



2016  
**ENVIRONMENTAL  
PERFORMANCE**  
REPORT





# 2016 ENVIRONMENTAL PERFORMANCE REPORT

**Nalcor Energy has an important role to play in our province – to harness safely and responsibly our natural resources in the best interest of Newfoundlanders and Labradorians.**

Our company's foundation is rooted in the generation and delivery of a safe, reliable electricity supply to meet the needs of utility, industrial, residential, and commercial customers across the province. We continue that important work today while expanding our business to include a wide-ranging portfolio of energy projects that will help us build a sustainable future.

Our people, across six lines of business at Nalcor, work hard to ensure the responsible and sustainable development of these energy resources. Each of our lines of business, including Newfoundland and Labrador Hydro (Hydro), Churchill Falls, Lower Churchill Project, Oil and Gas, Bull Arm Fabrication, and Energy Marketing, are guided by this principle and their performance is detailed in this report.

Nalcor is a diverse energy company, with employees working across the province in different capacities and functions, while never losing sight of our collective commitment to safety. Together we strive for world-class safety performance and an injury-free workplace where everyone embraces this responsibility and aspiration.

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# MESSAGE FROM CEO STAN MARSHALL



At Nalcor, we take our responsibility as environmental stewards seriously as we continue the responsible development of our energy resources. The 2016 Environmental Performance Report demonstrates this commitment and includes information on Nalcor's efforts to protect the province's natural resources and enhance conservation and efficiency while also providing the outcomes and milestones yielded from this work.

Last year, Nalcor advanced key environmental components on a number of significant capital projects including: Environmental Assessment (EA) release for the construction of the new transmission line from Bay d'Espoir to the Avalon Peninsula, including the plan for the segment through the Bay du Nord Wilderness Area; EA release for upgrades to the Grand Falls dam in Grand Falls-Windsor; and environmental management activities for the Muskrat Falls Project.

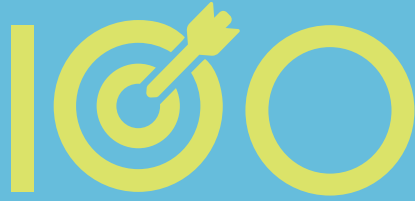
I am pleased to also share that, in 2016, Nalcor earned the environmental excellence standard as measured by our ISO certification. This is the result of the unwavering commitment of employees at work sites across the province, achieving 100 per cent of our environmental targets and making significant progress in the development of the company's first sustainability strategy. As we look ahead to the months and years to come, we will continue to strive for excellence in environmental protection.

As Nalcor sets the course for the sustainable development of our province's natural resources, we are focused on following sound, responsible environmental practices. We recognize our achievements and ability to overcome challenges are due to the skills, dedication, and passion of our employees. Their experience and commitment is always focused on getting the work done safely, while also helping to protect and enhance our environment.



Stan Marshall, CEO Nalcor Energy

# 2016 BY THE NUMBERS



per cent of environmental management system targets achieved



**669MWh** in total annual energy saved through Take Charge internal energy conservation programs

**72%**

of the electricity was generated from clean hydroelectric power on the Island Interconnected System



SO<sub>2</sub>

CO<sub>2</sub>e

NOX

Carbon Dioxide Equivalent (CO<sub>2</sub>e), Nitrogen Oxide (NOX) and Sulphur Dioxide (SO<sub>2</sub>) emissions were approximately 1,522,247, 4,933.21 and 5,401.88 tonnes respectively

190

GIGAWATT

hours of clean energy was purchased by Hydro from the island's two wind farm projects

ENERGY MARKETING

99%

of available recapture energy delivered to market

177 BIRD NEST

assessments were completed, resulting in Hydro's protection of 12 active nests on transmission and distribution lines



take! CHARGE!

Take Charge external energy conservation programs prevented 1,589.27 tonnes of Greenhouse Gas (GHG) emissions and conserved 1,976 MWh of total annual energy which is equal to the annual emissions of 336 cars.

## 2016 HIGHLIGHTS

- Received the environmental assessment release and began construction on TL267, a 188 km transmission line between Chapel Arm and Bay d'Espoir.
- Recovered approximately 35,000 artifacts from the Hudson's Bay Trading Company outpost at Sandy Banks with the help of 25 local field assistants with the Lower Churchill Project.
- Received release of the Grand Falls Dam project from the Environmental Assessment process.
- Ensured the protection and safe relocation of rare black ash trees within two right-of-ways through a vegetation management program.
- Lichen specialists protected and relocated more than 500 lichens on the new TL267 right-of-way.
- Started transition to the new ISO 14001:2015.
- Sponsored two Conservation Corps Green Teams focusing on bat conservation (Coast of Bays), and avifauna (Avalon Peninsula).
- Launched revised Environmental Policy and Guiding Principles.
- Created the first Hydro Place Go Green Team.

# CORPORATE MANAGEMENT

At Nalcor, there is an established corporate management framework which guides the environmental direction of the company. We develop environmental targets, goals, objectives, and plans through this framework. The Leadership Team works with a committee of managers with responsibilities for facilities and operations with environmental aspects to administer the corporate management framework. The goal is to co-ordinate the development and maintenance of the overall Environmental Management System (EMS) for Nalcor and to identify environmental priorities appropriate to the Leadership Team's activities and responsibilities. Nalcor's corporate environmental policy and guiding principles set the standard for all our companies where employees carry out periodic reviews of activities and issues to ensure consistency with corporate standards.




## Environmental Stewardship in Churchill Falls

Stacey Jacobs, a resident and employee at Churchill Falls, was the recipient of the 2016 Environmental Stewardship Award. For the past several years, Stacey has dedicated hundreds of hours of volunteer time helping various organizations with a beverage container recycling program, often with her children by her side, who help her collect, sort, and load recyclables for shipping. She reuses household materials and limits waste, and conserves energy as part of her daily lifestyle.

*Oral Burry, Manager, Health & Safety and Environment, Churchill Falls  
with Stacey Jacobs, winner of the 2016 Environmental Stewardship Award*







# ENVIRONMENTAL POLICY AND GUIDING PRINCIPLES

Nalcor is dedicated to supporting and maintaining a diverse and healthy environment for Newfoundlanders and Labradorians now and in the future. The company maintains a high standard of environmental responsibility and performance through its comprehensive Environmental Management System which guides all work from planning to implementation. In 2016, the Nalcor Leadership Team endorsed a revised environmental policy based on the principles of awareness, environmental management, sustainability and leadership. Building on the strong foundation of the previous policy regarding pollution prevention, compliance and continual improvement, the new policy is forward-looking and reflects the company's corporate goal: to be an environmental leader.

Within the policies and guiding principles of the EMS, Nalcor bases all decision-making and environmental actions on the following:

## **AWARENESS**

Fostering the environmental consciousness of employees and commitment to environmental compliance. Nalcor engages with identified interested parties, supports stewardship in the community, and participates in environmental research and development.

## **ENVIRONMENTAL MANAGEMENT**

Maintaining an environmental management system to respond effectively to environmental emergencies and to manage, avoid, or mitigate biophysical and socioeconomic effects for all company activities and facilities.

## **SUSTAINABILITY**

Ongoing commitment to climate change management and adaptation and the efficient use of resources including the promotion of electricity conservation through internal and external programs. Nalcor applies a life cycle approach to planning and engineering, design, procurement, and execution.

## **LEADERSHIP**

Demonstrating environmental stewardship through active leadership which promotes identifying opportunities for continual improvement, establishing environmental targets, and monitoring and reporting on environmental performance.



# SUSTAINABILITY

**Sustainable development is a holistic approach to development which considers a broader perspective to environment, the economy, and society in general.**

At Nalcor, we believe a sustainable approach to growth and operations drives performance, enhances employee relations, and builds a stronger relationship with the community. It is our social license to operate and is an industry best practice.

The company is executing a five-year plan to develop a sustainability strategy. Based on an assessment completed in 2015, we have established sustainability themes in line with our corporate goals and with the views and expectations of our stakeholders, specifically around safety, environment, business excellence, people, and community.

Hydro and Nalcor Energy - Churchill Falls (CF(L)Co) are members of the Canadian Electricity Association (CEA) and are active participants in the Sustainable Electricity Program (SEP). A set of indicators used to track the overall sustainable development performance of the electricity industry as a whole supports this program. Through SEP, we have made a commitment to improve continually the program's overall sustainable development performance, and to report to stakeholders in a timely and transparent manner.





# ENVIRONMENTAL MANAGEMENT

**Nalcor has chosen the ISO 14001 certified environmental management system to drive the continual improvement of the company's environmental performance for Hydro and Churchill Falls.**

The management system is an integral part of the organization, setting standards, and providing a management framework for all environmental responsibilities. External auditors review the ISO 14001 EMS for Hydro and Churchill Falls every year.

As the organization continues to grow, Nalcor has applied the principles of the EMS to all lines of business.

In 2016:

- Menihek Generation successfully completed an ISO 14001:2004 internal audit.
- Bull Arm Fabrication continued to implement its Environmental Management Framework and continued with its development of an EMS consistent with the ISO 14001:2015 standard.
- The Lower Churchill Project continued to work within its environmental management plan which is consistent with the ISO 14001:2004 standard and also continued with its development of a certified ISO 14001:2015 EMS for operations.

All areas set environmental targets as part of the continual improvement principles.

