Report to the Municipality of Chatham-Kent-Natural Heritage Committee of the Whole

Subject: Mapping Project of Forest Cover and Natural Heritage Features

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Summary:

The Lower Thames Valley Conservation Authority has undertaken a project employing provincially accepted techniques using data provided from South Western Ontario Ortho-imagery Project (SWOOP 2020) as a backdrop. The project was undertaken to prepare a detailed and comprehensive mapping of forest cover in the Municipality of Chatham-Kent. This work is part of a larger program to complete a detailed and comprehensive mapping product of the natural heritage features in the Municipality. This product has many uses including the development of mapping that will support municipal Official Plan updates. The maps are provided in a draft form, as third party peer review of the project has not been completed as of the time of writing of this report.

The first step of the project involved the digitizing of all woodlots greater than 0.5 ha based on techniques undertaken in 2015 to complete a forest cover analysis at that time. By completing this analysis, a comparison of forest cover in the year 2015 vs the year 2020 can be undertaken.

The analysis shows the following:

Acronymns used in below chart

CK-Municipality of Chatham-Kent

FN-Delaware First Nation at Moraviantown

PP-Provincial Parks- Rondeau and Wheatley

Municipality of Chatham-Kent Land Area Analysis			
• Area calculated in hectares	**2010**	**2015**	**2020**
CK Total Area	246,045.0	246,045.0	246,045.0
Forested Area in CK (no Delaware First Nation)	10,518.5	9,846.0	9,684.7
% Forested Area in CK	4.28	4.00	3.94
Forested Areas excluding Provincial Parks (PP), no FN	9,532.5	8,860.0	8,698.7
% of forested area in CK (no PP, no FN)	3.87	3.60	3.54
Forest lost in CK (no PP, no FN)		672.50	161.30
Regional Analysis			
Total Area (CK+FN)	247,289.00	247,289.00	247,289.00
Forested Area of FN	721.00	721.00	721.00
Total Forested Area (CK+FN)	11,239.50	10567.00	10405.70
Regional Forest Area % (CK+FN)	4.55	4.27	4.21

Notes Regarding Data Presented in this Report:

1. The information provided in this analysis is both preliminary and draft in nature as the peer review and public review of this information has not been completed. Please note that results may change when these reviews have been completed.
2. The 2020 analysis represents a snap shot in time and will not include forest cover removed after March, 2020.
3. The land area defined within the Municipality of Chatham-Kent has changed since 2010 due to an improved GIS data layer. This new data is consistently used in this analysis.
4. Forested areas have been recalculated/updated for the 2015 analysis based on the data presented to the Natural Heritage Implementation Committee and input/revisions provided by that group.
5. Due to lands being moved into the ownership of Clear Creek Provincial Park subsequent to the 2010 analysis, these lands have not been shown as provincial park lands to allow comparison of results between 2010, 2015 and 2020
6. Erosion of forested and non-forested lands along Lake Erie has been included in the 2020 analysis.

Mapping of Forest Cover in the Municipality of Chatham-Kent

In 2015 the Lower Thames Valley Conservation Authority used an accepted methodology most recently described in *"Upper Thames River Conservation Authority, Vegetation Cover and Natural Heritage Mapping Rules"*, 2018 for the preparation of forest cover mapping. This approach allowed the product to be consistent with Natural Heritage mapping undertaken in recent years in Southwestern Ontario. This methodology has been used in a number of local counties and employs methodologies used in a number of provincial natural heritage mapping programs. The recent 2021 project (using 2020 air photos) employs the above 2015 methodologies to allow comparison of forest cover and definition of forest cover change in the 5 year interval.

It must be noted that the depiction of forest cover in this analysis is for the year 2020 (March 2020) and does not include forested areas removed after the air photos were taken in that year. This product represents a picture in time.

The first step of the mapping of the Natural Heritage features of the municipality was the digitizing of forest cover. All forested areas 0.5 ha and greater have been mapped in the municipality. Additionally, forested areas 0.2 to 0.5 ha in size have been digitized to allow further analysis. This finer level of mapping was not completed in 2015 and therefore comparisons of these smaller areas cannot be undertaken.

