Pre-Settlement Landscape Vegetation Modeling and Mapping

Southern Ontario's Historic Vegetation Cover

- Forests once covered over 80% of the land-scape.
- Prairies and savannahs covered 1% of southern Ontario.
- Wetlands (swamp, marsh and wet meadows) made up about one quarter of all vegetation cover.
- Some areas, such as Essex County had wetland cover as high as 80%.
- Early successional forest made up about 5% of the total forest cover.
- In the past there was much more American elm, and less red maple and red ash.
- American beech was a dominant species in some forest stands.
- Windfalls, fire and beaver activities were prominent natural disturbances.



Collecting sugar maple sap in 1907

"If we are serious about restoring ecosystem health and ecological integrity, then we must first know what the land was like to begin with." - Aldo Leopold, American Ecologist

- Have you ever wondered what southern Ontario's landscape looked like before European settlement and the major land clearing activities that accompanied this process?
- What did the vegetation in southern Ontario look like two centuries ago before farms were established, and our cities, towns, subdivisions, schoolyards, factories and roads were built?
- What was the structure and spatial extent of our forests prior to European settlement?
- How much natural vegetation cover was lost, and from where on the landscape?
- Do our parks, protected areas, conservation lands, ravines, remnant forests, woodlots, wetlands and grasslands resemble the historic vegetation of two centuries ago?
- Have you ever wished you had wall-to-wall maps of the pre-settlement vegetation and landscape to help you make informed resource management decisions?

These questions can be answered as we map southern Ontario's past, and begin to use this information to understand the present and shape our future.

Looking to the past to understand the present and shape the future

To understand present-day vegetation distribution and composition in southern Ontario, and forecast and shape its future direction, we must first look to the past. Prior to European settlement and the extensive land clearing, logging, development and agriculture that accompanied this process, the landscape of southern Ontario was largely forested with patches of prairie, savanna and marsh.

Our understanding of southern Ontario's pre-settlement vegetation can be derived from historical reports, books, land surveyors' notebooks, personal diaries, old maps and documents.

What is pre-settlement landscape vegetation modeling and mapping?

Using statistical modeling and prediction techniques, historical information can be converted into maps of pre-settlement vegetation, which can be used to support and inform conservation efforts and natural resource management. The process draws on information about historical vegetation and landscape condition from old land surveyors' records and historical maps. Model development and validation also utilizes various sources of environmental and contemporary vegetation data.

Land surveyors' records are the key to discovering Ontario's past

Just prior to the arrival of large waves of European settlers to southern Ontario, land surveying was carried out to support settlement. At that time, surveyors traveled across the landscapes, marking township lines, concessions and lot corners, and recording information about natural features, vegetation cover and forest composition. These 200 year old records are a rich source of historical vegetation and landscape information. They were one of the main data sources used to support pre-settlement vegetation modeling and mapping.

Historical surveyors' records (right) contain information about natural features and vegetation cover.



Pre-settlement landscape vegetation mapping in Ontario



In Ontario, statistically derived pre-settlement models and maps have been generated for Algonquin Park and the Temagami Sustainable Forest License Area, based on digital land surveyors' information collected from 1856 to 1958. Pre-settlement mapping was also completed for York Region in 2003. Most recently, presettlement mapping has been generated for the southwestern Golden Horseshoe.

Pre-settlement vegetation mapping completed for York Region in 2003 (left).



A woodlot west of Guelph, 1910.



Tree stumps in Norfolk Country, between 1906 and 1912.

Pre-settlement landscape vegetation mapping for the southwestern Golden Horseshoe

Most recently, pre-settlement vegetation mapping has been completed for the southwestern Golden Horseshoe. The study area covered includes the Regions of York, Toronto, Peel, Halton and Hamilton and the entire Credit Valley watershed.

The mapping products produced for the southwestern Golden Horseshoe area are diverse, and include numerous vegetation and tree species distribution maps for the presettlement era. Amongst these mapping products are reconstructions of the pre-settlement distributions of American chestnut, oak dominated forests, and wetlands.



The pre-settlement probability distribution of the American beech-basswood association (above).

Contact:

If you want to find out more about the science behind presettlement landscape vegetation mapping, applying this information, or the next steps for expanding the scope of this mapping in southern Ontario, including developing partnerships to expand mapping availability, please contact:

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Knowledge of pre-settlement landscape vegetation composition and structure is important because:

- It can be used to conduct gap analysis, which in turn provides evidence for setting conservation and restoration objectives and targets, and determining ecological thresholds.
- It can be used to direct forest management and silvicultural practices towards attaining historical vegetation species composition.
- It can help us determine the location of remnant vegetation patches that are important for gene conservation, and that can act as regional seed sources.
- Most of southern Ontario's species and wildlife are adapted to the landscape and vegetation structure that existed prior to European settlement; pre-settlement vegeta-

tion mapping can help target, protect and restore underrepresented plant and wildlife habitats.

- It can help us quantify and measure the extent and loss of biodiversity.
- It helps give us a sense of place, and appreciate the history of the land we live on.