

Severn Sound

Environmental Association

EVALUATION OF NATURAL HERITAGE CONDITIONS IN THE TOWNSHIP OF TAY









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by SEVERN SOUND ENVIRONMENTAL ASSOCIATION

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FOREWORD

This document reports on the natural heritage conditions within a selected area of the Township of Tay, to provide the Township with the technical basis for planning decisions on future management of its natural heritage.

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TABLE OF CONTENTS

LIST OF	TABLES	ii
LIST OF	MAPS	iii
LIST OF	FIGURES	iii
LIST OF	APPENDICES	iii
1.1 1.2 1.3 1.4 1.4.	ntroduction Provincial Policy Statement Purpose Study Area Scope 1 Habitat Analysis 2 Natural Heritage Evaluation 3 Ecological Land Classification	1 1 2 2
2.1 2.1. 2.1. 2.1. 2.1.	3 Evaluated and Unevaluated Wetlands, and Wet Areas	4 5 5 6 7 7
3.0 S 3.1 3.2 3.3 3.4 3.5 3.6 3.7 3.8 3.9 3.10 3.11	Coring Descriptions for Natural Heritage Components Woodland Patch Size Significant Woodlands Interior Forest Woodland Adjacent to Riparian Habitat Woodland Adjacent to Wetland Habitat Natural Watercourses Wildlife Habitat Areas Slope Low Slope Areas with Water Great Lakes Shoreline Combined Score and Special Consideration Areas	10 11 11 12 13 14 14 15 15

4.0 Result	ts and Recommendations	. 19
4.1 Hab	oitat Analysis	. 19
4.2 Nat	ural Heritage Evaluation	. 22
4.2.1	Woodland – Percent Cover	
4.2.2	Woodland Patch Size	. 23
4.2.3	Significant Woodlands	
4.2.4	Interior Forest	
4.2.5	Woodland Adjacent to Riparian Habitat	
4.2.6	Woodland Adjacent to Wetland Habitat	
4.2.7	Natural Watercourses	
4.2.8	Wildlife Habitat Areas	
4.2.9	Slope	
4.2.10	Low Slope with Water	
4.2.11	Great Lakes Shoreline	
4.2.12	Combined Score and Special Consideration Areas	
	logical Land Classification	
4.4 Sun	nmary of Recommendations	. 33
5.0 Refere	ences/Literature Cited	E 1
J.U INGIGI	ences/Literature Oileu	
	LIST OF TABLES	
Table 1: Eva	luated Wetlands in the Township of Tay Study Area	6
	a Sets Used for Natural Heritage Evaluation Model	Ć
	EA Scoring for Woodland Patch Size	
	EA Scoring for Significant Woodlands	11
	A Scoring for Interior Forest	12
	A Scoring for Woodland Adjacent to Riparian Habitat	13
	A Scoring for Woodland Adjacent to Wetland Habitat	13
	A Scoring for Natural Watercourses	14
	EA Scoring for Wildlife Habitat Areas	15
	SEA Scoring for Slope	15
	SEA Scoring for Low Slope Areas with Water	16
Table 12: 55	SEA Scoring for Great Lakes Shoreline	16
	SEA Scoring for Special Consideration Areas	18
	w Much Habitat is Enough (2004) Guidelinesmmary of 2008/2009 Woodland, Riparian and Wetland Habitat	20
	Vithin the Township of Tay Study Area	21
	mmary of Great Lakes Shoreline Scores	29
	mmary of Ecological Land Classification for Selected Township of	۷۵
	Properties	31
Table 18: EL	C Descriptions, Selected Township of Tay Properties	32

LIST OF MAPS

Map 1: Township of Tay Natural Heritage Evaluation - Overview Map	37
Habitat Conditions	38
Map 3: Township of Tay Natural Heritage Evaluation - 2008/2009 Riparian	20
Habitat ConditionsMap 4A: Township of Tay Natural Heritage Evaluation - 2008/2009 Wetland	39
Habitat Conditions	40
Habitat Conditions	41
Map 5: Township of Tay Natural Heritage Evaluation – Slope and Elevation Contours	42
Map 6: Township of Tay Natural Heritage Evaluation – Ecological Land	
Classification of Selected Township Owned Properties	43
LIST OF FIGURES	
Figure 1A: Woodland Patch Locations with the Study Area Boundary	44
Figure 1B: Woodland Patch Size Scoring	44 45
Figure 3: Interior Forest Scoring	45
Figure 4: Woodland Adjacent to Riparian Habitat Scoring	46
Figure 5: Woodland Adjacent to Wetland Habitat Scoring	46 47
Figure 7: Wildlife Habitat Areas Scoring	4 <i>1</i> 47
Figure 8: Slope Scoring	48
Figure 9: Low Slope Areas with Water Scoring	48
Figure 10: Great Lakes Shoreline Scoring	49
Figure 11: Natural Heritage Evaluation – Combined Score	50
Figure 12: Natural Heritage Special Consideration Areas	50
LIST OF APPENDICES	
Appendix A: Glossary and List of Acronyms	54

1.0 Introduction

The words *woodland* and *forest* both appear in this report, but they represent the same type of natural heritage feature. Earlier projects and data, such as *How Much Habitat Is Enough* (Environment Canada, 2004), often used the term 'forest' to describe a woodled area, while more recent literature refers to these areas as 'woodlands'.

1.1 Provincial Policy Statement

The 2005 Provincial Policy Statement (PPS) sets out the Province of Ontario's interests in land use planning and development. These policies must be reflected in local planning documents, such as the update to the Township of Tay Official Plan. The PPS requires the Township to protect significant natural heritage features and areas, known collectively as the Natural Heritage System, by restricting development and site alteration, and by demonstrating that the features and ecological function of the areas will not be harmed if development is permitted. This is normally done through the preparation of an Environmental Impact Study by a qualified individual.

The components that comprise a Natural Heritage System are those identified in section 2.1 of the PPS, and include: Significant Habitat for Endangered and Threatened Species, Significant Wetlands, Significant Woodlands, Significant Valleylands, Significant Wildlife Habitat, Areas of Natural and Scientific Interest, Habitat for Fish, and Linkages. This report provides an assessment of natural heritage conditions in a portion of the Township of Tay, to assist in identifying features that should be protected within the update of the Township's Official Plan. The Natural Heritage Evaluation is based on the GIS methodology outlined later in this report.

1.2 Purpose

The Severn Sound Environmental Association (SSEA) was contracted to provide a habitat analysis (including mapping and an evaluation of natural heritage features) of selected portions of the Township of Tay, Ontario, to assist the Township with their Official Plan Review and other planning initiatives.

1.3 Study Area

Tay Township staff determined that there were two major priority areas for the Natural Heritage Evaluation: the Waverley area, and the Port McNicoll, Victoria Harbour and Waubaushene area (Map 1). The study area was chosen because it incorporated the settlement areas of the Township, as well as a buffer of rural land around these settlements.

The land base of the Township of Tay, not including water lots, is approximately 14,118.7 hectares (ha) in size; the total study area is 3,606.7 ha. The Port McNicoll, Victoria Harbour and Waubaushene portion of the study area is 3,380.4 ha, and is bounded on the south by Highway 12 between Wye River and Hogg Bay and the old Canadian Pacific Railway corridor between Hogg Bay and Waubaushene (Map 1). Throughout most of this area, the highway and railway corridor widths were sufficient to serve as a break in contiguous vegetation (e.g., woodland patches) and were a logical limit to the boundary for this portion of the study area. The analysis ended at the shoreline and did not include any in-water features or islands; the elevation used to delineate the shoreline was approximately 176.1 metres above sea level (MASL).

The Waverley portion of the study area is 226.3 ha, and is bounded to the south and west by the municipal borders with the Townships of Tiny and Springwater, and to the north and east by a 500 metre (m) buffer to the settlement area (Map 1).

For the Woodland scoring components of the Natural Heritage model (Section 3.0), the study area was further subdivided into <u>Settlement Area</u> and <u>Rural Area</u>. The boundaries of Settlement Areas were delineated by the Township of Tay and provided to SSEA in electronic format; all portions of the study area outside the Settlement boundaries are referred to as the Rural Area.

The Settlement Area is 1,168.7 ha in total: 83.2 ha in Waverley, 497.1 ha in Port McNicoll, 438.1 ha in Victoria Harbour and 150.3 ha in Waubaushene. The Settlement Areas contain mostly residential land use, as well as commercial, industrial, institutional, open space and environmental zones. The Rural portion of the study area is 2,438 ha in total: 143.1 ha in Waverley, and 2,294.9 ha combined for Port McNicoll, Victoria Harbour and Waubaushene.

1.4 Scope

The project was undertaken in three parts: the *Habitat Analysis* provides an overview and mapping of existing conditions within the study area; the *Natural Heritage Evaluation* scores the natural heritage components within the study area; *Ecological Land Classification (ELC)* mapping was completed for selected sites within the study area and provides additional detail on the habitat types present on these properties.

1.4.1 Habitat Analysis

The first phase of this project was a Habitat Analysis of the study area, adapted from the Automated ArcView 3.1 Habitat Analysis Method (McPhail, 1999).

Three types of habitat were measured to model the existing landscape:

- Forested areas (percentage of area covered by forest and interior forest areas)
- Riparian areas (percentage of stream reaches with adjacent forest cover and at least 30 m adjacent forest cover)
- Wetlands (percentage of study area covered by wetland and amount of adjacent forest cover)

Section 2.3 contains further information on the background of the Habitat Analysis.

1.4.2 Natural Heritage Evaluation

The second part of the project focused on evaluating the natural heritage features currently found within the Township of Tay study area, providing a baseline of natural heritage information that can be used as part of future municipal planning and development initiatives.

In addition to the features examined in the Habitat Analysis, five additional components were scored as part of the Natural Heritage Evaluation, resulting in ten layers of information:

- · Woodland Patch Size
- Significant Woodlands
- Interior Forest
- Woodland Adjacent to Riparian Habitat
- Woodland Adjacent to Wetland Habitat
- Natural Watercourses
- · Wildlife Habitat Areas
- Slope
- Low Slope Areas with Water
- Great Lakes Shoreline

Based upon existing models when possible, the SSEA scoring system was designed to provide an evaluation for each of the ten natural heritage components. Each component was weighted equally and scored out of 10 possible points; a description of the scoring employed is provided in Section 3.0. Using GIS technology, the component layers were then combined and a cumulative score was determined. These results are illustrated on maps that utilize a colour representation of their score (Figures 1 to 12).

The Natural Heritage Evaluation scoring is a planning tool that identifies areas of interest within the study area; it can be used as the basis for protecting important natural heritage features in the Township and is a starting point for further detailed studies of natural heritage features. A complete Natural Heritage System should identify natural heritage features, as well as linkages, and other important habitat (e.g., significant habitat of endangered species and threatened species). The significance of some resources can only be determined after site level evaluation.

1.4.3 Ecological Land Classification

Ecological Land Classification (ELC) was carried out for selected municipallyowned properties within the study area, using the ELC manual (Lee et al., 1998). ELC was completed for these properties to provide additional detail on these sites and their contributions to natural heritage in the study area.

2.0 Data Preparation

As part of the Natural Heritage Evaluation process, several GIS layers were used as inputs to the model. These inputs included slope, surface watercourses, woodland cover, wetlands, Areas of Natural and Scientific Interest (ANSI) and other natural heritage features.

The evaluation required additional interpretation and analysis of some of the layers to update the information to the most recent conditions (refer to Section 2.1, Updated Layers) and to provide additional derived data (refer to Section 2.2, Derived Data Layers).

All input layers were converted to a 5-metre resolution raster grid. The scored grid layers were added together mathematically using the ArcGIS 9.3 Spatial Analyst software's Raster Calculator tool which produced a single combined score grid layer. The final combined score layer provides a visual depiction of high scoring natural heritage areas within the Township of Tay study boundary.

Note: All layers used in the Natural Heritage Evaluation were limited to fall within the Township of Tay study boundary; however, for some scoring purposes, the Habitat Analysis method considered natural heritage features that extended beyond the study boundary (e.g., the total size of a woodland patch that spans municipal boundaries was used to identify Significant Woodlands).

2.1 Updated Layers

The Natural Heritage Evaluation model required woodland, wetland and riparian data that were updated to the ground conditions found in the most recent available aerial photos. The latest aerial photos that were available for this project are 10-centimetre resolution orthogonally-rectified photographs (ortho-photographs) that were flown by the County of Simcoe in late April, 2008. The data update was crucial in order to provide an accurate representation of the 2008 conditions.

2.1.1 SOLRIS Woodland Updated to 2008

The existing Southern Ontario Land Resources Information System (SOLRIS) woodland data was produced by the Ontario Ministry of Natural Resources (OMNR) and is based on 2002 ortho-photographs. To update the 2002 SOLRIS data to 2008 conditions, a method was used similar to that originally applied by OMNR. Woodland patches were interpreted and digitized on-screen using the 2008 ortho-photographs and criteria from SOLRIS: Image Interpretation Manual (OMNR, 2004).

In general, a woodland patch was altered or added to the SOLRIS woodland data if it contained: contiguous forest growth with gaps no greater than 20 metres; had greater than 60% tree cover; and was larger than 0.5 hectare (SOLRIS Image Interpretation Manual, OMNR, 2004).

Treed wetlands, such as swamps, were included as woodlands. For this study, large hedgerows were also considered to be part of a woodland patch if they contained tree cover greater than 60%, gaps between woodland patches were not wider than 20 m across, and the trees appeared to be greater than 2 m in height.

Selected woodlands were given a unique patch identification (ID) number. The updated layer was produced as a shapefile and was then used as an input to the Habitat Analysis for the Natural Heritage Evaluation (Map 2).

2.1.2 Watercourses Corrected to 2008

As part of the on-going *Severn Sound Source Protection Area* studies, detailed watercourse data had already been interpreted using the 2008 ortho-photos, including the identification of natural streams, ditches, overland flow and culverts (Map 3). This watercourse data was used for the riparian component of the Habitat Analysis method as well as an input into the natural watercourse component of the Natural Heritage Evaluation model.

For this study, a natural watercourse was defined as a series of connecting drainage line segments that are part of an unaltered drainage system, and may include channels with intermittent flow. Sometimes it was necessary to include ditches or culverts in the natural watercourse designation when the water flowing through a ditch originates in, or flows to, a natural system.

2.1.3 Evaluated and Unevaluated Wetlands, and Wet Areas

Existing Natural Resources and Values Information System (NRVIS) data was used for the boundaries of evaluated wetlands and unevaluated wetlands.

There are four evaluated wetlands that fall within or touch the Township of Tay study area boundary (Table 1); all are coastal wetlands. The portions of each of these wetlands that extend inland and were within the study area (i.e., above 176.1 MASL) were used as inputs to the model. The portions of the wetlands that extend into the water (i.e., below 176.1 MASL) were not included in the Habitat Analysis.

Table 1: Evaluated Wetlands in the Township of Tay Study Area

Wetland Name	Status	Total Area (ha)	Area within Study Boundary (ha)
Port McNicoll Marsh	Provincially Significant	85.8	31.2
Hog Bay Wetland	Provincially Significant	39.4	15.3
Sturgeon Bay Wetland	Provincially Significant	200.8	106.7
Victoria Harbour Marsh	Locally Significant	36.1	13.4

Unevaluated wetland boundaries were originally delineated in the Ontario Base Map data (OMNR, 1983) by aerial photo interpretation and were also included in the Habitat Analysis; the wetlands have not been evaluated using the Ontario Wetland Evaluation System (OMNR, 1994).

Additional wet areas were included as part of the Habitat Analysis and Natural Heritage Evaluation models, and were interpreted from the 2008 ortho-photos. A wet area was digitized on-screen if a distinct boundary could be distinguished from the aerial photo. A wet area is a zone that has standing water and has not been previously identified in the wetland or drainage layers. The evaluated and unevaluated wetlands and wet areas layers were combined into a single wetland/wet area shapefile for the Habitat Analysis (Maps 4A and 4B).

Although urban stormwater ponds can provide habitat, they were not included in the Habitat Analysis, since they are specifically managed to control runoff and may be altered or cleaned out periodically.

2.1.4 Areas of Natural and Scientific Interest and Wildlife Habitat Areas

Existing NRVIS data on Areas of Natural and Scientific Interest (ANSI) and wildlife habitat areas, including Waterfowl Nursery Areas, Deer Yards, and Important Bird Areas, was used for the analysis.

The Waubaushene Beaches Earth Science Provincially Significant ANSI and two Waterfowl Nursery Areas (Sturgeon Bay and Hogg Bay) fall in the study area. There were no Deer Yards or Important Bird Areas within the study boundary.

The ANSI boundary and Waterfowl Nursery Areas layers were appended to the wetland/wet area layer, creating the Wildlife Habitat Areas layer for the Natural Heritage Evaluation process.

2.2 Derived Data Layers

Additional analysis was undertaken to produce derived layers that in turn were used as inputs to the Natural Heritage Evaluation model. These layers included shoreline data, physical data (elevation contour and slope), and results from the Habitat Analysis.

2.2.1 Elevation and Slope Data

A 5-metre resolution Digital Elevation Model (DEM) was used to generate elevation contours and a slope model (Map 5). The DEM used is a product of the OMNR's Water Resources Information Project, and is based on data captured during the 2002 ortho-photo project.

The contour data was used to identify the 177.5 MASL line for the Natural Heritage Evaluation *Great Lakes Shoreline* scoring component.

The slope model was used for the Natural Heritage Evaluation *slope* scoring, and *low slopes with water* scoring. Percent gradient of slopes were generated from the DEM and separated into very low slope (0-5%); low slope (5.1-15%); moderate slope (15.1-25%); and high slope (25.1% or greater) categories (adapted from the Eastern Ontario Woodland Valuation System, Rowsell, 2003).

The *low slope associated with water* component of the Natural Heritage Evaluation involved extracting the 0–5% slope category, converting the grid to a shapefile and intersecting the shapefile with the Watercourse layer. If a drainage segment flowed through a low slope polygon, then the polygon remained in the shapefile. If a low slope polygon did not have any watercourses flowing through it, then the polygon was removed from the layer. Low slope areas associated with water were scored in the Natural Heritage Evaluation model.

2.2.2 Great Lakes Shoreline

A shoreline is the edge of a body of water, where the land meets water. Since the Great Lakes shoreline varies daily, seasonally and yearly, the shoreline used for the Natural Heritage Evaluation analysis was derived from the County of Simcoe's 2002 ortho-photo break line data, and was at an elevation of 176.1 MASL. A break line is a line feature that controls surface behaviour when modeling elevation data.

The maximum monthly mean for Lake Huron (including Georgian Bay) is approximately 177.5 MASL (Fisheries and Oceans Canada, 2009).

The shoreline shapefile (176.1 MASL) was combined with the high water contour line (177.5 MASL) and converted to a polygon layer. Using the 2008 ortho-photos, an interpretation and scoring of the shoreline area (i.e., between 176.1 and 177.5 MASL) was completed. The polygon layer was then converted to a 5-metre grid for input into the Natural Heritage Evaluation model.

2.3 Habitat Analysis Results Applied to the Natural Heritage Evaluation Model

Results from the Habitat Analysis component were used in the scoring of woodland patches in the Natural Heritage Evaluation model and consisted of the interior forest (Map 2), amount of woodland adjacent to streams (Map 3) and amount of woodland adjacent to wetlands/ wet areas (Maps 4A and 4B) components.

2.3.1 Interior Forest

The 2008 SOLRIS woodland layer was combined with the 100 metre and 200 metre interior forest layers to create a single layer which was joined by a unique identifier to the 2008 SOLRIS layer. If a woodland patch did not have interior forest, then a proximity selection step was completed using GIS to determine if the woodland patch was within 20 metres of a woodland containing interior forest, since small gaps in forest cover can potentially be closed through planting or natural succession to increase the amount of forest interior habitat. Woodland patches with 100 m and 200 m interior forest, and patches without interior forest that were within 20 m of a woodland patch containing interior forest were scored using the Natural Heritage Evaluation model.

