into account when they set up the library. Once the research team has a good idea of what the digital library users will want to find, how they will want everything organized, and how they will want to be able to search, they will get people to test it out.

Simmons, Deborah

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File Number: 12 410 678**Region:** SA**Licence No:** 15640**Location:** Norman Wells, Tulít'a, Déljñę, Fort Good Hope, Colville Lake**Mapping knowledge in the Sahtú Region**

The goal of this project was to take information on the Sahtú that was stored on paper maps, in records, and on computers, and return it to the residents and decision-makers in the Sahtú Region. The project included information from several different studies, including the Sahtú Settlement Harvest Study and the Dene Mapping Project. For the harvest study, the research team are taking the numbers of animals harvested and creating a report with understandable information for the communities. For the Repatriation of Dene Mapping Project, the research team are updating old computer files. Paper maps have been conserved and scanned. The research team also finished a 'Spatial state of knowledge of the Central Mackenzie Valley/Sahtú Region' project. They made a catalogue of maps and computer map files that are now available on the Sahtú Renewable Resources Board website for researchers, community/regional organizations, and others to freely use. Finally, the research team has released a community atlas. This password-protected online map is available for renewable resource councils and other community or regional organizations. An ongoing Sahtú-wide engagement process continues, including meetings with community renewable resource council members and other stakeholders. There have been three engagement tours, with another planned. There has also been continued contact between community and regional stakeholders and the project team.

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File Number: 12 410 678**Licence No:** 15647

Region: SA**Location:** Colville Lake, Délıne, Fort Good Hope, Norman Wells, Tulı'ta**Sahtú youth network for a regional action plan on the health impacts of climate change**

This is the latest step on a multi-year journey by Sahtú communities to address the impacts of climate change on individual and community health, by helping young people become community leaders. Expanding on previous projects in Tulı'ta, Délıne and Fort Good Hope, this project had a regional approach for the first time. It involved the formation of a regional Sahtú Youth Network whose members led the investigation and conducted interviews with Sahtú elders and harvesters. Over the course of this project, the youth network participants identified environmental determinants of health related to climate change in the Sahtú, mapped the connections between climate change and environmental and human health effects, and identified ways that young people can make a difference. At the urging of the youth network members themselves, investigation methods were centred around on-the-land, experiential learning. A Tulı'ta youth participant summarized the project as follows: "We're coming together to try to find things we can work on, things we can do around language, culture and our land. We are getting to know the land and trying to find out what's changing, so that we can use it in safe ways and think about it for future generations."

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File Number: 12 410 678**Licence No:** 15746**Region:** SA**Location:** Délıne**Our land is changing: climate change, food security and health in Délıne**

The goal of this project was to study climate change and its effects on human health and 'food security', or the ability of Dene people to get their own healthy and nutritious food. The project was linked to community initiatives on caribou conservation and food security planning, and included focus groups, interviews, and on-the-land activities. In Délıne, like many other communities, health is linked to living off the land and eating traditional foods. Climate change is impacting the health of the land, the water, the animals and the people. There has been a shift away from the Dene way of life to one that is more dependent on food from the store. Community members described changes they have seen in the weather and their land, and discussed how much more unpredictable and risky travelling can be. Community members are unsure if younger harvesters have the skills they need to survive on the land if they encounter problems. Transferring skills and language to the next generation of harvesters is critically important, not only for safety purposes but to ensure the supply of traditional foods from the land. As a result of this research, a community-based food security and adaptation plan has been proposed, entitled 'Dene béré belarewıle - Ensuring food security for future generations in Délıne'.

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File Number: 12 410 1037**Licence No:** 15756**Region:** SS**Location:** Kakisa**Building community resilience in Kakisa**

The goal of this project is to help the community of Kakisa increase its ability to withstand changes in the future. Preliminary work in Kakisa on the development of a recycling and waste management plan was completed during this year. The research team used participatory research methods, which means that the researchers worked closely with the community members and included planning for change as part of the research process. The researchers held a workshop and a general educational presentation on recycling, and gathered community input. A plan is being developed.

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File Number: 12 410 986

Region: SA

Licence No: 15580

Location: Délıne

The wind will not wait for you: Sahtuot'ine spirituality

The Sahtúgot'ıne have lived in the Sahtú Region around Great Bear Lake since time immemorial. Elders believe that spirituality is the foundation for language, culture and worldview and that it is essential for language and culture to be taught in the context of spirituality. This thesis provides a description and a definition of spirituality from the perspective of the Sahtúgot'ıne, distinguishing spirituality from concepts such as worldview, culture and medicine power. In keeping with the traditional ways of preserving and transmitting knowledge to future generations, this thesis relies heavily on stories passed on from elders. The thesis explains key concepts of Sahtúgot'ıne spirituality. First, like human beings, all animals on this earth have a living spirit or bets'ıne. Other entities on this earth - plants and trees, the water and the wind - are also living beings with their own Yedı. Specific geographic sites with a special significance to the Sahtúgot'ıne are also said to be Yedı. The other key concept is the existence of three dimensions of existence and their inter-relationship, which is crucial to the understanding of Sahtúgot'ıne spirituality.

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File Number: 12 410 1043

Region: NS

Licence No: 15774

Location: Yellowknife

Delivery system for pre-engineered manufactured self-sustaining (PEMaSS) housing to remote regions

Homes are costly to build, operate and maintain in Canada's North. The goal of this project was to see if policy changes by the city of Yellowknife about five years ago, which were meant to make houses use less energy, were actually working. This will help the research team in their long-term goal of creating an assessment tool to calculate how energy-efficient a newly planned house will be. The research team interviewed home occupants and builders, and reviewed the EnerGuide assessment of 1744 homes in the NWT. The EnerGuide energy rating service rates homes for how energy efficient they are. In 2008, the City of Yellowknife adopted a by-law (4469), which introduced mandatory minimum energy efficiency levels for newly built private homes. The city ordinance went into effect shortly thereafter. A total of 220 homes constructed between 1990 and 2007, and 102 homes built between 2010 and 2015, were evaluated in Yellowknife. In every way that they were tested, homes built after 2010 were remarkably more energy efficient. These homes used 12% less electricity and consumed 30% less total energy than homes that were

constructed in the previous time period (1990 to 2007). This finding has important implications for policy makers, because it is a stepping stone for the introduction of similar by-laws in other northern municipalities, which would make housing much more affordable.

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File Number: 12 410 934

Region: IN

Licence No: 15676

Location: Inuvik, Aklavik, Tuktoyaktuk, Paulatuk, Sachs Harbour, Ulukhaktok

Food security, environment and community health: integrating participatory methods, tools and knowledge to promote food security in the Inuvialuit Settlement Region

The goal of this ongoing project is to study food security in the Inuvialuit Settlement Region (ISR). Food security refers to people's ability to get their own healthy and nutritious food now and into the future. The research team started a food cost study to document the price of healthy and commonly consumed foods in ISR communities. This project builds on research priorities that were identified by local and regional representatives from the ISR during workshops held in Inuvik. A community research assistant from each of the six ISR communities received training to collect food price information. Food prices were collected seasonally for a year, with a final round of food costing anticipated in late fall 2015. The research team will provide the results to the communities in the spring of 2016. A second project component took place in Inuvik at the East Three Secondary School, with the goal to promote youth engagement with country foods. The research team planned to educate and build awareness about nutrition, harvesting, food preparation, food preservation, and consumption. Two community youth were hired as project assistants to help develop and implement the project. The project team interviewed professionals in education and public health to identify barriers to, and opportunities for, the integration of country foods in schools in the ISR. Follow-up work is underway.

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File Number: 12 410 1034

Region: NS

Licence No: 15735

Location: Yellowknife

A study exploring the challenges and facilitators of nursing faculty engagement in research in college and polytechnic institutions and the role of library services in supporting this research

The goal of this project was to see how often the instructors in nursing programs are conducting research, and why. The research team sent out email surveys to undergraduate nursing program faculty members in 53 colleges and polytechnic institutions across the country. Preliminary results confirm what the research team had found in the scientific literature on this topic. Important barriers to doing research include a lack of time, and a lack of willingness to do research and hone skills. Nearly 70% of the participants had no plan to start or do any research. Over one-half either did not know whether doing research was important to keeping their jobs as nursing instructors, or did not believe that it was important. The researchers also found other challenges in Canadian colleges and polytechnics that prevent faculty from doing research. The research team has sent their results to leaders at colleges and polytechnics in the hope that this will provide

resources to nursing faculty that will support new research, and help identify the learning needs of nursing faculty.

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File Number: 12 410 970

Licence No: 15644

Region: IN, NS

Location: Yellowknife, Inuvik, Tuktoyaktuk

Inuit regional autonomy in the provincial and territorial north

The goal of this project is to study the government-to-government relations between three Inuit areas of Canada's north – Nunavik in Quebec, Nunatsiavut in Newfoundland and Labrador, and the Inuvialuit Settlement Region in the Northwest Territories. In November and December of 2015, a member of the research team traveled to Yellowknife, Inuvik and Tuktoyaktuk to conduct interviews with local, regional and territorial officials. The research team have written a book summarizing the research in the three regions, and are also writing a shorter policy brief or report that summarizes the main research findings, which will be sent to the officials in the study area. This is the first project that compares intergovernmental relations and policy development across the three regions. The research team hopes that this project is a starting point for developing long-term research relationships with officials in each region. Later stages of research will collect important and valuable information about how different regions make policies and build relationships with other levels of government.

Traditional Knowledge

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File Number: 12 410 948
Region: GW

Licence No: 15634
Location: Fort McPherson

Arctic Domus

The goal of the overall research project is to study domesticated animals in the northern parts of the globe. This component project is focussed on dogs in the Gwich'in area. The research team searched archives for information about colonialism and dog breeds in the NWT, and the use of dogs by state agencies (such as the Northwest Mounted Police) in northern development schemes. They also searched for information on early American anthropology and the question of domestication in the NWT, and how Canadians in general view the idea of domestication in the Canadian north. Researchers visited archives in the Kew Gardens and the British Museum, both located in London, England. The researchers shared photos and experiences with the Gwich'in Social and Cultural Institute (GSCI) and several Gwich'in elders. The research team wrote several papers and presentations on dogs. This included a paper on Gwich'in dog teams, a paper on dog blankets and embroidery, and an article on the history of sleds and dogs in the North. The research team is co-editing a book on Dogs in the North which has a significant NWT presence (at least 3 chapters), including one from the GSCI. Further fieldwork trips are in the planning stage in order to conduct community research in Fort McPherson during Spring 2016.

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File Number: 12 410 1015
Region: IN

Licence No: 15594
Location: Aklavik

Aklavik traditional use and traditional knowledge study

The goal of this project is to gather Inuvialuit traditional use information about the Yukon North Slope from residents of Aklavik. In January 2015, the researchers held a planning meeting with the Aklavik Hunters and Trappers Committee and a public meeting to discuss the Yukon North Slope Traditional Use (TU) study. The research team then interviewed 40 respondents over a four week period in February and March. The Hunters and Trapper Committee was responsible for selecting the interviewees. For every trip the interviewees made to the North Slope, the research team carefully recorded the location, date, season, and activity. The maps from these interviews

have been scanned, and the information on the maps has been converted into a computerized mapping file. Interview audio recordings have been transcribed (typed out). The interview team followed standard ethical guidelines about informed consent and confidentiality, and had all participants sign a permission form. The researchers and the Hunters and Trappers Committee plan to hold validation/confirmation workshops in Aklavik in late February or early March 2016, in order to review draft reports and maps with interviewees and other community members. A draft of the study report will then be submitted for review by the Hunters and Trappers Committee and the North Slope Wildlife Management Advisory Committee.

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File Number: 12 410 1019

Region: IN, GW

Licence No: 15654

Location: Aklavik, Fort McPherson, Inuvik, Tsiigehtchic, Tuktoyaktuk

Arctic borderlands ecological knowledge society: community based ecological monitoring program

The Arctic Borderlands Ecological Knowledge Society Community Based Monitoring Program is a long-term monitoring project with the goal of collecting people's observations of the land. Community researchers were hired in Aklavik, Inuvik, Fort McPherson, Tuktoyaktuk, and Tsiigehtchic to conduct approximately 20 interviews with both Inuvialuit and Gwich'in community members about their time spent on the land. Interviewers received training and assistance with report writing and data entry as required throughout the project. Community gatherings were held in each of the communities in partnership with local Renewable Resource Councils and Hunters and Trappers Committees. Community interviewers prepared a report on their findings, and presented their report at their community gathering. In addition to these reports, Arctic Borderlands members presented summaries of information gathered from the past season and led community discussions. These local gatherings were advertised in advance in each community, and everyone was welcome. A report from these gatherings was sent to all interviewees, interviewers, other participants and partners, and was posted on the Arctic Borderlands website.

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File Number: 12 410 1001

Region: IN

Licence No: 15585

Location: Inuvik

Traditional knowledge of beluga whale sustainable hunting and harvesting

The goal of this research project was to collect traditional knowledge about sustainable beluga whale hunting and harvesting by the Inuvialuit people from the Inuvialuit Settlement Region, with a special focus on how sustainable beluga whale hunting and harvesting has changed from the past to now. Questionnaires were developed and mailed out to people who hunt and harvest beluga whales along the coast at Kendall Island, Baby Island, and East Whitefish Station. Once questionnaires were returned, they were typed up and a technical report containing graphs, tables and maps was created. Some questions that were asked in the questionnaire included what type of equipment is used for hunting, what types of tools are used for harvesting, how did participants

prefer their muktuk (cooked or raw), did they eat the heart and flipper, did they award first time hunters, and, do women get to participate in whale hunting? The researcher also asked if the participants had noticed any change in the beluga whales, or hunting and harvesting. The researcher wrote a technical report and made a presentation at the Aurora Research Institute. Copies of the report were printed and mailed out to those participants who had requested a copy.

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File Number: 12 410 1038

Region: NS

Licence No: 15758

Location: Dettah, Ndilo

Yellowknives Dene astronomy and sky-related knowledge

The goal of this project is to document Yellowknives Dene knowledge and language about the stars and sky. To gather this information, the investigators interviewed eight elders in Dettah and Ndilo in early November 2015. Elders described traditional knowledge related to the northern lights, stars and constellations, star navigation techniques, eclipses, meteors, atmospheric halos and sundogs, thunder and lightning, and the sun and moon. In particular, the investigators focused on documenting a large constellation called yéhdaa that resembles a man. This constellation is a spiritual figure that is further subdivided into eight smaller groups of stars that are named using words for body parts. Yéhdaa is similar to other human-like constellations that the investigators have documented in Alaska Dene languages, and it is apparently widespread across the northern Dene region. The research team included a linguist who assisted with the language documentation in both the Wíi líi` deh and Tetso `t'iné dialects. A Yellowknives Dene star chart with 19 star names and a typed wordlist of astronomy-related terminology were submitted to both the Yellowknives Dene traditional knowledge specialist in Ndilo, and to the Goyatiko Language Center in Dettah. Digital copies of the interviews that were recorded during this project are stored at the Goyatiko Language Center.

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File Number: 12 410 989

Region: IN

Licence No: 15596

Location: Sachs Harbour

Working towards a community-based archaeology of Banks Island, NWT

The goal of this project was to see how the Ikaahuk Archaeology Project can best address community concerns and involve community members in archaeological research. Fieldwork conducted in 2015 involved six weeks of interviews and 'participant observation' in Sachs Harbour. Participant observation refers to an anthropologist living in the community and documenting life. The researcher took part in the traditional goose hunt, and community members discussed how this was an important aspect of engaging with their heritage and past. Within the community, there are diverse and sometimes conflicting understandings of the past and perceptions of archaeology. Community members identified their concerns with archaeological research and gave ideas for future research. They also identified ways that the community could be better involved in future research, and how archaeology can fit into their existing heritage management practices. Based on concerns raised by community members during previous field seasons the Ikaahuk Archaeology Project hosted a community trip to the Prince of Wales

Northern Heritage Centre, where community members were able to interact with artifacts that had been excavated on Banks Island. Interviews are currently being analyzed and work continues. An Ikaahuk Archaeology Project and Inuvialuit traditional knowledge website will be launched to address concerns that researchers do not share their results effectively.

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File Number: 12 410 906
Region: IN, GW

Licence No: 15648
Location: Aklavik, Inuvik, Tuktoyaktuk,
Tsiigehtchic, Fort McPherson

Using Inuvialuit and Gwich'in observations to monitor environmental change in the Mackenzie Delta Region

The Mackenzie Delta Region is an active environment that is ecologically and culturally significant. It is experiencing rapid environmental changes that are expected to get worse. Some areas are changing so quickly that communities and researchers cannot keep track. Inuvialuit and Gwich'in land users are in an excellent position to understand what is changing on the land. Therefore, the main goal of this research project is to document Inuvialuit and Gwich'in observations of the environment through interviews. In previous years, the research team showed pictures of disturbances during the interviews, and asked questions about them. In 2015, the research team added a new focus: muskrats. Seventy on-the-land monitors recorded their observations of changes in muskrat populations, water flow in the Mackenzie Delta, and human disturbances. Extensive interviews were conducted about muskrats. Interviewees discussed how economic and social changes in the last 50 years have affected muskrat harvesting, how muskrat populations are changing, and shared their observations of changing beaver, otter, and muskrat interactions. Many interviewees said that water levels and spring flooding strongly influence muskrat populations, but also indicated that muskrats are not declining consistently in all areas of the Delta. However, numerous interviewees stressed that recent declines are unlike anything seen before. This research is ongoing.

