Appendices

Appendix A-1. ELC Code Descriptions

FOC –   Coniferous Forest
FOD –   Deciduous Forest
FOM –   Mixed Forest
CUP –   Cultural Plantation
TPW –   Tallgrass Woodland
CUT –   Cultural Thicket
CUW – Cultural Woodland
TPO –   Open Tallgrass Prairie
CUM – Cultural Meadow
BBO –   Open Beach / Bar
BBS –   Shrub Beach / Bar
BBT –   Treed Beach / Bar
BLO –   Open Bluff
BLS –   Shrub Bluff
BLT –   Treed Bluff
CLO –   Open Cliff
CLS –   Shrub Cliff
CLT –   Treed Cliff
TAO –   Open Talus
TAS –   Shrub Talus
TAT –   Treed Talus
SWC –   Coniferous Swamp
SWD –   Deciduous Swamp
SWM – Mixed Swamp
SWT –   Thicket Swamp
FET –   Treed Fen
FES –   Shrub Fen
BOT –   Treed Bog
BOS –   Shrub Bog
FEO –   Open Fen
BOO –   Open Bog
MAM – Meadow Marsh
MAS –   Shallow Marsh
SAS –   Submerged Shallow Aquatic
SAM –   Mixed Shallow Aquatic
SAF –   Floating-leaved Shallow Aquatic
OAO –   Open Aquatic

Source: Lee et al, 1998. *Ecological Land Classification for Southern Ontario: First Approximation and Its Application.* SCSS Field Guide FG-02.

Appendix A-2. The similarities and differences between the ELC *Vegetation Community* Series and the MNHSS 2014 *Vegetation Groups*

ELC *Vegetation Community* Series		MNHSS 2014 *Vegetation Group*	
Code	**Definition**	***Veg. Group* (Ecosystem)**	**Definition**
SWC, SWD SWM	>25% tree or shrub cover ; >20% standing water;	Woodland (Wetland)	>20% standing water; >25% tree or shrub
CUP	>60% tree cover; >20% standing water; ≥1 linear edge;		
FOC, FOD FOM	>60% Tree cover	Woodland (Terrestrial)	>60% Tree cover <20% standing water
CUP	>60% tree cover < 20% standing water; ≥1 linear edge		
TPW	35-60% tree cover	Thicket (Terrestrial)	25-60% tree/shrub cover; <20% standing water
CUT	<25% Tree cover; >25% shrub cover		
CUW, TPW	35-60% tree cover		
SWT	<25% tree cover; >25% hydrophytic shrub cover	Thicket (Wetland)	10-25% tree cover or <10% tree cover and >25% shrub cover; >20% standing water
FET	20-25% tree cover		
FES	<10% tree cover; >25% shrub cover		
BOT	10-25% tree cover		
BOS	<10% tree cover; >25% shrub cover		
TPO CUM	<25% tree cover; <25% shrub cover	Meadow (Terrestrial)	<10% tree cover and <25% shrub cover
FEO BOO	<10% tree cover; <25% shrub cover	Meadow (Wetland)	<10% tree cover and <25% shrub cover; located in wetland as defined in Section 2.2.2.1 below
MAM MAS	<25% tree cover; <25% shrub cover		
SAS, SAM SAF	No tree cover; >25% macrophytes		
OAO	No vegetation; open water	Water Feature (Aquatic)	No vegetation; open water
BBO, BBS BBT	<60% tree cover; along shorelines	Watercourse Bluff and Depositional Area (Terrestrial)	<60% tree cover; on naturally active sites such as shorelines, steep slopes and base of cliffs
BLO BLS BLT	<10% tree cover; on active or steep near vertical surfaces		
CLO, CLS CLT	<60% tree cover; on steep near vertical surfaces		
TAO, TAS TAT	<60% tree cover; on slopes of rock rubble at base of cliffs		

*Note: Connected *Vegetation Group* can be made up trees and shrubs

Appendix B. Wetland Layer Methodology and Sources

The wetland layer for Middlesex was derived from four sources: (1) OMNR Evaluated Wetlands, (2) UTRCA/LTVCA.KCCA unevaluated wetlands, (3) ABCA unevaluated Wetlands and (4) SCRCA unevaluated wetlands.

(1)   Ontario Ministry of Natural Resources (OMNR) Evaluated Wetlands

The Ontario Ministry of Natural Resources evaluates wetlands based on the Ontario Wetland Evaluation System (OWES) Southern Manual (OMNR 2013). Sites are evaluated in the field, mapped, and then scored based on field data, hydrology and use. Since evaluated wetlands have been mapped during site visits, they can be smaller than 0.5 ha and are retained as part of the natural heritage system.

In some cases, CA staff found the perimeter of the evaluated wetland did not match the natural heritage feature boundary on the orthoimagery and so boundary amendments were made. It should be noted that this may have resulted in extending the wetland beyond the true boundary approved under OWES criteria.

If boundary amendments are being made to reflect the outer extent of a natural heritage feature this may be extending the wetland beyond the true boundary approved under OWES criteria.   Using OWES criteria the wetland boundary may not always align with the natural heritage feature boundary. For the wetland *Vegetation Community* feature layer, CA staff adjusted the boundaries of the wetland to the ortho-image. However, these amendments are not verified in the field and may extend the wetland boundary beyond the true boundary approved using the criteria in the Southern Ontario Wetland Evaluation manual. Therefore, for policy decisions, the approved wetland boundary should be used.

Recognizing that wetlands are dynamic, it is recommended that a DAR determine the accurate wetland boundary using the criteria in the Southern Ontario Wetland Evaluation Manual. The Ontario Wetland Evaluation System (OWES) uses an open file system where files can be amended as new information becomes available. MNR is the approval authority on Provincially Significant Wetlands (PSW), so any changes to the boundaries of PSWs must be approved by the MNR.

(2)   UTRCA, LTVCA and KCCA Unevaluated Wetlands

The Upper Thames River Conservation Authority (UTRCA) began identifying unevaluated wetlands in 2006 in an attempt to consolidate information and map the numerous wetlands that were not part of the evaluated wetland layer of OMNR to better represent natural features in the watersheds. These wetland areas were identified for the generic regulations using the following desk-top procedure:
  i.   Compile wetland indicators:
      a.   Historic Forest Cover. Delineate and digitize historic forest cover information collected in the 1950s and 1960s by teams of foresters who examined every woodlot in the watersheds and characterized cover types. Identify areas associated with wetland species (e.g. silver maple, black ash, cedar, white elm, and tamarack).
      b.   Soils. Delineate and digitize organic and clay soils (wetland soils) using OMAF soils maps.
      c.   Elevation. Delineate and digitize areas in depressions or lower elevations using a Digital Elevation Model (DEM).

  d. Groundwater. Delineate and digitize recharge and discharge areas from the Six CA Groundwater Model.

  e. Proximity. Delineate and digitize areas within 120 m of an OMNR evaluated wetland since 120 m is the distance at which adjacent lands may have an impact on a wetland. This distance ensures there will be enough area to account for changes in the wetland boundary.

 ii. Overlay the indicators to determine possible wetland areas. The more indicators that overlap, the more likely there is a wetland in that area.

 iii. Compare the areas delineated by overlaying the wetland indicators to an aerial photo interpretation of wetland areas where wetness is indicated by color (dark), texture (granular), and canopy cover (sparse or spotty). Areas that matched were identified as unevaluated wetlands.

The UTRCA staff applied this wetland mapping methodology to the watersheds of the Lower Thames Valley and Kettle Creek within Middlesex County.

(3) ABCA Unevaluated Wetlands

The Ausable Bayfield Conservation Authority (ABCA) developed a methodology for progressively updating their regulated wetland layer in 2006 in order to comply with the CA Generic Regulation (Ontario Regulations 157/06). Regulated unevaluated wetlands include:

- Wetland features > 0.5ha included in the Natural Resource Value Information System (NRVIS) water polygon layer (MNR OBM 1983) were selected and verified with 1999 aerial spring photography. Irrigation ponds, sewage lagoons, and cultivated fields were removed, as were wetlands already identified in another MNR wetland layer.
- ABCA digitized wetland layer based on the existing ABCA Environmentally Significant Areas (ESAs) digital layer (ABCA 1994), and adjusted according to:
    - boundaries drawn on 1978 air photos from field visits,
    - photo interpretation of 1999 aerial photography,
    - soil mapping (Experimental Farm Service 1952), and
    - 1 m contours from a Triangulated Irregular Network (TIN) layer.
- Other wetland mapping including marshes identified in the 1986 OMNR Ontario Base Map series were added

All wetlands have since been viewed and adjusted using the 2010 air photos and 3-D stereo model where required.

(4) St. Clair Region Conservation Authority (SCRCA) Unevaluated Wetlands

In 2012, the SCRCA undertook Wetland Analysis Mapping. The SCRCA developed a desk-top methodology to identify previously unidentified wetlands greater than 0.5 ha. Regulated unevaluated wetlands include those identified in one of two methods:

- Desk top interpretation of 2010 aerial photography. Areas exhibited a high likelihood of wetland potential include areas darker than the surrounding features because of the presence of water, areas that appear granular because of the type of vegetation associated with wetlands, and sparse or spotty canopy cover.   OR
- The presence of three indicators of wetland potential overlaid on 2010 aerial photography:
    - Soil mapping (OMAF Soils Ontario Version 1.0) using soil types identified as: Organic, Bottomland and Beach, Silt and Clay and Silt and Clay Loams
    - Groundwater discharge (FEFLOW Groundwater Model, Waterloo Hydrogeologic Inc., 2005)
    - Woodlands (1983 Agricultural Resource Inventory by OMAF)

Appendix C. Groundwater Dependent Wetlands and a possible procedure for landscape scale study

An index of ecosystem groundwater dependency can be developed for the watershed by mapping and overlaying the following three ecosystem types to determine areas of ecosystem groundwater dependency:

Springs and seeps. Survey the landscape in late fall (e.g., by plane) when there is fog to identify seeps. Map as point features. All springs are groundwater dependent regardless of location.

Groundwater dependent wetlands. Use the spatial layer of wetland *Vegetation Groups* developed in Section 2.2.2.1 as base layer. Since groundwater dependent wetlands are defined by hydric or partially hydric soils, the wetland *Vegetation Group* layer was intersected with a soils layer to remove all surface water dependent wetlands. Surficial geology can also be used to identify groundwater dependent wetlands as most are located on sand and gravel deposits.

Groundwater dependent streams.   Survey the landscape in winter and summer to identify groundwater dependent streams.

Alternatively, as groundwater discharge areas are detected through site studies as part of the Ecological Site Assessment Process and recorded in the Development Assessment Report (DAR), it is recommended that the appropriate Conservation Authority is notified and the location of discharge is mapped as significant.

Source: UTRCA Staff

Appendix D-1. Summary of Significance Criteria and Rationale, Criteria 1 to 3

#	*Vegetation Group* Criteria	Scientific Rationale	Other Natural Heritage Study (NHS) Sources	Application / MNHSS Rules for Mapping Significant Features
1	Any *Vegetation Group* within or touching a **valley**	Vegetation on valley lands prevents erosion, improve water holding capacity that ensures regeneration of vegetation, and encourages wildlife movement.	Oxford (ONHS 2006): patches on valley lands Huron (HCNHS 2013): all areas within valley lands or patches < 100 m from valley lands.	Section 3.2.1.1: *Vegetation Group* on valley land defined using 3:1 slope or 100m from centerline of watercourse.
2	Any *Vegetation Group* located within or touching a **Life Science ANSI** (Area of Natural and Scientific Interest)	Recognized significant areas are a logical foundation on which to design a natural heritage system.	Huron (HCNHS 2013): contains a Life Science ANSI	Section 3.2.1.2: Pre-determined by OMNR using five evaluation selection criteria: representation, condition, diversity, other ecological considerations, and special features.
3	Any *Vegetation Group* located within 30 m of an **open watercourse**	Relationship between water course and vegetation is interactive whereby vegetation along watercourses improves water quality for aquatic Vegetation Ecosystems through reduction in soil erosion and input of nutrients; while the watercourse attracts animals and acts as a corridor.	Middlesex (MNHS 2003): <50 m of watercourse Oxford (ONHS 2006): < 50 m of watercourse Huron (HCNHS 2013): < 30 m of watercourse LCNHS 2013: > 0.5 ha woodland < 30 m from watercourse COL 2006: woodland < 50m of watercourse, floodplain, or riparian corridors.	Section 3.2.1.3: All *Vegetation Groups* within 30 m from the edge of an open watercourse (defined as the bank-full width if greater than 20m wide, or a defined channel visible on the aerial photography if less than 20m wide).

