2019 FALL FORUM & ANNUAL GENERAL MEETING
Presentation Submissions
September 21, 2019
Saskatoon, SK

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**ABSTRACTS**

Recipes for restoration, and the context of climate and landscape in Western Canada  
*Darcy Henderson, Senior Species at Risk Biologist, Environment and Climate Change Canada*

If you have lived in wet and dry parts of Western Canada, and you happen to be a baker, you may have noticed how the same recipe doesn’t always work in one place or the other. I certainly notice that a lot of recipes in dry places require you to add a quarter cup of water not otherwise called for, because the recipe-book author lived in a wet place where their flour, baking soda, and other ingredients had absorbed moisture from the air while mine had desiccated. In a restoration context you see the same things. Season and method of planting, along with the use of cover crops are particular pet peeves of mine. We have drastically different ecosystems across Western Canada, from Pacific Maritime Rainforest, to Great Basin Deserts, to Northern Great Plains, to Subarctic and Subalpine Coniferous Forests, to Alpine and Arctic Tundra. We also have very different landscape contexts. A restoration site in the middle of an agricultural and urban landscape is going to suffer from an abundance of weeds and propagule pressure with no native plant and soil micro-organism immigration over time. In contrast, a mine site, right of way, or well-pad in large expanses of natural forests and grasslands are surrounded by an abundance of natural propagule sources and dispersal vectors. Despite these challenges and opportunities, we often see the
same poor practices of hydro-seeding cover crops and cultivars of the same agricultural species without respect to climate and landscape. Let’s talk about it and challenge some norms. Good bakers must know how to substitute and supplement ingredients when necessary.

**Meewasin Valley Authority – 40 Years of Restoration Programs**

*Renny Grilz, Resource Management Officer, Meewasin Valley Authority*

Meewasin is a conservation agency dedicated to conserving the cultural and natural resources of the South Saskatchewan River Valley. It is the means by which the three participating parties (City of Saskatoon, Government of Saskatchewan, and University of Saskatchewan) have chosen to best manage the Meewasin Valley in the South Saskatchewan River Basin. Meewasin is recognized world-wide for its leadership in conserving the natural resources of the 6,700 hectares of the Meewasin Valley. Meewasin strives to protect and enhance biodiversity in the Meewasin Valley through conservation grazing, prescribed burns, removal of invasive species, restoration projects, and clean-up activities. Over the last 40 years, the Meewasin Valley Authority has successfully enabled the valley to flourish, with a mix of conserved and developed land. In celebration of our 40th, we will take a look back at some of the projects, completed and in progress, undertaken by the Meewasin Valley Authority.

**Potentilla recta invasion of rangelands in East Kootenay, British Columbia: Examining best management practices**

*Myra Juckers, MSc student and Katherine Stewart, Assistant Professor, Soil Science Department, University of Saskatchewan*

Invasive species are a main contributing factor to the degradation of rangelands. Rangeland within the East Kootenay region of British Columbia has been degraded in part due to invasion by *Potentilla recta* (sulphur cinquefoil). Identifying best management practices to control *P. recta* is needed to improve rangeland health in the East Kootenay. Over two growing seasons (2019 and 2020) targeted goat grazing (grazing once vs grazing twice per season), herbicide application (single application of Milestone), and seeding of native rangeland plants (with and without fertilizer addition) are being examined as management strategies to control *P. recta* on two sites near Cranbrook, BC. Preliminary results indicate targeted goat grazing conducted twice per season leads to the greatest reduction in biomass and number of flowering stems and seed heads of *P. recta* compared with other management practices. This suggests goats are affecting *P. recta* growth and reproduction, particularly under a higher grazing frequency. Continued monitoring of these management strategies, as well as, greenhouse trials to examine mechanisms of invasion will provide important information for future *P. recta* management.