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File Number: 12 410 1031
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Licence No: 15712
Location: Paulatuk

Traditional ecological knowledge of capelin in Darnley Bay, NT

The goal of this project was to collect Inuvialuit traditional knowledge about capelin, an important small fish eaten by other fish and an indicator for changing climate. The research team wanted to gather traditional knowledge in order to combine scientific knowledge gathered in recent years with observations from the community about capelin. A youth from the community was hired and interviewed five elders. The youth also transcribed (typed out) the elders' answers. Five other community members also filled out observation questionnaires, in which they used a map to show where they had seen capelin in the past. The elders and community members provided information on locations where capelin spawn, and how long they have been spawning in Darnley Bay. The research suggests that capelin have been present in Darnley Bay since as early as 1959, which means they are not a recent invasive species into this northern habitat. This

traditional knowledge study was part of a scientific research project, the Darnley Bay Nearshore Survey.

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Region: SA

Licence No: 15572

Location: Délı̄ne

Mapping, language and stories in Délı̄ne

As the community of Délı̄ne makes a transition to self-government, there has been increased interest in stories, songs, and concepts of place in order to better understand what these reveal about Dene ts'ı̄lı̄ (being Dene). An indigenous research methodology is being developed through this project, and was presented at the International Conference on Language Documentation and Conservation. The project team showed how to document language while in the community, with a focus on creating a digital archive. Community researchers have also become experts in transcribing and translating recordings. As well, the research team is studying Father Emile Petitot's dictionary from the 1850s, which gave rise to the surprising finding that the Délı̄ne language was distinct from neighbouring languages earlier than was previously known. The project team continued research on place names around Great Bear Lake, and continued research on song and its importance to the community of Délı̄ne. This project has supported the completion of two Masters theses.

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File Number: 12 410 678

Region: SA

Licence No: 15720

Location: Tulıt'a, Délı̄ne, Fort Good Hope, Colville Lake, Norman Wells

Sahtú region wolverine traditional knowledge study

The goal of this study was to record Sahtú traditional knowledge about wolverine. This study included elders and harvesters from Tulıt'a, Délı̄ne, Fort Good Hope, Colville Lake and Norman Wells. The researchers asked elders and harvesters what they think is important about wolverine, given current events such as climate change, an increase in industrial development, and the fact that wolverine are at risk in southern Canada. The elders agreed that although wolverine are difficult to locate, especially when they have young, harvesters have seen fewer tracks in the boreal forest of the Sahtú Settlement Region over the last decade, yet have seen more wolverine on the tundra. The elders suggested that they may be moving north. The elders and harvesters did not discuss the relationship of wolverine with caribou, however one hunter described seeing several wolverines feeding on musk-ox. Given the apparent decrease in numbers in the Sahtú Settlement Region (which is different than what is reported by Gwich'in elders) and the importance of wolverine to the Dene and Métis, the elders suggested "ending sport hunting" in order to ensure that Dene and Métis have access to this culturally important animal into the future. They also suggested that students should hear more oral history from elders, given the significance of wolverine in providing insight into Dene laws and environmental responsibilities.

Archaeology

Andrews, Tom

Prince of Wales Northern Heritage Centre

Permit Number: 2015-021

Region: GW

Class: 1

Location: Travaillant and Trout Lake areas

Archaeological sites and slump risk inspections

Throughout the Northwest Territories, permafrost is thawing due to climate change, which is leading to big changes on the land – changes which can impact archaeological sites. It is hard to keep an eye on all these changes. However, it is important to understand where archaeological sites are most at risk. For this reason, the project team, created a digital risk map that showed different levels of threat to cultural sites in the Gwich'in Settlement Area. The risk map showed that the greatest threat to Gwich'in cultural resources is on the Peel Plateau. Areas close to the Mackenzie River and Delta seem to be at low risk. After making the risk map, the researchers went to check out three spots that are rich in heritage resources to see whether melting permafrost is actually affecting archaeological sites. Two spots were “medium-high risk” on the risk map, located on the Peel Plateau west of Fort McPherson. The shore of two lakes on the Ramparts Plateau labelled as “medium risk” were also checked out. The research team looked at each site from a helicopter. What did they find? On the Peel Plateau they did not find any archaeological sites impacted by slumping. On the Ramparts Plateau they found that lake shorelines were eroding, which their satellite mapping research had missed. This means the risk map needs to be revised as often as possible, to make sure that areas that are really at risk are caught by the map.

Clarke, Grant

Golder Associates Ltd.

Representing: New Discovery Mines Ltd.

Permit Number: 2015-005

Region: NS

Class: 2

Location: Discovery Lake area

Mon Gold project archaeological impact assessment (AIA)

This project included archaeological fieldwork carried out in the location where the Mon Gold mine will be built, on Discovery Lake. There has been mining here before, and the area is currently used as a camp and work area by the mining company, New Discovery Mines Ltd. The Mon Gold mine site is within the traditional lands of the Yellowknives Dene First Nation, Tłı̨chǫ, and Métis people. The archaeologists decided that fieldwork was needed because there are some landscape features known to be good areas to look for archaeological sites. These features included the shoreline and some nearby high areas, including an esker. There has been little archaeological work done to date. One new archaeological site was found, KfPg-1, consisting of

one stone artifact. Information about the site was recorded by the archaeologists, and the stone artifact collected to be studied further. No further archaeological work was recommended.

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Permit Number: 2015-006
Region: IN

Class: 2
Location: Outer Mackenzie Delta centred around Kugmallit Bay as well as Liverpool Bay and Wool Bay

Arctic cultural heritage at risk: climate change impact on the Inuvialuit archaeological record

The Lower East Channel of the Mackenzie River and the Beaufort Sea coast are home to many important Inuvialuit heritage sites. This includes the major villages of Kitigaaryuit (Kittigazuit), Kuukpak, Nuvugaq (Atkinson Point), and a group of settlements at the mouth of the Anderson River. These sites are now threatened by coastal erosion due to climate change. Warmer temperatures are also causing the permafrost to thaw, so delicate artifacts that have been frozen for centuries are now rotting and being destroyed. The project "Arctic Cultural Heritage At Risk" (Arctic CHAR) is a collaboration between the University of Toronto and the Inuvialuit Cultural Resource Centre. The project is designed to reveal which heritage sites are most at risk from erosion, and then to excavate some in order to save their contents. The researchers focused on helicopter surveys in two regions, and found that erosion is really variable. They are checking a few sites every year to see how erosion is affecting them. At McKinley Bay, the bluff is eroding more than 1 metre (3 feet) per year, and two houses are currently half destroyed. At Kuukpak, the largest of all ancient sites in the area, the site has seen a huge amount of erosion over the past year, probably due to a storm in the fall of 2014.

Gray, Rebecca
University of Toronto

Permit Number: 2015-018
Region: NS

Class: 2
Location: Grandin River area

Ezqdziti (The Refuge)

Ezqdziti, or 'The Refuge,' is an important area of traditional land use according to Tłı̄chq̄ oral tradition. Despite its importance, there has not been archaeological fieldwork in this area before this project. The project team conducted fieldwork to find archaeological sites and learn more about how the Tłı̄chq̄ used the area in the past. They surveyed around Kwidī?ee or 'Fish Trap Rock', a narrow channel described by elders as good for fishing, and found a few old and more recent sites. At one site, the archaeologists discovered that people had made stone tools. At another site dating to likely a few hundred years ago, stone flakes of a particular type of rock known as Tertiary Hills Clinker were found. It is only found in a few far-away places, so finding it at Kwidī?ee means that people were trading or moving this valuable stone over long distances. The archaeologists will use radiocarbon dating to find out how old the sites are. Some artifacts were more recent: they found metal tobacco and lard cans with bullet holes, axe-cut stumps, dog kennels, wooden poles used in fishing activities, and tipi frames. They plan on doing more fieldwork at Kwidī?ee, and surveying other areas of Ezqdziti.

Heffner, Ty
Kalo-Stantec Ltd.
Representing: Selwyn Chihong Mining Ltd.

Permit Number: 2015-012
Region: DC

Class: 2
Location: Howard's Pass Access Road from Nahanni Range Road to the NWT/Yukon border

Heritage resource impact assessment (HRIA) for the Selwyn Project

There are plans to upgrade the Howard's Pass Access Road into the Nahanni and Nááts'ihch'oh National Park reserves. Since archaeological sites might be disturbed, archaeologists surveyed areas where previous research had indicated that sites might be found. They also surveyed areas where the road upgrades might disturb the ground. To find any sites, they walked across the areas and dug small test holes to see if they could find any archaeological artifacts. Six archaeological sites were found during the survey, four in Nááts'ihch'oh National Park Reserve and two on GNWT land. All six had stone flakes and tools, artifacts which were found both above and below a layer of ash from a large volcanic eruption in AD 803. This means that some of the sites are from before AD 803. Most of the artifacts were stone flakes from rocks similar to flint. They are the by-product of making stone tools. However, at each of the two sites found on GNWT land, the archaeologists found the bottom of a broken spear point (spear head). One spear point piece was broken off from a leaf-shaped point. The other spear point piece is from a point with notches in the sides. Both of these finds were from just below the ash and are likely 2000 years old.

Kasstan, Steve
 Simon Fraser University

Permit Number: 2015-015
Region: SS

Class: 2
Location: Wholdaia Lake area

Respect for caribou: indigenous heritage and archaeology of Ethen-Eldeli

This archaeological study is part of a larger research project with the Black Lake Denesúliné First Nation, Hatchet Lake Denesúliné First Nation and Fond du Lac Denesúliné First Nation. The point of the overall project is to understand how Ethen Eldeli Denesúliné show respect to caribou. The study team looked for very old and more recent sites associated with caribou hunting. An elder of Black Lake Denesúliné First Nation worked with the project team, sharing oral history and personal accounts of living and hunting throughout the study area. Based on guidance from community partners, the research team surveyed a well-known caribou crossing at Wholdaia Lake. Ethen Eldeli Denesúliné were known to harvest caribou here as long ago as the 1770s. The study team went to both the caribou crossing and a campsite on the portage between Flett Lake and Wholdaia Lake, recorded hundreds of years ago on a traditional map. They found a number of recent and old sites. They recorded two archaeological stone circle sites, two caches, and a site with stone tools. They also recorded more recent campsites where Denesúliné families made dry meat in the fall, and the villages at Wholdaia Lake from the 1970s and 1980s. The survey showed that Denesúliné have always used the Wholdaia Lake caribou crossing.

Leyden, Jeremy
 Stantec Consulting Ltd.
 Representing: Government of the NWT

Permit Number: 2015-002
Region: DC

Class: 2
Location: Mackenzie Highway right-of-way from N'Dulee ferry crossing to Wrigley

Mackenzie Valley fibre link project

This archaeological survey was to check for heritage sites along the Mackenzie Highway between the N'Dulee ferry crossing on the Mackenzie River and the community of Wrigley. To start, the research team checked out the entire stretch by truck. They were looking for landforms that are more likely to have archaeological sites. When they saw one of these landforms, they stopped and surveyed it on foot. They looked carefully for archaeological remains on the ground, and dug small test pits to look for artifacts. The team went back to all previously-recorded archaeological sites close to the development, to make sure that these sites would not be impacted. The team visited and studied 48 cultural sites, including 22 that were not known before. Most (37) of these sites were from recent times, but 11 were much older, so were considered archaeological or historic sites. These older sites include several sites with stone tools, from before contact with Europeans. There were also historic sites such as camps and cabins, a cemetery, and a historic fort/trading post. The GNWT has promised they will avoid all historical, archaeological, and burial sites that are inside the development area. To make sure they will not impact any sites, they are making a plan with the Prince of Wales Northern Heritage Centre.

MacKay, Glen R.

Prince of Wales Northern Heritage Centre
Representing: Yellowknives Dene First Nation

Permit Number: 2015-009

Region: NS

Class: 2

Location: Yellowknife Bay and Yellowknife River areas

Yellowknife Bay archaeology project

In 2015, archaeologists from the Prince of Wales Northern Heritage Centre (PWNHC) continued an archaeological survey of the Yellowknife Bay area in collaboration with the Yellowknives Dene First Nation. The goal of the project is to record archaeological sites in and around Yellowknife Bay, which will help to ensure that these sites are protected from future land use activities. The archaeologists also wanted to learn more about the culture history of the region. Very little survey work was completed under this permit in 2015. Several small archaeological sites with stone tools and a historic camp were recorded along the Yellowknife River. The historic camp had the remains of a cabin and some other buildings.

MacKay, Glen R.

Prince of Wales Northern Heritage Centre
Representing: Department of Transportation, Government of the NWT

Permit Number: 2015-010

Region: DC

Class: 2

Location: NWT Highway near Jean Marie River

Archaeological impact assessment at quarry at KM 384 of Highway 1

Archaeologists from the Prince of Wales Northern Heritage Centre surveyed a proposed quarry at KM 384 of Highway 1, to see if there were any archaeological sites. The Department of Transportation will quarry limestone bedrock at this location for use in highway maintenance. The archaeological team surveyed the area on foot, looking for archaeological remains. The quarry area was flat and featureless, and there was not much likelihood of finding archaeological sites for this reason. No archaeological sites were found in the study area.

MacKay, Glen R.

Prince of Wales Northern Heritage Centre

Permit Number: 2015-014

Class: 2

Region: DC**Location:** Deep Lake area**Five lakes archaeology project**

This permit was cancelled.

MacKay, Glen R.

Prince of Wales Northern Heritage Centre

Representing: Department of Transportation, Government of the NWT

Permit Number: 2015-017**Class:** 2**Region:** DC**Location:** NWT Highway near Nahanni Butte**Archaeological impact assessment of quarry at KM 147 of Highway 7**

An archaeologist from the Prince of Wales Northern Heritage Centre surveyed a proposed quarry at KM 147 of Highway 7 (the Liard Highway), to see if there were any archaeological sites. The Department of Transportation (DOT) will quarry for gravel at this location to use for highway maintenance. Two DOT employees helped with the survey, and a member of the Nahanni Butte Dene Band was the wildlife monitor for the project. The research team walked over the entire quarry area on foot. The quarry area is mainly flat and featureless, which means there was not a high likelihood of finding archaeological sites there. However, a high terrace overlooking a wetland was found near the west edge of the proposed quarry area. This terrace would be more likely to have archaeological remains, so the team surveyed it carefully. Small test pits were dug along the terrace edge where it came closest to the quarry boundary. Even with this careful work, no archaeological sites were found within the quarry area.

MacKay, Glen R.

Prince of Wales Northern Heritage Centre

Representing: Tulit'a Dene Band

Permit Number: 2015-019**Class:** 2**Region:** SA**Location:** Mackenzie Mountains**NWT ice patch monitoring program**

The archaeological research team spent 5 days in August 2015 checking on approximately 15 ice patches in the Mackenzie Mountains, near the NWT-Yukon Border. The project team included an elder originally from Tulit'a, a student from the University of Toronto, and the Territorial Archaeologist with the Prince of Wales Northern Heritage Centre. All of the ice patches had melted a lot over the summer. A stone dart point (like an arrowhead, but bigger and older) was found in the dung band of an ice patch – this was evidence of an ancient caribou hunt. Caribou bones were also collected from a few ice patches. The archaeologists have been watching the ice patches in the Mackenzie Mountains over the last decade, and they have seen that the ice patches are melting away very quickly. As they melt, fragile artifacts left there by humans, along with natural items like wood or dung which were previously frozen in the ice, become exposed to the elements. Ongoing monitoring is important to save and protect these one-of-a-kind objects.

Murphy, Brent

Golder Associates Ltd.

Representing: Dominion Diamond Ekati Corporation

Permit Number: 2015-013**Class:** 2**Region:** NS**Location:** Lac du Sauvage area

Jay Project archaeological site mitigations

This archaeological project was aimed at studying and protecting three archaeological sites near a winter road and under a waste rock pile. The field crew included archaeologists from Golder, and a member of the Yellowknives Dene First Nation. They went to two archaeological sites near the Sable winter access road, which was used in the winter of 2014-2015. These sites are small and made up of a few flakes of stone. These flakes are cast-offs from when people made stone tools long ago. The sites were checked in 2015 to see if the stakes that the archaeologists had placed at the sites were still there, and to check if there was any damage to the sites from the winter road. Both sites were protected and in the same condition as before. The project team also went to another archaeological site, which is going to be covered up by the Jay Project waste rock storage area. They collected artifacts from the ground surface and dug into the ground as well, to find any artifacts. There was bedrock just under the surface. They collected many stone tool-making flakes in order to understand what was going on at the site when people lived there.

Novecosky, Brad

Golder Associates Ltd.

Representing: Aurora Geosciences Ltd.