Appendix D-2. Summary of Significance Criteria and Rationale, Criteria 4 to 9

#	*Vegetation Group* Criteria	Scientific Rationale	Other NH Sources with this criterion	Application / MNHSS Rules for Mapping Significant Features
4	All evaluated wetlands and any unevaluated **wetland** *Vegetation Group* ≥0.5 ha	Wetlands have disproportionately been removed from the landscape of southern Ontario. Some of their important functions are to maintain the hydrological regime of the surrounding area by dampening water peaks in the gullies, reduce the potential for erosion and provide critical breeding and overwintering habitat for reptiles and amphibians.	<u>HCNHS 2013</u>: contains either • OMNR evaluated wetland, • coastal wetland	The wetland layer was derived from the OMNR evaluated wetland mapping layer, as well as the unevaluated wetland layers developed from each of the Conservation Authorities in Middlesex County (refer to Mapping Criteria Section 1.3).
5	Any **woodland** *Vegetation Group* ≥**4 ha**	Habitat size is one of the most important measures for sustaining stable, diverse and viable populations of wildlife species. In a highly fragmented landscape, the definition of a "large sized" woodland can be relatively small.	<u>MNHS 2003</u>: >10 ha in size and has interior >100 m from edge <u>ONHS 2006</u>: >10 ha in size and has interior >100 m from edge <u>HCNHS 2013</u>: >4 ha <u>LCNHS 2013</u>: >2 ha in size and has interior >100 m from edge <u>Perth 2012</u>: > 1 ha <u>COL 2006</u>: woodland >2 ha and has interior >100 m from edge	All woodland vegetation groups ≥4 ha meet this criterion.
6	Any Woodland *Vegetation Group* **within 100 m of a ≥4 ha Woodland** *Vegetation Group*	The < 100 m distance is based on average seed dispersal distances in the literature.	<u>MNHS 2003</u>: <100 m from 10 ha woodland <u>HCNHS 2013</u>: woodland <100 m from 4 ha woodland <u>LCHNS 2013</u>: either – 0.5 ha woodland within 30 m of any veg. community or > 0.5 ha woodland located <120m of a >1 ha *Vegetation Community*.	All woodland less than 4 ha within 100 m of a >4 ha woodland, regardless of what land use surrounds them, meet this criterion.

Appendix D-3. Summary of Significance Criteria and Rationale, Criteria 7 to 9

#	*Vegetation Group* Criteria	Scientific Rationale	Other NH Sources with this criterion	Application / MNHSS Rules for Mapping Significant Features
7	Any **Thicket** *Vegetation Group* ≥ 2 ha in size	Larger thickets are better if managing to enhance the long-term survival of a variety of wildlife. Large thickets >2 ha are relatively rare in Middlesex County, yet thickets of at least 10 ha in size are required for uncommon species (Oehler *et al.* 2006).	HCNHS 2013: >2.5 ha shrub land	Thickets ≥2 ha meet this criterion. They are relatively rare in Middlesex County
8	Any **Meadow** *Vegetation Group* ≥ 10 ha in size	The amount of native meadow habitat has declined drastically throughout North America. Grassland birds are of special concern since they have suffered more serious population declines than any other group of birds. Johnson (2001) demonstrated a preference for large grassland *Vegetation Groups* by a number of grassland bird species, irrespective of territory size.	HCNHS 2013: ≥10 ha shrub land / meadow	All meadows ≥10 ha meet this criterion.
9	Any **Meadow** *Vegetation Group* **within 100 m of a large size Woodland or Shrubland** *Vegetation Group*	Meadow butterfly habitat must be considered in context with the surrounding range of habitats. Using the average distance of wind dispersed seeds as a conservative estimate, all meadows found within 100 m of a large shrub land or woodland were identified meeting this criterion.		All meadows within 100 m of a large woodland (4 ha) or large shrub land (2 ha) meet this criterion.

Appendix D-4. Summary of Significance Criteria and Rationale, Criteria 10 to 12

#	*Vegetation Patch* Criteria	Scientific Rationale	Other NH Sources with this criterion	Application / MNHSS Rules for Mapping Significant Features
10	Any *Vegetation Patch* that contains a *Vegetation Group* identified as significant	The arrangement of spatial elements, especially barriers, conduits, and highly-heterogeneous areas between the *Vegetation Communities* within the *Vegetation Patch* determine the movement of species, energy, material, and disturbance over a landscape.		All *Vegetation Patches* containing a *Vegetation Group* that has been identified as significant.
11	Any *Vegetation Patch* that contains a diversity of *Vegetation Communities*, Ecosystems or Groups	The number of *Vegetation Communities* in a *Vegetation Patch* is a measure of habitat and species diversity.	ONHS 2006: patches with largest *Vegetation Community* type HCNHS 2013: > 15 vegetation polygons COL 2006: > 3 community series	The *Vegetation Patch* was identified as significant if it either contained more than one Vegetation Ecosystem, or more than two *Vegetation Groups*, or more than three *Vegetation Communities*.
12	Any *Vegetation Patch* within 100 m of a significant *Vegetation Patch*	Local landscapes that include large natural areas linked to the regional landscape mosaic by a network of smaller interacting natural areas and corridors, offers the highest probability of maintaining overall ecological integrity. The < 100 m distance is based on average seed dispersal distances in the literature.	MNHS 2003: <100 m from 10 ha woodland HCNHS 2013: woodland <100 m from 4 ha woodland LCHNS 2013: either – • 0.5 ha woodland within 30 m of any *Vegetation Community* or > 0.5 ha woodland located <120m of a >1 ha *Vegetation Community*.	All *Vegetation Patches* within 100m of a significant *Vegetation Patch*, regardless of what land use surrounds them, are identified.

Appendix D-5. Summary of Significance and Rationale, Criteria 13 to 15

#	*Vegetation Patch* Criteria	Scientific Rationale	Other NH Sources with this criterion	Application / MNHSS Rules for Mapping Significant Features
13	Any *Vegetation Group* that contains **Significant Wildlife Habitat**	According to the PPS, wildlife habitat is considered significant where it is ecologically important in terms of features, functions, representation or amount. Suggested criteria for determining Significant Wildlife Habitat are provided by OMNR in the Significant Wildlife Habitat Technical Guide (OMNR 2000b), the Significant Wildlife Habitat Ecoregional Criteria Schedules (OMNR 2012), and the Natural Heritage Reference Manual (OMNR 2010).	COL 2006: patch with either • > 1 species of amphibian, or • 1 species of amphibian that is occasional, or • 1 critical habitat component, or • Conifer communities> 2.0 ha in size, or • Dissolved oxygen> 5.0 mg/L, or • Moderate in stream woody debris HCNHS 2013: seeps (when identified)	As SWH is identified, the appropriate planning authority must confirm its significance. Significant habitat will be mapped and reported to the OMNR and the appropriate Conservation Authority and submitted to the County as an update to the significant natural heritage mapping layer.
14	Any *Vegetation Group* that contains a **Groundwater Dependent Wetland (GDW)**	GDWs are ecosystems that require access to groundwater to maintain their communities of plants and animals, ecological processes and ecosystem services. Examples: seeps, fens	ONHS 2006: on well head capture zones of GW susceptibility areas. LCNHS 2013: woodland > 0.5 ha on groundwater feature COL 2006: within or contiguous to groundwater recharge area (as defined in Schedule B1 on London the Official Plan)	Section 3.2.1.4: An index of ecosystem groundwater dependency can be developed for the watershed by mapping and overlaying the following three ecosystem types to determine areas of ecosystem groundwater dependency
15	Any *Vegetation Group* that contains a **Watercourse Bluff or Deposition Area**	Steep slopes, areas of erosion and beaches (depositional areas) can create unique natural features for specialized assemblages of plants and animals.	ONHS 2006: patches on valley lands HCNHS 2013: all areas within valley lands or patches < 100 m from valley lands.	Deposition Areas, Steep Slopes, Cliffs and Valley Bluffs identified through the Ecological Site Assessment Process on valley lands.

Appendix D-6.   Summary of Significance Criteria, Natural Heritage Studies Referenced

COL ─ City of London (City of London, 2006)
- evaluation of woodlands, cutoffs based on medium to high rankings

HCNHS ─ Huron County Natural Heritage Study (County of Huron, 2013 Draft)
- based on more complete natural heritage system mapping and no field work

LCHNS ─ Lambton County Natural Heritage Study (County of Lambton et al., 2012 Draft)
- based only on woodlands and field work

MNHS ─ Middlesex Natural Heritage Study (UTRCA, 2003)
- based only on woodlands and field work

ONHS ─ Oxford Natural Heritage Study (County of Oxford, 2006)
- based on woodlands, floodplain meadows, watercourses and dated fieldwork

Perth ─ Perth County Official Plan Amendment #47 (County of Perth Official Plan). 2008.
Section 11.5.5)
- regarding minimal woodland size

Appendix E. Summary of rationale for 19 criteria NOT used to identify significance

Criteria	Rationale for Not Including in MNHSS 2014	Other Natural Heritage Studies*
1. Best representative *Vegetation Patch* on **landform physiography and soil type**	This is redundant as the Life Science ANSI uses this criterion, even though it is done at a different scale (i.e., by site district rather than by county).	<u>ONHS 2006</u>: largest patch on each landform and each soil type <u>LCNHS 2013</u>: largest patch on slope of 10% or greater and largest patch on each landform and each soil type <u>COL 2006</u>: patch contains either: - > 1 ecosite in 1 Community series OR - > 2 vegetation types OR - > 1 topographic feature OR - 1 vegetation type with inclusions/ complexes
2. Located on a **distinctive, unusual or high quality landform**	Definition of a distinctive, unusual or high quality landform is subjective.	<u>COL 2006</u>: patch located on either - Beach Ridge - Sand Plain - Till Plain - Till Moraine
3. All areas (both vegetated and **non-vegetated**) on: - **Gullies** - **Valley lands** - within 30 m of **limestone outcroppings**	The MNHSS will identify *Vegetation Patches* on valley lands as significant and recommend that other land uses on valley lands (e.g., agriculture, golf courses, etc.) be considered as special policy areas with limitations on further development to maintain valley land connectivity. There are no shorelines or limestone outcroppings in Middlesex.	<u>ONHS 2006</u>: patches on valley lands <u>HCNHS 2013</u>: patches on or < 100m from landform features - dunes, - shore bluffs, - gullies, - valley lands, - within 30m of limestone outcroppings
4. All *Vegetation Patches* found alongside a **coldwater watercourse or watercourse containing Brook Trout**	Definition of a watercourse, both cold and warm, includes an additional area immediately adjacent to the water (in proportion to the size of the watercourse feature) and therefore it is not necessary to include additional lands for protection (e.g., *Vegetation Patches* 30 m from edge) Non vegetated setbacks from watercourses can be restricted using other official plan and zoning plan policies. <u>Questions remain</u>: Is this sensitive information? How easy is it to determine coldwater streams? Are they already identified?	
5. **Shape** of *Vegetation Patch*	When shape metrics are used, often very small and round *Vegetation Patches* are selected over larger *Vegetation Patches*.	<u>COL 2006</u>: has perimeter to area ratio <3.0 m/m^2

Appendix E continued

Criteria	Rationale for Not Including in MNHSS 2014	Other Natural Heritage Studies*
6.Adjacent to an OMNR evaluated wetland or life science ANSI	This is redundant as other adjacency rules have these features incorporated into them.	MNHS 2003: woodland < 750m from recognized feature. ONHS 2006: < 150m of non-wetland feature
7.Contains an area identified in the local official plans e.g. **Local ESAs** (Hilts and Cook 1978).	The MNHSS uses modern landscape parameters. Verification that the old ESAs are being identified as significant will occur.	ONHS 2006: Local OP designated habitats
8.Unique Intrinsic Characteristics (i.e., site level)	No field work or site visits are being conducted for this project, so it is not possible to evaluate the intrinsic or site specific characteristics of *Vegetation Patches* at this fine scale.	LCNHS 2013: > 0.5 ha woodland with either - - unique species composition, - cover type, - age - structure. COL 2006: woodland with either – - mid to old age community, or - tree size > 50 cm DBH, or - > 16 m2/ha for trees >25 cm DBH, or - > 12 m2 / ha for trees > 10 cm DBH, or - All diameter class sizes represented or - community with MCC > 4.1, or - patch MCC > 3.9, or - > 1 community in good condition or - Community with SRANK > S4 or - > 1 northern / specialized habitat / tree / shrub species or - > 2 Carolinian tree / shrub species
9.Distance from development (e.g., permanent infrastructure and buildings) or matrix	Difficult to evaluate. Too complex for this study.	COL 2006: > 7% vegetation cover within 2 km radius from woodland centroid
10.Persistence or Threatened	A natural feature that persists through time is not necessarily more significant. However, it is interesting to compare 2006 to 2010 aerial photography to see what the trends are and why.	LCNHS 2013: > 0.5 ha woodland with high economic or social value
11.Porous or erodible soils	The aim of the MNHSS is to identify biological natural heritage features, not hazards. Natural features found on porous soils should be captured in *Vegetation Patches* found on significant groundwater areas	MNHS 2003: woodland on porous soils COL 2006: patch on either- - 25% slope any soil - Remnant slope - >10% to <25% on clay, silty clay

Appendix E continued

Criteria	Rationale for Not Including in MNHSS 2014	Other Natural Heritage Studies*

12. *Vegetation Patch* contains **a large sized wetland** defined as:
• Wooded wetlands >4ha based on Env. Canada
• Wetland meadows and marshes > 10ha based on Env. Canada
• Small wetland meadows and marshes adjacent to other *Vegetation Communities* may be vital to butterflies
• Wetland shrubland size determined by top 75th percentile distribution cutoff of all county wetland shrubland sizes
	The MNHSS 2014 has identified all wetlands ≥0.5 ha (MMU) as significant, regardless of size or type.	<u>HCNHS 2013</u>: either -
		  - 4ha wooded wetland
		  - 10ha wetland meadow or marsh
		  - 2.5ha wetland shrubland
		
		<u>COL 2006</u>: woodland contains or contiguous to a wetland

13. *Vegetation Patch* contains a wetland that is **within 1,000m of another wetland;** distance based on S. Ont. Wetland Evaluation Manual where wetlands are scored based on their proximity to another wetland (Section 1.2.4) and receive points if they are within 1 km of another wetland. The 750m is for delineating wetland boundaries, not scoring wetlands.	MNHSS 2014 has identified all wetlands ≥0.5 ha (MMU) as significant.	<u>ONHS 2006</u>: < 750 m from wetland <u>HCNHS 2013</u>: < 1000 m from wetland