**IN 2016, NALCOR ACHIEVED 100 PER CENT OF ITS ENVIRONMENTAL TARGETS FOR THE SECOND TIME SINCE IT REGISTERED THE EMS IN 1999.**

As we move forward with our plans, the company will transition to the new ISO 14001:2015. This will put additional attention on strategic environmental management, leadership, life cycle thinking, and communication with internal and external stakeholders.



# CLIMATE CHANGE ADAPTATION

**In 2016, Nalcor formed a climate change working group and developed terms of reference for its work. The group will guide and support Nalcor's climate change strategy.**

**The working group will contribute to climate change REDUCTION by:**

- Encouraging and helping to facilitate ways for employees, customers, and others to enhance and maximize energy conservation and, efficiency at every opportunity.
- Promoting company-wide action, recognizing the need for all employees to do their part in reducing the effects of climate change.
- Identifying and maximizing opportunities, such as the development of clean energy resources, improving competitiveness, and developing new technologies.
- Supporting the province of Newfoundland and Labrador in reducing greenhouse gas emission levels.
- Maintaining transparency in tracking and reporting greenhouse gas emissions.

**It will contribute to climate change ADAPTATION by:**

- Strengthening the understanding of the impacts of climate change.
- Strengthening the understanding of federal and provincial frameworks, legislation, regulations, and policy, particularly as it relates to operations. This includes liaising with federal and provincial regulators.
- Understanding and identifying risk, particularly those associated with the potential impacts of climate change on our operations and infrastructure.
- Supporting collaboration and partnerships, and using the experience and expertise that is readily available in the public, private, academic, and non-governmental organizations (NGO) sectors, and liaising with relevant provincial governmental departments.



# GO GREEN TEAM



In 2016, the first Go Green Team was created at Hydro Place, Nalcor's corporate headquarters. This program gives employees an opportunity to participate individually and collectively towards minimizing our ecological footprint and raising awareness about reducing pollution, consumption and waste, conserving resources and energy, and protecting the earth's ecological balance.

Throughout the year, Go Green Team members generate ideas and actions across our organization. Members are proud ambassadors, promoting sustainability within their own departments and identifying achievements and opportunities to help the team achieve its goals.

Some of the monthly employee activities have included collecting gently used items for families in need, beach cleanups, litterless lunches, and environmental champion recognition.

## ENERGY EFFICIENCY AND CONSERVATION

Hydro promotes the use of cost-effective, energy efficient technologies to customers and seeks opportunities to reduce energy use within its own facilities through similar technologies and improvements. Reducing the amount of electricity Hydro uses in its operations means reducing greenhouse gas emissions associated with fossil fuel based electricity generation.

In 2016, the company completed 11 projects that saved energy and also created improvements to lighting levels, safety and comfort, and reduced maintenance frequency. These projects included lighting upgrades to diesel plants and service buildings, yard and terminal station lighting, optimizing HVAC controls and equipment, and initiating a program to control space heating use at remote Hydro sites. In 2016, Take Charge external energy conservation programs prevented 1,589.27 tonnes of greenhouse gas (GHG) emissions and conserved 1,976 MWh of total annual energy, which is equal to the annual emissions of 336 cars. Through Take Charge internal energy conservation programs, the total energy conservation was 669 MWh of total annual energy.

### **Hydro has invested in many upgrades and initiatives to help improve its environmental performance including:**

- Prepared operating project proposals for all three transmission and rural operations (TRO) regions to meet annual energy savings target of 75 MWh (minimum of one building per region).
- Installed energy efficient lighting at the St. Brendan's, L'Anse-Au-Loup, and Postville Diesel Plants.
- Installed energy efficient high bay lighting and exterior wall packs at the Wabush line depot.
- Replaced existing high bay lighting with energy efficient LED fixtures in the Bishop's Falls Service Building.

## ISOLATED SYSTEMS COMMUNITY ENERGY EFFICIENCY PROGRAM

Hydro's Isolated Systems Community Energy Efficiency Program focuses on energy savings and building knowledge of residential and commercial customers in communities served by diesel electricity systems in the province. Local representatives are hired and trained to work within their own communities to promote the program, provide useful information on energy use, and complete the direct installation of energy efficient products.

During 2016, 345 customers benefited from the free, direct install of more than 5,700 energy efficient products, with a total annual energy savings of 512 MWh. An average of 91 per cent of customers said they were satisfied or very satisfied with the program. Doreen Barbour, a participant from Nain, said, "They knew exactly what they were doing; they were quick and efficient. They were not just knowledgeable and informative, but also very polite and hardworking young men. Thank you for making a program like this in our town."



Ethel O'Brien, a Hydro isolated community representative, showing the pledge and block heater timer being given away in Forteau.



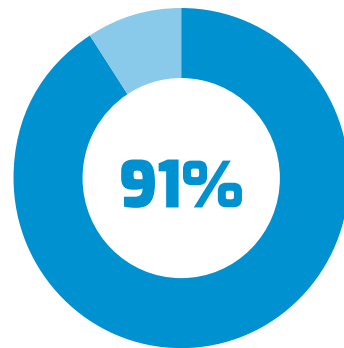
## NET METERING

The Government of Newfoundland and Labrador committed to net metering which provides regulatory support for small-scale renewable energy sources. Net metering allows utility customers with small-scale generating facilities to generate power from renewable sources for their own consumption, and to feed power into the distribution system during periods when they generate excess power and to draw power from the grid when their generation does not fully meet their needs. The main idea is for customers to generate sufficient electricity to supply their own needs, not to generate power to supply to the grid.

## POSTVILLE LOAD CONTROL PILOT PROJECT

In 2016, Hydro launched a pilot to test direct load control technology in an isolated diesel system. The technology will have the ability to allow direct control of certain electric loads within the sites of participating customers. A mix of thermal storage heaters and domestic hot water controllers will be used to control load in the pilot. The expected benefits are: reduced peak system demand; fuel savings achieved by shaping system load curve for more efficient loading/dispatching of generators; reduced cold load pickup; and improved integration of future renewable projects.

During 2016,  
**345 customers**  
benefited from the free, direct install of more than  
**5,700 energy efficient products,**  
with a total annual energy savings of  
**512 MWh.**



AN AVERAGE OF 91 PER CENT OF CUSTOMERS SAID THEY WERE SATISFIED OR VERY SATISFIED WITH THE PROGRAM.



**take!**  
**CHARGE!** 

In 2016, on the Island Interconnected System, clean hydroelectric power generated 72 per cent of electricity.



## AIR

**Nalcor is committed to protecting the environment and we continue to focus on reducing emissions from our diesel and thermal generating facilities.**

The company has made a tremendous investment through environmental monitoring programs, operational controls, and fuel changes to ensure continual improvement in the reduction of emissions at these facilities.

Hydro's mandate is to provide safe, reliable electricity at least cost. The company has an installed generating capacity of 1,792 megawatts (MW). Hydro's generating assets consist of nine hydroelectric plants (955.8 MW), one oil-fired plant (490 MW), and four gas turbines (248.2 MW) with power purchases totaling 99.8 MW from sources such as Exploits, Star Lake, Vale, and Corner Brook Pulp and Paper. In addition, the company has secured power purchase agreements for 54 MW of wind energy on the island – a 27 MW wind project

in St. Lawrence and a 27 MW project in Fermeuse. Hydro also operates 25 isolated diesel generating and distribution systems (35.8 MW). The company continues to use alternative sources of energy supplementing the province's energy supply and reducing emissions from burning fossil fuels.

Between 15 and 20 per cent of the island's electricity continues to come from thermal generation at the Holyrood Generating Station each year to meet the total customer demand requirements and to secure the transmission supply into the Avalon Peninsula.

Overall, thermal production at the Holyrood generating station increased in 2016, by 10.6 per cent from 2015. This is primarily driven by lower hydroelectric production due to lower inflows and reservoir storage during the winter months. The Holyrood generating station produced 23 per cent of the energy supplied by Hydro in 2016, up from 20 per cent in 2015.





# LOWER CHURCHILL PROJECT:

**CREATING A SUSTAINABLE ENERGY  
FUTURE FOR NEWFOUNDLAND  
AND LABRADOR**

Once power from Muskrat Falls comes online, we anticipate a significant reduction in GHG emissions from electricity generation and this reduction will offset GHG emissions from other sources. This will allow us to replace thermal generation resulting in the reduction of one million tonnes of GHG emissions annually. We estimate power from Muskrat Falls to displace more than 16 megatonnes of CO<sub>2</sub> emissions annually and provide clean, renewable energy which will help reduce our carbon footprint.

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## **Did you know?**

16 megatonnes of CO<sub>2</sub> emissions is equal to GHG emissions from 11,242,168 passenger vehicles driven for one year. (Source EPA)

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## GREENHOUSE GAS (GHG) EMISSIONS

Nalcor uses formulas approved by the Department of Municipal Affairs and Environment to calculate total emissions of CO<sub>2</sub>, Nitrogen Oxide (NOX), and Sulphur Dioxide (SO<sub>2</sub>) for the Holyrood Generating Station, gas turbine facilities, and isolated diesel generating stations. The air emissions resulting from production at the Holyrood Generating Station dominate Nalcor's overall air emissions.

Carbon dioxide equivalent emissions increased by an estimated 18.4 per cent in 2016 relative to 2015 emissions. This increase is attributed to an overall increase in thermal generation to meet system demands.

Total company emissions of NOX from all facilities (Isolated Diesel System, Labrador Interconnected System, and Island Interconnected System) increased by an estimated 13.4 per cent in 2016 relative to 2015. Total company emission of SO<sub>2</sub> from all facilities increased an estimated 10 per cent in 2016 relative to 2015. We attribute these increases to an overall increase in thermal generation to meet system demands.