2.3.2 Woodland Adjacent to Riparian Habitat

Using the riparian output from the Habitat Analysis (Map 3), the watercourse layer was clipped to the 2008 SOLRIS Woodland layer. A new layer was created that consisted of stream segments with greater than 30.1 m adjacent woodland and stream segments with between 0.1 and 30 m adjacent woodland that fall within the SOLRIS woodland patch boundaries.

Each stream segment was attributed the corresponding unique woodland patch identification (ID) number. The stream segments were summarized by the unique ID, providing a total length of stream with greater than 30.1 m and between 0.1 and 30 m adjacent woodland for each woodland patch. The lengths were converted to percentages that were used to apply the Natural Heritage Evaluation scoring.

2.3.3 Woodland Adjacent to Wetlands/ Wet Areas

The widths of woodland adjacent to wetland/wet area boundaries (Maps 4A and 4B) were used to provide summary statistics for each woodland patch. The amount of adjacent woodland cover that a woodland patch provides to one or more wetlands was determined using this method.

The wetland boundary layer was broken into approximately 10 m segments and attributed the maximum adjacent woodland value for each segment, according to the Automated ArcView 3.1 Habitat Analysis Method (McPhail, 1999), clipped to the 2008 SOLRIS woodland layer. The line segments were assigned a unique ID number for the woodland patch that they fell within. The wetland boundary segments were summarized by the woodland patch ID to provide an average width of adjacent woodland that each patch provides to the wetland. The average value for each patch was used in the Natural Heritage Evaluation scoring process.

A summary of the data sets used for the Natural Heritage Evaluation model is provided in Table 2.

Table 2: Data Sets Used for Natural Heritage Evaluation Model

Table 2. Data Sets Osed for Natural Heritage Evaluation Model										
	1	2	3	4	5	6	7	8	9	10
Natural Heritage Evaluation Component Data Set	Woodland Patch Size	Significant Woodlands	Interior Forest	Woodland Adjacent to Riparian Habitat	Woodland Adjacent to Wetland Habitat	Natural Watercourse	Wildlife Habitat Areas	Slope	Low Slope with Water	Great Lakes Shoreline
SOLRIS Woodland Updated to 2008	Х	Х	Х	X	Х					
Evaluated Wetlands					Х		Х			
NRVIS & Interpreted Wet Areas					Х		х			
NRVIS ANSI							Х			
Watercourses Corrected to 2008				Х		Х			Х	
5m Digital Elevation Model (DEM) based on 2002 ortho-photos								х	х	х
5m Slope Model Based on 5m DEM								Х	Х	Х
177.5 MASL, High Water Mark Approximation										х
176.1 MASL, 2002 Shoreline										Х
Habitat Analysis Condition Mapping Data Set										
100 and 200m Interior Woodland			Х							
Amount of Woodland Adjacent to Streams				Х						
Amount of Woodland Adjacent to Wetlands/ Wet Areas					Х					

3.0 Scoring Descriptions for Natural Heritage Components

Some Woodland evaluation criteria differ in scoring weight between the Settlement Area and the Rural Area. In four of the ten components scored, greater values were assigned to those features found within the Settlement Area, in accordance with other methodologies and reports (e.g., Significant Woodland patch size as defined within County of Simcoe Official Plan, 2008). Natural features found within a Settlement Area tend to be smaller or fewer, but remain critical to maintaining ecological functions within that area.

Components that were scored differently between Settlement Area and Rural Area were:

- Woodland Patch Size (Section 3.1)
- Significant Woodlands (Section 3.2)
- Woodland Adjacent to Riparian Habitat (Section 3.4)
- Woodland Adjacent to Wetland Habitat (Section 3.5)

3.1 Woodland Patch Size

The largest woodland patch within the Settlement portion of the study area and the largest woodland patch in the Rural portion of the study area were each measured for spatial size (hectares); these sizes became the 100% benchmark for the Rural and Settlement areas. The largest woodland patch in any of the Settlement areas was in Port McNicoll; the woodland patch extends beyond the Settlement boundary, however, the 62.5 ha of woodland inside the Settlement area was used as the benchmark. The largest woodland patch in the Rural area was east of Port McNicoll, at 128.4 ha. Other patch sizes were then compared and scored relative to the largest patch within their respective areas (Table 3).

	Table 3: SSEA	Scoring for	Woodland	d Patch	Size
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Relative size of	Score (points)				
woodland (as % of	Rural:	Settlement:			
largest patch)	(largest patch = 128.4 ha)	(largest patch = 62.5 ha)			
100%	10	10			
90 – 99%	9	9			
80 – 89 %	8	8			
70 – 79 %	7	7			
60 – 69 %	6	6			
50 – 59 %	5	5			
40 – 49 %	4	4			
30 – 39 %	3	3			
20 – 29 %	2	2			
Less than 20 % (but	1	1			
greater than 0.5 ha)					

Note: If a woodland patch spanned the Settlement/Rural boundary within the study area, the entire patch was scored according to the criteria for the area (i.e., Settlement or Rural) that contained the largest proportion of the patch. However, woodland patches that extended beyond the study area or municipal boundaries were only scored based on the amount of the woodland within the study area, to provide a relative comparison of patch size within the study area.

3.2 Significant Woodlands

Due to forest fragmentation, there is a need to recognize the value of moderatesized, contiguous woodland patches; they also have potential to become even larger woodlands, either through tree planting initiatives or via natural seeding/ succession over time.

Adopting criteria from section 5.8 of the County of Simcoe Official Plan (2008), a *Significant Woodland* in the Township of Tay is a minimum of 2 ha in size within a Settlement Area, and a minimum of 10 ha within the Rural Area (Table 4).

	<u> </u>
Feature	Score (points)
Settlement Area	10
(Patch size >2ha)	
Rural Area	10
(Patch size >10 ha)	

Note: If a woodland patch spanned the Settlement/Rural boundary within the study area, the entire patch was scored according to the criteria for the area (i.e., Settlement or Rural) that contained the largest proportion of the patch. However, the scoring criteria for *Significant Woodlands* used the size of the entire woodland patch; in some instances, a contiguous woodland patch extended beyond the study area or municipal boundary.

3.3 Interior Forest

'Interior forest' is the portion of a woodland that is situated 100 metres or more from the outside edge. In southern Ontario, the criteria of 100 m and 200 m from the forest edge are used as threshold measurements for interior forest and deep interior forest (How Much Habitat is Enough, Environment Canada, 2004; Eastern Ontario Woodland Valuation System, Rowsell, 2003). Interior forest represents the amount of sheltered habitat available for species that require large tracts of undisturbed woodland.

Scoring was awarded by determining the proportion of woodland that was 100 m or more from the outside edge of each woodland patch. The maximum score attained within a woodland patch was assigned to the patch as a whole (Table 5). Woodlands with 200 m interior forest were attributed the highest score, followed by 100 m interior habitat. If a woodland patch did not have interior forest but was within 20 metres of another woodland containing interior forest, it received a lower score than patches with interior forest. Small gaps in forest cover can potentially be closed through planting or natural succession to increase the amount of forest interior habitat. All other patches received a zero score.

Table 5: SSEA Scoring for Interior Forest

Feature	Score (points)
Woodland patch with deep interior forest	10
200 m or more from its outer boundary	
Woodland patch with interior forest more	8
than 100 m (but less than 200 m) from its	
outer boundary	
Woodland patch with no interior forest, but	6
is within 20 m of another patch with interior	
forest	

Note: The scoring criteria for *Interior Forest* used the boundaries of the entire woodland patch; in some instances, a contiguous woodland patch extended beyond the study area or municipal boundary.

3.4 Woodland Adjacent to Riparian Habitat

Woodlands provide shade and soil stability to areas immediately adjacent to small watercourses. How Much Habitat is Enough (Environment Canada, 2004) provides the following guideline:

"streams should have a minimum 30-metre wide naturally vegetated adjacent lands area on both sides, greater depending on site-specific conditions."

In order to characterize the full effect of the riparian interface, the scoring considers the entire woodland patch (Table 6). Scoring reflects the Settlement Area having intrinsically smaller woodlands, i.e., a small woodland patch in a Settlement Area has more 'value' than the same sized woodland in a Rural Area.

Table 6: SSEA Scoring for Woodland Adjacent to Riparian Habitat

Feature	Score (Points)			
	Rural	Settlement		
Woodland patch provides >30m cover adjacent to 76 – 100% of an intersecting stream	10	10		
Woodland patch provides >30m cover adjacent to 26 – 75% of an intersecting stream	8	10		
Woodland patch provides >30m cover adjacent to 1 – 25% of an intersecting stream	6	8		
Woodland patch provides <30m cover adjacent to a stream	4	6		
Woodland patch is within 30m of a stream but does not intersect the stream	2	4		

Note: The scoring criteria for *Woodland Adjacent to Riparian Habitat* used the boundaries of the entire woodland patch; in some instances, a contiguous woodland patch extended beyond the study area or municipal boundary.

3.5 Woodland Adjacent to Wetland Habitat

Woodland cover within or adjacent to a wetland is a critical habitat component. Trees, living and dead, as well as shrubs, provide shade, soil stability and wildlife habitat. Scoring reflects this relationship between wetlands (evaluated and unevaluated) and woodland cover by examining at the average width of adjacent woodland vegetation.

In the document A Framework for Guiding Habitat Rehabilitation in Great Lakes Areas of Concern: 1st Edition (Environment Canada et al., 1998) the guideline for the width of natural vegetation (herbaceous and/or woody) around all wetlands is 240 metres. This was broken down into smaller widths for scoring purposes (Table 7).

Table 7: SSEA Scoring for Woodland Adjacent to Wetland Habitat

Feature	Score (Points)	
	Rural	Settlement
Woodland patch provides >240m adjacent vegetation	10	10
Woodland patch provides 101 – 240m adjacent vegetation	8	8
Woodland patch provides 1 – 100m adjacent vegetation	4	6
Woodland patch is within 30m of wetland boundary	2	4

Note: Woodland patches that extended beyond the study area or municipal boundaries were scored based on the amount of the woodland cover adjacent to the portion of the wetland within the study area only.

3.6 Natural Watercourses

Three types of watercourses were scored by the type of drainage they provided within the Township of Tay: natural watercourses, intermittent overland flow, and constructed ditch/ culvert. The area that was assigned a score was not the watercourse itself, but an area adjacent to the watercourse, which varied dependent on the amount of habitat it typically provides (Table 8).

Natural watercourses (e.g., streams, creeks) have a permanent channel and may contain water either year-round or intermittently. A score of ten points was applied to a 30 metre area on either side of the section(s) of watercourse with this type of flow.

Intermittent overland flow of water included seasonal flooding of fields and drainage down shallow hills. A score of seven points was applied to a ten metre area on either side of the section(s) of watercourse with this type of flow.

Where watercourses traveled through a constructed ditch or culvert, a score of four points was applied to a five metre area on either side of these section(s) of watercourse.

Table 8: SSEA Scoring for Natural Watercourses

Feature	Score (points)	Area Scored
Natural watercourse	10	30 m on either side of the centre line of the channel
Intermittent overland flow	7	10 m on either side of the watercourse centre line
Constructed ditch or culvert	4	5 m on either side of the watercourse centre line

3.7 Wildlife Habitat Areas

Data from the OMNR related to the following wildlife habitats was examined:

- Waterfowl Nursery Areas
- Winter Deer Yards
- Important Bird Areas
- Areas of Natural and Scientific Interest (ANSI)
- Evaluated Wetlands (scoring reflects wetland habitat only, not adjacent woodland habitat, which is scored in Section 3.5, Woodland Adjacent to Wetland Habitat)

A 25 metre 'buffer zone' was created as part to the scoring matrix to also assign value to the immediately adjacent lands that do not fall within the boundary of the Wildlife Habitat feature.

Although the quality of data on record for these wildlife habitats is variable, the best information available was used to apply the scoring (Table 9).

Table 9: SSEA Scoring for Wildlife Habitat Areas

Feature	Score (points)
Area is an ANSI, evaluated wetland, or Waterfowl Nursery Area	10
Area is an unevaluated wetland or wet area	7
Area is within 25 metres of ANSI boundary or an evaluated wetland boundary	5
Area within 25 metres of an unevaluated wetland or wet area	3

3.8 Slope

Percent gradient of slopes were separated into categories, adapted from the Eastern Ontario Woodland Valuation System (Rowsell, 2003): very low slope (0-5%); low slope (5.1-15%); moderate slope (15.1-25%); and high slope (25.1 or greater). Areas were scored according to their slope (Table 10); areas of Very Low Slope (<5.1%) with indications of the presence of intermittent or seasonal surface water are scored in Section 3.9.

Table 10: SSEA Scoring for Slope

Feature	Score (points)
High slope (25.1% or greater)	10
Moderate slope (15.1 – 25 %)	8
Low slope (5.1 – 15 %)	5
Very low slope (0 – 5 %, no surface water)	0
Very low slope (0 – 5 %, with surface water)	Refer to Table 11

3.9 Low Slope Areas with Water

If an area was determined to have very low slope (0 - 5%) and also had indications of containing seasonal or intermittent surface water, it has some potential to be a wetland, and thus a separate scoring layer was employed (Table 11). The flatter the area is (e.g., 1% slope) the greater the probability that water will collect in this area (A Method For Analyzing Historical Wetland Habitat Conditions, McPhail, 2004).

Table 11: SSEA Scoring for Low Slope Areas with Water

Feature	Score (points)
0 – 1 % slope	10
1 – 2 % slope	8
2 – 3 % slope	6
3 – 5 % slope	2
over 5 % slope	0

3.10 Great Lakes Shoreline

Much of the coast of the Great Lakes has been subjected to development pressure and has been degraded from its natural state. Shorelines that have undisturbed natural vegetation, including natural stream and river mouths, have high suitability for fish and wildlife habitat. A shoreline currently impacted by artificial structures (e.g., solid crib docks, breakwalls, imported fill) or effluents (drain ditch outflow) is of low habitat quality. Vertical steel breakwalls were not given any points, due to their dramatic and negative influence on shoreline habitat. Higher scores were applied to shoreline areas with little or no impact on the natural shoreline (Table 12).

Table 12: SSEA Scoring for Great Lakes Shoreline

Feature	Score (points)
Shoreline natural, vegetation buffer present, no structures	10
Shoreline mainly natural (>75%), contains few artificial structures	7
Shoreline has been somewhat altered (<75%) and contains artificial structures	5
Shoreline greatly altered (>75%) from historic configuration, contains artificial structures	2
No shoreline present, or vertical steel breakwall installed	0

3.11 Combined Score and Special Consideration Areas

The scores for the ten components of the Natural Heritage Evaluation were summed to provide an overall score for each area. Each component was assigned a score up to a maximum 10 points. Each of the ten components was weighted equally. Since the slope (Section 3.8) and low slope with water (Section 3.9) scoring components are mutually exclusive, the maximum achievable Combined Score for an area is 90 points.

The Combined Score layer illustrates the relative importance of various portions of the study area. The Combined Score layer provides the locations and boundaries of natural heritage areas in one layer, which may help guide refinements to the Official Plan and Zoning Land Use boundaries. There is no established value that identifies significant natural heritage features; the Township of Tay must determine which features should be protected.

Areas that score high in several components are important elements of an area's natural heritage. Areas that score low in the Combined Score layer may not be as important to an area's natural heritage, however, focusing only on the Combined Score for an area may undervalue certain natural heritage components. The Special Consideration Areas layer was developed to address this possibility.

The Ontario Wetland Evaluation System (OMNR, 1994) applies methodology and scoring based on a wetland's features: a wetland is Provincially Significant if it scores 600 or more total points, or if it scores 200 or more points in the Biological or Special Features components. This approach allows the importance of specific values to be recognized even when the total score is below the threshold of 600 points. For example, a wetland that scored 450 total points that has Provincially Significant winter cover for wildlife and Provincially Significant waterfowl breeding habitat would score enough points in the Special Features category to make the wetland Provincially Significant.

In a manner similar to the *Ontario Wetland Evaluation System* (OMNR, 1994) approach, this study used threshold scores for some parameters (Table 13) to identify 'Special Consideration Areas'.

Table 13: SSEA Scoring for Special Consideration Areas

Parameter	Score	Rationale		
	(points)			
Significant Woodlands	10	Corresponds with criteria for Significant Woodlands (County of Simcoe Official Plan, 2008)		
Interior Forest	8	The landscape within the Township of Tay study area is below the 100-m interior forest guideline (How Much Habitat is Enough, 2004); any woodland with interior forest may be important		
Woodland Adjacent to Riparian Habitat	10	Corresponds with guideline for stream length that should be naturally vegetated (How Much Habitat is Enough, 2004)		
Woodland Adjacent to Wetland Habitat	8	Corresponds with guideline for natural vegetation adjacent to swamps and marshes (How Much Habitat is Enough, 2004)		
Natural Watercourse	10	Existing permanent/natural watercourses may be important even if they do not have substantial woodland or wetland habitat associated with them		
Wildlife Habitat Areas	7	A variety of sizes and types of wetlands should be maintained across a landscape (How Much Habitat is Enough, 2004); wetlands (including evaluated wetlands and unevaluated wetlands larger than 2.0 ha) and ANSI are considered County Greenlands (County of Simcoe Official Plan, 2008)		
Slope	10	Steep slope areas (refer to Section 3.8)		
Shoreline	7	Fisheries and Oceans Canada advises developing 25% or less of a property's total shoreline frontage (The Shore Primer, 2008, Fisheries and Oceans Canada Ontario Operational Statement, 2007)		

A Special Consideration Area met one or more of the criteria in Table 13, thereby indicating the presence of notable features, even if the area received a low aggregate score.

Both the Combined Score and Special Consideration layers are a tool that can be referred to when determining an area's overall natural heritage value.

4.0 Results and Recommendations

The Habitat Analysis and Natural Heritage Evaluation were based on updated data layers, primarily based on 2008 aerial photographs (the most recent available). Any changes to the extent of natural features after April 2008 (e.g., alterations caused by recent development) would not be captured by the analysis, influencing the results of the evaluation.

This project only considered the study area portion of the Township of Tay. An analysis of habitat in the entire Township may yield different results for some natural heritage features; for example, the largest woodland patch identified for the study area is not necessarily the largest woodland patch in the entire Township.

General Recommendations:

- a) Complete the Habitat Analysis for the entire Township of Tay, to determine forest, riparian and wetland parameters for the whole planning area.
- b) Complete the Natural Heritage Evaluation for the entire Township of Tay, to provide a more comprehensive representation of the relative importance of various areas to the natural heritage of the Township.
- c) Identify areas where development has been approved or initiated since April 2008; re-run the Habitat Analysis and Natural Heritage Evaluation to determine how loss of habitat in these areas affects natural heritage in the Township.

4.1 Habitat Analysis

A Habitat Analysis of the study area was completed, based on the Automated ArcView 3.1 Habitat Analysis Method (McPhail, 1999).

The Habitat Analysis included the following parameters for the study area:

Forest Habitat

- · percent forest cover
- size of largest patch
- percent forest >100m from edge
- percent forest >200m from edge

Riparian Habitat

- percent streams naturally vegetated
- percent streams with >30m buffer

Wetland Habitat

- percent wetland cover
- amount of vegetation adjacent to wetlands

The How Much Habitat is Enough (Environment Canada, 2004) guidelines (Table 14) were established for <u>watersheds</u>, however they can also be used to indicate the relative health of other areas within a municipality, and provide a benchmark for planning purposes.

