



Canadian Land Reclamation Association
Association canadienne de réhabilitation des sites dégradés

2017

SPEAKERS & SESSIONS



CLRA NATIONAL
AGM | CONFERENCE | FALL TOURS
SHELL PLACE
MACDONALD ISLAND PARK
FORT MCMURRAY, AB
SEPTEMBER 18-21

SPEAKERS & SESSIONS

TUESDAY, SEPTEMBER 19 | FORT MCMURRAY, AB



PLENARY SPEAKERS

PG

OPENING REMARKS	2
2016 HORSE RIVER WILDFIRE RESPONSE AND RECOVERY	3
TAILINGS, PROCESS WATER MANAGEMENT & WATERSHED RECLAMATION	4
LEARNINGS FROM RECLAIMING A TAILINGS POND, CONSTRUCTING A FEN AND WORKING WITH INDIGENOUS PEOPLES	5
EARLY ECOSYSTEM DEVELOPMENT IN RECLAIMED AND NATURALLY DISTURBED FORESTS	6
RECLAIMING PEAT OPERATIONS - ALBERTA'S POLICY APPROACH	7
BOREAL PEATLAND RESTORATION AND ALBERTA'S PEATLAND RECLAMATION CRITERIA (2015): LESSONS, OPPORTUNITIES, AND CHALLENGES	8
EVOLUTION AND CHALLENGES OF SOIL BIOENGINEERING APPLICATIONS TO CONTROL SOIL EROSION IN RE- CONSTRUCTED WATERWAYS ON THE ALBERTA OIL SANDS	9
WOODLAND CARIBOU HABITAT RECLAMATION/REFORESTATION ON LINEAR DEVELOPMENTS IN NORTHEASTERN ALBERTA: AN OPERATIONAL VIEW	10
SLUDGE IMPACT ON THE STABILIZATION OF THE FIRE ROAD MINE IN NEW BRUNSWICK	11
EARLY SUCCESSIONAL WILDLIFE MONITORING OF RECLAIMED HABITATS IN THE ALBERTA OIL SANDS REGION OF CANADA: INDICATORS OF ECOSYSTEM SHIFT	12
OIL SANDS EXPLORATION (OSE) RECLAMATION - SUCCESSES AND CHALLENGES IN RECLAMATION CERTIFICATION OF OSE PROGRAMS	13
NATURAL PROCESSES FOR THE RESTORATION OF DISTURBED SITES	14
REMEDICATION EAST COAST STYLE	15
GUEST SPEAKER: AURORA BOREALIS NATURE'S BEAUTY AND THE BEAST	16

SPEAKERS & SESSIONS

TUESDAY, SEPTEMBER 19 | FORT MCMURRAY, AB



ROOM A/B | 8:00 - 8:15

OPENING REMARKS

Andrea McEachern | President, CLRA National, VP, PurLucid Treatment Solutions/PurLucid Consulting

PRESENTER BIOGRAPHY

Andrea has been the President of the National CLRA Board since 2011 and had served as Director and Executive of the Alberta Chapter Board from 2009 - 2015. When she doesn't have her 'volunteer' hat on, she works at her companies, PurLucid Treatment Solutions, a water treatment company, and PurLucid Consulting, a specialized environmental company.

Additional questions can be directed to Andrea at andrea@purlucid.com

SPEAKERS & SESSIONS

TUESDAY, SEPTEMBER 19 | FORT MCMURRAY, AB



ROOM A/B | 8:15 - 9:15

2016 HORSE RIVER WILDFIRE RESPONSE AND RECOVERY

Jordan Redshaw | Communications Manager, Recovery Task Force, Regional Municipality of Wood Buffalo

In this talk you will learn about the wildfire that forced the evacuation of 88,000 residents, destroyed more than 2,500 homes, and how the region is recovering from one of the largest natural disasters in Canadian history.

PRESENTER BIOGRAPHY

As a Press Secretary with the Regional Municipality of Wood Buffalo, Jordan Redshaw led communications during the May 3 evacuation of Fort McMurray and served as the Communications Manager for the Recovery Task Force.