Permit Number: 2015-022

Class: 2

Region: NS

Location: Kennady Lake area

Kennady North Property Archaeological Impact Assessment

In September 2015, Golder Associates Ltd. conducted an archaeological survey on behalf of Aurora Geosciences Ltd. for the Kennady North Property located approximately 280 kilometres east-northeast of Yellowknife, NT. The field crew consisted of two Golder employees as well as a member of the Łutselk'e Dene First Nation. The objective of the 2015 archaeological survey was to examine potential seasonal road and camp options required for ongoing diamond exploration activities. The archaeological investigation included a combination of low level helicopter and pedestrian surveys of areas of high potential along road corridors, as well as potential camp options adjacent to Kelvin Lake. Over the course of the three day field program, 11 previously recorded archaeological sites were revisited and 11 new archaeological sites were recorded. The revisited sites consist of seven lithic scatters, two isolated finds, a lookout and one instance of axe-cut trees. The newly recorded sites consist of nine small lithic scatters and two isolated finds. No diagnostic tools were identified at any of the sites visited during the 2015 fieldwork. As a result of the archaeological reconnaissance and inventory, the location of each site will be incorporated into future project planning and exploration activities on the Kennady North Property.

Prager, Gabriella

Points West Heritage Consulting Ltd.

Representing: Department of Transportation, Government of the NWT

Permit Number: 2015-004

Class: 2

Region: SA

Location: A corridor running from Norman Wells to Canyon Creek

Mackenzie Valley Highway - Norman Wells to Canyon Creek

Archaeologists from Points West Heritage Consulting Ltd. completed an archaeological study of a portion of an all-season highway which will be built in the Mackenzie Valley. They were looking at the part of the highway south of Norman Wells, and some related developments like borrow pits, access roads, and quarries. They flew over the whole area in a helicopter to check out the route first, to find landforms such as terraces and hills that are more likely to have archaeological

remains. The research team surveyed all of these landforms by carefully examining the ground for artifacts. They also scraped dirt on the roots of overturned trees to check for artifacts, and dug test pits to see if there were artifacts underground. Most of the road route will pass through flat muskeg, which doesn't usually have archaeological sites. The research team surveyed the creek terraces near a proposed bridge, and the higher ground near two quarries. These are also landforms that are more likely to have archaeological sites. Overall, no archaeological sites were found. The research team found that although the ground is vegetated, most of this area is already disturbed.

Prager, Gabriella

Points West Heritage Consulting Ltd.
Representing: Avalon Rare Metals Inc.

Permit Number: 2015-008

Class: 2

Region: NS
Slave Lake

Location: Northeast shore of East Arm of Great

Nachalacho Rare Earth Metals Mine Project

This permit was cancelled.

Prager, Gabriella

Points West Heritage Consulting Ltd.
Representing: Indigenous and Northern Affairs Canada

Permit Number: 2015-011

Class: 2

Region: NS

Location: Gordon Lake area

Gordon Lake Project

Archaeologists from Points West Consulting surveyed some mining-related developments near Gordon Lake, about 100 km northeast of Yellowknife. There were three main goals of the study. The first goal was to check the condition of some old (1930s-40s) buildings. They found that most of the buildings had been damaged or destroyed by forest fires or past mine work; the most complete structure was a crusher mill at Burnt Island. Other buildings and remains include falling-down cabins, foundation mounds of earth, logs and rocks, and mining equipment. The second goal was to survey each site to check for any archaeological remains of an earlier time; in other words, remains from before the mines were running. The third goal was to survey any undisturbed areas that might be disturbed later to remediate the mine, including borrow pits. In the end, two archaeological sites were found. One is on a peninsula north of the West Bay mine site and was a short term camp. The other was said to be the location of a historic saw mill and an indigenous camp. This site contains a collapsing cabin, several tent frame foundations, and some artifacts. No pre-contact archaeological sites were found. Further study of some of the historic or mining remains at these sites could provide a lot of interesting information about early mining in the NWT.

Ross, Julie M.

Points West Heritage Consulting Ltd.
Representing: De Beers Canada Inc.

Permit Number: 2015-001

Class: 2

Region: NS

Location: Areas of Snap Lake, Kennady Lake, and MacKay Lake

Gahcho Kue Project

Archaeologists from Points West Heritage Consulting Ltd. surveyed the Gahcho Kué Mine, and the mine's winter road route, near Kennady Lake. There were four goals of this project. The first goal was to visit three archaeological sites to see if further research was needed. The archaeologists carefully checked the ground and dug test pits to see if there were any buried artifacts. All three sites had stakes put up around them, and all can be carefully avoided by the developers. The second goal was to check on 12 other sites to make sure they were not being impacted by the mine. All of these sites were safe. The third goal was to collect a bow from a site at the request of the Prince of Wales Northern Heritage Centre. The archaeologists also recorded more information about the site where the bow was found, and took photographs of the site and artifacts. They were excited to relocate and photograph an old sled (Ba Chin) made of wood with antler runner pieces and ivory and bone pegs. The final goal was to confirm the locations of a few nearby archaeological sites to double-check on their co-ordinates using GPS. Nine sites were found, but four others could not be found despite considerable effort.

Seip, Lisa

ERM Consultants Canada Ltd.
Representing: Seabridge Gold Inc.

Permit Number: 2015-003**Region:** NS**Class:** 2**Location:** Courageous Lake area**Courageous Lake**

This permit was cancelled.

Soucey, Kristin

Circle CRM Group Inc.
Representing: Public Works and Services, Government of the NWT

Permit Number: 2015-020**Region:** DC**Class:** 2**Location:** Fort Simpson**Archaeological impact assessment for the new trades shop and health centre and Lot #504 in Fort Simpson**

Blyth & Bathe, in partnership with Circle CRM Group Inc., conducted a special type of archaeological study on three proposed developments within the community of Fort Simpson. They used a machine that aims a radar into the ground, and then reads the radar signal as it bounces back to the machine. The way the radar bounces back tells the archaeologists a bit about what is under the ground. The survey team was made up of four employees from the two companies. The purpose of the survey was to see if the research team could find any unmarked human graves in the development area, as the projects are very close to historic graveyards. The team did find some possible grave sites. Two of the projects are next to the Sacred Heart Roman Catholic Cemetery. Four possible burials were found in these two proposed projects. The third project is next to St. David's Church Anglican Cemetery. Six possible burials were found during the survey. The archaeologists recommended that the project developers avoid digging and damaging the ten possible burials. If that is not possible then a qualified archaeologist should watch construction activities to make sure they are not affected.

Thomson, Callum J.

Thomson Heritage Consultants
Representing: Adventure Canada

Permit Number: 2015-016**Class:** 1

Region: IN

Location: Melville Island, Banks Island, Prince of Wales Strait, and Ulukhaktok areas

Into the Northwest Passage: expedition cruise on board MV Ocean Endeavour

This permit was cancelled.

Walker, Daniel

ERM Consultants Canada Ltd.

Representing: TerraX Minerals Inc.

Permit Number: 2015-007

Region: NS

Class: 2

Location: Walsh, Banting, Jackson and Ryan Lakes areas

Yellowknife City Gold Project

This permit was cancelled.

Wildlife

Amos, Amy

Gwich'in Renewable Resources Board
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Permit No: 500313

Region: IN, GW

Species Studied: Muskrat

Location: Inuvik

Assessing muskrat history, health and predation in the Mackenzie Delta

The project goal is to document the history of muskrat populations in the Mackenzie Delta, check out the health of individual muskrats, and try to understand how other animals hunt muskrats. Many Gwich'in and Inuvialuit trappers have seen a decline in muskrat numbers in the Delta. To study this decline, the researchers checked fur return records to see if muskrat returns had dropped off faster than those of other furbearers. They checked muskrat carcasses for body size, condition, parasites, and levels of mercury contamination. They also checked the stomach contents of muskrat predators (red fox, mink, and otter). The researchers found that muskrat fur returns in the three lower Delta communities (Inuvik, Aklavik, and Tuktoyaktuk) dropped faster than other furbearers over the last 40 years. These declines started first in Tuktoyaktuk (late 1970s), then Aklavik (late 1980s), and finally Inuvik (late 1990s). In 2015, 16 trappers contributed 54 muskrats, 34 red fox, 36 mink, and 15 otter for this study. These muskrats were smaller than muskrats studied in the 1950s. In addition, modern muskrats had very few parasites and a low level of mercury contamination. The researchers will continue this study for at least three more years.

Armstrong, Terry

Department of Environment and Natural Resources, Wildlife Division
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Permit No: 500314

Region: SS, NS

Species Studied: Wood bison

Location: Fort Providence and Behchokò areas

Mackenzie wood bison population monitoring project

The Mackenzie bison population is found between the Mackenzie River on the south, and around Behchokò to the north. It is an important population for the the future of healthy wood bison, because these animals do not have the two diseases that are so dangerous for other herds - bovine brucellosis and tuberculosis. This project is designed to check on the population's size, calving success, the health of the animals, and to survey for potential anthrax cases. During the summer of 2015 the researchers tried to figure out how many bulls and cows are in the herd, but only 14 bulls were found. This was partly due to heavy wildfire smoke in the area. The researchers also collected a few samples and found no evidence of bovine brucellosis or tuberculosis in any

of the animals or samples. To check for anthrax, the researchers flew over the area three times in a plane and once in a helicopter. They found no signs of anthrax.

Bidwell, Mark

Environment and Climate Change Canada
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Permit No: 500330

Region: SS

Species Studied: Whooping crane

Location: 200 km radius of 60 10'N, 113 20'W

Whooping crane ecology and rehabilitation

The goal of this project was to check on Whooping crane pairs. There are two types of pairs that scientists study: breeding/nesting pairs, who are having young ones, and territorial pairs, who do not have nests but are setting up a new homeland for themselves for later years. The researchers counted 68 nesting pairs and around 20-24 territorial pairs. The researchers couldn't be more exact as the birds do move around during the survey time. The high number of territorial pairs may mean that the population will grow quickly in the near future. Six nests were found outside of Wood Buffalo National Park; two in the Lobstick Creek area, and four north of the Nyarling River.

The researchers also studied young birds after they had hatched and grew feathers. During these surveys, the researchers counted 23 young ones from 23 family groups. The number of young ones per nest was only about one young bird for every three nests. This is lower than the 20-year average of around one young bird for every two nests, but it is still within the long term natural range.

Bienentreu, Felix

Laurentian University
fbienentreu@laurentian.ca

Permit No: 500351

Region: SS

Species Studied: Frogs, toads, garter snake

Location: 15 wetlands within 1 km of established roads

Health of amphibian populations in the boreal forest of Canada

The goal of this project was to check on the health of toads, frogs, and snakes, and to check on the health of their habitat too. The project team was trying to understand animal health from a population level, rather than an individual animal level, which is helpful for understanding if the animals are at risk of disappearing. In 2015, the researchers studied frogs and toads in and around Wood Buffalo National Park. They checked for two illnesses that can affect frogs and toads – a virus known as a “ranavirus”, and a type of mould called “chytrid fungus”. They took samples from wood frogs, Canadian toads, and boreal chorus frogs. Generally they just took a small sample but sometimes they took the whole animal. They found the ranavirus in almost all the areas they visited, but they found no animals sick with the fungus. The researchers are still testing the samples. Aside from illnesses, the researchers were also looking for physical problems like missing legs or healed wounds. They found three animals with healed wounds, but none with problems stemming from how they developed. They are also looking for pollution in the environment that might hurt frogs and toads.

Branigan, Marsha

Department of Environment and Natural Resources, Wildlife Division
marsha_branigan@gov.nt.ca

Permit No: 500328
Region: IN, GW

Species Studied: Grizzly bear
Location: Along the Inuvik-Tuktoyaktuk Highway

Grizzly bear denning survey for the Inuvik to Tuktoyaktuk Highway

The goal of this study was to check on grizzly bear dens along the Inuvik-Tuktoyaktuk Highway corridor. The researchers wanted to know if the dens they had found during the previous fall were being used. In addition to checking known dens, the researchers also looked for bear tracks in the snow. When they found them, they tried to follow them to find additional active dens in the region. The researchers went out to check on the dens in the spring. Of the eight dens the researchers had found the previous fall, three were not being used, one was being used by a smaller animal, and four were covered in snow so had to be checked again in the summer. A potential new den was identified from bear tracks and what looked like an exit hole in the snow. The summer denning survey was conducted to check on the dens that were snow-covered in the spring, and the new den. They found that the four dens that had been snow covered were not being used by grizzlies. The new den found in the spring could not be re-located, leading the survey team to believe that this 'exit hole' was in fact an 'entrance hole'.

Carrière, Suzanne

Department of Environment and Natural Resources, Wildlife Division
suzanne_carriere@gov.nt.ca

Permit No: 500335
Region: All NWT

Species Studied: small mammals, snowshoe hare
Location: All NWT

Northwest Territories small mammal and hare survey

This project is an ongoing, long-term study to understand population changes in small animals in the NWT. To understand how the populations are changing, the researchers go out on the land and count how many times they see evidence of various animals. There are two parts to the study. The first part is the 'NWT small mammal survey,' which includes voles, mice, lemmings, and shrews. The second part is the 'snowshoe hare survey.' The snowshoe hare survey looks at snowshoe hare "density" – that is, how many hares are found per acre, across all forested areas. It also looks at how many Arctic hares are found on the tundra. These surveys are part of a long-term effort to monitor natural population cycles in the forest and on the tundra. The information collected by the researchers from the hare and small mammal surveys is used in many other projects. For example, it is used to make predictions about furbearer populations in the NWT. Other agencies or organizations also use this information in their own studies. Participating agencies and organizations in 2015 included the Department of Environment and Natural Resources, Ka'a'gee Tu First Nation, Sahtú Renewable Resources Board, Gwich'in Renewable Resources Board, and the Aurora College in Fort Smith. Data are available upon request at wildlifeobs@gov.nt.ca.

Cluff, Dean

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Permit No: 500249
Region: NS

Species Studied: Wolves
Location: Bathurst caribou range within the NWT and Nunavut

Spatial distribution of wolves on Bathurst caribou range

The goal of this study was to understand how well wolf populations are doing within the range of the Bathurst caribou. The researchers surveyed the wolves many times in 2013 and 2014 during

the 'denning period,' which means the time when the mother wolf has very young pups with her. These surveys showed that things are the same as they were when the wolves were studied by plane from 2006-2012. The researchers saw that wolf packs, which are usually a mother and father wolf and their young and new-born offspring, were often leaving their dens. They also saw that not too many pups were living to adulthood, especially when compared to the late 1990s and early 2000s. At that time, there were many more Bathurst caribou around. The researchers think that wolves are leaving their dens both because pups are dying, and because adult wolves are moving the pups to a new location. The low number of wolf pups making it to adulthood (less than 2 pups per pack) means that the wolf population of the area is going down. The researchers counted eight wolf packs with pups in 2014, compared to 15 packs with pups in 2013.

Cox, Karl

Department of Environment and Natural Resources, Wildlife Division
karl_cox@gov.nt.ca

Permit No: 500225**Region:** NS**Species Studied:** Bats**Location:** Fort Smith area**Bat research and monitoring in the South Slave region**

The goal of this project was to find where bats hibernate over the winter in the NWT. Bats play a very important role in the environment as the main predator of bugs at night. At least seven species of bats are found in the Northwest Territories and three are common in the South Slave region. Scientists call these three species the 'little brown myotis,' 'northern myotis,' and big brown bat. The little brown myotis and northern myotis are endangered in Canada because of white nose syndrome, a fungal disease that is killing millions of hibernating bats in eastern North America. There is great urgency to learn where NWT bats hibernate because white nose syndrome is expected to continue to spread west and it is not known how long before it will arrive in Alberta and NWT. Studying the populations of bats and other basic research is important to better understand how and where bats live in the southern NWT and how things might change in the future.

Cox, Karl

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Permit No: 500206**Region:** DC**Species Studied:** Wood bison**Location:** Fort Providence and Hay River area**Bison control area program surveillance season**

The goal of this ongoing program is to ensure that there are no bison in the bison control area. The bison control area is a large zone between herds of wood bison in the southern NWT, and the Mackenzie population north of the Mackenzie River. The Mackenzie population does not have any signs of the two very serious diseases that some bison in the southern NWT have, bovine brucellosis and tuberculosis. The bison control area is kept clear of bison to keep the Mackenzie population safe from these diseases. It is recommended that the program continue until either there is no more disease in the southern populations, or until a better method of reducing that risk is found.

Cox, Karl

Department of Environment and Natural Resources, Wildlife Division
karl_cox@gov.nt.ca

Permit No: 500255/500371
Region: SS

Species Studied: Wood bison
Location: Slave River Lowlands

Slave River Lowlands bison population studies

Every year, researchers monitor the Slave River Lowlands bison population. They usually try to do three things; to count bison by sex and age, to determine if there has been an anthrax outbreak, and to count the whole population by airplane survey. In both 2014 and 2015, the researchers were able to do 'composition' surveys, where they count the bison by sex and age, as well as anthrax monitoring. The composition surveys included a count of the number of calves, yearlings, and bulls compared to the number of cows. This information is useful for wildlife biologists if they are trying to understand the population mix over time, especially which age and sex of animals seem to be dying. For example, how many calves are making it to adulthood? It can also tell them if the population is healthy, and help the government make hunting license decisions. A population survey conducted in February 2014 showed that the bison population estimate was around 700-1400 animals.