Table 14: How Much Habitat is Enough (2004) Guidelines

	to Enough (2001) Guidemies
Parameter	Guideline
Forest Habitat	
Percent forest cover	>30% of the area
Size of largest forest patch	At least 200ha and >500m wide
Percent 100 m interior forest habitat	>10% of the area
Percent 200 m interior forest habitat	>5% of the area
Riparian Habitat	
Percent of stream naturally vegetated	75% of stream length
Wetland Habitat	
Percent wetland in watershed	>10% in watershed; >6% in a
	subwatershed
Amount of natural vegetation adjacent to	Marsh: 100m
wetlands	Swamp: 100m

Table 15 provides the results for the Habitat Analysis of the study area.

Table 15: Summary of 2008/2009 Woodland, Riparian and Wetland Habitat Conditions Within the Township of Tay Study Area

WOODLAND HABITAT										
		Port McNicoll, Victoria Harbour and Waubaushene Area					Waverley Area			
PARAMETER		Total Area	Settlement Areas	Port McNicoll	Victoria Harbour	Waubaushene	Rural Areas	Total With 500m Buffer	Settlement Area	Rural Area
% Woodland Cover		44.8%	33.0%	38.4%	30.8%	21.4%	50.4%	41.4%	10.6%	59.2%
Area of Woodland Cover (ha)		1513.8	357.9	191.0	134.7	32.2	1155.9	93.5	8.8	84.7
Size of Largest Patch Within Bo	oundary (ha)	128.4	44.1	44.1	24.0	14.0	128.4	0.6	0.0	0.6
Size of Largest Patch Touching	Boundary (ha)	240.6 (32.9 Inside)	110.2 (62.5 Inside)	110.2 (62.5 Inside)	89.8 (28.2 Inside)	15.8 (5.4 Inside)	240.6 (32.9 Inside)	188.4 (58.7 Inside)	188.4 (5.1 Inside)	188.4 (58.7 Inside)
% of area with Forest Cover > 1	00 m from Edge	9.1%	6.4%	11.7%	3.4%	0.0%	10.3%	8.5%	0.6%	13.1%
% of area with Forest Cover > 2	200 m from Edge	1.5%	1.4%	3.0%	0.0%	0.0%	1.5%	0.2%	0.0%	0.4%
RIPARIAN HABITAT										
		Port McNicoll, Victoria Harbour and Waubaushene Area				Waverley Area				
PARAMETER		Total Area	Settlement Areas	Port McNicoll	Victoria Harbour	Waubaushene	Rural Areas	Total With 500m Buffer	Settlement Area	Rural Area
% of Natural Veg. Along First to	Naturally Vegetated	65.3%	67.7%	69.3%	65.0%	69.4%	64.5%	82.7%	41.8%	93.8%
Third Order Streams	30 m Wide Buffer	44.0%	44.5%	47.9%	44.2%	31.8%	43.9%	68.5%	7.7%	85.0%
WETLAND HABITAT										
			Port McN	licoll, Victoria Harbo	ur and Waubaushen	e Area		Waverley Area		
PARAMETER		Total Area	Settlement Areas	Port McNicoll	Victoria Harbour	Waubaushene	Rural Areas	Total With 500m Buffer	Settlement Area	Rural Area
% Wetland in Study Area		7.5%	6.1%	10.3%	3.5%	0.0%	8.1%	0.3%	0.1%	0.40%
Amount of Vegetation Adjacent	Mean Width (m)	119	99	128	91	0	122.7	298	15	397.8
to Wetland	Minimum Width (m)	0	0	0	0	0	0.0	0	0	0
	Maximum Width (m)	1740	1450	1450	690	0	1740.0	1580	705	1580
Total Area of Wetland/ Wet Area	as (ha)	253.2	66.5	51.4	15.1	0	186.7	0.65	0.12	0.53
Total Length of Wetland/Wet Ar	ea Perimeters (km)	58.1	12.4	8.7	3.7	0	45.7	0.6	0.2	0.4
Perimeters by Adjacent	No Adjacent Woodland	41.7%	50.6%	56.2%	37.5%	NA	39.0%	37.1%	100.0%	11%
	Between 0.1 and 100 m	25.4%	21.8%	15.8%	35.8%	NA	26.4%	2.8%	0.0%	4%
	Between 100 and 240 m	10.5%	6.8%	4.6%	11.6%	NA	11.6%	7.4%	0.0%	11%
	Greater than 240 m	22.4%	20.8%	23.4%	15.1%	NA	23.0%	52.7%	0.0%	74%

4.2 Natural Heritage Evaluation

This project used two boundaries to define areas of analysis for the Woodland components of the Natural Heritage Evaluation: Settlement Areas (Waverley, Port McNicoll, Victoria Harbour, and Waubaushene, total 1,168.7 ha), and the Rural Area (2,438 ha), the portion of the study area that falls outside the settlement boundaries.

The term "significant" indicates that a feature has unique qualities, such as size, function or location, and requires special consideration for planning and development decisions. See Appendix 1, Glossary, for a definition of "significant" from the Provincial Policy Statement.

Recommendations:

- a) The Township should consider protection for areas that score high in the Combined Scoring layer, as well as Special Consideration areas. Both layers should be taken into account when development is proposed, since some Special Consideration areas (e.g., Sturgeon Bay Marsh) may have a low cumulative score but still be important contributors to the natural heritage of the Township. The results from this study should be used to guide Official Plan (OP) and Zoning Land Use boundary refinement and enhancement exercises.
- b) The Township should ensure that there are no negative impacts to natural heritage features as a result of development of adjacent lands, by requiring an Environmental Impact Study for all proposed development on adjacent lands. The Ministry of Natural Resources has produced a draft second edition Natural Heritage Reference Manual (OMNR, 2009), which includes recommended distances for the extent of adjacent lands, which are areas where a change in land use may cause negative impacts on the natural heritage feature or area.
- c) The Ministry of Natural Resources is responsible for identification or approval of significant wetlands, coastal wetlands, Areas of Natural and Scientific Interest, and significant habitat of endangered species and threatened species; this information may be updated periodically. Additional detailed studies of natural heritage features may be undertaken from time to time, by proponents of development or other agencies. Municipal policies and Environmental Protection mapping of the Natural Heritage System should be amended or refined as additional information becomes available.
- d) Generally, natural heritage features in existing built-up areas are degraded and fragmented. In Settlement areas in particular, the Township of Tay should protect and enhance remaining features, their functions, and connections, wherever possible.
- e) This report and the Natural Heritage System that is developed should be reviewed and updated as part of each five-year review and update to the Township's Official Plan.

4.2.1 Woodland – Percent Cover

The How Much Habitat is Enough (Environment Canada, 2004) guidelines (Table 14) recommend at least 30% of a watershed area should remain forested to ensure ecological functions. Woodland cover within the Settlement areas is 38.4% in Port McNicoll, 30.8% in Victoria Harbour, 21.4% in Waubaushene, and 10.6% in Waverley; the Rural areas around these settlements have over 50% forest cover (Table 15).

Recommendations:

- a) The Settlement Areas of Port McNicoll and Victoria Harbour generally have a healthy percentage of woodland cover, which should be maintained as much as possible.
- b) The Settlement Areas of Waubaushene and Waverley have smaller percentages of woodland cover, which should be enhanced with tree planting where possible. Any proposal to remove existing trees should be reviewed, with emphasis on retaining woodland cover.
- c) The Rural portions of the study area have good forest cover, which should be maintained as much as possible.

4.2.2 Woodland Patch Size

Woodland habitat conditions are presented in Table 15. Figure 1A illustrates the location of woodland patches in the study area; the scoring for Woodland Patch Size is depicted in Figure 1B.

Woodlands provide a wide range of benefits, including environmental, social and economic returns. A variety of sizes, shapes and species configurations are desirable, with large-sized woodlands generally being more productive.

The largest woodland patch entirely in the Rural area is 128.4 ha; the largest patch completely in the Settlement Areas is 44.1 ha, located in Port McNicoll; the Waverley area has a very small patch of woodland, at 0.6 ha (Table 15). All areas in the study boundary have woodlands within their limits that are part of much larger woodland patches.

Recommendation:

- a) Examine opportunities for mitigation of lost habitat, or in-filling of open areas through tree planting initiatives, to increase woodland patch size.
 - For example, if feasible, permanently close the road allowances in woodland patch IDs 10812 and 10813 (Map 6), to help maintain the integrity of these woodlands. In addition, planting the Athabaska Street road allowance between these two woodlands would result in a contiguous woodland patch approximately 10 ha in size.
 - Additional areas for potential in-filling could be determined by SSEA in a supplementary project, using the Automated ArcView 3.1 Habitat Analysis Method (McPhail, 1999).

4.2.3 Significant Woodlands

Due to forest fragmentation, remaining large and moderate sized contiguous woodland patches should be recognized for their values and for their potential to become even larger woodlands through tree planting initiatives or via natural seeding/succession over time.

The County of Simcoe Official Plan (2008) states that any woodland greater than 2 hectares in a Settlement Area, and any woodland greater than 10 hectares in a Simcoe Uplands Rural Area (which includes the study area) will be classified as a significant woodland. Figure 2 illustrates the locations of Significant Woodlands within the Township of Tay study area (red shaded areas); woodland patches smaller than the Significant Woodlands criteria have no shading.

Recommendations:

- a) The Township should retain all Significant Woodlands.
- b) Through tree-planting or natural succession, some moderate sized patches could become joined, potentially creating additional Significant Woodlands. Additional areas for potential in-filling could be determined in a supplementary project, using the Automated ArcView 3.1 Habitat Analysis Method (McPhail, 1999).
- c) Development proposals on lands with Significant Woodlands should require ELC and descriptions of species and composition. Natural, mixed species woodlands generally have more value to wildlife than plantations; however, woodlands of any type provide environmental benefits such as erosion control and carbon storage

4.2.4 Interior Forest

Large patches of woodland are inherently important areas due to their scarcity within the landscape of southern Ontario. A large woodland usually contains a mix of many plants and animals; some of these species require wide buffers from the forest edge to the quiet and undisturbed interior. The decline of populations of interior species is partially attributed to forest fragmentation and diminished woodland patch size.

The How Much Habitat is Enough (Environment Canada, 2004) guidelines recommend that at least 10% of a watershed should have forest cover 100 m or further from the forest edge, and at least 5% of a watershed should have forest cover 200 m or further from the forest edge (Table 14).

Figure 3 and Map 2 illustrate the locations of woodlands within the study area that contain interior forest. Table 15 shows that the Port McNicoll/Victoria Harbour/ Waubaushene area has 9.1% cover of woodlands with 100 m interior forest and 1.5% cover with 200 m interior forest; the Waverley area has 8.5% coverage by woodlands with 100 m interior forest and 0.2% coverage with 200 m interior forest. Port McNicoll settlement contains several patches of both 100 m and 200 m interior forest; Victoria Harbour settlement contains only 100 m interior habitat, and Waubaushene and Waverley settlements contain virtually no interior habitat (Map 2).

Recommendations:

- a) Woodlands with interior forest should receive special consideration for protection from development, in order to retain their ecological integrity.
- b) Woodlands with no interior forest that are within 20 m of another woodland with interior habitat should be examined to determine the feasibility of planting trees to connect the two woodlands and increase forest interior habitat.

4.2.5 Woodland Adjacent to Riparian Habitat

Woodlands are important to maintaining healthy streams: trees and shrubs provide soil stability, water retention, and wildlife habitat adjacent to streams. First order streams (the headwaters of a stream) and second order streams (joined tributaries) are more sensitive to streamside disturbance than the larger and more stable downstream areas (third and fourth orders). Therefore, these smaller streams require the bank stability provided by a tree's root system and the shading provided by adjacent woodland cover. *How Much Habitat is Enough* (Environment Canada, 2004) provides a guideline of at least 30 m of vegetation on both sides, with natural vegetation along 75% of the stream.

Figure 4 illustrates the scoring for riparian areas that intersect woodlands. Note that the entire woodland patch is scored, since the forest as a whole provides riparian protection.

With the exception of the Waverley Rural area, all other parts of the study area contain less than the recommended 75% streamside cover, and less than half of the streams have 30 m of natural vegetation on either side (Table 15).

Recommendations:

- a) Retain woodlands that contribute to riparian habitat.
- b) Enhance woody vegetation cover adjacent to streams to 30 metres wherever possible, to help establish and maintain healthy riparian habitat.

4.2.6 Woodland Adjacent to Wetland Habitat

Wetlands are unique habitats, and the amount (or lack) of adjacent woodland cover has an effect on both function and diversity of species within a wetland.

A Framework for Guiding Habitat Rehabilitation in Great Lakes Areas of Concern (Environment Canada et al., 1998) provided a guideline of 240 metres for the width of natural vegetation (herbaceous or woody vegetation) around wetlands.

There is woodland habitat adjacent to each of the evaluated wetlands, as well as adjacent to most of the unevaluated wetlands or wet areas in the study area (Maps 4A and 4B). Figure 5 depicts the scoring for woodlands adjacent to wetlands.

Recommendations:

- a) Development in any woodland directly associated with a wetland should be carefully considered before approval.
- b) No development should be permitted within woodlands located within 120 metres of a wetland boundary unless an Environmental Impact Study confirms there will be no negative impacts on the features or functions of the wetland.

4.2.7 Natural Watercourses

Watercourses, including streams with defined beds and banks, as well as any linked ditches, are important elements within a natural heritage system, since they provide transfer of water and nutrients throughout the drainage area. Watercourses also provide habitat requirements to many species of birds, mammals, invertebrates, plants, reptiles, amphibians and fish. Figure 6 illustrates the scoring for Natural Watercourses.

The Markham Small Streams Study: Principles and Strategies for the Protection and Management of Small Drainage Courses (Schollen et al., 2006) studied the importance and function of small, seasonal and intermittent watercourses. Their report indicates that these watercourses are a vital aspect of ecological function within a watershed, both as natural flow and as stormwater and flood runoff.

Recommendations:

- a) Natural watercourses should be retained, and any development should preserve the natural character of the watercourse.
- b) Any required ditching or drainage activities should be planned with careful consideration of potential impacts to upstream and downstream flow patterns, as well as fish habitat.

4.2.8 Wildlife Habitat Areas

Figure 7 shows the location and scoring for Wildlife Habitat Areas, including wetlands (evaluated and unevaluated), Areas of Natural and Scientific Interest (ANSI) and Waterfowl Nursery Areas.

One ANSI, four evaluated wetlands, and two Waterfowl Nursery Areas are present in the study area.

ANSI are identified by the Ontario Ministry of Natural Resources, and include Life Science and Earth Science types of sites. ANSI are classified as being either provincially or regionally significant. The Waubaushene Beaches Earth Science Provincially Significant ANSI is 34.1 ha in size. It contains a series of ancient shorelines and has a variety of habitat present, including forest, meadow, and wetland (Macdonald, 1983).

The Ontario Wetland Evaluation System (OMNR, 1994) provides a method for evaluating wetlands in southern Ontario, and has been applied to several wetlands in the Township of Tay. The study area contains three Provincially Significant wetlands (Port McNicoll Marsh, Hog Bay Wetland, and Sturgeon Bay Wetland), and one Locally Significant Wetland (Victoria Harbour Marsh).

An unevaluated wetland is an area that contains water at or near the surface and supports aquatic plant growth that has not been scored using the *Ontario Wetland Evaluation System* (OMNR, 1994). Wetlands smaller than 2 ha are normally not evaluated; unevaluated wetlands have been identified using Ontario Base Maps (OBM) and aerial photo interpretation.

Recommendations:

- a) Continue to protect Provincially Significant Wetlands and ensure adequate buffer zones are maintained if development is proposed.
- b) Consider evaluating existing wetlands 2 ha or greater in size that are currently unevaluated, to determine their status (i.e., Provincially Significant or Non-provincially Significant Wetland).

4.2.9 Slope

Steep slopes generally have a greater risk of erosion than flat areas, and thus are more dependent on tree roots and thick herbaceous growth for soil stabilization. It is therefore important that natural vegetation (and thus erosion control) is present and maintained on steep slopes, and it may be necessary to restrict development on these types of sites. The Slope scores for the study area are depicted in Figure 8.

As well as indicating potential erosion sites, slope can be used to assist with identifying Significant Valleylands. For example, the Lake Simcoe Watershed Natural Heritage System (Beacon et al., 2007) uses 8% slope as one of the criteria for identifying a valley wall, whereas the Oak Ridges Moraine model uses a slope of 15%, among other criteria (Ontario Ministry of Municipal Affairs and Housing Technical Paper). This indicates that the limits for defining Significant Valleylands depend upon factors such as local topography and geology.

Recommendations:

- a) Consider defining and identifying Significant Valleylands in the Township.
- b) Protect existing cover on steep slopes.
- c) If an area has steep slopes but does not have other natural heritage features or linkages present, it should not be included as part of a Natural Heritage System. However, these lands could be termed hazard lands, or flagged for remediation or special zoning.

4.2.10 Low Slope with Water

Areas that have very low slope (less than 5% grade) and indications of permanent or intermittent water may be existing or historical wetlands; these areas may also be groundwater recharge areas. Existing wetlands contribute to the overall percentage of wetland habitat in the Township. The scoring for areas of low slope with water is shown in Figure 9.

Recommendations:

- a) Consider evaluating existing wetlands 2 ha or greater in size that are currently unevaluated, to determine their status (i.e., Provincially Significant or Non-provincially Significant Wetland).
- b) As opportunities arise, restore historical wetland areas, to increase the percentage of wetland habitat in the Township.

4.2.11 Great Lakes Shoreline

The coastal shoreline of the Great Lakes is being heavily impacted by development. Natural shorelines have been lost as on-shore and aquatic vegetation has been replaced by sand beaches, steel breakwalls, docks and other alterations.

Shorelines provide both wildlife habitat (shoreline flora and fauna, littoral zone aquatic life) and human recreational opportunities (e.g., swimming, fishing, photography, canoeing). The scoring breakdown for shorelines is detailed in Table 12; the Shoreline Scoring is depicted in Figure 10.

The Township of Tay study area contains 57.9 kilometres (km) of shoreline on Severn Sound; approximately 27% (15.5 km) of the study area's shoreline is natural and unimpacted, while 73% (42.4 km) has undergone alteration to some degree (Table 16). Approximately 44% (25.6 km) of the shoreline length has been altered more than 75% from its natural state.

Table 10. Summary of Great Lakes Shoreline Scores					
Score (points)	Length (km)	Percent			
10	15.5	27%			
7	3.1	5%			
5	13.7	24%			
2	22.7	39%			
0	2.9	5%			
Total	57.9	100%			

Table 16: Summary of Great Lakes Shoreline Scores

Recommendations:

- a) Shoreline areas with natural vegetation or near-natural conditions should be protected from development.
- b) Restoration of natural shoreline vegetation should be encouraged, and undertaken as opportunities arise.

4.2.12 Combined Score and Special Consideration Areas

The Combined Score mapping (Figure 11) provides insight as to the relative importance of various areas within the study boundary. High scoring areas are shown in orange and red. Within the study area, the Combined Score ranges from a minimum of 0 points to a maximum of 87 points.

Focusing only on the combined score for an area may undervalue certain natural heritage components. For example, most of the south end of Sturgeon Bay appears as a relatively low score area (Figure 11). However, this area is a Wildlife Habitat Area (evaluated wetland, waterfowl nursery area) and has a natural shoreline, both of which meet the threshold scores as listed in Table 13; this includes it within the Special Consideration Areas (Figure 12).

This project only considered natural heritage features; white areas depicted on Figures 11 and 12 are not automatically suitable for development, since agriculture or other factors could be constraints to development.

Recommendations:

a) Development within or adjacent to Special Consideration Areas may need careful consideration, limitations, or mitigation. The Township, as part of its Official Plan review and update, should closely examine Special Consideration Areas, to establish what lands should be included as part of a Natural Heritage System.

4.3 Ecological Land Classification

Ecological Land Classification (ELC) was applied to selected properties owned by the Township of Tay in the study area, to provide background information on habitat present on each property. The Township of Tay identified which sites required ELC; sites chosen were primarily in, or in close proximity to, settlement areas and had a substantial woodland component to the property.

