Vegetation Criteria and Indicators to Assess Forests within the Niagara Escarpment Plan

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Introduction:

- The Vegetation Sampling Protocol (VSP) is a plot-based, quantitative and standard vegetation sampling method for settled landscapes of southern Ontario.
- It is a spatial and repeatable method for best inventory and monitoring practices.
- VSP field data are used to create a number of comparable, precise, efficient and objective vegetation criteria and indicators.

Preliminary Results:

- Standard field data has allowed development of vegetation criteria and indices such as:
  - Biodiversity, Indicators species, Invasive Species, Forest Characteristics, Forest Regeneration, Mature and Old growth forests, Forest Structural, and Wildlife Habitat
  - Cross-comparison of criteria and indices is being also tested for the Lake Simcoe Protection Plan.

Methods:

- The VSP(1) protocol was used to collect data from 56 Carolinian forest plots in the Niagara Escarpment.
- Each fixed area (400m²) plot is circular.
- The VSP entails a comprehensive full species list, tree and snag measurements, regeneration, and soil texture.

Figure 1. VSP field measurements can be used to estimate wildlife habitat in the NE. Percent of all snags (143) by Diameter class found across all 56 plots in the NE.

Figure 2. VSP field data enables estimate of structural attributes within a plot. Gradients of total biomass (kg) in three plots in the NE show that some forest types have eight folds more stored carbon than others.

Figure 3. VSP field data is used to estimate biodiversity within a plot. Gradients of mean Coefficients of Conservatism for four plots in the NE.

Total Species Richness, Native and Non-Native Species Richness in 56 NE Plots

<table>
<thead>
<tr>
<th>Plot Number</th>
<th>Total Species Richness</th>
<th>Average # of Species Per Plot</th>
</tr>
</thead>
<tbody>
<tr>
<td>43, 44, 21, 34</td>
<td>227</td>
<td>25.96</td>
</tr>
<tr>
<td>49</td>
<td>169</td>
<td>21.83</td>
</tr>
<tr>
<td>7, 8, 9, 22, 30, 32, 40, 51</td>
<td>36</td>
<td>3.77</td>
</tr>
</tbody>
</table>

Table 1. VSP derived information provides a range of biodiversity indicators. Data shows that non-natives make 18% of total species richness, and some of these are invasive species.

Carolinian Indicator Species Found in 56 NE Plots

<table>
<thead>
<tr>
<th>Plot</th>
<th>Carolinian Indicator Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>43, 44, 21, 34</td>
<td>Tulip tree [1]</td>
</tr>
<tr>
<td>49</td>
<td>Sassafras [2]</td>
</tr>
<tr>
<td>7, 8, 9, 22, 30, 32, 40, 51</td>
<td>Witch hazel [2]</td>
</tr>
<tr>
<td>36</td>
<td>Prickly Ash [2]</td>
</tr>
</tbody>
</table>

Table 2. VSP derived information identifies indicator species characteristic of Carolinian forest.

Conclusion:

- The VSP allows the creation of standardized, measurable and repeatable criteria and indices that are capable of detecting small changes in the ecosystem over space and time.
- VSP information supports evidence based: conservation and land use planning practices; wildlife habitat, invasive species and forest management; and better understanding of vegetation composition and structure.
- VSP could become a standard for inventory and monitoring of vegetation that is necessary for conservation and natural resources management and land-use planning.
- The range of derived criteria and indicators can be used to inform performance of the Niagara Escarpment Plan in 2015 and its revision.

References:


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400m²

11.28m