We calculate emissions of CO<sub>2</sub>e, NOX and SO<sub>2</sub> for the Isolated Diesel System, Labrador Interconnected System, and Island Interconnected System to be approximately 1,522,247, 4,933.21 and 5,401.88 tonnes respectively in 2016.

## GHG MANAGEMENT AND REGULATION

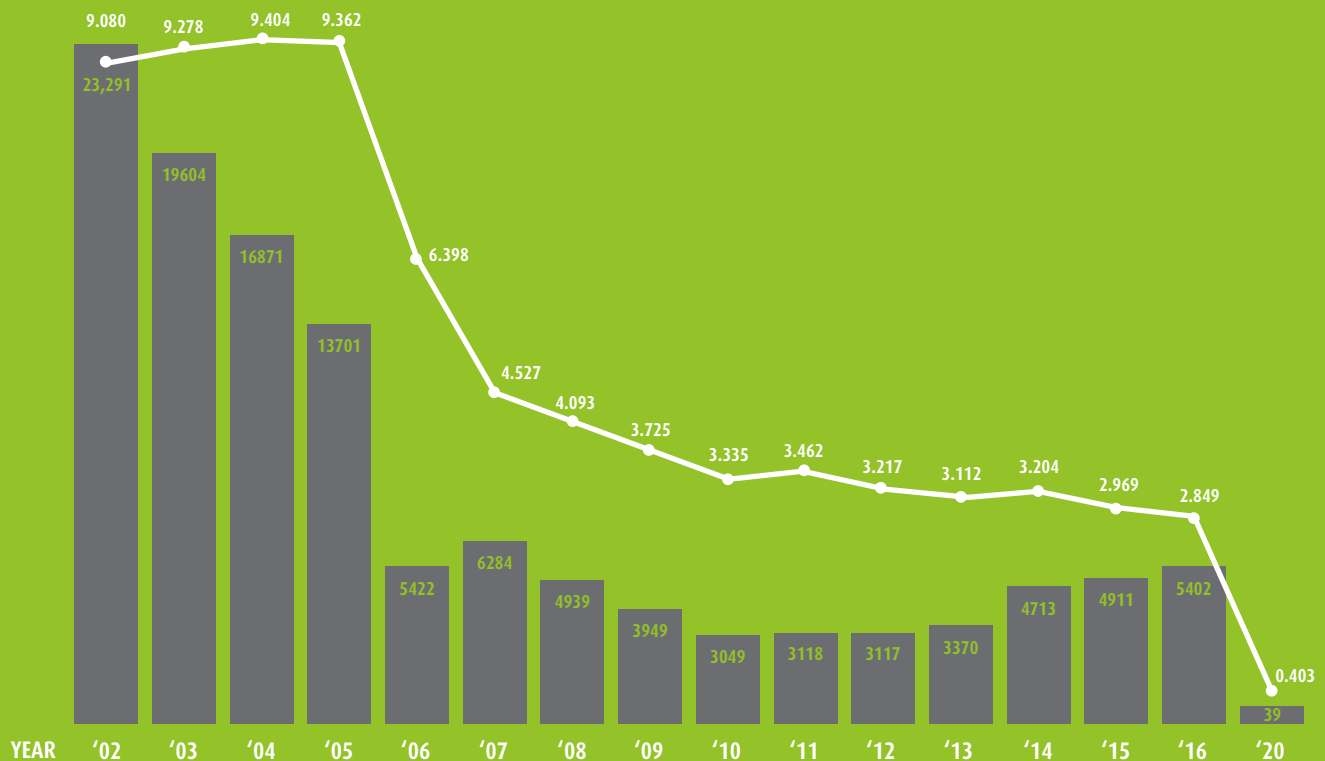
In 2016, the province of Newfoundland and Labrador released new legislation around the quantifying and reporting of GHG emissions. Under the Management of Greenhouse Gas Reporting Regulation, we are required as a facility to report GHG emissions if we release more than 15,000 tonnes of CO<sub>2</sub>e in one calendar year. The regulation also requires a third party verification of emission reports if a facility releases more than 25,000 tonnes of CO<sub>2</sub>e in a calendar year. Currently, the Holyrood Thermal Generating Station is exempt from these requirements as outlined in the Management of Greenhouse Gas Act.

Based on this new regulation, Hydro completed and submitted reports for the Hardwoods Gas Turbine facility and the Holyrood Gas Turbine facility. We require third party verification for the Holyrood Gas Turbine as the calculated emissions at this facility exceeded the 25,000 tonnes of CO<sub>2</sub>e threshold.

# SULPHUR DIOXIDE (SO<sub>2</sub>)

We revised our methodology for calculating total SO<sub>2</sub> for diesel generators and gas turbines in 2015 with the Department of Municipal Affairs and Environment and Conservation to reflect lower sulphur content in the fuel being consumed by the Hardwoods Gas Turbine facility and the Holyrood Gas Turbine facility. Total SO<sub>2</sub> for 2016 was 5,402 tonnes. Total SO<sub>2</sub> has shown an increasing annual trend since we observed a low of 3,049 tonnes in 2010. We attribute this trend to an increase in thermal production and fuel consumption. While the total amount of SO<sub>2</sub> has been increasing, the emission intensity (or tonne SO<sub>2</sub> per unit of electricity produced) has been relatively stable. In 2016, total SO<sub>2</sub> emissions increased 10 per cent while SO<sub>2</sub> intensity decreased 4.04 per cent when compared to 2015 data.

The following graph shows SO<sub>2</sub> emissions and intensity for 2002-2016 and provides a projected data set for 2019 (post Muskrat Falls). We developed the 2019 data by calculating a five-year average (2011-2016) for diesel generators and gas turbines.



2020 data represents a five-year average (2012-2016) of emissions data for diesel generators and gas turbines

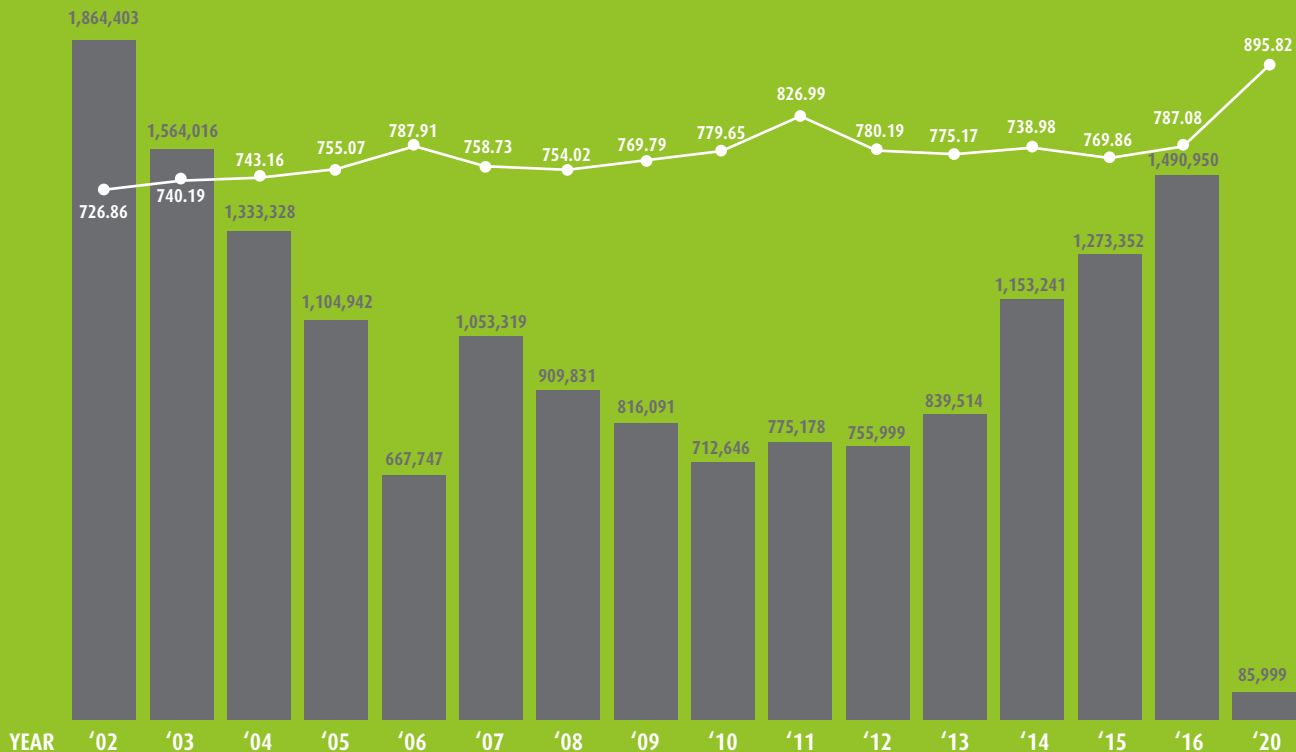
- Total Emissions (tonnes)
- Emission Intensity (tonnes/GWh)

2019 - MF/LITL Commissioned

# CARBON DIOXIDE (CO<sub>2</sub>)

In 2016, total CO<sub>2</sub> emissions increased 17.09 per cent while CO<sub>2</sub> intensity increased 2.24 per cent when compared to 2015 data. This increase is due to additional production and fuel consumption. Emission intensity for CO<sub>2</sub> has been fairly stable since the start of data collection in 2002.

The chart below shows the 2002-2016 CO<sub>2</sub> emissions plus projection for 2019 using diesel and gas turbine data.



