Subject: Ecological Land Classification Mapping Project

Report to: Planning and Economic Development Committee

Report date: Wednesday, December 9, 2020

Recommendations

1. That Report PDS 33-2020 **BE RECEIVED** for information; and

2. That Report PDS 33-2020 **BE CIRCULATED** to the Area Municipalities, the Niagara Peninsula Conservation Authority (NPCA) and the Greenbelt Foundation.

Key Facts

- This purpose of this report is to inform Council of the process, and completion of, the Region-wide Ecological Land Classification (ELC) mapping project.

- This project was undertaken in collaboration with the Niagara Peninsula Conservation Authority (NPCA) and with funding from the Greenbelt Foundation through the *Resilient Greenbelt* funding stream.

- ELC is a provincially-accepted approach for mapping natural features. In addition, this project included a field verification exercise which involved participation from Local and Regional planning staff and staff from the NPCA.

- The ELC mapping exercise was undertaken primarily to support the environment work program for the new Niagara Official Plan. However, the data will also have supplementary uses by the Region's environmental planning team and the NPCA.

- The ELC mapping is not the natural heritage system for the Region. ELC is a data source that will form the basis for several of the features included in the natural heritage system.

Financial Considerations

The costs associated with the ecological land classification mapping project were accommodated within the Council approved project budget for the Niagara Official Plan, with additional funding from the Greenbelt Foundation under the *Resilient Greenbelt* funding stream.

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Analysis

As part of the new Niagara Official Plan, maps and schedules are being updated for all sections of the Plan. These mapping updates require inputs from numerous data sources.

In Niagara, there are several sources of natural heritage mapping, including Provincial, NPCA as well as Regional datasets. Each serving a different purpose and each with a different level of accuracy. Updates to several of these individual datasets are required to move forward with the mapping of the natural heritage and water resource systems.

Accurate inventory and assessment of natural areas and features is critical to environmental planning and processes. PDS 32-2019 (November 6, 2019) recommended that an ELC mapping dataset was the preferred option for identifying natural areas and information across the Niagara Region, as this method has a range of benefits associated with natural environment planning.

Beginning in 2006, the NPCA initiated the "Natural Areas Inventory" (NAI) project, in coordination with the Region, local naturalist clubs, and area municipalities. A major element of the project was the completion of comprehensive ELC 'community series' level mapping of natural areas. Updates to this data set continued through 2012, however, the bulk of the mapped data was derived from 2006 aerial imagery analysis. Natural environments are dynamic and constantly changing; as a result, significant changes to the landscape including development and succession since 2006 are not reflected in the dataset.

An update to the NAI data using high-resolution aerial imagery formed the approach for this project. A consultant was retained in spring of 2020, and the project has recently been completed. The NPCA has collaborated and provided technical feedback on this project, and Regional staff intend to provide a copy of the final data to the NPCA for their use.

Ecological Land Classification Approach

The ELC system is an industry-accepted methodology, which provides a comprehensive and consistent approach to describing, inventorying, and analyzing vegetation communities. ELC mapping is required to be completed by a certified ecologist or other practitioner.

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ELC mapping can be undertaken at several different scales. For this exercise, the community series level was determined to be appropriate for the mapping update. This level of ELC is the most detailed level of characterization that can be produced from aerial imagery interpretation without the requirement of site visits at each location.

Simplified, the community series interpretative process involves creating a polygon-based spatial dataset, then analyzing and imbedding the polygons with classification codes representative of the feature. Coding for the community series is assigned through analysis of substrates, topographic features, history, cover values, and plant form and classified as one of 62 distinct community series types.

Field Verification Program

Community series level ELC does not require in-field site analysis. However, this project endeavoured to go beyond the minimum requirement and include a field verification component to foster an education of the ELC methodology and ensure a higher degree of confidence in the data amongst our local and agency partners.

A field verification exercise was completed between August 24 and September 21, 2020, within each municipality, and included verification of features inside and outside of urban boundaries. Each community was observed for characteristics including species present, wetland tolerance of species present, canopy cover, presence of standing water, presence of coniferous trees and evidence of disturbance or succession. The verification program was carried out under 2 frameworks:

1. *Multi-Agency Collaborative Field Exercise*

12 field sessions were held in a collaborative group setting which engaged Regional, NPCA and local staff from the 12 municipalities. These sessions generated participation from local planning staff in 11 of the 12 sessions, NPCA staff at 11 of the 12 sessions, and multiple Regional staff and ELC certified consultant team members. Overall, 25 different individuals participated in 1 or more of these sessions.

