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February 26 - 28, 2020



CONFERENCE PROGRAM

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MESSAGE FROM THE PREMIER OF ALBERTA

On behalf of the Government of Alberta, it is my pleasure to welcome everyone to the Canadian Land Reclamation Association Alberta Chapter's 2020 annual general meeting and conference.

As you gather in beautiful Central Alberta to learn, share information and network, I would like to add my voice to yours in celebration of Alberta energy. Our province's abundant natural resources, and the energy we derive from them, power our homes, businesses, economy and way of life. While we are facing some challenges, we also have more than a few opportunities. I look forward to working alongside the CLRA to ensure we can continue to power the world and protect the environment for future generations.

Thank you for 44 years of leadership to advance the practice of reclamation and remediation of environmentally disturbed lands and waterways in our province. I appreciate your commitment to innovation, collaboration and education.

I hope everyone enjoys the local hospitality in Red Deer. Best wishes for a productive conference.


Hon Jason Kenney, Premier of Alberta





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April 1, 2019 – March 31, 2021

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Student Mentor Program

Thank you to all the Students and Mentors who participated in the program. Your commitment provides substantial value to the conference.

Thank you to all our volunteers for helping make this conference a success!



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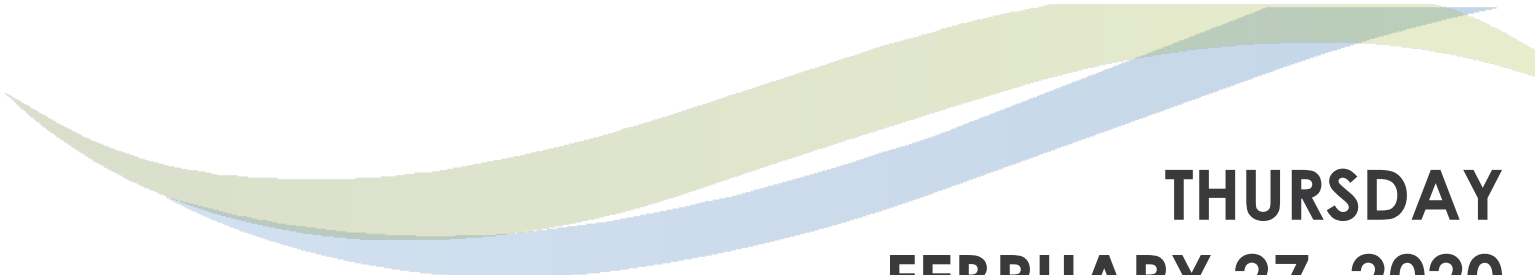


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**THURSDAY
FEBRUARY 27, 2020**



**PLENARY
SESSIONS:
08:00 – 10:00**

Exhibition Hall

Room Sponsored By:



The Future of the Oil and Gas Industry in a Carbon Constrained World

Scott McNally, Green Energy Advisor, Crescent Point Energy

With the increasing pressure to fight climate change, one has to wonder what will happen to oil and gas as pressure increases from the public, regulators, the government, investors, and markets. “Divest from Fossil Fuels” and “Climate Crisis” movements have gained significant traction in recent years, with the apex being Greta Thunberg named Time’s Person of the Year.

As a former Energy and Environmental Policy Advisor to two governments, and a current Green Energy advocate in the Oil and Gas industry, Scott will explore what the future of the oil and gas industry could look like in a carbon constrained world.

Presenter Biography

Scott McNally, B.S.Eng, M.S.Eng, MPP
Green Energy Advisor, Crescent Point Energy

Scott McNally currently manages Green Energy and other special projects at Crescent Point Energy, where he focuses on emissions reduction and generating low carbon power. Scott was formerly an energy advisor to the Governor of North Dakota, a fellow at the U.S. Department of Energy, and was a White House Intern during the Obama administration, where he worked on energy and environmental policy in the Executive Office of the President. Scott also has several years of experience as an engineer, working for Shell, BP, and Austin Energy. Scott holds a B.S. in Chemical Engineering from the University of Texas at Austin, an M.S. in Energy Resources Engineering from Stanford University, and a Master’s in Public Policy from Harvard University.

Additional questions can be directed to Scott at smcnally@crescentpointenergy.com

Alberta Energy: Spreading the Good News

Carlene Meeks, Director of Quality, Trace Associates Inc. & Chris Powter, Owner, Enviro Q&A Services

There are many misconceptions about mining, pipelines, the oilsands, and even green energy. With negative press and fake news, it can be difficult to find the good-news stories of the real and positive impacts of our work in remediating and reclaiming energy sites. Environmental practitioners are the experts on the ground, remediating and reclaiming sites and seeing progress. We are in a unique position as we are frequently the intermediary between regulators and industry, between industry and the public, and between rules and practice. How do we, as practitioners and experts in reclamation and remediation, share the world-class and significant environmental work that is happening?

We see others speaking out about Canadian energy, like Modern Resources' Chris Slubicki. This talk will share the good news on how reclamation and remediation have evolved due to Government policy, environmental regulations, industry best practices, and technical experts in Alberta. But more importantly, it is meant to inspire others to speak out and create opportunities to share their experience and expertise with other Canadians about the world-class work being done in a country with some of the highest standards in safety, labour, environmental, and human rights legislation.

Presenters Biographies

Carlene Meeks **Director of Quality, Trace Associates Inc.**

Carlene Meeks has a Bachelor of Science degree with distinction, from the University of Alberta, majoring in Land Reclamation, Remediation, and Conservation. She is the Director of Quality, the Practice Area Lead for Reclamation, and has been a Partner at Trace Associates Inc. (Trace) since 2008. Carlene is responsible for streamlining processes, managing technical standards, and training. As the Practice Area Lead for Reclamation, she is responsible for overseeing reclamation across the firm. She also provides technical direction for complex projects and is the Principal-in-Charge for clients across the oil and gas and mining market sectors.

She is a Professional Agrologist in Alberta, British Columbia, and Saskatchewan. Ms. Meeks was the recipient of the Professional Agrologist Award with the Alberta Institute of Agrologists in 2014.

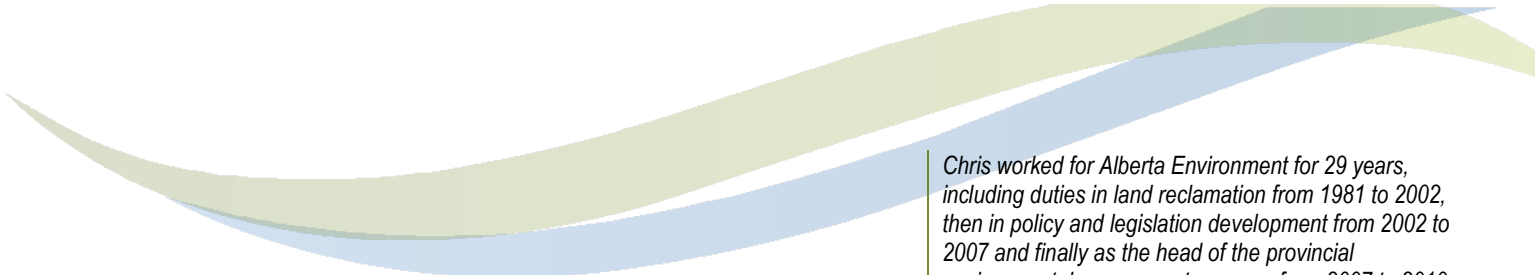
Carlene's technical career is diverse and includes expertise in both the reclamation and remediation aspects of consulting across prairie, parkland, forested, and arctic areas of Canada. Routinely, Carlene provides senior advisory relating to Phase 1 and 2 environmental site assessments (ESAs), remediation, detailed site assessments, reclamation certificate applications, pipeline post-construction reclamation assessments, and clubroot assessment and mitigation programs.

Ms. Meeks is a Senior Technical Advisor with nearly 20 years of environmental science and project management experience in the upstream and midstream oil and gas, mining, and waste management sectors and has worked in secondment positions for clients over the last 7 years. Ms. Meeks works with regulators and clients in streamlining reclamation practices and has helped developed a reclamation assessment protocol for large coal mines in Alberta. Carlene has extensive oil and gas reclamation knowledge and is a proven leader that can balance business and technical demands.

Chris Powter **Enviro Q&A Services**

Chris has a B.Sc. in Ecology and an M.Sc. in Plant Ecology from the University of Guelph. He is the owner of Enviro Q&A Services, a consulting firm providing environmental advice and guidance to the resource industry and government regulators since 2015.

From April 2010 to December 2014 Chris was the Executive Director of the Oil Sands Research and Information Network (OSRIN) in the School of Energy and the Environment at the University of Alberta.



Chris worked for Alberta Environment for 29 years, including duties in land reclamation from 1981 to 2002, then in policy and legislation development from 2002 to 2007 and finally as the head of the provincial environmental assessment program from 2007 to 2010.

Chris is a member of the Environmental Appeals Board and the Public Lands Appeal Board.

Chris was the recipient of the Canadian Land Reclamation Association's Edward M. Watkin Award in 1988, the Noranda Land Reclamation Award in 2001 and the Alberta Chamber of Resources 2004 Reclamation Citation for lifetime achievement. He was also a long-time editor of the CLRA's Reclamation Newsletter and the IALR Newsletter, and author of Curmudgeon's Corner in the Canadian Reclamation magazine for 10 years.

Additional questions can be directed to Carlene at cmeeks@traceassociates.ca or Chris at enviroqas@shaw.ca

Evolution of the Orphan Well Association

Lars DePauw, Executive Director, Orphan Well Association

The Orphan Well Association (OWA) has gone from a small organization that few people knew about to one of the most active organizations in the oil and gas closure space in Western Canada with regular media attention. The OWA has had to adapt and change in numerous ways to deal with the new realities facing the organization.

The presentation will focus on providing insights on how the organization has changed, what the future could hold for the OWA, what future budgets will look like once the OWA begins repaying the provincial loan in earnest and what the OWA's role is in insolvencies post Redwater decision.

Presenter Biography

Lars DePauw

Executive Director, Orphan Well Association

Lars has been involved in assessing and managing environmental liabilities in the oil and gas sector for over twenty years. His current focus is leading a diverse group of professionals who are handling the continuing influx of properties being designated as Orphans in Alberta as a result of the ongoing downturn in the oil and gas industry. A large portion of his time is dedicated to managing the increased number of orphan properties, the increase in funding and the evolving scale and scope of the Orphan Well Association (OWA).

Prior to joining the OWA, Lars worked in the environmental consulting field, the oil and gas service sector and with a large producer. His work in all three sectors focused on the decommissioning and reclamation of oil and gas assets including estimating liabilities. He holds a Masters of Science from the University of Guelph and is a Professional Engineer.

Additional questions can be directed to Lars at lars.depauw@orphanwell.ca



**CONCURRENT
SESSIONS:
10:30 – 12:00**

Exhibition Hall

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Navigating CLRA: “Coles Notes” and Cheat Codes for Students

Todd Martin, MA, RTAg, Director, CLRA Alberta – Chapter & Senior Environmental Specialist, Ovintiv Services Inc.

I became a member of the CLRA in 2004. Since then, I have witnessed students missing key opportunities to maximize their conference experience. This includes which plenary session to attend, how to actively listening, how to make a great first impression (what is your 10 second pitch), how to network during the conference, and how to stay connected after the conference. If you are a student wanting to get the most of this conference and build meaningful connections... this should be your first session of the conference.

Presenter Biography

**Todd Martin, MA, RTAg,
Director, CLRA – Alberta Chapter &
Senior Environmental Specialist - Construction,
Acquisition, Reclamation, Ovintiv Services Inc.**

Todd Martin is a Senior Environmental Specialist with Ovintiv's environmental compliance team. His environmental role is split between office and field support for contractor management, supply management, surface land, environmental concern response, procedure development, construction, and reclamation.

Additional questions can be directed to Todd at Todd.Martin@ovintiv.com



Monaco

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Solar Pump - The Future of Irrigation for Ecological Restoration

James Proudfoot, Co-Founding Director, Leaf Ninjas Inc.

Through challenges, failures, and shortcomings, there is always the opportunity to innovate our processes and products in ecological restoration installations. Leaf Ninjas was consistently faced with the challenge of keeping plantings alive in an economical way while using a low amount of natural resources. The quality of plant material and conditions plants are installed in are major factors, but one area that is often overlooked is the aftercare and maintenance, regular watering especially. This is how we implemented the solar pump to irrigate restoration activities.

Knowing the direct correlation of watering maintenance to the survival of plants, we asked the question, how can we incorporate effective watering programs in remote and ecologically sensitive sites? Or how can we improve and innovate in municipal areas to have higher success rates of plant survival with lower input? It was clear with Alberta's resource of sunlight averaging 325 per year and an inconsistent rainfall of 12-20 per year that a consistent system like a solar-powered irrigation system was a valuable tool for these types of installations. The systems that have been deployed are being used in areas where you cannot access safety (across rivers) or within certain times of year (fish hatching windows, bird nesting windows, rare plant blooms) while increasing the success of projects. Using its built-in data recording program, stakeholders are able to get real-time information on how much water is used, what times of day, and how much energy is used.

Join us as we explain the benefits and results of the solar pump in restoration activities, bot in remote projects as well as private and municipal installations.

Additional questions can be directed to James at info@leafninjas.ca

Presenter Biography

James Proudfoot
Co-Founding Director, Leaf Ninjas Inc.

James Proudfoot is a nature, ecology, and plant enthusiast that strives for innovation in the way he approaches challenges and goals of projects in Western Canada. At Leaf Ninjas, a native plant nursery and installation company, James Proudfoot's role allows him to focus on custom plant propagation for restoration activities to use in their own installations, as well as other municipal, industry and private projects. Using his University training, professional specialization certificate in ecological restoration and project experience at Leaf Ninjas, James is able to positively impact the ecosystems and communities he works within.

Biophysical Impacts And Reclamation Consideration For Solar, Wind and Geothermal Energy Systems

Amalesh Dhar, Research Associates, University of Alberta

Global energy demands and environmental concerns are the driving forces for searching alternative sustainable energy sources. Solar, wind and geothermal are among the most promising sources and have been developing steadily in recent years. Although these energy sources are considered the cleanest renewable energy, they are not without environmental impacts. We evaluate the environmental challenges associated with development and utilization of these resources and provide potential reclamation considerations for the ecosystems they disturb. The major environmental issues with solar and wind energy plants are bird mortality, biodiversity and habitat loss, noise, visual impact and hazardous chemicals used in solar panels. Although geothermal plants have low carbon dioxide, hydrogen sulfide and ammonia emissions with low land and water usage, they can alter vegetation and wildlife habitat by reducing species diversity and community composition. Integration of timely reclamation during and after plant operation can significantly contribute to reducing long term reclamation costs while enhancing ecosystem recovery. Along with biophysical perspectives, we provide some socio-economic perspectives, including policy related to re-powering initiatives, decommissioning and reclamation liability of solar, wind and geothermal energy systems. The outcomes of this study improve our understanding of environmental challenges and land reclamation potential for these energy resources.

