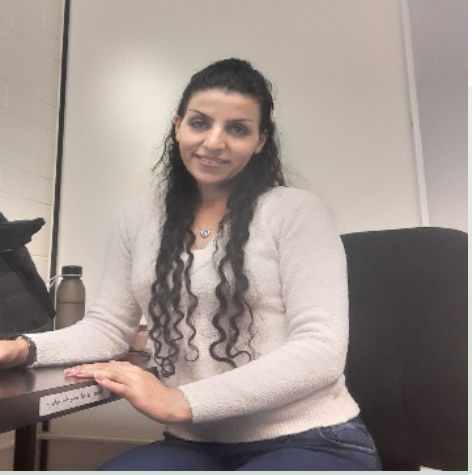

Restore Carbon Dynamics

BERA Project Update

The Assessment of Seismic Line Disturbance on Water Balance in the Boreal Region

Project Update Year
2021

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Project Theme Area
Soils/Hydrology

Project Code
SY2

Project Location
TBD

Working Group
Please contact Maryam if you are interested in joining this working group

Why is this study important?

The construction of seismic lines is associated with vegetation removal and soil compaction, resulting in alterations in microclimate and hydrology. Soil moisture content is an important driver of plant community composition, growth, and rates of biogeochemical processes. Changes in soil moisture content are driven by the water balance. Regarding this fact, determining the impact of seismic line disturbance on the water balance is important for understanding its effects on ecosystem function and the effectiveness of restoration treatments. The main questions of this investigation will be 1) how do seismic lines impact the water balance at local and large (watershed) scales 2) how could uncertainties in measuring some water balance components such as evapotranspiration, and deep percolation affect the water balance? 3) which constructive method would describe the connection among water balance factors in the region.

How was it completed?

For achieving the goals, a combination of field-based measurements and computer hydrological modelling will be exploited. Measurements will be made weekly in the summer at sites where meteorological data (e.g., radiation, temperature, precipitation) will also be collected. Furthermore, for assessing the impact of snow on the water balance, the amount of snow on and off the lines will be measured as well. After gathering the data, calibration and validation of the model will incorporate the physical and chemical properties of the soil, the type of vegetation cover, and weather variables. The output of the model will be key components of the water balance including evapotranspiration, deep percolation, runoff, soil moisture, etc.

What are the core management implications to date?

Currently there is a lack of data and understanding of the effect of seismic line disturbance on water balance in the boreal region. Therefore, this study will attempt to fill the knowledge gap related to modelling the hydrological parameters and tracing the pollutants in the wetlands in the region. Results will inform how hydrologic conditions, like soil moisture content, affect tree regeneration and carbon cycling on seismic lines while also providing insight into how the anthropogenic footprint may be affecting local to regional water resources.

By applying hydrologic models to understand the effect of disturbance, results can be extended beyond local study areas. Furthermore, the whole status of the watershed can be seen in one model at the same time. In other words, this model will provide the opportunity to see the interaction among ecosystem components. Moreover, since weather variables are considered as an input, the impact of climate change on the water balance would be seen on the model by the predicted variables for the future, which will be helpful in land management, particularly for wetland ecosystems.

Boreal Ecosystem Recovery & Assessment