Additional questions can be directed to Jordan at jordan.redshaw@rmwb.ca

SPEAKERS & SESSIONS

TUESDAY, SEPTEMBER 19 | FORT MCMURRAY, AB



ROOM A/B | 9:15 - 10:00

TAILINGS, PROCESS WATER MANAGEMENT & WATERSHED RECLAMATION

Preston McEachern | Ph.D., Adjunct Professor, Civil & Environmental Engineering, University of Alberta

Oil extraction in northeastern Alberta is one of the largest concentrated industrial developments in the world. Combined with the fact that this is a single industry, the cumulative disturbance is similarly concentrated in the public perspective. Discourse on oil sands mining has been dominated by negative views on water use, water quality, reclamation and ultimately on sustainability. Comparisons to other human disturbance such as agriculture and urban centers are intriguing but of little relevance to a core distrust that unsustainable development today can be reversed through reclamation at the scale of this industrial development. Indeed, the failures at large scale such as the Giant Mine in the NWT or at home in coal dwarf successes also in coal, forestry and oil and gas. This talk will review the challenges of reclamation at the watershed scale with highlights of the systems approach for water and the landscape that must ultimately deliver functional terrestrial landscapes and acceptable water quality to the Athabasca River. One integrated research program known as FORWARD will be used to exemplify this perspective and some of the tools that can be used to plan for reclamation success at this scale. How we deploy these tools and ultimately the science behind them will determine if reclamation will be successful or join the list of long term liabilities we hope to avoid.

PRESENTER BIOGRAPHY

Dr. McEachern is a principal investigator leading the FORWARD III research program focused on developing soil, vegetation and water assessment models for use in reclamation. Dr. McEachern is also the CEO & Founder of Purlucid Treatment Solutions and is a respected leader in water management in the oil and gas industry with 23 years' experience in solving water treatment challenges. He received his Ph.D. from the University of Alberta modeling industrial impacts on northern hydrology and water quality. Dr. McEachern spent a decade with Alberta Environment where he led the science research and innovation section influencing policy for protecting water quality and quantity and in the public debates about sustainability of oil sands development. Dr. McEachern is active in research with an appointment to the Biorefining Research Institute and adjunct professor appointments at the University of Alberta in Civil and Environmental Engineering where he supervises graduate students in water quality and water treatment, and at Lakehead supervising students in forestry and reclamation.

Additional questions can be directed to Preston at pmceachern@purlucid.com

SPEAKERS & SESSIONS

TUESDAY, SEPTEMBER 19 | FORT MCMURRAY, AB



ROOM A/B | 10:30 - 11:10

LEARNINGS FROM RECLAIMING A TAILINGS POND, CONSTRUCTING A FEN AND WORKING WITH INDIGENOUS PEOPLES

Joshua Martin | M.Sc., P. Bio, Senior Technology Advisor - Aquatic Closure, Suncor Energy Inc.

Following development, oil sands companies are required to reclaim the land back to boreal forest ecosystems with equivalent land capability. Over several decades, Suncor Energy Inc. (Suncor) has been working to develop and deploy innovative ways to reclaim both upland and wetland ecosystems. Recent examples of innovation in oil sands reclamation at Suncor include: (1) Wapisiw Lookout, the first reclaimed oil sands tailings pond; (2) Nikanotee Fen, one of two reclaimed fens in the oil sands and; (3) a culturally significant wetland plant study in collaboration with six First Nation and Metis communities. This presentation will provide an overview of the three above mentioned reclamation projects and share some of the learnings they have provided on oil sands reclamation.

PRESENTER BIOGRAPHY

Joshua Martin is a Professional Biologist and successful reclamation and closure practitioner with 10+ years of experience in the oil sands. Currently, he works as a Sr. Technology Advisor for Suncor Energy Inc., one of Canada's largest integrated energy companies and holder of one of the largest positions in the oil sands. Based out of Calgary, Alberta, he collaborates with researchers, industry, and regulators to develop, pilot and deploy technology and advance innovative solutions to improve environmental performance and accelerate the reclamation and closure of disturbed lands. He also represents Suncor at Canada's Oil Sands Innovation Alliance (COSIA), an alliance of oil sands producers collaborating on research and innovation in the four areas of land, tailings, greenhouse gases and water. He received both a B.Sc. and M.Sc. in Biological Sciences from the University of Windsor, with his graduate research focusing on the health of reclaimed wetlands in the oil sands.

