

Attendee Handbook



Understanding our changing northern communities to navigate the future

This conference will bring together scientists, experts, organizations, Indigenous leaders, and other participants as partners in learning to share and increase knowledge of the climate change, impact and adaptation, and to provide information about policies, programs, and tools in place to protect, mitigate and help Northern communities to adapt.

SATURDAY, MARCH 26

9 a.m. - 5 p.m., Earth Hour

Keyano College

Virtually and In-Person (*limited*)

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SCAN



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General Information

We're pleased that you'll join us for the 1st Keyano Climate Change Conference 2022. We hope that this handbook will provide all the information you need in advance of the conference. If after reading the handbook you have questions, don't hesitate to contact us via email climate.change@keyano.ca.

Registration

Please register online [here](#)

Registration include access to the virtual and in person event. A few days prior to the events further instructions on how to access the conference will be provided.

Thank You to our Sponsors

Thanks to the department of University Studies and Environmental Technology Department, Marketing and Communications, and Information Technology Services, Keyano College, and Fort McMurray Matters Mix 103.7.

Conference Attendance

Conference attendees may be eligible for a confirmation of attendance certificate, which can be requested for attendance. For more, information, please contact climate.change@keyano.ca.

We respectfully acknowledge that we are on Treaty No. 8 Territory, the traditional meeting grounds and gathering places of our First Nations, Métis, and Inuit peoples.

About Keyano College

Keyano College is a comprehensive community institution in the Regional Municipality of Wood Buffalo. Stretching from north-central Alberta to the borders of Saskatchewan and the Northwest Territories, Wood Buffalo is one of the largest municipalities in Canada.

Keyano serves students through its Clearwater Campus and Suncor Energy Industrial Centre in Fort McMurray, Fort Chipewyan Campus, and through our Learning Centres in Fort McKay and Gregoire Lake.

The College meets both the training and skills acquisition needs of industry, and the personal enrichment and cultural needs of the Wood Buffalo community. Keyano provides opportunities for lifelong, relevant and practical learning, and is committed to increasing access to post-secondary programs.

The College offers programs that lead to certificates, diplomas, certificates of qualification (trades), and baccalaureate degrees. The College also supports the development of professional knowledge and skills in several sectors, including energy, construction, business, health and safety, arts, sciences, education, human services, and transportation. A wide range of corporate training options are available to client companies as well as Aboriginal Education and Regional Stewardship programming focused on improving access to learning opportunities.

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1.0 About the Conference

The overall goal of this conference is to bring together scientists, experts, organizations, Indigenous leaders, and other participants as partners in learning to share and increase knowledge of the climate change, impact and adaptation and to provide information about policies, programs, and tools in place to protect, mitigate and help Northern communities to adapt.

By the end of the conference, we hope to enhance the understanding of:

- Climate change in the past, present, and future.
- Effects of the impact of climate change in Northern communities and Arctic regions.
- Methods and strategies used by communities to adapt, build, and enhance their climate change resilience.

To achieve these objectives, participants will be engaged in a diverse range of oral presentations from several leaders in climate change around the globe and poster presentations from our student members. The presentations will cover three major themes: i) climate change perspectives, ii) climate impact, and iii) education, policy, and resilience programs.

2.0 Agenda

Time (MDT)	Agenda Items
9:00 – 9:30	Registration and Refreshments
9:35 – 9:50	Welcome and Opening Remarks Jay Notay (President, Keyano College)
9:50 – 10:25	Morning Keynote: Being Whole – Yukon First Nation's Science and Storytelling for Climate Change Jocelyn Joe-Strack (Research Chair in Indigenous Knowledge, Yukon University)
10:25 – 10:50	Climate Change in the Geological Record – A Quick Look in the Rear-View Mirror Neil O'Donnell (Instructor, Keyano College)
10:50 – 11:15	Climate Change and Arctic Border Security Heather Nicol (Director of the School for the Study of Canada, Trent University)
11:15 – 11:40	The Impacts of High Latitude Dust in the Arctic Climate and Environments Pavla Dagsson-Waldhauserová (Researcher, University of Iceland)
11:40 – 12:05	Climate Change and Subsistence Culture in Northern Communities David Smith (Instructor, Keyano College)
12:05 – 1:05	Lunch
1:05 – 1:30	Climate Change and Wildfire Mike Flannigan (Research Chair in Predictive Services, Emergency Management and Fire Science, Thompson Rivers University)
1:30 – 1:55	Climate Change in Wood Buffalo National Park Teresa Little (Resource Management Officer II, Wood Buffalo National Park)
1:55 – 2:20	Boreal Woodland Caribou Habitat Conservation as a Nature-Based Climate Solution Chow-Fraser (Boreal Program Manager) & Tara Russell (Program Director), CPAWS Northern Alberta
2:20 – 2:45	Poster and Coffee Break
2:45 – 3:10	Peat Bog Archives of Decades, Centuries, and Millennia of Environmental Change: Examples From the Lower Athabasca River Watershed William Shotyk (Bocock Chair for Agriculture and the Environment, University of Alberta)
3:10 – 3:35	Synchrude's Greenhouse Gas Program Karen Whalen (GHG Compliance Advisor) & Sol Cifuentes (GHG Strategy & Program Lead), Synchrude
3:35 – 4:00	Athabasca Chipewyan First Nation's Renewable Energy Program Jason Schulz (Executive Director, Strategic Advisory Service, Athabasca Chipewyan First Nation)
4:00 – 4:30	Summary and Closing Remarks Jean-Pierre De Villiers (Chair, University Studies and Environmental Technology, Keyano College)