Presenter Biography

Amalesh Dhar
Research Associates, University of Alberta

Amalesh Dhar works with Professor Dr. Naeth on the Resilient Reclaimed Land and Water Systems theme within the Future Energy Systems program at the University of Alberta, Edmonton. He obtained his PhD degree from the University of Natural Resources and Life Sciences, Vienna, Austria and has research experience in various fields of natural resources management at the University of British Columbia, University of Northern British Columbia and Bulkley Valley Research Centre. His areas of expertise are reclamation and restoration ecology, environmental impact assessment, landscape disturbances, ecosystem health and biodiversity, climate change and forest ecology and management.

Co-Authors

Professor M. Anne Naeth, University of Alberta
Professor P. Dev Jennings, University of Alberta
Professor Mohamed Gamal El-Din, University of Alberta

Additional questions can be directed to Amalesh at amalesh@ualberta.ca

Using the Revised Universal Soil Loss Equation (RUSLE) for Predicting and Protecting Against Soil Loss From Energy Sites

Brian Free, CPESC, CPSWQ, CISEC, Market Development Manager, Profile Products LLC & Damon Sump, CPESC, CESCL, Regional Sales Manager, Profile Products LLC

With ever increasing scrutiny on energy projects, the industry needs to employ scientific models to predict and protect against soil loss and sedimentation coming from construction activities. Illicit discharges from energy sites into water bodies often serve as rallying cries for those who oppose energy development. The RUSLE formula was developed to predict soil loss from a given unit of area over a specific unit of time. By understanding the factors that influence erosion and sedimentation we can design projects that better protect our natural resources and limit self-inflicted harm to the energy sector.

Presenters Biographies

Brian Free

Market Development Manager, Profile Products LLC

Brian Free is the Market Development Manager for Profile Products in Western North America and is a Certified Professional in Erosion & Sediment Control (CPESC), Certified Professional in Storm Water Quality (CPSWQ) and a Certified Inspector of Sediment and Erosion Control (CISEC). He holds a B.Sc. degree in Horticulture Technology from North Carolina State University and has spent more than two decades in the Green Industry. Brian brings a holistic approach to solving many of today's challenges in erosion control and vegetation management. He has successfully helped clients in diverse market segments including: energy, transportation, solid waste management, mining reclamation, and post-fire remediation..

Damon Sump

Regional Sales Manager, Profile Products LLC

Damon Sump is the Northwest Regional Sales Manager for Profile Products. Profile is a world leader in erosion control, soil stabilization and vegetation establishment products. We are currently working on many projects in the US and Canada and have experience in many sectors including Energy, Transportation, Mine reclamation, Waterways, Fire re vegetation, etc. Damon has spent the last twenty five years in the landscape and erosion control industries, working in market development, sales, marketing, operations and management. He is a long-time resident of Oregon, and currently spends his time consulting on projects and working with distributors and contractors to provide innovative reclamation and erosion control solutions. His territory includes the four western Canadian provinces and five western states.

Additional questions can be directed to Brian at bfree@profileproducts.com or Damon at dsump@profileproducts.com



Santano

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Regulator Variance Requests: A Tool for Site Closure

Jason Hampson B.Sc., P.Ag. Principal Scientist, Trace Associates Inc.

The environmental industry in Canada is currently going through a time of change with lower budgets and a higher demand for site closure being driven by regulators. There is currently a backlog of over 100,000 abandoned wellsites in Alberta and Saskatchewan, with only a few thousand Reclamation Certificates issued each year.

Trace has recognized an underutilized tool to assist with moving sites through the closure process. Trace has successfully used the regulator variance request option combined with the use of sound judgement and existing data to build defensible requests to close out sites. On many sites, parameters exist that may exceed generic guidelines but do not represent an adverse effect to the environment. Sites are moved from being trapped in the assessment/remediation phase to being sent on to reclamation and subsequent closure.

The goal is not to hide from problem sites but to focus on sites that are not an environmental concern. Through employing this option, costs are reduced on unneeded assessment/remediation to allow funds to be redirected towards those sites that pose a true environmental concern.

Trace has been successful with multiple contaminant types (petroleum hydrocarbons, polycyclic aromatic hydrocarbons, methanol, salts, barium, etc.), and via multiple lines of evidence (risk review, adjustment of land use designation, limiting additional damage to sensitive receptors, identifying stable parameter trends, etc.).

There are too many times in a consultant's career that the recommendation to conduct "one more" groundwater monitoring event is given as an option. In this presentation, Jason will explain ways to avoid this scenario, and provide learnings regarding when and where to move sites forward using regulator variance requests.

The following successful case studies will be used to highlight these opportunities:

- Methanol in peat;
- Depth of receptor adjustment for applying barite-barium guidelines
- Confirmed chloride trends in groundwater following remediation activities; and,
- Utilizing remote green zone guidelines on non-remote forested sites.

This presentation will summarize how variance requests can be used pre or post remediation to maximize cost savings and move sites to closure on a faster timeline.

Presenter Biography

Jason Hampson, B.Sc., P.Ag.
Principal Scientist, Trace Associates Inc.

Mr. Jason Hampson, B.Sc., P.Ag., is a Project Manager, Principal Scientist, and Partner at Trace Associates Inc. (Trace). Mr. Hampson began his career at Trace in 2007, and has over 19 years of experience conducting environmental site assessments, remediation, environmental liability assessments, and groundwater monitoring related to upstream oil and gas activities and land development.

Jason oversees the development, planning, and completion of large-scale assessment, remediation, and reclamation of contaminated sites, including oil and gas and commercial/industrial sites. Jason provides company-wide technical support on contaminated site projects and specializes in advisory on large-scale projects that integrate assessment, remediation, and reclamation phases into one for a more efficient approach.

Mr. Hampson specializes in developing cost-effective assessment and remediation solutions for complex contaminated sites. Through the use of innovative guideline adjustment, remedial techniques, and risk management options, Jason ensures that liability is effectively managed, and sites are quickly progressed towards regulatory closure.

Additional questions can be directed to Jason at jhampson@traceassociates.ca

Novel Methods of Trace Metals Sampling in Water: Applications and Challenges

Aaron Zwiebel, M.Sc., University of Northern British Columbia

Trace metal contamination is a perpetual problem arising from natural resource extraction in Alberta and across Canada. However, the most common methodology to sample and assess trace metal contamination in water bodies, the surface grab sample, has a number of deficiencies which are overcome by relatively novel technologies. Two innovative tools have the potential to improve metal sampling: diffusive gradients in thin-films (DGT), and biomonitoring. The major advantages of these approaches are that they are time-integrated, in-situ, and chemically representative. Using data collected in the aftermath of the Mt. Polley Mine tailings spill, this presentation will explore the value of alternative trace metal monitoring methodologies.

There are three main issues with grab water sampling. The first issue is that samples commonly include suspended sediment, small quantities of which can be high in metals but present low environmental risk. The second deficiency is that water samples, taken at discrete locations and times, are poor representations of complex and dynamic water bodies. The third problem is that elemental concentrations alone do not necessarily indicate bioavailability, as chemical conditions vary widely. The DGT and biomonitoring methodologies can greatly improve on these deficiencies.

Diffusive gradients in thin-films are small passive samplers which slowly adsorb dissolved, ionic trace metals at a predictable rate based on Fick's law of diffusion. They are placed in water bodies for approximately a week at a time, and the concentration of metals in solution can be calculated based on the accumulation in the device. This overcomes all three deficiencies explained above. Sediment-associated and non-labile metals are not detected by the device, meaning only the theoretically bioavailable metals are sampled. This labile fraction is much more accurate at predicting risk to humans and aquatic life. This practice is especially useful for monitoring impacts from large-volume but low-risk materials, such as the large tailings deposit left behind by the Mt. Polley breach.

If the goal of monitoring activities is to understand environmental risk and bioavailability, why not go a step further and directly sample the concentration of trace metals in organisms? Multi-trophic biomonitoring data from the Mt. Polley spill shows how this methodology can inform ecological risk assessments. While this method is time integrated and chemically targeted, biomonitoring results are difficult to compare to references or regulations, and can be meaningless on their own. However, biomonitoring may bring the next revolution in environmental risk assessment, with ongoing innovation for molluscs, macroinvertebrates, and biofilm.

Presenter Biography

Aaron Zwiebel, M.Sc.
University of Northern British Columbia

Hailing from the deserts of Utah, Aaron Zwiebel is a lover of many ecosystems, and is drawn to the prairies, mountains, and forests of Alberta. Coming off of a B.Sc. in Forestry and an M.Sc. in Environmental Sciences, he is pursuing a career in land reclamation in Western Canada. Currently an independent consultant and biostatistician, Aaron is passionate about using natural processes and an understanding of microbiology to reduce the environmental cost of resource extraction. In his recent master's thesis, entitled "Spatial and Trophic Biomonitoring of Aquatic Trace Metals following the Mt. Polley Mine Tailings Spill" (2019), Aaron applied a biocentric paradigm to environmental monitoring, resulting in otherwise unobtainable research findings. He hopes for an exchange of ideas with CLRA members, and contribute to Canada's leadership in the fields of land reclamation and ecological restoration.

Additional questions can be directed to Aaron at zwiebel.aaron@gmail.com

Approaching Assessment and Remediation with an Understanding of Screening Guideline Derivation

Cory Kartz P.Bio., Environmental Scientist, Millennium EMS Solutions Ltd. & Lindsey Mooney, P.Bio., Risk Assessment Specialist, Millennium EMS Solutions Ltd.

Alberta Tier 1 guidelines are purposefully conservative to ensure protection for the majority of Sites in the province. Generic Alberta Tier 1 guidelines are often the initial screening end points when designing and reviewing assessment and remediation programs for contaminated Sites in Alberta. These guidelines are commonly applied to a Site based on the minimal requirement for application – knowledge of land use and soil texture – without much consideration for how the guideline was derived. By overlooking the scientific basis of a screening guideline, the likelihood of unnecessary remediation increases. A working understanding of how the Tier 1 guidelines were derived can help determine if they are appropriate end points at a Site, or if a site-specific approach is more favorable.

The presentation herein will aim to provide a general overview of factors which are considered when developing the Alberta Tier 1 guidelines. Additionally, the presentation will highlight some of the conservative and generalized assumptions which have been applied in guideline derivation, along with highlighting common scenarios where Tier 1 guidelines are inappropriately applied. By increasing the user-knowledge of the construction of the commonly used Tier 1 screening guidelines the expected outcome will be to ensure a positive net benefit for the Site.

Case studies will be used to demonstrate situations in which knowledge of the underlying basis of the guidelines was used to identify alternative endpoints.

Presenters Biographies

Cory Kartz, P.Biol Environmental Scientist, Millennium EMS Solutions Ltd

Cory is an Environmental Scientist with 9 years' experience in conducting contaminated sites investigations at dozens of industry sites throughout Alberta including upstream, midstream and downstream categories. He has conducted or supervised the development of conceptual site models at many contaminated sites to support site investigation, site management strategy and guideline development. Mr. Kartz is specialized in human and ecological risk assessment and risk management along with quantitative hydrogeological analysis including groundwater modelling. Mr. Kartz has also taken both lead and supporting roles in the development of policies/guidelines for regulatory bodies and industry partners.

Lindsey Mooney, P.Biol Risk Assessment Specialist, Millennium EMS Solutions Ltd

Ms. Mooney's academic background in aquatic toxicology and microbiology has provided a base for a variety of science-based consulting projects. Since 2006, she has evaluated contaminated sites using risk assessment, conducted comprehensive site assessments, prepared toxicity and chemical use assessments, completed scientific literature and technical peer reviews, and project managed risk-based remedial work at a variety of sites.

Ms. Mooney's main area of specialty is risk assessment, with a focus on ecological risk assessment. In Alberta, she is fluent with the Tier 2 framework, including guideline calculation. She has worked on a number of federal contaminated sites in a variety of ecosystems, including national parks. Her experience spans all stages of risk assessment, from problem formulation through risk characterization and recommendations. Her risk assessment portfolio includes mines, dry-cleaning facilities, landfills, historical and active spill sites, oil and gas facilities, pipeline releases, wharfs, and industrial sites; encompassing a range of different chemical groups.

Additional questions can be directed to Cory at ckartz@mems.ca or Lindsey at lmooney@mems.ca



Palermo

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Watercourse Crossings, A Collaborative Approach Before it is Too Late

Iain Sharp, BIT, MSc, Restoration Ecologist, Woodlands North Inc.

In 2014, Alberta Environment and Parks released the Roadway Watercourse Crossings Remediation Directive (updated July 2019) to address declining fish populations resulting from poorly installed and maintained crossings. Based on predictive modeling, it is estimated there are over 50,000 fluvial watercourse crossings along green zone resource roads and approximately 30% require remediation to be compliant with the Directive. Considering that each crossing is estimated to cost about \$35,000 on average to remediate, the total cost for compliance could be in excess of \$525 million dollars. This is a massive cost for roadway owners to absorb and to complete restoration with the newly defined timelines of the latest Directive.

Road owners are required to individually inventory and assess their watercourse crossings and identify those that are physical barriers to fish passage or a point source of significant sediment input, both of which isolate or degrade fish habitat. Once identified, these crossings are to be prioritized and restored to increase habitat availability and suitability. Conservation of four salmonid species is the key driver of this Directive: these include: Arctic Grayling (*T. arcticus*), Athabasca Rainbow Trout (*O. mykiss*), Bull Trout (*S. confluentus*), and Westslope Cutthroat Trout (*O. clarki lewisi*), all of which have declining or extirpated populations throughout their native habitat. Thus, to assist in the recovery effort of these species and to manage costs for roadway owners, it is essential to create an industry network that is capable of prioritizing, directing, and coordinating restoration efforts. This newly formed network, the Alberta Watercourse Crossing Collaborative (AWCCC) encourages a collaborative effort amongst practitioners, roadway tenure owners, scientists, regulators, and natural resource operators.

The purpose of the AWCCC is to align roadway owners and aquatic restoration practitioners to work together and incorporate best management practices to develop and implement HUC-8 watershed level restoration plans. By working together and targeting watersheds and crossings where the collective ecological footprint is highest amongst members, the impact on restoring habitat for threatened aquatic species will be maximized, giving these salmonid species the opportunity to recruit lost habitat within these watersheds. Not only will the ecological impact be greater, but logistical and economic efficiencies of collaborative work will be realized by Alberta's municipalities and resource-based industries. Now is the time to implement Best Management Practices with the conservation of the species as the priority.

Additional questions can be directed to Iain at iain@woodlandsnorth.com

Presenter Biography

Iain Sharp, BIT, MSc,

Restoration Ecologist, Woodlands North Inc.