Additional questions can be directed to Joshua at ijmartin@suncor.com

SPEAKERS & SESSIONS

TUESDAY, SEPTEMBER 19 | FORT MCMURRAY, AB



ROOM A/B | 11:10 - 11:50

EARLY ECOSYSTEM DEVELOPMENT IN RECLAIMED AND NATURALLY DISTURBED FORESTS

Ruth Errington | M.Sc., Natural Resources Canada, Canadian Forest Service

Co-Author, Brad Pinno | Ph.D., Natural Resources Canada, Canadian Forest Service

One of the goals of land reclamation after oil sands mining in northern Alberta is to create functioning boreal forest ecosystems; so it is important to understand how both reclaimed and natural forests develop. We compared a broad suite of ecosystem development properties, including both biotic and abiotic components, on different operational reclamation soils, i.e. upland based forest floor-mineral mix (FFMM) and lowland based peat-mineral mix (PMM), to naturally disturbed forests of the same age. Overall, we found that natural tree seedling establishment and growth was greater on PMM compared to FFMM, likely due to the greater water availability and reduced plant competition on PMM. In contrast, plant community composition, abundance and diversity, and microbial diversity were greater on FFMM than on PMM. Soil nutrient bioavailability on FFMM was also more similar to natural soils. After six years, there are still significant differences between reclaimed and natural forests, but more importantly, the differences between reclaimed and natural forests are decreasing over time. For example, after the third growing season tree density was approximately 70,000 stems/ha greater in natural forests than in reclaimed forests but by the sixth growing season that difference was reduced to only 15,000 stems/ha due to self-thinning in the natural stands and continued ingress in the reclaimed stands. It is clear that there are different benefits of each reclamation cover soil and now we are working on operational techniques for combining these soils across the landscape to maximize the benefits of both.

PRESENTER BIOGRAPHY

Ruth Errington is a Technician with the Canadian Forest Service in Edmonton, specializing in plant community ecology of forests and peatlands. Ruth's research interests are largely focussed on ecological responses to change, both the abrupt changes associated with forest fires and open pit mining, as well as the more gradual shifting of climatic conditions. She holds a BSF in Forest Resources Management from UBC and a MSc in Environmental Biology and Ecology from the U of A.

CO-AUTHOR BIOGRAPHY

Brad Pinno is a Research Scientist with Natural Resources Canada, Canadian Forest Service based in Edmonton, Alberta where he has been studying the impacts of reclamation cover soils and operational treatments on forest development after oil sands mine reclamation. He has a BSc and MSc in Forestry from the University of Alberta and Ph.D. in Soil Science from the University of Saskatchewan.

Additional questions can be directed to Ruth and Brad at: ruth.errington@canada.ca & brad.pinno@canada.ca

SPEAKERS & SESSIONS

TUESDAY, SEPTEMBER 19 | FORT MCMURRAY, AB



ROOM A/B | 13:00 - 13:35

RECLAIMING PEAT OPERATIONS – ALBERTA’S POLICY APPROACH

Susan McGillvray | B.Sc., P.Ag., Native Land Reclamation Policy Specialist, Alberta Environment and Parks

Peatlands provide ecological goods and services such as water storage, carbon storage, water filtration, and wildlife habitat. Peat extraction has occurred for a few centuries across North America, Europe and Russia. Peat extraction in Canada has been primarily for horticulture purposes.

The intent of the reclamation components of the policy for Allocation and Sustainable Management of Peat Resources in Alberta included:

1. Create policy that is representative of the value of Peatlands to Albertans.
2. Address the historical footprint and future footprint of peat operations
3. Incent timely reclamation to prevent alternate communities from establishing and ensuring equivalent land capability
4. Manage the uncertainty pertaining to restoration of Peatlands in drier climates
5. Manage the financial and reclamation liability to Albertans
6. Ensure any policy specific to the peat operations is aligned with the Alberta Wetland Policy

A key challenge was bringing the technical knowledge from the peat industry and peat restoration, academia primarily from Eastern Canada and applying it to Alberta’s climate and Alberta’s legislation, policy and industrial application requirements.

The first step was to create a GoA steering committee comprised of representation from public lands, hydrogeologists, fish and wildlife, reclamation policy, limnologists, and AEP program services. Key technical and operational collaboration was provided and led by the Canadian Sphagnum Peat Moss Association’s (CSPM) industry representatives whom met with the steering committee throughout the policy creation. Lastly, a technical reclamation subgroup with representation from AEP reclamation policy, reclamation approval coordinators, peat industry reclamation specialists and the CSPM science coordinator was created to complete the “Conservation and Reclamation Requirements for Peat Operations”.

The commitment to sharing information was a primary factor that underpinned the ability to complete the policy. This presentation will discuss the challenges and outcomes in completing goals. Timeliness of reclamation was identified as an essential mitigation of potential environmental impacts associated with peat operations. Time remains a key element of the policy implementation, as a review in 10 years will assess if the reclamation policy tools are functioning as desired.

PRESENTER BIOGRAPHY

Susan McGillvray is a Senior Native Reclamation Policy specialist with the Land Reclamation Policy Branch, AEP. In her 18 years practicing in reclamation, remediation and soil surveying, she has spent the last 9 years writing reclamation policy focusing on crown Forested land, Grassland and Peatlands. As well, as enjoying developing and instructing staff reclamation and inspection courses. At home, her boys 5 and 7, have refined their technique at extending bedtime routines by asking questions like “Where does soil come from and Why are bogs and fens important?”