2020 data represents a five-year average (2012-2016) of emissions data for diesel generators and gas turbines

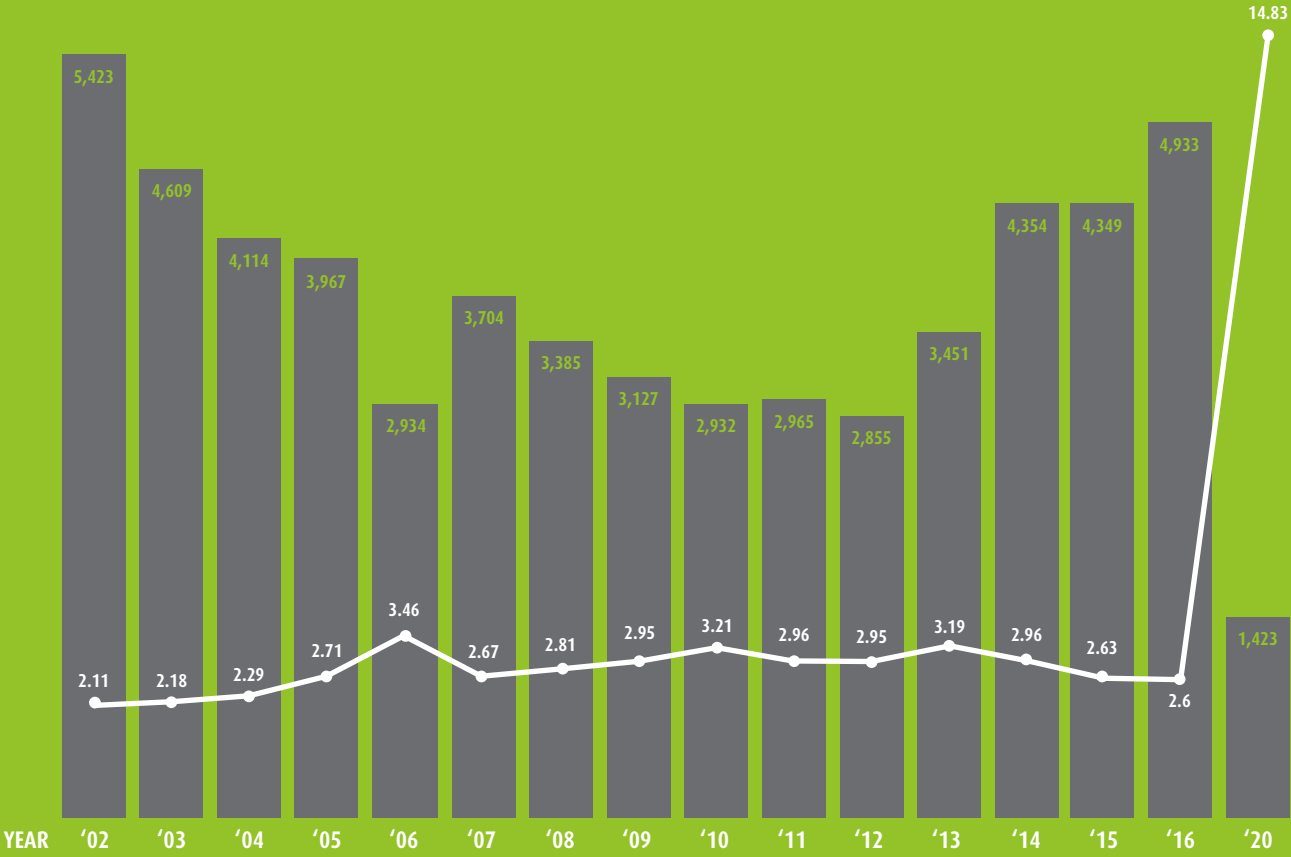
- Total Emissions (tonnes)
- Emission Intensity (tonnes/GWh)



# NITROGEN DIOXIDE (NO<sub>2</sub>)

In 2016, total NO<sub>2</sub> emissions increased 13.03 per cent while NO<sub>2</sub> intensity decreased 1.05 per cent when compared to 2015 data.

The chart below shows the 2002-2016 NO<sub>2</sub> emissions plus projection for 2019 using diesel and gas turbine data. Of note, the 2019 projection for NO<sub>2</sub> does not show as a significant decrease as other parameters, since NO<sub>2</sub> is a primary by-product of diesel combustion.



2020 data represents a five-year average (2012-2016) of emissions data for diesel generators and gas turbines

- Total Emissions (tonnes)
- Emission Intensity (tonnes/GWh)

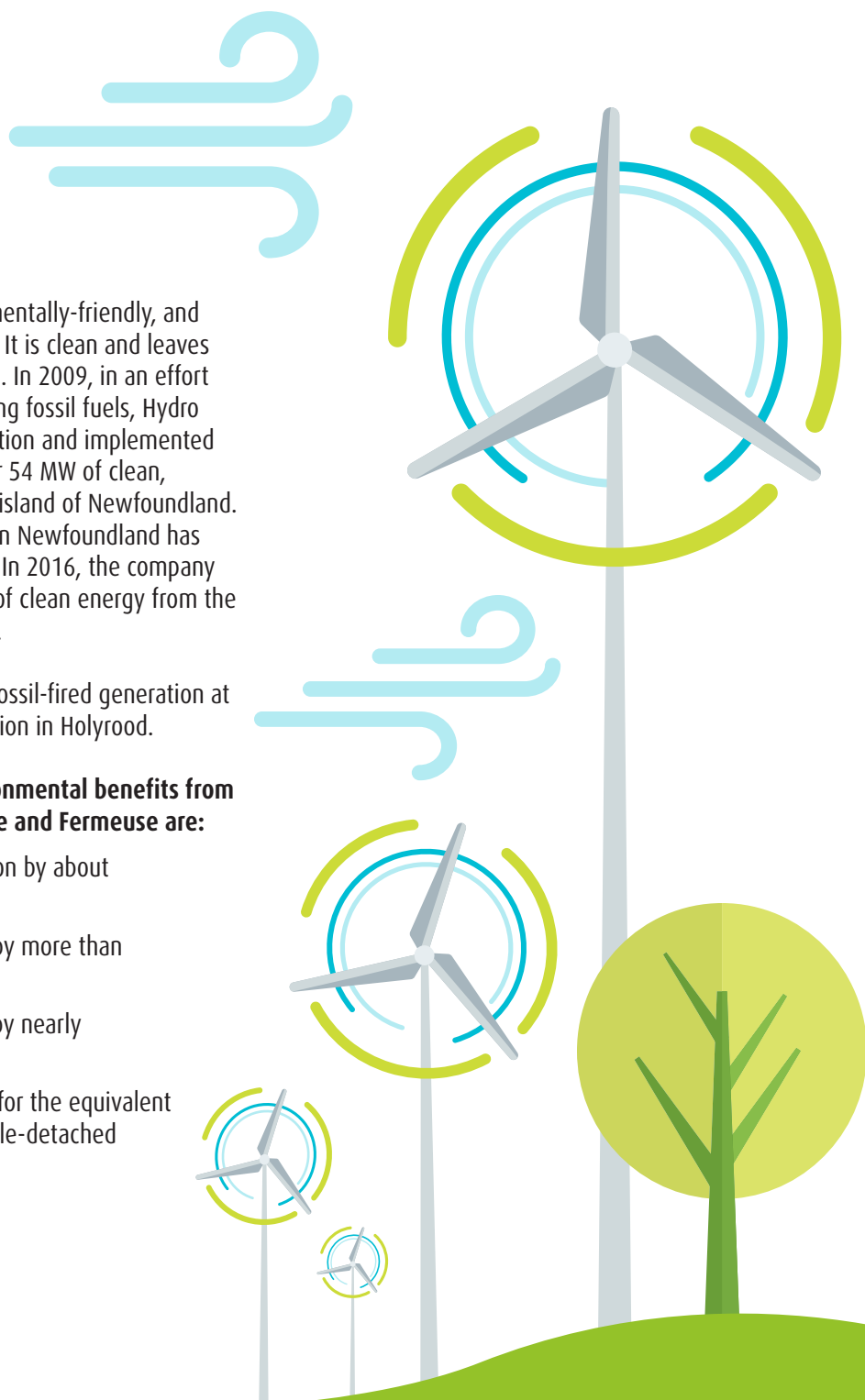
## WIND GENERATION

Wind generation is an environmentally-friendly, and pollution-free source of energy. It is clean and leaves a small environmental footprint. In 2009, in an effort to reduce emissions from burning fossil fuels, Hydro increased its renewable generation and implemented power purchase agreements for 54 MW of clean, renewable wind energy on the island of Newfoundland. The integration of wind power in Newfoundland has broadened Hydro's energy mix. In 2016, the company purchased 190 gigawatt hours of clean energy from the island's two wind farm projects.

Wind generation helps reduce fossil-fired generation at Hydro's thermal generating station in Holyrood.

### **On average, the annual environmental benefits from the wind farms in St. Lawrence and Fermeuse are:**

- Reduction in fuel consumption by about 300,000 barrels.
- Reduction in SO<sub>2</sub> emissions by more than 650 tonnes.
- Reduction in CO<sub>2</sub> emissions by nearly 160,000 tonnes.
- Generation of green energy for the equivalent of nearly 8,700 average single-detached homes with electric heat.





# WATER

**Water quality is important to Nalcor and the work we do every day. Water quality directly affects the health of people, animals, and plants which drink or otherwise use or inhabit water.**

Protection of water quality for the company includes rivers, streams, ponds and lakes, and wetlands. It also includes the protection of Protected Water Supply Areas for municipalities.