14. *Vegetation Patch* contains a recently observed (post 1980) **Regionally Rare Plant**	Uncommon or rare species in Middlesex County may be used as a warning that indicates the continued decline of a species.
	    Regional rarity was once tracked by MNR Aylmer but no longer. Dr. Jane Bowles updated the R status list in 2002, but there is nothing more current.
	    Furthermore, the geo-references for the data are inconsistent or lost. The UTRCA has only one map showing locations of regionally rare plants, mapped by hand onto a topographic map of London-St. Thomas 40-I/14, by Dr. Bowles, circa 1993. Neither MNR Aylmer nor NHIC have retained or digitized the historic data.
	    Presently, no agency is responsible for ensuring the data is being updated and monitored for change in status. There is a need to develop a reporting and evaluation system.
		<u>ONHS 2006</u>: contains rare species
		<u>COL 2006</u>: Contains either:
		• Rare tree / shrub
		• Rare herbaceous
		• Regionally rare plant

Appendix E continued

Criteria	Rationale for Not Including in MNHSS 2014	Other Natural Heritage Studies*
15. *Vegetation Patch* contains **shrubland/thicket with interior**	Although studies have shown that most shrub land birds avoid edges (Schlossberg and King 2008) and experience lower nesting success near edges (King et al. 2001, King and Byers 2003, King et al. 2009b), there is not a consistent definition of edge habitat. Rather, the size of a shrub land is used as a proxy measure of edge habitat.	
16. *Vegetation Patch* contains an **Earth Science ANSI** that contributes to the presence of an uncommon *Vegetation Community*	Biodiversity planning requires an understanding of uncommon *Vegetation Communities* in terms of their distribution on significant areas. However, the presence of an ES ANSI does not mean there are unique *Vegetation Community* features that are resulting from the characteristics of the Earth Science ANSI.	
17. Carolinian Canada **Big Picture Corridors**	Carolinian Canada's Big Picture has been accepted as a planning tool when no other landscape level studies were complete. Many of the rules used to identify Carolinian Corridors on the larger landscape (SW Ont) have been incorporated in the MNHSS 2014 proposed criteria, but refined for the smaller County scale (e.g., valley land definition layer and proximity criteria). The Big Picture corridors incorporate areas that are <u>not</u> vegetated at present, as part of a restoration plan. The MNHSS captures only vegetated natural heritage patches, not farmland or other lands that could be restored or naturalized. Picking corridors at a larger scale is somewhat arbitrary. It is proposed that more current science and mapping be used to delineate corridors. Recommend as a followup step to the MNHSS or deal with it when there is a landuse change.	<u>MNHS 2003:</u> woodland within recognized corridor <u>COL 2006:</u> woodlands connected by either – - Watercourses - Gaps < 40m - Recognized corridors - Abandoned rail and utility lines - Open space greenways and golf courses - Active agriculture or pasture
18. Interior woodland habitat that is ≥ **0.5 ha in size** of continuous habitat	• Interior is defined as >100 m from the woodland edges. • All woodlands with at least 0.5ha of continuous interior habitat are considered significant. • Habitat found along the edge of a woodland *Vegetation Community* is characterized by a climate (e.g., higher humidity, lower wind) and *Vegetation Community* composition different from that of interior woodland habitat. • Interior habitat is often less prone to disturbances and supports fewer predators.	<u>MNHS 2003:</u> has interior >100 m from edge <u>ONHS 2006:</u> has interior >100 m from edge <u>HCNHS 2013:</u> has interior > 0.5 ha that is > 100 m from edge <u>LCNHS 2013:</u> has interior >100 m from edge <u>COL 2006:</u> : has interior >100 m from edge

Appendix E continued

Criteria	Rationale for Not Including in MNHSS 2014	Other Natural Heritage Studies*
19.Species at Risk	• Includes plants, *Vegetation Communities*, birds, mammals, herpetofaunal (frogs, toads, salamanders, turtles and snakes). Rare or uncommon species can be indicators of unusual and rare habitat and are often used to guide conservation strategies (Lesica and Allendorf 1995, Lomolino and Channell 1995). • Table 3-4 in the Natural Heritage Reference Manual (OMNR, 2010) recognizes species rarity as an ecological function, and habitats that contain rare species are more valuable. MNR recommends that this be restricted to END and THR. • SAR have their own legislation for protection and a DAR needs to consider their presence This is not a criterion for the following reasons: - This is a landscape study rather than an intrinsic characteristics study and there is not a complete inventory - The absence of a species does not mean that suitable habitat or conditions are not present - Areas with END or THR species are already protected in the SAR Act while IUCN S1 – S3 are considered under SWH - Mapping limitations of the past limit accuracy in identifying locations. New species are added to the SAR over time. • These areas are not mapped currently but it is recommended that they be mapped as they are identified through site studies on the landscape and reported to the OMNR and the appropriate Conservation Authority.	

Natural Heritage Studies Referenced above

COL -- City of London (City of London, 2006)
- evaluation of woodlands, cutoffs based on medium to high rankings

HCNHS -- Huron County Natural Heritage Study (County of Huron, 2013 Draft)
- based on more complete natural heritage system mapping and no field work

LCHNS -- Lambton County Natural Heritage Study (County of Lambton et al., 2012 Draft)
- based only on woodlands and field work

MNHS -- Middlesex Natural Heritage Study (UTRCA, 2003)
- based only on woodlands and field work

ONHS   -- Oxford Natural Heritage Study (County of Oxford, 2006)
- based on woodlands, floodplain meadows, watercourses and dated fieldwork

Perth   -- Perth County Official Plan Amendment #47 (County of Perth Official Plan. 2008. Section 11.5.5)
- regarding minimal woodland size

Appendix F. Metadata: Patch and Group Criteria Mapping and Field Description

The following Information describes the feature classes (layers) and fields that are associated with the criteria section of the report. The feature classes are being delivered in a file geodatabase format (name).

Naming Convention

A naming convention is being followed that should make data easy to understand and follow.

Table 1 describes short forms used for Groups:

Group Type	Short Form
Woodland	WDL
Meadow	MDW
Thicket	THK
Wetland	WTL
Connecting Features	CNF
Waterbody	WBY

Table 2 describes short forms used for Patch:

Patch	Short Form
Patch	PTC

Table 3 describes how the level of information are defined.

Level of Detail	Detail
Field provides criteria of the individual group	CR
Fileld provides supporting information that may be important to the group	INF

Populated data and Field Structure

Field names are generally named in the following manner "Short Form"_"Detail"_Description (e.g. Woodland_Criteria_Greater Than 4ha is WDL_CR_GT4ha)

Group, Patch and Information filelds are *short integers* fields and are populated with 1 or 0, 1=applicable 0=not applicable – See table below

"Short Form"_"CR"_Total– are short integers fields that indicate the total number of criteria met within the individual group

Appendix F continued.

Table 4 provides field descriptions and field names within each group and patch feature class. It also provides information of what values are populated.

Feature Name and Field Description	Field Name	Value
Group_Woodland_Cluster_02_21_2014		
Within valley land	WDL_CR_Valleyland	0= Not applicable, 1=applicable
With Life Science ANSI	WDL_CR_ANSI	0= Not applicable, 1=applicable
Group within 30m of Watercourse	WDL_CR_Watercourse	0= Not applicable, 1=applicable
Any Woodland or Woodland Cluster >4ha	WDL_CR_GT4ha	0= Not applicable, 1=applicable
Any Woodland within 100m of a Woodland Cluster> 4ha	WDL_CR_100m_GT4ha	0= Not applicable, 1=applicable
Number of Significant Woodland Criteria Met	WDL_CR_Total	0 = Not applicable >0=Applicable
Wetland within Woodland	WDL_INF_Wetland	0= Not applicable, 1=applicable
Individual Woodland or Woodland within Cluster has Interior	WDL_INF_Interior	0= Not applicable, 1=applicable
Group_Meadow_Cluster_01_08_2014		
Within valley land	MDW_CR_Valleyland	0= Not applicable, 1=applicable
With Life Science ANSI	MDW_CR_ANSI	0= Not applicable, 1=applicable
Group within 30m of Watercourse	MDW_CR_Watercourse	0= Not applicable, 1=applicable
Any Meadow or Meadow Cluster >10ha	MDW_CR_GT10ha	0= Not applicable, 1=applicable
Number of Meadow Significant Criteria Met	MDW_CR_Total	0 = Not applicable >0=Applicable
Wetland within Thicket	WDW_INF_Wetland	0= Not applicable, 1=applicable
Group_Thicket_Cluster_01_22_2014		
Within valley land	THK_CR_Valleyland	0= Not applicable, 1=applicable
With Life Science ANSI	THK_CR_ANSI	0= Not applicable, 1=applicable
Group within 30m of Watercourse	THK_CR_Watercourse	0= Not applicable, 1=applicable
Any Thicket or Thicket Group >2ha	THK_CR_GT2ah	0= Not applicable, 1=applicable
Number of Significant Thicket Criteria Met	THK_CR_Total	0 = Not applicable >0=Applicable
Wetland within Thicket	THK_INF_Wetland	0= Not applicable, 1=applicable

Group_Wetland		
Within valley land	WTL_CR_Valleyland	0= Not applicable, 1=applicable
With Life Science ANSI	WTL_CR_ANSI	0= Not applicable, 1=applicable
Group within 30m of Watercourse	WTL_CR_Watercourse	0= Not applicable, 1=applicable
Any wetland >0.5 ha or Provincial Evaluated Wetland	WTL_CR_Wetland	0 = Not applicable >0=Applicable
Number of Significant Wetland Criteria Met	WTL_CR_Total	>0=applicable
Group_Connecting_Feature		
Within valley land	CNF_CR_Valleyland	0= Not applicable, 1=applicable
With Life Science ANSI	CNF_CR_ANSI	0= Not applicable, 1=applicable
Group within 30m of Watercourse	CNF_CR_Watercourse	0= Not applicable, 1=applicable
Number of Connecting FeaturesSignificant Criteria Met	CNF_CR_Total	0 = Not applicable >0=Applicable
Wetland within Connecting Feature	CNF_INF_Wetland	0= Not applicable, 1=applicable
Group_Waterbody_04_04_2014		
Within valley land	WBY_CR_Valleyland	0= Not applicable, 1=applicable
With Life Science ANSI	WBY_CR_ANSI	0= Not applicable, 1=applicable
Group within 30m of Watercourse	WBY_CR_Watercourse	0= Not applicable, 1=applicable
Number of Waterbody Significant Criteria Met	WBY_CR_Total	0 = Not applicable >0=Applicable
Patch_MNH_Cluster_06_18_2014		
Patch contains at least one group significant from field list below (see field descriptions below in Patch Information) MDW_CR_Significant- patch meets a criteria SHB_CR_Significant - patch meets a criteria WDL_CR_Significant- patch meets a criteria WTL_CR_Significant- patch meets a criteria CNF_CR_Significant- patch meets a criteria WBY_ CR_Significant- patch meets a criteria	PTC_CR_Group	0= Not applicable, 1=applicable
Vegetation Communities I) Patch contains more than one vegetation system, or ii) Patch contains more than two *Vegetation Groups*, or iii) Patch contains more than three *Vegetation Communities*	PTC_CR_Diversity	0= Not applicable, 1=applicable
within 100m of a large *Vegetation Group* i) Any Woodland or Woodland Cluster> 4ha ii) Any Thicket >2ha iii) Any Meadow >10ha	PTC_CR_Proximity	0= Not applicable, 1=applicable

Patch Information		
Patch contains a Patch criteria	PTC_CR_Signficiant	0= Not applicable, 1=applicable
Patch contains a Woodland Group criteria	WDL_CR_Signficant	0= Not applicable, 1=applicable
Patch contains a Meadow Group criteria	MDW_CR_Signficant	0= Not applicable, 1=applicable
Patch contains a Thicket Group criteria	THK_CR_Signficant	0= Not applicable, 1=applicable
Patch contains a Wetland Group criteria	WTL_CR_Signficant	0= Not applicable, 1=applicable
Patch contains a Connecting Feature Group criteria	CNF_CR_Signficant	0= Not applicable, 1=applicable
Patch contains a Waterbody Group criteria	WBY_CR_Signficant	0= Not applicable, 1=applicable
Woodland Criteria		
Patch contains a woodland within a Valleyland	WDL_CR_Valleyland	0= Not applicable, 1=applicable
Patch contains a woodland within a ANSI	WDL_CR_ANSI	0= Not applicable, 1=applicable
Patch contains a woodland that is within 30 m of watercourse	WDL_CR_Watercourse	0= Not applicable, 1=applicable
Patch contains a woodland or woodland group >4ha	WDL_CR_GT4ha	0= Not applicable, 1=applicable
Patch contains a woodland that is within a 100m of a woodland >4ha	WDL_CR_100m_GT4ha	0= Not applicable, 1=applicable
Meadow Criteria		
Patch contains a meadow within valley land	MDW_CR_Valleyland	0= Not applicable, 1=applicable
Patch contains a meadow within an Life Science ANSI	MDW_CR_ANSI	0= Not applicable, 1=applicable
Patch contains a Meadow that is within 30m of a watercourse	MDW_CR_Watercourse	0= Not applicable, 1=applicable
Patch contains a Meadow or Meadow Cluster >10ha	MDW_CR_GT10ha	0= Not applicable, 1=applicable
Patch contains a meadow within 100m of large Woodland or Thicket	MDW_CR_Proximity	0= Not applicable, 1=applicable
Thicket Criteria		
Patch contains a Thicket within a valley land	THK_CR_Valleyland	0= Not applicable, 1=applicable
Patch contains a Thicket within a Life Science ANSI	THK_CR_ANSI	0= Not applicable, 1=applicable
Patch contains a Thicket that is within 30m of a watercourse	THK_CR_Watercourse	0= Not applicable, 1=applicable
Patch contains a Thicket or Thicket group >2ha	THK_CR_GT2ah	0= Not applicable, 1=applicable
Wetland Criteria		
Patch contains a Wetland within a valley land	WTL_CR_Valleyland	0= Not applicable, 1=applicable
Patch contains a Wetland within a Life Science	WTL_CR_ANSI	0= Not applicable,

ANSI		1=applicable
Patch contains a Wetland that is within 30m of a watercourse	WTL_CR_Watercourse	0= Not applicable, 1=applicable
Patch contains a Wetland >0.5 ha or a Provincial Evaluated Wetland	WTL_CR_Wetland	0= Not applicable, 1=applicable
Connecting Feature Criteria		
Patch contains a *Connecting Feature* within a valley land	CNF_CR_Valleyland	0= Not applicable, 1=applicable
Patch contains a *Connecting Feature* within a Life Science ANSI	CNF_CR_ANSI	0= Not applicable, 1=applicable
Patch contains a *Connecting Feature* that is within 30m of a watercourse	CNF_CR_Watercourse	0= Not applicable, 1=applicable
Waterbody Criteria		
Patch contains a Waterbody within a valley land	WBY_CR_Valleyland	0= Not applicable, 1=applicable
Patch contains a Waterbody within a Life Science ANSI	WBY_CR_ANSI	0= Not applicable, 1=applicable
Patch contains a Waterbody that is within 30m of a watercourse	WBY_CR_Waterbody	0= Not applicable, 1=applicable
Any Patch or Patch Cluster >100 ha	PTC_INF_GT100	0= Not applicable, 1=applicable

Appendix G. Metadata for *Vegetation Communities and Vegetation Groups*

Community_MNHS_24_03_2014-06-30
The community feature class consists of all community features that allow them to be dissolved into individual Groups or create the overall Patch Feature Class. Zero in the field indicates that it is not applicable to the community or group/patch type and 1 indicates that it is applicable.