Sites were described to Ecosite level, providing information on the habitat types and soil moisture regimes present on each site (Table 17).

Table 17: Summary of Ecological Land Classification for Selected Township of Tay Owned Properties

													lical La	ind Cla	ssificati			d low	nship of Tay (Owned	Proper											
ELC Community Shrub Cultural Cultural Plantation Cultural Cultural Thicket Beach Meadow Savannah					Thicket	Cultural Woodland	Conifero	ous Forest	Deciduous Forest										Mixed	l Forest		Manicured Deciduou Open		ous Swamp	Mixed Swamp	Thicket	Swamp	Not Rated	Total Area			
	/Bar																								Space							
Assessment Roll #	BBS1	CUM1-1	CUP1	CUP3-	1 CUP3-3 CUP3	8 CUS1-1	CUT CUT1	1 CUT1-1	CUW1-2	FOC1-2	FOC4-1	FOD1-1	FOD2-4	FOD3-1	FOD4-2	FOD5-2	FOD5-3	FOD5-6	FOD5-8 FOD5-10		FOM4-1	FOM6-2	FOM7-2	FOM8-1	MOS		SWD4-1	SWM1-1	SWT	SWT2-2	NR	m²
435304000410500 435304000412405	193.4	()	0 0	0	0 0	0 0	C	0	0	0	() (0	0	0	0	1402.9 1305.	4 0	0	0) (0 0	317	7	0 0	0	0	0	0	3218.8
435304000412405	0)	0 0	0	0 0	0 0		0 0	0 0	0			0 0	0	0	0	649.8	0 0	0 0	0) 0	291.1	1	0 0	0	0	0	432.1	649.8 723.2
435304000413522	197.3	(0 0)	0 0	0	0 0	0 0	C	0	0	0	() (0	0	0	0	0	0 0	1906.3	0		0 0) ()	0 0	0	0	0	15.1	2118.7
435304000413551	0	() ()	0 0	0	0 0	0 0	C	0	0	0	() (0	0		0	0	9 (0	0) (0 0	C)	0 C	0	0	0	122.6	1872.5
435304000413600 435304000413623	0	(0	0 0	0	0 0	0 0	0	0 0	0 1288	0	() (0 0	0	0 14520.4	0	<u> </u>	0 0		1838		0	208.4	7	0 0	0	0	0	0 1007.1	2046.5 20984.5
435304000413023	0	6712.5	4078.4	1	0 995.3	0	0 0	0 1384		0 0		3776.1	() (4325.4	0 0	0	0		0 0	47433.3	3	0 0	0	0	0	0	70197.3
435304000429900	0	30.6	6 0)	0 0	0	0 0	0 209.2		0	0	0	C	0 0	0	0	0	0	0	0 0	0	0) (0 0) C	D	0 0	0	0	0	0	239.8
435304000430501	0	() (276		0	0 0	0 0	C	0	0	0	() (0	0	0	0	0	0 0	0	0		0 0	0)	0 0	0	0	0	0	276.3
435304000430502 435304000431200	0	231.4 550.5	5 0) 44.	0 0	0	0 0	0 0) 0	0 0	0			3.3	0	0	0	0	0 0		0) 0)	0 0	0	0	0	0	275.9 553.8
435304000431400	0	()	0 0	0	0 0	0 0	C	0	0 0	0	() (554.9	0	·	0	0	0 0	0	0		0 0	o c	Ď	0 0	0	0	0	0	554.9
435304000431501	0	(0 0)	0 0	0	0 0	0 0	C	0	0	0	() (330.8	0	0	0	0	0 0	0	0) (0 0	C)	0 0	0	0	0	0	330.8
435304000431900 435304000432004	0	830.4	1 0)	0 0	0	0 0	0 0	0	0	0	0	() (0 274.4	0	0	0	0	0 0	0	0		0		0	0 0	0	0	0	0	830.4 274.4
435304000432004	0) ()	0 0	0 207.	5 0	0 0	0	0 0	0 0	0	() (0 274.4	0	0	0	0	0 0	0 0	0		0 0)	0 0	0	0	0	123.3	330.8
435304000558500	0		0 0)	0 0	0	0 0	0 0	o c	1229.7		0	6826.5	5 0	0	0	0	0		0 5300.5	<u> </u>	0		0 0	130.4			0	0	0	1115.9	27068.3
435304000588800	0	1502.	1 0)	0 0	0	0 0	0 0	C	199.7	0	0	() (0	0	0	0	0	0 2625.3	0	0		0 0	0	389.	.8 0	4107.1	0	301.6	123874.1	133000
435304000606400 435304000606601	0	() (וי	0 0	0	0 0	0 127.9		0	0	0	() (2108.8	0	0	0	0	0 0		0	2098.3	3 0	544.5	1	0 0	0	0	0	469.9 0	2578.7 3739.9
435304000606001	0	()	0 0	0	0 0	0 658.2		0 0	0	0	(0 0	0		0	0	0 0	0	0	2000.	0 0	224.2	2	0 0	0	0	0	372.6	1255.2
435304000607301	0	() ()	0 0	0	0 848.6	0 4077.2		0	0	0	() (748.3	0	0	363.2	0	0 0	0	0) (0 0	1178.4	4	0 0	0	1362.3	0	0	8578.2
435304000646900 435304000650201	0	()	0 0	0	0 0	0 0		0	0 0	0	1655.6	6 0	0 0	0	0	2439.6	0	0 0		0		0	2423.8 509.7	7	0 0	0	0	0	0	4079.5 2949.3
435304000650202	0		0 0)	0 0	0	0 0	0 0	0	0 0	0 0	0) (0 0	0	0	265.8	0	0 0	0 0	0		0 0	303.7)	0 0	0	48.9	0	0	314.7
435304000688800	0	794.3	3 0)	0 0	0	0 338.7	0 7699.5	C	0	0	0	() (68.5	0	0	0	0	0 0	0	0) (0 0	6224.8	3	0 6784.8	0	0	0	43119.3	65030.1
435305000134100	0	(0 0)	0 0	0	0 0	0 0	C	0	0	0	() (0	0	0	0	0	0 1581.8	0	0) (0 0	4	4	0 0	0	0	0	0	1585.8
435305000134200 435305000134300	0	()	0 0	0	0 0	0 0	0	0 0	0 0	0			0 0	0	0	0	0	0 886.2 0 123.9		0			318.4	1	0 0	0	0	0	0	886.2 442.3
435305000135200	0	(0 0)	0 0	0	0 0	0 C	C	0	0	0	() C	0	0	0	0	0	0 286.6	6 0	0) (0 0	C)	0 C	0	0	0	533.4	820
435305000135300 435305000135400	0	(0 0)	0 0	0	0 0	0 0	C	0	0	0	() (0	0	0	0	0	0 775.8 0 748.7	, 0	0		0	C)	0 0	0	0	0	0	775.8 748.7
435305000135400	0	()	0 0	0	0 0	0 0	0	0 0	0 0	0	(0 0	0	0	0	0	0 748.7	0 0	0		0 0)	0 0	0	0	0	69.5	638.4
435305000137600	0	(0 0	3010	5 0	0	0 0	0 0	C	0	0	0	Ċ) (0	0	0	0	0	0 0	0	0) (0 0	1050.7	7	0 0	0	0	0	0	4061.3
435305000137800	0	() (1780	.1 0	0	0 0	0 0	C	0	0	0	() (0	0	0	0	0	0 0	0	0		0 0	682.5	5	0 0	0	0	0	0	2462.6
435305000138100 435305000138400	0	3570.7 2305.2)	0 0	0	0 0	0 0) 0	0 0	0			0 0	0	0	0	0	0 1272.9 0 742.6		0) 0))	0 0	0	0	0	1790.8	4843.7 4838.7
435305000140900	0	2000.2	0 0)	0 799	0	0 0	0 0	C	0	0	0			818.5	0	0	0	0	0 0	0	0		0 0	123.6	6	0 0	0	0	0	0	1741.3
435305000141000	0	() ()	0 0	0	0 0	0 0	C	0	0	0	() (123.1	0	0	0	0	0 94.6	0	0) (0 0	118.6	6	0 0	0	0	0	0	336.4
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435305000141600	0	Ò	0 0	Ó	0 0	0	0 0	0 0	268.4	0	0	0	(0	0	0	0	0	0 0	0	0		0	000	o O	0 0	0	0	0	0	268.4
435305000141700	0	() ()	0 0	0	0 0	0 0	268.3	0	0	0	() (0	0	0	0	0	0 0	0	0) (0 0	()	0 C	0	0	0	0	268.3
435305000141900 435305000142000	0	()	0 0	0	0 0	0 0	2628.4	0	0 0	0	() (1355.5	0	0	0	0	0 1679.4		0		0 0	910.4	1	0 0	0	0	0	0	4894.4 1679.8
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435305000142500	0	(0 0)	0 356.3	0	0 0	0 C	C	0	0	0	() (0	0	0	0	0	0 0	0	0) (0 0	184.8	-	0 C	0	0	0	0	541.1
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435305000142700	0)	0 152.4 2277	.1	ŭ ŭ	0 0	o c	0 0		0	(1226.4		0		0	, ,	0 0	0 0			0 0	61.1		0 0	0	0	0	0	3717.2
435305000142900	0	() ()	0 613.7	0		0 0	C	0	0	0	(985.2		0	0	0	0	0 0	0	0) (0	C	0	0 0	0	0	0	0	1598.9
435305000143000 435305000143100	0	()	0 1705.1 0 3018.4	0	ŭ ŭ	0 0	0	0	0	0	(733.1		0	0	0	0	0 0	0	0		0	50	ין	0 0	0	0	0	0	2743.5 5188.8
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435305000144700	0	(0 0)	0 0	0	-	0 0	C	0 0		0	(0 0	0 12.0	0	0	0	0	0 50.9	0	0) (0 0	538.7	_	0 0	0	0		180.6	1712.7
435305000144800	0	207	7 0)	0 5004.9	0		0 0	C	0		0	(0	_			0 000 1	0	·	'	0)	0 0	0	0		0	5191.7
435305000145100 435305000145400	0	267.7 262.7)	0 0	0	-	0 0	843.9	0) 0	0	(0 0	0		0	0	0 999.1 0 0	0 0	0	1 0		450.5	5	0 0	0	0	0	685.2 0	1952.1 1556.6
435305000145500	0	()	0 0	0	0 0	0 0	354.1	0	0	0	(0	0	0	0	0	0 0	o o	0) i	0 0	199.8	3	0 0	0	0	0	0	553.9
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435305000146400 435305000146401	0				0 351.5 0 2659.3	0	• •	0 0		0 0		0	() (0	·	0		0 0		0) () 0)	0 0	0	0		5942.4 2519.4	6293.9 5209.7
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435305000156900	0	-	0 0)	0 0	0	• •	0 0	C	0	, 0	0	() (0	0		0	0	0 0	0	0		0 0	318.7	7	0 0	0	0	0	62.4	929
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435305000161300	0	() ()	0 0	0		0 0	C	0		0	() (0		0	.002.0	0 0	0 0	0) (0 0	C	0	0 0	0	0	0	15.4	
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A description of the ELC communities is provided in Table 18.

Table 18: ELC Descriptions, Selected Township of Tay Properties

ELC code	Soil Type	Vegetation Type*
BBS1	Mineral	Shrub Beach/Bar
CUM1-1	Dry-Moist	Old Field Cultural Meadow
CUP1	variable	Deciduous Cultural Plantation
CUP3-1	variable	Red Pine Cultural Plantation
CUP3-3	variable	Scotch Pine Cultural Plantation
CUP3-8	variable	White Spruce-European Larch Cultural Plantation
CUS1-1	Mineral	Cultural Savannah
CUT	variable	Cultural Thicket
CUT1	Mineral	Cultural Thicket
CUT1-1	Mineral	Sumac Cultural Thicket
CUW1-2	Dry	Red Oak Cultural Woodland
FOC1-2	Dry-Fresh	White Pine-Red Pine Coniferous Forest
FOC4-1	Fresh-Moist	White Cedar Coniferous Forest
FOD1-1	Dry-Fresh	Red Oak Deciduous Forest
FOD2-4	Dry-Fresh	Oak-Hardwood Deciduous Forest
FOD3-1	Dry-Fresh	Poplar Deciduous Forest
FOD4-2	Dry-Fresh	White Ash Deciduous Forest
FOD5-2	Dry-Fresh	Sugar Maple-Beech Deciduous Forest
FOD5-3	Dry-Fresh	Sugar Maple-Oak Deciduous Forest
FOD5-6	Dry-Fresh	Sugar Maple-Basswood Deciduous Forest
FOD5-8	Dry-Fresh	Sugar Maple-White Ash Deciduous Forest
FOD5-10	Dry-Fresh	Sugar Maple-White Birch-Poplar Deciduous Forest
FOD8-1	Fresh-Moist	Poplar Deciduous Forest
FOM4-1	Dry-Fresh	White Cedar-White Birch Mixed Forest
FOM6-2	Fresh-Moist	Hemlock-Hardwood Mixed Forest
FOM7-2	Fresh-Moist	White Cedar-Hardwood Mixed Forest
FOM8-1	Fresh-Moist	White Birch Mixed Forest
SWD2-1	Mineral	Black Ash Deciduous Swamp
SWD4-1	Mineral	Willow Deciduous Swamp
SWM1-1	Mineral	White Cedar-Hardwood Mixed Swamp
SWT	variable	Thicket Swamp
SWT2-2	Mineral	Willow Thicket Swamp

^{*} a *Cultural* community is one resulting from, or maintained by, cultural or anthropogenic-based disturbance

The parcel mapping fabric does not necessarily match the ortho-photography, due to shifted assessment data. Therefore, some land parcels show roads on the property, which affects the ELC mapping and summary for that parcel.

The ELC mapping is presented on Map 6.

Recommendations:

- a) Extend the ELC analysis to Township-owned properties not covered during this project.
- b) Support a supplemental project to further analyze ELC data for Township-owned sites.
- c) When corrections to the parcel fabric mapping become available, the analysis that intersects ELC data with the parcels should be re-run to provide a more accurate representation of the habitat present on each site.

4.4 Summary of Recommendations

This section summarizes the recommendations presented in Sections 4.0 through 4.3, since recommendations for some natural heritage components recur in several sections. For example, the recommendation to plant trees is found in Sections 4.2.2 (Patch Size), 4.2.3 (Significant Woodlands), and 4.2.4 (Interior Forest). The section numbers and bullet numbers of the original recommendations are given in italics in square brackets, e.g., [4.2.1 c].

General Recommendations:

- Complete the Habitat Analysis for the entire Township of Tay, to determine forest, riparian and wetland parameters for the whole planning area. [4.0 a]
- Complete the Natural Heritage Evaluation for the entire Township of Tay, to provide a more comprehensive representation of the relative importance of various areas to the natural heritage of the Township. [4.0 b]
- Identify areas where development has been approved or initiated since April 2008; re-run the Habitat Analysis and Natural Heritage Evaluation to determine how loss of habitat in these areas affects natural heritage in the Township. [4.0 b]

Natural Heritage Evaluation Recommendations:

- The Township should consider protection for areas that score high in the Combined Scoring layer, as well as Special Consideration areas. Both layers should be taken into account when development is proposed, since some Special Consideration areas may have a low cumulative score but still be important contributors to the natural heritage of the Township. The results from this study should be used to guide OP and Zoning Land Use boundary refinement and enhancement exercises. [4.2 a]
- Development within or adjacent to Special Consideration Areas may need careful consideration, limitations, or mitigation. The Township, as part of its Official Plan review and update, should closely examine Special Consideration Areas, to establish what lands should be included as part of a Natural Heritage System. [4.2.12 a]

- The Township should ensure that there are no negative impacts to natural heritage features as a result of development of adjacent lands, by requiring an Environmental Impact Study for all proposed development on adjacent lands. The Ministry of Natural Resources has produced a draft second edition Natural Heritage Reference Manual (OMNR, 2009), which includes recommended distances for the extent of adjacent lands, which are areas where a change in land use may cause negative impacts on the natural heritage feature or area. [4.2 b]
- The Ministry of Natural Resources is responsible for identification or approval of significant wetlands, coastal wetlands, Areas of Natural and Scientific Interest, and significant habitat of endangered species and threatened species; this information may be updated periodically. Additional detailed studies of natural heritage features may be undertaken from time to time, by proponents of development or other agencies. Municipal policies and Environmental Protection mapping of the Natural Heritage System should be amended or refined as additional information becomes available. [4.2 c]
- Generally, natural heritage features in existing built-up areas are degraded and fragmented. The Township of Tay should protect and enhance remaining features, their functions, and connections within the Settlement Areas, wherever possible. [4.2 d]
- This report and the Natural Heritage System that is developed should be reviewed and updated as part of each five-year review and update to the Township's Official Plan. [4.2 e]

Woodland Habitat Recommendations:

- The Settlement Areas of Port McNicoll and Victoria Harbour generally have a healthy percentage of woodland cover, which should be maintained as much as possible. [4.2.1 a]
- The Settlement Areas of Waubaushene and Waverley have smaller percentages of woodland cover, which should be enhanced with tree planting where possible. Any proposal to remove existing trees should be reviewed, with emphasis on retaining woodland cover. [4.2.1 b]
- The Rural portions of the study area have good forest cover, which should be maintained as much as possible. [4.2.1 c]
- Examine opportunities for in-filling of open areas through tree planting initiatives, to increase the size of smaller woodlands and increase forest interior habitat. Opportunities for potential in-filling could be determined by SSEA in a supplementary project, using the Automated ArcView 3.1 Habitat Analysis Method (McPhail, 1999). [4.2.2 a, 4.2.3 b, 4.2.4 b]
- The Township should retain all Significant Woodlands. [4.2.3 a]
- Development proposals on lands with Significant Woodlands should require ELC and descriptions of species and composition. Natural, mixed species woodlands generally have more value to wildlife than plantations; however, woodlands of any type provide environmental benefits such as erosion control and carbon storage. [4.2.3 c]

- Woodlands with interior forest should receive special consideration for protection from development, in order to retain their ecological integrity. [4.2.4 a]
- Retain woodlands that contribute to riparian habitat. [4.2.5 a]
- Enhance woody vegetation cover adjacent to streams to 30 metres wherever possible, to help establish and maintain healthy riparian habitat. [4.2.5 b]
- Development in any woodland directly associated with a wetland should be carefully considered before approval. [4.2.6 a]
- No development should be permitted within woodlands located within 120 metres of a wetland boundary unless an Environmental Impact Study confirms there will be no negative impacts on the features or functions of the wetland. [4.2.6 b]

Riparian Habitat Recommendations:

- Natural watercourses should be retained, and any development should preserve the natural character of the watercourse. [4.2.7 a]
- Any required ditching or drainage activities should be planned with careful consideration of potential impacts to upstream and downstream flow patterns, as well as fish habitat. [4.2.7 b]

Wetland Habitat Recommendations:

- Continue to protect Provincially Significant Wetlands and ensure adequate buffer zones are maintained if development is proposed. [4.2.8 a]
- Consider evaluating existing wetlands 2 ha or greater in size that are currently unevaluated, to determine their status (i.e., Provincially Significant or Non-provincially Significant Wetland). [4.2.8 b, 4.2.10 a]
- As opportunities arise, restore historical wetland areas, to increase the percentage of wetland habitat in the Township. [4.2.10 b]

Shoreline Habitat Recommendations:

