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MES Candidate 2011

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Thesis Research:

Enhancing carbon sequestration and storage potential in the future urban forest of Burnside Industrial Park in Halifax, Nova Scotia

Project Goal:

To examine the biophysical potential for improvement of the BIP urban forest, principally in terms of establishing more trees of appropriate species on suitable sites.

Abstract:

Urban and industrial settings represent potential areas for increased carbon sequestration through intensified tree planting. Most such ecosystems could easily have greater tree cover, and such tree-cover increases would enhance carbon uptake and storage. Burnside Industrial Park in Dartmouth, NS, is both already well developed and poised for expansion on lands currently forested. My study will examine the degree to which improved forest management in the Burnside ecosystem could enhance carbon sequestration. I will quantify the potential carbon-uptake increases associated with planting more trees in the developed portion of the Park, as well as the carbon implications of developing more industrial infrastructure where semi-natural forest now occupies the landscape. Of particular interest is the potential for supporting yet another business in Burnside, one that would expand and tend the urban forest in the Park with funding from companies investing in carbon offsets.

Keywords: Burnside Industrial Park, Halifax, Nova Scotia, carbon storage, carbon sequestration, urban forest, industrial ecology, urbanization, urban sprawl



(Left) Enhancing biological adsorption of carbon, (e.g. increasing density of tree planting), is one way to mitigate atmospheric carbon dioxide levels

Research Questions:

1. What is the potential for C sequestration and storage of Burnside's urban forest today?
 - a. What is the potential if it is (left as is/half planted/fully planted) in 2050 and 2100?
 - b. What would the imputed monetary value of the urban forest be in 2050 and 2100, if Burnside is (left as is/half planted/fully planted)?
2. To what extent might the development of Burnside's urban forest be funded via local businesses purchasing C credits?

(Right) From the air, the impacts of urbanization within Burnside Industrial park are extremely evident.



Methods:

Assemble GIS database of Burnside

- Construction of tree hospitality map

Model potential carbon storage and sequestration

- GIS-based models:
 1. Carbon Budget Model of the Canadian Forest Sector (CBM-CFS3)
 2. Urban Forest Effects Model (UFORE)
- Excel-based model:
 1. Centre for Urban Forest Research Tree Carbon Calculator (CTCC)

Assign \$/tonne value to estimated carbon storage

- Simple calculation:
(Estimated tree planting program revenue)
- (Estimated tree planting program costs)

Extent of which Burnside urban forest may be developed via purchasing of carbon credits