Feature Class	Field Name	Type	Parameters		
Community_MNHS_24_03_2014	Community	Text	Bluff or Deposition, Coniferous, Deciduous, Hedgerow Connected, Meadow Marsh, Meadow Upland, Mixed, Plantation Mature, Plantation Young, Thicket, Water, Watercourse		
	Woodland	Short	0, 1		
	Wetland	Short	0, 1		
	Meadow	Short	0, 1		
	Shrub	Short	0, 1		
	Patch	Short	0, 1		
	CA	Text	AB, KC, LT, SC, UT		
	Comments	Text			
	Riparian	Short	0, 1		
	Water	Short	0, 1		
	Connecting_Features	Short	0 , 1		
	Group_Type	Text	Bluff or Deposition Area, Hedgerow, Meadow, Meadow and Wetland*, Thicket, Thicket and Wetland*, Water, Water and Wetland*, Woodland, Woodland and Wetland* * included in both groups		
	Ecosystem	Text	Aquatic, Wetland, Terrestrial Upland		
	ELC_CODE	Text	Bluff or Deposition Area (BBO), Connecting Feature (NA), Meadow (CUM), Meadow and Wetland (MAM), Thicket (CUT), Thicket and Wetland (SWT), Water (OAO),		
				Woodland	Conifer (FOC), Deciduous (FOD), Mixed (FOM), Mature Plantation (CUT)
				Woodland and Wetland	Conifer Swamp (SWC), Deciduous Swamp (SWD), Mixed Swamp (SWM) Plantation Swamp (CUT)

Appendix G continued

Group Woodland_02_21_2014
This feature class was created by exporting woodlands from the Community_MNHS_24_03_2014-06-30 feature class. Using values equal to one in the Woodland field, data was exported to a new feature class and all communities were dissolved using the Woodlands field equal to one to create a seamless polygon woodlands feature class. The woodlands less than 0.5 ha were then deleted using the Shape Area Field to create the Group Woodlands_02-21_2014 feature class. This feature class was then used to establish the Woodland Cluster Feature Class (see below) and perform the interior forest calculation.
Zero in the field indicates that it is not applicable to the Information being provided and 1 indicates that it is applicable.

Feature Class	Field Name	Type	Parameters
Group Woodland_02_21_2014	WDL_Unique	Short	Unique Value
	WDL_Cluster	Short	Woodland Cluster Value
	INF_WDL_Interior	Short	0, 1

Group _Woodland_Cluster_02_21_2014
This feature class was created from the Group_Woodland_02_21_2014 Feature Class. The values in the MDW_Cluster field were merged to create multipart features which act as a single woodland polygon.
This feature class support the criteria information for the woodland group.
Zero in the field indicates that it is not applicable to criteria or information and 1 indicates that it is applicable.

Feature Class	Field Name	Type	Parameters
Group_Woodland_Cluster_02_21_2014	MDW_Cluster	Short	Unique Value
	MDW_CR_Valleyland	Short	0, 1
	MDW_CR_ANSI	Short	0, 1
	MDW_CR_Watercourse	Short	0, 1
	MDW_CR_GT_4ha	Short	0, 1
	MDW_CR_GT_100m_4ha	Short	0, 1
	MDW_INF_Wetland	Short	0, 1
	MDW_INF_Interior	Short	0, 1
	MDW_CR_Total	Short	0 to 5

Appendix G continued

Group Meadow_02_21_2014
This feature class was created by exporting meadows from the Community_MNHS_24_03_2014-06-30 Feature Class. Using values equal to one in the Meadow field, data was exported to a new feature class and all communities were dissolved using the Meadow field equal to one to create a seamless polygon meadow feature class. The Meadows <0.5 ha were then deleted using the Shape Area Field to create the Group_Meadow_02-21_2014 Feature Class. This feature class was then used to establish the Meadow Cluster Feature Class (see below).

Feature Class	Field Name	Type	Parameters
	MDW_Unique	Short	Unique Value
	MDW_Cluster	Short	Meadow Cluster Value

Group _Meadow_Cluster_02_21_2014
This feature class was created from the Group_Meadow_02_21_2014 feature class. The values in the MDW_Cluster field were merged to create multipart features which act as a single meadow polygon.
This feature class support the criteria information for the meadow group.
Zero in the field indicates that it is not applicable to criteria or information and 1 indicates that it is applicable.

Feature Class	Field Name	Type	Parameters
Group_Meadow_Cluster_02_21_2014	MDW_Cluster	Short	Unique Value
	MDW_CR_Valleyland	Short	0, 1
	MDW_CR_ANSI	Short	0, 1
	MDW_CR_Watercourse	Short	0, 1
	MDW_CR_GT_10ha	Short	0, 1
	MDW_CR_Proximity	Short	0, 1
	MDW_INF_Wetland	Short	0, 1
	MDW_CR_Total	Short	0 - 5

Group Thicket_02_21_2014
This feature class was created by exporting Thickets from the Community_MNHS_24_03_2014-06-30 feature class. Using values equal to one in the Thicket field, data was exported to a new feature class and all communities were dissolved using the Thicket field equal to one to create a seamless polygon Thicket Feature Class. The Thickets less than 0.5 ha were then deleted using the Shape Area Field to create the Group_Thicket_02-21_2014 Feature Class. This feature class was then used to establish the Thicket Cluster Feature Class (see below).

Feature Class	Field Name	Type	Parameters
	THK_Unique	Short	Unique Value
	THK_Cluster	Short	Thicket Cluster Value

Appendix G continued

Group _Thicket_Cluster_02_21_2014
This feature class was created from the Group_Thicket_02_21_2014 feature class. The values in the
THK_Cluster field were merged to create multipart features which act as a single Thicket polygon.
This feature class support the criteria information for the Thicket group.
Zero in the field indicates that it is not applicable to criteria or information and 1 indicates that it is
applicable.

Feature Class	Field Name	Type	Parameters
Group_Woodland_Cluster_02_21_2014	THK_Cluster	Short	Unique Value
	THK_CR_Valleyland	Short	0, 1
	THK_CR_ANSI	Short	0, 1
	THK_CR_Watercourse	Short	0, 1
	THK_CR_GT_2ha	Short	0, 1
	THK_INF_Wetland	Short	0, 1
	THK_CR_Total	Short	0 - 5

Group Wetland_02_21_2014_all
This feature class was created by exporting Wetlands from the Community_MNHS_24_03_2014-
06-30 Feature Class. Using values equal to one in the Wetland field, data was exported to a new
feature class and all communities were dissolved using the Wetland field equal to one to create a
seamless polygon Wetland feature class. All wetlands that were identified are included in this layer.
The CR_Wetland field identifies wetlands that are used to be identified as significant (greater than
0.5 ha or evaluated), where zero in the field indicates that it is not applicable and 1 indicates that it
is applicable.

Feature Class	Field Name	Type	Parameters
Group Wetland_02_21_2014_all	CR_Wetland	Short	0, 1

Group Wetland_02_21_2014
This feature class was created from the Group Wetland_02_21_2014_all feature class. The values
equal to 1 in the CR_Wetland field were selected and features were exported to a new layer Group
Wetland_02_21_2014.
This feature class supports the criteria information for the wetland group.
Zero in the field indicates that it is not applicable to criteria or information and 1 indicates that it is
applicable.

Feature Class	Field Name	Type	Parameters
Group_Wetland	WTL_CR_Valleyland	Short	0, 1
	WTL_CR_ANSI	Short	0, 1
	WTL_CR_Watercourse	Short	0, 1
	WTL_CR_Wetland	Short	0, 1
	WTL_CR_Total	Short	1 to 4

Appendix G continued

Group Connecting Features all
This Feature Class was created by exporting Connecting Features from the
Community_MNHS_24_03_2014 Feature Class. Using values equal to one in the Connecting
Featues field, data was exported to a new Feature Class and all communities were dissolved using
the Connecting_Features field equal to one to create a seamless polygon
Group_Connecting_Features_all, Feature Class.

Feature Class	Field Name	Type	Parameters
roup_Connecting_Features_all	Connecting_Feature	Short	0, 1

Group Connecting Features
This feature class was created from the Group_Connecting_Feature_all,feature class. The values
>0.5ha in shape field were exported to a new feature class.
This feature class support the criteria information for the Connecting_Feature group.
Zero in the field indicates that it is not applicable to criteria or information and 1 indicates that it is
applicable.

Feature Class	Field Name	Type	Parameters
Group_Connecting_Features	CNF_CR_Valleyland	Short	0, 1
	CNF_CR_ANSI	Short	0, 1
	CNF_CR_Watercourse	Short	0, 1
	CNF_INF_Wetland	Short	0, 1
	CNF_CR_Total	Short	0 - 3

Group_Waterbody_04-04_2014_all
This feature class was created by exporting Group_Waterbody_21_2014_all from the
Community_MNHS_24_03_2014-06-30 Feature Class. Using values equal to one in the Water
field, data was exported to a new Feature Class and all communities were dissolved using the Water
field equal to one to create a seamless polygon Waterbody feature class.
Zero in the field indicates that it is not applicable to the Information being provided and 1 indicates
that it is applicable.

Feature Class	Field Name	Type	Parameters
Group_Waterbody_04-04_2014_all	Water	Short	0, 1

Appendix G continued

Group _Waterbody_04_04_2014
This feature class was created from the Group_Waterbody_04-04_2014_all feature class. The values in the >0.5ha in shape field were exported to a new feature class.
This feature class support the criteria information for the Waterbody group.
Zero in the field indicates that it is not applicable to criteria or information and 1 indicates that it is applicable.

Feature Class	Field Name	Type	Parameters
Group_Woodland_Cluster_02_21_2014	WBY_CR_Valleyland	Short	0, 1
	WBY_CR_ANSI	Short	0, 1
	WBY_CR_Watercourse	Short	0, 1
	WBY_CR_Total	Short	0 to 3

Valleylands_02_21_2014
Valley Land data was created according to description in report. This layer represents the major valley areas within the County.