Forest cover mapping is a part of the larger Natural Heritage System mapping. Techniques for forest cover mapping are described below.

Mapping Natural Heritage System Features

Natural Heritage features have been identified using a standard set of rules and guidelines to support the development of a Natural Heritage System and to define and compare forest cover in the Municipality of Chatham-Kent. Photo interpretation techniques using data provided from South Western Ontario Ortho-imagery Project (SWOOP 2020) as a backdrop were used to prepare a detailed and comprehensive mapping product of the natural heritage features in the Municipality. Air photo interpretation enables coarse level identification of vegetation communities without a site visit. Mapping rules as defined within the Southern Ontario Land Resources Information System (SOLRIS) Image Interpretation Manual (MNR 2004) assisted in defining the basic rules of mapping some of the vegetated features. A majority of the Natural Heritage Vegetation feature mapping rules are based on guidance from the Ministry of Natural Resources and Forestry (MNRF), Natural Heritage Reference Manual (NHRM) for Natural Heritage Policies of Provincial Policy Statement, 2005, Second Edition (MNRF 2005). The NHRM is a document that supports the Provincial

Policy Statement, for use in supporting Municipalities of Ontario to create Natural Heritage System Studies to assist in making land use planning decisions that may have an impact on the Natural Heritage System. Certain guidelines within NHRM have been adjusted based on other technical review completed by the Upper Thames River Conservation Authority (UTRCA) and approved by peer review.

Vegetation Communities

The smallest unit mapped in this study is the *Vegetation Community.* The *Vegetation Community* is a unit of vegetation that is normally visible and consistently interpreted on remotely sensed images. *Vegetation Communities* are internally homogenous and distinguishable at a 1:2,000 scale by the dominant types of plant forms that characterize the *Vegetation Community*. The *Vegetation Communities* must be at least 0.5 ha in area and 30 m wide to be included (length is the longer direction and width is the shorter). This minimum width was chosen to ensure the protection of the roots of some of the tree species. Tree roots often extend out from the core of the tree to a distance of at least the height of the tree, and the average height of a mature tree in the UTRCA is 30 m. The Natural Heritage Reference Manual (section 7.3.2) suggests 0.5 ha in size and 40 m width, but the width was reduced to 30 m for the reasons mentioned above. The LTVCA felt that this assumption was consistent with forest cover in our watershed and therefore used the 30m width for this project.

Vegetated areas 20 to 30 m wide and connected to two or more *Vegetation Communities* are considered connecting features (e.g., hedgerows), not woodlands. Unconnected vegetated areas of the same width are not mapped or included in this study. Linear treed areas <20 m wide are considered windbreaks and are mapped or included in this study. The features defined as windbreaks in this manner are not included in the forest cover results presented below. It is understood that windbreaks do provide many benefits to the environment including protection from soil erosion. For consistency, the 30 m width was chosen as the minimum width for thickets and meadows as well as woodlands. Thickets and meadows are also not included in the forest cover analysis.

A Minimum Mapping Unit (MMU) of 0.5 ha was used as the minimum size of an isolated *Vegetation Community*. The Ecological Land Classification (ELC) (Lee *et al.* 1998) uses 0.5 ha and that is one of the standards referenced as being acceptable.

Additionally, forest cover areas of 0.2 ha to 0.5 ha have been digitized but not included in the forest cover analysis as they were not included in the 2015 results. This smaller size of forest cover areas was defined to allow the municipality to consider these forested areas.

False colour imagery (e.g. infrared Imagery) was used to distinguish between conifer and deciduous forested areas.

Vegetation Communities are mapped and updated guided by the manual on-screen digitizing procedures outlined in the Southern Ontario Land Resources Information System (SOLRIS) Image Interpretation Manual (MNR 2004), with the following notes:

- **Small Intrusions** – Existing buildings, structures, gardens, manicured areas and waterbodies that are < 20 m in width are considered part of the surrounding natural feature (i.e., they do not cause a break in the *Vegetation Community*), as per the SOLRIS manual. This included vegetated drains if the minimum width criteria were met.