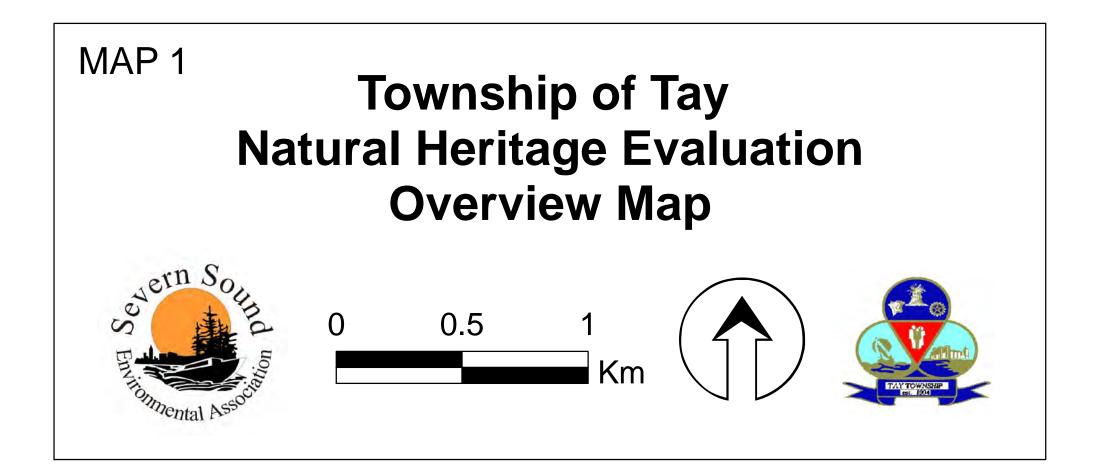
- Shoreline areas with natural vegetation or near-natural conditions should be protected from development. [4.2.11 a]
- Restoration of natural shoreline vegetation should be encouraged, and undertaken as opportunities arise. [4.2.11 b]

Slope Recommendations:

- Consider defining and identifying Significant Valleylands in the Township. [4.2.9 a]
- Protect existing cover on steep slopes. [4.2.9 b]
- If an area has steep slopes but does not have other natural heritage features or linkages present, it should not be included as part of a Natural Heritage System. However, these lands could be termed hazard lands, or flagged for remediation or special zoning. [4.2.9 c]

Ecological Land Classification Recommendations:

- Extend the ELC analysis to Township-owned properties not covered during this project. [4.3 a]
- Support a supplemental project to further analyze ELC data for Townshipowned sites. [4.3 b]
- When corrections to the parcel fabric mapping become available, the analysis that intersects ELC data with the parcels should be re-run to provide a more accurate representation of the habitat present on each site.
 [4.3 c]

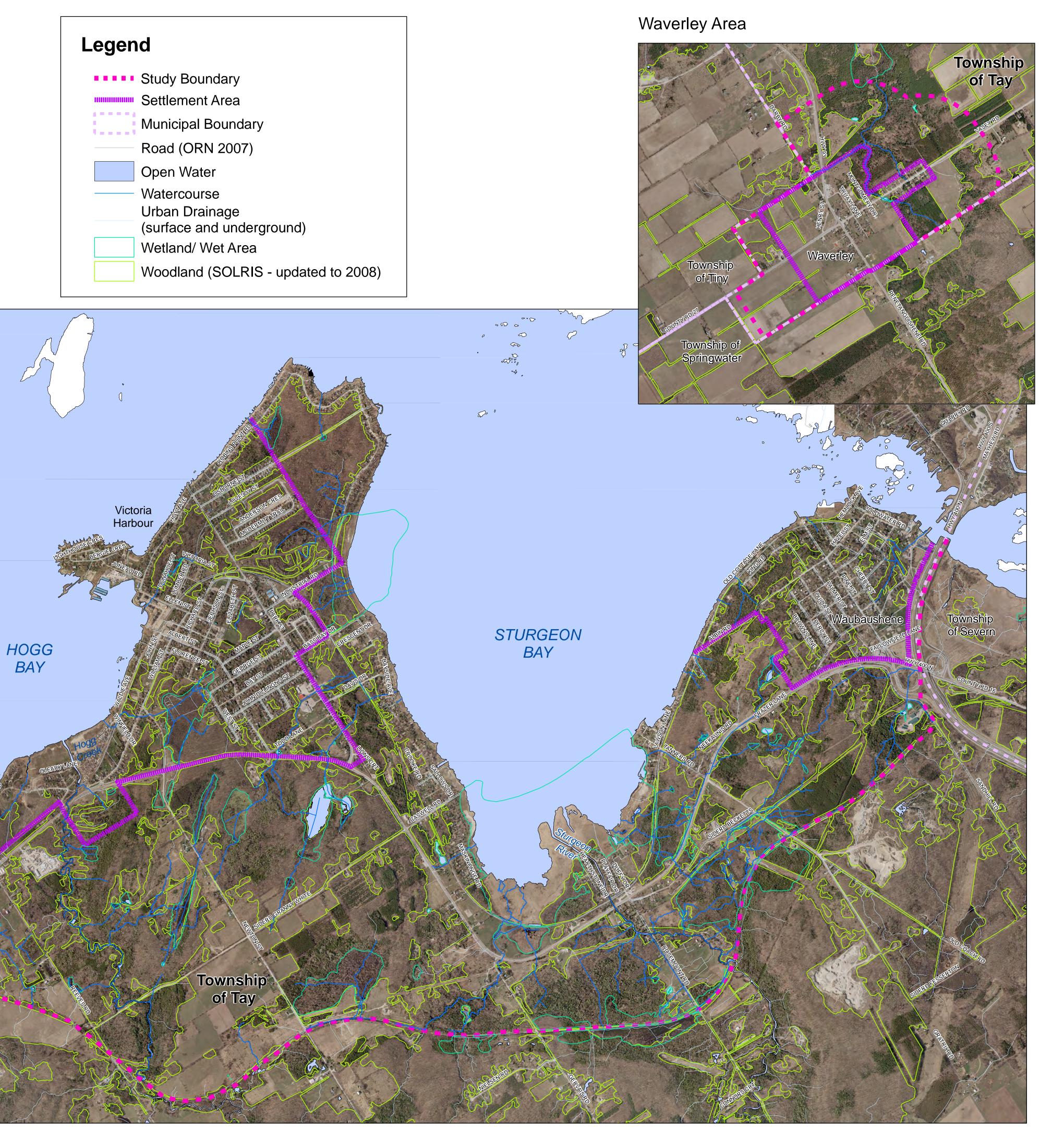


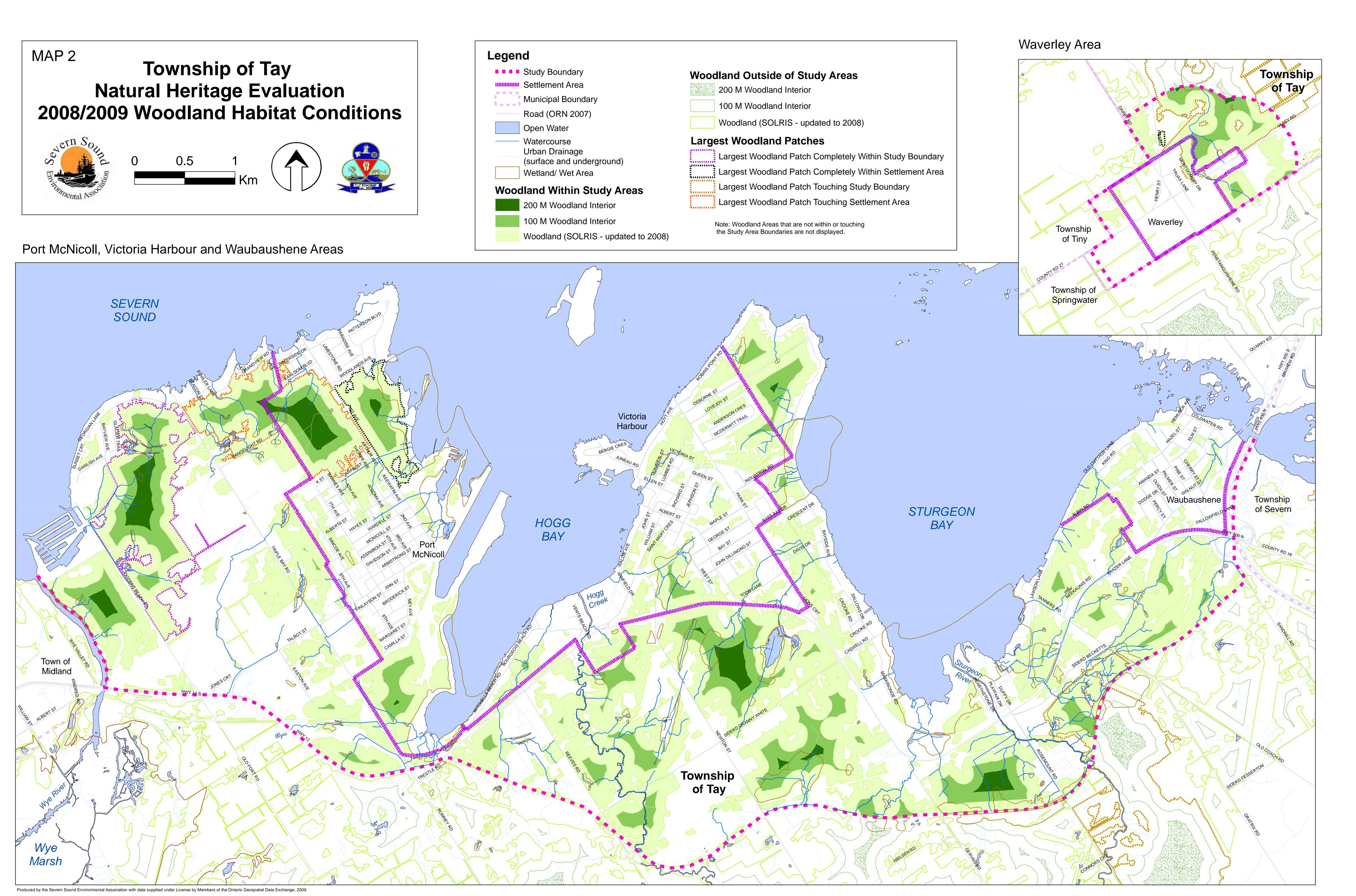
Port McNicoll, Victoria Harbour and Waubaushene Areas

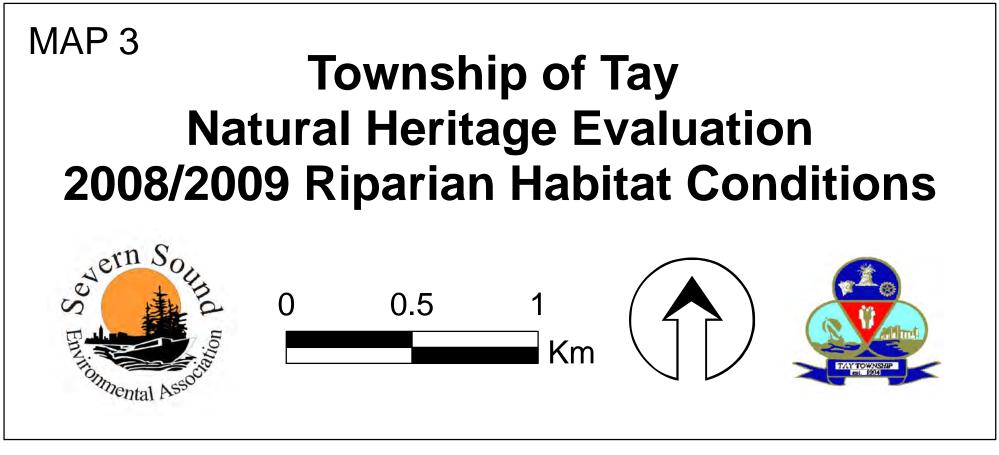
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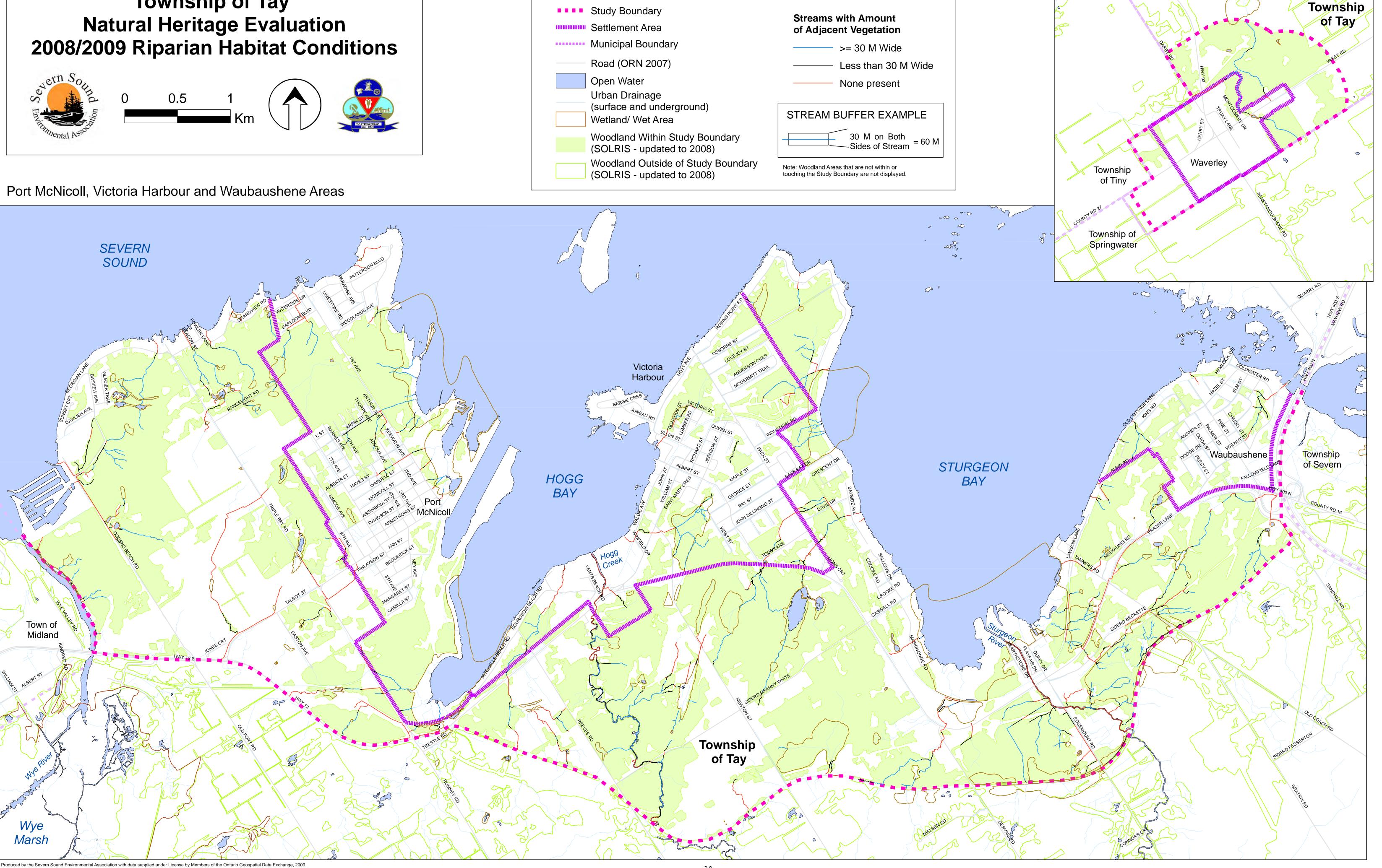
SOUND

Produced by the Severn Sound Environmental Association with data supplied under License by Members of the Ontario Geospatial Data Exchange, 2009.



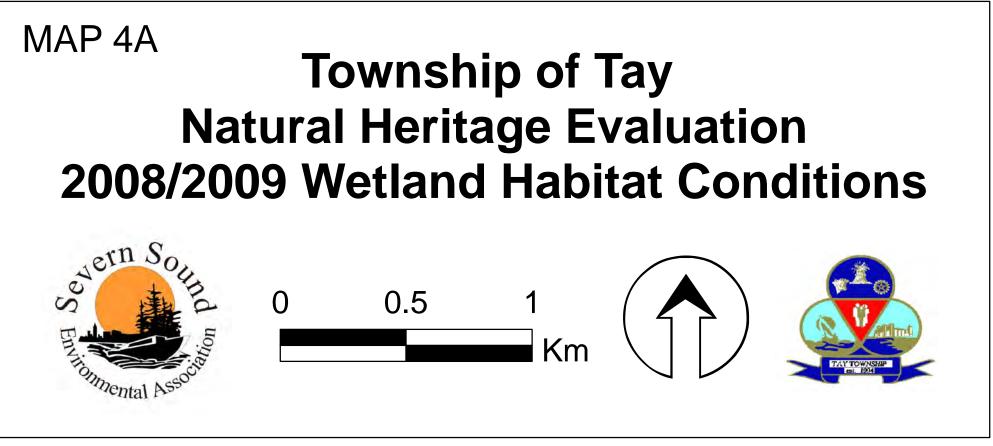




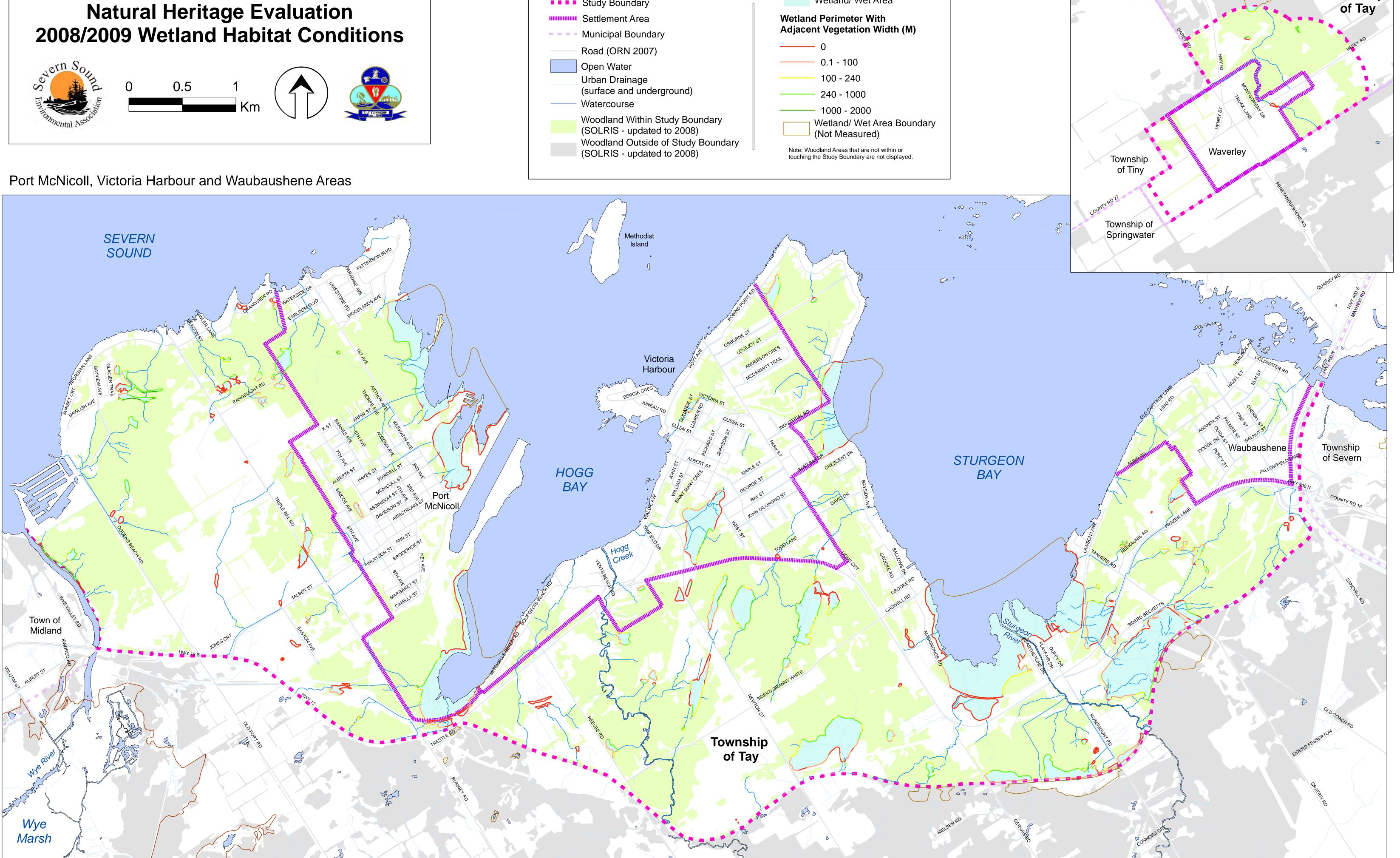


Legend

Waverley Area



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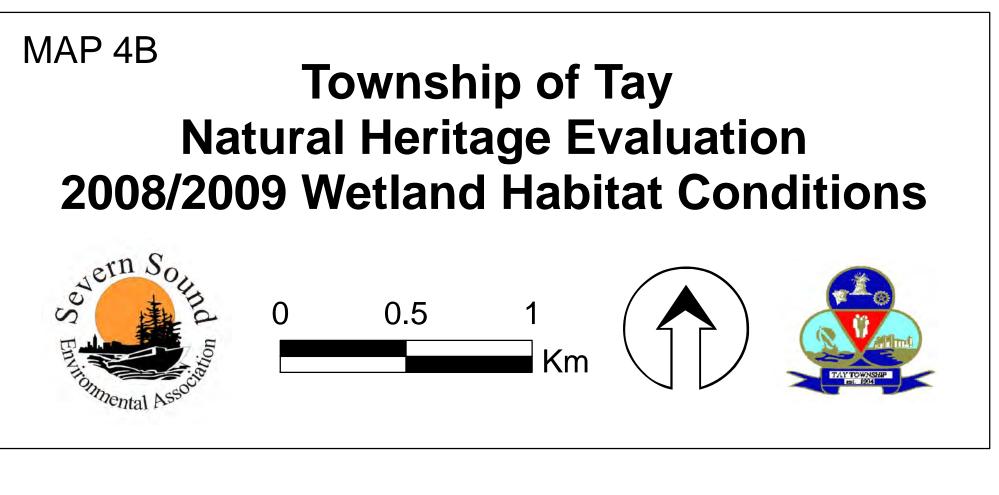
Wetland/ Wet Area