Cox, Karl

Department of Environment and Natural Resources, Wildlife Division
 karl_cox@gov.nt.ca

Permit No: 500222/500315
Region: SS

Species Studied: Caribou
Location: Beverly barren-ground caribou winter and/or spring migration range

Distribution and movements of Beverly/Ahiak barren-ground caribou

Caribou in the Beverly and Ahiak herds range from northern Saskatchewan, through the NWT, and into Nunavut. Within the NWT they are found around the East Arm of Great Slave Lake. The nearest NWT communities are Lutselk'e, Fort Resolution and Fort Smith. This range is remote and researchers and even harvesters do not get to see the caribou very often in person. They are usually only seen when the herds come close to the communities or when hunters travel to accessible harvesting areas. Placing collars on caribou is a valuable way to collect information on how caribou move throughout the years, and to help researchers find good locations to do field work. For these reasons, ENR placed a GPS satellite collar on 26 Beverly herd cows in 2014, and on 10 more cows and 15 bulls in 2015. This was the first time bulls were collared in this area. The researchers also did a survey to see how many cows had calves. This can show if the herd is declining, stable, or growing. It appears that the herd is stable. Into the future, the researchers will continue to watch and study these caribou and their range, including research on their calving grounds by the Government of Nunavut.

Croft, Bruno

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Permit No: 500219
Region: SA, NS, SS

Species Studied: Barren-ground caribou
Location: Délı̄ne, south of Great Bear Lake, Keller Lake, and Grandin Lake, and all areas between the communities of Behchokò, Whati, Gamèti, Wekweèti, Dettah and Lutselk'e

Monitoring of the Bathurst and Bluenose-East caribou herds

The goal of this ongoing project is to count how many calves make it through the winter and will join the herds as adult caribou. This count is a good way of assessing how the herd is doing – is

it growing, stable, or shrinking? Results from 2015 show that the number of calves who make it through the winter in the Bluenose-East and Bathurst herds is still below normal. Both herds are declining rapidly and management actions are needed to help the herds recover. This study must be conducted every year, to allow wildlife managers and co-management boards to understand the herds better, and to predict their status into the future.

Croft, Bruno

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Permit No: 500220
Region: NS

Species Studied: Barren-ground caribou
Location: Bathurst, Bluenose-East and Beverly/Ahiak caribou late winter and fall ranges

Bathurst, Bluenose-East and Beverly/Ahiak caribou health, condition and contaminants monitoring

The goal of this ongoing project is to take samples of caribou to see if the caribou are healthy, are in good condition, and if there are pollutants or contaminants in their bodies. Usually researchers get the samples of caribou that they use for monitoring health, condition and contaminants from aboriginal community hunts. However, the Bathurst and Bluenose-East caribou herds are declining quickly. There was a complete hunting ban on the Bathurst herd, and a very limited harvest allowed on the Bluenose-East herd where only individual hunters were given authorization to harvest caribou. No samples were taken from the Bluenose-East caribou by harvesters allowed to go hunting. Additionally, although there are no harvest restrictions on the Beverly and Ahiak herds, ENR was unable to participate in community hunts to collect samples, and no samples were collected by aboriginal harvesters hunting these two herds on their own. In summary, no samples were collected in 2015 for this ongoing project.

Davison, Tracy

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Permit No: 500321
Region: IN

Species Studied: Caribou and muskox
Location: Victoria Island

Northwest Victoria Island Peary caribou and muskox population survey

The goal of this ongoing study is to understand how many Peary caribou and muskoxen are on northwest Victoria Island. To count the caribou and muskoxen, the researchers flew over northwest Victoria Island, following a pattern of strips they had determined beforehand. They counted all the animals they saw within about one-third of a mile (500 meters) on each side of the aircraft. The researchers recorded whether the muskoxen close to the flight line were either adults or calves. They also recorded any other wildlife they saw. There was only one group of two adult Peary caribou seen, so it wasn't possible to make an estimate of how many Peary caribou are on the island. There were a total of 2,782 adult muskoxen (and 139 calves) seen during the flights. Using mathematical techniques, the research team was able to make a good guess that the total population of muskoxen is around 12,000 to 17,000 animals.

Davison, Tracy

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Permit No: 500231

Species Studied: Barren-ground caribou

Region: IN, GW

Location: Range of Tuktoyaktuk Peninsula, Cape Bathurst, and Bluenose-West caribou herds

Monitoring of the Tuktoyaktuk Peninsula, Cape Bathurst, and Bluenose-West barren-ground caribou

The goal of this ongoing project is to understand how many caribou are in these three herds, and to try to understand if the herds are growing, stable, or shrinking. To see if the herds are stable or not, the researchers do what is known as a “composition survey”, which involves counting how many calves and bulls there are compared to the number of cows. Researchers can use this information to see, for example, how many calves made it through the winter and will likely end up in the herd as adults. Researchers counted calves, bulls, and cows in both the fall (before the hard winter season when many calves can die) and the spring. The researchers found that for the Tuktoyaktuk Peninsula and Cape Bathurst herds, a very good number of calves survived the winter. Before winter, there were around 70 calves and 43 bulls for every 100 cows. After the winter, about 55 calves survived for every 100 cows. No surveys were conducted on the Bluenose-West herd.

Elkin, Brett

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Permit No: 500289

Region: All NWT

Species Studied: All wildlife species

Location: All NWT

Wildlife health, condition, stress and genetic monitoring

The goal of this ongoing project is to keep a good record of wildlife diseases. The researchers run tests on any hunter-submitted samples and animals found dead. They also actively investigate disease cases or outbreaks. They provide the results of the testing to the Department of Environment and Natural Resources, individual harvesters, the public, wildlife management agencies and wildlife co-management boards.

Farnell, Richard

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Permit No: 500304

Region: DC

Species Studied: Caribou and moose

Location: The Howards Pass Access Road commencing at km 188 of the Nahanni Range Road, north of the Cantung Mine

Selwyn Project - Howards Pass Access Road wildlife baseline studies

The goal of this project is to understand moose and caribou populations around the proposed Selwyn Project mine and the Howards Pass Access Road. Researchers need to understand what the populations are now, so they can make sure the mine is not affecting the populations in the future. For this reason, they have been studying wildlife near the Selwyn Project since 2007. Every March from 2012 to 2015, the project team has surveyed moose and caribou in a 10 km corridor on either side of the Howards Pass Access Road. They have also surveyed caribou during the May calving season from 2007 to 2012, and checked on caribou after the calving season from 2007 to 2015. Finally, the researchers surveyed both caribou and moose around the time of the rut in early winter, in 2012 and 2013. The research team also recorded late-winter snow conditioning around the Howards Pass Access Road, to see if snow conditions affect caribou and moose.

Fronczak, David

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Permit No: 500368
Region: DC

Species Studied: Waterfowl
Location: Mills Lake Station

Western Canada cooperative preseason waterfowl banding program - Mills Lake Station, NWT

The governments of Canada and the USA work together to put leg bands on a small number of migratory waterfowl every year, to help researchers understand more about these birds. In 2015 the researchers put leg bands on almost 1,300 ducks (509 mallards, 765 northern pintails, three American wigeons, five American green-winged teals, one bufflehead, and one blue-winged teal) and one American coot in August. About a third of the mallards and a quarter of the northern pintails were young ones who had just hatched that year. Seventeen previously banded ducks were captured (12 northern pintails and five mallards). There were no deaths from the banding operations. Water levels were extremely low and the water continued to recede throughout August. Trap sites were located outside Mills Lake next to the Mackenzie River. Weather was warm for the first half of the operation, with mid-day temperatures around 23°C and night-time temperatures around 15°C. Mid-day temperatures declined to 15°C and night-time declined to 9°C for the rest of the operation. Traps sites were closed for three days due to poor weather, which lowered water levels and affected crew safety. Precipitation was steady for the last week of operations. Approximately 3,700 pounds of rolled barley were used to bait up to six trap sites daily.

Hache, Samuel

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Permit No: 500305
Region: SA, DC

Species Studied: multi species
Location: Fort Providence, Jean-Marie River, Fort Simpson, Wrigley

Edézhíe long-term landbird monitoring program

Environment and Climate Change Canada wanted to start a new monitoring program in the Edézhíe candidate National Wildlife Area (the Horn Plateau) in 2015. The program would include studying 33 sites throughout the candidate protected area to see how many different types of animals and plants are found there, and the size of the animal populations. However, funding was not received for the 2015 field season and the program was delayed. The monitoring program began in 2016.

Hache, Samuel

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Permit No: 500323

Region: DC, NS

Species Studied: Vultures, hawks, grouse, doves, cuckoos, owls, nighthawks, swifts, hummingbirds, kingfishers, woodpeckers, passerine
Location: Fort Providence, Behchokò area

Natural disturbance long-term landbird monitoring program

Environment and Climate Change Canada started a new long-term study in 2015 to check out how forest fires affect boreal birds, especially those birds that are known to live in burned-out areas. To study the birds, the researchers put special recorders called automated recording units in both recently (2014) burned forest stands and nearby forest which did not burn. These machines record birdsong. From the recordings made, it seems like there are more types of birds in the southern areas, and fewer types in the north. The seven most commonly heard species were hermit thrush, Swainson's thrush, white-throated sparrow, American robin, dark-eyed junco, Lincoln's sparrow and chipping sparrow. These birds can live well in many areas. The American robin was more common when the forest fire had been very severe. The robin seems to like the type of vegetation that grows back soon after a fire. The hermit thrush and Swainson's thrush seemed to prefer areas where the fire had been less severe. The olive-sided flycatcher, a type of bird known to be a fire specialist, was only detected in recently burned areas.

Haseldine, Philip

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Permit No: 500333**Region:** SA, DC**Species Studied:** All birds**Location:** Parallel to the Mackenzie Highway from McGill Lake to Wrigley**Mackenzie Valley Fibre Link pre-clearing bird nest surveys**

The goal of this project was to see how many birds there were along the route of the Mackenzie Valley Fibre Optic Link between McGill Lake and Wrigley. The research team also wanted to find any areas where the birds make nests and have young ones, to ensure that the Mackenzie Valley Fibre Optic Link, which is a cable placed into the ground to provide better Internet services to northern communities, does not affect these areas. The researchers stopped to count birds about every 100 m along the line. A total of 156 nest sites were found, from 27 different types of birds. The researchers put flagging tape around each nest site to keep it protected. They only took the flagging tape down when the birds had left for the year.

Hebert, Craig

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Permit No: 500331**Region:** SS**Species Studied:** Aquatic birds**Location:** Egg Island, Great Slave Lake**Assessing impacts of oil sands development on aquatic birds**

The goal of this research project was to see if pollution from the oil sands development has made its way into gull eggs on Egg Island, Great Slave Lake. The researchers went to Egg Island by boat from Fort Resolution, with the assistance of the Deninu K'ue First Nation. Both herring gulls and California gulls were nesting on the island. The researchers did not do a nest count, but they estimate that there were about 50 pairs of herring gulls and 500 pairs of California gulls nesting on the island. Fifteen herring gull eggs were collected and taken to the National Wildlife Research Centre in Ottawa. Egg samples were analyzed there to see how much mercury is in the eggs. The eggs were also sent to the University of Ottawa for more testing, which will help the researchers understand what the birds are eating. Understanding what the birds are eating can help the researchers figure out the source of pollution.

Hering, Adam

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Permit No: 500303
Region: SS

Species Studied: Wood bison

Location: Slave River Lowlands, immediately north and northwest of Wood Buffalo National Park and west of the Slave River in the Grand Detour area

Evaluation of novel blood-based diagnostic tests for *Mycobacterium bovis* (bovine tuberculosis) in bison

The goal of this research was to see if bovine tuberculosis, which is a disease affecting wood bison, can be accurately detected using a blood sample. There are issues with the currently used testing method, which is a skin test. The most accurate way to find tuberculosis is to check a dead animal. For this reason, twenty-eight bison bulls were captured and blood was drawn to see if tuberculosis could be found in the blood. Most (26) of the bulls were also tested using the skin test method. Twenty of these 26 animals tested positive for bovine tuberculosis (77%) on the skin test. The researchers planned on comparing the blood test to the skin test, and then later on harvesting the bulls to check their remains. At that point, however, community leaders asked the researchers to recapture all test subjects, remove the collars, and stop the research, so the researchers were not able to test the remains of the animals to compare the blood and skin tests. All but two collars were removed (one animal was killed by predation, and one collar stopped working so the animal could not be found). The researchers are now studying the blood samples and other information they gathered.

Hodson, James

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Permit No: 500309
Region: SA

Species Studied: Multi-species

Location: At the Mackenzie River near Tulít'a

Multi-species monitoring using winter wildlife track surveys in the Sahtú Settlement Region

The goal of this ongoing study is to try to determine the population size for certain animals in the Sahtú Region. The research team counts animals by following a set route and counting how many tracks they find. They use a mathematical formula to figure out about how many animals there are from their track counts. The research team surveyed four routes twice, and tried a new survey route, 12 Mile Point, on the last day of field work. They surveyed a total distance of around 100 km. Marten tracks were by far the most numerous of the tracks recorded. The researchers did not count the tracks of snowshoe hare, ptarmigan/grouse, or red squirrel as there were just too many. However, they did make a note of whether these animals' tracks were there or not.

Hodson, Keith

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Permit No: 500336
Region: SA, DC, GW

Species Studied: Peregrine falcon

Location: Wrigley, Tulít'a, Norman Wells, Fort Good Hope, Tsiigehtchic

Bioelectronic monitoring of peregrine falcons along the Mackenzie River Northwest Territories - second year of research

The goal of this ongoing research is to check on peregrine falcons and their nests. The researchers have checked on peregrine falcons every five years since 1990. On this 2015 survey 82 sites were checked – both known ones and new ones. About 70 nests were being used by peregrine falcons, and the falcons were able to successfully hatch young ones in 50 nests. A total of 81 young birds were banded. The researchers used a special type of leg band for these birds, a band which has a small electronic part. This electronic part can be “read” by a special tool so that in the future, the researchers will be able to identify which falcons they have banded without getting too close. They have about 200 of these special leg bands on peregrines, and will be able to start using the leg band reader in June 2016.

Hood, Alexandra

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Permit No: 500311**Region:** NS**Species Studied:** Multi-species**Location:** 31 km radius from the centre of Snap Lake Mine**2015 wildlife effects monitoring program**

One of the requirements of the Snap Lake Mine is to study how the mine might affect wildlife around it. For this reason, the owners of the mine, De Beers, do a few different surveys every year to check on wildlife such as caribou, bears, some birds, and other animals. They do a caribou survey if the caribou migrate close to the mine. For grizzly bears, black bears, and wolverine, De Beers usually helps out in a regional DNA study. However, no DNA studies were done in 2015. A raptor nest survey was conducted, however, so that the researchers could give nesting and other types of information to the North American Peregrine Falcon Survey.

Ken Hansen

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Permit No: 500266**Region:** SA**Species Studied:** All species**Location:** The central Mackenzie Valley, between 64 48' N - 65 06' N and 126 00' W - 126 39' W**Project:** EL 462 and EL 463

No report was submitted for this permit.

Kaupas, Laura

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Permit No: 500247**Region:** SS, DC**Species Studied:** Bats**Location:** Fort Smith, Kakisa**Investigation of northern adaptations in tree-roosting bats in the South Slave region**

The goal of this project was to study how bats have adapted to living in the north, by looking at bats that make their homes in trees in the South Slave region. The researchers found two colonies of the bats known to scientists as “northern myotis.” Mother bats with young ones look for big trembling aspen trees to make their homes. They roost both in holes and splits made by frost. The splits were low to the ground, but the holes the bats chose were higher up. Some roost trees were alive, some had died recently, and a few were rotting. Unlike bats who live in the south,

these bats lived in large colonies. They also changed roosts often, rarely staying in a roost for more than one day. Despite the cooler temperatures in their roosts, northern myotis bats keep themselves warm in the same way as other bats. To stay warm they have to eat a lot more, so they stay out hunting bugs for much longer. They also have much longer fur than other bat species, which may keep them warmer too. Overall, to help save these endangered bats, there should be areas of forest left standing with a variety of mature deciduous trees.

Kelly, Alicia

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Permit No: 500293/500205**Region:** DC**Species Studied:** Boreal caribou

Location: Mackenzie River/Great Slave Lake to the north, the Hay River to the east, the Cameron Hills to the south and the Redknife and Kakisa Rivers to the West

Boreal caribou population trends and habitat use in the Hay River Lowlands, Mackenzie and Pine Point areas

No report was submitted for this permit.

Kutz, Susan

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Permit No: 500256**Region:** IN**Species Studied:** Muskox

Location: Across the muskox range in the Inuvialuit Settlement Region

Muskox resilience under changing climatic conditions

Researchers do not know very much about muskox health – for example, there are many questions about illnesses, parasites, and whether or not there is a big enough population of muskoxen to prevent issues from inbreeding. Recently, there have been large die-offs of muskoxen in northern Canada. Researchers have found that a muskox parasite called lungworm has shown up on Victoria Island. Two diseases that affect muskoxen, the bacteria *Erysipelothrix rhusiopathiae* and a parapox virus, have also been found on Victoria and Banks Islands. This research project began due to these changes in muskox health, and the goal of the study is to better understand muskox diseases and parasites considering how fast things are changing in the Arctic. Another goal is to check on muskoxen genetic diversity. Muskoxen are genetically very similar to each other – almost like they are all from the same family. This could be an issue in the changing Arctic, too. When keeping up with a changing environment, an animal species is more likely to survive if they are more diverse. This is like having many different families, all with slightly different features – at least a few animals could then survive if their food supply changes, the weather changes, or if there are new diseases.