Additional questions can be directed to Susan at: susan.mcgillvray@gov.ab.ca

SPEAKERS & SESSIONS

TUESDAY, SEPTEMBER 19 | FORT MCMURRAY, AB



ROOM C | 13:45 - 14:20

BOREAL PEATLAND RESTORATION AND ALBERTA'S PEATLAND RECLAMATION CRITERIA (2015): LESSONS, OPPORTUNITIES, AND CHALLENGES

Bin Xu | Ph.D. NSERC Industrial Research Chair for Colleges, Peatland Restoration, Boreal Research Institute, Northern Alberta Institute of Technology

Peatlands are dominant landforms in Canada's boreal and subarctic regions, covering 12% of the surface area and accounting for 56% of organic soil carbon in Canadian soils. In Alberta, boreal peatlands cover 17% of the province and their distribution coincides with the oil deposits in the northern boreal regions. These ecosystems are facing increasing pressure with the development and expansion of the energy sector. As in-situ bitumen production continues to grow and outpace the output by mining, the cumulative impact of thousands of well pads and connecting linear features on boreal peatlands are potentially significant but difficult to assess and mitigate.

The Peatland Restoration program at the NAIT Boreal Research Institute (NBRI) was established in 2012 with joint industry and NSERC funding to develop practical, cost-effective technologies and solutions to restore boreal peatlands disturbed by resource exploration and extraction in northern Alberta. Partnered with universities and industry, NBRI pioneered the peat inversion and moss layer transfer technique (PI-MLTT) method to successfully restore an in-situ clay well pad to peatland status. The peatland program has been developing and testing modified and alternative approaches to restore various types of in-situ features (well pads, OSE, and roads) with increased efficiency and reduced operational costs. We are conducting research to better understand and mitigate industrial impacts on peatland ecosystems through better planning and management practices.

The development and release of the 2015 Peatland Reclamation Criteria provides a unique opportunity for NBRI's applied peatland research program. In this presentation, I will discuss 1) how the well pad trial was used to evaluate the criteria; 2) how the criteria can be incorporated in the planning and reclamation process to ensure maximum success; 3) lessons from various peatland trials regarding meeting the reclamation criteria; 4) challenges and gaps in peatland restoration practice, research, and policy requirements.

PRESENTER BIOGRAPHY

Dr. Bin Xu is a peatland ecologist with a Ph.D. in Plant Biology from Southern Illinois University Carbondale. He worked as a postdoctoral research fellow at the University of Calgary before joining NAIT in 2013 as the NSERC Industrial Research Chair for Colleges (IRCC) in Peatland Restoration at the NAIT Boreal Research Institute in Peace River, Alberta.

He has over 17 years of research experience on the impact of human activities on natural peatland ecosystems in boreal Canada. As the IRCC Chair, he is working closely with university collaborators, industry partners and small and medium sized enterprises (SMEs) to develop science-based, effective techniques and methods to reclaim disturbed peatlands by in-situ extraction in northern Alberta. He's leading research on assessing and mitigating industrial footprint, particularly linear features, on boreal peatlands through strategic planning, innovative mapping technologies, and ecological restoration. He's closely involved in the development of the provincial peatland reclamation criteria (2015). He has hosted workshops and field training schools for practitioners, land managers, regulators on bryophyte biology/identification, peatland ecology, community ecology, provincial criteria assessment, as well as hands-on training of site preparation, civil earthwork, plant species selection, propagation and field deployment.

Additional questions can be directed to Bin at: binx@nait.ca

SPEAKERS & SESSIONS

TUESDAY, SEPTEMBER 19 | FORT MCMURRAY, AB



ROOM D | 13:45 - 14:20

EVOLUTION AND CHALLENGES OF SOIL BIOENGINEERING APPLICATIONS TO CONTROL SOIL EROSION IN RE- CONSTRUCTED WATERWAYS ON THE ALBERTA OIL SANDS

Pierre Raymond | Senior Site Reclamation Specialist & President, Terra Erosion Control Ltd.

This presentation will introduce the participants to the science of soil bioengineering. It will discuss the history of soil bioengineering throughout the world and demonstrate recent research developed toward the resistance of various structure types. It will describe the benefits associated with the use of soil bioengineering on its own and incorporated within civil engineering structures. The main part of the talk will present two case studies where soil bioengineering applications were designed and implemented on reconstructed waterways (swales) in 2004 and 2010 at the Mildred Lake base mine of Syncrude Canada. Alpha Swale was the largest swale constructed in 2003 within the W1 dump. In response to rill erosion caused by snowmelt of the catchment basin in the spring of 2004, erosion control measures, through means of soil bioengineering techniques, were carried out in April of 2004. Although the establishment of vegetation planted was considered successful, some soil erosion was noticed during the spring and summer of 2005. Based on observations made during field visits, a prescription was developed to remediate and repair existing soil bioengineering structures within the swale. As a result of the 2004 trial, the original design was modified and applied to the 09 Alpha 02 and 09 Beta 01 Swales in the spring of 2010. Both swales have been monitored since installation with minor repairs applied to swales implemented in 2010. Both sites were visited again in the fall of 2014 and were found fully vegetated and functioning as intended at draining the respective catchment areas (i.e. 32.0 and 66.5 ha). The application also created significant wildlife and wetland habitat and travel corridors. Lesson learned will be discussed in regards to combining past experiences with process planning, design, and logistics of implementation.