Local planning staff were invited ahead of time to identify any naturalized areas in their municipality for field review. Additional sites were selected with consideration for ease of access, parking safely, and allowing space for socially distant discussion with a group of 5 to 8. Municipal site visits included a variety of community types to provide a varying overview of the possible natural features present across the landscapes.

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2. *Consultant Field Exercise*

The project consultant completed several additional field exercises. Field verification sites were selected from a randomized subset of the data with consideration of site accessibility and from polygons within 25m of a road with a low interpretation rating, meaning, those polygons in the spatial dataset that had been tagged as having lesser confidence in the community series code assignment from aerial photo interpretation.

Results

More than 27,000 polygons were derived or updated, across the Niagara Region through the mapping exercise. Fifty-four different community series classifications were identified covering a total of 51,618ha of land. The majority composition of the naturalized areas were; Swamp (49.46%), Forest (21.27%), Meadow (8.09%), Thicket (6.7%), Marsh (5.79%) and Woodlands (2.72%). Composition of natural areas, and the percentage of overall municipal area covered by the dataset, varied by municipality. The following table identifies the total area of land (ha), and the corresponding percentage of total land area within each municipality that was classified through the data.

Municipality	Area Classified (ha)	% of Municipality
Niagara Falls	7862.64	36.69%
Port Colborne	4044.73	32.58%
St. Catharines	1400.98	14.00%
Thorold	2889.29	32.59%
Welland	2457.37	28.99%
Fort Erie	6065.36	36.34%
Grimsby	1888.98	27.41%
Lincoln	3357.84	20.28%
Niagara-on-the-Lake	1775.71	13.17%
Pelham	3906.79	30.74%
Wainfleet	6618.89	30.18%
West Lincoln	9007.85	23.14%

Region-wide, the data identified 18.8% (35,515 ha) of the Region is 'wooded' communities with canopy cover (woodland, forest, swamp, plantation, treed). Additionally, 15.6% of the Region is wetland cover. It should be noted that this includes treed wetlands, which are included under woodland cover, and as a result, the two coverage types should not be expected to equal the total natural cover for the Region. It is also of note, that some direct comparisons of changes from the original dataset to the

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updated data product are not possible due to several differences in the community coding methodology and classifications used, as well as the spatial difference between the Region's land area and the NPCA regulation area.

During the field exercise, 1,233 polygons representing 47 distinct community series interpretations were verified across the Region. The final accuracy rate for the verified polygons was 86.5%. The completion of the field review reaffirms that aerial interpretation is accurate at this level, and provides context for planning and policy decisions. The accuracy rating for the field exercise was expected to be lowered by the significant amount of polygons selected for review based on a low interpretive rating from the mapping exercise. Other factors influencing the accuracy rating included under estimation of absolute cover type as a result of analyzing spring imagery, and change in series code based on the cover type (e.g. mixed woodland to coniferous woodland).

Intended Use

The ELC dataset will provide a wealth of natural areas identification information. As previously noted, the ELC mapping itself is not the natural heritage system for the Region; it is a data source that will form the basis for several of the features that need to be mapped in the new Niagara Official Plan. No policies are developed based on the ELC dataset alone. For example, this dataset will provide the spatial information required to identify woodlands in the Region, but criteria still need to be determined and applied to derive significant woodlands. The data also has the capability to be used to identify additional features such as non-significant woodlands, non-evaluated wetlands, grasslands, etc.

Regional environmental planning review functions, including stormwater management review, will benefit and make use of the updated dataset for review of development files and when making land-use planning related decisions. In addition, staff will use the mapping when developing supporting guidelines and strategies targeted at enhancing the Region's natural heritage system. The mapping will also be frequently used by the Regional Forester to support decision-making, and can be considered as a candidate for the Region's open data initiative.

The NPCA intends use the data and derived statistic information to support their restoration program to aid prioritization and project targeting to areas that support clearly defined ecological objectives for the landscape. Additionally, the data will provide input and decision support value to the NPCA's land acquisition strategy, and will be used to update the Watershed Report card, which will be published again in early 2022.

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Alternatives Reviewed

N/A

Relationship to Council Strategic Priorities

This report is being brought forward in alignment with Objective 3.2 Environmental Sustainability and Stewardship:

 "A holistic and flexible approach to environmental stewardship and consideration of the natural environment, such as in infrastructure, planning and development, aligned with a renewed Official Plan."

Other Pertinent Reports

- PDS 32-2019 - Natural Environment Work Program – Phases 2 & 3: Mapping and Watershed Planning Discussion Papers and Comprehensive Background Study
- PDS 3-2020 – Ecological Land Classification Mapping Update
- PDS 26-2020 - Natural Environment Work Program – Phase 4: Identification and Evaluation of Option

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