3.0 Climate Change: A Brief Introduction

Over the course of the past few decades the science behind climate change has become increasingly clear – our climate is changing in a way that is unlike any other time in Earth’s history. The Intergovernmental Panel on Climate Change (IPCC), the leading international body for the assessment of climate change, states that the degree of warming that the Earth has experienced since the 1950s is unequivocal, and many of the changes are unprecedented over decades to millennia. The evidence of this warming is all around us: the atmosphere and oceans have warmed, snow and ice cover have diminished, sea levels have risen, and the concentration of greenhouse gas emissions (GHGs) has increased (IPCC, 2013).

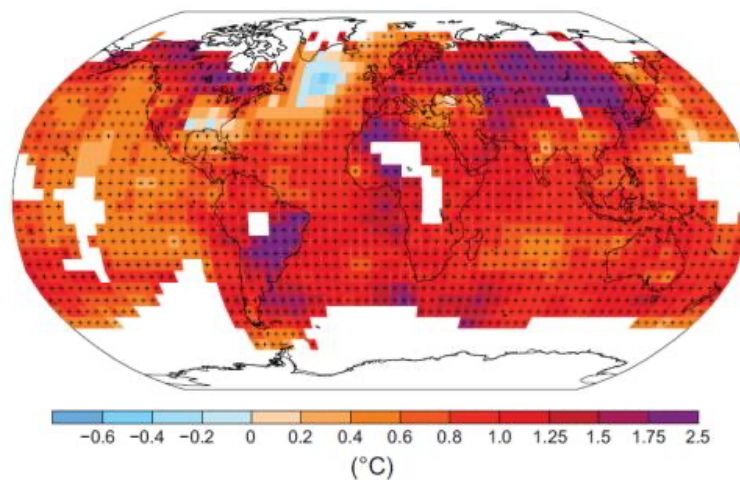


Figure 1: Observed change in global surface temperature 1901-2012 (source: IPCC, 2013).

The globally averaged combined land and ocean surface temperature shows a warming of 0.85°C over the period of 1880 to 2012 (Figure 1). Each of the last three decades has been successively warmer at the Earth’s surface than any preceding decade since 1850 and in the Northern Hemisphere, 1983-2012 was likely the warmest 30-year period of the last 1,400 years (IPCC, 2013). The IPCC states that it is *extremely likely* that human influence has been the dominant cause of the observed warming since the mid-20th century, particularly through carbon dioxide (CO₂) emissions. If we continue along the path that we are currently on (e.g., no significant effort is made to reduce our consumption of fossil fuels), global surface temperature could rise by another 4.8°C by 2100 (IPCC, 2013). In 2020, there were warmer-than-average temperatures across most regions globally, as shown by the high annual temperatures measured over the land and ocean surfaces (NOAA, 2020). The land and ocean surfaces included Europe, Asia, southern North America, South America, and parts of the Atlantic, Indian, and Pacific oceans. National Oceanic and Atmospheric Administration (2020) found that most land and ocean areas recorded cold that year.

Earth's average temperature is 1.1°C warmer than those observed around 1850 during the industrialization period (IPCC, 2022). This warming is also more significant in the northmost areas globally. The rise in global surface temperature has led to the rapid melting glaciers, rising sea levels, and increasing incidence of catastrophic weather events (IPCC, 2022). There is evidence of its effects on our ecosystems and society in which society will need to cope with these changes (IPCC, 2022). Scientific evidence has also shown that climate adaptation is happening, but it is too slow, although several measures are implemented on a small scale to address major climate challenges (IPCC, 2022).