PRESENTER BIOGRAPHY

Mr. Pierre Raymond is a senior site rehabilitation specialist. He has worked since 1990 in the natural resources sector in British Columbia and Alberta, Canada. Since 1996, his focus has been on soil bioengineering, biotechnical slope stabilization and riparian habitat restoration. Pierre’s experience includes biotechnical design, prescriptions, implementation, maintenance, and monitoring of sites. He has a strong background in supervision of specialized construction machinery and implementation of steep slope stabilization, riparian habitat restoration, storm water outfall protection on river banks, and mining reclamation projects. In 2002 he was involved in the monitoring, auditing, training and trial establishment for erosion control measures on a pipeline project in Peru. Between, 2004 - 2013 he was involved in design and implementation of soil bioengineering applications for rehabilitation of mine dump reconstructed water ways in northern Alberta.

Recent involvement includes the development of streambank restoration guidelines (2012) and workshops on low impact development within urban stream environments for the City of Calgary, Alberta (2014 & 2015). Pierre also presented lectures at the I.U.C.N. conference in Beijing and I.A.S.H.K., Hong Kong, China in 2014. Currently he is involved with AEP on the Bioengineering Demonstration and Education Project as Soil Bioengineering Subject Matter Expert in Calgary, AB.

Additional questions can be directed to Pierre at: pierre@terraerosion.com

SPEAKERS & SESSIONS

TUESDAY, SEPTEMBER 19 | FORT MCMURRAY, AB



ROOM C | 14:20 - 14:55

WOODLAND CARIBOU HABITAT RECLAMATION/REFORESTATION ON LINEAR DEVELOPMENTS IN NORTHEASTERN ALBERTA: AN OPERATIONAL VIEW

Keith Ebbs | RPFT, Forestry and Environmental Coordinator, CCI Solutions

Ken Birkett | RPFT, VP of Environmental Services and Planning, CCI Solutions

Over the past decade both Federal and Provincial legislation has undergone changes in the regulations and directions concerning our dwindling Boreal Woodland Caribou populations. With the ingress of whitetail deer into northern habitats predators have increased in caribou ranges across Canada. Linear development has increased predator / prey interactions and increased hunt effort / success ratios for wolves. The Woodland Caribou (*Rangifer tarandus caribou*) is listed as Threatened under Canada’s Species at Risk and Alberta’s Wildlife Act. In October 2012, the government of Canada released its Recovery Strategy for Woodland Caribou, Boreal Population in Canada. Recognizing the legislation, increased predation and threatened caribou herds; change was inevitable.

Major oil and gas companies have stepped up to the plate by adopting proven forestry silviculture practices and entering into applied, large scale, reforestation and reclamation efforts. They have also researched new techniques and applications to mitigate industrial impacts. The discussion will focus on both tried and true and new techniques from the operational standpoint. We will illustrate operational best practices and logistics that are successful in mitigating the challenges of reforestation / reclamation in northeastern Alberta.

PRESENTER BIOGRAPHY

Keith brings over 40 years of forestry experience, working in the areas of silvicultural, access management, timber harvest planning, data collection and interpretation, and forestry and construction supervision. As 22-year veteran at Weyerhaeuser, Keith was a member of the Woodlands Lead Team responsible for the management of Weyerhaeuser Pembina Forest Management Areas in Central Alberta. He is a silvicultural specialist and has played a key role in developing reforestation plans and leading the reclamation of over 400 km of active pipeline in caribou habitat. Keith also assists in promoting Aboriginal employment opportunities for our clients.

CO-PRESENTER BIOGRAPHY

With over 33 years of land management experience in Alberta, Ken brings a wide variety of knowledge to CCI regarding regulatory, environmental and construction activities, especially within forested lands. Ken began his career as a Forest Officer with the Alberta Government. He then owned and operated a successful consulting company for 20 years working in the Forest, Oils and Gas, Utility, First Nations and Private Land Sectors of Alberta. Before joining CCI’s team, he had been working as a Civil Construction superintendent for SAGD operations with a major operator in Fort McMurray area.