Feature Class	Field Name	Type	Parameters
Valleylands_02_21_2014	CA	Text	AB, UT, LT, SC

Appendix H. Results of Significance Modeling at the *Vegetation Group* Level

Vegetation Group ↓	Number of *Vegetation Groups*			Area of *Vegetation Groups*			% of Study Area (333,330 ha) that is Significant
	Number	Number that are Significant	% Significant	Area (ha)	Area Significant (ha)	% Significant	
Woodland	4,123	**3,200**	77.6%	52,748	**51,200**	97.1%	15.4%
Meadow	3,040	**2,785**	91.6%	8,319	**7,925**	95.3%	2.4%
Thicket	1,365	**999**	73.2%	3,205	**2,830**	88.3%	1.0%
Water Feature	284	**156**	54.9%	2,205	**1,756**	79.6%	0.7%
Connected Vegetation Feature	124	**94**	75.8%	97	**78**	80.4%	<0.1%
Total	**8936**	**7234**		**66,574**	**63,789**		**19.1%**
Wetland	1,919	**1,919**	100.0%	11,729	11,729	100.0%	3.5%

Note: Wetlands include woodland meadow and thicket and so are part of the total instead of being additional

Appendix I-1. Criterion 1 Map, Significant Valley Systems
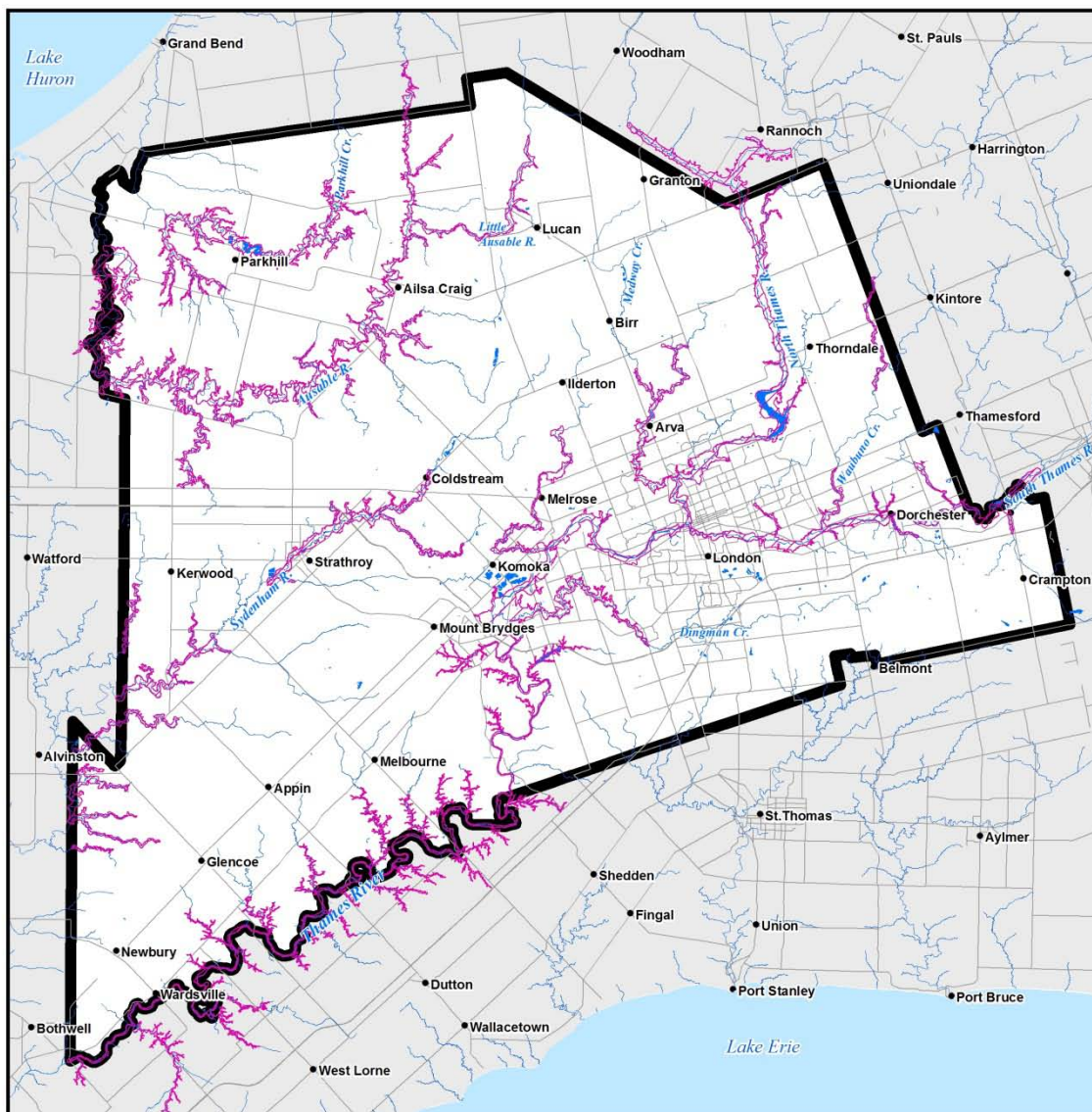
Middlesex Natural Heritage Systems Study 2014

Significant Valley System

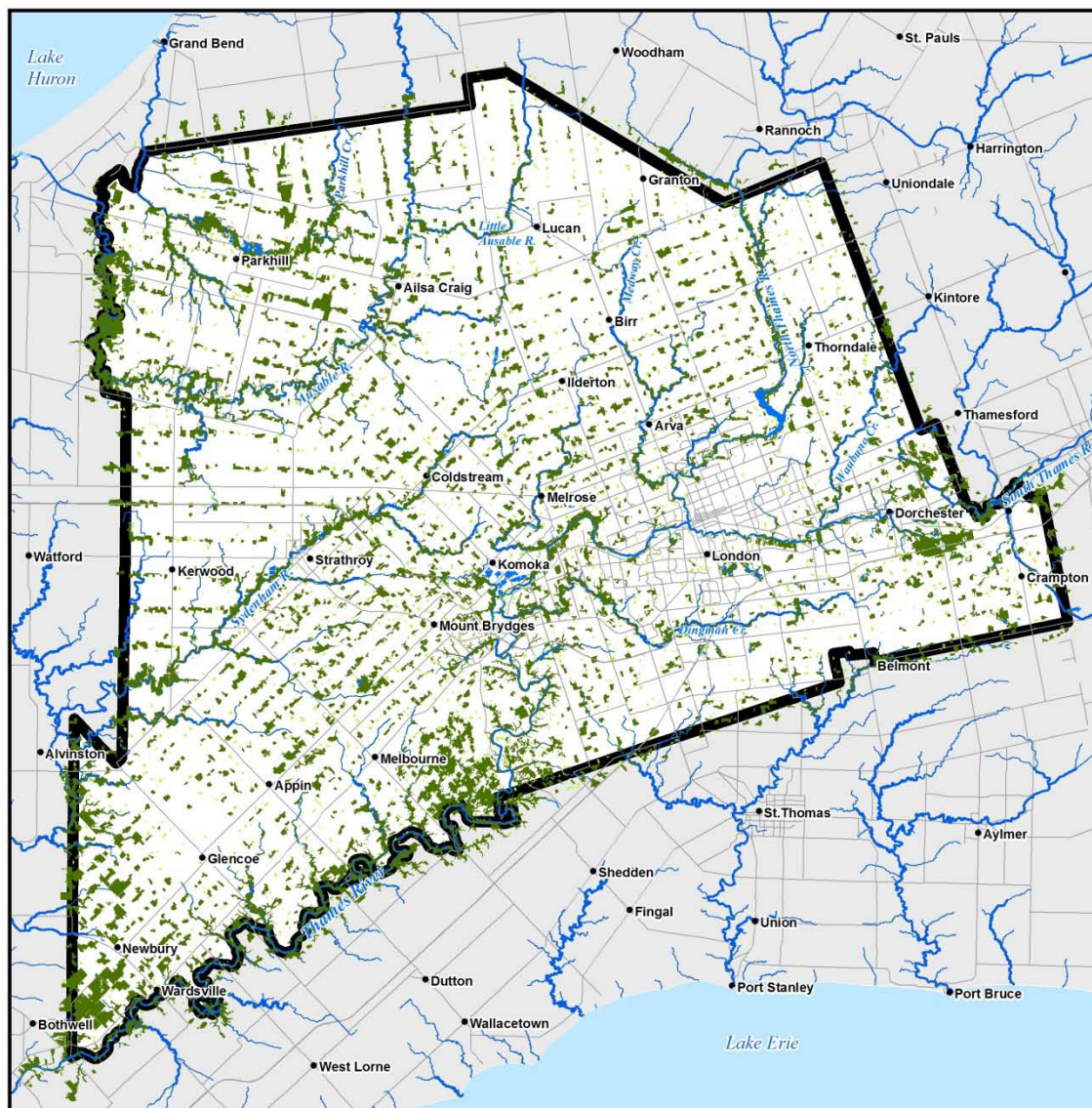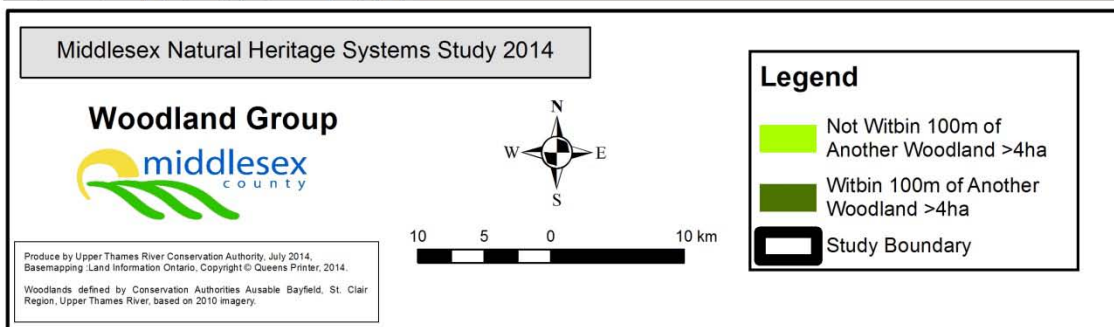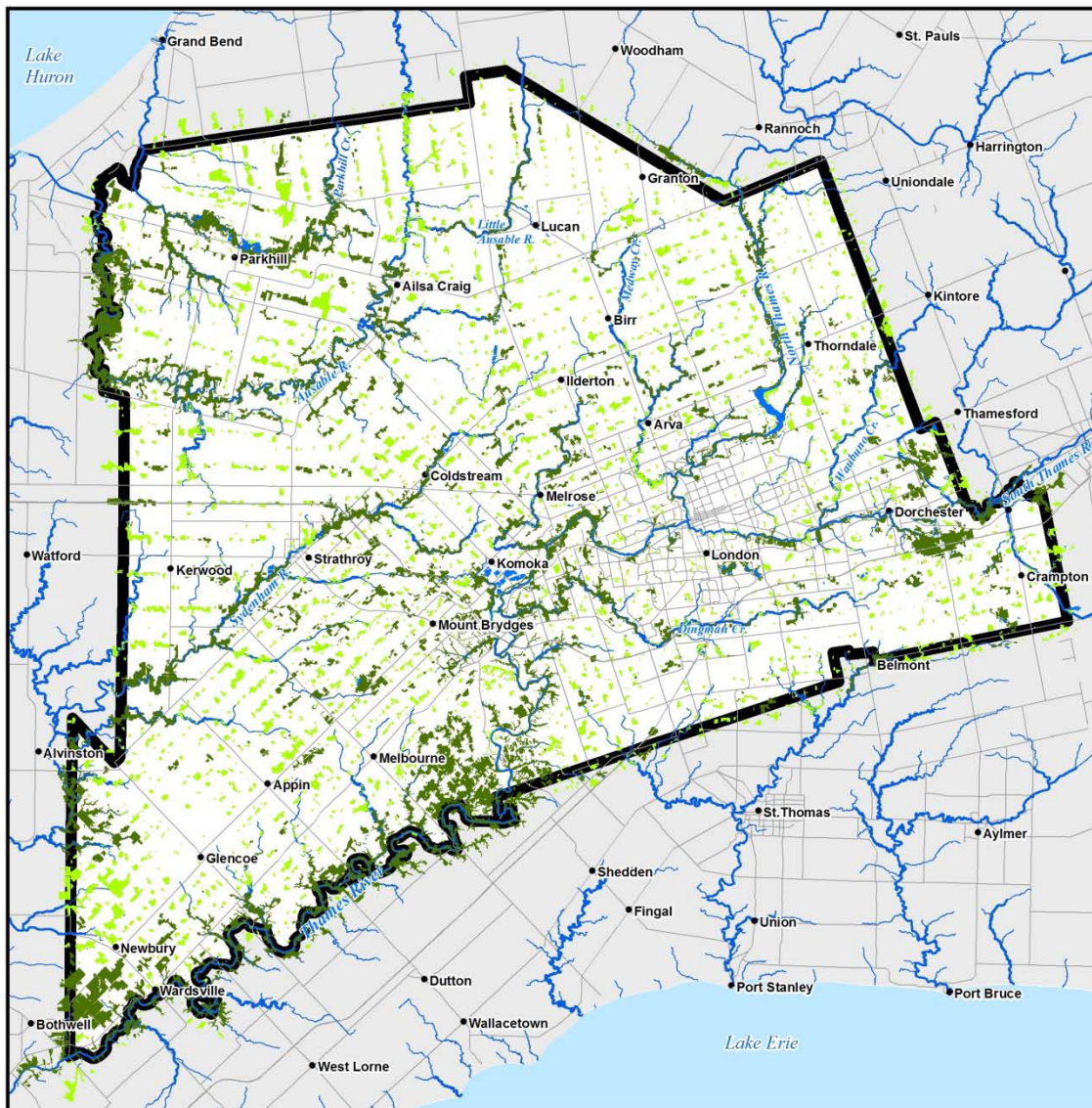middlesex county

Produce by Upper Thames River Conservation Authority, July 2014,
Basemapping :Land Information Ontario, Copyright © Queens Printer, 2014.

Significant Valley Systems defined by Conservation Authorities: Ausable Bayfield,
St. Clair Region, Upper Thames River, Lower Thames Valley.