3.1 Climate Change in Canada

The Government of Canada reported that the year 2020 was a year of destructive and impactful weather with up to nine costly weather events. One of Canada's top 10 weather events was the unusually warm temperatures across the central and eastern Canada in May 2020. Eastern Canada's summer 2020 was the warmest summer since 2012 and ranked among the top five warm summer in the nation's 73-year record. For instance, Montreal had a maximum temperature of 36.6°C (97.9°F) on May 27, 2020 that marked the hottest May temperature. This temperature is the second highest ever recorded for Montreal and the first with a temperature of 37.7°C (99.9°F) set on August 1, 1975, was the hottest. In addition, many records were set during the months of June and July.

However, in a recent news release by Environment and Climate Change Canada (ECCC), Canada experienced further catastrophic, destructive, and unprecedented weather, in several form of devastating flooding, wildfires, relentless heatwaves, and powerful tornadoes in 2021. For instance, The Government of Canada reported that western Canada was particularly affected by extreme weather in 2021, with the top two events centred in British Columbia. Topping ECCC's 2021 list is "Record Heat Under the Dome", about the heat wave that hit the province in June 2021 and was called the deadliest weather event in Canadian history. On June 29, 2021, a record-breaking high temperature of 49.6°C was recorded in Lytton, British Columbia. Just one day later, 90% of the village was lost to wildfires, resulting in two fatalities and displacing 1200 residents.

In second place is "British Columbia's Flood of Floods". On November 13, while nearly 200 countries agreed to the Glasgow Climate Pact at COP26, an enormous storm struck the south coast of British Columbia. A total of seven atmospheric rivers or "rivers in the sky", and three "weather bombs" in November created devastating floods. The rain-flood storm led to the tragic loss of at least six lives and thousands of evacuations. It also resulted in the destruction of critical infrastructure and property damage throughout the region, which are expected to cost billions to restore.

Interestingly, extreme weather conditions were not confined to the west in 2021. For instance, the other top weather event is the "Year of the EF2 Tornado". Canada experienced a series of tornadoes that ranked as a 2 on the Enhanced Fujita (EF) scale, characterized by wind speeds of between 180 and 220 km/h. These tornadoes included the deadly twister in Québec in June 2021, and the series of EF2s on July 15, 2021, in Ontario, including the devastating Barrie tornado.

As these severe weather events show, climate change is real, and Canadians are already feeling its effects. The cost of inaction is enormous, which is why the Government of Canada is developing Canada's first National Adaptation Strategy in collaboration with provinces, territories, municipalities, and Indigenous peoples.

These severe weather events also underscore why the Government of Canada has already begun investing billions in targeted federal adaptation programs, developing climate-resilient building and infrastructure codes, and advancing nature-based climate solutions like tree-planting, shoreline restoration, and preserving and expanding marshlands and wetlands.

The Government of Canada committed more than \$1.9 billion through the Disaster Mitigation and Adaptation Fund, for 69 large-scale infrastructure projects that will help protect communities across the country from the threats of climate change, including coastal erosion (ECCC, 2021).

4.0 Presenters

4.1 Welcome and Opening Remarks

Jay Notay, President, Keyano College



Jay Notay has been working in Canadian post-secondary for over 25 years. He brings significant experience as a college executive, president & CEO, vice-president academic, dean, associate dean, and senior leader for urban and rural post-secondary institutions in Saskatchewan, Ontario, and British Columbia. He is leaving the position of President & CEO at North West College in Battleford, Saskatchewan to join Keyano College.

In his most recent role, North West College serves a region that spans over 44,000 square kilometers in rural and northern Saskatchewan; 2 campuses; 24 program delivery locations; 23 Indigenous communities, and three Tribal Councils that represent over one-third of Saskatchewan's Indigenous population; 60% self-identified Indigenous student population.

In addition to successfully establishing training programs and initiatives in partnership with Indigenous communities, he has extensive experience in establishing and enhancing partnerships with various international post-secondary institutions as well.

Jay has significant experience leading and assisting in the development and implementation of institute-wide strategies. These include strategic plans, academic/education plans, operational plans, Indigenous and international education, trades/vocational strategy, corporate training, applied research, and government relation among other notable achievements.

Jay holds a Bachelor of Commerce from the University of British Columbia and a Master of Education from Nipissing University in North Bay, Ontario. He is currently a PhD candidate with the University of Western Ontario, nearing completion of a Doctor of Philosophy degree in Education Administration.