Iain Sharp studied at the University of Alberta in the Center for Earth Observation Sciences laboratory specializing in the use of remote sensing technology to validate satellite imagery, to better characterize the boreal forests of Alberta and the tropical forests of Costa Rica. During this time, Iain spent a 4-month practicum at Ghent University in Belgium studying under Dr. Kim Calders and Dr. Hans Verbeeck learning to use machine learning techniques in combination with LiDAR to identify and extract the different physical characteristics of trees. Combining these techniques with information gathered from multi-spectral drone imagery and ground-based environmental sensors he contributed towards the creation of a Radiative-Transfer model that displayed the interaction of photons with trees in forests. Now, Iain is combining the technical skills from his masters degree along with his knowledge of aquatic systems and fish species learnt from his bachelors of science degree in marine biology from Dalhousie University to tackle the issues of habitat restoration for both salmonid species in Alberta's watersheds and Woodlands Caribou in Alberta's boreal and parkland forests.

Co-Author

Bruce Nielsen, General Manager, RPF, Woodlands North Inc.

Borrow Pit Reclamation: Establishment, Survival, and Growth of Vegetation within Two Topsoil Depths in Northeastern Alberta

Ira Sherr P.Biol., Researcher, InnoTech Alberta

In 2015, InnoTech Alberta was commissioned by MEG Energy Corporation to design, install, and execute a five-year field trial to investigate the development of a reclaimed borrow pit (BP7) on their Christina Lake SAGD project. The focus of the study was to determine whether 15 or 25 cm of topsoil placement was sufficient to promote healthy development of a riparian community that would interface a shallow open water wetland and a larger upland forest area. Several tree and shrub species were planted in 2015, and monitoring occurred in 2015, 2016, 2017, and 2019.

The main study area was divided into three concentric zones to mimic the different soil moisture contexts of riparian areas. Three soil placement treatments were replicated in 12 x 20 m plots that crossed each of the three zones to investigate the impacts of placement soil depth and, indirectly, water table interactions on plant community development. Non-metric, Multi-Dimensional Scaling (nMDS) showed that plant communities clustered by soil treatment and not by zone, implying that zone stratification was less of a determinant in vegetation community development than topsoil placement depth, and suggested that widespread saturation and significant water table fluctuations were responsible for a homogenization of the plant community across zones. In many cases, there were significant differences in performance between vegetation on the 25 cm treatment and the control treatment (no topsoil), but there were no significant differences in performance between the 15 and 25 cm treatments. Evidence showed that 15 cm of topsoil is sufficient to promote high species richness and robust tree growth in terms of height, root collar diameter, and growth node length. The same placement depth also provided sufficient support for the development of good shrub cover and acceptable projected future stem counts and projected survivorship over time. The 25 cm treatment showed significantly higher annual weed cover than the 15 cm treatment – possibly due to a larger quantity of immediately available soil nutrition – however, there was no significant difference in perennial weed cover between the 15 and 25 cm treatments. In addition to ecological outcomes, the BP7 trial also provided insight into the shortcomings of the current Peatland and Upland Forest reclamation criteria to evaluate borrow pit reclamation towards the certification of a riparian zone.

Presenter Biographies

Ira Sherr, P.Biol.

Researcher, InnoTech Alberta

Ira received his M.Sc. in Plant Biology from the University of Alberta in 2012, and has been working in the land reclamation space since 2013. He formerly worked at the CNRL Horizon Oil Sands Mine north of Fort McMurray, AB, leading reclamation revegetation initiatives and developing research projects to close knowledge gaps and enhance reclamation outcomes. He joined InnoTech Alberta in 2019 as a researcher focusing on native plants, where he currently works to improve deployment opportunities for native species and improve reclamation practices across the province.

Co-Authors

Sara Venskaitis, InnoTech Alberta

Marshall McKenzie, InnoTech Alberta

Additional questions can be directed to Ira at ira.sherr@innotechalberta.ca

Underutilized Open Bottom Culvert System for a Fish Friendly Watercourse

Ben Poltorak, RPF, Project Manager - Northern Operations, Earthmaster Environmental Strategies Inc.

Deteriorating and damaged watercourse crossings can have a significant impact on aquatic communities, their habitats, and can present a barrier to fish passage. Earthmaster was asked to evaluate the condition of a watercourse crossing on a small permanent fluvial stream (Walton Creek) located in an area west of Sundre, Alberta. The original crossing consisted of one 1.2 m x 17 m corrugated steel pipe which was likely installed in the late 1970s. An Alberta Energy Regulator inspection of the culvert identified several deficiencies that were a hindrance to fish passage, including a partial collapse of the structure. The outflow end was perched (0.5 m) encouraging erosion to the road subgrade and resulting in an outflow pool, making fish passage impossible. In addition, the culvert was installed at a steep gradient (7%) resulting in a lack of substrate and backwater in the existing culvert structure making fish passage impossible. Immediate action was required to repair the watercourse crossing and restore fish passage.

Earthmaster was retained to develop a remedial action plan and repair the damaged watercourse crossing over Walton Creek. It was determined that the presence of fish as well as fish passage through the watercourse crossing was unlikely in its current state; therefore, Earthmaster recommended using an open bottom modular culvert system to allow for the re-establishment of a natural stream bed to facilitate the return of fish activity. The open bottom culvert system is an innovative tool for restoring natural streambeds as part of watercourse crossings restoration activities. An arched culvert system consisting of a non-metallic viscoelastic material was chosen. This presentation will describe the methods used to replace the watercourse crossing and restore the surrounding area. The open bottom culvert system is an underutilized option for watercourse crossings in Alberta for a variety of reasons that will be discussed. The pros and cons of using a lightweight bottomless modular culvert system will also be discussed and the arched system will be compared to the more traditional round corrugated steel pipe.

Presenter Biography

Ben Poltorak, RPF, Project Manager - Northern Operations, Earthmaster Environmental Strategies Inc.

Ben has been active in environmental consulting and leadership in the delivery of services to the forestry and upstream oil and gas industry coast to coast across Canada since 2007. He has a Bachelor of Science in Forest Management degree from the University of Alberta and a Master of Science in Forest Engineering degree from the University of New Brunswick. Ben has ample experience in forested site reclamation, contaminated soil and groundwater assessment and remediation, spill response, silviculture, engineering research related to soil science, and has been developing a team of aquatic professionals focusing on stream crossing monitoring, mitigation, and installation. Ben has been working in the forested areas of Alberta since 2003 and is the Project Manager for Northern Operations and leads the Earthmaster Edson office. His focus is contaminated site management and remediation (including phytoremediation of northern and remote sites), reclamation of oil and gas or other industrial disturbances, and aquatics.

Co-Authors

Adam Dunn, Vice President – Operations, Earthmaster Environmental Strategies Inc.

Perry Gerwing, President, Earthmaster Environmental Strategies Inc.

Elizabeth W Murray, Senior Scientist, Earthmaster Environmental Strategies Inc.

Additional questions can be directed to Ben at elizabeth.murray@earthmaster.ab.ca

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CLRA Alberta Chapter

A Tool for Managing Invasive Species for Success

Megan Evans, MSc. PBIol, Executive Director, Alberta Invasive Species Council

Good information is the key to successful energy projects. The Alberta Invasive Species Council has an invasive species mapping tool called EDDMapS Alberta (Early Detection & Distribution Mapping System). The EDDMapS Alberta app is free and available for use by all Albertans to report, map and monitor locations of invasive species infestations. The app can be utilized on or offline, contains helpful identification resources, and allows users to bulk upload or download data. Digital monitoring of invasive species infestations allows for timely updates of invasive species lists, informs invasive species management priorities, provides visual assessment of control efficacy upon 'revisit' reports and can inform early detection and rapid response efforts. Find out how EDDMapS Alberta can assist with planning, reclamation, stakeholder communication and adapting to climate change.

Presenter Biography

Megan Evans, MSc. PBIol.

Executive Director, Alberta Invasive Species Council

Megan first started her invasive species career working with the provincial Forest Health program. While there Megan oversaw a regional invasive plant management program, implemented education and outreach initiative and was responsible for survey and control of forest insects and disease. She then worked as an Ecologist with Alberta Parks where she established a holistic in-house invasive plant management program, which included native seed harvesting, restoration work and an integrated approach to invasive plant management. Throughout this time, she participated as a board member for the Alberta Invasive Species Council and the Entomological Society of Alberta.

Megan is currently the Executive Director for the Alberta Invasive Species Council and the President of the Alberta Native Bee Council.

Additional questions can be directed to Megan at execdirector@abinvasives.ca

Using Autonomous Technology to Improve Worker and Environmental Safety in the Reclamation Industry

Wade McLean, CEO, Strongfield Environmental Solutions &
Cory Southam, Operations Manager, Strongfield Environmental Solutions

Every year companies are forced to send out employees with backpack sprayers and broadcast bag seeders to treat areas unreachable by vehicle. These areas tend to be difficult to access, wet, heavily vegetated, steeply sloping or just too rough in general. Proceeding on foot exposes these workers to the dangerous task of navigating this terrain and a heightened risk of injuring themselves in the process. Is there a way we could limit the number of occasions that require employees to trek in on foot to sites like these? Could we send a drone in place of a worker with handheld equipment to do these jobs?

Around the world, countries are implementing regulations to permit drone spraying, and in turn, reducing the number of instances handheld equipment is unnecessarily packed in and out of these locations. Imagine being able to send one drone up the length of a topsoil pile to control weeds, or over muskeg to a lease site that needs to be sprayed, or broadcast seeding a cover crop on a site where that is too wet or steep to run equipment or even walk on. By using drone technology, we could drastically reduce the potential risk of injury to these employees being sent in on foot.

Current Canadian regulations allow the use of drones for broadcast seeding, however, Health Canada/ PMRA does not recognize drones as an aerial application platform; as such, pesticide application by drone is not permitted in Canada - except by a PMRA-approved research authorization. With this being the case, we saw the need for an official working group. Strongfield Environmental Solutions now leads the Remotely Piloted Aerial Application Systems (RPAAS) Working Group with over 30 members from Health Canada, Transport Canada, 6 major chemical companies, agricultural research scientists, forestry, industry and provincial government representatives. The goal of this working group is to address the issues surrounding environmental risk, worker exposure and value/efficacy that are standing in the way of adding RPAAS as an accepted aerial application platform.

Drone seeding and spraying not only lowers risk of injury, but also increases overall operational efficiency. Being able to cover 5-10 acres per hour with a single machine means a 1-2 person crew could do the job it currently takes a team of workers to complete in significantly less time, allowing vegetation management budgets to be used much more effectively than current methods allow.

Presenter Biographies

Wade McLean

CEO, Strongfield Environmental Solutions

Wade is the President and CEO of Strongfield Environmental Solutions Inc. which he founded in 2006. Originally from Strongfield, Saskatchewan Wade attended the University of Saskatchewan graduating with a Bachelor of Science in Agriculture in 2003. Wade has been working in the Environmental Industry since 2006 focusing on developing the most innovative and advanced integrated pest management and reclamation plans for clients across Western Canada. With a continuous effort to adopt and introduce new technologies into the Environmental Industry, Strongfield Environmental Solutions partnered with both Croplands and TTA in 2019. These partnerships further increase the ability to provide the most comprehensive and state of the art IPM and reclamation plans by incorporating the latest autonomous technologies. Introducing UAV Inspections, Precision Spot Spraying, Drone Seeding and Chlorophyll-Sensing targeted spraying will further advance IPM programs throughout the Environmental Sector.

Cory Southam

Operations Manager, Strongfield Environmental Solutions

Cory is originally from Strongfield, Saskatchewan and has a Bachelor of Science in Earth Sciences from Simon Fraser University. Graduating in 2014, he found his way into the reclamation industry with Strongfield Environmental Solutions, where he has been for 5 years and is now the Operations Manager. Always looking for innovative ways to improve operations, Cory has been busy over the past year and a half helping to build Strongfield Environmental's drone program and sits as the moderator in their newly formed Remotely Piloted Aerial Application Systems (RPAAS) Working Group. This group is made up of over 30 individuals from Health Canada, Transport Canada, the United States Department of Agriculture, 6 major chemical companies and several industry representatives. Working with Health Canada and Transport Canada, Cory's main goal for the group is to find the proper set of regulations to satisfy Health Canada's concerns around including RPAAS platforms as a recognized aerial application method for Canada's vegetation management industry.

Additional questions can be directed to Wade at wmclean@strongfieldeviro.com or Cory at cory@strongfieldeviro.com

Integrated Weed Management: Overcoming Challenges in Forested and Grazing Systems Using a Holistic Approach

Shellie English, ACTTBC CTech, A.Ag, Senior Reclamation Technical Advisor & LRM Instructor, Matrix Environmental Solutions and Northern Lights College &
Sandra Burton, M.Sc., P.Ag. Independent Consultant

Integrated Weed Management is an important aspect of energy development projects of all types so that producers can continue to develop systems while minimizing the overall environmental, economic and social impacts of projects... Various challenges exist for revegetation after construction of all energy developments and within every type of land use and Integrated Weed Management strategies provide a proactive set of tools for a practitioner to implement. The Integration Weed Management triangle of strategies will be described including: Prevention Practices; Cultural/Management Practices; Mechanical Practices; Biological Practices and Chemical/ Herbicide Applications. However, the focus of the presentation will be the implementation of Prevention (i.e. equipment cleaning, site drainage options) and Cultural (i.e. specific soil preparation and seeding rates) tools to use within Forested and Grazing systems. Incorporating Traditional Ecological Knowledge and the use of native plants and revegetation options while working with Organic producers will also be discussed. The presentation will provide tools to consider and implement in order to realistically meet these diverse reclamation goals in an increasingly diverse and complex environment.

In closing the presenters will provide resources for further guidance in both Alberta and British Columbia jurisdictions and a discussion of project learnings to be shared.

Presenter Biographies

**Shellie English, ACTTBC CTech, A.Ag,
Senior Reclamation Technical Advisor & LRM
Instructor, Matrix Environmental Solutions & Northern
Lights College**

Shellie brings over 20 years of experience working as a Land Resource Management and Reclamation practitioner in Northern BC and Alberta as a field consultant, environmental business owner and currently as a College instructor. She has also gained important perspective with an upbringing in her farming and oilfield construction family for industry challenges, including integrated weed management, to achieve project goals and closure on sites. Shellie is a Land Resource Management graduate of Old's and in the process of finishing her master's degree in environmental management which includes a thesis on overcoming the challenges of boreal forest reclamation with native plants. She is a Senior Technical Advisor with Matrix Environmental Solutions and the Key Program Instructor for the Land and Water Resource Department within the Northern Lights College in Fort St. John, BC. Shellie has belonged to the Applied Science Technologist and Technicians for 18 years, and, is recognized as a BC Qualified Reclamation Specialist.

**Sandra Burton, M.Sc., P.Ag.,
Independent Consultant**

Sandra has worked for the last 33 years in the BC and Alberta Peace River area as a consulting Agrologist, mainly with applied agriculture research associations including the Peace River Forage Association. She completed her Bachelor of Science in Agriculture from the University of Saskatchewan in Saskatoon in 1978 and her Master of Science in Soil Science at the University of British Columbia in Vancouver in 1987. Sandra also brings with her 7 years as a soil landscape mapper in Saskatchewan, Alberta and Nepal and experience with her own small farming operation.