Larter, Nic

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Permit No: 500233**Region:** DC**Species Studied:** Wood bison

Location: the Nahanni wood bison population

Nahanni wood bison population monitoring

The goal of this ongoing project is to study the Nahanni wood bison population to see if it is growing, stable, or shrinking. The Nahanni wood bison population lives in an area where bison used to live long ago. All the bison there died out in recent times, so to bring them back, animals from Elk Island National Park were released there in the 1980s and 1990s. The communities in the area were concerned that little was known about what bison were doing in the area, which is why this project began. There are a few different parts to this study. The first is to count how many bulls and calves there are compared to cows, which can help researchers predict if the population is shrinking or growing. The second is to try and count the whole population using airplane surveys and mathematical calculations. Third, the researchers have placed collars on some bison to track their movements. Finally, the researchers are collecting samples and studying bison disease. Previous surveys found more than 400 bison, and the researchers hope to count them again in 2017 if the research team can collar more bison. They need to do another count to see if the population is growing or not.

Larter, Nic

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Permit No: 500194**Region:** DC**Species Studied:** Boreal caribou**Location:** Dehcho region**Continued monitoring and deployment of satellite collars on Dehcho boreal caribou**

The Dehcho boreal caribou study began in 2004 at the request of, and after consultation with, the Sambaa K'e Dene Band of Trout Lake. In the first year the research team put ten satellite collars on ten caribou cows. Other organizations then became interested and joined the study. From 2004-2015, a total of 136 collars have been placed on boreal caribou cows. Using the information from the collars, the researchers were able to map out the range used by each individual cow. The cows had range sizes that differed widely. Some used areas as small as about 260 km², some more than 14,000 km², with the average around 3,000 km². To put this in perspective, Tathlina Lake is about 600 km², and Wood Buffalo National Park is about 45,000 km². The collars show that sometimes caribou travel to northeast British Columbia and northwest Alberta. The collars also show where the cows go to have their young ones. It seems they usually calve in mid-May. The research team took blood samples from captured caribou and found that 93% of the cows were pregnant, which showed that the collars are not preventing cows from becoming pregnant and having calves.

Martin, Pamela

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Permit No: 500332**Region:** NS**Species Studied:** Herring gulls**Location:** North shores of the North Arm of Great Slave Lake from Baker Island west to Frank Channel**2015 chemicals management plan - national wildlife monitoring program: collection of herring gull eggs on the North Arm of Great Slave Lake**

The goal of this ongoing project is to see if there are contaminants in the eggs of herring gulls from across Canada. It is part of a larger group of projects which track chemicals in the environment and wildlife. When researchers find pollution and chemicals in herring gull eggs, it tells them that the gulls came in contact with the chemicals somehow, for example by eating

contaminated food. This helps researchers to understand pollution, how pollution is affecting wildlife, and what chemicals are a concern. Eggs collected from 2008 to 2014 show that levels of flame retardants and chemicals like Scotchguard fabric protector were similar to levels found in gull eggs from the Atlantic and Pacific coasts of Canada. However, northern gull eggs only had a small amount of these chemicals compared to eggs from the Great Lakes, St. Lawrence, and prairie areas.

McLean, Sarah

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Permit No: 500291

Region: NS

Species Studied: Birds, carnivores, ungulates

Location: Gahcho Kue Mine Site

Baseline wildlife studies for the DeBeers Canada Gahcho Kue Mine

The owners of the Gahcho Kue Mine, De Beers, have to conduct various studies on wildlife as part of the environmental review process. To meet this requirement, they worked with the GNWT on the Barren-ground Caribou Management Strategy, studied how wide of an area the mine affects, and conducted a routine monitoring of the winter road and project site for caribou and other wildlife. Routine monitoring included a daily check of the winter road, weekly wildlife surveys around the mine site, and taking note of what wildlife is seen around the mine. De Beers checked the mine pit for raptors and worked with ENR to come up with a plan for monitoring raptor nests, if any are found in the future. De Beers also surveyed for raptors as part of the Regional Peregrine Falcon Monitoring Program, and for shorebirds as part of the Program for Regional and International Shorebird Monitoring. They provided the information they gathered to the territorial and federal governments. Lastly, De Beers conducted a small mammal trapping project with ENR, and sent the results and samples to ENR.

Obst, Joachim

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Permit No: 500348

Region: NS

Species Studied: Loons, gulls, songbirds, shorebirds

Location: Tundra Ecosystem Research Station, Daring Lake

2015 climate change impacts on habitats, breeding densities and population trends of tundra birds at Daring Lake, NT

This is an ongoing project which includes revisiting areas near Daring Lake that usually have nesting birds year after year. The researchers checked all these spots in 2015 and found that there were very few birds compared to previous years, and that the birds they did see were not that successful in having young ones – a trend of lower and lower population numbers that has been ongoing for almost twenty years. To summarize, less than half of the traditional loon nesting territories were occupied, while only eight of 13 yellow-billed loon territories were occupied and only one pair raised a chick. Also, only five of 18 territories of Pacific loons and red-throated loons were occupied and only two pairs raised chicks. Numbers of diving ducks were extremely low and no broods were seen. Yellow warblers have been increasing in numbers for a few years due to climate change, which is causing the shrubs to grow quickly. Ptarmigan reached the low point in their natural population cycle and were scarce. Otherwise, the numbers of tundra birds were similar to past years. Egg shells from two loon nests were collected two weeks after hatching to

conduct tests on the shells. In addition, eggs from five herring gull nests were carefully collected for a national study on mercury in water birds.

Olson, Steve

US Fish and Wildlife Service
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Permit No: 500369**Region:** SA**Species Studied:** waterfowl**Location:** Willow Lake banding station

Western Canada cooperative waterfowl banding program at Willow Lake, Sahtú Settlement Area, Northwest Territories, 2015

No report was submitted for this permit.

Rausch, Jennie

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Permit No: 500339**Region:** SS, NS**Species Studied:** Shorebirds (sandpipers, plovers, phalaropes)**Location:** Wekweèti, Lutselk'e**2015 Arctic shorebird monitoring program**

The population of shorebirds migrating through southern Canada and the United States is declining drastically. Researchers started the Arctic Shorebird Monitoring Program in order to better understand why this is happening. The shorebird monitoring project is part of an even larger program which is studying shorebirds in North America and internationally, too. This study has two different survey types – short term snap-shot surveys, or “rapid surveys” conducted over large areas, and long-term, “intensive” surveys conducted in a small area. In 2015, the team conducted rapid surveys near Wekweèti and Lutselk'e. There were no intensive surveys in the NWT in 2015.

Rapid surveys involve two people walking carefully through a small “plot” and recording all the birds and nests they see. A total of 61 randomly-selected plots were surveyed in June. The research team counted almost 600 birds during the surveys, including almost 40 shorebirds: 15 semipalmated sandpipers, eight red-necked phalarope, six least sandpipers, five stilt sandpipers, two dunlins, and one Wilson’s snipe. They also saw 23 bird nests, including nine shorebird nests: five semipalmated sandpiper nests, two least sandpiper nests, one dunlin nest, and one American golden-plover nest.

Sayine-Crawford, Heather

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Permit No: 500377**Region:** SA**Species Studied:** Bears, wolverine, wolves, and raptors**Location:** Along the all-season road from Norman Wells to Canyon Creek**Black bear/grizzly bear/wolverine/wolf/raptor monitoring program for Canyon Creek Road**

The Department of Transportation has applied to construct a 14 km all-season road from Norman Wells to Canyon Creek. To ensure this construction causes as little impact as possible to animals along the route, a survey of the area was conducted. This aerial survey was checking for dens

and nests of bears, wolverines, wolves and raptors. The survey was carried out as soon as there was enough snow on the ground to record the animal's tracks, but before they went into their dens for the winter. Even though the research team surveyed the area at the right time of year, they did not see any of the target animals, other than a raptor's nest and a possible bear, wolverine or wolf den. Muskox tracks and a moose were seen along the creek. The researchers recommended to the Department of Transportation that they keep an eye on the nest to ensure that construction of the road does not cause the birds to constantly fly to and from the nest. If that happens, then construction should stop or move.

Sayine-Crawford, Heather

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Permit No: 500341

Region: SA

Species Studied: Dall's sheep

Location: Katherine Creek and Palmer Lake

Mackenzie Mountain Dall's sheep monitoring

Dall's sheep are found across much of the Mackenzie Mountains in the Northwest Territories. In the past (1960s to 1990s), the government tried to get a general understanding of how many sheep there were by counting sheep in ten separate areas in the mountains, and doing mathematical calculations to figure out the whole population. Dall's sheep were not a high priority at that time. In fact, starting in the mid-1970s, the only information collected was from hunted rams. They recorded how old the ram was and how large the horns were. Then in 1997, ENR and the Sahtú Renewable Resources Board began ground-based surveys in four study areas in the Sahtú portion of the Mackenzie Mountains. ENR has continued these surveys in two of the study areas. In 2015, ENR was only able to survey around Katherine Creek. The number of sheep seen in the Katherine Creek study area in 2014 and 2015 were the lowest on record since these surveys began in 1997. Sheep population numbers are going down everywhere. Despite the declining population, the research team continues to see family groups of sheep with good numbers of lambs and yearlings, which usually means that the population is doing well. Researchers do not know why the population is going down.

Sayine-Crawford, Heather

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Permit No: 500308

Region: SA

Species Studied: Bluenose-West barren-ground caribou

Location: Range of Bluenose-West barren-ground caribou herd

Radio collar deployment on the Bluenose-West barren-ground caribou herd

The purpose of this project was to capture Bluenose-West barren-ground caribou and place satellite collars on them. The reason the collars are needed is to be able to find the same exact group of caribou at different times of the year, to see how well their calves are doing. Prior to the crew going out, the researchers flew over the caribou's winter range to find where the caribou were. They saw almost 2,000 caribou during the flights. The researchers captured and placed collars on close to 50 caribou – two-thirds of the caribou were cows, and one-third were bulls. The research team were not able to collar the 60 caribou they had planned on due to equipment problems. However, they were able to use the 20 functioning collars that are still on caribou from a 2012 program in order to do the post-calving survey of the herd.

Sharam, Gregory

Environmental Resources Management
greg.sharam@erm.com

Permit No: 500269
Region: NS

Species Studied: Ungulates, carnivores, birds
Location: Seabridge Gold Inc.'s Courageous Lake property

Courageous Lake project wildlife baseline program

No report was submitted for this permit.

Tout, Ann Marie

Enbridge Pipelines Inc.
annmarie.tout@enbridge.com

Permit No: 500287
Region: SA, DC

Species Studied: All wildlife species
Location: Norman Wells, Tulit'a, Wrigley, Fort Simpson, Jean Marie River, and Trout Lake

Wildlife monitoring along the Enbridge right of way

This is a community-based program to record wildlife sightings and tracks along the Enbridge Pipeline. The program is financially supported by Enbridge. Enbridge invited regional community groups and all but one participated. For every community, Enbridge supported ten winter trips along select portions of the pipeline. These areas were selected because they are close to a community, safe to access, and/or have different or important landscape features. Monitors travel by snowmobile and record all wildlife sightings and tracks. Then, the information is sent to Enbridge. The actual number of trips taken depends on the availability of monitors as well as weather and ground conditions.

Wells, David

Diavik Diamond Mine Inc.
david.wells@riotinto.com

Permit No: 500263/500230
Region: NS

Species Studied: Barren-ground caribou, wolverine, grizzly bear, raptors, waterfowl
Location: Diavik Diamond Mine, Lac de Gras

2014 wildlife monitoring program for the Diavik Diamond Mine

The goal of this on-going project is to understand how the Diavik Diamond Mine is impacting wildlife around the mine site. The project is a requirement of the mine's environmental commitments. One part of the project includes watching for, and recording, wildlife sightings around the mine. The mine grew in 2014, so the research team was particularly interested in how this might affect wildlife. Diavik employees saw nine barren-ground caribou. They also saw grizzly bears and wolverines – more than a hundred sightings of each. Since there was never more than a hundred caribou around the mine, the caribou travel advisory remained at “no concern” throughout the entire year. Most Bathurst caribou migrated to the west of the mine, around East Island, during the northern migration. On their way south in the fall, the herd mostly passed to the east of the mine, around Lac de Gras. Diavik employees also checked the pit walls for raptor nests, and found four. Finally, Diavik employees went out to survey for wolverine tracks around the mine. They found wolverine tracks on a quarter to a third of their surveys. There were no reported mortalities or injuries to caribou, grizzly bears, wolverine, and raptors in 2014 and 2015.

Wilson, Joanna

Department of Environment and Natural Resources, Wildlife Division
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Permit No: 500224
Region: All NWT

Species Studied: Bats
Location: All NWT

Bat monitoring in the Northwest Territories

Bats are an important animal that helps to keep northern areas in a natural balance, but they are facing threats. Bat researchers do not have much information about where bats are, how and when they hunt, and what different types of bats can be found in any area. For this reason, bats are being studied at a number of different spots in the NWT. The researchers are using 'bat detectors', special devices with microphones that can record the sounds that bats make when they travel and hunt. These sounds are so high-pitched that people can't even hear the noises bats make, which are called 'echolocation calls'. Since 2010, bat detectors have been set up for a time at sites in the South Slave, North Slave, Dehcho, and Sahtú regions. The bat sound recordings from 2014-15 are still being studied, but previous work has shown that myotis bats are very active at Sambaa Deh Territorial Park. The bats are also present in Yellowknife, but there are not nearly as many. In addition to the other recorders, this year a new type of equipment which can be used to record bat sounds year-round was used. Soon, the research team will be able to study those recordings to learn more about bats throughout the year.

Wood, Cindy

Environment and Climate Change Canada
cindy.wood@ec.gc.ca

Permit No: 500345
Region: IN

Species Studied: Lesser snow goose
Location: Banks Island

Western Arctic snow goose management: band lesser snow geese in the western Canadian Arctic

The western Arctic population of lesser snow geese has grown considerably over the last 20 years. This growth is due in part to new 'refuges,' which are areas set aside and protected for the geese to use both during their migration and at their wintering grounds. There have also been changes in farming and ranching in areas where the geese spend the winter and along their migration route. These changes mean that the geese have an unlimited food supply during these important times. Due to safe areas to land and plentiful food, the goose population has grown so large that it has been designated as 'overabundant' – too many geese. The government decided to change hunting regulations and allow springtime hunting for non-aboriginal hunters in Alberta and the Northwest Territories in 2015, and the Yukon in 2016. The goal of this research was to see how the changes to hunting rules have affected the snow goose population. To study this, the researchers started a banding program on Banks Island in 2015. They will study banded birds and compare the population now to the population before the hunting rules changed, and to the population from long ago when the geese were not considered overabundant.

Wood, Cindy

Environment and Climate Change Canada
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Permit No: 500322
Region: All NWT

Species Studied: Waterfowl
Location: Mackenzie Valley

Cooperative waterfowl population surveys in the NWT

The Waterfowl Population Survey is an international program to study ducks, geese, and swans. Biologists record how many birds there are, what types of birds are in what areas, and if the populations are growing, shrinking, or staying the same. The project includes many important waterfowl breeding areas in North America. For more than 50 years, biologists from the United States Fish and Wildlife Service, Canadian Wildlife Service, state and provincial governments and non-government partners have worked together on this program. The NWT is one of the most important breeding and summering areas for ducks, geese, and swans in North America. The information gathered in this program is needed to determine if current harvest levels are sustainable. This helps ensure that waterfowl populations are conserved for the long-term use and appreciation of northern residents and anyone living along the migration route. Habitat and weather conditions were good for ducks in spring 2015, and the duck population was 16% higher than in 2014. It was 60% higher than the long-term average. Overall, waterfowl populations appear to be healthy in the NWT.

Fisheries

Byrne, Geraldine

Northwest Territories Power Corporation
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Licence Number: S-15/16-3022-YK

Species: All fish species

Location: Taltson River system

Taltson Twin Gorges hydro generating facility aquatic effects monitoring program

To meet the requirements of a water licence, the Northwest Territories Power Corporation has to conduct an aquatic effects monitoring program. The goal of the monitoring program is to make sure that a hydro generating facility isn't harming a waterway beyond what was agreed to in the licence. The power corporation checked both Trudel Creek and Lower Taltson River to see if fish became stranded during the time when the flow from the dam was reduced to allow for annual maintenance, called a "rampdown". Field crews were ready to catch and relocate any fish that became isolated or stranded during the rampdown. All stranded fish were identified and counted. A sub-sample of each species and age class were measured and weighed. The monitoring team also took samples which provided information on how old the fish were (e.g. fin rays, scales) and to learn more about the fish community.

Carson, Richard

RC BioSolutions
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Licence Number: S-15/16-3028-YK-A1

Species: All fish species

Location: Flat River

Cantung Mine 2015 environmental effects monitoring

The goal of this project was to see whether the Cantung Mine has a different impact on water and life in the Flat River in different years, or in different locations along the river. The research team recorded changes to the river during their last visit in 2012. They wanted to check whether the river was still in the same condition, and if not, they wanted to find out whether the changes were due to current mining practices, historical mining practices, or a combination of both. The researchers checked fish health, including how much food the fish seemed to be getting, and the age of the fish in the area affected by the mine compared to similar populations outside the mine's influence.