Additional questions can be directed to Keith and Ken at: kebbs@ccisolutions.ca & kbirkett@ccisolutions.ca

SPEAKERS & SESSIONS

TUESDAY, SEPTEMBER 19 | FORT MCMURRAY, AB



ROOM D | 14:20 - 14:55

SLUDGE IMPACT ON THE STABILIZATION OF THE FIRE ROAD MINE IN NEW BRUNSWICK

Michele Coleman | Environmental Engineer, Generation and Business Development, NB Power, Director, CLRA National

The approximately 120 ha backfilled coal mine cut, located near Fredericton, New Brunswick, Canada, has been a source of acid rock drainage since the mid 1980's. The approximately 20 m³ mine cut was backfilled with run of mine sandstone rock containing iron sulphides, principally pyrite in the range of 1 to 2 wt%. Lime neutralization of acidic drainage has been continuously ongoing to prevent discharge of approximately 200m³/year of untreated surface and ground water into the environment. Various reclamation schemes have been considered over the years, but engineering studies indicated either impracticalities associated with maintaining a flooded site or excessively high costs for an engineered cover while not necessarily eliminating the need for continuing drainage treatment operations.

Annual hydrated lime demand for water treatment has decreased from approximately 2000 t/a in the 1990's to less than 250 t/a today, primarily due to exhaustion of reactive sulphides in the unsaturated (vadose) zone. The periodic dredging of treatment ponds and ultimate disposal of the aluminum/iron-rich treatment sludge into the backfilled cut has shown no adverse effects on acid generation and may be acting as a source of residual alkalinity and as a "sealant," somewhat reducing the rate of acid generation. Detailed analysis of twenty years of mine water chemistry has indicated that the impact is negligible on the overall acidity of the mine water. In situ neutralization of generated acidity, due to reaction of acid with alkaline mineralization, has been the major contributor to the decrease in acidity over the years. Levels of trace metals in the drainage, from the area, have and are expected to remain at low concentrations during and subsequent to stabilization of the site.

PRESENTER BIOGRAPHY

For over twenty-five years, Michele Coleman has worked for New Brunswick Coal Limited, a surface coal mining company, and their parent company, New Brunswick Power, with responsibility for environmental and mine closure issues. One of these responsibilities was monitoring the acid generating Fire Road Mine.

The scope of work included teaming up with the University of New Brunswick on several research projects and field camps and having a long term investigative relationship with a consulting chemist, other chemical engineers and geochemists to fill in gaps in the understanding what was occurring within the Fire Road Mine waste rock, identify how it was changing over time and recommend actions towards mine closure.

The benefit of staying in school for way too many years was getting a background in both chemical engineering and geology. Knowing the "language" of both fields has enabled Michele to facilitate an almost seamless exchange in information between scientists, researchers and engineers. The research presented today is part of the ongoing collaboration with the university, chemists and geologist on the monitoring of the acid generation situation at the Fire Road Mine.

Additional questions can be directed to Michele at mcoleman@nbpower.com

SPEAKERS & SESSIONS

TUESDAY, SEPTEMBER 19 | FORT MCMURRAY, AB



ROOM C | 15:20 - 15:55

EARLY SUCCESSIONAL WILDLIFE MONITORING OF RECLAIMED HABITATS IN THE ALBERTA OIL SANDS REGION OF CANADA: INDICATORS OF ECOSYSTEM SHIFT.

Virgil C. Hawkes | Vice-President & Senior Wildlife Biologist, LGL Limited Environmental Research Associates

Anthropogenic disturbances are occurring in the Athabasca Oil Sands Region of northeastern Alberta, principally from surface mining, in-situ, and conventional oil and gas development. These disturbances include habitat loss through deforestation and habitat alteration and the installation of mining infrastructure such as roads, tailings ponds, and upgraders. Concurrent with disturbance and active mining is the reclamation of upland habitats. The success of this reclamation is contingent (in part) upon the quantification of the return to and use of reclaimed habitats by wildlife. To that end, an effectiveness monitoring program has been implemented in the region to assess the return and re-establishment of wildlife to reclaimed upland habitats relative to the seral stages through which the reclaimed habitats will develop and to mature forest reference points. These data will also contribute to the state of knowledge regarding the efficacy of approaches to upland habitat reclamation as it pertains to the creation of functional wildlife habitat. Appropriate indicators of ecosystem shift are necessary to track the developmental trajectories of reclaimed habitats over time and indicator species need to be considered in context to their life-history requirements, behaviours, and site-characteristics of the habitats being studied. The analysis of data collected between 2011 and 2016 suggest that certain species of songbirds (sparrows) and terrestrial arthropods (spiders and beetles) are indicative of the habitats through which reclaimed habitats will develop, providing the data necessary to track ecosystem shifts and assess reclamation effectiveness. Investigations continue to determine the strength and persistence of these relationships over time.