Additional questions can be directed to Shellie at senglish@matrix-solutions.com



**CONCURRENT
SESSIONS:
13:30 – 14:30**

Monaco

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Energy Production & Environmental Protection - Finding a Balance

Paul Leveille, MSc. & E.I.T. TerraShift Engineering Ltd. &
Janeen Ogloza, MSc. & E.I.T. TerraShift Engineering Ltd.

It is a consensus that sustainable management and development of natural resources and the environment is one of the top challenges facing us today. In 2016, seventeen (17) sustainable development goals for 2030 were outlined by the United Nations, nine (9) can be tied to natural resources and the environment. If these goals are met, they will have lasting and positive impacts to our environment and community, however, these goals cannot be achieved without industry support. These goals reflect how important the world's land and resource management over the next decade will be.

Our demand for energy and energy related products continues to increase, but so has our awareness of how these needs impact the environment and our sustainability. Using modern GIS and data analytic tools we can monitor Alberta's industries, and have visualized the spatial and temporal effects new legislations and policies have on industry. In an effort to protect the environment, the government has created and implemented a variety of no-development zones and restrictions which has pushed companies into remote undisturbed areas or a reliance on alternative technologies. Often these areas are further from the end users or the technologies are less efficient, increasing the product cost, carbon footprint, and environmental risks.

In the last couple of years, changes in federal, provincial, and municipal directives have resulted in undervalued natural resources, reduced opportunities for sustainable development, and increased administrative burdens within the government. Often these directives have been developed solely with a reactionary mindset to protect the environment and without proper industry consultation. These observations support the idea that effective policies require the acknowledgment of both the needs of the environment and industry, and an understanding of the effects the policies have on industry conduct. By balancing the values of the industry and the environment, we can maximize the value of our natural resources while meeting our responsibilities for ethical energy production and environmental sustainability.

Presenter Biographies

Paul Leveille, MSc. & E.I.T.

TerraShift Engineering Ltd.

Paul is a graduate from the University of Alberta with a Master of Science in Mining Engineering focusing on environmental geotechnics. He has a wide range of mining knowledge and experience working at strip mines in southern Saskatchewan, an open pit mine in British Columbia, and diamond mines in the Northwest Territories. Paul has experience developing aggregate sites around Alberta and aiding existing sites with regulatory compliance and reclamation. Paul is skilled in GIS, drafting, mine planning, landform design, reclamation planning, surveying, material testing, programming, and web development.

Janeen Ogloza, MSc. & E.I.T.

TerraShift Engineering Ltd

Janeen is a graduate from the University of Alberta with a Master of Science in Mining Engineering focusing on tailings reclamation and environmental geotechnics. She has a wide range of mining knowledge and experience gathered working at coal mines in western Alberta, diamond mines in the Northwest Territories, and oil sands operations in northern Alberta. Janeen has been working in the sand and gravel industry developing aggregate sites around Alberta and aiding existing sites with regulatory compliance and reclamation. Janeen is a member of the Alberta Sand and Gravel's Land and Environment Committee, as well as an active volunteer with APEGA.

Additional questions can be directed to Paul at paul.levaille@terrashift.ca or Janeen at janeen.ogloza@terrashift.ca

Research Collaboration Advances Best Practice and Ecological Outcomes for In Situ Oil Sands

Terry Osko, Ph.D, P.Ag., Principal, Circle T Consulting Inc.

The industrial Footprint Reduction Options Group (iFROG) is a collaboration among ten in situ oil sands operators. The group evolved initially from three energy companies and one forest company in 2003 to address poor reclamation outcomes on wellsites in boreal forests. The collaboration has included as many as eleven companies, has generated spinoff programs, and has supported publication of several academic papers. Present focus is on boreal wetlands. The group has identified three guiding principles by which it selects research projects to develop, implement, or fund: Land Stewardship, Research Intelligently, and Collaboration. The result is a portfolio of projects that balances ecological best practice advancement with meeting AEPEA approval conditions. Past and ongoing studies are described, featuring a road construction project that minimizes interruption of water flow within the fens that it intersects. Roads constructed in peatlands are often problematic because soft peat soils are poor foundations for roads, leading to performance issues. Moreover, roads in peatlands commonly impede water flow, resulting in ecological and hydrological impacts far beyond the location of the road. The study road is approximately 1.5 km long, intersecting three areas of deep fen peat. Corduroy topped with mineral fill was used as the road foundation (as opposed to mineral fill only) over the fen sections, within which drainage structures were placed at short spacing. Structures included seventeen culverts, four log and three HDPE pipe bundles. Culverts rested on saddles set to a pre-embedded elevation within a countersink trench targeting proper embedment for post-construction settlement of the road. HDPE and log bundles were placed between culverts directly among the corduroy logs. The road has been monitored for two years to assess culvert deflection, excessive road settlement, and erosion and sedimentation. Five transects consisting of three wells on each side of the road (thirty wells total) were installed to measure the water table on each side of the road as an indicator of hydrologic flow impediment. Flow appears not to be impeded overall, but there are indications of flow impediment on certain sections of the road. Further study will determine the efficacy of the various drainage structures and whether the road is causing upwelling of subsurface flows that are compensated for by surface drainage.

Presenter Biography

**Terry Osko, Ph.D, P.Ag.,
Principal, Circle T Consulting, Inc.**

Terry has diverse academic training and a wide range of professional experience in renewable resource management. He has operated Circle T Consulting for 25 years, serving clients in energy, forestry, and agriculture. Much work has focused on evaluating oil sands construction and reclamation practices for regulatory compliance and practice improvement. Terry's efforts have contributed to a number of applied research studies and several best practice documents for boreal forests and wetlands. Terry is motivated by resource stewardship and innovation fostered by critical thinking and the leveraged expertise of collaborators to assist clients in research and development of practices aimed at reducing the size, intensity, and duration of project footprints. Biophysical data collection, synthesis, and analysis, round out the range of services Terry provides clients to enable informed decisions. Other interests include regenerative agriculture, which Terry endeavours to apply to his own farm operation and hopes to soon integrate into his consulting practice. Biophysical data collection, synthesis, and analysis, round out the range of services Terry provides to clients to enable informed decisions. Other interests include regenerative agriculture, which Terry endeavours to apply to his own farm operation and hopes to soon to integrate into his consulting practice as well.

Additional questions can be directed to Terry at terryosko@circletconsulting.ca



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Impacted Soil as a Resource - A Different Way of Thinking

Ian Mitchell P.Biol., P.Eng., VP Client & Business Services, Millennium EMS Solutions Ltd. & Tony Ciarla, Executive Vice President, Millennium EMS Solutions Ltd.

Large quantities of contaminated soil are handled in Alberta every year; some of this soil may exceed Tier 1 guidelines for a sensitive land use but meet Tier 1 or Tier 2 guidelines for other uses. Current practice is to treat this soil as a waste, which is defined under the Alberta Environmental Protection and Enhancement Act as materials intended to be disposed of. Treating it as waste results in the soil being treated or disposed of. Outside of the contaminated sites realm, materials that can be used beneficially are treated as recyclables (defined as materials for which there is a use and which would otherwise be a waste) instead. Applying the same logic to lightly impacted soils leads to an opportunity to reduce the amount of soil disposed of at landfills as well as the disruption of virgin land to obtain clean fill.

There is a long history in other parts of the world of treating soil as a valuable resource; some countries even import soil to meet their needs. There is also growing interest in using soil wisely in Alberta, and an opportunity to change how we think about lightly impacted soil. Several recent projects have involved soil exceeding Tier 1 guidelines being successfully re-used at less sensitive locations where it meets Tier 1 or Tier 2 guidelines. This soil re-use has led to both substantial cost savings and better environmental outcomes than landfill disposal of the soil.

Presenter Biographies

Ian Mitchell P.Biol., P.Eng.,

VP Client & Business Services, Millennium EMS Solutions Ltd

Ian Mitchell has degrees in ecology, environmental engineering and toxicology, and over 20 years of experience with a focus on human health and environmental risk assessment. He has contributed to risk-based guidance documents and guidelines for federal and provincial regulatory agencies, including Alberta Tier 1 and Tier 2 guidelines. He regularly leads training sessions for industry and regulators on Tier 2 and risk-based approaches. Ian is currently responsible for enhancing Millennium's technical capabilities.

Ian has also taught risk assessment courses at SAIT and University of Victoria. In his spare time he is actively involved with Scouts Canada.

Tony Ciarla, Executive Vice President,

Millennium EMS Solutions Ltd.

Tony Ciarla is an Executive Vice President at Millennium EMS Solutions and has over 20 years of experience in the environmental industry. With a background in Environmental Chemistry and a graduate from Mount Royal University, he has extensive experience in analytical chemistry, waste management, decommissioning/demolition, and earthworks. His experience with contaminated site remediation includes development and implementation of soil management plans to allow for beneficial re-use of impacted soil from urban brownfield sites. He has a passion for collaboration and promoting team structure to solve complex challenges, with proven success for decommissioning and remediation projects across Canada.

Tony is the President of the Chemical Institute of Canada's Chemical Technology constituent, a former board member for the not-for-profit Unlocking Potential Foundation, and volunteer coach for soccer. He and his wife, Hailey, have 2 daughters that are active in soccer and equestrian activities and keep them constantly entertained.

Additional questions can be directed to Ian at imitchell@mems.ca or Tony at tciarla@mems.ca

An Integration of Science and Indigenous Knowledge to Reconstruct Natural Environmental Background

Lisa Neville, Director of Science, AGAT Laboratories & Michelle Cotton, President, Solstice Canada

Climate warming and natural climate cyclicity is starting to create a problem when defining the end-points of a reclamation project. The problem hinges around the fact that meeting “background” has become difficult to achieve as climate continues to warm.

The regulatory concept of Equivalent Land Capability is complicated by natural climatic shifts. Consider a project that is initiated in year one of a fifty-year cycle and decommissioned in year twenty-five. The ecological condition in year one may not be realistically achieved in year twenty-five, due to natural shifts in conditions which may be independent of a project’s impacts on the local ecology. Paleolimnological reconstructions of past climatic conditions provide a robust understanding of past natural environmental response to previous climate conditions. Paleoclimate records record environmental conditions through temperatures both warmer and cooler than those recorded using the instrumental record. Understating how the environment responded the last time conditions were warmer than today allows for more meaningful predictions of how parameters such as vegetation will respond as the climate warms. Similarly, indigenous knowledge archives information on past environmental conditions when temperatures were outside the norms of today.

The Story of the Land is a collaborative project with the Lubicon Lake Band and several organizations representing scientific knowledge (including Solstice Environmental Management, Enviro-Verse Ltd, AGAT Laboratories, and Brock University), that is combining indigenous knowledge and science to define background in with respect to our current and future climate conditions. By combining these results with the indigenous story of the land, a collaborative understanding of the present land conditions, and expected changes into the future, can be used by all parties to agree to reclamation end points that are fair, reasonable, and representative of a specific location.

Results gathered through scientific methods can be used to complement the indigenous narrative of past conditions recorded in the oral history of Indigenous peoples. Through this combination of methodologies, the effects of events that were captured in the oral history can be translated to the kind of measurement regulatory systems use to evaluate concepts like Equivalent Land Capability.

We are excited to share the 2019 results of the Story of the Land project to demonstrate this groundbreaking collaboration gathering data to verify the applicability of this technique on the Lubicon Lake Band’s traditional territory. This talk will present some of the preliminary trends and learnings.

Presenter Biographies

Lisa Neville, Director of Science, AGAT Laboratories

Dr. Neville is a micropaleolimnologist with a diverse academic background and is currently AGAT Laboratories’ Director of Technical Sciences. Dr. Neville has worked as an invasive species researcher for Fisheries and Oceans Canada and, most recently, as a Senior Environmental Consultant at Enviro-Verse Ltd. While in this role, she traveled to China as a member of the Alberta Trade Missions and established environmental business opportunities with Chinese companies. Her academic background consists of a B.Sc. Honours in Earth Science and Biology and M.Sc. in Earth Science from Brock University and her Ph.D. in Earth Science from Carleton University. As part of her postgraduate research, Dr. Neville used microfossils to characterize ecologic changes related to anthropogenic impact and natural climate change. She has also held the position of NSERC Postdoctoral Fellow at the Geological Survey of Canada, characterizing oil and gas potential in arctic formations. Dr. Neville has authored and co-authored over 25 scientific papers in the fields of micropaleontology, biostratigraphy, limnology, tailings pond benthic ecology, natural climate change, and offshore exploration. Dr. Neville is currently an Adjunct Professor at Brock University and the Chair of the Board of Directors for Geology at Mount Royal University.

Michelle Cotton, President, Solstice Canada

Michelle Cotton is the President and Senior Technical Advisor with Solstice Canada Corp. She has 30 years’ experience as an environmental consultant. The first half of her career Michelle focused primarily on assessment, remediation and reclamation activities for upstream oil & gas activities. Based on some important learnings from working in remediation and reclamation activities, Michelle has put a huge emphasis during the last 15 years of her career on baseline assessments, conservation and reclamation planning, and liability assessments in order to help her clients plan better developments and reduce their future liabilities. Her experience with full life cycle oil and gas environmental activities allows her to support her clients to develop and to operate in an environmentally sustainable way. Michelle’s professional development over the past 5 years has largely focused on understanding the relationship of indigenous people to responsible resource development.

Co-Authors

D. Ghostkeeper, Lubicon Lake Band

D. Glaude, Lubicon Lake Band

J. Auger, Lubicon Lake Band

M. Foster, Solstice Canada

Additional questions can be directed to Lisa at neville@agatlabs.com or Michelle at mcotton@solsticecanada.com



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Rethinking the RFP Process & KT Analysis - Beyond the Environmental Services Rate Sheet

Todd Martin, MA, RTAg, Senior Environmental Specialist, Ovintiv Services Inc

Consultants put in a tremendous amount of work preparing a bid submission in response to requests for proposal (RFP) invitations for environmental services. Bids can be for site-specific projects or for general (on demand) environmental services (Phase 1, Phase 2, Risk Assessment, DSA, Reclamation Certificate Applications, etc.).

As a client of environmental service providers, we have reworked our RFP process for general (on demand) environmental services to minimize the amount of work required to submit a bid, give a fair evaluation of bidding companies, provide us with the information we require to select qualified companies, AND to satisfy corporate supply management requirements for service orders.

Experience dictates that lowest rates are not always the best value. However, that is not how some (if not most) RFP decisions are made.

True cost (what is invoiced) is driven by numerous factors not typically evaluated or quantified during the RFP process. These include team depth and breadth, scope creep, project management, quality of field work and associated reporting, regulatory interpretation, safety, and billing.

Rather than bidding on hypothetical projects, our bid package requests include proforma invoices for examples of actual work conducted. The evaluation has 3 main parameters - COST, SCOPE (pm, field, report), and FRONT END EXECUTION (TRIF, location, past performance).

The final decision to award looks beyond the rate sheet by quantifying the assessment parameters above, separating the evaluation “problem” from the “decision” by means of a weighted KT analysis, and a round table ‘what if’ discussion to make the final selection.