## **PROTECTION OF WATERBODIES DURING CONSTRUCTION**

Hydro understands the construction of a new transmission line may have potential impact on the aquatic environment. Identifying the types of impact is an important step in developing appropriate mitigations for each of the following:

- Sedimentation resulting from vegetation clearing and other site preparation activities.
- Direct habitat alteration due to in-water structures and activities, such as watercourse crossings.
- Solid and liquid waste disposal.
- Potential spills of fuel or other deleterious substances.
- The requirements for and use of water during project construction activities.

TL267 is a new 188 km long transmission line between Chapel Arm and Bay d’Espoir. This new line crosses more than 200 watercourses along its length.

Before construction began, Nalcor put measures in place to ensure it could manage any potential impacts through sound planning and design, and this continues into the active construction phase.

In the planning phase of the project, Nalcor undertook a detailed identification and analysis of all watercourses and waterbodies located within, and crossed, by the right-of-way. Hydro used this information in detailed project planning and design and in the development and implementation of environmental protection measures during and following construction. Hydro has in place various measures to prevent and mitigate any impacts from activities on the aquatic environment.

**Key mitigations include:**

- Obtaining permits for watercourse crossings (fording, culvert, or bridge installation).
- Using existing and approved fording sites and access trails as much as possible.
- Establishing adequate and clearly-marked buffer zones between any areas of ground disturbance and watercourses.
- Scheduling activities, as is practical, in or near waterbodies or watercourses during low flow or frozen conditions, so that Hydro can avoid sensitive periods/habitat for fish and heavy precipitation events.
- Implementing appropriate erosion control measures where soil and terrain conditions require measures to protect aquatic habitats.
- Locating the handling, use (including refueling), and storage of bulk fuels (>2000L) at least 100m from any waterbody or wetland. Equipment repairs will occur at least 100m from any surface water.
- Carrying out detailed field inspections of watercourse crossings before, during, and post-construction.



*Culvert installation along the access for TL267*

### MUSKRAT FALLS REAL-TIME WATER QUALITY NETWORK FROM LOWER CHURCHILL PROJECT

As work continues through to the completion of the Lower Churchill Project, protecting and maintaining water quality in the Lower Churchill River remains a priority.

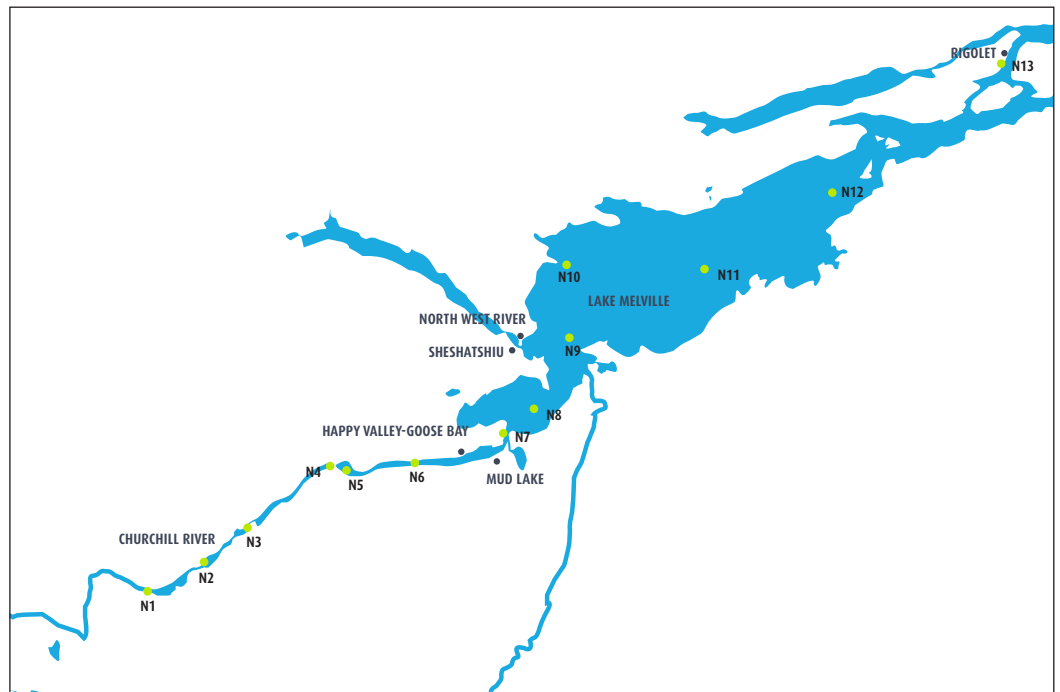
The Real-Time Water Quality (RTWQ) monitoring network was established by the Department of Environment and Conservation and Environment Canada in cooperation with Nalcor in 2008, and continues to ensure the protection of ambient water resources in the Lower Churchill River.

The RTWQ monitoring network tracks emerging water quality issues and creates a database of water quality data. The information collected serves as a baseline from which Nalcor can monitor changes throughout the construction and operation of the hydroelectric facility. The Government of Newfoundland and Labrador publishes this data on its website and it can be found at [www.mae.gov.nl.ca/waterres/rti/stations.html](http://www.mae.gov.nl.ca/waterres/rti/stations.html)





*Transmission lines, Churchill Falls*



## **METHYLMERCURY WATER QUALITY MONITORING**

In October 2016, Nalcor initiated sampling of water and sediment at 11 sites from Gull Island to Rigolet to understand the effect of construction on methylmercury concentrations. We have collected on a weekly basis a number of parameters at these locations and we have posted these results on the Nalcor website.

To find out more about how Nalcor is monitoring methylmercury, see page 37.





# BIODIVERSITY

**Nalcor is committed to ensuring the protection of wildlife during construction, operations, and maintenance activities.**

For our major construction projects such as Muskrat Falls, Labrador-Island Link and TL267, we have developed environmental effects management plans. For our current operating facilities, the environmental management systems identify environmental aspects such as the impact on wildlife. There are standard operating procedures in place to ensure operations and maintenance activities protect fish and wildlife.



## MUSKRAT FALLS FISH HABITAT COMPENSATION CONSTRUCTION

In the fall of 2016, construction began on the fish habitat compensation (FHC) project. The FHC work completed to date includes delta enhancement at Pinus River and habitat enhancement at the Edward's Brook reservoir preparation camp location.



Placement of **225,000 cubic metres [m3]** of common fill and granular material and 70 boulders at the Pinus River delta



Clearing of **6.5 hectares** of vegetation at the Pinus River delta



Placement of approximately **60,000m<sup>3</sup>** of common fill and granular material and 30 boulders at the Edward's Brook camp site



Clearing of **8.7 hectares** of vegetation at the Edward's Brook camp site





**177**  
**BIRD NEST**  
assessments were completed in 2016, resulting in Hydro's protection of 12 active nests on transmission and distribution lines.

## AVIFAUNA MANAGEMENT

**Minimizing impacts on avifauna species and habitats is important, in particular during construction and operation of our assets.**

Nalcor has developed a rigorous avifauna management plan for the Lower Churchill Project and associated infrastructure. It includes comprehensive surveys, avoidance through buffers, and relocation protocols, where necessary. In addition to these measures, all staff working on the project are provided with training to increase awareness, particularly during nesting season.

Our staff conduct ground nest surveys ahead of clearing activities and we establish buffer zones if we observe active nest indicators. Experienced surveyors not only rely upon physical structures as cues, but they also look for behavioural cues indicating a nest is present. If we observe active nest indicators, we establish buffers, and we do not conduct any work or activity within these buffers until the birds have fledged the nest.

For construction of the 1,100 km Labrador-Island Transmission Link, the 2016 avifauna program included ground surveys in Labrador and Newfoundland along the right-of-way for the new transmission line. During the nesting period (May 15 - July 31), we established 172 buffer zones and we found peak numbers of nests from late June to early July. We detected more than 40 individual species, including raptors, waterfowl, songbirds, and waterbirds. The most commonly encountered species

included white-throated sparrow, hermit thrush, savannah sparrow, wilson's warbler, and yellow-rumped warbler. Setbacks included identifying two species at risk in the study area: olive-sided flycatcher and bank swallow. We also encountered a number of incidental sightings of the red crossbill, rusty blackbird, and gray-cheeked thrush.

To manage potential environmental impacts on birds associated with clearing activities for the new transmission line from Bay d'Espoir to the Avalon Peninsula Hydro developed and implemented a comprehensive avifauna management plan to mitigate potential disturbance to migratory and resident avifauna based on federal and provincial legislation. In 2016, we protected 12 nests by establishing setbacks around nest locations based on the results of surveying the 40m wide right-of-way. Surveys were carried out from June 27 - July 31, 2016.

Under Hydro's vegetation management standard operating procedures, staff completed 117 bird nest assessments in 2016, resulting in the protection of 12 active nests on our transmission lines. Once discovered, we buffered the nests and we stopped work in the immediate area. Over the last three years, Hydro has completed 797 bird nest assessments on brush clearing and spraying operations, with a total of 61 active nests identified and protected.



# NALCOR'S PARTNERSHIP WITH THE CONSERVATION CORPS



## AVIFAUNA GREEN TEAM

Ahead of any construction or installation work, Nalcor conducts extensive fieldwork to assess and protect avifauna in the area. In 2016, the Nalcor Avifauna Green Team worked with an ornithologist around the Avalon Peninsula to identify osprey breeding sites that could potentially be affected by transmission line installation associated with the Lower Churchill Project.