4.2 Theme 1: Climate Change Perspectives

Jocelyn Joe-Strack

Research Chair in Indigenous Knowledge, Yukon University



Morning Keynote by Jocelyn Joe-Strack, Daqualama (Da-kal-a-ma), who is a member of the Wolf Clan of the Yukon's Champagne and Aishihik First Nation.

Jocelyn is an Indigenous scientist and storyteller who strives to evolve education and policy by blending yesterday's ancestral lessons with today's systematic knowledge. She uses her experience as a trained microbiologist, hydrologist, and policy analyst along with her cultural foundations to explore resilient approaches to challenges such as climate change, wellness, and reconciliation. Jocelyn is the Indigenous Knowledge Research Chair at Yukon University where she shares her teachings as @AuntyJocey on TikTok. Her research focuses on Indigenous-led whole person, emergent and storytelling approaches in education and governance.

Abstract

Title: Being Whole – Yukon First Nation's Science and Storytelling for Climate Change.

Jocelyn Joe-Strack, Daqualama (Da-kal-a-ma) will share her experience at the frontlines of Indigenous-led societal transformation. This begins with the determination of Yukon's past leaders to the strength of youth today. She will present art, song, and story to reflect her journey as a First Nations scientist-in-recovery devoted to promoting body, heart, and spirit-centered approaches in our mind-dominated society. We will explore how educating and making decisions with only half our being has led to Climate Change and Inequality and how reclaiming our Ancestral ways of living, learning, and working can offer the confidence needed to lead and innovate change.

Neil O'Donnell, Instructor, Keyano College



Neil O'Donnell's early career involved working in underground and open-pit mining in base metals, gold, and later oil sands. Most recently, Neil has been an instructor at Keyano College with various courses in Environmental Technology, Earth and Atmospheric Science, and Engineering. Neil enjoys helping students prepare for careers in the oil sands business environment.

Neil lived in Fort McMurray with his wife and family since 1977, and participated in many community organizations, such as Treasurer on the Youth Soccer Association, Catholic School Board Trustee and Chair, and several Keyano College groups.

Degrees: B.A. (Toronto); B.Sc. (Queen's); M.Sc. (U.W.O.)
Dually registered as Professional Engineer (P.Eng.) and Geologist (P.Geol.) with APEGA (Association of Professional Engineers and Geoscientists of Alberta).

Designations: FEC (Fellow of Engineers Canada), FGC (Fellow of Geoscientists Canada)

Abstract

Title: Climate Change in the Geological Record - a Quick Look in the Rear-View Mirror

Evidence for climate change on Earth is provided by the geological record of materials (rocks) and life forms (fossils). Some changes have been short-term (usually dramatic, catastrophic events such as asteroid impacts, mass extinctions, and volcanic eruptions). Others have been longer-term (gradual, repetitious processes such as buildup of oxygen in the atmosphere, CO₂ sequestration in limestone deposits, occurrences of snowball Earth and glaciations, formation and breakup of supercontinents, and astronomical factors). The Earth behaves naturally as a dynamic entity, both internally and externally; it is not static.

Heather Nicol, Director of the School for the Study of Canada, Trent University



Heather Nicol is also a Professor of Geography in the School of the Environment at Trent University. Her research is focused upon exploring the dynamics which structure the political geography of the circumpolar North, with a specific focus on the North American Arctic and Canada-US relations. Her work is focused upon cross-border relations, tensions, geopolitical narratives and mappings of power and sovereignty. She is currently exploring both the history of circumpolar geopolitics in relation to globalization, security, environment, and polar governance. Nicol is a Fulbright Scholar and was the 2015-16 Visiting Fulbright Chair to the University of Washington, at the Centre for Canadian Studies and the Henry M. Jackson School of International Studies.

Abstract

Title: Climate Change and Arctic Border Security

Climate change has affected the way in which we think about security. Not only has it defined a new field of environmental security, but it has changed the way in which we think about the relationship between how traditional security is conceptualized and delivered by traditional security agencies. This presentation will speak to this issue. It argues that border security in the Arctic now being redefined as recognition of climate change is factored into the equation.

4.3 Theme 2: Climate Impact

Pavla Dagsson-Waldhauserová, Researcher, University of Iceland



Pavla Dagsson-Waldhauserova is a researcher and lecturer at the Agricultural University of Iceland and the Czech University of Life Sciences Prague. Pavla leads the Icelandic Aerosol and Dust Association (ICEDUST, <https://icedustblog.wordpress.com/>). Pavla is a steering committee member of the World Meteorological Organization on Sand/Dust Storm Warning Advisory, (WMO SDS-WAS, <https://sds-was.aemet.es/>). Pavla is the author of over 40 scientific publications focused on atmospheric dust and its interactions systems in circumpolar regions such as the cryosphere.