**The Charette River Lot is one of the original Métis landscapes on the South Saskatchewan River, originally part of the Batoche settlement**

*Karon Shmon, Director, Department of Métis Culture and Heritage, Gabriel Dumont Institute
Roberta Cross, Proprietor, Grow Solutions*

The title holder, Grow Solutions, jointly manages the land with the Gabriel Dumont Institute’s Department of Métis Culture and Heritage. This unique reconciliation partnership is protecting a mixed environment of unbroken prairie, wetland, and creek and riverfront and is also exploring how to restore prairie and how to restore Indigenous culture and management principles to the land. Supported by the Native Plant Society of Saskatchewan, a full plant inventory has been conducted in 2018-19, and a management plan is being developed between Métis knowledge-keepers and Western-trained biologists and agronomists. Restoring the biodiversity and the prairie happens alongside restoring the Métis culture and heritage of this unique landscape.

**Tidal Marshes and Rising Tides: Facilitating ecological resilience in the Fraser River delta**

*Eric Balke, Coordinator, BC South Coast Conservation Land Management Program*

The Fraser River delta is the most important area for overwintering birds in Canada, contains the most important salmon estuary in Canada, and is a wetland of international significance. However, the delta has been heavily
modified and degraded by anthropogenic activities, including an extensive network of dikes protecting cities of Metro Vancouver. Sea level is anticipated to increase by 1 metre over the next 80 years, and threatens to drown out the tidal ecosystems of the delta that cannot migrate landward due to the presence of dikes. It will cost approximately $9 billion to protect Metro Vancouver from sea-level rise, but there may be cost-effective opportunities to protect communities from the rising tides by facilitating tidal marsh resilience throughout the delta.

**Restoration of low arctic tundra using locally sourced vegetative sods**

*Ian Hnatowich, M.Sc. student and Katherine Stewart, Assistant Professor, Soil Science Department, University of Saskatchewan*

Restoration of terrestrial arctic ecosystems is hampered by several unique challenges, such as short growing seasons, harsh climates, and a lack of readily accessible native seeds or vegetative propagules. In partnership with Agnico Eagle Mines Limited, a restoration trial was established in the summer of 2019 to assess the effectiveness of using locally harvested vegetative material to promote revegetation of disturbed low arctic tundra. Two transplanting techniques were used: Intact plugs of upland tundra heath (0.4m$^2$) and shredded plugs (sieved through 2cm$^2$, applied at 30% surface area). Intact plugs of native vegetation and underlying soils were transplanted onto gravel quarries that had been manipulated to resemble hummock-hollow microtopography. Percent cover of all species was determined for the transplanted materials. Soil samples were taken from harvest sites for characterization of soil properties and soil invertebrate populations of undisturbed tundra. Initial field observations indicated vegetative growth and overall community survivability within the transplanted plugs. The restoration trial will be monitored in the summers of 2020 and 2021 to assess the survivability and growth of individual tundra species and any changes to the overall community composition. The maintenance of key ecosystem services within transplanted materials will also be examined through monitoring soil invertebrate communities and functional gene prevalence associated with key nutrient cycling processes.

**The development and function of Biological Soil Crust (BSC) communities**

*Phaedra Cowden, Ph.D. student and Katherine Stewart, Assistant Professor, Soil Science Department University of Saskatchewan*

Anthropogenic activities can have a negative impact on terrestrial landscapes and typically require restoration efforts to return them to their natural state. Common methods of restoration, such as the addition of soil amendments, seeding and fertilization have shown to be effective methods to initiate re-vegetation on degraded ecosystems; however, these methods may be overlooking the importance of initiating the early foundational processes which are essential to support a healthy self-sufficient ecosystem. Restoring these key ecosystem functions, such as nutrient cycling, may improve the long-term success of terrestrial restoration. Biological soil crusts [BSCs] are communities of bacteria, fungi, algae, lichens and mosses and are often the primary colonizing communities in early successional landscapes. Investigations into the role of BSCs in early ecosystem development has shown that they play important roles in soil stability, moisture retention and nutrient cycling. Understanding these processes is essential for successful manipulation and propagation of BSC communities for use in a restoration capacity. Chronosequences of BSC development in both anthropogenically disturbed (Drilling waste sites, Rankin Inlet, NU) and naturally developing (Glacial foreland, Castle Creek glacier, BC) ecosystems will be used to examine community assembly of BSCs and their associated ecosystem functions. Investigation of nutrient (carbon and nitrogen) interactions between BSCs and underlying substrate at increasing stages of BSC development will provide important information on how BSCs modify their environment over time.