After receiving training in the recognition of common birds and bird calls, the team resurveyed several known osprey breeding sites to see whether nests were still active. They relayed the data to the project ornithologist for use in future avifauna reports.

*Nalcor Avifauna Green Team (l-r): Adrienne Nofall (leader), Stacey Parmenter, Emily Mercer, and Alicia Morry.*

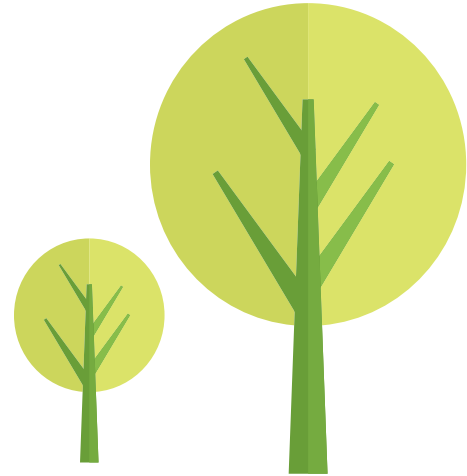
## BAT CONSERVATION

Bat conservation is important for the well-being of our environment by helping control insect populations and promoting biodiversity. On discovering a growing bat population in an older building at the Bay d'Espoir Hydro generation site, Hydro worked with the St. Alban's Green Team to survey the area, get population estimates on affected bat colonies, and build bat boxes to serve as alternate shelters for the bats. Members continue to monitor the bat populations to help ensure they are healthy and protected.

*Green Team members Julie Young, Matthew Murphy and Matthew Kendell (l-r) review plans for bat box construction.*







## VEGETATION MANAGEMENT

Hydro uses an integrated vegetation management approach along its transmission and distribution lines, stations, access roads, and trails. Given the magnitude of the transmission and distribution system that must be maintained, geographic extent (over 3,000 Km), and challenging terrain encountered, Hydro staff use a combination of manual cutting, herbicide application, and mechanical mulching. Hydro undertakes a relatively small spray program on an annual basis that targets specific species using handheld wands mounted on tracked equipment or backpack sprayers. The application of herbicide products is a highly regulated activity in the province. Hydro and its herbicide application contractor each hold a pesticide operator license and each individual applicator holds a pesticide applicator license.

Hydro regularly engages suppliers regarding new herbicides and more environmentally friendly products with low application rates. The company tests products that may meet vegetation control needs while reducing the environmental footprint. We have significantly reduced the amount of active ingredient required to maintain the transmission and distribution lines, stations, trails, and roads.

We also adhere to strict buffer zones for all water bodies, private land, wells, and human habitation (temporary or permanent). Before spraying, we

consult with the Department of Municipal Affairs and Environment regarding the potential presence of species at risk in the areas where we plan to work. Government will note on the spray maps where these species may be encountered. As crews move along the line, they watch carefully for the presence of these plants in the specified areas. If staff discover at-risk plants, they are buffered and spraying will not occur in that location. Each crew also has a team that goes ahead of the spraying operation daily to confirm buffer widths, look for unmapped water bodies requiring protection, and check the site for the presence of active bird nests. Any bird nest discovered has a buffer applied around it to maintain cover for the nesting birds. Monitoring for nesting birds occurs on all vegetation management activities and is not limited to the spray program only.

Hydro also consults every year with the Department of Fisheries and Oceans and the Department of Municipal Affairs and Environment regarding water crossings that may be encountered during work activities along the transmission and distribution systems. Hydro also works with other groups such as the Nature Conservancy of Canada (NCC) in protecting rare species in the province.

# PROTECTING SPECIES AT RISK

## BLACK ASH TREES

In 2016, the Nature Conservancy Of Canada (NCC) identified black ash trees (*fraxinus nigra*) within the right-of-way for transmission lines TL226 and TL239, near Reidville on the west coast of Newfoundland. Black ash are rare in Newfoundland and are located in the extreme northern limit of their north american range. Working with the NCC, we altered our vegetation management program and left the black ash trees within the right-of-way, as there was no immediate threat to the line. Inspectors flagged and avoided the trees.

To mitigate potential future effects to the rare black ash, we will relocate approximately 30 trees from within the transmission line right-of-way to an adjacent nature reserve.

## RARE LICHENS

A protected plant species, the boreal felt lichen (*erioderma pedicellatum*), has been known to occur in areas where we are building TL267, a new transmission line between Bay d’Espoir and Chapel Arm. Based on this knowledge, Hydro developed a rare lichen environmental effects monitoring plan to reduce and prevent potential interactions with this species. Lichen specialists surveyed all areas with a reasonable potential for boreal felt lichen occurrences. Following the survey, lichen specialists transplanted all identified occurrences outside the right-of-way or quarry sites to an area that would not be affected by the construction of the new transmission line.

In 2016, lichen specialists transplanted more than **500 lichens**.



*Transplanted Boreal Felt Lichen*



Newfoundland caribou



Long's Braya near the cable landing site at Shoal Cove, Newfoundland and Labrador

## NEWFOUNDLAND CARIBOU

The new transmission line being constructed between Bay d'Espoir and Chapel Arm overlaps with areas important to Newfoundland caribou. To avoid creating a new corridor, the transmission line is located next to two existing transmission lines. The caribou behaviour most likely to be affected by the construction of a transmission line would be changes in movement and usage patterns. To understand if the project has an effect on this population of the caribou, GPS telemetry collars are used to monitor movement and usage.

## WILDLIFE PROTECTION ON THE LOWER CHURCHILL PROJECT

Nalcor has established an impacts mitigation and monitoring plan as well as a protection and environmental effects monitoring plan, with respect to species at risk for the Lower Churchill Project.

These plans demonstrate how the company will mitigate any negative environmental effects on species at risk during construction and operation of the project. The plans also set out a program for monitoring the effectiveness of the proposed mitigation measures we are implementing for the generation and transmission components of the project.

### Comprehensive plans have been developed and implemented for:

- Red wine caribou herd and the mealy mountain caribou herd
- Long's braya and fernald's braya
- Newfoundland marten
- Boreal felt lichen
- Several avifauna species at risk

Mitigation measures for some species at risk include timing activities to minimize or avoid interactions altogether, conducting surveys to understand their location, or transplanting at risk flora.





## NOTES FROM THE FIELD: ROLAND KEMUKSIGAK

My name is Roland Kemuksigak and I am an Environmental Services and Occupational Health Professional. I would say I am definitely an outdoor enthusiast. I live in Happy Valley-Goose Bay so I am quite familiar with the Labrador wilderness.

In my role, I get to work outdoors and ensure the environment is safe for my colleagues and for wildlife in the area. While my duties can vary from day-to-day, I often monitor rivers and streams for sedimentation, ensuring culverts are clear or – if bigger activities are on the horizon – photograph and analyze environmental conditions before heavy equipment and crews arrive.

Quite often, I work in very remote areas and it can be challenging in winter when temperatures can fall as low as -60 C. This is part of the job as construction on the Lower Churchill Project and other work is a year-round operation, rain or shine. As long as there is heavy equipment out there working, we'll be there too. Despite the weather, we know what we do is important and that keeps us motivated.



## AQUATIC EFFECTS MONITORING AT THE LOWER CHURCHILL PROJECT

Nalcor has developed the aquatic environmental effects monitoring program (EEMP) in close consultation with the Department of Fisheries and Oceans. The Fish Habitat Compensation Plan and EEMP details the baseline and post-construction monitoring program to understand the effectiveness of the physical compensation, as well as other project-related aquatic environmental impacts.

**The EEMP outlines monitoring parameters designed to assess predictions made during the Environmental Assessment (EA) process and is focused on three major facets:**

- Downstream effects, including Happy Valley-Goose Bay estuary and Lake Melville.
- Turbine entrainment.
- Methylmercury bioaccumulation.

An extensive baseline dataset has been collected, beginning with data collected in 1998.

Nalcor continues to collect additional baseline data, up to the completion of the construction head pond and the filling of the reservoir to the 25m elevation contour; at this point, post-project monitoring will

be initiated. We are using the extensive dataset to document the natural variability on the monitoring parameters included in the EEMP.

As with previous years, the data collected in 2016 included the types of fish present. Within the mainstem and tributaries below Muskrat Falls, threespine stickleback were the most abundantly sampled species during 2016 while white sucker provided the majority of the sampled biomass. The species composition from 2016 was similar to past sampling programs, with abundance dominated by threespine stickleback, longnose, and white sucker and lower abundancies maintained from salmonids and large piscivores.

Sampling in Happy Valley-Goose Bay and Lake Melville continued to use gillnets. Brook trout were the most abundant species captured in Lake Melville, while longnose sucker were the most abundant species in Goose Bay. Overall, species composition and catch rates were similar to past sampling programs. We also completed additional sampling in 2016 using fyke nets, which yielded high catches of tomcod and rainbow smelt.

Quantitative electrofishing (a non-lethal method to estimate fish population and health) was completed



in McKenzie River, near its confluence with Churchill River, and Caroline Brook near the Muskrat Falls access road. Similar to past programs, salmonids made up a low portion of the total catch in McKenzie River, with only a single brook trout being captured, indicating low utilization. Sculpin were the most abundant species in McKenzie River. Brook trout were the only species captured in Caroline Brook by electrofishing in 2016.

In addition to collected data on the species present, we also collected different measures of fish health, including trophic feeding level, growth rates, age demographics, and condition in 2016. All measures of fish health showed similar results to those measured in past sampling years.