Legend
Significant Valley System
Study Boundary

Appendix I-2. Criterion 2 Map, ANSIs
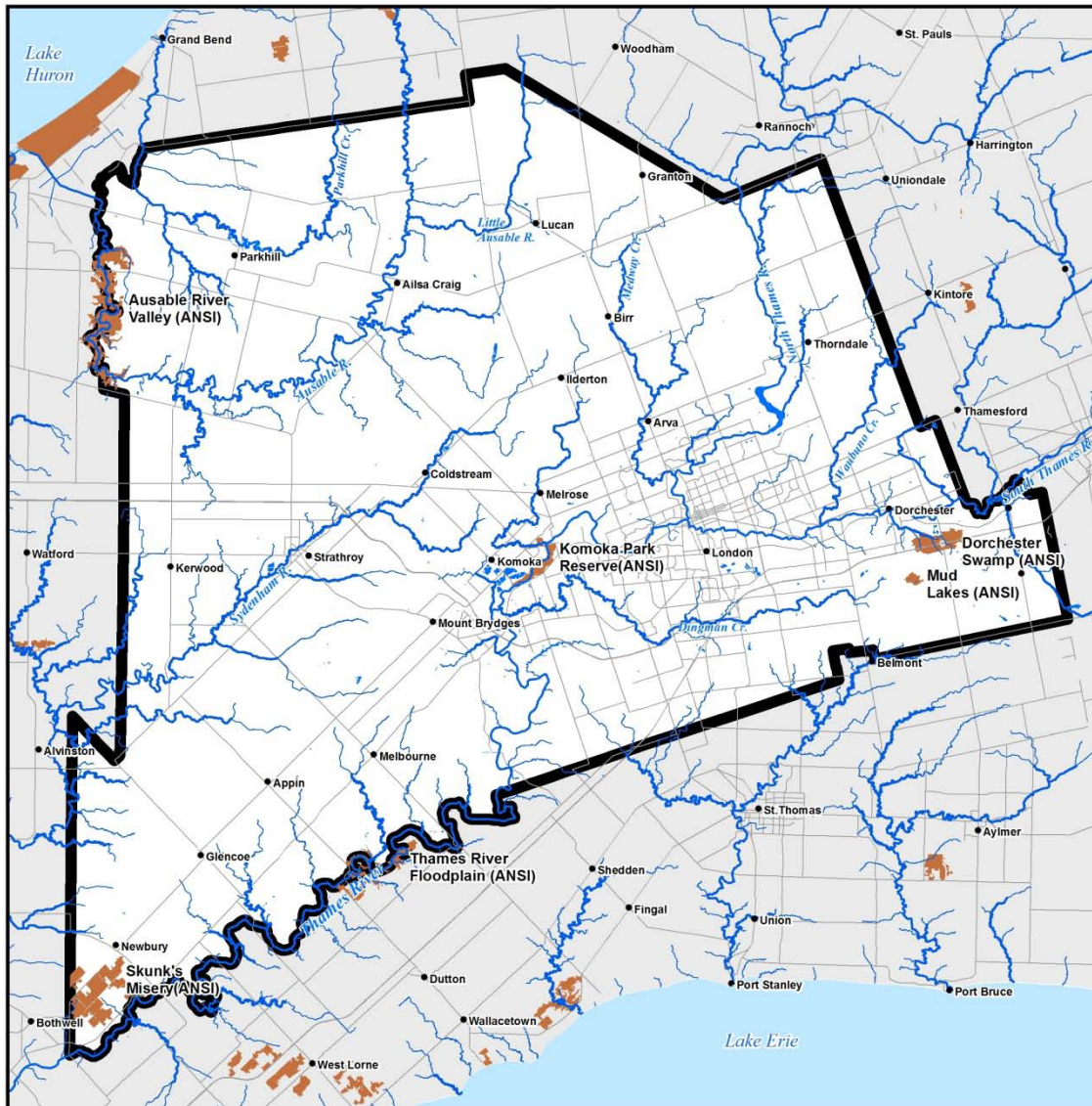
Middlesex Natural Heritage Systems Study 2014

Areas of Natural Scientific Interest (ANSI)

middlesex county

Produce by Upper Thames River Conservation Authority, July 2014,
Basemapping :Land Information Ontario, Copyright © Queens Printer, 2014.

Area of Natural and Scientific Interest : Ontario Ministry of Natural
Resources, Copyright © Queens Printer, 2014.

10   5   0   10 km
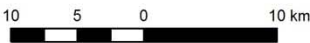
Legend

ANSI - Life Science

Study Boundary

Appendix I-3. Criterion 3 Map, *Vegetation Groups* within 30 m of an open watercourse
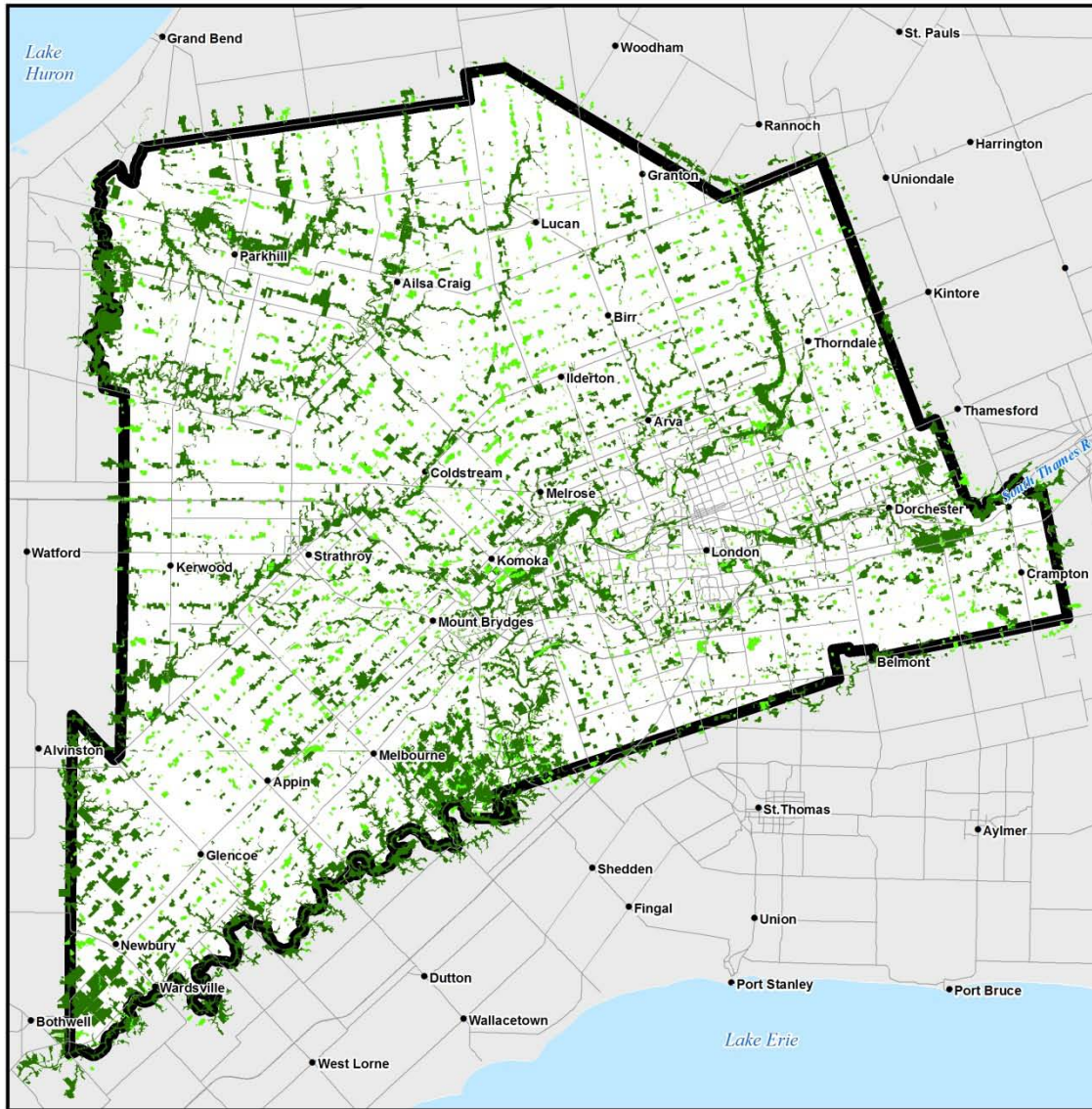
Middlesex Natural Heritage Systems Study 2014

Vegetation Groups within 30m of Watercourse

middlesex county

Produce by Upper Thames River Conservation Authority, July 2014,
Basemapping :Land Information Ontario, Copyright © Queens Printer, 2014.

Vegatation Groups defined by Conservation Authorities: Ausable Bayfield, St. Clair
Region, Upper Thames River, based on 2010 imagery.

Note: Individual watercourses are shown on map because they are not mapped
realize to scale.
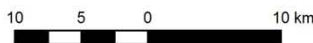
Legend

Vegetation Group Not within 30m of Watercourse

Vegetation Group within 30m of Watercourse

Appendix I-4. Criterion 4 Map, Wetlands
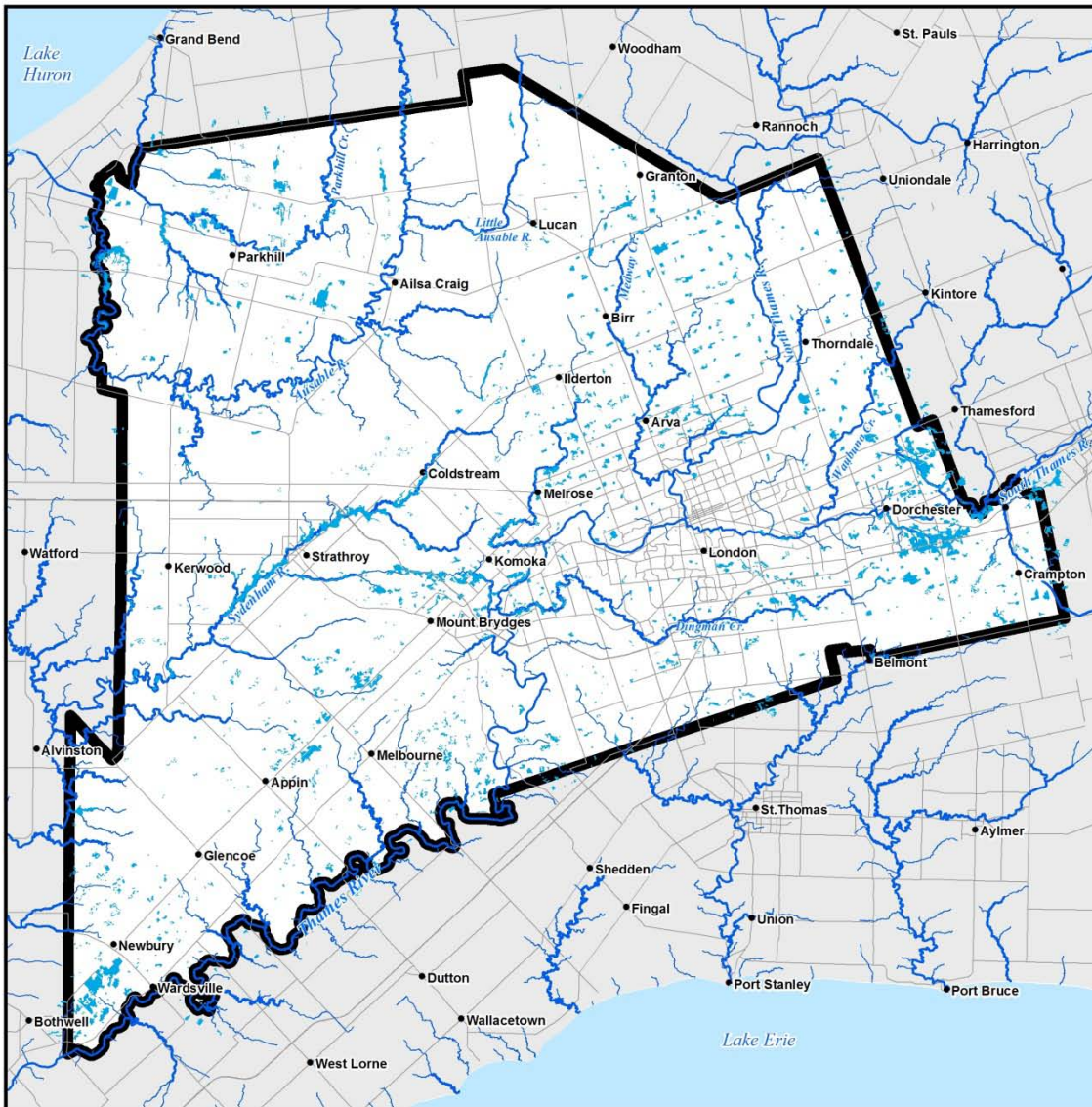
Middlesex Natural Heritage Systems Study 2014

Wetland Group

Produce by Upper Thames River Conservation Authority, July 2014,
Basemapping :Land Information Ontario, Copyright © Queens Printer, 2014.

Wetland Boundaries: Ontario Ministry of Natural Resources, Copyright ©
Queens Printer, 2014 and Conservation Authorities: Ausable Bayfield, St.
Clair Region, Upper Thames River, based on 2010 imagery.

Legend

Wetland Group
Study Boundary

Appendix I-5. Criterion 5 Map, Woodland Size ≥4 ha

Middlesex Natural Heritage Systems Study 2014

Woodland Group

middlesex
county

Produce by Upper Thames River Conservation Authority, July 2014,
Basemapping :Land Information Ontario, Copyright © Queens Printer, 2014.

Woodlands defined by Conservation Authorities Ausable Bayfield, St. Clair
Region, Upper Thames River, based on 2010 imagery.

Legend

Woodland Group <4ha

Woodland Group ≥ 4ha

Study Boundary

Appendix I-6. Criterion 6 Map, Woodland Proximity

Middlesex Natural Heritage Systems Study 2014

Woodland Group

middlesex
county

Produce by Upper Thames River Conservation Authority, July 2014,
Basemapping :Land Information Ontario, Copyright © Queens Printer, 2014.

Woodlands defined by Conservation Authorities Ausable Bayfield, St. Clair
Region, Upper Thames River, based on 2010 imagery.

Legend

Not Witbin 100m of
Another Woodland >4ha

Witbin 100m of Another
Woodland >4ha

Study Boundary

Appendix I-7. Criterion 7 Map, Thicket Size ≥2 ha

Middlesex Natural Heritage Systems Study 2014

Thicket Group

Legend
- Thicket Group <2ha
- Thicket Group ≥ 2ha
- Study Boundary

Produce by Upper Thames River Conservation Authority, July 2014,
Basemapping :Land Information Ontario, Copyright © Queens Printer, 2014.
Thickets defined by Conservation Authorities: Ausable Bayfield, St. Clair Region,
Upper Thames River, based on 2010 imagery.