Presenter Biography

**Todd Martin, MA, RTAg,
Senior Environmental Specialist – Construction,
Acquisition, Reclamation, Ovintiv Services Inc.**

Todd Martin is a Senior Environmental Specialist with Ovintiv's environmental compliance team. His environmental role is split between office and field support for contractor management, supply management, surface land, environmental concern response, procedure development, construction, and reclamation..

Additional questions can be directed to Todd at Todd.Martin@ovintiv.com

Pilot Turnkey - Lump Sum Asset Closure Project

Brandon Spiller P.Geol, General Manager, Environment, Vertex Professional Services & Dave Marks P.Ag., Manager, Projects, Orphan Well Association

The recent collapse of global oil and gas prices has led to the exponential growth of inventory under the purview of the Alberta Orphan Well Association (OWA). This sizable inventory needs to be managed as efficiently and effectively as possible, and represents a significant challenge to the board and leadership of the OWA. In response to this increased workload, the OWA is examining how work is executed to ensure the best and most efficient approaches are adopted and continuously improved. This project tested the philosophy of a “hands-off” approach to determine benefit through a turnkey approach to asset retirement. A turnkey approach may reduce OWA obligations, and provide benefits through a cohesive and coordinated field execution program. However, cost recovery strategies vary widely and risk-averse contingencies create challenges to this approach.

In late 2018 Vertex Professional Services (Vertex) was selected by the OWA to execute the abandonment, decommissioning, remediation and reclamation of 46 wells, 3 satellites, 1 small former oil battery and 56 pipeline segments near Carseland, Alberta.

Through the execution of this program, there have been many lessons learned for both the OWA and Vertex that can be applied to future programs completed in Western Canada.

Presenter Biographies

Brandon Spiller P.Geol, General Manager, Environment, Vertex Professional Services

Brandon is a Professional Hydrogeologist with 10 years of experience in Environmental Consulting throughout Canada. The majority of his work has been related to the groundwater monitoring and the assessment, remediation and reclamation of contaminated sites. In the past several years he has become involved in multiple area based closure programs including abandonment, decommissioning and reclamation.

Dave Marks P.Ag., Manager, Projects Orphan Well Association

Dave Marks has over 30 years of experience dealing with environmental and regulatory issues in the upstream oil and gas industry. He is currently Manager of Projects with the Orphan Well Association (OWA) and is a former board member with the Association. Dave spent 20 years with a large E&P company, most recently as Manager of Environment and Regulatory. Prior to this he initiated his career consulting with Wotherspoon Environmental Inc.. Dave is a Professional Agrologist (P.Ag.) with the Alberta Institute of Agrologists and an Environmental Professional - Certified Environmental Auditor EP(CEA) with Eco Canada. He holds a B.Sc. in Resource Conservation from the University of Montana.

Additional questions can be directed to Brandon at bspiller@vertex.ca or Dave at dave.marks@orphanwell.ca



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CLRA Alberta Chapter

TMI: Too Much Information

Vincent Lam, Founder and CTO, Matidor Technologies &
Liesl Hanlan C.E.t, Founder and President, THINK Envirotechnical Services

In the last ten years especially, one recurring theme has dominated conversations relating to efficiency in our industry. That issue is information, too much information: Correspondence, contracts, reports, field data, photos, budget, expenses, lab data, and the list goes on. Some companies are good at dealing with data, but most aren't. Spreadsheets and paper-based systems are still in use, and their lack of practicality cannot be overstated. Meanwhile outdated and hard-to-use legacy software does not offer much help: they're complex, siloed, often impractical and brittle and therefore unloved by the people who need them most. This leads to problems such as lost, incomplete or erroneous data, team member frustrations, duplication of effort and poor time management. Sure, there's plenty of data, but knowledge often goes lacking because of software usability or accessibility issues.

Some clients want daily updates, some want weekly, some monthly. We would email reports, or copy and paste information into their systems, or sometimes send a copy of our tracking sheet. In the past I would have to ask, 'Hey, can you email me this information so I can pass it along to the client?'" - Liesl Hanlan, THINK Envirotechnical Services

Things are changing. Best practices are evolving. Technology now exists to give project stakeholders the transparency and information they deserve, and the right software tools can make that happen. Alberta Energy Regulator's latest OneStop initiative is meant to drive efficiency through collaboration; but how practical will it be without the proper support of software technology?

Vincent Lam, the founder of Matidor Technologies, and Liesl Hanlan, the founder of THINK Envirotechnical Services, will be demonstrating how a well-designed collaborative platform can transform the industry through better visualization, collaboration, and data management.

Presenter Biography

Vincent Lam, Founder and CTO, Matidor Technologies

Vincent is a visionary and serial entrepreneur with a passion for bringing the latest information and communication technologies into conventional industries. He built and sold his first Point-of-Sale system during his university years, and later joined Google to lead projects with the Google Earth team. Vincent has over 20 years of experience in commercializing world-class software, and has been working closely with clients in the O&G, environmental and property development space to innovate using the latest technologies. Since 2011, Vincent has a built number of software involving mapping, augmented reality and artificial intelligence use cases, including his latest, Matidor.com, designed to solve data sharing and collaboration in field service industries. Vincent holds an MBA from the University of Ottawa and a BAsC in Computer Engineering from UBC.

Liesl Hanlan C.E.t, Founder and President, THINK Envirotechnical Services

Liesl is the founder of THINK Envirotechnical Services, a Calgary-based company that provides specialized drafting and GIS services, borehole log entry and analytical data tabulation to environmental consultants across Canada.

Liesl graduated from NAIT's Engineering Design & Drafting Technology program in 1992 and immediately began her career as an engineering technologist for a multi-disciplinary consulting company. She taught AutoCAD at NAIT for a semester and has enjoyed being a mentor for young people throughout her career. She has been involved with the management of drafting programs and data management for 28 years, and for the past 16 years has focused primarily on the environmental industry.

Her focus and interest have always been in streamlining processes and maximizing efficiency, whether in the drafting departments she managed or dealing with large volumes of data produced during the life of a project. She feels fortunate to not only have worked during a time when drawings were inked on vellum and mylar, and reports were stamped by hand, but to be involved with the high tech software and processes that are used in the industry today. She feels that this gives her a well-rounded understanding of data, its limitations, and its possibilities.

Additional questions can be directed to Vincent at vincent@matidor.com or Liesl at liesl@thinkenv.ca

Utilizing Remote Sensing and Statistical Analysis for Efficient and Transparent Reclamation Monitoring

Ryan Tulloch, A.Sc.T, EP, President, ProDelta Projects Inc.

Working within a budget is never easy – maximizing what you can do within a reclamation budget, given any number of potential activities and sites to manage, adds another level of complexity. By harnessing digital technologies including a specially designed 3D modelling platform, ProDelta is able to help clients make decisions that will maximize the amount of work done within a budget, as well as the number of sites that reach closure status, thus reducing their liability.

With the major challenges of amount of surface reclamation to monitor, ProDelta utilizes remote sensing with both manned and unmanned aircraft. Monitoring sites at a pixel level, and utilizing statistical analysis, remote sensing technology can generate a transparent data set for all stakeholders.

ProDelta's utilizes cloud processing and advance analytics run through business intelligence to bring a different level in-site to client's projects. From reclamation monitoring in remote forested areas, to statistical analysis in landowner projects, remote sensing is a tool of the future and will help clients optimize their resources.

Feel free to learn how remote sensing can determine your vegetation health, vegetation height, surface drainage and other analytics that aid in site reclamation activities.

Presenter Biography

**Ryan Tulloch, A.Sc.T, EP, President,
ProDelta Projects Inc**

Ryan is an Environmental Professional and Applied Science Technologist. Over the last 19 years, he has worked as a consultant, an owner representative and started his own company in 2015. With a passion for technology and an understanding of different sides of the industry, he founded ProDelta to provide cost-effective environmental site management while integrating cutting edge technologies to provide better information, and to develop and execute on unique solutions.

Additional questions can be directed to Ryan at ryan.tulloch@prodelta.ca



**CONCURRENT
SESSIONS:
15:00 – 16:30**

Monaco

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Recovery Evaluation of Harvested Donor Moss Sites for In-Situ Peatland Restoration: Ecological & Provincial Criteria Perspectives

Melanie Bird, Research Technician - Peatland Restoration, NAIT Centre for Boreal Research

Alberta has some of the most stringent guidelines in the country for reclaiming peatland ecosystems disturbed by in-situ oil & gas extraction. This is driving the advancement of scientifically backed, innovative restoration approaches. With the release of "Peatland Reclamation Criteria for Wellsites and Associated Facilities" in 2017, it is important to ensure that these reclamation strategies not only return ecological function, but also meet regulatory guidelines to obtain reclamation certification. This presentation uses both perspectives to examine the recovery of harvested donor peatland moss communities used as a promising revegetation strategy to reclaim in-situ well pads in boreal peatland settings.

The Moss Layer Transfer Technique (MLTT) utilizes harvested donor moss containing root fragments and diaspores to reintroduce peatland community structure and composition to reclaimed peat surfaces. However, the ecological impact on the donor areas as well as any potential regulatory implications stemming from their use for reclaiming well pads has yet to be assessed. While it is unclear at this time whether these areas would need to be included in a site assessment to receive certification, we proactively assessed their recovery from both an ecological and the provincial reclamation criteria perspective.

Donor sites 4 - 7 years old, harvested for well pad reclamation trials from pre-existing cutlines were surveyed in Peace River, Alberta during August, 2019. We compared harvested donor site recovery to that of non-harvested cutline control areas, as well as adjacent undisturbed peatland areas. We measured moss, herb and woody species percent cover and collected pore water samples for EC and pH. Donor sites and the non-harvested cutline controls were also evaluated using the Peatland Criteria and assigned a pass or fail based on the parameter point system. In this presentation we will discuss our findings and the implications for using the MLTT as a revegetation strategy for in-situ peatland reclamation.

Presenter Biography

Melanie Bird, Research Technician - Peatland Restoration, NAIT Centre for Boreal Research

Melanie joined the NAIT Centre for Boreal Research in the Peatland Restoration program as a research technician in 2014. She manages daily operations ranging from overseeing civil earthwork and revegetation field trials, experimental setup, greenhouse experiments, data collection and summer field operations. She is a wetland ecologist who has been involved in peatland research since 2012.

Co-Author

Dr. Bin Xu, NSERC Industrial Research Chair – Peatland Restoration

Additional questions can be directed to Melanie at mbird@nait.ca

Reforestation in a Stressful and Uncertain Climate

Jeff Renton, FIT, Reclamation Coordinator, Tree Time Services Inc

Though there is often variation in weather seasonally or annually, it typically falls within a range that native vegetation is adapted. For instance, trees will set their buds prior to when fall frosts typically occur. If the timing of frost changes, unset buds will be vulnerable. This predictability allows plants to establish and thrive in an area.

With a changing and less predictable climate, weather events can fall outside of the well-established range of severity and timing. Plant health and survival, particularly of younger plants, are increasingly becoming stressed as a result and this will only increase into the future.

Reclamation sites are already stressful sites for seed and seedlings to establish. To cope with the current and future uncertainty and variability of weather, restoration specialists can employ several strategies and techniques.

This presentation will provide a broad overview of the challenges posed by current and future conditions as well as how to mitigate for them in restoration planning. Strategies discussed will include species selection, seedlot genetics, site preparation techniques and timing of key project activities.

Presenter Biographies

**Jeff Renton, FIT, Reclamation Coordinator,
Tree Time Services Inc**

Jeff is a Reclamation Coordinator with Tree Time Services, responsible for planning and implementation of reclamation tree planting projects across Alberta. He is also responsible for company wide business development as well as seed collection and sourcing for reclamation seedling production.

Jeff Renton holds an M.Sc. in Biological Sciences from the University of Manitoba (2010) and has several years of environmental/forestry surveying and restoration experience from several consulting companies and NGO's. Through managing two separate non-profits in the Prairies he specialized in public extension in forested and agricultural land management primarily in private lands.

Jeff has been an active member of the Canadian Institute of Forestry for over a decade, and primarily focused on planning and implementing forestry based professional development events regionally and nationally.

Additional questions can be directed to Jeff at jeff@treetime.ca

Initiation of Fen Communities on Remnant Mineral Substrate of In-Situ Oil and Gas Features: A Meta-Analysis of Field Trials

Rebekah Ingram, GIT, Research Associate - Peatland Restoration, NAIT Centre for Boreal Research

Construction of in-situ infrastructures (i.e. well pads and roads) in boreal peatlands requires the addition of mineral fill and geotextile to provide all season access and long-term support for equipment. Vegetation is either cleared or flattened before a geotextile is placed to prevent mixing of mineral soil with buried peat. These mineral features have long lasting impacts on a wide range of microclimatic, biogeochemical and ecohydrological parameters which can alter the ecosystem functions of natural peatlands. Reclamation techniques for mineral features range from complete removal of the mineral fill to partial removal to left as is. High costs associated with moving mineral material is often a key factor in selecting the reclamation approach which is used.

In this presentation, we will provide an overview of the development of peat-accumulating vegetation on several reclaimed mineral features in peatland settings. A total of eight study sites ranging in age from three to 12 years post-reclamation were investigated. Two sites were reclaimed by the complete removal of mineral fill followed by donor moss transfer. Six sites were reclaimed by removing a portion of the mineral fill to lower ground surface elevation, followed by either moss donor transfer, planting or natural ingress. Percent cover of all vegetation types present was measured across each reclaimed site; soil moisture, porewater electrical conductivity and pH, and water level measurements were also taken. Vegetation composition, richness and abundance were compared among all sites. We found that wet mineral substrate is capable of supporting the development of fen vegetation (sedges and true mosses) over time. Moss donor transfer is critical to accelerate vegetation recovery compared to natural ingress alone, particularly when the surrounding areas are dry bogs/poor fens. Hydrological connectivity with the surrounding area and overall substrate moisture conditions are also influential to the growth of fen vegetation. Different responses between fen mosses and Sphagnum mosses were observed. Sphagnum mosses developed best when all mineral fill was removed and a saturated peat surface was available to receive moss donor transfer. In addition to studying vegetation development, tissue samples of major plant groups were collected and decomposition bags deployed in 2019. Over the next two years, we will study primary productivity, decomposition and peat accumulation potential at each of the reclaimed sites. Results from this study will be used to further refine peatland reclamation strategies to facilitate in-situ infrastructure removal by the oil and gas industry in the future.

Presenter Biography

Rebekah Ingram GIT, Research Associate - Peatland Restoration, NAIT Centre for Boreal Research

Rebekah is a Research Associate in the Peatland Restoration research program at the NAIT Centre for Boreal Research. Rebekah received a MSc in Earth and Environmental Sciences from McMaster University, wherein she researched the recovery of soil carbon in ombrotrophic bogs following wildfire. Following two years of work as an Environmental Geoscientist in the environmental consulting industry, Rebekah joined the Centre for Boreal Research where she is involved in evaluating the success of peatland restoration trials through assessment of vegetation communities, peat accumulation, and carbon fluxes; as well as developing assessment tools which are accessible and cost effective for practitioners.