Legend

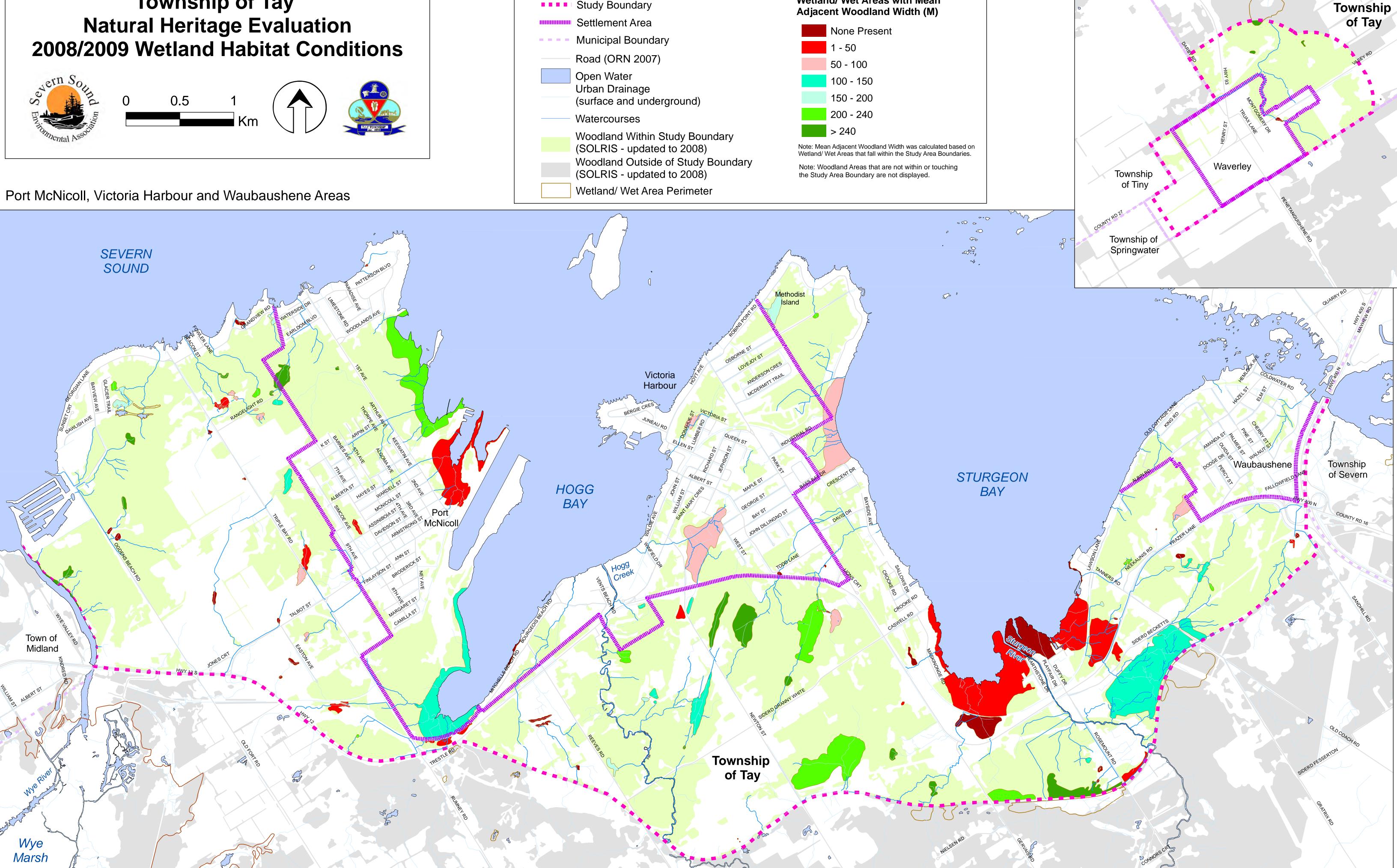
Study Boundary

Waverley Area

Township



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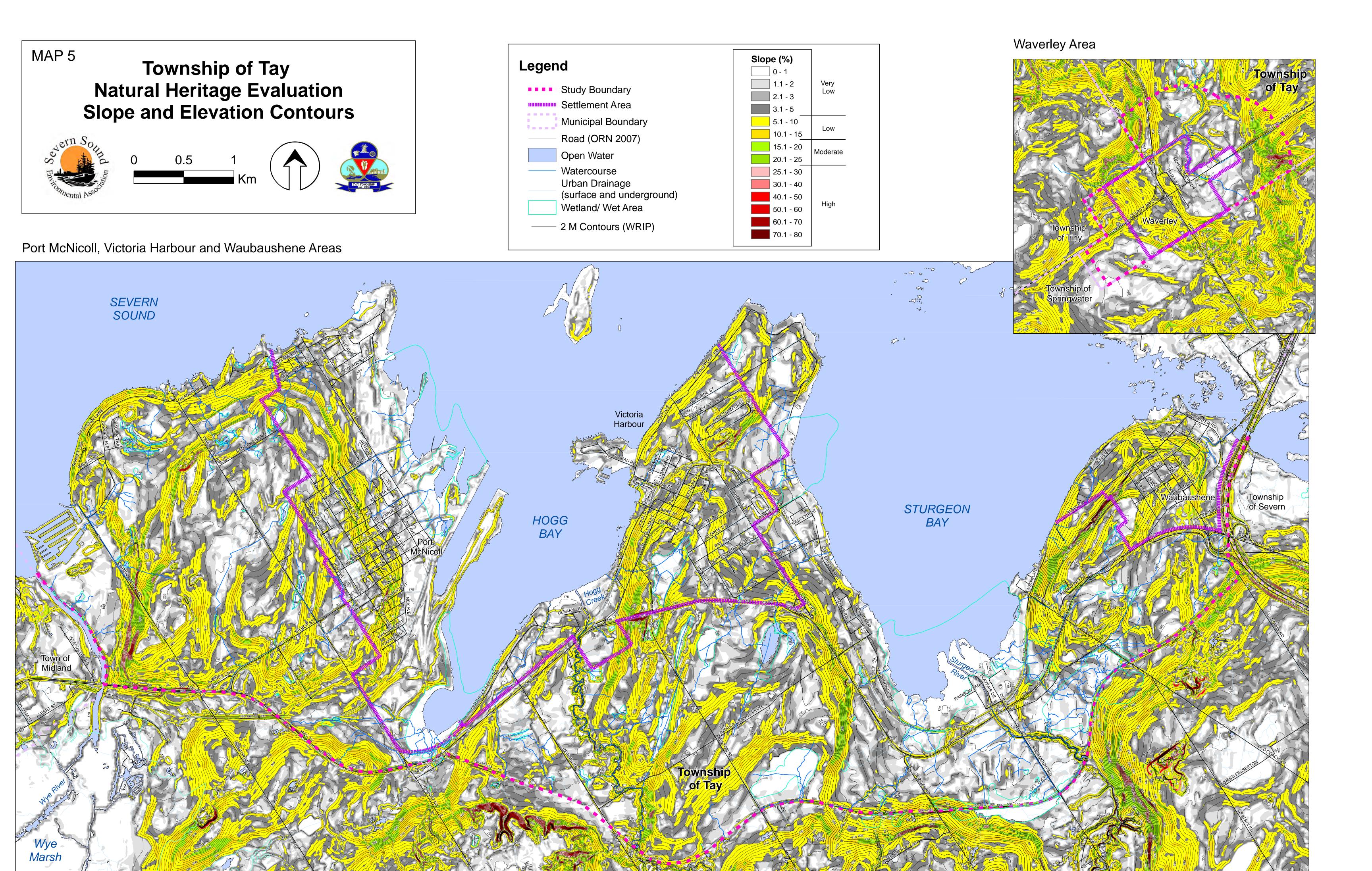


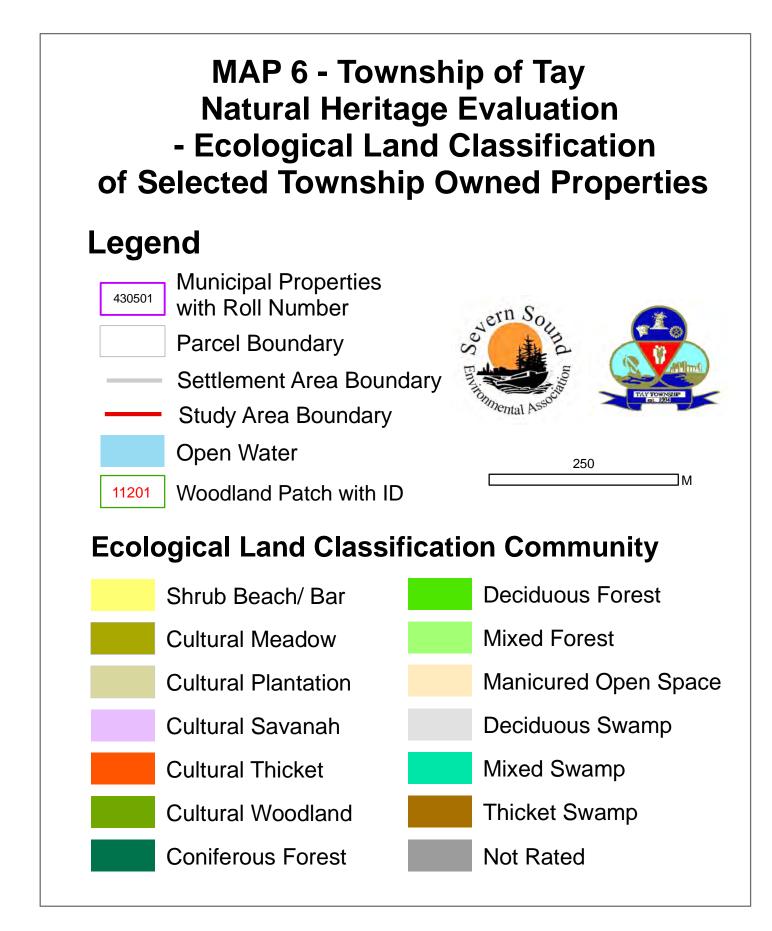
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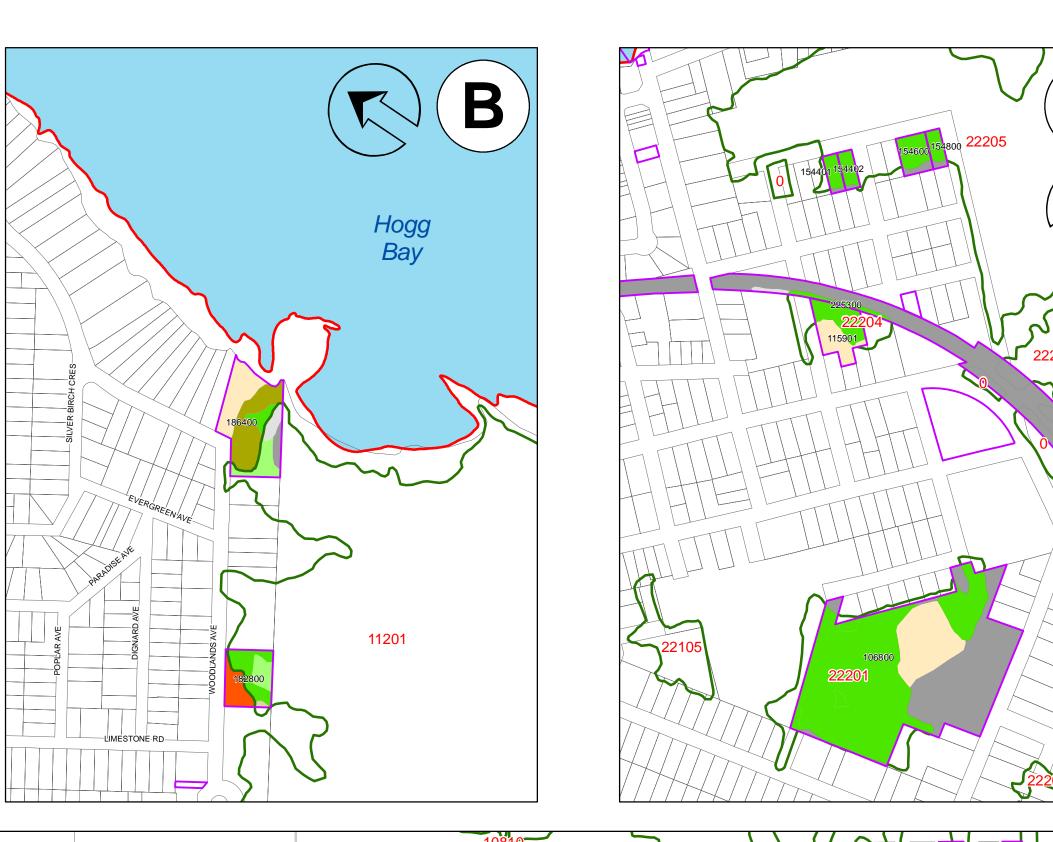
Study Boundary

