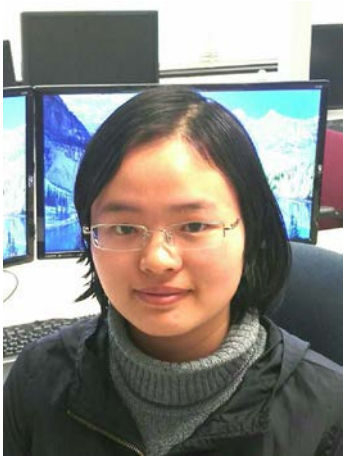
2020 Project Summaries
Boreal Ecosystem Recovery & Assessment
An NSERC Collaborative Research & Development Program

Remote Sensing Team: Drones Can Measure Vegetation Height on Seismic Lines

Shijuan Chen, MSc
University of Calgary, Department of Geography
shijuan@bu.edu

Research Team:
Guillermo Castilla[1], Greg McDermid[2], Julia Linke[2], Tobias Tan[3]
[1] Canadian Forest Service, Natural Resources Canada;
[2] University of Calgary, Department of Geography;
[3] University of Alberta, Department of Renewable Resources



Project Summary
UAV photogrammetry – the process of measuring ground features from overlapping photos acquired from drones – brings huge efficiencies to ground-based vegetation surveys. In this study, we wanted to assess whether UAV photogrammetry could replace traditional field measures of mean vegetation height along seismic lines (narrow corridors open in the forest for oil and gas exploration), where height is an indicator of recovery. We surveyed, both with a drone and on foot, 30 seismic lines of varying recovery status in four different areas of Alberta's oilsands region, and compared the field measurements to the UAV estimates, including their respective cost. We found that UAV photogrammetry can estimate mean vegetation height along the line within 10 cm of the field value, does not need external data on terrain elevation, and is more cost-effective than traditional field methods. This can potentially transform the way vegetation recovery is monitored in linear disturbances.

Management Implications and Lessons Learned
At the aggregated site level, we found that UAV photogrammetry could replace traditional field-based vegetation surveys of mean vegetation height across the range of conditions assessed in this study, with an average error of less than 10 cm. Cost analysis indicates that using UAV-based point clouds is more cost-effective than traditional field vegetation surveys.

Our findings have implications beyond monitoring recovery in seismic lines. Utility companies could use it to assess when vegetation has encroached in a powerline or pipeline and needs to be treated.

Publication(s)
Chen, Shijuan (2017): Characterizing Vegetation Structure on Anthropogenic Disturbances Features in Alberta's Boreal Forest with Unmanned Aerial Vehicles. MSc thesis, Department of Geography University of Calgary.

Chen, S., McDermid, G.J., Castilla, G. and Linke, J. (2017) Measuring vegetation height in linear disturbances in the boreal forest with UAV photogrammetry. *Remote Sensing*, 9(12), p.1257.