PRESENTER BIOGRAPHY

Virgil Hawkes has studied wildlife and their habitat relationships in British Columbia and the Pacific Northwest, extending from California to coastal, central, eastern, and the north- central regions of B.C., as well as portions of the Yukon and Northwest Territories and Alberta for the past 20 years. Much of his career has focused on the conservation of rare and endangered species and the interaction between those species, their habitats, and human-induced disturbances on those habitats. Virgil is currently leading a region-wide study of the use of reclaimed habitats by wildlife in the Athabasca Oil Sands Region and is assessing reclamation techniques to increase habitat suitability in the drawdown zones of large hydroelectric reservoirs.

Additional questions can be directed to Virgil at vhawkes@lgl.com

SPEAKERS & SESSIONS

TUESDAY, SEPTEMBER 19 | FORT MCMURRAY, AB



ROOM D | 15:20 - 15:55

OIL SANDS EXPLORATION (OSE) RECLAMATION – SUCCESSES AND CHALLENGES IN RECLAMATION CERTIFICATION OF OSE PROGRAMS

Kira Gerow | Reclamation Coordinator, Canadian Natural Resources Limited

Oil Sands Exploration (OSE) Reclamation presents many opportunities and challenges to successfully meeting the Alberta Energy Regulator (AER) regulatory criteria. As the Horizon Oil Sands mine continues to develop and evolve, it is essential to further characterize the lithology of the surrounding lands to inform and guide long-term planning for future expansion development. Once the application is approved for an OSE program and any associated oil sands evaluation wells within public lands and executed, field work commences to fulfill expected reclamation timelines. To effectively manage up to 55 OSE programs including 1800 well sites annually to reduce Canadian Natural’s footprint involves detailed planning and annual investment in conducting field work to bring programs to closure in a cost effective and timely manner. Evolving construction practices contribute to the success in the road to recovery to meet requirements for forested and peatland criteria. Many challenges exist including large inventory management, justification of site deficiencies, remote winter access of locations and timing of site monitoring to fulfill annual reporting requirements to ensure long term trajectory of equivalent land use is met. Lessons learned will be discussed with recent success with application of innovative techniques contributing to Canadian Natural obtaining 47 OSE program reclamation certificates, totally 515 hectares of land.

PRESENTER BIOGRAPHY

Kira Gerow is a reclamation coordinator with Canadian Natural Resources managing an extensive inventory of conventional and unconventional oil and gas lease sites including OSE programs and thermal production. Expertise is provided to manage and fulfill site closure through to reclamation certification to meet specific land use criteria across the provinces including agricultural, peatland and forested scenarios.

Kira obtained a Bachelor of Science in Agriculture specialized in Agronomy from the University of Manitoba and is a registered Professional Agrologist in Alberta with a strong agriculture background. Over 10 years of experience, both in consulting and industry, includes risk assessment, remediation, reclamation and extensive vegetation management that brings a well-rounded perspective to diverse land reclamation.

Additional questions can be directed to Kira at kira.gerow@cnrl.com

SPEAKERS & SESSIONS

TUESDAY, SEPTEMBER 19 | FORT MCMURRAY, AB



ROOM C | 15:55 - 16:30

NATURAL PROCESSES FOR THE RESTORATION OF DISTURBED SITES

David Polster | M.Sc., R.P. Bio., Plant Ecologist, Polster Environmental Services Ltd.

Ecological restoration is defined as the process of assisting the recovery of an ecosystem that has been degraded, damaged or destroyed (SER 2004). This definition suggests that all our efforts, however large they may need to be, are directed to assisting the return of natural processes. In many cases, in fact, natural processes can often be harnessed as a major mechanism of recovery, reducing the degree of input required. The new standards for ecological restoration suggest (Section III, 2.3) that, "All treatments are undertaken in a manner that is responsive to natural processes and fosters and protects potential for natural and assisted recovery." (McDonald et al. 2016). Natural processes have been restoring naturally disturbed sites (volcanos, landslides, glaciation, asteroid impacts, sea level changes, river bank erosion, etc.) for millions of years. By understanding how these recovery processes operate to restore these natural disturbances, strategies for the restoration of human caused disturbances can be developed. The first step in defining effective restoration strategies is to identify the filters (constraints) that are preventing the recovery of the ecosystem. Polster (2013) lists eight abiotic filters such as compaction, steep slopes, and adverse chemical properties and six biotic filters including herbivory, competition and lack of propagule availability. By addressing the filters that are preventing recovery without introducing new filters, the natural processes that have been operating for millions of years can assist the recovery of the disturbed site. Examples are drawn from the author's experience.