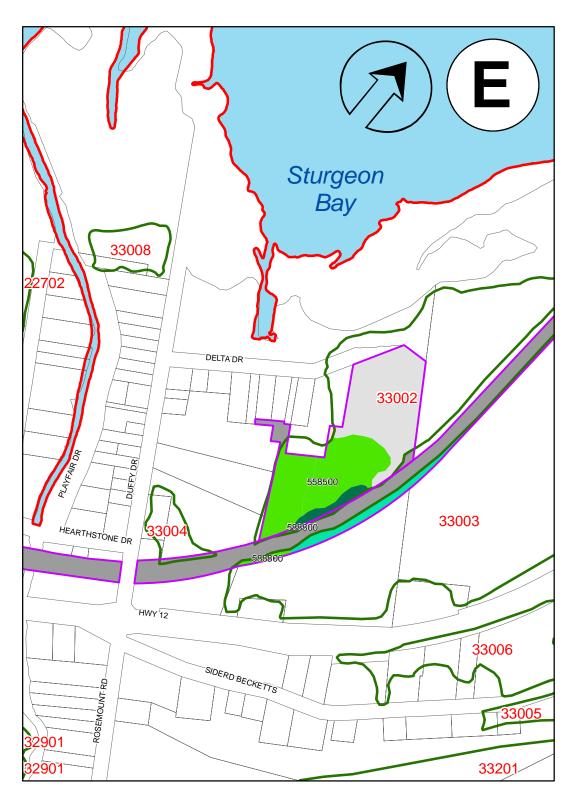
Waverley Area

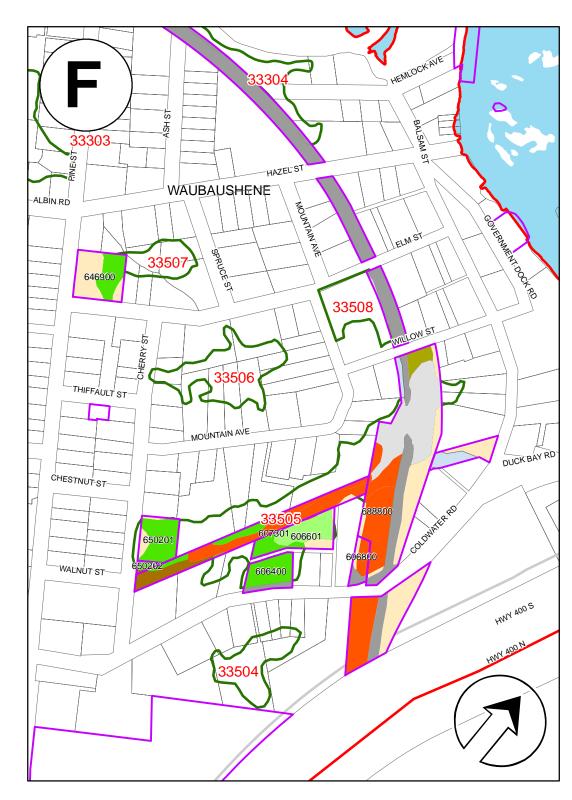
Wetland/ Wet Areas with Mean

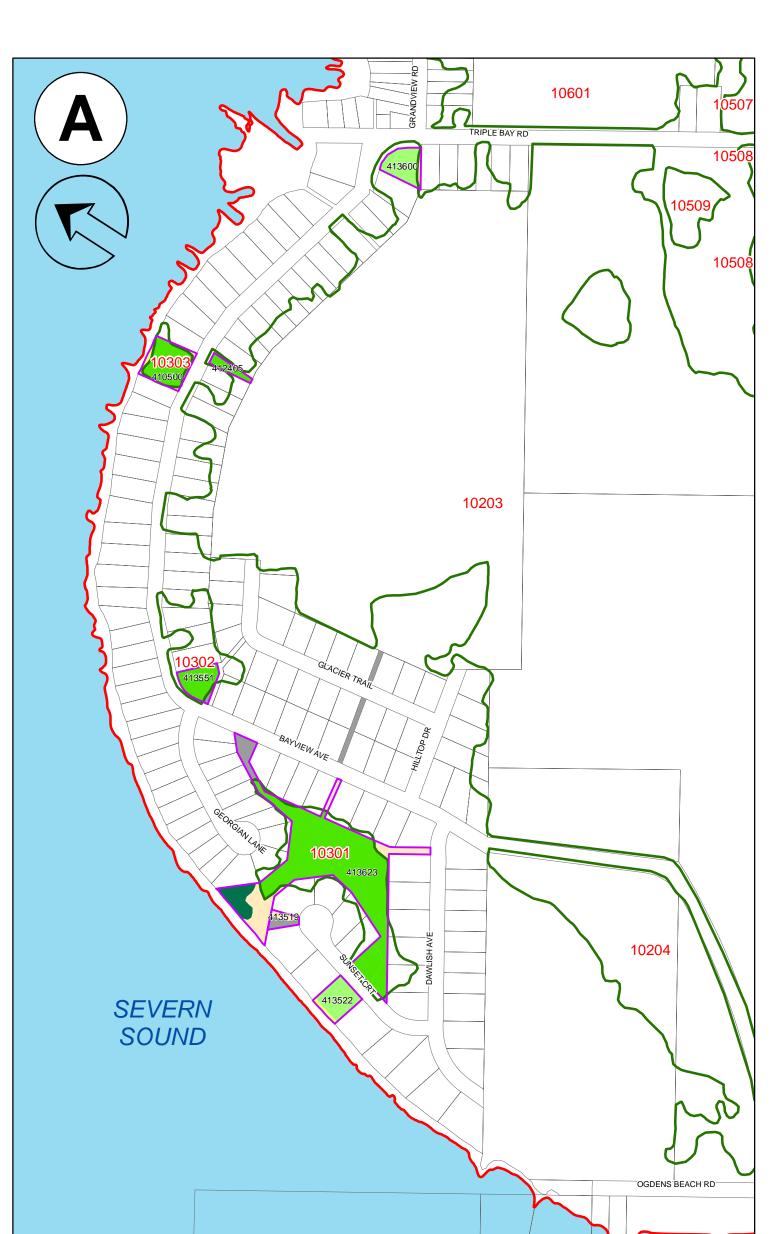




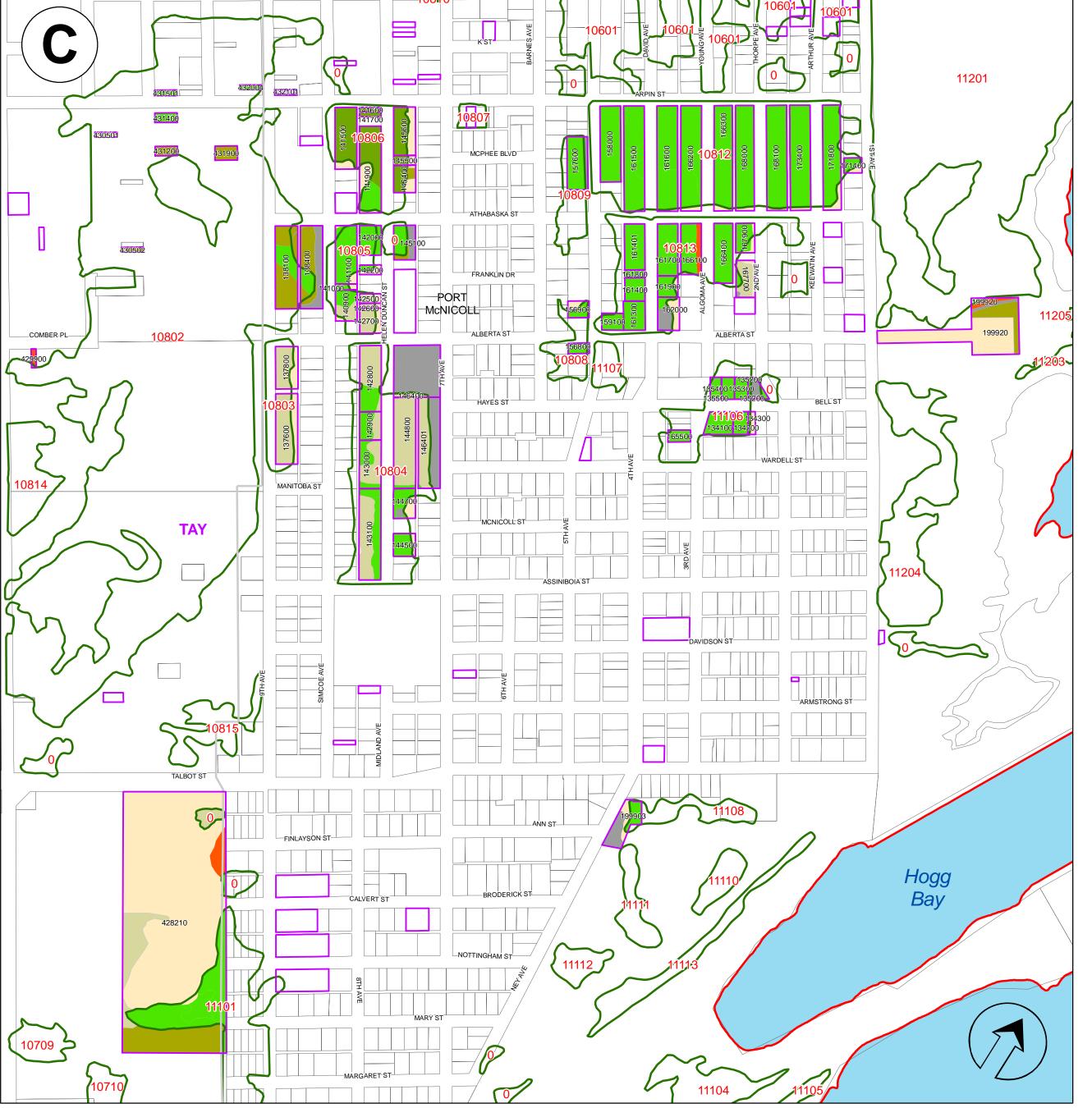








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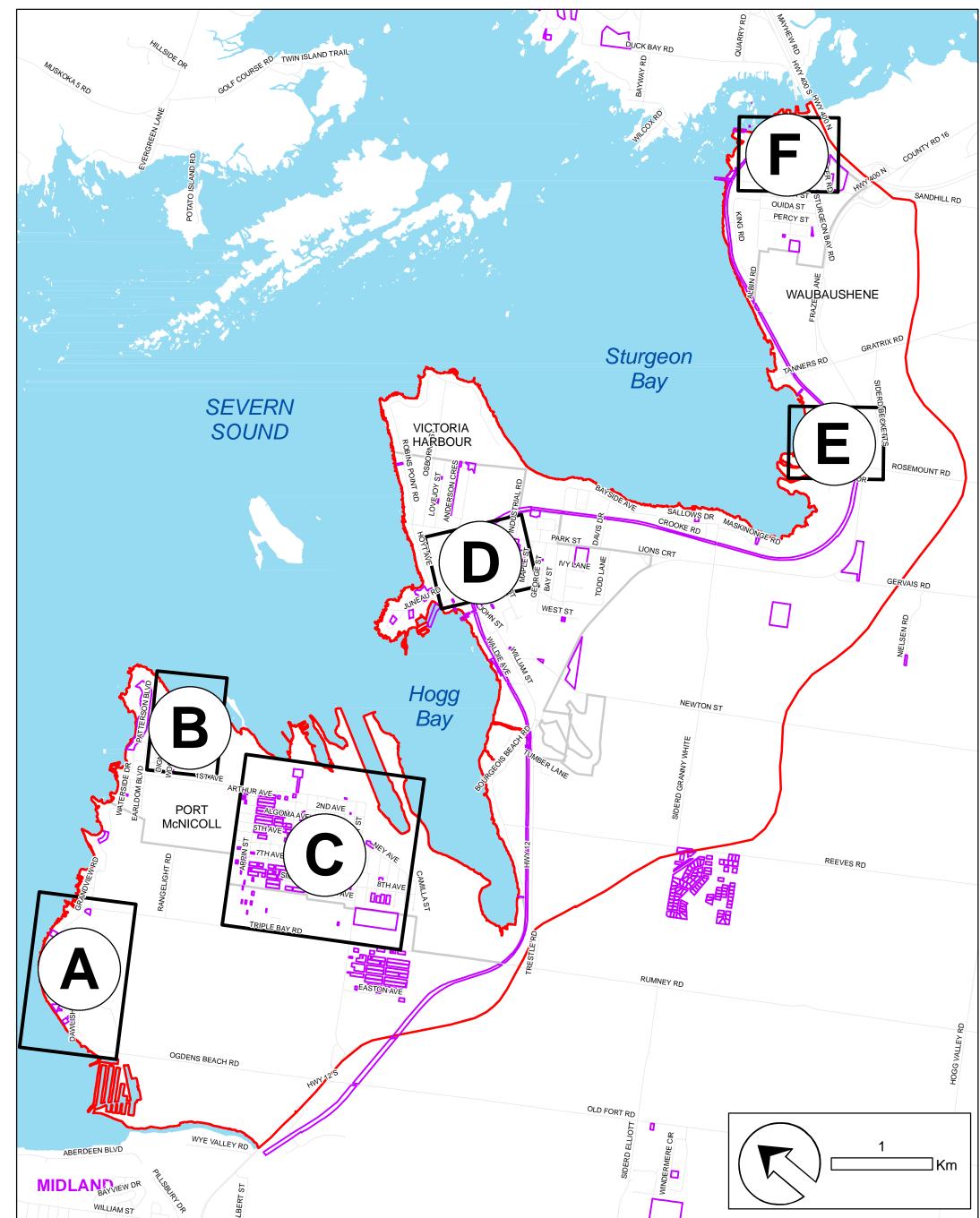


