Boreal Ecosystem Recovery & Assessment
An NSERC Collaborative Research & Development Program
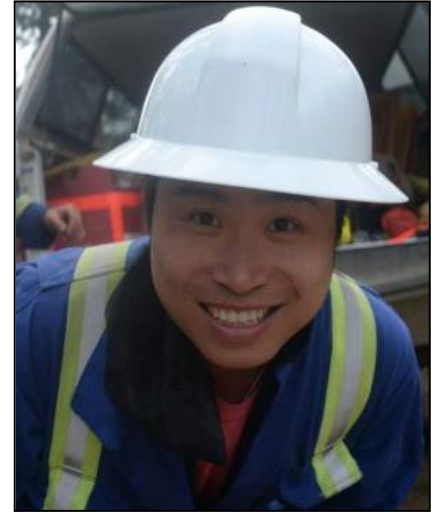
Man Fai Wu, MSc Student
University of Calgary, Department of Geography
mfwu@ucalgary.ca
Research Team:
Julia Linke[1], Mir Mustafizur Rahman[1], Greg McDermid[1], Guillermo Castilla[2]
[1] University of Calgary, Department of Geography; [2] Canadian Forest Service, Natural Resources Canada

Project summary

Under the correct conditions, remote sensing can provide the information necessary to perform conifer stocking assessments on boreal seismic lines. However, we require a sound understanding of the circumstances under which remote sensing can adequately deliver. In pursuing this goal, BERA researchers are working on a number of studies aimed at revealing the influence of various data, site, environmental, and processing factors on remote-sensing based stocking assessments. The target of this particular project is *automated object-based analysis*. In this work, we will compare traditional assessments of conifer seedling location, density, and stocking performed the field to remote-sensing assessments performed using 5-cm airborne imagery. We want to know: (i) how does automated object-based analysis compare to field surveys, and (ii) how is performance affected by factors such as seedling size, site type, and illumination conditions?

Progress to date

We established 63 field sites to collect field data based on the stocking criteria in the Provincial Restoration Framework. Field sampling was performed in the summer 2017. Aerial fixed-wing surveys using an optical sensor (Leica RCD30) delivered 4-band (RGB and infrared) imagery and LiDAR data over Foster Creek (38.6 km2), LiDEA (369 km2) and Kirby South (37 km2). Pre- and post-processing of the field data and the remote sensing data for these sites is complete. Currently, we are working on developing an image classification algorithm for automated seedling detection within eight selected sites. Once developed and refined, the algorithm will be applied to the rest of the sites.

Management implications

Our goal is to specify the environmental conditions (seedling size, site type, line orientation, phenology, etc), data requirements (ground sample distance, spectral resolution, etc) under which remote sensing can deliver reliable estimates of conifer stocking. This research, along with other related research projects, is part of that effort.

Geographic location

The study areas for this research are the Kirby South, Foster Creek, and LiDEA project sites near Bonnyville and Conklin, Alberta.