



“Filtering”

Ink and acrylic paint on Mulberry paper

42”h x 18”w

Cheryl Buckmaster (2023)

Artist's Commentary:

This “draft” painting was created as I researched constructed wetlands and new findings in the application of genomics to enhance constructed wetland treatment systems (CWTS) in northern environments. “Filtering” uses imagery to symbolize a constructed wetland and humans’ responsibility within the whole ecosystem. Slender Wheatgrass is uptaking toxins in oilsands processed water and the question of what happens to the toxins is evident.

Such amazing abilities these plants have! They bestow on us their assistance, possibly saving us and the ecosystem from poison. But we don’t know the whole process—nature is full of chaos, and unpredictable webs of interdependence—thus, the Coyote, the original trickster, hides within the scene. The Coyote represents the innate mystery of the natural world, and the tricks it will play are for us to learn from. If nature is to be “used” to work for humans, we invite the unknown and let go of control. Let’s honor nature’s innate balance, mystery, and powers. Let humans work for nature. Slender Wheatgrass seeds are blowing in the sun and blood is running from the bunny. The bunny eats the grass, the coyote eats the bunny, and we drink the water — our life source, running and filtered through everything. The blood falls onto the larger hand which holds the responsibility to ensure safe, clean, water into the child’s hand and to the people for generations. In-depth and relative preliminary research, acting on knowledge from the surrounding people and ecosystems, and public education, are all essential to this foundational project.

Water experts that informed this artwork:

Douglas Muench’s team (Mitchell E. Alberts, Jeremy Wong, Ralph Hindle, Dani Degenhardt, Richard Krygier, Raymond J. Turner, Douglas G. Muench), and Christine Martineau NRCCanada, Graham Strickert and Lori Bradford from the GELS team.

About the art-science collaboration:**GROW: Genomics Research for Optimization of constructed treatment Wetlands Art Science Collaboration: Research-Creation to Support the Balance of Power for Decision-Making in the GROW project.**

Scientists across Canada are conducting studies and creating marsh-type labs to clean toxic oil sands processed water(OSPW). This research will identify the optimal conditions for OSPW degradation by plant, bacteria and algae, and enhance our understanding of the genes and mechanisms associated with the biodegradation of toxic naphthenic acids (NA’s) in OSPW.

Keeping with the goal of regenerative sustainability CWTS’s have the potential to work with nature as a whole and give back to the surrounding ecosystems. Douglas Muench’s team have detected the uptake of naphthenic acid into root and shoot tissues of Sandbar Willow and Slender Wheatgrass. This exciting research finding indicates a direct role for plants in the remediation of OSPW.

GROW

Genomics Research for Optimization of constructed treatment Wetlands
for water remediation.

I found an overall sense of the unknown and great hope that all aspects of safety for the surrounding ecosystem and humans living in the area are secured. For example, Muench states: “Future studies that identify biotransformation products and their volatility are essential in understanding the fate of NAs in a phytoremediation setting.” In other words, more studies are needed to understand what happens to the toxins within, and outside of, the plant after uptake. The research-creation involved in this project takes place in many sites located in Treaty 8 and Treaty 6 Territories and the Homeland of the Métis. Partners on the project include Fort McKay First Nation, Fort McKay Métis, McMurray Métis, Athabasca Chipewyan First Nation, Clearwater River Dene Nation, and Fond du Lac Denesuline Nation. Other university partners and industry partners include the University of Calgary, Brock University, University of New Brunswick, NRCan, Simon Fraser University, and Imperial Oil.

The oil sands region in Athabasca, Canada, is the largest deposit of crude oil in the form of bitumen in the world, spanning 142,000 square kilometres, of which about 1030 square kilometres is in active extraction (Canadian Association of Petroleum Producers, 2022).

The overall project will use genomics approaches to investigate how wetland plants and microbes can work together to help remove contaminants from the OSPW in cold weather (Northern environments). While there is some understanding of the microbial genes and biochemical pathways involved, the natural science team will learn more about the molecular aspects of remediation and the role of plants in these processes alongside the social, legal, ethical, economic, and other aspects that people will be concerned about. The research will provide insight into the commercialization of OSPW remediation through constructed treatment wetland systems as a part of a suite of solutions to return safe water back to its ecosystem.

Cheryl Buckmaster has direct involvement in the observation of the researchers doing their individual projects, the project team members coming together in regular meetings, workshops, and output generation; and visiting sites (labs, pilot wetland sites, mesocosm labs), Indigenous and non-Indigenous communities who may be impacted or concerned, and in liaising with industry partners. She will also be involved in the interpretation of social network analysis of the team members over the years of the project to understand the human dimensions of how these research networks evolve over time. It is a quasi-ethnographic study, with researchers as subject, voluntarily, from which we will create new knowledge as art. There is a multi-directional exchange of information so that all team members, participants, industry partners, and the funding agency will be in communication with Cheryl Buckmaster. Fred McDonald, an artist from Fort McKay, will be joining Cheryl to collaborate artistically on the GROW project.

About the Artist

Cheryl Buckmaster's professional art career of 30 years includes exhibiting, private, public, and corporate commissions, instruction, social work, art studio management, and collaborating with Indigenous communities and establishments. Today she is the first visual artist to pursue a transdisciplinary Masters in the School of Environment and Sustainability at USASK.

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