- **Roads, Railroads, Watercourses** – All municipal roads, railroads and watercourses were mapped as separate *Vegetation Communities* regardless of their width.

Table 1 provides a description of each *Vegetation Community* including how they are identified and the ELC (Ecological Land Classification) equivalent. Note: not all of these communities are included in the forest cover mapping as they do not represent mature forest.

Table 1. Definition and attributes of the 18 *Vegetation Communities*

Vegetation Community	**Description and Methods uses for Identification on Imagery**	**ELC Equivalent**
1. Deciduous Woodland (Forest)	- Contains ≥60% tree cover. Comprised of tree species that lose their leaves at the end of the growing season and are capable of reaching heights of several metres (typically 20-30 m). - Individual deciduous trees have a billowy texture on air photography. If the image is taken when trees are not in leaf, individual trees have a translucent appearance such that tree trunks can be seen through the branching canopy.	FOD
2. Mixed Woodland	- Contains ≥60% tree cover. Comprised of a combination of coniferous and deciduous tree types scattered throughout. - Each tree type comprises >25% but <75% of the canopy.	FOM
3. Coniferous Woodland	- Contains ≥60% tree cover. Comprised of >60% coniferous (cone-bearing) tree species capable of reaching heights of several metres. - Individual trees are dark green in colour and have a conical shape with a pointed top.	FOC

4. Mature Plantation	- Contains ≥60% tree cover. Comprised of deciduous and/or coniferous tree species. - In the past, most plantations start as planted rows of conifers, but in time deciduous trees filled in. - Boundary distinguishable by at least one edge with a straight line. - At maturity, individual trees or rows of trees are not clearly discernible at 1:2,000.	CUP
5. Deciduous Swamp	- Contains ≥60% tree cover. Deciduous woodland with a more open canopy (indicating lower tree vigor) located in a wetland as identified by MNRF or CAs. - The standing water, common in spring, appears dark in colour.	SWD
6. Mixed Swamp	- Contains ≥60% tree cover. Mixed woodland (coniferous and deciduous) with a more open canopy (indicating lower tree vigor) located in an MNRF or CA identified wetland area.	SWM
7. Coniferous Swamp	- Contains ≥60% tree cover. Coniferous woodland with a more open canopy (indicating lower tree vigor) located in a MNRF or CA identified wetland area. - Treed bogs, a type of coniferous wetland, are uncommon and often have a pond or low open thicket at the centre.	SWC
8. Plantation Swamp	- Contains ≥60% tree cover. A mature plantation with a more open canopy (indicating lower tree vigor) located in a MNRF or CA identified wetland area. - Trees are usually conifers (planted).	CUP
9. Upland Thicket	- Comprised of 25 to 60% tree or shrub cover. Shrubs are woody plants that are not capable of reaching heights of several metres. - < 20% standing water.	TPW, CUT, CUW
10. Wetland Thicket	- A thicket *Vegetation Community* that is found either along a watercourse, has ≥20% standing water, or is located in a MNRF or CA identified wetland area. - Has either 10-25% tree cover or, <10% tree cover and >25% shrub cover. - Dark water tones interspersed throughout demarking standing water.	SWT, FET, FES, BOT, BOS
11.0 Young Plantation	- Comprised of coniferous (usually) or deciduous trees planted in rows that are discernable at 1:2,000 scale. Trees short, not mature. - Boundary distinguishable by at least one edge with a straight line - Does NOT include fruit/nut orchards or Christmas tree farms and these may need to be verified at the site level if in question.	CUT, CUW
12. Young Plantation Wetland	- A young plantation *Vegetation Community* located in a MNRF or CA identified wetland area where individual trees or rows of trees are discernible at 1:2,000. Trees are usually young conifers.	CUT