Co-Author

Dr. Bin Xu - NSERC Industrial Research Chair – Peatland Restoration

Additional questions can be directed to Rebekah at rebekahi@nait.ca



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Remediation of Chloroform by Chemical Reduction Using Zero Valent Iron in Anaerobic Bottles

Alison Murata, PhD., University of Alberta

The Ellerslie Waste Management Facility in Edmonton, Alberta processed laboratory waste from 1972 to 2007. A waste water pond leak resulted in soil and ground water contamination with chloroform and other substances including salts and trace elements. The site's location along the route of existing and planned pipelines compounds the need for remediation because contamination increases pipeline construction and operation risks. Zero valent iron can be used to treat numerous contaminants including chlorinated organic compounds, trace elements, and nitrate. The objective of this study was to investigate the chemical reduction of chloroform using micro scale zero valent iron under anaerobic conditions with and without Ellerslie soil.

Reaction bottles were prepared in an anaerobic hood. Each bottle received distilled water and either glass beads, glass beads plus soil, glass beads plus zero valent iron, or soil plus zero valent iron. Bottles were sealed and spiked to 2 g chloroform L⁻¹ slurry. Headspace chloroform, dichloromethane, and methane were measured over time. Chloroform was no longer detected by days 0.5 and 2 in the soil zero valent iron and zero valent iron treatments, respectively. Dichloromethane and methane were formed in both treatments; unlike in the literature, dichloromethane did not persist. Chloroform reduction by zero valent iron is a promising remediation method for the Ellerslie site.

Presenter Biography

Alison Murata, PhD., University of Alberta

Alison Murata is a Research Assistant working with Dr Anne Naeth in the Department of Renewable Resources at the University of Alberta. Alison completed her PhD program in Land Reclamation and Remediation at the University of Alberta in 2019. She holds an MSc in Soil Science and a BEnvSc (Honours, Coop) from the University of Manitoba. Alison has experience in soil and groundwater contamination and remediation including characterization of long term contaminant trends, chloroform bioremediation and zero valent iron reduction, salt leaching, and trace element phytoremediation. She has worked as a Reclamation Intern with Paragon Soil and Environmental Consulting and was a member of the Land Reclamation International Graduate School.

Co-Author

Dr. M Anne Naeth

University of Alberta

Additional questions can be directed to Alison at amurata@ualberta.ca

Evaluating Phase 1 ESA Production Triggers and Update to PTAC Drilling Waste Compliance Option Project: Adapting and Collaborating When Determining Risk

Jim Purves P.Ag., Technical Advisor, North Shore Environmental Consultants Inc.

Environmental professionals are required to evaluate risk associated with oil and gas production sites, which incorporates both professional judgement and regulatory guidance. As public, regulatory and economic concerns continue to arise around the framework for asset retirement activities, industry needs a progressive approach to streamlining site closure.

To support this streamlining, a collaborative effort to identify the characteristics of low risk production sites during the Phase 1 ESA stage is required. Production risk can best be determined by evaluating past Phase 2 ESA results. By critically evaluating hundreds of Phase 2 ESA analytical results, we'll examine specific site characteristics (spud date, production volumes, years of production, major criteria changes) that help identify low risk sites. If low volume producing sites inherently represent lower risk: what constitutes low production?

To support continued improvements in decision making, we'll provide an update to our Petroleum Technology Alliance Canada (PTAC) initiative: Review of Phase 2 ESA data from past drilling waste disposal locations to better understand the effectiveness of the Alberta Energy Regulator (AER) document "Assessing Drilling Waste Disposal Areas: Compliance Options for Reclamation Certification" (Compliance Options, AER 2014). North Shore and Waterline are collaborating to determine if the Compliance Options: are appropriate as currently written; require adjustment to reduce false positive or negative triggers for Phase II ESAs; or are in need of other changes. Stage 1 (Data Collection) has been completed and Stage 2 (Data Analysis) is underway.

The intent of this presentation is to provide insight and guidance on improving decision making with respect to evaluating production and drilling waste disposal risk. As an industry, how can we use our collective learnings to adapt our production trigger rationale while remaining conservative? How can we effectively collaborate with consultants and industry to identify the characteristics of low risk sites and expedite closure? What improvement or changes, if any, are required to make the Drilling Waste Compliance Options more effective? By adapting and collaborating, the reclamation practitioner has the opportunity to utilize these tools to improve public perception while maintaining land stewardship.

Presenter Biography

Jim Purves, PAg,
Technical Advisor, North Shore Environmental
Consultants Inc.

Mr. Purves is a Professional Agrologist with over 24 years of experience in the environmental and agricultural industries. As a Technical Advisor, Mr. Purves provides technical support, senior report review as well as mentorship and staff training to his team members. His focus is on complex projects; mainly contaminated sites in the form of guideline modification, risk assessment and Subsoil Salinity Tool (SST). Mr. Purves' remediation and reclamation experience includes all aspects of the 'life cycle' approach from Phase 1, 2, and 3 ESAs, spill clean-up and restoration, reclamation, DSAs, and the implementation of various remediation techniques.

Additional questions can be directed to Jim at jpurves@northshoreenv.com

North Saskatchewan River Clean up and Assessment

Gordon Wichert, P. Biol., Technical Director – Ecology, SLR Consulting

In July 2016 a pipeline leak into the North Saskatchewan River occurred. The pipeline was immediately isolated at the river crossing and spill response crews were dispatched. The break occurred on land, approximately 160 metres from the riverbank on the south slope of the river. An estimated 225 m³ (+/- 10%) of crude blended with condensate was released from the pipeline, and about 40 percent of this volume entered the river. A variety of methods to identify locations of Polycyclic aromatic Hydrocarbons (PAHs) and several clean up techniques were deployed. Shoreline clean-up activities occurred until conditions of No Observed Oil and No Further Treatment were achieved. Multidisciplinary data collection and observations including water and sediment quality, aquatic habitat assessment, and benthic invertebrates and fish were undertaken in 2016 and 2017. Reference and exposure locations were identified by upstream and downstream orientation to the pipeline leak and by characteristics indicating source of PAHs. Results from these collections were used to support contaminant analyses and organoleptic testing for fish consumption advisories, and assessment of natural environmental conditions.

Presenter Biography

Gordon Wichert P. Biol., Technical Director – Ecology, SLR Consulting

Dr. Gordon Wichert serves as a Technical Director – Ecology – at SLR Consulting. He specializes in aquatic ecosystem dynamics, assessment and rehabilitation, and watershed planning. Over the past 25 years he has completed studies in, watershed planning, landscape-scale aquatic delineation and classification. Gordon has completed numerous Environmental Assessments and Environment Impact Studies. Much of his work involves characterizing existing ecosystem conditions, identifying potential responses to proposed changes, often associated with development, and recommending mitigation, rehabilitation and habitat enhancement measures. Dr. Wichert has led multidisciplinary teams and provided aquatic advice for extensive shoreline protection in Lake Ontario and waterfront design in Marie Curtis Park. He also supported reconstruction and restoration of Wilmer Wetlands (BC) and Windermere Basin (Ontario) to provide habitat for fish and colonial water birds, conversion of waste water treatment lagoons into productive wetland habitat, stream and fish passage restoration at Pacific Rim National Park (BC).

Additional questions can be directed to Gordon at gwichert@slrconsulting.com



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Native Seed Quality and Supply within Canada's Supply System

Steven Tannas, Ph.D., P.Ag., Senior Vegetation Ecologist & President, Tannas Conservation Services Ltd.

Within the Energy industry of western Canada the success of reclamation has been dependent on the quality and availability of native seed. There have been many changes to the supply system of native seed over the past 40 years. Some of these have been good and others have been bad. The availability of native species has similarly varied, providing a range of options for practitioners, but this has not always resulted in better seed. From breeding programs focused on productivity to poor selection protocols, there have been a number of instances where the native plants commercially available for sale are not suitable for reclamation. TCS was contracted by a pipeline company to source approximately 30 species and to determine which species were suitable for use within the reclamation program. Samples were gathered from the majority of major seed suppliers across western Canada and the USA for grow out trials. In addition, TCS has acted as an expert witness in legal proceedings over seed establishment gathering further evidence. The results of these programs have identified some significant problems within the seed supply system, including invasive species being supplied instead of native species, as well as native species that perform differently than their wild counterparts. In some cases, the species don't appear even to be the same species that they are supposed to be. In this talk we will discuss problems with a number of native species and some of the characteristic's reclamation specialists should consider when planning their projects.

Presenter Biography

Steven Tannas, Ph.D., P.Ag., Senior Vegetation Ecologist & President, Tannas Conservation Services Ltd.

Steven Tannas, Ph.D., P.Ag., QWSP, is a Senior Vegetation Ecologist, with Tannas Conservation Services and has over 15 years of experience working with the industry in his professional career and over 10 years prior to that apprenticing within his parents' company before obtaining his first degree. His work spans through a wide range of practice areas within Western Canadian ecosystems including: bioengineering, reclamation, native plant propagation, rangeland agrology, and plant community and wetland classification and mapping. His work has spanned throughout Alberta, BC, Saskatchewan, and Manitoba, as well as within the Yukon, NWT and Nunavut with clients within development, oil and gas, electrical grid, mines and agriculture, and with federal, provincial and municipal governments. Steven is a highly experienced plant taxonomist and able to spot identify over 1000 plant species. In addition, he manages a greenhouse (Eastern Slopes Rangeland Seeds) which propagates and grows various native grasses, forbs, shrubs, willow and numerous rare species for both upland and wetland habitats. The greenhouse supplies seed and live plant materials for bioengineering, habitat restoration and enhancement, reclamation, and rare species conservation.

Additional questions can be directed to Steven at steven@tannasenvironmental.com

Doing It Right: Using Ecological Principles to Select Appropriate Techniques and Equipment for Grassland Reclamation

John Morgan, M.N.R.M., President, Prairie Habitats Inc.

This paper provides a concise overview of maximizing the chances of a successful native grassland reclamation seeding. Using case studies, a literature review plus over 50 years of combined experience, we provide a concise road map to reclaiming diverse native grasslands. State of the art reclamation involves bringing an area back to a functioning, biologically diverse ecosystem that virtually is indistinguishable from nearby undisturbed areas. Using native species to achieve this goal is standard practise in western Canada. Yet many native seedings fail to accomplish their objectives due to a lack of appreciation for proper established procedures. Defining and deciding what is native, how to source the right local seed (wild harvest, vs commercially grown seed), essential site preparation techniques, choosing the best planting methods from among drilling, broadcasting and hydroseeding, using suitable equipment, a thorough knowledge of soil conditions, potential weather effects and meaningful follow-up all are essential to ensure native seeding success. Cutting corners in one or more of these areas jeopardizes the entire, costly, multi-year process. This paper encourages a practical, ecological approach to grassland reclamation. It is meant to be used by land managers to meet or exceed native planting goals.

Presenter Biography

John Morgan, M.N.R.M., President, Prairie Habitats Inc.

John has an Honours degree in Zoology and Masters in Natural Resources Management from the University of Manitoba. With his wife Carol, they started Canada's first prairie restoration company in 1987, Prairie Habitats Inc., near Argyle, Manitoba. They have put ecological theory into practical ideas to restore native grasslands. They have developed harvesting equipment used for local native seed collection in 45 countries worldwide. John co-wrote the book "Restoring Canada's Native Prairies" with colleagues Doug Collicutt and Jackie Thompson.

Co-Author

Steven Tannas, Vice-President, Eastern Slopes Rangeland Seeds

Additional questions can be directed to John at john01@xplornet.com

Innovative Reclamation for Energy Projects: Harnessing the Power of Native Species on Salt-impacted Sites

Sarah Thacker AIT, Reclamation Researcher, InnoTech Alberta

While Alberta energy powers the province, innovative reclamation initiatives help fuel the energy industry. Managing resources through the full life cycle of an oil and gas project is an important component of reclamation, and innovative science is vital to achieving successful reclamation outcomes.

Releases of salt to terrestrial ecosystems often occur in association with the energy industry and other anthropogenic activities. Salt contamination can be a significant problem resulting in degraded soil properties and impaired vegetative growth. Given the prevalence of Solonchic soils in Alberta, natural salinity can also create challenges. Previous research has indicated a difference in the toxicity of natural (sulphate) and anthropogenic (chloride) salt, which could be a key consideration for industry, government, and reclamation practitioners.

Salt-impacted soils can be a particular problem in grasslands, which are notoriously difficult to reclaim. Native vegetation communities have evolved to changes in edaphic conditions of saline soils, and perhaps these same plant communities can be successful in establishing in reclaimed landscapes affected by anthropogenic or natural salinity. Harnessing the natural tolerance of native species in reclamation of salinity impacted areas may increase reclamation success considerably. Better understanding of native species response to salt-impacted soil has the potential to improve interim revegetation, erosion control, and weed control on energy sites by prioritizing the use of certain species under different conditions.

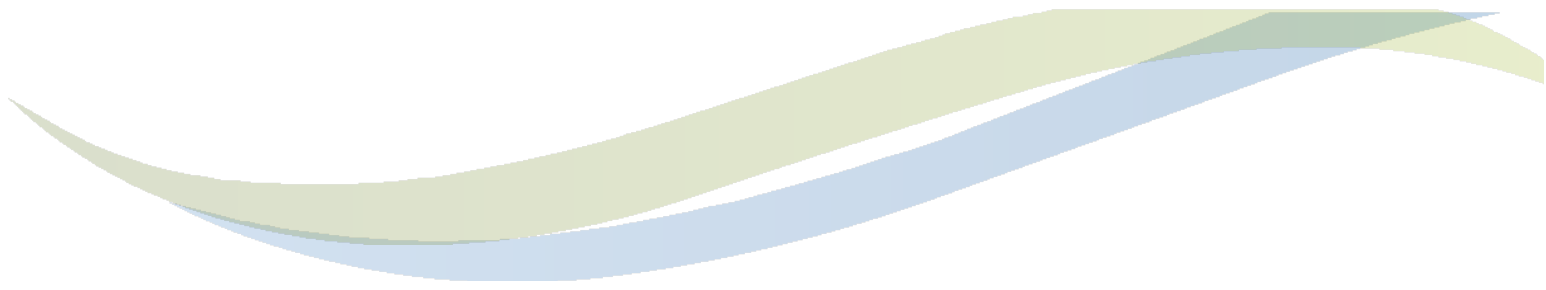
InnoTech Alberta has been conducting research on the tolerance of native grassland species to anthropogenic soil salinity through greenhouse trials. Research into the toxicity of anthropogenic versus naturally salt-impacted soils has also been conducted. Outcomes of such research could include improved risk-based techniques for managing naturally and anthropogenically saline sites. Results indicate that some species would be better suited for site establishment. As well, traditional seeding methods may not be appropriate in salt-impacted soils. Differences in the toxicity of sulphate and chloride salts to native species were observed. This research can be utilized by industry and reclamation practitioners when developing reclamation plans and seed mixes for salt-impacted sites, and by government when making decisions regarding reclamation outcomes.