Chetelat, John

Environment and Climate Change Canada
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Licence Number: S-15/16-3001-YK

Species: All fish species

Location: Great Slave Lake from Yellowknife Bay to Wool Bay and Pilot Islands

Cumulative impacts monitoring of aquatic ecosystem health of Yellowknife Bay, Great Slave Lake

The health of the ecosystem (the plants, animals, and environment) in Yellowknife Bay has been impacted by historical mining. The mines released toxic metals into the environment, particularly arsenic. The bay is also polluted by metals such as mercury, which come in through the atmosphere from far-away human emission sources. People in Yellowknife are concerned about arsenic exposure from this pollution, and are also concerned about the news that mercury levels are increasing in fish in Great Slave Lake. When fish eat plants or animals that are polluted with mercury, the mercury from that food stays in the fish's body and is stored there for some period of time. The more mercury eaten by a fish, the more mercury will be in its flesh. The researchers wanted to find out what is making the level of mercury in fish increase now, so long after the mines have closed. They also wanted to understand how much of the mercury found in fish came from the nearby mines, and how much came from far-away sources via the atmosphere.

Clipperton, Casey

Golder Associates Ltd.
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Licence Number: S-15/16-3003-YK-A2

Species: Arctic grayling eggs

Location: Outflow to Lac du Sauvage: 64° 35' 40.2716" N, 110° 7' 42.9531" W

Dominion Diamond Corporation baseline study in Lac du Sauvage Area and Lynx offsetting in Lutsel K'e

The Ekati Diamond Mine will soon be expanding with a development known as the Jay Project, which will extend the life of the mine. Environmental studies are needed for the Jay Project before it can go ahead. For the environmental assessment of the Jay Project, the researchers needed to study the current state of several streams near the mine, including the types and number of fish and how the streams support the fish. Knowing more about the natural state of the streams will allow researchers to see if the mine has any impact in the future. The information collected in 2015 will be added to information collected during previous studies in the same locations, to examine the natural yearly changes in fish populations and migration behaviour. The researchers also checked on the progress of a different program for the Ekati mine, which was designed to ensure good jackfish spawning in a small creek in order to offset the jackfish lost from draining Lynx Lake. The researchers used fishnets to see how many jackfish were migrating and spawning, and how many young jackfish are making it back down the creek.

Clipperton, Kasey

Golder Associates Ltd.
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Licence Number: S-15/16-3009-YK-A1

Species: Lake trout, lake whitefish

Location: Lynx Lake

Dominion Diamond Corporation - Lynx Lake fish-out

The goal of this project was to remove all fish from Lynx Lake before it was drained for the expansion of the Ekati Diamond Mine. The project team started in early June 2015, shortly after ice-out, and were finished by late summer. The lake was drained immediately afterwards. The project team used angling, beach seining, minnow traps, trap nets, electrofishing, and gillnets to

get as many fish as possible out of the lake. They killed all of the fish and counted how many of each type there were. For some fish, they collected more detailed information such as length, weight, sex and maturity. They took special samples from 200 lake whitefish and lake trout to see how old each fish was. All of this information will be useful to scientists who want to study fish populations. The project team also took samples from 40 lake whitefish and lake trout to test for concentrations of metals such as mercury and arsenic.

Evans, Marlene

Environment and Climate Change Canada
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Licence Number: S-15/16-3042-YK

Species: Lake trout, cisco

Location: Great Bear Lake area

Monitoring of mercury, flame retardants and other chemicals in lake trout and cisco from Great Bear

This study determined the levels of contaminants of concern, including mercury, in lake trout and cisco from Great Bear Lake. The researcher will compare the results from this year to previous studies to see whether contaminants levels are changing over time.

Evans, Marlene

Environment and Climate Change Canada
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Licence Number: S-15/16-3045-YK

Species: Burbot, northern pike, lake trout

Location: Resolution Bay, Hay River area, Great Slave Lake area

Spatial and long-term trends in persistent organic contaminants and metals in fish from the NWT

The goal of this long-term study is to see if contaminant levels are changing in fish in the Northwest Territories, with a focus on Great Slave Lake. Fish in Great Slave Lake have been studied since the early 1990s, so the researchers can now see long-term trends. They collected lake trout from Great Slave Lake in the Hay River and Lutsel K'e areas. They also collected burbot (loche) from the Lutsel K'e and Fort Resolution areas of Great Slave Lake, and northern pike from the Fort Resolution area of Great Slave Lake. All fish will be tested for contaminants and compared to results from previous years, to see if the levels are increasing, staying the same, or decreasing.

Gallagher, Colin

Fisheries and Oceans Canada
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Licence Number: S-15/16-3008-YK

Species: Dolly Varden

Location: Babbage River system, Little Fish River, Firth River system, Joe Creek fish hole (Ivvavik National Park), Ptarmigan Bay

Population studies on Dolly Varden from the Northwest Territories and Yukon North Slope

The goal of this on-going project is to check on the population of Dolly Varden char. The population of Dolly Varden has declined in recent decades, and careful study is needed to find

out why it has declined and to check whether the population has become stable or has started to grow. The research team used a variety of tagging systems in this study. A number fish were tagged in previous years and again in 2015. The number of previously-tagged fish were recaptured this year allows the researchers to calculate the population. The research team also gave satellite tags to around 20 fish in both the Big Fish and Babbage Rivers, to see when and where they migrate. Sixty other fish were tagged with electronic archival tags, which are like small computers that record information about the water the fish lives in. Finally, the researchers caught small-sized spawning Dolly Varden from Joe Creek and the Babbage and Rivers, and resident Dolly Varden from Joe Creek and the Big Fish, Babbage, and Firth Rivers. They recorded the length, weight, age, sex, maturity and diet of the fish, and took tissue samples to test for contamination. They also took samples from fish caught by community members at Herschel Island and Ptarmigan Bay, Yukon.

Gallagher, Colin

Fisheries and Oceans Canada
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Licence Number: S-15/16-3012-YK

Species: All fish species

Location: Shingle Point

Community based monitoring of coastal fish ecology and harvest of Dolly Varden

The goal of this on-going program is to learn more about the ecosystem of the Tarium Niruyutait Marine Protected Area. 'Ecosystem' refers to the plants and animals in an area, as well as their environment and how they all work together. The researchers are collecting samples from fish caught by local fishers at Shingle Point. The samples are tested for chemicals that show what the fish are eating. The researchers are also recording how many Dolly Varden the fishers are catching, as well as other information about the fish such as their length, weight, sex, maturity and age. They are also taking samples of the Dolly Varden which will be used for DNA testing and stomach content analysis to see what they are eating. The researchers will use the information they collect to understand normal annual variations in the fish, and how this variation affects what people are harvesting. This program provided training to support long-term, community-based coastal monitoring, and also helped the broader research community understand how to check if the oceans are changing due to the combined effects of development and other man-made changes.

Gallagher, Colin

Fisheries and Oceans Canada
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Licence Number: S-15/16-3015-YK

Species: Dolly Varden, Arctic grayling

Location: Big Eddy, Rat River Mouth, Destruction City, Fish Creek

Biological investigation of Dolly Varden from the Rat River

The goal of this ongoing project is to collect information about Dolly Varden in the Rat River. There are several types of Dolly Varden that can be found in this river. Some travel to the ocean to feed and then return to the river to spawn, while others stay in the creeks year-round instead of migrating to the ocean. The research team worked with local harvesters to collect fish they had previously tagged, which gives the researchers information about the population size. They also recorded information such as the weight and size of the fish that were caught. The researchers asked harvesters how many fish they caught compared to how much time they spent fishing, which helps calculate population size. The researchers travelled to Fish Creek, a tributary of the

Rat River, and live-caught Dolly Varden in order to gather information about them while they were migrating and spawning. Finally, they caught and sampled some fish who stay in the creek all year for later study.

Gallagher, Colin

Fisheries and Oceans Canada
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Licence Number: S-15/16-3020-YK

Species: Arctic char

Location: Hornaday River, Darnley Bay, Lasard Creek (mouth)

Arctic char monitoring in Darnley Bay NT, 2015

This project has two goals. The first is to check on the Arctic char populations in Hornaday River, Darnley Bay, and at the mouth of Lasard Creek. The second is to gather information about the life history of Arctic char captured in Lasard Creek and at the mouth of the Hornaday River. The researchers also caught some fish near Tippitiuyak (western Darnley Bay) that are known locally as 'blue char'. Local harvesters consider these fish to be different from Arctic char. Finally, the research team continued to work with the community of Paulatuk to provide important information that is needed to fulfill the the Paulatuk Char Management Plan.

Gallagher, Colin

Fisheries and Oceans Canada
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Licence Number: S-15/16-3037-YK

Species: Arctic char

Location: Fish Lake

Assessment of Arctic char stock from Fish Lake

The goals of this ongoing project are to record the number of Arctic char caught by harvesters at Fish Lake, and to gather information about the char such as their size, sex, and age. This information helps the researchers understand if the char population is stable, decreasing, or increasing, and also helps them predict what will happen to the population if the amount of fishing increases or decreases.

Harwood, Lois

Fisheries and Oceans Canada
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Licence Number: S-15/16-3006-YK

Species: Bearded seal, ringed seal

Location: Safety Channel, coastal marine waters in the Ulukhaktok area

Assessment of reproduction, condition disease and contaminants of ringed seals and bearded seals

The goal of this project was to check on ringed and bearded seals to see how healthy they are. Seal health is determined by looking at whether the seals are in good enough condition to reproduce, whether they have any diseases, and whether there are a lot of contaminants in their flesh. The research team can use the health of the seals to monitor seal populations in general, and to understand if the plants, water, and animals that the seals rely on are also healthy. The researchers gathered information by examining and taking samples from seals that were harvested by Ulukhaktok hunters. There were 100 ringed seals and five bearded seals taken in

the annual harvest in the Ulukhaktok area, and all were sampled and measured. The researchers also noted what types of prey animals the bearded seals prefer. Finally, the research team recorded regional ice conditions.

Howland, Kimberly

Fisheries and Oceans Canada
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Licence Number: S-15/16-3018-YK

Species: Lake trout, cisco

Location: Great Bear Lake area

Long-term monitoring of cumulative impacts to fisheries and ecosystems in Great Bear Lake

The goal of this long-term monitoring program is to monitor fish in Great Bear Lake. The researchers were focussed on lake trout and cisco. They recorded the size and age of lake trout sampled from the Dareli (Keith), Turili (McVicar), Kwit tla (McTavish), Tugacho (Dease) and Tirato (Smith) Arms of Sahtú (Great Bear Lake). They also recorded the number of eggs per female lake trout. The research team used this information to see if lake trout numbers are changing over time, or if the lake trout themselves are changing over time. The researchers also wanted to find out if there are multiple types of ciscos in Great Bear Lake. To figure this out, they took ciscos which had been caught over the past seven years and carefully measured various aspects of the fish, including their size and scales. Finally, the research team studied the whole living system of Great Bear Lake that supports the fish, including the plants and small animals that the fish eat and the quality of the water. All of these things support the growth and reproduction of the fish.

Hynes, Kristin

Fisheries Joint Management Committee
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Licence Number: S-15/16-3032-YK

Species: Arctic char

Location: Sachs River

Sachs Harbour char monitoring

The goal of this ongoing program is to collect information on Arctic char harvested by the community of Sachs Harbour, with a focus on those harvested from Sachs River. This was a community-based program aimed at learning more about the Arctic char stocks in the area. The focus on Sachs River char was because of reduced harvest levels in recent years, which is a concern for the community.

Insley, Stephen

Wildlife Conservaton Society Canada
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Licence Number: S-15/16-3005-YK

Species: Bearded seal, ringed seal

Location: Amundsen Gulf

Darnley Bay seal monitoring

The goal of this ongoing project was to design and maintain a long-term, locally-based monitoring program focused on ringed seals and bearded seals in the Darnley Bay region of the Inuvialuit Settlement Region. This was the first year of the project, and the researchers and community worked together to develop a project methodology that could be used in future years. The community and the researchers were interested in a few different topics. The first was to check

on the local seal population to see if it is stable, growing, or declining. They also wanted to know if seals are using the same areas as they always have, or if this is changing. Finally, they wanted to know about seal diet and body condition.

Janjua, Muhammad Yamin

Fisheries and Oceans Canada

muhammad.janjua@dfo-mpo.gc.ca

Licence Number: S-15/16-3004-YK

Species: Inconnu

Location: East Great Slave Lake, Buffalo River closed area

Buffalo River spring sampling

The goal of this ongoing program is to continue the long-term monitoring of inconnu (coney) at the mouth of the Buffalo River. Community members and scientists have been worried about the state of Buffalo River inconnu for many years. In order to carefully watch the population, researchers have counted the fish every few years for the last few decades. An increase in fishing, an increase in the value of the fish, and the expansion of a commercial fish packing plant are all threatening the inconnu at a level not seen before. Due to these new threats, keeping track of the population is critically important during this period of change. The last sampling program took place in 2014. In 2015, gillnets were set and 250 inconnu were caught and sampled for research purposes. The information collected was used to update the status of the population.

Janjua, Muhammad Yamin

Fisheries and Oceans Canada

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Licence Number: S-15/16-3043-YK-A1

Species: Inconnu

Location: Whitesand River, Yates River

Buffalo River inconnu acoustic tagging

The goal of this study was to gather information about Buffalo River inconnu (coney) from fish that had been tagged in previous years. The tags placed on the fish emit a sound, which can be recorded by researchers to identify their migration routes and track their seasonal movement patterns from Great Slave Lake into the Buffalo River, and upstream to Buffalo Lake and its tributaries. The tags can also be used to find spawning areas.

Lair, Stephane

University of Montreal

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Licence Number: S-15/16-3031-YK

Species: Beluga

Location: Hendrickson Island

Health assessment of beluga whales harvested at Hendrickson Island

The goal of this research program was to check on the health of beluga whales harvested around Hendrickson Island. The research team partnered with both the Fisheries Joint Management Committee and Fisheries and Oceans Canada to develop and maintain a long term beluga monitoring and sampling program in the Tarium Nirjutait Marine Protected Area. They used Hendrickson Island as their main sampling site, but also supported the growth of similar programs at other community beluga hunt locations such as East Whitefish, Kendall Island, Shingle Point, and Paulatuk. The researchers also helped out with beluga sampling efforts in the proposed

Anguniaqvia niqiqyuam Marine Protected Area in Darnley Bay along with the Paulatuk Hunters and Trappers Committee. Using the information they collected, the researchers were able to chart out how conditions around Hendrickson Island, and the beluga populations found there, change naturally from year to year. This information is needed in order to assess potential impacts at a regional scale, like climate change, and also at a localized scale, such as oil and gas activities. Another goal of the research team was to build capacity for science and long-term monitoring of beluga health in the Inuvialuit Settlement Region.

Lea, Ellen

Fisheries and Oceans Canada
ellen.lea@dfo-mpo.gc.ca

Licence Number: S-15/16-3014-YK**Species:** Sand lance, Arctic char**Location:** Coastal marine waters in the Ulukhaktok area**Ulukhaktok summer coastal harvest monitoring 2015**

The goal of this project was to collect information about Arctic char from fish harvested in the Ulukhaktok area. Community monitors work with local harvesters to gather information about the fish, such as size and how many fish were harvested. The information collected by the monitors is used in the community fishing management plans that are established between the Olokhaktomiut Hunters and Trappers Committee, Fisheries Joint Management Committee, and the Department of Fisheries and Oceans Canada.

Lea, Ellen

Fisheries and Oceans Canada
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Licence Number: S-15/16-3035-YK**Species:** Inconnu**Location:** Marian Lake, Great Slave Lake area**Great Slave Lake inconnu sampling**

The goal of this project was to collect DNA and other biological samples from inconnu (coney) from different areas of Great Slave Lake in order to learn more about the 'natal stocks' – that is, the parent populations – of the fish that are harvested.

Lea, Ellen

Fisheries and Oceans Canada
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Licence Number: S-15/16-3044-YK**Species:** Cisco, lake whitefish**Location:** Tartan Rapids (Yellowknife River), Bluefish Lake**DFO Yellowknife River Tartan Rapids cisco monitoring**

This research project had several goals. The research team wanted to find out when cisco and lake whitefish migrate to their spawning areas, and how long the migration lasts. They also mapped out spawning locations, and took samples of fish throughout the run to study health, length, weight, and age.

Lea, Ellen

Fisheries and Oceans Canada
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Licence Number: S-15/16-3046-YK

Species: Dolly Varden, Arctic grayling **Location:** Little Fish River

Big Fish River Dolly Varden harvest sampling

The goal of this program was to collect information about Big Fish River Dolly Varden that were harvested at Little Fish River near Aklavik. The researchers took biological samples from fish that were harvested by Aklavik residents under an Aboriginal Communal Fishing Licence, which was issued to the Aklavik Hunters and Trappers Committee. They also collected information about how many fish were harvested and collected any tags from the fish that were caught. The researchers also asked the harvesters how long it took them to catch their fish, which helps the researchers understand the population of Dolly Varden.

Low, George

Dehcho, Aboriginal Aquatic Resource and Oceans Management
geobarbgeo@hotmail.com

Licence Number: S-15/16-3036-YK

Species: All fish species **Location:** Willow Lake, Kakisa Lake, Big Island Lake, Mustard Lake

Bio-magnification of mercury within fish species of the Dehcho and their varying levels among lakes

Fish that live in different lakes in the Dehcho region have different levels of mercury in their flesh. Mercury is a poisonous metal that, if present at high enough levels, can make people and other animals sick. The goals of this project were to determine why fish mercury levels vary among these lakes, and to figure out how to predict the level of mercury in fish. Finally, the researchers tried to figure out which fish species have the lowest levels of mercury while still being nutritious for people to eat.