Abstract

Title: The Impacts of High Latitude Dust in the Arctic Climate and Environments

High Latitude Dust (HLD) contributes 5% to the global dust budget and active HLD sources cover > 500,000 km². Potential areas with high HLD emission in Iceland, Canada, Alaska, Svalbard, Greenland, North Eurasia, Patagonia, Antarctica, and New Zealand are calculated to cover >1,670,000 km². Iceland is the largest European desert with 44,000 km². Recent studies have shown that Icelandic dust travelled about 2,000 km to Svalbard, about 3,500 km to Balkan Peninsula and it can reach Scandinavia at least 10 times per year. It is estimated that about 7% of Icelandic dust can reach the high Arctic (N>80°). HLD was recognized as an important climate driver in Polar Regions in the IPCC Special Report on the Ocean and Cryosphere in a Changing Climate in 2019.

In situ dust measurements conducted in Arctic deserts of Iceland and Antarctic deserts of Eastern Antarctic Peninsula revealed some of the most severe dust storms in terms of particulate matter (PM) concentrations. Icelandic dust has impacts on atmosphere, cryosphere, marine and terrestrial environments. It decreases albedo of both glacial ice/snow as well as mixed phase clouds via reduction in supercooled water content.

Large HLD field campaign has been organized as well as first HLD operational dust forecast for Icelandic dust is available at the World Meteorological Organization Sand/Dust Storm Warning Advisory and Assessment System (WMO SDS-WAS) at <https://sds-was.aemet.es/forecast-products/dust-forecasts/icelandic-dust-forecast>. HLD research community is growing and Icelandic Aerosol and Dust Association (IceDust) has 100 members from 48 institutions in 18 countries (<https://icedustblog.wordpress.com>, including references for this abstract).

Keywords: Circumpolar regions, aerosol, climate change.

David Smith, Instructor, Keyano College



David began teaching in the Environmental Technology and University Studies Programs at Keyano College in 2008. David's research background is in plant/animal interactions and anthropogenic effects in grassland, boreal forest, and tundra ecosystems.

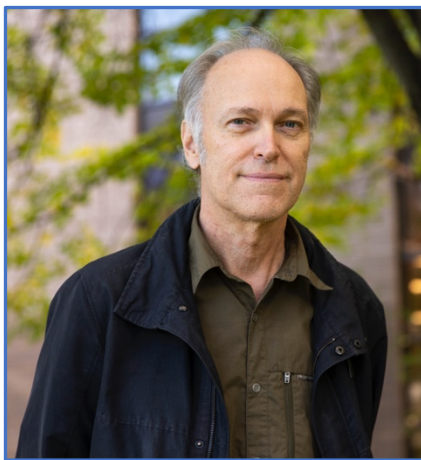
Abstract

Title: Climate Change and Subsistence Culture in Northern Communities

The geographic focus of this presentation falls within the boreal forest and tundra biomes in Canada which support local Cree, Dene, Metis and Inuit communities such as Fort Chipewyan (Chipewyan Dene, Cree and Metis), Garden River (Cree), Colville Lake (Sahtu Dene), Tsiigehtchic (Gwich'in Dene), Ulukhaktok (Inuvialuit), Cambridge Bay (Inuit), Resolute (Inuit) and Mittimatalik (Inuit). An overview of the causes of climate change including accumulation of atmospheric carbon dioxide and methane is provided. The ecological consequences of climate change are addressed, i.e., shifts in species distribution and abundance; increased abundance of exotic plant, animal and fungi species and the possible displacement of biomes in the long-term. Changes in the demography of polar bear populations, the location of treeline in Canada, the distribution and abundance of exotic species in primary wood bison habitat and the increased frequency and intensity of forest fires in Canada are addressed in relation to subsistence culture. The presentation is concluded with an overview on the importance of traditional ecological knowledge, Inuit Qaujimajatuqangit (IQ) and western science in adapting to change.

Mike Flannigan

Research Chair in Predictive Services, Emergency Management and Fire Science, Thompson Rivers University



Mike Flannigan is the Research Chair for Predictive Services, Emergency Management and Fire Science at Thompson Rivers University and the Scientific Director of the Canadian Partnership for Wildland Fire Science. He received his BSc (Physics) from the University of Manitoba, his MS (Atmospheric Science) from Colorado State University and his PhD (Plant Sciences) from Cambridge University. Dr. Flannigan has been studying fire and weather/climate interactions including the potential impact of climatic change, lightning-ignited forest fires for over 40 years. Recently, he has been applying machine learning approaches to various fire science topics.