Samples were also collected from seals by working with local hunters. The data collected indicated that ringed seal muscle and liver mercury concentrations remain relatively similar across sampling years. There are several years of baseline mercury data for fish in the lower Churchill River.

Mercury analysis conducted in 2016 continued to show a decreasing trend in mercury concentrations in fish for all sampling areas (i.e. above and below Muskrat Falls, Happy Valley-Goose Bay, and Lake Melville).

In 2016, we also added an additional sampling site near the eastern end of Lake Melville as a result of a Canadian Science Advisory Secretariat review. Further information on methylmercury monitoring can be found on page 37.

## FISH HABITAT COMPENSATION MONITORING

The company has conducted baseline sampling on the lower Churchill River since 1998, and this sampling continued until the start of construction. Given the large dataset, we will incorporate baseline natural variability into post-project monitoring.

In 2016, we undertook sampling in the future Muskrat Falls reservoir area including fish, water quality, fish habitat use in tributaries, benthic invertebrate production, and fish health.

Since 1998, threespine stickleback have been the most abundant species captured, followed closely by longnose sucker. We sampled a total of 12 species throughout the future Muskrat Falls reservoir area. Throughout the mainstem of the future Muskrat Falls reservoir area, suckers (both longnose and white) at various densities and small prey species (lake chub and threespine stickleback) have been the most dominant species captured. Salmonids and large piscivores have been much less abundant throughout the sampling programs.

Electrofishing surveys were completed within several tributaries in the Muskrat Falls reservoir area. Edwards Brook, near the Churchill River confluence had the highest overall abundance estimate, of which sculpin made up the majority. Pinus River was the only tributary with salmonids (brook trout) captured near its Churchill River confluence, albeit in small numbers. Salmonids (brook trout) were present in each tributary near the Trans Labrador Highway (control locations).

Fish health has been monitored since 2010 through growth rates, feeding patterns and age demographics. These parameters have remained within the variability currently being measured throughout the Muskrat Falls reservoir area.

Monitoring activities will continue during the summer of 2017 and will include all the parameters measured in 2016.



## WASTE MANAGEMENT

**Waste management is important for the protection of the environment and the health of the population.**

Nalcor is committed to management of waste generated as a result of its operations and through its long term asset management program. Proper handling, transport, and disposal of waste is part of our standard practices and as assets are decommissioned, the asset management program includes considerations for recycling and diversion where possible. We are also committed to waste reduction in operations and capital programs.

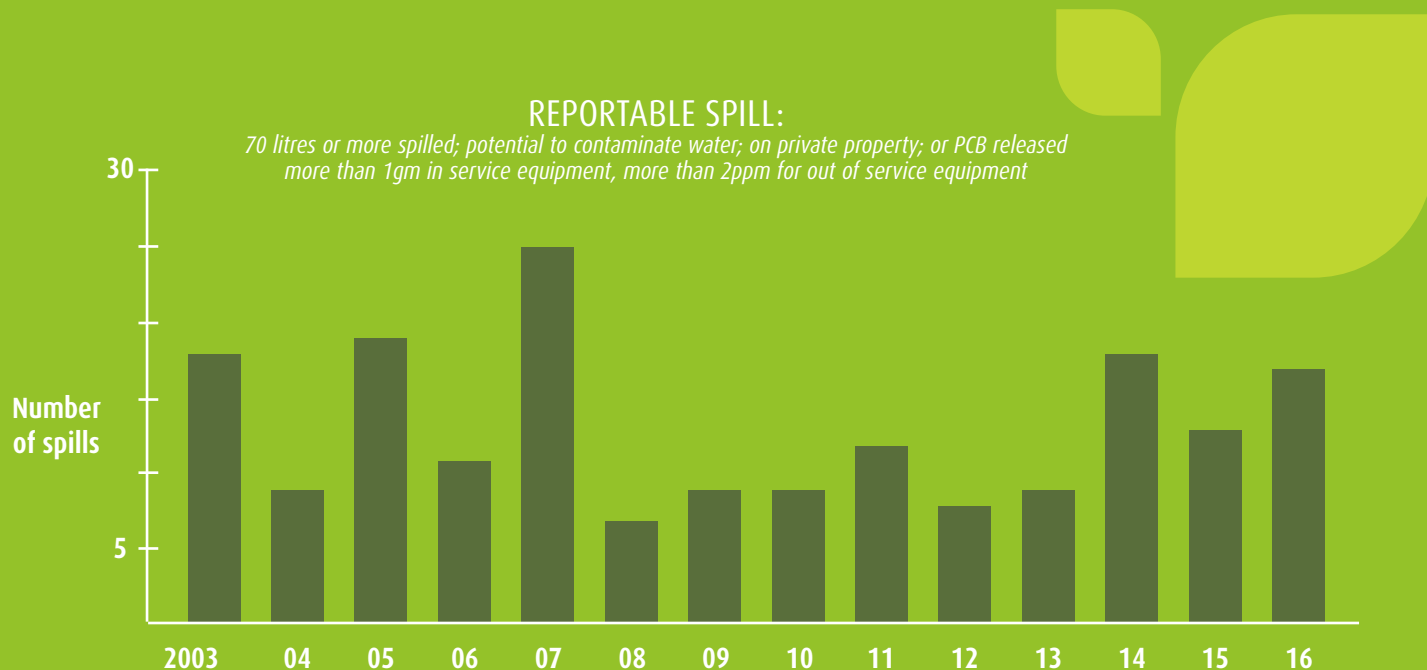
## SPILL ANALYSIS

As part of Nalcor’s commitment to continual improvement, a comprehensive spill analysis report was prepared in 2015 to analyze existing spill data and to identify any possible trends. This insight into the root cause of spills and areas for improvement will help inform further action the company can take to reduce impacts on the environment. The spill review process provided an opportunity to evaluate the established practices within spill reporting by all lines of business. This review includes the effectiveness of the safe workplace observation program (SWOP) for the reporting of release incidents and the quality and consistency of the information being recorded by each operational area with regard to release incidents.

Based on the spill analysis report, we received several recommendations to further improve spill reduction, response, and recording. As a result, we completed several related EMS targets in 2016.

### These were:

- Improvements in the Churchill Falls (CF) Engineering Directive for Fuel System.
- Upgrades to the CF-Execute fuel system at remote site (Phase II – Upgrade Gabbro fuel system including install leak detection system).
- Implementation of CF-Design leak detection system for hospital.
- Transmission and Rural Operations (TRO) – Five-year visual inspection of TRO Central tanks by authorized inspector.
- TRO – Reduce the risk of spill/leaks to the environment through replacement of distribution transformers.
- TRO – Prepare summary report of oil spills, leaks, and other environmental SWOPs including trends that occurred in 2015 for TRO.
- TRO – Reduce the risk of spill/leaks to the environment by replacing one aged power transformer within TRO.



## PCB PHASE-OUT PROGRAM REVIEW

Federal PCB regulations enacted in 2008 focused on removal of higher concentration PCB equipment (50 mg/kg and greater) from service by planned dates, and more restrictive handling of PCB waste.

In 2016, Nalcor submitted its eighth year of online PCB reports under the PCB regulations for the year 2015 for the Bishop's Falls PCB storage facility and for the Churchill Falls PCB storage facility. Churchill Falls continued to advance their PCB phase-out program in 2016 and Hydro's Transmission and Rural Operations Division continued to execute on their PCB phase-out plan for sealed equipment submitted to Environment Canada in 2010 under a Section 33(2) extension permit.

The federal deadline to have specific groups of electrical equipment out of service, that is 50 mg/kg and greater PCBs, is December 31, 2025. To ensure Nalcor's lines of business are on track to meet that federal deadline, we completed a review of the PCB phase-out plans across the company in 2016. All lines of business have a clear plan for PCB phase-out, including proposed dates for replacement of individual pieces of equipment and documentation of each replacement, as well as equipment replacement dates that will meet the 2025 federal deadline. We focused on Exploits Generation, Churchill Falls, Menihek Generating Station, and Transmission and Rural Operations.

All areas are working diligently toward the 2025 deadline, with plans for testing and removal of equipment suspected to be PCB contaminated. Electrical equipment databases and equipment removal dates will be regularly reviewed and updated.



## EMPLOYEE COMPOSTING PROGRAM

Organic waste represents as much as 30 per cent of all the waste generated in Newfoundland and Labrador and accounts for nearly 65,000 lbs annually at Hydro Place. Organic waste produces harmful greenhouse gas emissions while increasing our landfill footprint. The Environmental Services Department has been composting for nearly three years, keeping about 300 lbs of organic waste from going to the landfill annually. This program has been so successful that the Hydro Place Go Green Team decided to bring it to the rest of Hydro Place. In just the first month, more than 50 lbs of organic waste was collected and disposed by way of compost. Hydro Place now has five departmental compost locations for organic waste.

## CONTAMINATED SITES MANAGEMENT PROGRAM

In 2000, Nalcor implemented a contaminated sites management program. The program applies methods and criteria based on the guidance document for the management of affected sites as prepared by the provincial Department of the Environment and Conservation to identify properties and facilities with risks and liabilities associated with contamination resulting from past or present processes and activities. The program uses standardized methods on all properties owned or occupied by Nalcor.

The contaminated sites management program is intended to provide corporate assurance of compliance with the Environmental Protection Act, 2002 as these relate to contamination of properties owned or operated by Nalcor that may have resulted from past practices and uses. It provides for the identification of liabilities resulting from contaminated properties that may need to be considered for corporate financial planning. It also allows for appropriate response to annual requests from the Provincial Controller General for documentation of property contamination liabilities that are associated with Crown companies in the province.