13.0 Upland Meadow	- Comprised of grasses or forbs where less than 25% of the canopy is comprised of woody plants. Trees or shrubs often widely scattered.	TPO, CUM
14.0 Meadow Marsh	- A meadow marsh *Vegetation Community* located in a MNRF or CA identified wetland comprised of cattails, wetland grasses and other wetland forbs (non-treed). - Fens and open bogs may not be distinguished in the wetland mapping layer, but these habitats are uncommon in the region. They should be distinguished when conducting EIS surveys.	FEO, BOO, MAM, MAS, SAS, SAM, SAF
15.0 Water Bodies	- Comprised of a body of standing water ≥ 20 m wide <u>adjacent</u> to another *Vegetation Community*. Can include a: • man-made pond associated with construction or extraction (e.g., aggregate pit), • reservoir created by a dam or barrier, • natural pond within a wetland or a natural water feature such as a kettle lake, or • sewage lagoon found in/on the outskirts of an urban area. - Appears as a flat plain surface on air photos; may show patterns of wind disturbance, floating aquatic vegetation, or cloud reflections.	OAO
16.0 *Major* Watercourse	- A linear feature >1 km long and mostly >20 m wide and containing flowing water at least for part of the year. - Delineated as a polygon using bank-full width as seen on aerial photography flown in the spring. - See Section 2.4.5 for more details.	OAO
17.0 Connected Vegetation Feature	- A linear feature comprised of woody plants (trees, shrubs) that connects two or more *Vegetation Communities*, often called a buffer, hedgerow or shelterbelt. - Length is >20 m and width is >20 m but <30 m. See Section 2.4.6 - Considered one feature as long as there are no gaps >20 m. - Often located between farm fields.	--
18.0 Watercourse Bluff and Depositional Areas (Bars, Beaches)	- Bluffs: Areas of mostly bare soil along the outside meander of a watercourse or on steep slopes not being actively cultivated. - Bars, Beaches: Appears as a sediment/stone depositional area along inside bends of watercourses. - Currently not mapped.	BBO, BBS, BBT, BLO, BLS, BLT, CLO, CLS, CLT, TAO, TAS, TAT

Results

Although a number of analysis can be undertaken on data generated from a Natural Heritage mapping project, the subject of this report is the forest cover of the

Municipality of Chatham-Kent. The lands within the municipality can be divided into elements based on ownership. This division allows a number of understandings to be developed regarding forest cover in the municipality. The divisions of ownership used in this study are:

1. Private ownership
2. Provincial Parks and Conservation Areas
3. First Nations Lands

Once again it is noted that this analysis includes forested areas equal to or larger than 0.5ha.

The following table provides a comparison of results from the 2010, 2015 and 2020 forest cover analysis:

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Recommended Review of Results

Lower Thames Valley Conservation Authority (LTVCA) has requested the services of the *Upper Thames River Conservation Authority* (UTRCA) to review and provide quality control (peer review) of the woodland / forested areas digitized. The first steps are the review of mapping rules set out by LTVCA to ensure the mapping is being completed consistently throughout the Municipality. To complete the work, UTRCA staff will randomly select ten percent of the total number of features from each feature size category, and these features will be reviewed for accuracy and consistency. At the time of the writing of this report, the peer review is ongoing.

In addition to the peer review, it is recommended that the municipality consider making the mapping available to the public for their review and comment. Comments and questions regarding the mapping should be directed to LTVCA staff so information can be gathered and revisions made as required.

References-

Lee, H., W. Bakowsky, J. Riley, J. Bowles, M. Puddister, P. Uhlig, and S. McMurray. 1998. *Ecological Land Classification for Southern Ontario. First Approximation and its Application.* Ontario Ministry of Natural Resources, South-Central Science section, Science Development and Transfer Branch. SCSS Field Guide FG-02.

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Ministry of Natural Resources (MNR). 2010. *Natural Heritage Reference Manual for Policy 2.3 of the Provincial Policy Statement. 2nd edition.* `