PRESENTER BIOGRAPHY

David F. Polster is a plant ecologist with almost 40 years of experience in vegetation studies, reclamation and invasive species management. He graduated from the University of Victoria with an Honours Bachelor of Science degree in 1975 and a Master of Science degree in 1977. He has developed a wide variety of reclamation techniques for mines, industrial developments and steep/unstable slopes as well as techniques for the re-establishment of riparian and aquatic habitats. He is the past-president (third term) of the Canadian Land Reclamation Association. He is the treasurer for the Western Canada Chapter of the Society for Ecological Restoration and is the NW Regional Representative on the board of the international Society for Ecological Restoration (SER). He was recently awarded the prestigious John Rieger Award from SER. He served as the alternate mining representative on the board of the Invasive Species Council of B.C. for 9 years.

Dave Polster has provided on-site design and direction in the development of reclamation and bioengineering systems for restoration of severely damaged ecosystems. He served as the environmental supervisor for CP Rail's massive Roger's Pass Project. He was responsible for developing the bioengineering systems that have successfully revegetated a portion of the Point Grey cliffs at UBC. Dave has prepared reclamation plans for numerous mines, quarries and gravel pits in Canada. He pioneered the concept of successional reclamation where the aim of the reclamation program is the re-integration of the disturbed site into the natural processes of vegetation succession. He has applied his knowledge in ecology to solving problems of unwanted and invasive vegetation. He has authored numerous papers and teaches graduate level courses on these topics.

Additional questions can be directed to David at d.polster@telus.net

SPEAKERS & SESSIONS

TUESDAY, SEPTEMBER 19 | FORT MCMURRAY, AB



ROOM D | 15:55 - 16:30

REMEDIATION EAST COAST STYLE

Frank Potter | P.Eng., Executive Director, Nova Scotia Lands Incorporated, President, CLRA Atlantic Chapter

This presentation is a story about a government agency that rose to prevalence from a state of industrial decline in Nova Scotia. In many ways, it is very much about a “Road to Recovery”. Aging industrial infrastructure, the global economy and changing technology has seen a steady decline in some of the backbone industries of this country. Many of these industries began their life in a period of time when the concept of obtaining an environmental permit before commencing operations simply wasn’t heard of. Nova Scotia Lands Incorporated is a provincial agency that started out with a mandate to clean up the former Sydney Steel Mill in Sydney, NS. The experience and success of this cleanup led to a demand for NSLI to move into other industrial sectors that were also experiencing a declining business climate. This government agency developed skills that quickly became recognized as vitally important in addressing many of the neglected industrial properties across the province. In addition to looking after the backend of the “Cradle to Grave” approach, NSLI also developed a skill at redeveloping once empty, run-down properties into vibrant prosperous new industrial parks. As NSLI grew, it broadened its base into other areas of provincial interest and added staff from the former industries to its core staff. Today, NSLI is taking on a variety of tasks that are paving the “Road to Recovery” for vacant industrial lands throughout Nova Scotia. This presentation will very much be a story about success, not old industries.

PRESENTER BIOGRAPHY

Frank’s engineering career has spanned more than 37 years with the Province of Nova Scotia and the Cape Breton Regional Municipality. He spent 10 years with NS Environment working in the fields of solid waste, emergency response, offshore oil exploration, hazardous waste, and water and wastewater infrastructure. He spent 10 years working in municipal public works and 7 years working on the Sydney Tar Ponds cleanup. For the past 9 years Frank, has been the Executive Director of Operations for Nova Scotia Lands Incorporated. His role includes the assessment, remediation and re-development of former industrial lands owned by the Province of Nova Scotia. Frank has spoken at numerous conferences throughout his career and despite his best efforts, he keeps getting asked to come back.

Additional questions can be directed to Frank at frank.potter@novascotia.ca

SPEAKERS & SESSIONS

TUESDAY, SEPTEMBER 19 | FORT MCMURRAY, AB



GRAND BALLROOM A | 19:30 - 20:30

GUEST SPEAKER: AURORA BOREALIS NATURE'S BEAUTY AND THE BEAST

Bill Rockwell

PRESENTER BIOGRAPHY

Bill Rockwell is a professional photographer, and entrepreneur. He has been a guide for aurora tours in the Fort McMurray area since 1996 helping thousands of people from all over the world to enjoy the night sky and photograph the aurora Borealis. Bill encourages audience participation as he describes the aurora and how people have studied and understood it from the past into the present.

Additional questions can be directed to Bill at: saturnv@shaw.ca



Photo source: <http://www.zenseekers.com/northern-lights>, courtesy of Bill Rockwell