We maintain an inventory of all our contaminated sites and we submit a status update to the provincial government annually. In 2016, the contaminated sites program included sites related to Churchill Falls, Hydro, and Exploits.

## CORPORATE FUEL INVENTORY CONTROL IMPROVEMENTS

In 2016, we worked to find efficiency in the inventory control process across our lines of business and to ensure regulatory requirements were met.

### **The process included:**

- Review of all pertinent legislation (including other jurisdictions).
- Development of an inventory control fact sheet for reference.
- Completion of a fuel reconciliation trends analysis for select sites.
- Review of remote fuel detection systems and variances from gasoline and associated products.
- Review of available fuel metering technology to determine the original equipment manufacture recommended calibration frequency for existing fuel meters.

The process resulted in valuable information to enable improvements in the fuel reconciliation process across multiple lines of business.

### **In 2016, several environmental targets were completed to improve fuel inventory control and included:**

- Corporate-wide implementation of a template for inventory control reporting.
- Exploits implemented a fuel reconciliation improvements plan.
- Hydro generation and Transmission and Rural Operations developed and implemented a task observation process for fuel reconciliation.



## INNOVATIVE THINKING LEADS TO WASTE REDUCTION

William Wiseman is well known as an environmental leader in Churchill Falls. He is also the most recent recipient of the Nalcor President's Award for Environment. One of William's major environmental contributions to the company is his continued work with preventative and corrective measures for oil release into the Churchill River. William was instrumental in ensuring oil skimmers were working correctly to reduce oil accumulation that helped reduce the risk of further oil release.

Typically, the skimmers pick up a bit of water with the oil. A couple of years ago, drums were added to the ends of the belt skimmers that receive the watery oil from the skimmers for further oil-water separation. This reduced the amount of water being sent out with the oil for disposal. The drum acted as a separator, so water could be poured back into the sump instead of shipping it out for disposal.

In 2016, the drum was further modified with a goose neck, to make the oil-water separation drum more efficient. Once the gooseneck starts to let out oil, it is drained from the drum and the modified drum is put back in place. Using the drum this way resulted in a 75 per cent reduction in watery oil volume shipped off site for disposal. The system (belt skimmers) has been a great success for a few years. The water in the sumps is much cleaner since installing the belt skimmers. Where there used to be oil and grease floating on the water, now sometimes there isn't even a sheen. Further, with the belt skimmers, there has been a more than 50 per cent reduction of solids settling to the bottom of the coalescing plates. There is much less time spent reacting to oil present in the sump, manually cleaning out the sumps, and hauling away waste oil. The system is working better to prevent oil from escaping the powerhouse.



William Wiseman  
2016 recipient  
of the Nalcor  
President's Award  
for Environment



*Churchill Falls drainage gallery sump oil-water separator system.*



# COMMUNITY

## PROTECTING THE HEALTH OF OUR COMMUNITIES

**We are committed to protecting the health and wellness of the communities in which we operate.**

Nalcor is committed to protecting land and resource use as well as historic resources during the construction and operation of new and existing facilities.

The issue of methylmercury and hydroelectric developments has been extensively studied globally for decades. Work on this matter for the Lower Churchill Project has been ongoing since the 1990s and continues today. Nalcor understands the local concerns regarding methylmercury levels. It is an important issue for the company and we want to work with Indigenous communities and all stakeholders to ensure the health of all local residents is protected.

*Green Team Members Alicia Morry, Adrienne Nofall, and Stacey Parmenter (L-R) complete surveying work in Rennie's River.*





The company's environmental management team has been working closely for many years with experienced technical experts and consultants from across the country to better understand methylmercury. Years of research and data have been collected to help inform decisions made about the project.

A great deal of research in the local area has focused on measuring mercury levels in the soil, animals, plants, and water and in people. Nalcor has studied various aspects of the local area and river system since the 1990s, to understand the current levels of methylmercury in the local species from the bottom to the top of the aquatic food chain. For example, we have collected more than 2,000 samples of fish to date, and more than 100 samples of seal tissue. Our fish sampling program includes studying fish at different levels of the food chain so we can follow changes in fish mercury levels as they occur. Collecting samples from lower levels of the aquatic food chain (e.g., water, sediment, and plankton) will allow the company to detect changes in methylmercury levels as early as possible.

All of Nalcor's studies and research, completed by scientific experts on methylmercury and related topics, undergo rigorous review processes by federal and provincial regulators. For example, Health Canada's advice is based on the most up-to-date information related to the Canadian context and subject to regular revisions and updates in view of

any new information gathered by Health Canada's scientists. In 2016, the aquatic environmental effect monitoring plan, which includes the baseline sampling and monitoring of methylmercury in the lower Churchill River aquatic environment, was reviewed by the Canadian Science Advisory Secretariat. The review deemed the plan as adequate and the Secretariat made recommendations for adaptive management, including the addition of a sampling location in Lake Melville.

In 2016, the provincial government announced it was establishing an Independent Expert Advisory Committee (IEAC). The IEAC is comprised of representatives of the Innu Nation, Nunatsiavut Government, the NunatuKavut Community Council, and representatives of the federal, provincial, and municipal governments. The mandate of the IEAC is to seek an independent, evidence-based approach to determine and recommend options for mitigating human health concerns related to methylmercury throughout the reservoir as well as in the Lake Melville ecosystem.

We share a common goal of better understanding the effects of the project on methylmercury levels in the Churchill Falls River, Goose Bay and Lake Melville, and in making sure the health and safety of people living in the area are protected. Nalcor has worked with nationally-regarded experts to develop models and to make predictions for the Muskrat Falls reservoir, and the company has consulted extensively with federal and provincial regulatory health agencies.

The project's comprehensive program to monitor mercury levels in the environment will continue as long as necessary to ensure the health and safety of those living in the Lower Churchill Project area is protected.

### **HISTORIC RESOURCES RECOVERY PROGRAM – PROTECTING OUR CULTURAL HERITAGE**

Nalcor is preserving the historic resources in project areas through a comprehensive assessment and recovery program. In close consultation with the Provincial Archaeology Office, we completed a comprehensive program to preserve the rich history at Muskrat Falls. This program will continue throughout construction to ensure historic resources are properly managed and protected.

The 2016 field season focused on the stage three historic resources impact assessment at the 19<sup>th</sup> century occupation of the Hudson's Bay Trading Company outpost at Sandy Banks. Historic records show the Sandy Banks Post was operated intermittently and seasonally between the 1830s and 1870s. The post was comprised of at least two, possibly three, principal buildings, including an accommodations building and a store. The associated artifact assemblage is compatible with the inferred date of occupation, and many pieces (e.g. Garrett and Copeland ceramics and marked tobacco pipes) are particularly characteristic of Hudson's Bay Company sites. Twenty-five local field assistants helped excavate 927 m<sup>2</sup> and recover about 35,000 artifacts.



*Artifact recovery at Sandy Banks HBC outpost.*



*Overview of structures and features at Sandy Banks HBC outpost.*



# NOTES FROM THE FIELD: CHRIS WHITE

My name is Chris White and I am a Field Assistant on the 2016 Historic Resources Recovery Program.

I wasn't born in Labrador, but I have lived here for most of my life. I have been residing in the Goose Bay area for 11 years and I've come to know and appreciate the long history of the region. I've always had an interest in history, and the long history of Labrador's Aboriginal population and the European fur traders is fascinating.

A typical day of field work starts off with getting to site. Depending on the site we are working on, it involves either an hour's drive or a helicopter flight if we are on a site inaccessible via truck. Once on site, much of the day will be spent digging. We dig in 2m x 2m square plots, using a trawl to dig the units down one soil layer at a time. Each time we find an artifact while digging, its location is marked off with a nail. All the soil that is dug up is placed in a bucket and once we fill the bucket, the soil is sifted to find any artifacts that were missed during the dig.

A lot of exciting moments happen on our work sites. There are so many amazing artifacts being unearthed throughout our seasons that there is always something interesting going on. I've been able to dig up a few exciting artifacts myself, including a piece of a shovel and a hammer during the 2016 season. These were old Hudson Bay Company tools used to build their lodges and trading posts.

The biggest challenge I face is certainly the environmental conditions. The weather conditions can sometimes be less than pleasant to work in, from hot temperatures in July to cold and snow in October. The number of mosquitoes and black flies during the summer months can also make working conditions difficult. Although the conditions can be difficult, it is nothing that can't be overcome by being prepared and bringing the proper materials.

I believe this type of project is important because historic materials are a very limited resource. Being able to preserve this material ensures its knowledge will be continuously available for future studies. The history of life on the Churchill River is fascinating, which I feel was perfectly highlighted on

I've also been on site when coworkers have unearthed some amazing pre-contact material such as points and arrow heads. These finds are always very exciting to see.



ABOVE | Sifting excavated soil in search for artifacts. All the soil taken out of a unit must be sifted to retrieve any flakes not recovered during excavation.

RIGHT | Excavating a newly opened unit. After removing the top layer of organic material we have access to the top soil layer where artifacts are commonly found.



our 2016 site. On that site within walking distance of each other were a pre-contact site from Aboriginal inhabitants who have lived in the area for thousands of years, a fur traders' post from over a hundred years ago, a trapper's tilt from the past 50 years and then ourselves all working to preserve the history of the area. It provided an eye opening cross section of life on the Churchill River from pre-contact era to present day.

The ability to preserve so many cultures and eras of history is certainly an important task.









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