Machtans, Hilary

Golder Associates Ltd.
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Licence Number: S-15/16-3010-YK-A1

Species: Lake chub, round whitefish, lake trout **Location:** Snap Lake, Lac Capot Blanc, Mackay Lake

De Beers Snap Lake Mine

In 2015, De Beers Canada Inc. carried out two summer research programs that looked at fish. The first program documented the health of 'small bodied' fish in the mine area. The research team harvested some lake chub from Snap Lake, Northeast Lake, Unnamed Lake 13, and Lac Capot Blanc, which are all lakes around the Snap Lake Mine. They used the samples to test for fish health, as required under the mine's water licence. The second program examined the current chemical composition of fish tissue in Mackay Lake, located downstream of Snap Lake and Lac Capot Blanc. Lake trout, round whitefish and lake chub were harvested from Mackay Lake and analyzed in the lab. In future years, similar samples can be taken and compared to the 2015

samples to see if the mine causes any future changes. The research team also collected samples of the tiny plants and animals that live in the water from four lakes in the Snap Lake Mine area.

Machtans, Hilary

Golder Associates Ltd.
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Licence Number: S-15/16-3023-YK-A2

Species: All fish species

Location: Horseshoe Island, Jackfish Bay, Kam Bay

Con Mine environmental effects monitoring phase 5 study

The goal of this study is to carry out the second year of environmental monitoring in areas around Con Mine. The sampling sites include Jackfish Bay, a spot that was exposed to the mine's pollution, and Horseshoe Island Bay and Kam Bay, areas that are similar to Jackfish Bay but which were not exposed to the mine's pollution. This allows the researchers to study how the mine has affected fish and fish habitat. The study is a multi-year, multi-phase project that will study how the historic mine might still be affecting the environment. Some of the things that are studied are the fish and the small animals and plants that live near the bottom of the lakes.

MacRae, Dovreshin

Environment and Climate Change Canada
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Licence Number: S-15/16-3025-YK

Species: All fish species

Location: Tuktoyaktuk area

Environment and Climate Change Canada borrow source 170 investigation

An enforcement officer from Environment and Climate Change Canada conducted an investigation into alleged (that is, unproven) offences under the Fisheries Act. In order to establish whether or not an offence has occurred, the officer must first find out whether or not the affected lake actually has a fish population.

Maier, Kris

Gwich'in Renewable Resources Board
 kmaier@grrb.nt.ca

Licence Number: S-15/16-3027-YK

Species: Dolly Varden

Location: Fish Creek

Examination of distribution and density of juvenile Dolly Varden in Fish Creek

The goal of this project was to study young Dolly Varden to find out more about where and how they live, and how many of them make it to adulthood and reproduce. The research team took samples of young Dolly Varden by electrofishing in Fish Creek. The information collected was useful to map out where the young char prefer to live at this life stage, which is something that was poorly known before this project. The research team used the number of char they harvested to figure out how many fish were living to adulthood, and to estimate future population numbers. This information is critical to improve management decisions that are made for the Rat River char stock by the Rat River Working Group.

Maier, Kris

Gwich'in Renewable Resources Board
kmaier@grrb.nt.ca

Licence Number: S-15/16-3034-YK

Species: All fish species

Location: Arctic Red River

Arctic Red River headwaters fisheries assessment

The goal of this project was to answer two questions about fish at the headwaters of the Arctic Red River. First, what fish species are present in the Arctic Red River headwaters? And second, what areas in the Arctic Red River headwaters are important to fish?

McLean, Sarah

De Beers Canada Inc.
sarah.mclean@debeersgroup.com

Licence Number: S-15/16-3000-YK-A2

Species: Burbot, phytoplankton, zooplankton, Arctic grayling

Location: Kennady Lake

Gahcho Kué project

De Beers Canada Inc. is developing a diamond mine at Kennady Lake. To access the diamonds, the mine had to drain the six main basins of Kennady Lake (Areas 2 to 7), as well as a nearby small lake. A dyke was built at the narrows between Areas 7 and 8 of Kennady Lake, which kept the water in Area 8 after Area 7 was drained. Another dyke was built to divert the creeks and rivers above Kennady Lake. In 2014, the project team started to “fish out” all of the lakes that were going to be drained. This is a process that removes all fish from the lakes, and includes setting lines and nets under the ice. This work continued in 2015. The “fish out” also included a study of Arctic grayling. The research team collected information about Arctic grayling migrations, spawning, and overwintering locations. As part of their water licence they also monitored fish health, contaminants in the fish, and the small plants and animals that live in the water. The research team will use this information to compare the health of the fish and ecosystem in their natural state (before the mine opens) to their health after the mine is operating.

McPherson, Morag

Fisheries and Oceans Canada
morag.mcpherson@dfo-mpo.gc.ca

Licence Number: S-15/16-3013-YK

Species: Arctic grayling

Location: Zenchuk Creek, Little Nahanni River, South Nahanni River watershed, Steel Creek, Placer Creek, March Creek, Fork Creek, South Lened Creek, Steel Creek, Mac Creek

Arctic grayling ecology in the Little Nahanni River watershed

The goal of this project was to improve the understanding of Arctic grayling and their habitat in the Northwest Territories. The research team identified where Arctic grayling prefer to live, and the critical areas they require, in the creeks and streams that drain into the Little Nahanni River. The researchers were particularly interested in young Arctic grayling, where they chose to live, what they ate, and where they were located. They mapped out spawning areas and the areas where grayling raised their young ones. The research team also made note of the rivers and creeks where grayling were found, in order to see if things change in the future. Finally, the

researchers were testing their own data collection methods to see how well they worked in northern conditions to study fish like grayling.

Mochnac, Neil

Fisheries and Oceans Canada
neil.mochnac@dfo-mpo.gc.ca

Licence Number: S-15/16-3019-YK

Species: Bull trout, slimy sculpin,
Arctic grayling

Location: Prairie Creek, Funeral Creek, Fast
Creek, Casket Creek

Bull trout ecology in the South Nahanni watershed

The goal of this project was to improve the understanding of bull trout and their habitat in the Northwest Territories. Bull trout were the primary species of interest during this phase of the project; however, other species will also be studied. The researchers wanted to figure out the extent of the area where bull trout lived, and also wanted to test out their research methods to see if they properly mapped trout habitat in the north. Their methods relied on gathering information in the field and then doing some math, so they were checking and re-checking to see if their math accurately predicted where bull trout were found in the real world. Finally, the researchers wanted to use their new method to map out trout habitat to see how impacts to the environment, such as climate change and development, might affect trout and other similar fish species.

Morinville, Genevieve

Rescan Environmental Services Ltd.
gmorinville@rescan.com

Licence Number: S-15/16-3002-YK

Species: All fish species

Location: Unnamed Stream (Pigeon Stream)

Pigeon Stream diversion monitoring program

The goal of this ten-year project is to monitor Pigeon Stream for any effects from the construction of a diversion channel. The diversion channel is a man-made creek bed that moved the course of the creek away from and around the Ekati Mine. It was carefully planned to ensure that the fish in Pigeon Stream would find the channel to be a good place to live. This was the second year of the study, and the research team focussed on studying how fish, especially Arctic grayling, use the Pigeon Stream diversion channel and the un-altered portion of Pigeon Stream. They also mapped out the migration patterns of Arctic grayling and other fish species as they moved through the stream and the new channel, and between downstream and upstream lakes such as Fay Bay, Upper Pigeon Pond A, and Pigeon Lake. Finally, the researchers took samples to compare the fish using the new channel to those in Pigeon Stream.

Morinville, Genevieve

Rescan Environmental Services Ltd.
gmorinville@rescan.com

Licence Number: S-15/16-3024-YK-A1

Species: Slimy sculpin

Location: Vulture Lake, Moose Lake, Counts Lake,
Nero-Nema Stream, Leslie Lake, Nanuq Lake,
Kodiak Lake

2015 Ekati Diamond Mine AEMP fisheries

The purpose of this project was to ensure that fish populations were not impacted as a result of mining activities at the Ekati Diamond Mine. This study is part of a larger monitoring project which is required under the mine's environmental assessment. In 2015, the researchers were only required to sample small fish. The fish they sampled are known as slimy sculpin, which are an important species. If the important species were to die, it is an early warning system if the environment is becoming polluted. Slimy sculpin are sampled every three years, and larger fish are sampled every six years.

Morinville, Genevieve

Rescan Environmental Services Ltd.
gmorinville@rescan.com

Licence Number: S-15/16-3029-YK-A1

Species: Arctic grayling

Location: Lac de Gras area (Panda Diversion Channel)

Panda Diversion

The Panda Diversion Channel is a man-made creek bed that diverts water around Panda and Koala Lakes. The lakes have been, or will be, drained for the Diavik Diamond Mine. The main goal of this project was to remove all of the fish from four areas of the Panda Diversion Channel, because the mine needs to do some more work on the channel itself. In three of the areas, the fish need to be removed because the areas will be drained so that the mine can improve the fish habitat by adding rock ramps. One area will be drained in order to work on a culvert that crosses the road.

Olenick, Adrian

MWH Canada Inc
adrian.olenick@mwhglobal.com

Licence Number: S-15/16-3033-YK

Species: All fish species

Location: Unnamed waterbody areas: 65.087°N
126.532°W, 65.081°N 126.314°W, 65.045°N
126.278°W, 65.028°N 126.365°W, 65.019°N
126.439°W, 65.009°N 126.496°W, 64.97°N
126.225°W, 64.965°N 126.541°W, 64.932°N
126.476°W, 64.935°N 126.217°W, 64.923°N
126.296°W, 64.876°N 126.13°W, 64.865°N
126.11°W, 64.853°N 126.278°W

Fish inventory study in EL494, south-east of Norman Wells in the Sahtú Settlement Area, NT

The goal of this project was to figure out which fish species are present in the lakes, rivers, and streams within Exploration License EL 494 held by Husky Energy Inc. The researchers also mapped out locations that were suitable for fish to live in, even if no fish were seen there. This information will be used later by Husky, when they are planning their environmental assessment.

Reist, Jim

Fisheries and Oceans Canada
jim.reist@dfp-mpo.gc.ca

Licence Number: S-15/16-3007-YK

Species: Lake trout

Location: Noell Lake, Eskimo (Husky) Lake, Sitidgi Lake, Parsons Lake

Assessment of lake trout genetic diversity and critical habitat within Husky Lakes and the Mackenzie Delta

The goal of this project was to examine how lake trout live in the Mackenzie Delta and Husky Lakes regions. Lake trout can live in both saltwater and freshwater lakes, although they usually spawn in freshwater. The Husky Lakes are not freshwater, but they are only about half as salty as the ocean. Recent research has shown that at least some trout in Husky Lakes live their whole lives, including spawning, in the salty Husky Lakes. The researchers studied whether there are two different types of lake trout that live in Husky Lakes; one that prefers saltwater, and one that prefers freshwater. They also studied which freshwater lakes connected to Husky Lakes support the lake trout fishery. To do this, they charted out what an ideal “lake trout lake” might look like. Finally, they studied how the construction of the Inuvik-Tuktoyaktuk Highway will affect the lake trout in the area.

Reist, Jim

Fisheries and Oceans Canada
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Licence Number: S-15/16-3017-YK

Species: All fish species

Location: Darnley Bay

Darnley Bay nearshore fish survey

The goal of this project was to study the fish that live close to the ocean coastline. This includes capelin in particular, although other species were collected as well. Capelin are a small fish that larger fish and sea mammals eat. The researchers were also studying how the whole ecosystem of the ocean works at Brown’s Harbour and Bennett Point, which are located on the Cape Parry Peninsula. In other words, the researchers wanted to study how the plants and animals in the water, and the non-living elements such as the water temperature and salt levels, all worked together to support life. The researchers also studied the how the nearshore and offshore areas are linked. This information will be used for the proposed Marine Protected Area in Darnley Bay.

Simba, Melaine

Ka'a'gee Tu First Nation
kaagetu_envcoord@northwestel.net

Licence Number: S-15/16-3038-YK

Species: Lake whitefish, walleye

Location: Kakisa Lake, Tathlina Lake

Investigating the cumulative impacts of environmental change and human activity in the Tathlina watershed

The goal of this project was to study walleye and whitefish at Tathlina Lake and Kakisa Lake. The researchers were looking at how much pollution and environmental change the fish may be able to handle. This included studying how much pollution a fish could handle before its overall health was affected, as well as the fish’s ability to reproduce and get enough to eat.

Sivalingam, Anusa

Golder Associates Ltd.
anusa_sivalingam@golder.com

Licence Number: S-15/16-3011-YK

Species: All fish species

Location: Bluefish Lake, Prosperous Lake, Quyta Lake

NTPC Bluefish Hydro Facility mercury and fisheries monitoring

This project had many different components, all related to monitoring fish, creeks and lakes around the Northwest Territories Power Corporation's Bluefish Hydro dam. First, the researchers made sure that a man-made fish spawning area was actually being used by spawning lake trout and other types of fish. Fish were caught with gillnets and a backpack electrofisher, and lake trout eggs were also collected. Second, the researchers checked if fall-spawning fish like lake trout, lake whitefish, and cisco (which are sometimes called herring) are still migrating and spawning in the Yellowknife River above the confluence with Prosperous Lake. The mine needs to ensure that there is enough flow for migration and spawning as part of their environmental assessment agreements. They checked this while snorkelling in the water. Third, the research team checked that lake chub still live in the Yellowknife River just downstream of the new dam spillway outlet. To do this, fish were caught using electrofishing. Fourth, some slimy sculpin were caught to check how much methyl mercury they had absorbed. Methyl mercury is a pollutant that was released into the water when the area between the old dam and the new dam was flooded. Finally, the research team studied a newly-discovered fish in the area, pygmy whitefish, as well as different ages of cisco.

Somers, Gila

Department of Environment and Natural Resources, Water Resources Division
gila_somers@gov.nt.ca

Licence Number: S-15/16-3047-YK-A1

Species: All fish species

Location: Arctic Red River, Mackenzie River, Husky Channel (Mackenzie River), Grace Lake, Mackenzie Delta, Kam Lake, Martin Lake, Peel River, Long Lake, East Channel

Metal levels in large-bodied fishes near communities along the Mackenzie River

The goal of this project was to study the metal levels in larger fish species that live close to Mackenzie River communities, and to compare them with the metal levels found in fish from lakes near Yellowknife that are exposed to mine waste. The research team collected tissue samples from the fish species that people regularly harvest and tested them for contaminants. They looked at patterns in contamination levels over the length of the Mackenzie River, as well as the levels found throughout the Yellowknife region, and also checked to see whether there were any seasonal changes to contaminant levels. The researchers will share their results with others to help the scientific community understand regional impacts and changes in the Northwest Territories. They also worked with Gwich'in communities to set up a long-term community monitoring program for contaminants in fish within the Gwich'in Settlement Area.

Vecsei, Paul

Golder Associates Ltd.
paul_vecsei@golder.com

Licence Number: S-15/16-3039-YK

Species: All fish species

Location: Marian Lake

Tłı̨chǫ government Marian Watershed stewardship program fish sampling

The goal of this program was to first determine which fish species are present in Marian Lake, and then to take samples from lake whitefish to test for metals, such as arsenic and mercury, in their flesh.

Vecsei, Paul

Golder Associates Ltd.
paul_vecsei@golder.com

Licence Number: S-15/16-3040-YK

Species: All fish species

Location: Russel Lake

Tłı̄chq̄ aquatic ecosystem monitoring project – Russell Lake fish sampling

This project had two main goals. First, the researchers worked with community members in Behchok̄, who shared traditional knowledge about fish in Russell Lake. The researchers used both the traditional knowledge and scientific methodology to develop a fish sampling protocol. Second, the researchers took samples from fish in order to test the mercury levels of the fish that are consumed by local residents.

Weber, Michael

ARCADIS Canada Inc.

Licence Number: S-15/16-3041-YK

Species: All fish species

Location: Sherman Lake, Alpha Lake, Mill Lake

Rayrock Mine site: site assessment and materials abatement

Rayrock Mine was a uranium mine which operated between the early and late 1950s. When it closed, piles of tailings, or waste rock, released contaminants into the environment. The goal of this project was to see whether there have been any effects on the fish living in Mill, Alpha and Sherman Lakes due to the historic contamination from the mine tailings. To do this, the team studied and sampled small fish (the kind that other fish feed on) from the shores of the three lakes to check for two types of contamination: metals, such as arsenic and mercury, and radioactive waste.

Wells, David

Diavik Diamond Mines Inc.
david.wells@riotinto.com

Licence Number: S-15/16-3026-YK

Species: Lake trout

Location: Lac de Gras (Diavik)

Diavik fish palatability and tissue chemistry study

The goal of this project was to determine whether the Diavik Mine is causing any changes to the fish that people generally catch and eat, especially to the texture and taste of the fish. The research team caught fish in Lac de Gras, which is where the mine runoff flows. They gave the fish to community members for taste tests to see if the texture and taste of the fish were acceptable. The research team also took samples from 20 lake trout from Lac de Gras to determine how old the fish were, and to test for mercury levels. Mercury is a serious pollutant from mines, and fish that eat plants and animals that are contaminated with mercury tend to store more and more mercury in their flesh over time. The team is working with other researchers to better understand mercury concentrations in lake trout populations, and are also checking the mercury levels in Lac de Gras trout to see if they are increasing over time.