Presenter Biography

**Sarah Thacker AIT, Reclamation Researcher,
InnoTech Alberta**

Sarah Thacker is an environmental scientist working as a researcher in the reclamation group at InnoTech Alberta. Sarah completed her BSc in Land Reclamation in 2016, and her MSc in Soil Science from the University of Alberta in 2018. Sarah's area of expertise is plant-soil interactions—she enjoys combining her knowledge of both plants and soil to advance applied research in Alberta.

Additional questions can be directed to Sarah at sarah.thacker@innotechalberta.ca



Savona

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CLRA Alberta Chapter



X-Ray Vision: Novel Use of CT Scanner to View In Situ Saline Response in Plant Roots

Sarah Venskaitis, Research Intern, InnoTech Alberta

Achieving regulatory closure on sites with produced water impacts can be one of the greatest challenges to reclamation practitioners. When returning these sites to agricultural land use, it is important to ensure that future crops are not affected by residual salts, and thus it is crucial to manage sites using risk-informed guidelines that will allow them to reach regulatory closure and return to productive use. The work to be presented is part of a greater project aiming to establish a scientifically-justifiable exclusion depth for salts in soil under agricultural land use, considering rooting depth of common agricultural species and impacts to roots at different soil salinity levels.

Using traditional methods, which include soil coring and separating roots from soil, assessing the impact of salt concentrations on roots is very challenging. This is mainly due to the difficulty in separating intact roots from the soil – often the smaller roots are lost or destroyed in the process, making it impossible to quantify roots in relation to salt concentrations. The novel use of X-ray CT scanning technology is being investigated to take images of roots while they remain in soil, thus illuminating the interactions of roots and other contaminants of potential concern (COPCs).

A study was set up using Alfalfa grown in soils with varying NaCl concentrations. Alfalfa was chosen as it is a valuable crop in Alberta's agricultural lands, has been deemed sensitive to saline impacts, and is among the deepest-rooted of commercially-grown crops in the province. Plants were grown in a controlled greenhouse environment in one of three treatments: control (0.84 dS/m), medium EC (2.85 dS/m), and high EC (6.36 dS/m) soil. Alfalfa was grown for 14 weeks before the aboveground biomass was harvested and the roots scanned. Preliminary results from the above and belowground biomass indicated no significant differences between treatments. However, alfalfa plants in the high EC treatment had significantly delayed development compared to the medium EC and the control, and their height growth over time was significantly reduced compared to the medium EC treatment. Results from modeled root volume and surface area, as well as measured biomass will be presented, followed by a comparison of root volume and surface area by depth and salinity. The use of X-ray CT scanning technology will be evaluated for its potential in understanding root architectural response to salts and other COPCs at depth, which could inform remediation targets.

Additional questions can be directed to Sarah at venskait@ualberta.ca

Presenter Biography

Sarah Venskaitis, Research Intern, InnoTech Alberta

Sara Venskaitis is a recent graduate from the University of Alberta with an M.Sc. in Forest Biology and Management. Her thesis work compared reclamation outcomes in the Athabasca Oil Sands, and she continues to focus on reclamation through her work with as a research intern on InnoTech Alberta's Reclamation Team. At InnoTech Alberta, Sara has employed innovative techniques to investigate current issues in reclamation, collaborating with various industry stakeholders.

Co-Author

Bonnie Drozdowski, InnoTech Alberta

Adopting New Field Screening Methods to Reduce Costs – A Set of Case Studies for the Application of SWIR Sensing with Machine Learning for PHC and Salinity Impacts

Graham Kawulka, P.Eng, President, Maapera Analytics Inc.

Obtaining analytical data during remediation activities, in near real time, represents a significant opportunity for most projects but is often seen as cost prohibitive without innovative quantitative field screening technology.

Rapid and accurate field screening data plays an important role in managing remediation program costs by reducing standby time, over-excavation, rush sampling for randomly selected samples, and remobilization when it is not complete. These costs all arise from the delays created between when data is needed and when it is usually available. Currently, limitations exist for soil salinity screening tools, as field measurements will vary due to soil sample water content and texture in addition to salt content.

A technological solution to this problem is the use of short wave infrared (SWIR) reflectance spectroscopy combined with machine learning to identify distinct spectral signatures for petroleum hydrocarbons (PHCs) and salinity parameters. These tools are relatively new but have now been deployed on a variety of sites in Alberta. The presentation aims to inform how and where these tools have provided value in assessment and remediation activities.

Specifically, looking at two sites for remedial excavation and 2 other sites for assessment where the combined costs savings for all 4 sites is in excess of \$90,000.

Presenter Biography

**Graham Kawulka, P.Eng,
President, Maapera Analytics Inc.**

Graham is President at Maapera Analytics, where he works with Maapera's ambitious team to dramatically improve the way environmental assessment and remediation activities are conducted. Graham is a native of Edmonton, Alberta and graduated from the University of Alberta, Mechanical Engineering Co-op Program. Graham has had the good fortune to live and work on 3 continents with a wealth of experience in R&D, product development, product management, sales, marketing, commercialization, and international business.

Additional questions can be directed to Graham at gkawulka@maapera.com

Bringing the Forest to the Office – How Virtual Reality Can be Used in Training and Decision Making About Restoration

Matthew Pyper, Principal, Fuse Consulting Ltd.

Virtual reality isn't just for video games anymore. This recent project by COSIA focused on leveraging the power of virtual reality to bring the forest to the office and showcase why and how modern techniques in forest restoration can help achieve environmental goals in oil sands operations. It is a clear example of how we can use innovative tools to help us improve reclamation and restoration outcomes.

This project leveraged professional quality 360 photos of restoration sites, both recently established and some that were up to 10 years old, to help showcase the benefits of creating microsites and encouraging restoration of legacy sites. Operators and managers can explore one of four virtual tours: lowland sites with surface roughness applied, linear restoration sites, planting on upland and lowland sites, and interim reclamation of soil storage piles. In addition to these virtual tours, the project houses the recently completed Silviculture Toolkit developed through a collaboration between COSIA and Natural Resources Canada.

This presentation will showcase why the virtual tours were established, and how they can be used by companies to drive innovation and quality treatment delivery in their own operations.

Presenter Biography

Matthew Pyper, Principal, Fuse Consulting Ltd

Matthew Pyper is an Ecologist and Science Communicator who has worked on over 175 Science Communication products related to forest management, caribou habitat restoration, and conservation biology. He is a graduate of the University of Alberta where he completed a Masters in Forest Ecology and a Bachelor's in Environmental Biology. Matthew is the co-owner of Fuse Consulting where he and his team work everyday to find creative, engaging ways to connect science to diverse audiences.

Co-Authors

Michael Cody

Katalijn MacAfee

Jack O'Neill

Georgina Campos

Kate Broadley

Additional questions can be directed to Matthew at matthew@fuseconsulting.ca



CLRA SOCIAL
17:00 – 18:00

Exhibition Hall

Sponsored By:



CLRA Alberta Chapter





**INDUSTRY
BANQUET AND AWARDS
18:00 – 22:30**

Exhibition Hall

Banquet Co-Sponsored By:



Western Sky – Celebrate the Rosebud River

Ellen Magidson, Development Manager, Western Sky Land Trust

All proceeds from the CLRA Alberta Charity Golf Tournament were donated to Western Sky Land Trust (Western Sky) again in 2019. Western Sky aims to achieve a significant and measurable conservation impact in southern Alberta by conserving open and natural landscapes that have important natural, agricultural, scenic, recreational and heritage values. To accomplish this, Western Sky protects critical watersheds in our region, conserves vital habitats and provides managed public access for recreation and education. They also work with other agencies and organizations to further protect and enhance natural areas and champion the conservation of environmentally sensitive lands that support the health of our watersheds.

Western Sky has produced a new and evocative short video that showcases the natural beauty and conservation values of the Rosebud River Valley.

<http://www.westernskylandtrust.ca/>



**Western Sky
Land Trust**
Conserving Our Sense of Place

Presenter Biography

Ellen Magidson

Development Manager, Western Sky Land Trust

Ellen Magidson joined Western Sky in January 2011. As Development Director, she is responsible for communications, programming, community engagement, government relations and fund development.

Previously, Ellen was a 15 year associate with Market Alert Limited, a Toronto based competitive intelligence consultancy that provides primary market research as well as educational support to Canadian corporations. Ellen holds a BA, Economics, from McGill University as well as an MBA, specializing in communications. She serves on a number of not-for profit boards, both national and community-based.

Ellen moved from Toronto to Calgary with her family in 2001, where they all love living under a western sky. Ellen is passionate about the beauty of the Calgary region and Alberta and welcomes the opportunity to further conservation of Alberta's special landscapes.

Additional questions can be directed to Ellen at emagidson@westernskylandtrust.ca

Student Award Recipients

Gabriel Staples
Environmental Assessment & Restoration Diploma Candidate
Lethbridge College

Gabriel Staples grew up in Calgary influenced by the mountains, parkland and prairie around him. After completing a degree in visual art, his interest quickly turned to plants. Working jobs in landscaping and gardening, he found that native plants were far more interesting to work with than horticultural varieties. To Gabriel, much of the appeal of working with native plants is understanding their ecological requirements and their complex relationships with human land-use. To this end, Gabriel is currently pursuing further education in ecological restoration at Lethbridge College.



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Michael Wendlandt
Bachelor of Science (B.Sc.), Environmental Science Candidate
Mount Royal University

Michael Wendlandt is a 4th-year Environmental Science student at Mount Royal University. He grew up and currently resides in Calgary, AB. Before attending university, he worked in the energy sector as a Journeyman Red Seal Instrumentation Technician. Michael decided to make a career change into the environmental industry to pursue his passion for the environment. Working as a research assistant on urban stormwater and wetland water quality in 2019 has focused those interests into the functional aspects of reclamation. In his spare time Michael Chairs the Mount Royal University chapter of CPANS. Michael also enjoys exploring the outdoors with his family camping, hiking, hunting, fishing.



Student Award Recipients

Kyleen Deering

**Land and Water Resources Program (Reclamation Major) Candidate
Olds College**

Kyleen Deering grew up in Red Deer, Alberta. The love of the natural world drew her to a career in environmental science, and she is currently enrolled in the Land and Water Resource Management program at Olds College. She is an avid outdoorswoman and enjoys hiking and climbing in both the warm summers and long cold winters of western Canada. She has a strong passion for the conservation, reclamation and overall protection of wild places. In between horse-back riding and backpacking trips in the mountains, Kyleen volunteers during the summer for non-profits such as Trout Unlimited and ReThink Red Deer. Giving back to the community around her is a very big part of how she balances her work and passions.



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Katelyn Aschenmeier

**Environmental Conservation Reclamation Candidate
Lakeland College**



Katelyn Aschenmeier was born and raised in Edson, Alberta. From an early age she loved being outdoors, she feels most at home surrounded by forest and she continues to pursue many outdoor activities like hiking, backcountry camping, kayaking, trail riding, and fishing. She also participated in provincial Enviro-thons, fresh water summits, and weekend environmental workshops throughout high school. However it wasn't until she spent a few years working in the oil and gas industry and thoroughly enjoying the work environment that it clicked; reclamation is a perfect intersection of her interests, a balance of industrial development and environmental stewardship, and that realization started her current educational path at Lakeland College.



Student Award Recipients

Benjamin White
Environmental Reclamation Technician Candidate
Medicine Hat College

Ben White is a student from Redcliff, Alberta, and is currently enrolled in the Environmental Reclamation Technician program at Medicine Hat College. He enjoys spending time outdoors, and especially hiking along the South Saskatchewan River near his home. At school he works hard, and loves learning about Southern Alberta's unique ecosystems, as well as the area's rich agricultural history, and how it provides insight to current land use. After finishing his diploma, Ben plans to gain work experience before earning a degree. In future, he hopes to study botany and aquatic ecology, and work towards protecting riparian health while allowing Canada's economic prosperity.



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Rosheen Tetzlaff
BSc Environmental and Conservation Science – Land Reclamation Major Candidate
University of Alberta

Rosheen Tetzlaff grew up in Prince Albert, Saskatchewan but has been living in Leduc, Alberta since 2011. After graduating high school she knew that she wanted to work towards making the world a better place in the face of climate change and so she began her degree in Environmental and Conservation Sciences with a major in Land Reclamation at the University of Alberta. She has worked as a Research Assistant in Anne Naeth's lab and as a Student Field Technician at Prince Albert National Park. Rosheen has enriched her university experience through volunteering with non-profit organizations (Waterlution and Edmonton and Area Land Trust) and is currently serving as the President of the Environmental and Conservation Sciences Students' Association. She enjoys rock climbing, yoga, and all things outdoors.



Student Award Recipients

Mikayla Donovan
BSc Environmental Science – Geography Major Candidate
University of Calgary



My name is Mikayla Donovan and I grew up on Vancouver Island. I moved to Calgary to pursue a Bachelor's of Science in Environmental Science. I decided to pursue this path after becoming interested in environmental health and toxicology. I am currently in my last year working on two major projects; modelling NOx emissions in the Ghost Watershed and analyzing anthropogenic nitrogen from vehicle traffic in Kananaskis. After I graduate my undergrad, I plan to go back to school to study a Master's of Science in Environmental Epidemiology. My passions lie in working with the environment to find a balance between sustaining our global populations and maintaining environmental health. When I'm not studying, I'm in the mountains hiking, biking or snowshoeing. If I'm in the city, I'll be on my road bike heading for a coffee.



**UNIVERSITY OF
CALGARY**

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Graduate Student Award Recipients



Sponsored by:



Kyle Stratechuk
MSc Candidate Department of Renewable Resources
University of Alberta

I was born and raised in Edmonton, Alberta and still call the city home. My interest in the environmental sciences came from my childhood, as I often found myself in the mountains for family vacations, typically camping and hiking. I remember loving the nature signs they had out on the trails and would stop to read them all as I found it all so fascinating. I gradually developed an interest in my grade school ecology courses and by the time I decided to attend university, I knew that I wanted to study something related to the environment that would let me work outdoors. This is why I decided to complete my bachelor's degree in land reclamation and pursue a master's degree in the same field. I enjoy being active and spending most of my free time outdoors as well, with some of my favorite activities being camping, hiking, kayaking, and skiing.





Industry Award Recipients

Gerry Bourassa Award

Winner to be Announced at the Time of Award Presentation

The CLRA Alberta Chapter is pleased to acknowledge and commemorate Gerry Bourassa through our Exceptional Volunteer Award. Gerry was a member, volunteer and friend whose love for the environmental industry and passion for volunteering touched our CLRA community. It is a goal of the Alberta Chapter of the Canadian Land Reclamation Association to recognize outstanding individuals who follow in Gerry's footsteps and volunteer for their communities, associations and institutions.

Novel Land and Wellsite Reclamation Innovation Award

Winner to be Announced at the Time of Award Presentation

Clean Resource Innovation Network (CRIN) and the CLRA want celebrate the hard-working innovators in land reclamation! This award will be presented at the 2020 AGM and Conference for innovation in technology or process that leads to greater efficiencies in the environmental management of legacy assets.