Abstract

Title: Climate Change and Wildfire

Wildfires are a frequent occurrence in many regions of the world. These fires are the result of interactions between climate/weather, fuels (vegetation – grass, leaves, needles, shrubs etc.), and people. Our climate and associated day-to-day weather are changing rapidly due to human activities that may have dramatic and unexpected impacts on regional and global fire activity. A warmer world means a longer fire season, more lightning activity, and most importantly drier fuels. Drier fuels means it is easier for a fire to start, to spread and it means more fuel is available to burn that leads to higher intensity fires that are difficult to impossible to extinguish. Existing studies suggest regional increases in fire occurrence and area burned although there is significant temporal and spatial variability. Climate change will likely mean more wildfire in the future for many regions of the world including Alberta. We will have to learn to live with wildfire.

Chow-Fraser (Boreal Program Manager), CPAWS Northern Alberta

Tara Russell (Program Director), CPAWS Northern Alberta



Gillian Chow-Fraser (M. Sc.) is the Boreal Program Manager of Canadian Parks and Wilderness Society (CPAWS) Northern Alberta. Gillian joined CPAWS Northern Alberta in 2018 following completion of her master's at the University of Victoria which focused on woodland caribou in west central Alberta. She leads the organizations work on caribou conservation.



Tara Russell (B. Sch.) is the Program Director of CPAWS Northern Alberta . Tara has been working with CPAWS Northern Alberta since 2015. She has led work on caribou range planning, nature-based climate solutions, parks and protected areas, and most recently work focused on coal and land use planning in the eastern slopes.

Abstract

Title: Boreal Woodland Caribou Habitat Conservation as a Nature-Based Climate Solution

Protecting and restoring woodland caribou habitat will recover the populations of this iconic species, but also provide Alberta with many nature-based climate solutions that will prevent further greenhouse gas releases and improve the resiliency of the boreal ecosystem. Boreal woodland caribou, native to Alberta's boreal forest, have been in decline for decades due to anthropogenic industrial disturbances in their home ranges. Disturbances, such as seismic lines, cut blocks, and oil and gas infrastructure, have increased predator populations, and predator access, thus increasing predation of woodland caribou. Caribou recovery is dependent on conservation of undisturbed habitat, coupled with restoration of existing disturbances within caribou ranges. An under-recognized co-benefit of boreal woodland caribou conservation is its potential as a nature-based climate solution. Boreal woodland caribou heavily favour lowland habitats containing peatlands - a carbon rich landscape. Peatlands are some of the world's most dense carbon stores. Habitat protection and restoration needed to recover Alberta's caribou will contribute to the conservation of these important boreal carbon sinks, preventing further loss of natural carbon storage. Peatlands also provide essential freshwater water management and storage. Conservation of peatlands, and other areas of caribou habitat, will increase boreal resiliency to fire and flood, both predicted to increase in frequency and severity in the face of climate change. Protected areas, and connected intact habitat, and areas of climate refugia are also an essential aspect of climate resiliency for Alberta's wildlife populations. Conservation and restoration of caribou habitat will provide all of these benefits.

Teresa Little, Resource Management Officer II

Wood Buffalo National Park



Teresa Little has a Bachelor of Arts in Environmental Studies and a Master's Degree in Climate Change. Teresa is currently the Resource Management Officer for the Wood Buffalo National Park, where she leads and assists projects that monitor and measure the ecological integrity of the Park.

Abstract

Title: Climate Change in Wood Buffalo National Park

Canada's largest national park, Wood Buffalo National Park, spans 44,741 km² across northeastern Alberta and into the Northwest Territories. It is renowned for being home to the world's largest herd of free-roaming wood bison, the breeding grounds of the endangered Whooping Crane, the biologically- and culturally-rich Peace Athabasca Delta, and extensive salt plains, among other things. It is predicted that WBNP will experience a 3-5 degree warming within the next 30-50 years, as well as an increase in total annual precipitation. However, due to the seasonal variability of these changes, overall conditions may become drier within the park. Some of the impacts WBNP may experience are adverse impacts on infrastructure, earlier spring breakup (and later fall freezing), changes in fire regime, increased pests and diseases, and reduced wetland habitats, which will impact WBNP's keystone species. Management strategies will focus on reducing greenhouse gas emissions, mitigating impacts by promoting ecosystem resilience, and adapting to changes that cannot be mitigated.