Figure 1A - Woodland Patch Locations within the Study Area Boundary

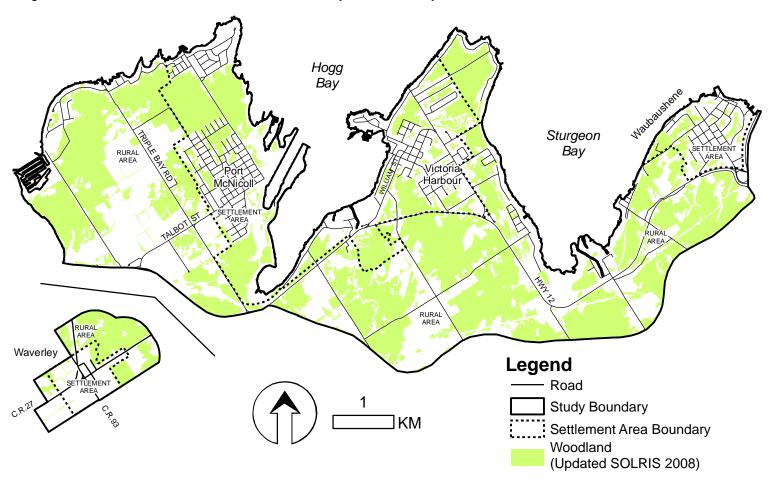


Figure 1B - Woodland Patch Size Scoring

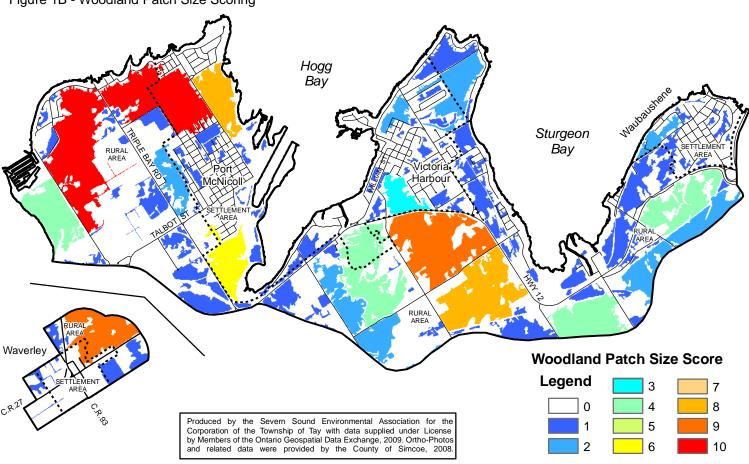


Figure 2 - Significant Woodland Scoring

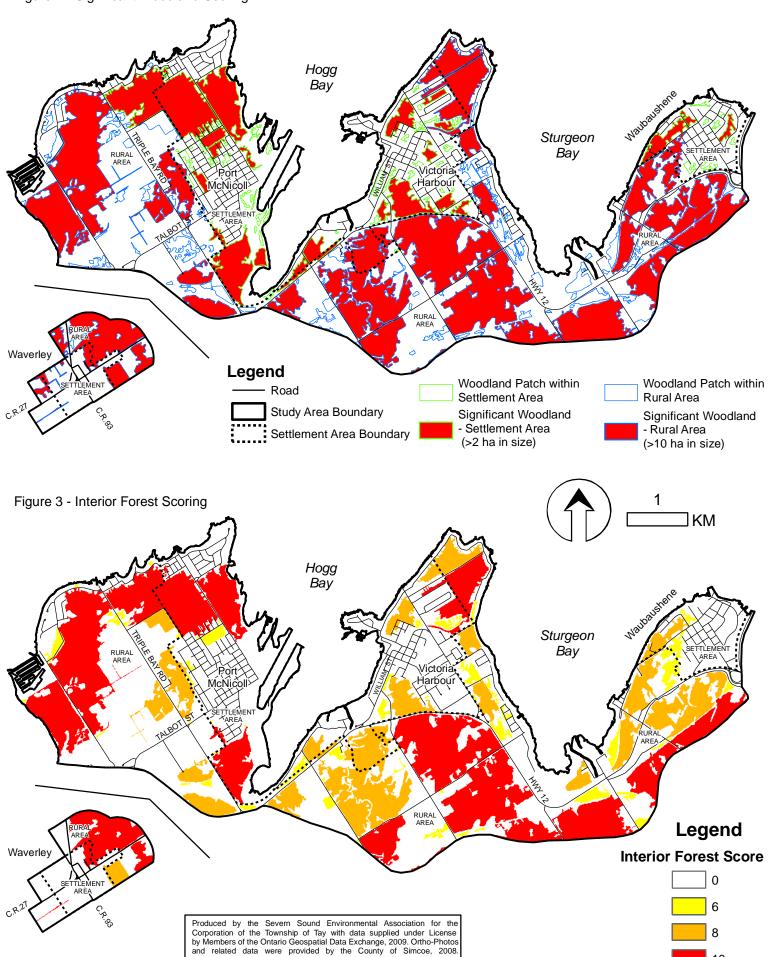


Figure 4 - Woodland Adjacent to Riparian Habitat Scoring

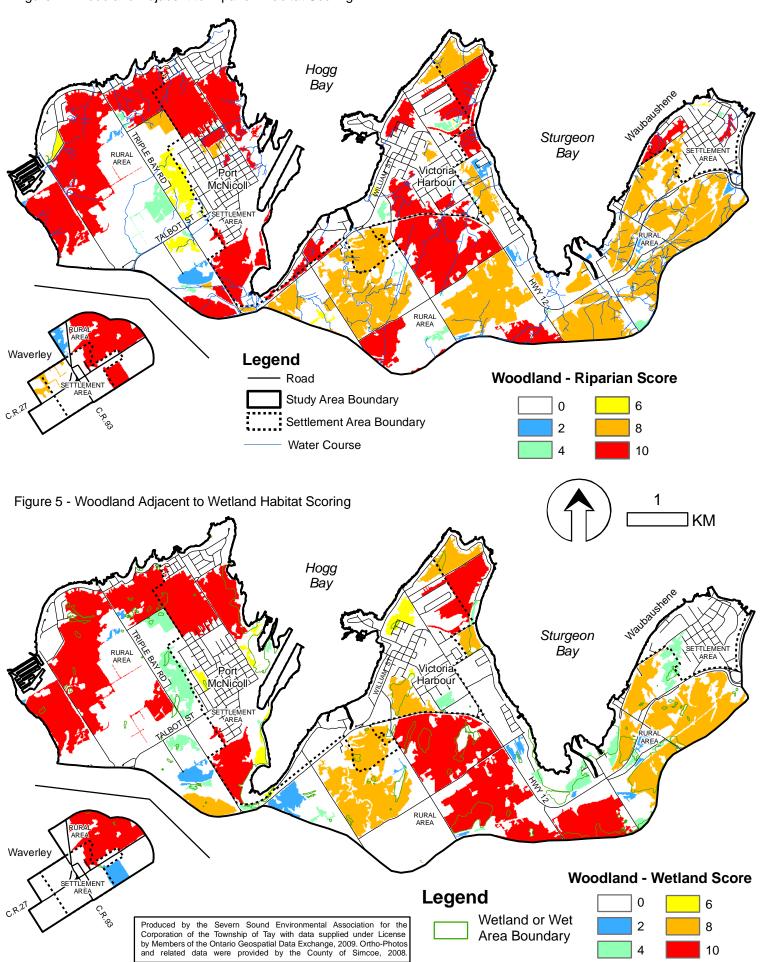


Figure 6 - Natural Watercourse Scoring

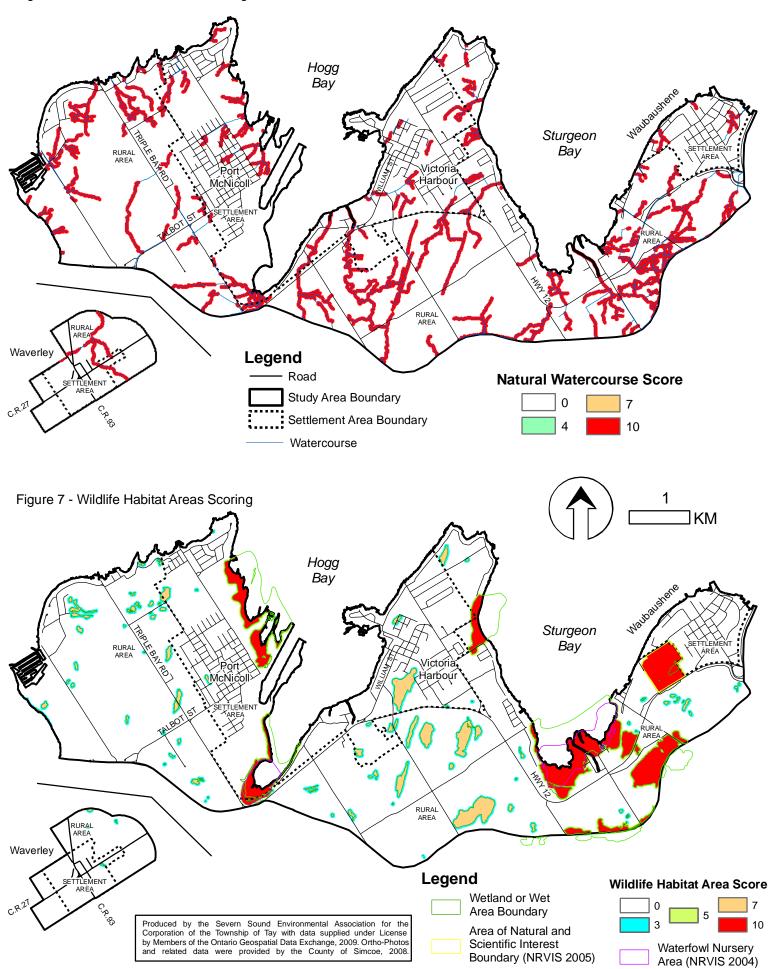


Figure 8 - Slope Scoring

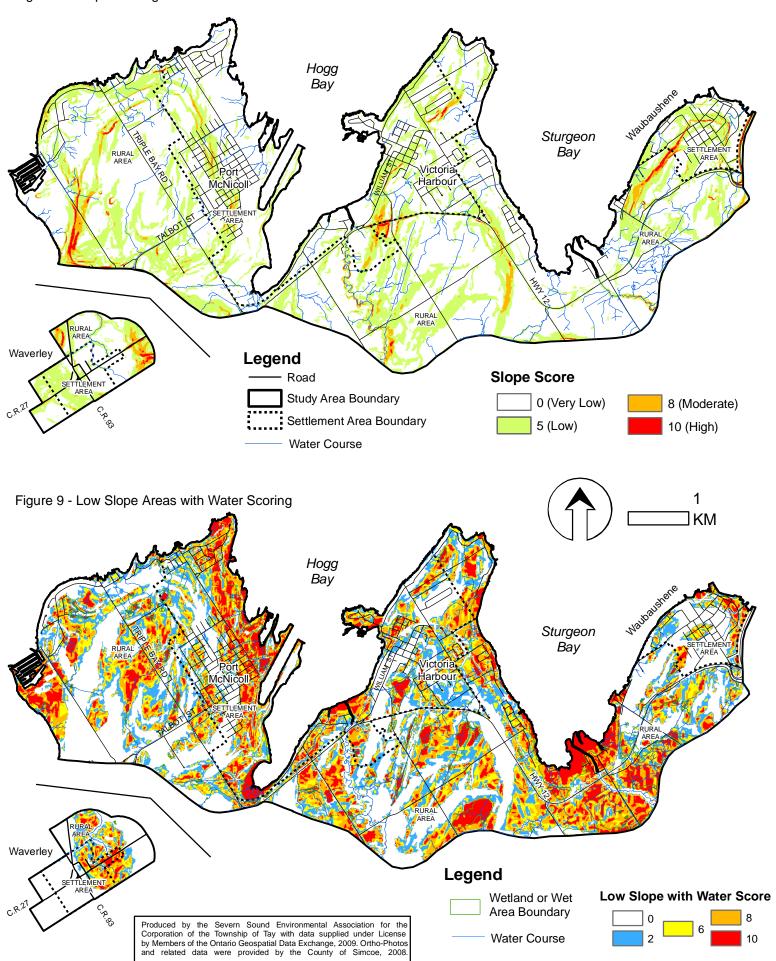
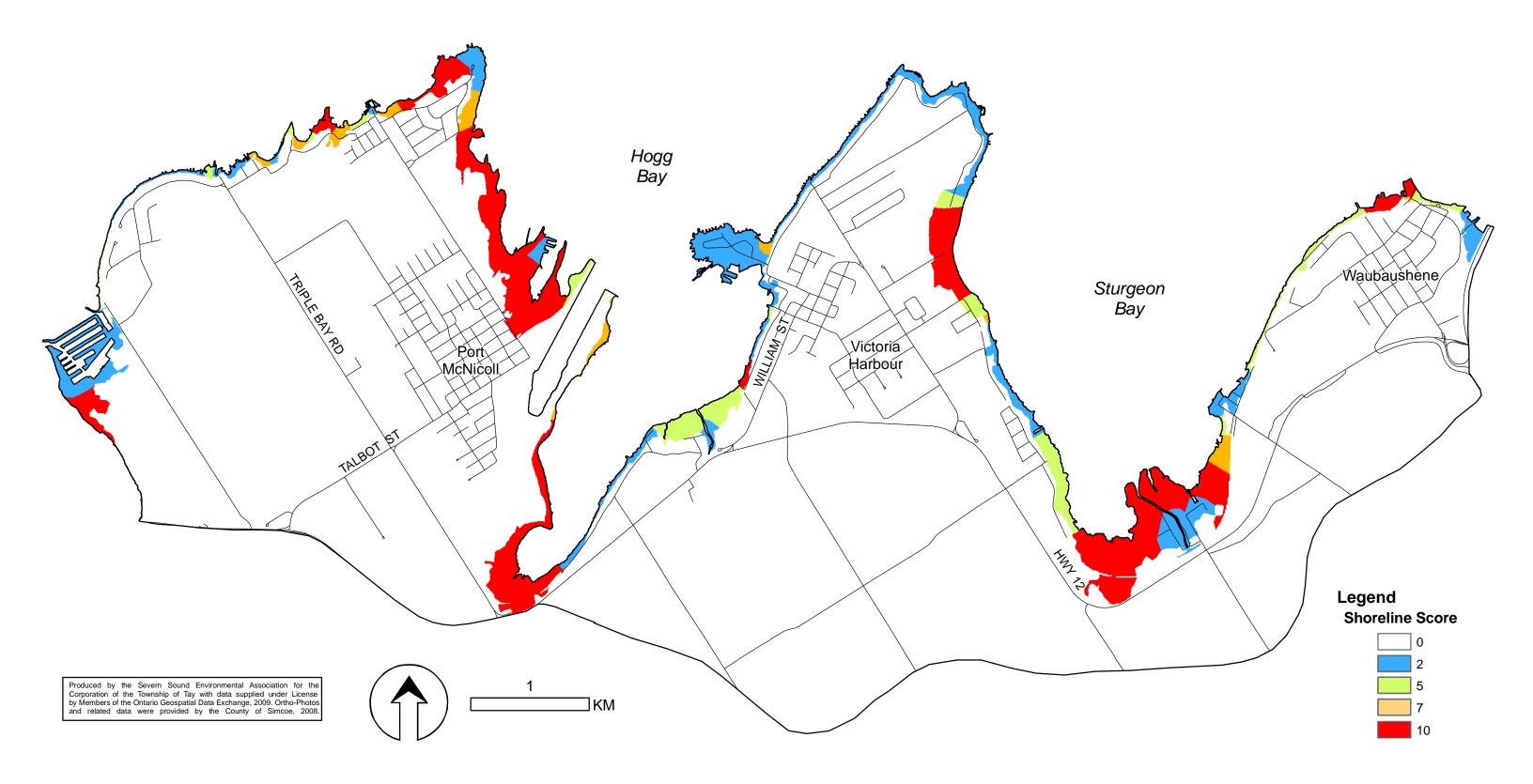
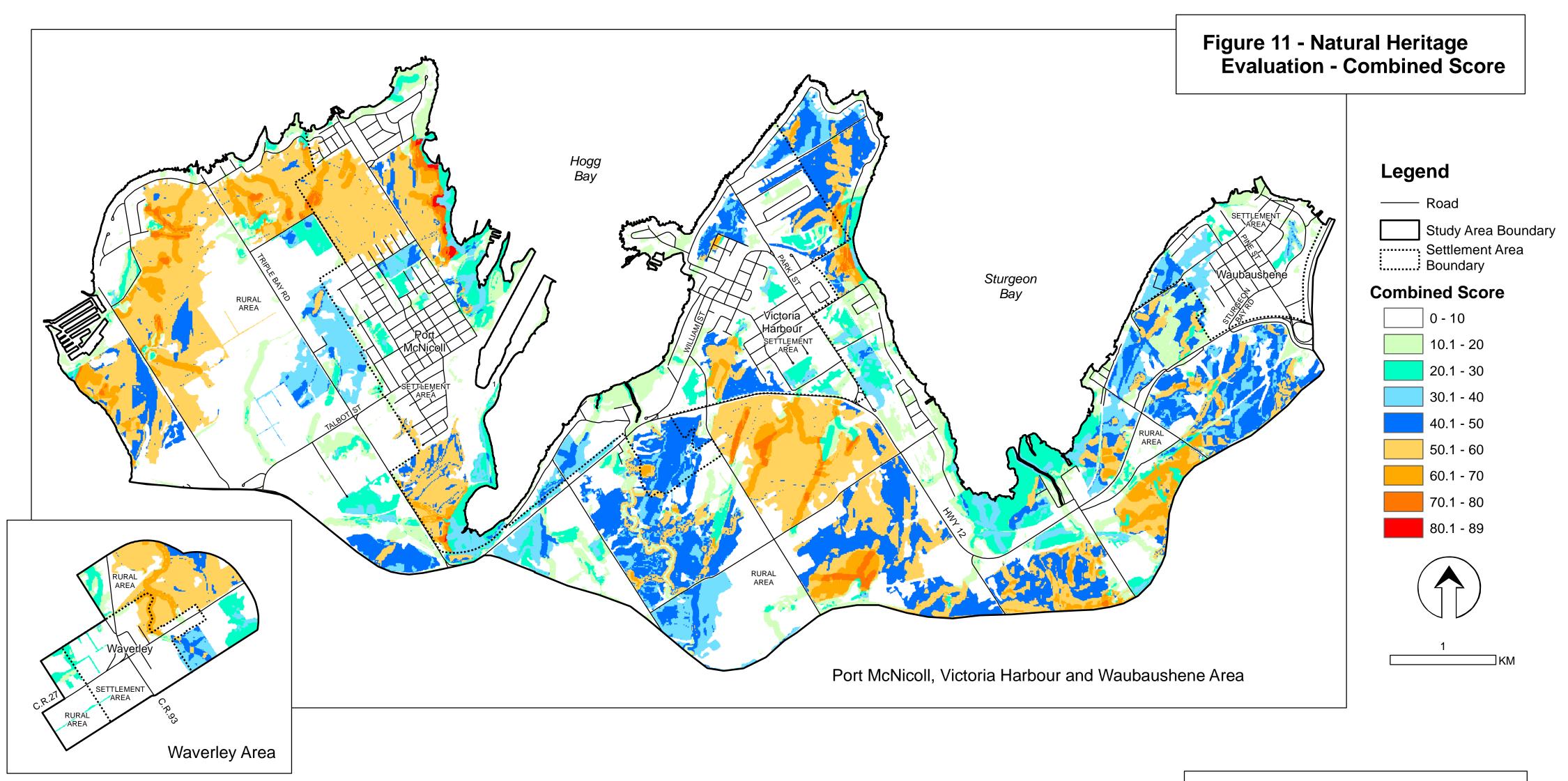
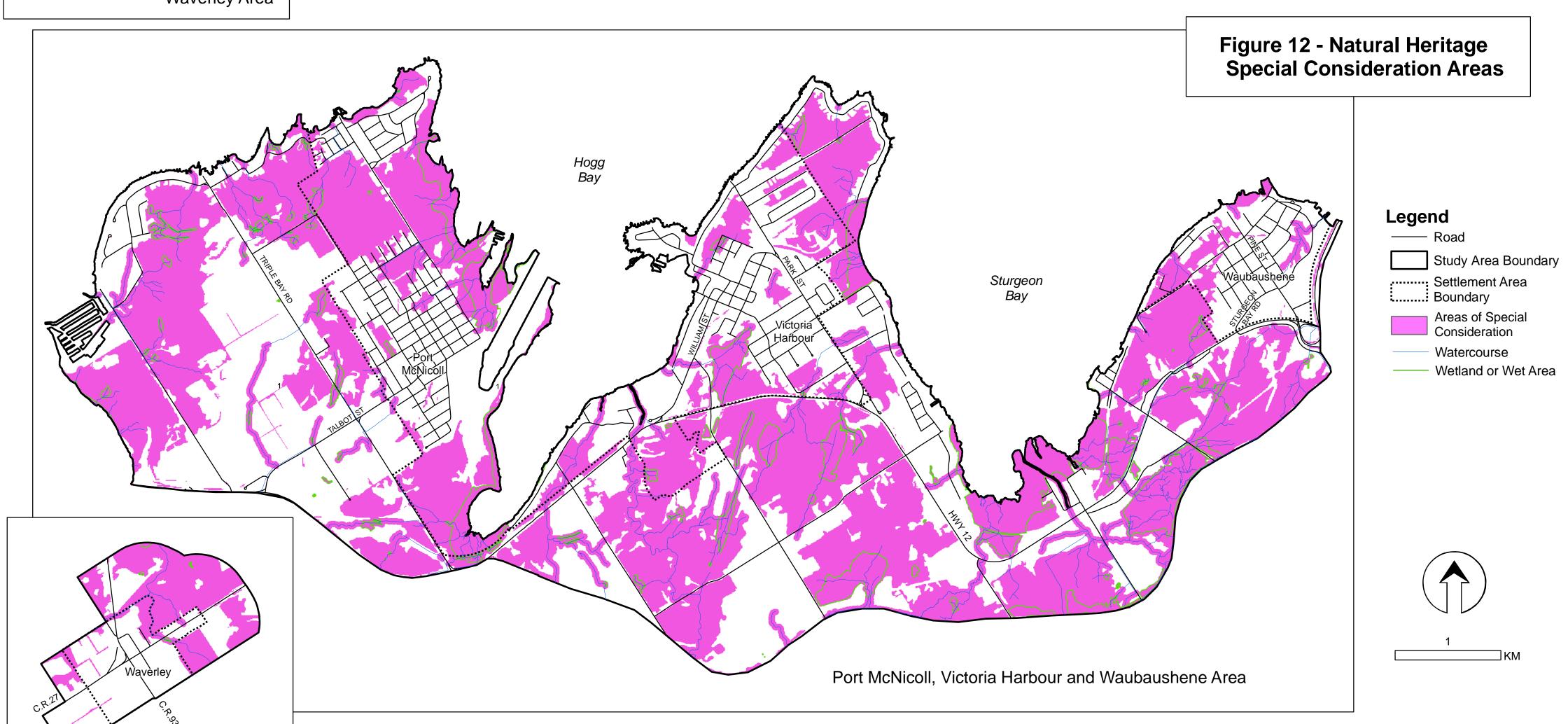


Figure 10 - Great Lakes Shoreline Scoring







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Waverley Area

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Appendix A: Glossary and List of Acronyms

Adjacent lands (from the Provincial Policy statement):

for the purposes of policy 2.1, those lands contiguous to a specific natural heritage feature or area where it is likely that development or site alteration would have a negative impact on the feature or area. The extent of the adjacent lands may be recommended by the Province or based on municipal approaches which achieve the same objectives.

Areas of Natural and Scientific Interest (ANSI) (from the Provincial Policy statement):

means areas of land and water containing natural landscapes or features that have been identified as having life science or earth science values related to protection, scientific study or education

ArcMap or ArcView

Geographic Information Systems (GIS) applications used for mapping and editing tasks, as well as for map-based analysis.

Break Line

In GIS, a line feature that controls surface behaviour when modeling elevation data.

Digital Elevation Model (DEM) (from ESRI GIS Online Dictionary)

The representation of continuous elevation values over a topographic surface

Ecosite

An Ecological Land Classification unit, used to describe a land area with homogeneous soils and vegetation, usually mapped at a scale of 1:50,000 to 1:10,000.

Ecological Land Classification (ELC)

A method of determining and classifying land types based on vegetation cover, soil type and hydrology. Designed by the Ontario Ministry of Natural Resources.

Geographic Information System (GIS)

Computer-based systems that are used to store and manipulate geographic information.

Habitat Analysis

A methodology designed by Severn Sound Environmental Association to provide a natural features profile of an area, created using GIS technology to determine characteristics of Forest Habitat, Riparian Habitat and Wetland Habitat.

Layer

A visual representation of a geographic data set in a digital map/GIS environment. [Also see *Shapefile*]

Metres Above Sea Level (MASL)

Natural heritage features and areas (from the Provincial Policy statement):

features and areas, including significant wetlands, significant coastal wetlands, fish habitat, significant woodlands south and east of the Canadian Shield, significant valleylands south and east of the Canadian Shield, significant habitat of endangered species and threatened species, significant wildlife habitat, and significant areas of natural and scientific interest, which are important for their environmental and social values as a legacy of the natural landscapes of an area.

Natural Resources and Values Information System (NRVIS)

A Geographic Information System (GIS) based system for managing the storage of Ontario Ministry of Natural Resources' (OMNR) digital land-related information in a standardized manner. It allows the user to work with spatial data along with the corresponding attribute information.

Ontario Base Mapping (OBM)

Past standard for land form and land use mapping; produced by the Ontario Ministry of Natural Resources. Now utilized within GIS technology.

Ontario Ministry of Natural Resources (OMNR)

Ontario Wetland Evaluation System

A document produced by the Ontario Ministry of Natural Resources that provides methodology for scoring wetlands in southern Ontario. Widely accepted as the governing document in classifying wet areas.

Official Plan (OP)

Guiding planning document for a municipality e.g., County of Simcoe Official Plan; Township of Tay Official Plan.

Ortho-photography (ortho-photos)

The orthogonal rectification process corrects for distortions caused by the terrain, the orientation of the airplane and the camera lens, resulting in an aerial image that allows users to accurately measure distances and areas. Ortho-photography is a product which has the geometric accuracy of a map but contains the immense detail of a photograph.

Provincial Policy Statement (PPS)

A document produced by Ontario Ministry of Municipal Affairs and Housing to guide and assist planners in land use decisions.

Riparian

To be associated with streams, waterways.

Rural Area (from the Provincial Policy statement):

means lands in the rural area which are located outside settlement areas and which are outside prime agricultural areas.

Settlement Area (from the Provincial Policy statement):

means urban areas and rural settlement areas within municipalities (such as cities, towns, villages and hamlets) that are:

- a. built up areas where development is concentrated and which have a mix of land uses; and
- b. lands which have been designated in an official plan for development over the long term planning horizon provided for in policy 1.1.2. In cases where land in designated growth areas is not available, the settlement area may be no larger than the area where development is concentrated.

Significant (from the Provincial Policy statement):

- a. in regard to wetlands, coastal wetlands and areas of natural and scientific interest, an area identified as provincially significant by the Ontario Ministry of Natural Resources using evaluation procedures established by the Province, as amended from time to time;
- b. in regard to the habitat of endangered species and threatened species, means the habitat, as approved by the Ontario Ministry of Natural Resources, that is necessary for the maintenance, survival, and/or the recovery of naturally occurring or reintroduced populations of endangered species or threatened species, and where those areas of occurrence are occupied or habitually occupied by the species during all or any part(s) of its life cycle;

- c. in regard to woodlands, an area which is ecologically important in terms of features such as species composition, age of trees and stand history; functionally important due to its contribution to the broader landscape because of its location, size or due to the amount of forest cover in the planning area; or economically important due to site quality, species composition, or past management history;
- d. in regard to other features and areas in policy 2.1, ecologically important in terms of features, functions, representation or amount, and contributing to the quality and diversity of an identifiable geographic area or natural heritage system;
- e. in regard to mineral potential, means an area identified as provincially significant through comprehensive studies prepared using evaluation procedures established by the Province, as amended from time to time, such as the Provincially Significant Mineral Potential Index;
- f. in regard to potential for petroleum resources, means an area identified as provincially significant through comprehensive studies prepared using evaluation procedures established by the Province, as amended from time to time; and
- g. in regard to cultural heritage and archaeology, resources that are valued for the important contribution they make to our understanding of the history of a place, an event, or a people.

Criteria for determining significance for the resources identified in sections (c)-(g) are recommended by the Province, but municipal approaches that achieve or exceed the same objective may also be used.

While some significant resources may already be identified and inventoried by official sources, the significance of others can only be determined after evaluation.

Shapefile

A format for storing location and attribute information of geographic features in GIS. Geographic features in a shapefile can be represented by points, lines, or polygons (areas). [Also see *Layer*]

Slope (percent)

How steeply the land rises. The rise is divided by the run to determine percent slope: e.g., the land rises 2 metres over a 10 metre distance, resulting in a 20% slope; the land rises 0.5 metre over a 25 metre run, resulting in a 2% slope. GIS applications determine this information from ortho-photographs.

Southern Ontario Land Resource Information System (SOLRIS)

A regional, ecologically based, land cover / land use inventory. It provides a comprehensive, landscape-level inventory of natural, rural and urban areas in Southern Ontario. The land cover / land use classification follows the standardized Ecological Land Classification for southern Ontario to describe, inventory and interpret land cover for ecoregions in southern Ontario. The inventory represents the landscape current to 2000 to 2002 including: exposed bedrock, shoreline, forest, agriculture (annual, mixed and perennial crop), vegetation, transportation, built-up areas and water.

Wetland: Evaluated and Unevaluated

An <u>evaluated</u> wetland is 2 hectares or larger that has been scored using the Ontario Wetland Evaluation System, and as a result is classified as being either Provincially Significant or Non-provincially Significant.

An <u>unevaluated</u> wetland has not been scored using the Ontario Wetland Evaluation System, sometimes due to its small size (less than 2 hectares).

Woodland

An area that is 0.5 hectare or larger containing over 60% contiguous tree cover with trees that are approximately two metres or greater in height with an identifiable canopy. May contain both tree and shrub species.

Woodland patch

A cluster of contiguous woody vegetation that contains over 60% tree cover and does not have any openings or gaps larger than 20m in width. The boundary of the woodland patch creates a closed polygon which may then be used in GIS applications.