**FRIDAY
FEBRUARY 28, 2020**



**PLENARY
SESSIONS:
08:30 – 12:00**

Exhibition Hall

Room Sponsored By:



CLRA National Updates

Andrea McEachern, President, CLRA National / VP & Co-Founder, PurLucid Treatment Solutions

CLRA National Updates



Presenter Biography

Andrea McEachern

CLRA National President & VP & Co-Founder, PurLucid Treatment Solutions

Andrea has been the President of the National CLRA Board since 2011 and previously served on the Alberta Chapter board as President. When she doesn't have her 'volunteer' hat on, she works at her company, PurLucid Treatment Solutions, a water treatment company based in Calgary.

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

The Canadian Conservation and Land Management Knowledge Network: Connecting and Supporting Communities of Practice

Bonnie Drozdowski, P.Ag., Team Lead – Reclamation, InnoTech Alberta

The Canadian Conservation and Land Management (CCLM) Knowledge Network is collaboration between several leading organizations in Canadian land management research, practice, and knowledge exchange. CCLM collaborators are currently building an online, robust, knowledge-sharing platform that will connect practitioners working across diverse Canadian landscape contexts to current and relevant resources. The Network will host sub-portals to consolidate information on wetlands, boreal caribou, and land management, with the potential to develop and host additional portals through future growth and collaborations.

The current information landscape surrounding these disciplines is highly fragmented. Researchers, communities, and organizations of all types regularly produce valuable resources, but because there is no centralized platform from which to search for, access, and share this information, these resources are often narrowly distributed on individual websites. As such, practitioners face difficulties in searching across organizations, and moving beyond resources that they are already familiar with.

The collaborators' goal is to secure the CCLM Knowledge Network as the premiere, go-to source for resources related to conservation, reclamation, and land management in Canada, enabling knowledge exchange across organizations, geographies, contexts, and user demographics. In doing so, it is hoped that the collaborative nature of the Network will enable communities of practice to develop around its themes, particularly to inspire, inform, and educate the next generation of practitioners who have grown accustomed to interacting with highly-connected and comprehensive online platforms.

This presentation will outline the history and development of the Knowledge Network, as well as discuss its features and functionality to illustrate applied benefits to users, practitioners, and organizations working within these areas across Canada.

Presenter Biography

Bonnie Drozdowski, P.Ag., Team Lead – Reclamation, InnoTech Alberta

Bonnie Drozdowski (M.Sc, P.Ag), is the team lead for the reclamation program at InnoTech Alberta which focuses on developing of innovative and practical land reclamation and remediation procedures and technologies for landscapes disturbed by industrial activities. She has been working in applied reclamation research for over 10 years managing and participating in multifaceted projects integrating business and science in various industries, including upstream oil and gas, mineable and in-situ oil sands, coal mining, sand and gravel, diamond mining, forestry, and pulp and paper. She is passionate about working collaboratively with colleagues in industry, academia and the environmental services sector to capitalize on varying expertise and experience in developing innovative solutions to complex problems.

Additional questions can be directed to Bonnie at Bonnie.Drozdowski@innotechalberta.ca

BC Regulatory Update – Dormant Site Assessment, Remediation, and Reclamation

Devin Scheck, Supervisor, Environmental Stewardship, BC Oil and Gas Commission

The Dormancy and Shutdown Regulation (DASR) has resulted in new regulatory requirements to ensure the timely decommissioning, assessment, remediation, and reclamation of inactive well sites in British Columbia. The regulation is expected to accelerate the rate of asset retirement and resolve the existing dormant site population over the next two decades.

The assessment and remediation provisions of the regulation make multiple references to the BC Contaminated Sites Regulation related to assessment, remediation, and reporting requirements under the DASR. This presentation aims to explain the requirements with respect to dormant site assessment, remediation, and reclamation, the required submissions, and how these relate to requirements under the Certificate of Restoration (CoR) process.

Presenter Biography

Devin Scheck, P.Ag
Supervisor, Environmental Stewardship, BC Oil and Gas Commission

Devin is professional agrologist who has been with the BC Oil and Gas Commission since 2001. For the last 15 years he has led the Commission's Environmental Management and Reclamation team responsible for overseeing site remediation/reclamation as well as the permitting of waste discharges from oil and gas activities. In his current role, he leads the Commission's Environmental Stewardship team which includes habitat management, surface water, groundwater, GHG management and methane reduction initiatives in addition to the rem/rec and waste discharge permitting functions.

Additional questions can be directed to Devin at devin.scheck@bcogc.ca

Native Prairie Protocol

Gordon Dinwoodie, P.Ag., Reclamation Policy Specialist, Alberta Environment and Parks

Alberta Environment and Parks released the Native Prairie Protocol for Reclamation Certification of Salt-Affected Wellsites in November, 2019. The goal of the Native Prairie Protocol is to avoid the disturbance of sensitive native grasslands associated with remediation of salt contamination when it can be shown that the contamination is not causing an adverse effect. Alberta Environment and Parks has successfully worked with the oil and gas industry to encourage minimal disturbance construction and operation on native grassland. Remediation of salt contamination typically requires excavation and disposal of salt contaminated soil, resulting in significant disturbance to this sensitive landscape. The Native Prairie Protocol provides an approach for identifying sites where adverse effects from elevated salinity are not occurring, and are not expected to occur in the future. Sites that meet the conditions specified in the Native Prairie Protocol are eligible for reclamation certification without further remediation even though salt concentrations may exceed Alberta Tier 1 guidelines.

Presenter Biography

Gordon Dinwoodie, P.Ag.,

Reclamation Policy Specialist, Alberta Environment and Parks

Gordon Dinwoodie is a Reclamation Policy Specialist with Alberta Environment and Parks. He is a Professional Agrologist and holds a B.Sc. (Agronomy) and M.Sc. (Soil Science) from the University of Alberta. Gordon works in the Land Conservation and Reclamation Policy group developing policies for land reclamation and remediation, and land application of industrial and municipal by-products.

Additional questions can be directed to Gordon at gordon.dinwoodie@gov.ab.ca

The New Remediation Regulation: Contaminated Sites Management in the Statutory Context of Environmental Protection

Jason Unger, Executive Director, Environmental Law Centre

Alberta has moved from a voluntary remediation certificate system to a broader remediation regulation with repercussions for future approaches to address contaminated sites. This talk will provide a review of the new regulation in the context of broader duties under the Environmental Protection and Enhancement Act (EPEA). Challenges and risks that remain under the new regulation will be highlighted and discussed.

Presenter Biography

**Jason Unger, Executive Director,
Environmental Law Centre**

Jason Unger is Executive Director at the Environmental Law Centre in Edmonton, Alberta. His work has focused on water law, species at risk law, regulation of brownfields, among others. Prior to joining the Centre in 2005 he worked in private practice doing general litigation, regulatory and administrative law.

Jason currently sits as a Director of the Alberta Water Council and has been involved on the boards of several non-governmental organizations.

Prior to practicing law he worked in biology, conducting fieldwork that examined roosting habits of bats in northern British Columbia and Costa Rica.

Additional questions can be directed to Jason at junger@elc.ab.ca

Reclamation and Remediation Issues before the Environmental Appeals Board and the Public Lands Appeals Board

Chris Powter, Owner, Enviro Q&A Services

The Environmental Appeals Board (EAB) and the Public Lands Appeal Board (PLAB) provide an opportunity for Albertans to appeal specific regulatory decisions made by Alberta Environment and Parks (AEP) staff. This open and transparent process ensures regulatory procedures are followed, decisions are fair, and regulators are held accountable. Decisions of both Boards are available to the public.

The EAB was established in 1993 with proclamation of the Environmental Protection and Enhancement Act (EPEA) and the Environmental Appeal Board Regulation. The Board hears appeals under EPEA, the Water Act, the Climate Change and Emissions Management Act, and Schedule 5 of the Government Organization Act.

The PLAB was established in 2011 with proclamation of the Public Lands Administration Regulation. The Board hears appeals related to dispositions and enforcement actions under the Public Lands Act.

Although the make-up of appeals has changed, especially for the EAB, since the transition of non-renewable energy projects from AEP to the Alberta Energy Regulator in 2013, many of the Board decisions have implications for reclamation and remediation in the energy sector.

This presentation will provide background on the two Boards and highlight recent appeals of interest to CLRA members. The roles and responsibilities of practitioners who appear before the Boards will also be described.

Presenter Biography

Chris Powter, Owner, Enviro Q&A Service

Chris has a B.Sc. in Ecology and an M.Sc. in Plant Ecology from the University of Guelph. He is the owner of Enviro Q&A Services, a consulting firm providing environmental advice and guidance to the resource industry and government regulators since 2015.

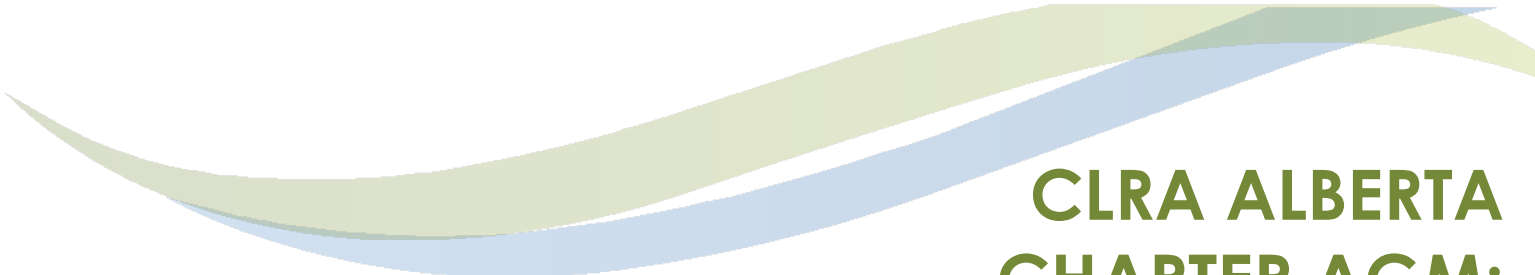
From April 2010 to December 2014 Chris was the Executive Director of the Oil Sands Research and Information Network (OSRIN) in the School of Energy and the Environment at the University of Alberta.

Chris worked for Alberta Environment for 29 years, including duties in land reclamation from 1981 to 2002, then in policy and legislation development from 2002 to 2007 and finally as the head of the provincial environmental assessment program from 2007 to 2010.

Chris is a member of the Environmental Appeals Board and the Public Lands Appeal Board.

Chris was the recipient of the Canadian Land Reclamation Association's Edward M. Watkin Award in 1988, the Noranda Land Reclamation Award in 2001 and the Alberta Chamber of Resources 2004 Reclamation Citation for lifetime achievement. He was also a longtime editor of the CLRA's Reclamation Newsletter and the IALR Newsletter, and author of Curmudgeon's Corner in the Canadian Reclamation magazine for 10 years.

Additional questions can be directed to Chris at enviroqas@shaw.ca



CLRA ALBERTA CHAPTER AGM: 13:00 – 13:30

Exhibition Hall

CLRA Alberta Chapter Annual General Meeting

Board of Directors

2019 President's Report

- Review of 2019 Events

2019 Treasurer's Report

- Review of Fiscal 2019
- Change of Fiscal Year End
- By-law Change - Vote

What's coming in 2020

- Golf Tournament
- Lunch and Learns
- Fall Tour
- 2021 AGM & Conference
- CLRA Vision for Moving Forward





**PLENARY
SESSIONS:
13:30 – 15:30**

Exhibition Hall

Room Sponsored By:



Canada's Oil Sands Innovation Alliance: Driving Innovation in Environmental Science and Technology through Collaboration

Natalie Shelby-James M.Sc., Sr. Technical Advisor Land Environmental Priority Area, Canada's Oil Sands Innovation Alliance

Canada's Oil Sands Innovation Alliance (COSIA) is a collective of oil sands companies that collaborate on environmental research and technologies to accelerate environmental performance improvement in Canada's oil sands. The oil sands are the third largest oil reserve on earth and development of this global scale resource requires unique and novel approaches to research and development. COSIA was created in 2012 with Environmental Priority Areas (EPA) in Land, Water, Green House Gases and Tailings. The Land EPA at COSIA actively develops and manages a significant portfolio of projects to gain knowledge, technologies and practices for restoration and effective reclamation in the boreal forest of Alberta Canada. This presentation will highlight the COSIA processes and a sampling of the innovative project work lead by COSIA Land EPA members within the focus areas of Caribou Conservation & Recovery, Footprint Reduction, Biodiversity and Species at Risk Management, Uplands-Soil-Vegetation and Wetlands.

Presenter Biography

Natalie Shelby-James M.Sc., Sr. Technical Advisor Land Environmental Priority Area, Canada's Oil Sands Innovation Alliance

Natalie Shelby-James is a Senior Technical Advisor in the Land Environmental Priority Area with Canada's Oil Sands Innovation Alliance (COSIA). She has over 15 years of work experience across numerous sectors including: onshore and offshore oil, oil & gas, and environmental consulting (clients including: government, transportation, mining and oil & gas). Areas of expertise include wetlands, reclamation, soils and vegetation ecology, stakeholder engagement, project & asset risk identification, and Project and Team management.

Co-Author

Jack O'Neill, Director, Land Environmental Priority Area, Canada's Oil Sands Innovation Alliance

Additional questions can be directed to Natalie at natalie.shelby-james@cosia.ca

Don't Get Bugged Down by Tier 2 Wetland Contamination Assessments – Solutions and Options for Common Problems.

Catherine Evans, M.Sc., P.Chem., Risk Assessment Specialist – Technical Science & External Innovation, Alberta Energy Regulator

Using an appropriate approach to delineation and monitoring of a wetland site can lead to a simpler and better risk assessment and ultimately to a better environmental outcome. This can then lead to the improved risk management of wetland contamination, more cost-effective remediation and less collateral damage from remedial activities. Due to their nature, remediation of contaminated wetlands requires a Tier 2 approach. Does being in Tier 2 make everything vastly more complicated? No! Most wetland sites can be assessed using simple Tier 2 evaluation methods that delineate and monitor impacts in a systematic and logical manner.

This presentation will cover the “what”, “where” and “in what medium” of wetland delineation, touch on some monitoring plan considerations, and address some common issues regarding background chemistry and biogenic interferences.

Presenter Biography

**Catherine Evans, M.Sc., P.Chem.
Risk Assessment Specialist – Technical Science &
External Innovation, Alberta Energy Regulator**

Catherine Evans has been getting her boots stuck in wetlands for as long as she can remember and started working on regulating Alberta wetland remediation in 2008. She left what was then Alberta Environment and Sustainable Resources Development in 2014 to join the Alberta Energy Regulator and is currently a Risk Assessment Specialist working on contamination risk issues from within the AER's Operations Division. Cat has a B.Sc. in Chemistry and Biology and a M.Sc. in Biological Sciences, both from the University of Alberta. She currently works on everything related to contaminant risk management and remediation from the emergency response stage on and reviews a lot of wetland risk assessments, risk management proposals, and monitoring plans.

Additional questions can be directed to Natalie at natalie.shelby-james@cosia.ca

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