Appendix I-8. Criterion 8 Map, Meadow Size ≥10 ha

Appendix I-9. Criterion 9 Map, Meadow Proximity
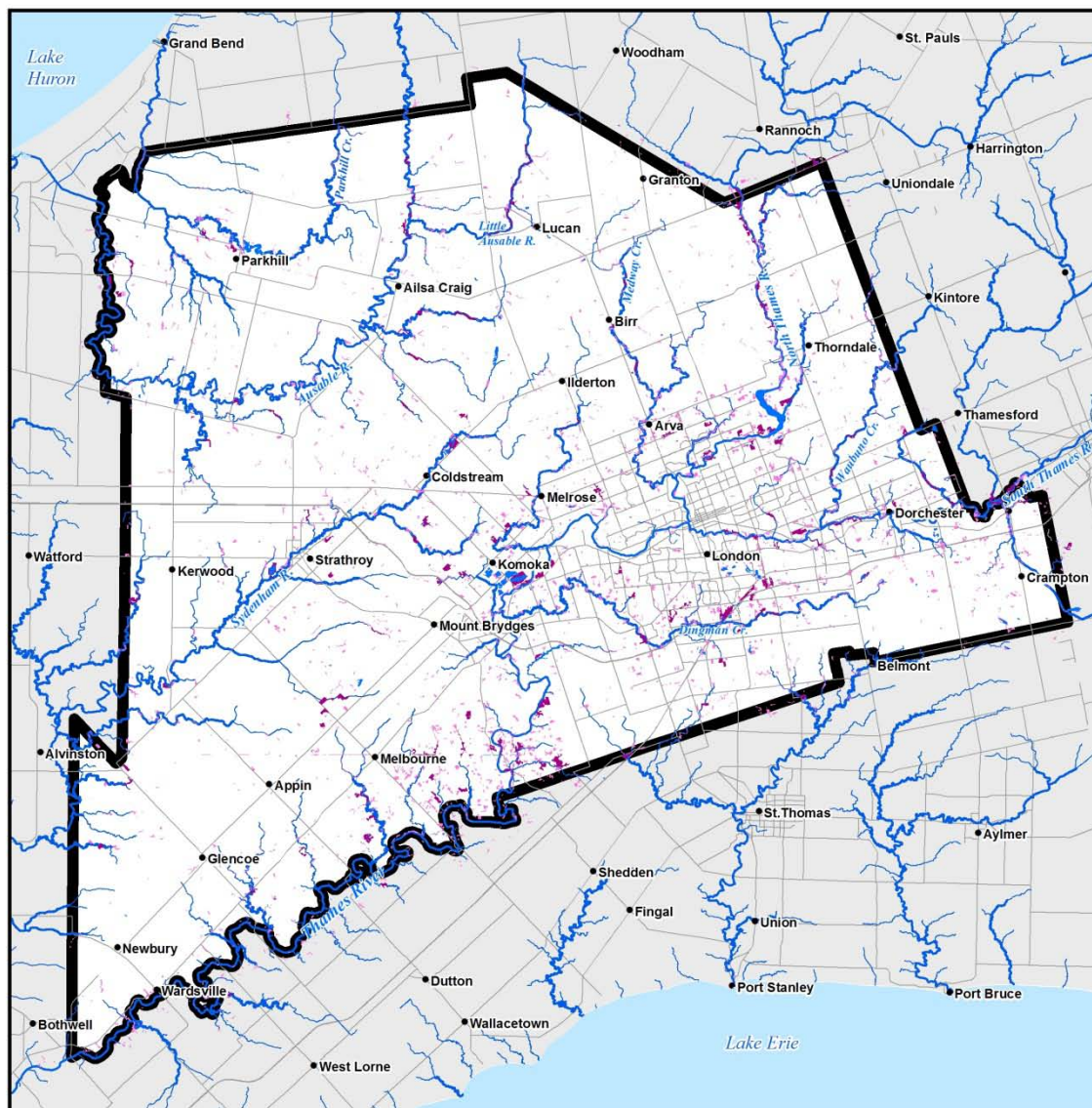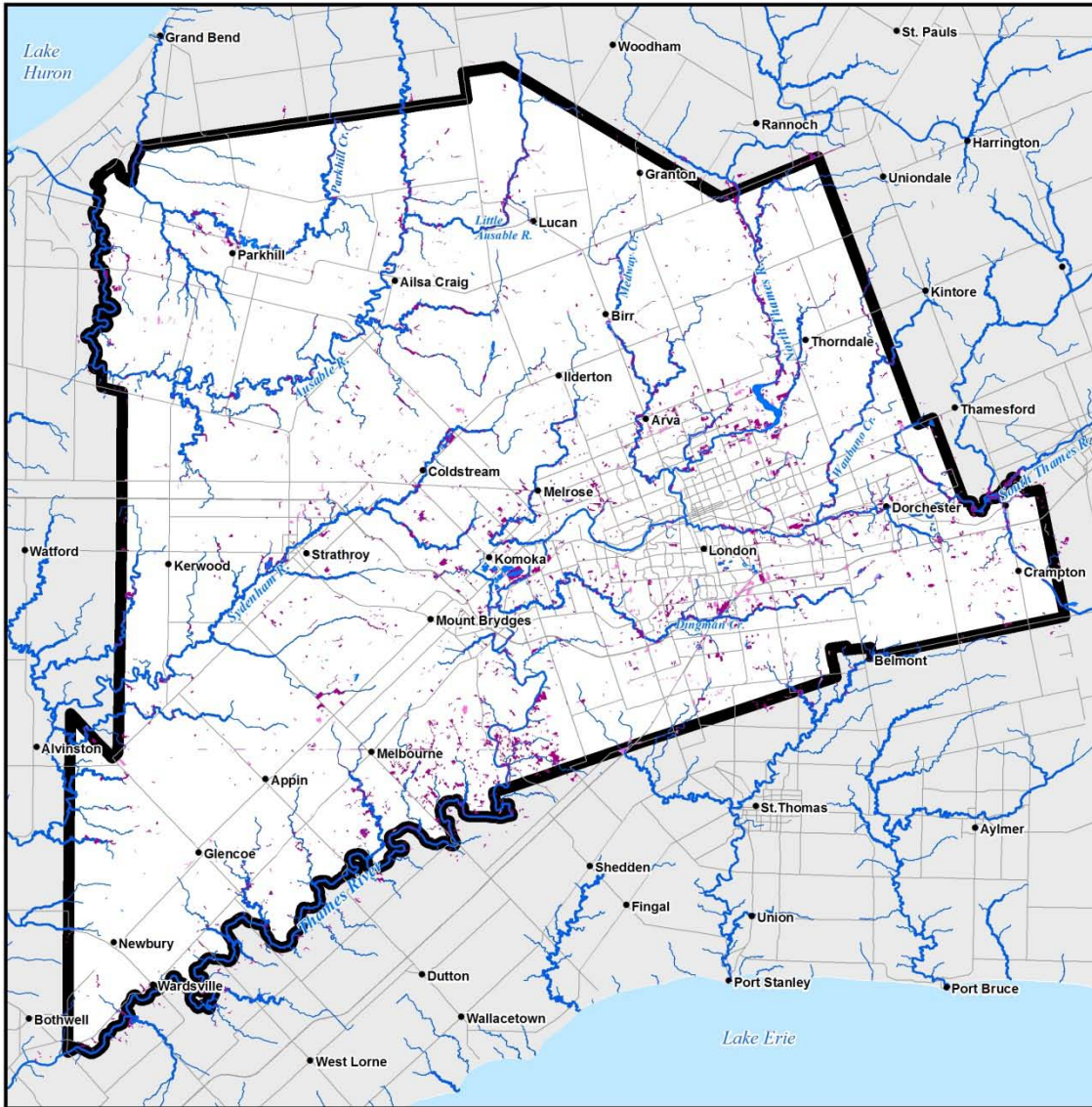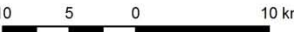
Middlesex Natural Heritage Systems Study 2014

Meadow Group

middlesex
county

Produce by Upper Thames River Conservation Authority, July 2014,
Basemapping :Land Information Ontario, Copyright © Queens Printer, 2014.

Meadows defined by Conservation Authorities: Ausable Bayfield, St. Clair Region,
Upper Thames River, based on 2010 imagery.

Legend

Meadow not touching Thickets >=2ha or Woodlands >=4ha

Meadow touching Thickets >=2ha or Woodlands >=4ha

Study Boundary

Appendix I-10. Criterion 10 Map, Patches that meet a Group Criteria
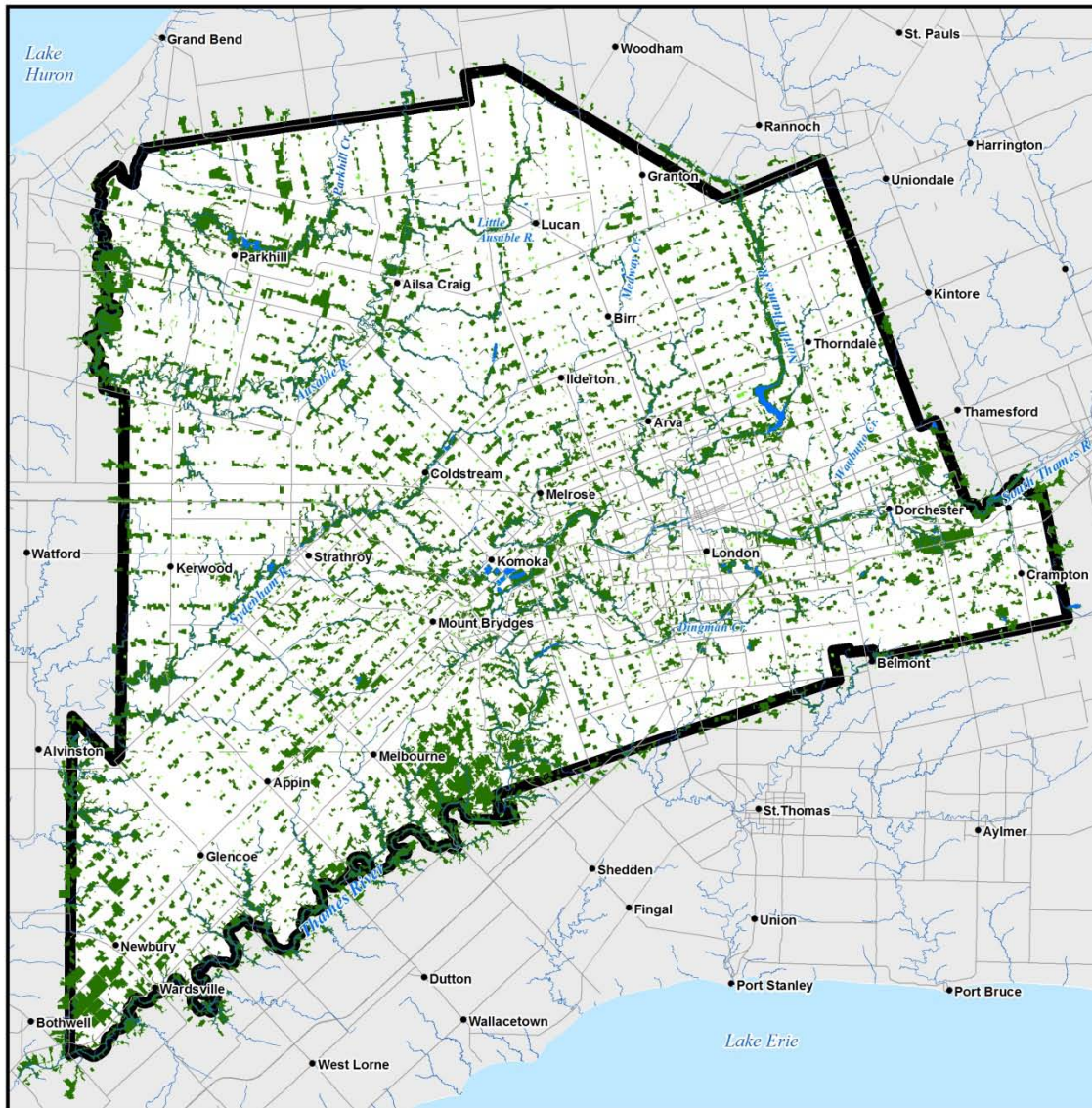
Middlesex Natural Heritage System Study 2014

