

FUNDING  
DETAILS

## Assessing Wetland Reclamation in the Alberta Oil Sands Region

Mining companies have used knowledge from over 20 years' research on wetland ecology and biota to create reclaimed watersheds containing young wetlands. However, research is needed to evaluate success of these efforts. Over three field seasons, we will use new technology and a novel conceptual/statistical approach to assess and interpret the wetland dynamics and quantify environmental stresses that affect biota in 120 wetlands of varying ages, sizes and origins. We will calibrate 3 composite wetland attributes of environmental stress - water quality (from lab analysis of water samples and conductivity & dissolved oxygen loggers) - permanence (from depth loggers; precipitation & evaporation records; stable isotopes of deuterium and oxygen; radon; drone-flown imagery) - and riparian disturbance (from drone-flown imagery). Surveys of vegetation, macroinvertebrate, and avifauna communities will be summarized to create calibrated wetland bioindicators.



**RECIPIENT:**

**Dr. Jan Ciborowski,  
University of  
Calgary**



**PARTNERS:**

**COSIA, NSERC**



**TOTAL BUDGET:**

**\$3,821,746**



**AI FUNDING:**

**\$500,000**



**PROJECT DATES:**

**MAR 2022 –**

**DEC 2025**



**PROJECT TRL:**

**N/A**

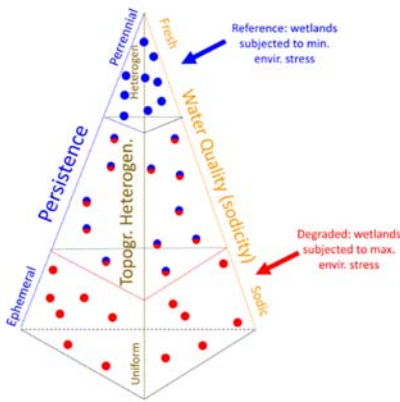


Figure 1. reference-degraded stressor pyramid concept.

### APPLICATION

The primary objective of the project is to validate a novel reclamation assessment approach, which identifies age-specific environmental thresholds ('triggers') at which biota (bioindicator scores) are altered by each class of stress in young wetlands. This will allow oil sands mining companies to better assess the status and properties of created and opportunistic wetlands that have emerged in restored areas and how these contribute to site reclamation objectives.



PROJECT GOALS

- Custom-design a searchable geodatabase to organize and house existing data compiled over the past 20 years
- Field sample young and maturing Athabasca Oil Sands (AOS) wetlands to document age-specific ranges of natural variation in environmental conditions and biological responses
- Using both historic and acquired data, develop a proof-of-concept application that defines measures of reclamation success for early successional stages of wetlands forming or constructed in the AOS postmining landscape

BENEFITS TO ALBERTA

- 50+ students (undergraduate, MSc, PhD) will be trained. These HQP will become leaders of new efforts to effectively reclaim mined landscapes that provide ecosystem services comparable to pre-mining conditions.
- The environmental thresholds derived to ensure wetland success will assist oil sands companies to reclaim impacted landscapes.
- Data and knowledge gathered will help to inform wetland reclamation policies and practices.
- New partnerships and networks formed through the project will disseminate these ideas throughout Alberta’s reclamation community.



Goal of 3+ Practices/Policies Informed



Goal of >50 Publications



Goal of 35+ Students Trained



Goal of 5-10 Jobs Created

CURRENT STATUS

APR 2023

There were significant delays in initiation of field work and student recruitment due to the pandemic. These challenges have been largely addressed and progress is being made in the gathering of data and initial analyses.