4.4 Theme 3: Education, Policy, and Resilience

William Shotyk, Bocock Chair for Agriculture and the Environment,
University of Alberta



William Shotyk received his B.Sc. (Agr.) in Soil Science and Chemistry from the University of Guelph and a Ph.D. in Geology from the University of Western Ontario. Following postdoctoral research at the University of California, Riverside and UWO, he worked at the University of Berne in Switzerland where he completed a Habilitation in Geochemistry, in 1995. He became Professor at the University of Heidelberg in Germany, and Director of the Institute of Environmental Geochemistry, in October of 2000. He joined the Department of Renewable Resources at the University of Alberta in October of 2011, as the Bocock Chair in Agriculture and Environment. With over 268 publications to his credit and 211 journal publications, his work has been cited more than 15,000 times (Google Scholar, December 1, 2021). He was awarded the Philippe Duchaufour Medal for Soil System Science by the European Geoscience Union (2013), elected a Fellow of the Royal Society of Canada (2018), and a Fellow of the Geochemical Society and the European Association of Geochemistry (2019). He is the founder and President of the Elmvale Foundation, a federally registered charity for environmental education (www.elmvale.org). Over the past 45 years, with the help of family and friends, he has planted 25,000 + trees on his family farm property near Elmvale, Ontario.

Abstract

Title: Peat Bog Archives of Decades, Centuries, and Millenia of Environmental Change: Examples From the Lower Athabasca River Watershed

Peat bogs were recognized as archives of environmental change as long ago as 1807, when Reverend Robert Rennie published the first edition of his book "Essays on the Natural History and Origin of Peat Moss" in Edinburgh. Given the recent interest in the environmental impacts of the industrial development of the Athabasca Bituminous Sands, the abundance of peatlands in the area presents an opportunity to describe and quantify the extent, intensity, and chronology of environmental change. We collected peat cores from five peat bogs in the vicinity of open-pit bitumen mines and upgraders. These cores, carefully collected using purpose-built equipment, were accurately and precisely age-dated using ^{210}Pb , ^{14}C (including the atmospheric bomb pulse curve) and tephrochronology. The bogs have provided us with unique records of climate change, but also reconstructions of the atmospheric deposition of nitrogen, dust, trace metals (including V, Ni and Mo which are enriched in bitumen, as well as Ag, As, Cd, Pb, Sb and Tl which are not), organic contaminants (in particular, PAHs), as well as fallout radionuclides (^{137}Cs and ^{241}Am). The bogs yield positive and negative news about environmental change: atmospheric metal deposition has been declining for decades, but deposition of dust and organic contaminants have been increasing over time.

Karen Whalen (GHG Compliance Advisor), Syncrude

Sol Cifuentes (GHG Strategy & Program Lead), Syncrude



Karen Whalen (P.Eng) is a Senior Advisor with the Environmental Affairs Team. Karen has been working in the field GHG compliance for the past 10 years. Karen joined Syncrude in 2003 from the University of Ottawa, where she studied Chemical Engineering. She also has a Bachelor's degree in Environmental Technology from the University College of Cape Breton. Karen was born and raised in Newfoundland and is now living with her family in Fort McMurray.



Sol Cifuentes (B.Eng, P.Eng) is a Senior Associate with the Process Development Team. Over the past 18 years, Sol has specialized in developing Greenhouse Gas strategies, business plans, abatement opportunities and performance metrics to help companies compete in a low carbon economy.

Sol joined Syncrude in 2018 and is currently the GHG Strategy & Program Lead working in collaboration with Operations Support, Production Planning and Research & Development to help Syncrude lower its carbon footprint. Sol developed Syncrude's GHG Strategy which at its core, leverages improvements in reliability, energy reductions and technology innovation to maintain carbon competitiveness. Sol was born in Guatemala and graduated from Toronto's Ryerson University with a B.Eng in Chemical Engineering in 2004. She calls Calgary home.

Abstract

Title: Syncrude's Greenhouse Gas Program

Syncrude's focus on sustainability touches every single aspect of our business – from research to operations, from environmental stewardship to our relationships with local communities. Our sustainability strategy reflects our commitment to responsible development of the oil sands resource now and for the future. The Oilsands industry is undergoing an energy transition. Stakeholders have raised the bar and are demanding low carbon products and action on climate change. Suncor is listening. We have committed to reducing 10 million tonnes of GHG emissions by 2030 and we are part of the landmark industry alliance: Oilsands Pathways to Net Zero with the aspiration to reach a net zero goal by 2050. The Syncrude presentation will take you through an overview of GHG emissions at Syncrude, the different regulations impacting our business and how the GHG Program is helping to keep Syncrude competitive in a low carbon future.