Vegatation Patch

middlesex county

Legend

Patch does not meet a Group Criteria

Patch meets at least one Group Criteria
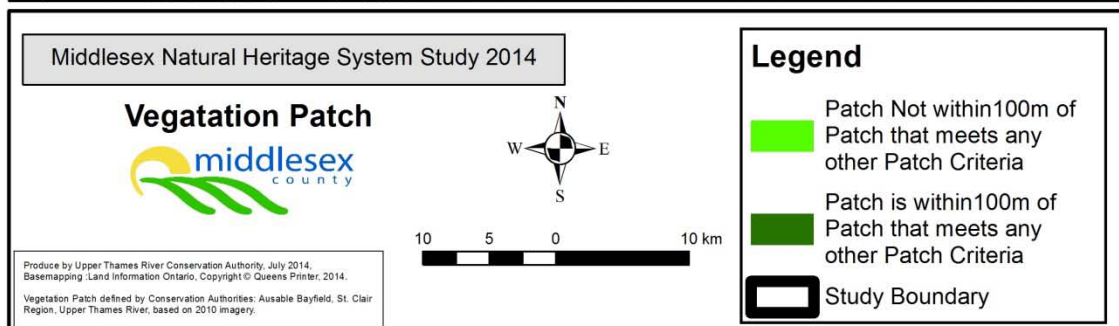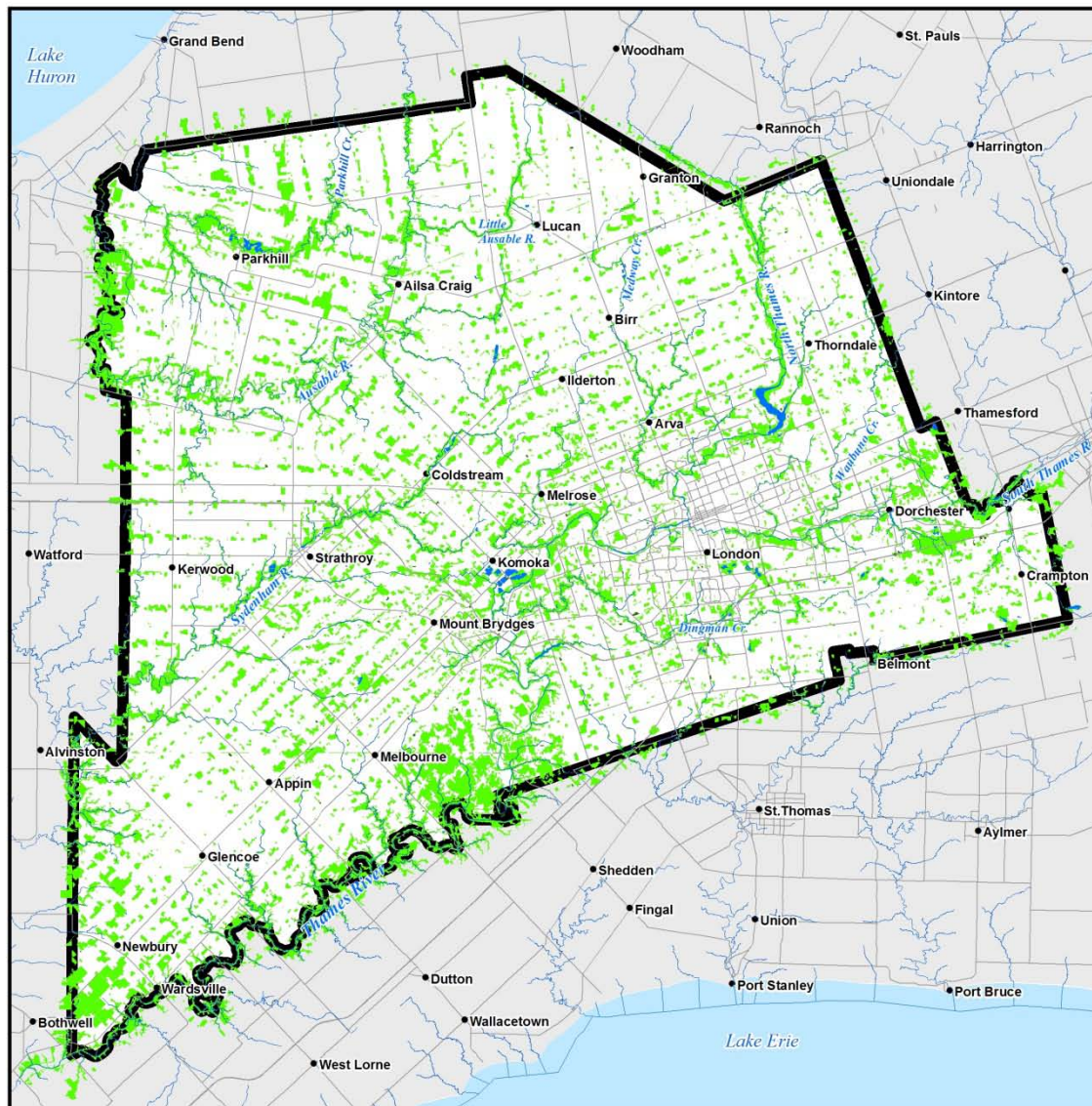
Study Boundary

10   5   0   10 km

Produce by Upper Thames River Conservation Authority, July 2014.
Basemapping :Land Information Ontario, Copyright © Queens Printer, 2014.

Vegetation Patch defined by Conservation Authorities: Ausable Bayfield, St. Clair
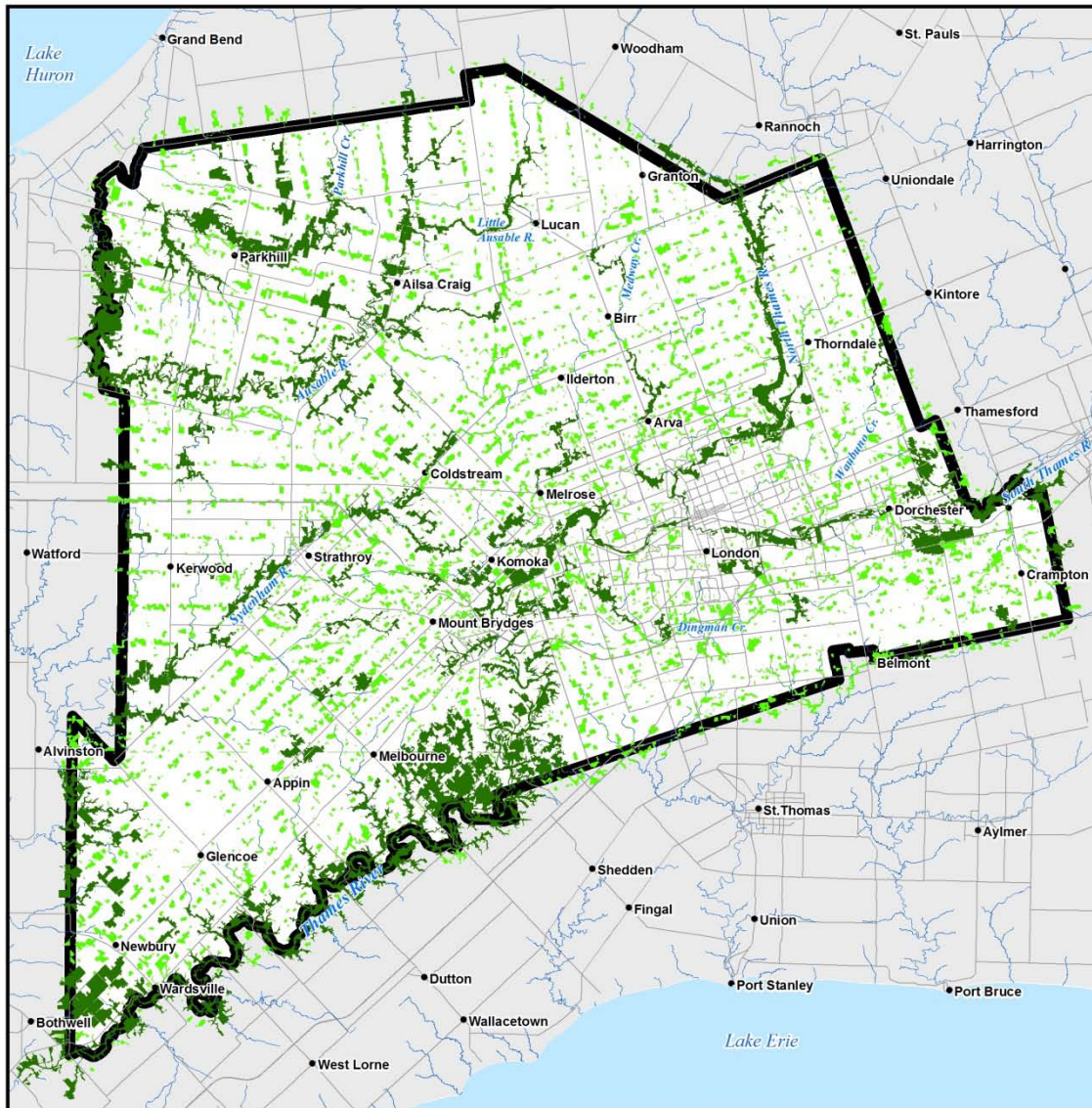Region, Upper Thames River, based on 2010 imagery.

Appendix I-11. Criterion 11 Map, Diversity
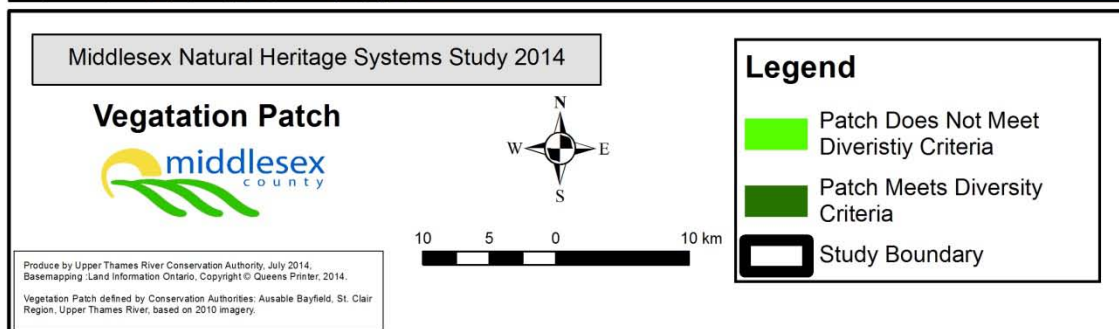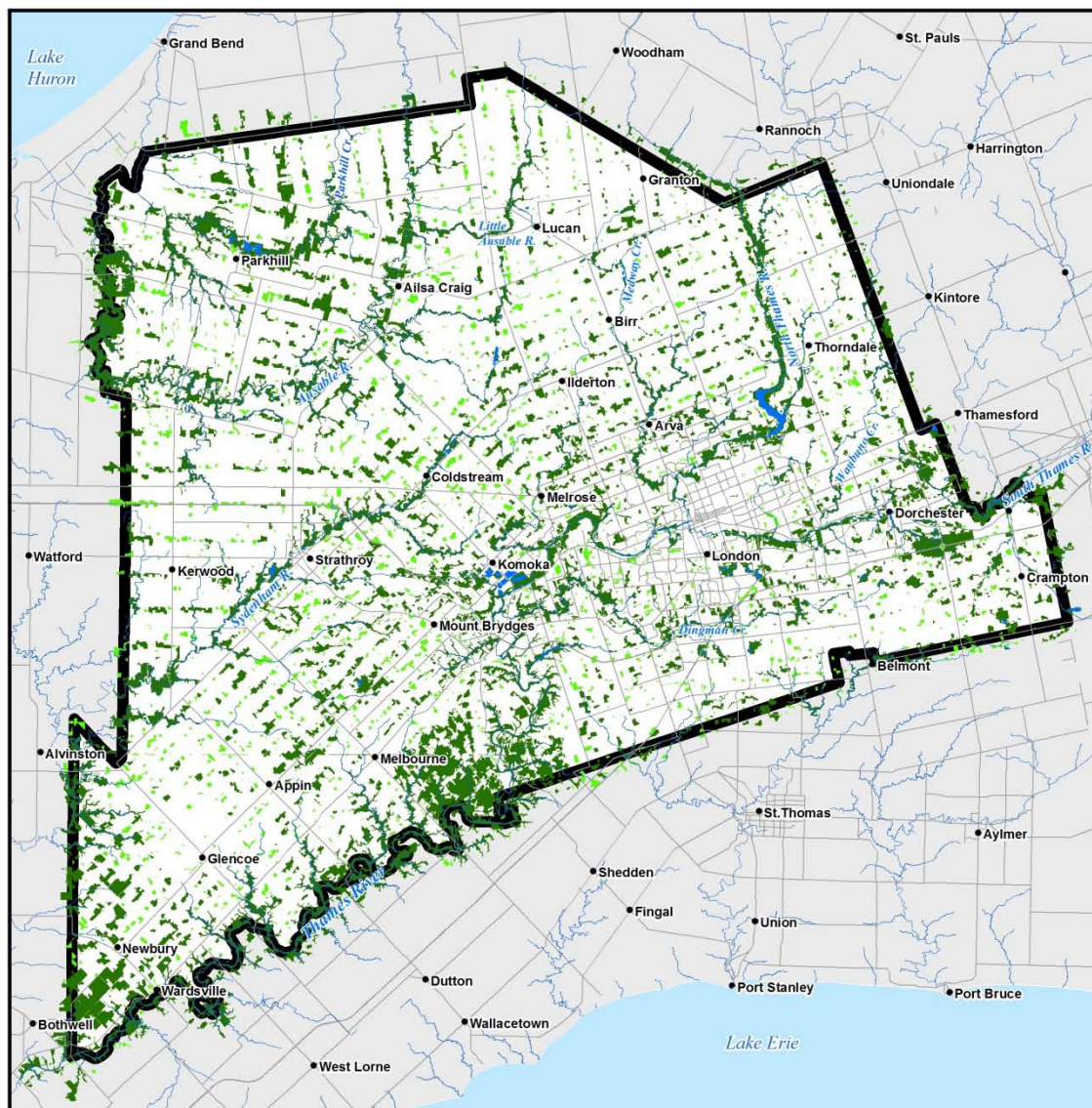
Appendix I-12. Criterion 12 Map, Proximity

Middlesex Natural Heritage System Study 2014

Vegatation Patch

Produce by Upper Thames River Conservation Authority, July 2014;
Basemapping :Land Information Ontario, Copyright © Queens Printer, 2014.

Vegetation Patch defined by Conservation Authorities: Ausable Bayfield, St. Clair Region, Upper Thames River, based on 2010 imagery.

Legend

Patch Not within100m of Patch that meets any other Patch Criteria

Patch is within100m of Patch that meets any other Patch Criteria

Study Boundary

Appendix J-1. Map showing patches ≥100 ha

Appendix J-2. Map showing patches that contain Woodland Interior