Zhu, Xinhua

Fisheries and Oceans Canada
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Licence Number: S-15/16-3016-YK

Species: All fish species

Location: Great Slave Lake

Monitor/assess cumulative impacts on important fish population productivity and community diversity in Great Slave Lake

The first goal of this multi-year program was to create a way to study 'cumulative impacts' on fish in Great Slave Lake. 'Cumulative impacts' refers to all of the impacts on fish taken together, from climate change, to mines, to oil and gas production. The researchers were particularly interested in studying fish populations to see whether changes to the environment were threatening any sub-groups of fish. To do this, the researchers worked in partnership with other research teams, resource users, Indigenous communities, and decision makers. The second goal was to assess whether the current fishing levels are likely to be sustainable when environmental change is taken into account. The researchers tested different mesh sizes of nets to see how many fish were caught using each mesh size. Using all the information they had, they started to calculate how communities may need to regulate fishing in the future to preserve the fish populations.

Glossary

Active layer - The area where the soil freezes during the autumn and thaws during the summer

Adaptation - A process by which a living organism (human, animal or plant) changes to become better suited to a new environment. This generally on an evolutionary timescale however, in the human context, it may be over a short period.

Aerial - In the air

Algae - Simple living aquatic single or multi celled plant organisms that contains chlorophyll

Alkali - A basic substance that can range in strength

Analytical - A detailed examination of the structure or some other parameter of a substance or thing

Anoxic - A situation where oxygen is present in very low amounts or not at all, common in water

Annual - Occurs every year

Anthropogenic - Caused by a human action

Anthropology - The study of the human beings including their origins, cultures, evolution

Aquatic - Of water

Aquatic Biota - All living organisms in the aquatic environment

Arable - Land fit to be cultivated

Archaeology - The study of past human life and culture by looking at remains and artifacts like tools

Archean - A period of geologic time from about 3.9 billion years to 2.5 billion years ago

Archival - Pertaining to a collection of documents, normal over long periods of time

Arsenic - A chemical element that is gray in color and that is highly poisonous with no taste

Artifact - A historical tool, weapon or other human-made object that can be studied

Asexual - An organism that reproduces without the aid of a partner and who passes on all of its genetic information

Atmosphere - The layers of gases that surround and protect the Earth

Attributed - To explain by indicating a cause

Avifauna - the birds of a particular region or period

Bacteria - A large and varied group of single-celled microorganisms

Baseline - A set of information and data serving as a basis for comparison into the future

Bathymetry - Underwater topography. Mapping the underwater contours of the bottoms of water bodies

Beaufort Gyre - The major ice and ocean current circulation of the Arctic Ocean

Benthos - The bottom of the ocean or body of water

Biochemistry - The study of chemical processes in living organisms

Biodiversity - Pertaining to the variety of species in an area

Biogenic - Produced by living organisms or biological processes

Biogeography - The study of the geographical distribution of organisms

Biomass - The total amount of all living material within a specific volume of the environment

Biomes - Distinct areas of the Earth that are common in climate conditions, life forms and physical features like the tundra or woodland

Biostratigraphy - Identification and differentiation of rocks based on the types of fossils they contain

Biotic - Having to do with living organisms

Boreal - Relating to the forest areas of the Northern Temperate Zone that are dominated by coniferous trees such as spruce, fir and pine

Breccia - Rock composed of sharp-angled fragments embedded in a fine-grained matrix

Brunisol Soil - soil type that is associated with forest vegetation. It is usually poorly developed and immature

Carnivore - A flesh/meat eating animal

Characterized - To describe an object or idea

Chlorophyll A - A pigment in plants that give them their green color and which absorb energy from the sun. Plants use Chlorophyll to change carbon dioxide and water into food and oxygen

Classification - Organize into groups or categories

Climate – Typical weather patterns of a region over long time periods

Community - All organisms in a particular environment

Comprehend - Being able to understand

Comprehensive - Conveying or including everything or almost everything

Coniferous woodland - A wooded area that is dominated by evergreen trees

Conifers - A group of woody plant commonly known as evergreen trees such as pine, spruce or fir that bears cones

Connectivity - As something is able to connect or relate with another thing

Core - A part removed from the interior of a mass especially to determine the interior composition

Correlated - A mutual relation between two comparable things

Cretaceous - Of or belonging to the geologic time, system of rocks and sedimentary deposits of the third and last period of the Mesozoic Era, characterized by the development of flowering plants and ending with the sudden extinction of the dinosaurs and many other forms of life

Crustacean - any mainly aquatic arthropod usually having a segmented body and chitinous exoskeleton

Cryosols - Cryosols are characterized by frozen soil within 1 metre (39 inches) of the land surface and by waterlogging during periods of thaw. They often show disrupted soil layers, cracks, or patterned surface features such as frost mounds, caused by the physical actions of ice formation and melting. Cryosols may be either mineral soils or humus-rich materials

Cryosphere - frozen water in the form of snow, permanently frozen ground (permafrost), floating ice and glaciers

Cumulative - Objects or ideas that add together

Deciduous – A plant that lose their leaves during one season, usually winter

Deducing – To draw a conclusion

Deformation - A measurable change in structure, normally for the worse

Degradation - To reduce something or to place something at a lower level

Delta – The land formed where a river deposited silt as it enters into a larger water body, classic example, the Mackenzie Delta

Dendrochronology - A system of dating wooden objects by studying the tree growth rings

Density - A quantity of mass per unit volume

Devonian - Of or belonging to the geologic time, system of rocks, or sedimentary deposits of the fourth period of the Paleozoic Era, characterized by the development of lobe-finned fishes, the appearance of amphibians and insects and the first forests

Discontinuous – Not continuing or linked

Diurnal - Relating to or occurring in a 24-hour period; daily. Occurring or active during the daytime rather than at night

Diversion - A changing of the direction an object is going

Ecology - The science that deals with how living organisms live in relation to each other and their environment

Ecological integrity - Ensuring the relationship in plant and animal communities remains healthy

Ecosystem – The organisms present in a defined area and how they interact with the non-living surrounding (the biotic and the abiotic)

Effluent - A pollutant that flows out from a main source, such as sewage or waste matter

Ekman Grab - A box core type of sediment sampling device.

Electrofishing - Using electricity to stun and kill fish, usually used during scientific scenarios

Electromagnetic - Magnetism that is caused by electricity

Emissions - A water product that is radiated outward or discharged from a source

Endocrine – 1) designating or of any gland producing one or more hormones 2) designating or of such a hormone

Endophyte - An organism, especially a fungus or microorganism, that lives inside a plant, in a parasitic or mutualistic relationship

Environment – An organism's physical surroundings

Erosion - Group of natural processes (weathering, disintegration, abrasion, corrosion, transportation) where the Earth's surface is worn away and removed

Eskers - A long, narrow ridge of coarse gravel deposited by a stream flowing under a decaying glacial sheet of ice

Estuary - A place where coastal seawater comes into contact with the current of a freshwater stream

Eukaryote - any member of the *Eukarya*, a domain of organisms having cells each with a distinct nucleus within which the genetic material is contained. Eukaryotes include protocists, fungi, plants and animals

Eutrophication – The enrichment of aquatic systems, promoting dense algal and plant growth in a body of water, depriving the water of oxygen and forcing change in species composition

Evaporites A sedimentary deposit that results from the evaporation of seawater

Evolution - A process where different species come into existence by differentiation and genetic mutations from common ancestors over a long period of time.

Excavated - Extracting or revealing something by removal of the surrounding earth

Fauna - Animal life of a particular region, environment, or geological period

Fault - A fracture in a rock along which the rocks move; the place of origination of seismic activity; types include: strike-slip and thrust

Fecundity - Ability to reproduce

Fen - Low, flat, swampy land; a bog or marsh

Flora - The plants of a particular region, environment or geological region

Fluvial - Pertaining to something's existence or growth around a stream or river

Fossil - Trace of an organism of a past age, embedded and preserved in the Earth's crust

Fry – Infant fish

Fungi - A kingdom of heterotrophic organisms that produce spores

Fyke - A long, bag-shaped fishing net held open by hoops

Gas hydrates (clathrates) – Crystalline water based solids physically resembling ice, in which small non polar molecules (typically gases) are trapped inside "cages" of hydrogen bonded water molecules

Gender - One's characteristics or traits determined socially as a result of one's sex

Genetic - Pertaining to an organism's traits or characters being linked to genes

Genera - A group of organisms that share common characteristics

Geochemistry - The science that deals with the chemical composition of and chemical changes in the solid matter of the Earth

Geochronological - The chronology of the earth's history as determined by geologic events and not by human history

Geomorphologic - Pertaining to the physical features of the Earth's surface

Glauconite - A greenish mineral of the mica group, a hydrous silicate of potassium, iron, aluminum, or magnesium

Gonad - a gland in which gametes (sex cells) are produced

Grams (g) - A unit of measurement for mass

Habitat - A place where organisms live

Hepatic – (Anatomy) of or relating to the liver; (Botany) *botany* of or relating to the liverworts

Heterogeneous - A situation where something is in a mixed composition

Holocene - The most recent 11,000 years of the Earth's history starting at the end of the last major iceage, which has been relatively warm

Hydraulic - Pertaining to movement caused by water

Hydroacoustic survey - An echo-sounding (SONAR) survey used for measuring such things as fish stocks, water velocity, etc.

Hydrocarbon – A molecule containing hydrogen and carbon, often petroleum, natural gas and coal

Hydrograph - A graph showing the water level, discharge, or other property of river volume with respect to time

Hydrology - Science dealing with the properties, distribution and circulation of water

Isotope - Atoms that have nuclei with the same number of protons (as the atomic number) but different numbers of neutrons

Igneous - A rock or mineral that solidified from molten or partly molten material, i.e. from magma; one of three rock types with metamorphic and sedimentary

Implement - To put into effect

Iron - A metallic element used for making tools and essential for all living organisms' survival

Jarosite - a yellow to brown secondary mineral consisting of basic hydrated sulphate of iron and potassium in masses or hexagonal crystals

Kimberlite – An igneous that forms in volcanic pipe, an indicator of diamond deposits

Larvae - A premature stage for an insect where it feeds before becoming a pupa

Latitude - A measurement of the from the equator to a given point on the Earth's surface in the north and south direction

Laurentide Ice Sheet - Principal glacial cover of North America during the Pleistocene Epoch (2.6 million – 11,700 years ago). At its maximum extent it spread as far south as latitude 37° N and covered an

area of more than 5 million sq mi (13 million sq km). In some areas its thickness reached 8,000 – 10,000 ft (2,400 – 3,000 m) or more

Ligotrophic (oligotrophic) - The opposite of eutrophic. Waters having very low levels of primary productivity and (usually) low concentrations of nutrients; good, clear water quality

Limestone - A sedimentary rock that contains mostly calcium carbonate and can be formed by either inorganic or organic processes

Limnology - The scientific study of the life and phenomena of fresh water, especially lakes and ponds

Lithic - Of, like, or made of stone. Archaeological artifacts made of stone

Mesic - Of, characterized by, or adapted to a moderately moist habitat

Metabolism - The chemical processes occurring within a living cell or organism that are necessary for the maintenance of life. In metabolism some substances are broken down to yield energy for vital processes while other substances, necessary for life, are synthesized

Metamorphic rock - Any rock derived from pre-existing rocks by changes in response to environmental factors such as temperature and pressure over a long period of time; one of three types of rocks with igneous and sedimentary

Methane - The simplest hydrocarbon that is the main ingredient in natural gas (CH₄)

Microclimate - The climate of a small area that is different due to changes in geography

Microorganisms - Organisms that must be viewed under a microscope, such as bacteria or a virus

Migration - The long range movement of a group of animals based on the seasons

Molecular analysis - A detailed look at the chemical structure and properties of a molecule

Moraine - A mound of rock debris carried and deposited by a glacier

Multicellular - Composed of more than one cell

Nutrient - Any chemical that an organism removes from the environment to aid with growth and development; common nutrients include nitrogen and phosphorus

Otolith - A part of a fish's inner ear, often used to determine the age fish

Organic - Material pertaining to plants or animals

Outcrop - A portion of bedrock or other stratum protruding through the soil level

Overlie - Sedimentary or volcanic rock that lies on top of older rock

Paleoecological - A relationship or study of ancient organisms and how they related to their ancient environment

Paleoenvironmental - An environment that existed in the past

Parr - a juvenile fish

Parameter - One set of measurable factors, such as the temperature and pressure that define a system and determine its behavior and are varied in an experiment

Pelagic - Relating to or living in or on oceanic waters. The pelagic zone of the ocean begins at the low tide mark and includes the entire oceanic water column

Permafrost - The permanently frozen layer of soil that characterizes the Arctic's ground; there are two various types: continuous and discontinuous

Pertinent - An object, idea or concept that is relevant to the topic

Phylogeography - the study of the historical processes that may be responsible for the contemporary geographic distributions of individuals

Phylum - (Biology) a major taxonomic division of living organisms that contain one or more classes. An example is the phylum *Arthropoda* (insects, crustaceans, arachnids, etc., and myriapods)

Physiological - Pertaining to the physical structures and functions of living organisms

Phytoplankton - A group of plant-like plankton that all sea animals depend on either directly or indirectly

Pingo - A large frozen mound covered with vegetation in permafrost areas

Pleistocene - An age of notable ice ages and development of humans between 2,000,000 and 10,000 years ago

ppm - An abbreviation of parts per million

Precipitation - Water (in the form of rain, snow hail, etc.) falling from the atmosphere

Prokaryote - An organism of the kingdom Monera (or Prokaryotae), comprising the bacteria and cyanobacteria, characterized by the absence of a distinct, membrane-bound nucleus or membrane-bound organelles, and by DNA that is not organized into chromosomes.

Qualitative - A complete detailed descriptions usually taken from a small sample that allows for distinctions to be drawn from the data

Quantitative - Use of large amounts of data where statistics can be applied to interpret the data

Quaternary - Of or belonging to the geologic time, system of rocks, or sedimentary deposits of the second period of the Cenozoic Era, from the end of the Tertiary Period through the present, characterized by the appearance and development of humans and including the Pleistocene and Holocene epochs

Radiocarbon dating - The determination of the approximate age of an ancient object, such as an archaeological specimen, by measuring the amount of carbon¹⁴ it contains

Raptor - A bird of prey such as an eagle, falcon or osprey

Regolith - The layer of loose rock resting on bedrock, constituting the surface of most land. Also called *mantle rock*

Regosol - a type of azonal soil consisting of unconsolidated material derived from freshly deposited alluvium or sands

Remote Sensing – A technique used to study locations using technology that does not require the researcher to be in the field

Revitalization - To give new life or vitality to something

Riffle – a) A rocky shoal or sandbar lying just below the surface of a waterway b) A stretch of choppy water caused by such a shoal or sandbar; a rapid

Satellite imagery - Computer images generated by a satellite which allow researchers to look at a specific area and monitor surface features such as vegetation

Sediment - Solid fragment material that occurs from the weathering of rocks. In water it is material that has settled from a state of suspension

Sedimentary rock - Rock derived from loose particles that have accumulated over time

Sedimentation - The process where small particles are moved and deposited to accumulate into layers

Seine - A large fishing net made to hang vertically in the water by weights at the lower edge and floats at the top

Seismic - Pertaining to vibrations in the Earth, both natural and induced

Shovel testing - A simple test where a sample of ground is taken by use of a shovel and examined

Species - A group of organisms that share common characteristics that group them together and also distinguish them from others

Stratified - A system that is set up in layers or strata

Stratigraphic - Formation of rock where different layers can be picked out based on type and age of the rock

Subsidence - The shifting of the Earth's surface downwards (compared normally to sea-level)

Succession - A progressive change in the biological community as a result of a response from species to the changing environment

Surficial - Pertaining to something that is on the surface

Suspension - A situation where the medium is able to support the weight of the particles trapped inside it, example: silt in a river.

Symbioses – An interaction between two or more organisms that usually benefits both

Sympatric - Occupying the same or overlapping geographic areas without interbreeding. Used of populations of closely related species

Systematic - Done according to a plan

Taxonomy - The classification of organisms in an ordered system that indicates natural relationships

Thermokarst - Sinking holes, caves and underground drainage that are produced in regions with permafrost from melting of ground ice and settling of the remaining ground

Theodolite - a surveying instrument for measuring vertical and horizontal angles. Also called (in the US and Canada) *transit*

Thermocline - Layer in a large body of water that sharply separates regions differing in temperature. An abrupt temperature gradient in a lake

Topography - A description of the surface of a given area

Trace metals - A metal that is not essential in the sample but is found in small quantities

Transect - An imaginary line across a surface where observations are made

Tributary - A stream or river which feeds into a larger body of water

Turbid - Stirred up material suspended in a medium leaving it unclear and opaque

Ungulate - Hoofed animals

Velocity - Rate of change of position; quickness of motion

Volatile - Unstable; a substance that easily vapourizes

Watershed - A region draining into a river, river system, or other body of water

Weather – Daily variable changes in temperature, precipitation, wind and other atmospheric conditions

Zooplankton - Microscopic animal organisms floating in water

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