Jason Schulz, Executive Director, Strategic Advisory Services



Jason Schulz, Executive Director Strategic Advisory Services, has been with the Athabasca Chipewyan First Nation (ACFN) since 2017. Jason's background encompasses Indigenous business, infrastructure projects and investments, business development and governance, community engagement, marketing, human resources and education. In addition to graduating with a Bachelor of Arts (Psychology) from Luther College, University of Regina, and a Master of Business Administration (Marketing) from the Sauder School of Business, University of British Columbia, Jason spent a year in Tokyo, Japan, studying the Japanese language (Nichibei Kaiwa Gakuin). Jason co-authored an English self-study textbook, *Eigo De Are Kore Ite Miru*: published by ZKAI publishers and released October 2002.

Jason ensures corporate governance practices are aligned while serving as Director (President) on the Tahsiptiy pipeline partnership that closed on November 30, 2021. In addition, he continues to play an active role in monitoring progress during the construction of three merchant solar farms in the ACFN-Concord Pacific partnership.

Abstract

Title: Athabasca Chipewyan First Nation Renewable Energy Program

Athabasca Chipewyan First Nation (ACFN) started its Renewable Energy Program in late-2017 when it began discussions with ATCO Electric on an opportunity to reduce diesel consumption and improve air quality in the remote community of Fort Chipewyan. Over the months--and years--ahead, the partnership evolved as we prepared an application to the Natural Resources Canada Clean Energy for Rural and Remote Communities (CERRC) program. Given a successful funding outcome and an additional contribution from the Government of Alberta, Three Nations Energy (www.3ne.ca) was born. This initial success became Canada's largest off-grid solar farm and continues to receive accolades, including being showcased at Expo 2020 in Dubai, receiving an Emerald Award and becoming a Canada Clean50 recipient. In parallel with Three Nations Energy, ACFN created a Community Energy Plan which was officially adopted in December 2018. This document continues to serve as a framework for additional green energy and energy efficiency initiatives many of which are showcased on the 3NE website.

In Spring 2021, in partnership with Concord Pacific (Concord Green Energy), ACFN made a large investment in three solar farms located in southern Alberta (Monarch, Coaldale, and Vulcan). Energization is expected in Spring 2022 onward and will produce a combined total of approximately 68 MW of merchant power that is sold into the Alberta grid. This opportunity will enable ACFN to diversify its current investment portfolio while continuing to lead by example on environmental stewardship initiatives

4.5 Summary and Closing Remarks

Jean-Pierre De Villiers

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Jean-Pierre De Villiers, PhD, P. Eng., has been with Keyano College since 2008. Currently serving as Chair, University Studies and Environmental Technology, Dr. De Villiers teaches courses in Physics and Engineering. Research interests include computational fluid dynamics in General Relativity and computational differential geometry.

5.0 EAS 208 Student Posters

Below is a list of student posters:

P1: Countermeasures Taken by Suncor to Reduce the Impacts of Fossil Fuel
Extraction

Usman Malik, Scott Langford, and Christo Syriac.

P2: The Impacts of 2017-2018 British Columbia Wildfire Events

Anca Papp, Ezekiel Granil, and Marissa Mestre

P3: Effects of Acid Rain on Aquatic Ecosystems

Isabelle Farjardo and Christopher Hamelin

P4: Factors Affecting Coral Reefs

Madison Tyson, Jonathan Verghese, and Tiana Davidson

P5: Consequences and Solutions on the Polar Bears

Autumn Chaytor and Karlene Kaminski

Posters will be available online for viewing and voting.

6.0 Literature Cited

ECCC [Environment and Climate Change Canada]. (2021, December 16). New Release: The Impacts of a Changing Climate: Canada's Top Ten Weather Stories of 2021. Accessed from <https://www.canada.ca/en/environment-climate-change/news/2021/12/the-impacts-of-a-changing-climate-canadas-top-ten-weather-stories-of-2021.html>.

ECCC [Environment and Climate Change Canada]. (2017, May 10). Annual 2016: Climate Trends and Variations Bulletin. Accessed from www.ec.gc.ca/sc-cs/default.asp?lang=En&n=439E7F88-1.

IPCC [Intergovernmental Panel on Climate Change]. (2013, November 21). Summary for Policymakers. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. Accessed from www.ipcc.ch/report/ar5/wg1

IPCC [Intergovernmental Panel on Climate Change]. (2022, February 28). Climate Change 2022: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. Accessed from <https://www.ipcc.ch/report/ar6/wg2/>.

NOAA [National Oceanic and Atmospheric Administration]. (2022, March 14). Global Climate Report - Annual 2020. Accessed from <https://www.ncdc.noaa.gov/sotc/global/202013>.