

Assessing Urban Forest Values using a Combination of LiDAR, TSI, and i-Tree Eco field data

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ABSTRACT

In 2015 and 2016 and 2018, students in the Renewable Resources (RENr) and GIS programs at the British Columbia Institute of Technology participated in a series of iTree inventory and urban forest assessment projects in partnership with the City of Maple Ridge. RENr students used GPS and GIS systems and a digital version of the iTree Eco survey form to map several urban forest areas. Sites with variation of land use, built environments and forest system types were selected to assess both forest canopy and efficacy of the iTree tool and GPS equipment in a range of forest and land use environments. Field data was used in project work by BCIT GIS interns at the City of Maple Ridge. These students prepared and processed the data with the iTree server and produced a series of ecosystem service reports and presentations for City staff.

BCIT students and faculty partnered with Object Raku Technologies, a private company who has developed a tool for tree species identification and assessment based on an analysis of LiDAR data for forested areas. This technology had been used mainly in commercial forestry applications and this study has been a test for its use in urban environments. Preliminary studies using data from 2015 inventory indicated that the integration of these technologies is possible. The main focus of the work completed in 2017 and 2018 is the test and study of the efficacy and accuracy of LiDAR results for several urban areas surveyed in 2016 and 2018. Students and staff from the RENr collected random grid samples in several locations using the i-Tree 20 metre by 20 metre grid plots where 100% of trees within each grid is recorded using GPS technology and a digital survey form. In 2018, the LiDAR data was incorporated as field reference with canopy segmented and tree height and species included in the background field map for navigation and reference in each grid plot.

A series of field studies with students, staff and the City of Maple Ridge will allow us to investigate the feasibility and potential for this application. If successful, this method and integration of technology could greatly aid urban land managers and resource management professionals in the assessment and management of urban forests. It will also promote a greater understanding of the ecological services and benefits provided by trees and urban forested areas in the lower mainland area.

BIOGRAPHY

Laurie Stott has over twenty years of experience in the natural resource industry and specifically, in field inventory projects. She has used remote imagery, the Global Positioning System and Geographic Information Systems to inventory and assess aquatic and terrestrial ecosystems. Laurie has taught in the Renewable Resource programs at BCIT for over 10 years and has developed and delivered several

courses in digital field mapping, geographic information systems, computer applications and urban forest inventory. Laurie holds a degree in International Relations with a focus on economics, international development and environmental policy, a diploma in Fish, Wildlife and Recreation management and a Master's in Education and Technology. Laurie has initiated and led several i-Tree inventory and research projects using a wide range of technologies and data sources in several urban communities and co-developed a part-time studies course for Urban Forest Assessment using i-Tree tools. She continues to study the use of LiDAR with the i-Tree Eco application and is currently playing around with drones and photogrammetric imagery to see what may be possible with these technologies for urban tree and natural capital assessments.

Mike Parlow has successfully led and managed efforts in software product management and remote sensing project management for the past 25 years. One of Object Raku's founders, Mike leads the team's strategic vision and was a key contributor to the creation of Object Raku's Tree Species Identifier software suite. As Object Raku's President, Mike has managed technology projects partnered with federal, provincial, and state governments, large corporate clients, and three universities. These efforts have ranged from pure research & development projects to system integration work involving leading edge technology and systems.

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