Report to: Development Services Committee Meeting Date: May 3, 2021

SUBJECT:	Phase 1 Report: Natural Heritage Inventory and Assessment Study
PREPARED BY:	Lilli Duoba, MCIP, RPP, Manager, Natural Heritage, ext. 7925 Patrick Wong, MCIP, RPP, Senior Planner, Natural Heritage, ext. 6922
REVIEWED BY:	Marg Wouters, MCIP, RPP, Senior Manager, Policy and Research, ext. 2909

RECOMMENDATION:

1. That the staff report and presentation entitled: "Phase 1 Report: Natural Heritage Inventory and Assessment Study" dated May 3, 2021, be received;

2. And that the Phase 1: Natural Heritage Inventory and Assessment Study provide input into the upcoming Official Plan review process and that the study recommendations be considered for the Terms of Reference for Phase 2 of the Natural Heritage Management Plan Study;

3. And that staff be authorized and directed to do all things necessary to give effect to this resolution.

PURPOSE:

The purpose of this report is summarize the findings and recommendations of the Phase 1: Natural Heritage Inventory and Assessment Study. The report is provided as Attachment A.

BACKGROUND:

In early 2020, the City issued a request for proposals for consulting services for the preparation of the first phase of a two-phase Natural Heritage Inventory and Assessment Study. The purpose of the Phase 1 Study is to provide an update to the City's natural heritage inventory. Phase 2 is intended to be a more detailed management strategy for natural areas and address any specific recommendations from the Phase 1 study to ensure the long term sustainability of publicly-owned natural areas in the City. Phase 2 has been deferred to the 2022 capital budget process. The Terms of Reference for the Phase 2 study would also review opportunities to address Goal 3: Safe, Sustainable and Complete Communities of the City's Corporate Strategic Plan 2020-2023 which identifies the development of a wildlife and biodiversity strategy.

The request for proposals for Phase 1 was undertaken through a competitive bid process and the consulting firm of North-South Environmental with Dougan and Associates were retained to undertake the work.

Phase 1 of the study was designed to meet four key objectives:

1. Provide an inventory of vegetation communities for the entire City to support any modifications that may be needed to the City's Natural Heritage Network mapping for the next Official Plan review. This activity was undertaken through a desktop review of aerial photography and existing data sources.
2. Undertake a detailed inventory of flora and fauna, including ecological health, on some City-owned natural heritage lands. This activity was undertaken through field surveys and a total of 570 hectares out of the approximately 950 hectares of city-owned natural areas were visited and assessed.
3. Provide analysis on the health and condition of the Greenway System including:
   - changes in natural cover and conditions since the 1993 Natural Features Study
   - assess the current state of biodiversity in the City
   - identify any major issues related to the health of the Greenway System
   - describe ecological connectivity, habitat complexity and species diversity
4. Identify management needs and areas of ecological concern on City-owned lands.

This report provides the findings of Phase I: Natural Heritage Inventory and Assessment Study.

A Technical Advisory Committee was established for this study comprising staff from Ministry of Natural Resources and Forestry, Parks Canada, Toronto and Region Conservation Authority and York Region to review the study findings and provide input. Most comments have been received, primarily technical in nature, and staff will review the comments and make any minor changes to the report, as necessary.

OPTIONS/ DISCUSSION:

Updated Natural Heritage Inventory

The Study provided an updated inventory of vegetation communities undertaken through a desktop review of aerial photography and existing data sources. In addition, a detailed inventory of flora and fauna on City owned lands (570 ha) was undertaken using Ecological Land Classification (ELC) system. The ELC system provides a consistent methodology to accurately describe the type of vegetation or land cover (e.g., woodlands, wetlands, successional, aquatic and open water habitats) based on vegetation, soil and moisture characteristics. Staff will review this data during the next Official Plan review process and recommend any minor boundary modifications to the Greenway System as may be appropriate. The study also recommended that the City review the Greenway System to identify any appropriate opportunities for protection of successional habitat. While it is optimal to include this landscape as part of an integrated and connected natural heritage system, opportunities would have to be balanced against other municipal priorities for growth management. Public consultation will be undertaken as part of the Official Plan review process.

Health and Condition of the City's Greenway System

One of the objectives of the Phase 1 study was to compare the finding of the inventory 1993 Natural Features Study (the inventory work for this study was undertaken in 1991).

While the overall amount of wetlands has remained fairly consistent over 30 years, there has been a noticeable change in the composition of wetland habitat. The amount of marsh

habitat has increased by about 200 hectares while swamp habitat has decreased by about 230 hectares. The area of woodland has increased over the past 30 years which is likely due to a combination of natural regeneration in previously open fields as well as tree planting efforts concentrated in the east end of Markham. The area of other natural cover (meadows/thickets) has also decreased possibly due to a combination of natural succession into woodlands and removals associated with urban development. Although the comparisons are generally reliable, it should be noted that a different vegetation classification system was used in 1991 which will have some impact on this comparison. Table 1 below provides a summary of vegetation cover change between 1991 and 2020.

Table 1: Natural Cover Change between 1991 and 2020

Type of vegetation	1991	2020
Wetlands (marsh and swamp)	Area: 833.9 ha % of City: 3.9%	Area: 793.0 ha % of City: 3.7%
Woodlands and Forests (including swamps)	Area: 1154.7 ha % of City: 5.4%	Area: 1669.7 ha % of City: 7.8%
Other natural cover (meadow, thickets)	Area: 1375.6 ha % of City: 6.5%	Area: 1008.4 ha % of City: 4.7%

Plants: A total of 506 plant species (of which, 365 are native) were identified in 1991 compared to 499 (350 native species) in 2020.
Birds: 77 species were reported in 1991 compared to 75 species in 2020.
Amphibians: 6 species of amphibians were reported in 1991 compared to 8 species of amphibians in 2020.
Reptiles: Targeted surveys for snakes were not conducted, however Eastern Gartersnake was recorded in both 1991 and 2020. 3 turtle species were found in 2020, however turtle surveys were not conducted in 1991.
Mammals: Similar urban-adapted mammal species were recorded in both 1991 and 2020.
Overall, biodiversity of flora and fauna in Markham has remained similar to what was reported in 1991.

In terms of impacts to the City's natural heritage system resulting from invasive species, Markham's natural areas are faring better than other GTA urban municipalities in relation to the amount of some invasive tree species (Norway Maple, Black Alder, Glossy Buckthorn), however other invasive species (Common Buckthorn, Dog-Strangling Vine and Garlic Mustard) are common and widespread and are impacting the condition of public natural areas.

Human related disturbances and impacts on public lands were also noted in field observations including private encroachment onto public lands resulting in dumping, removal of native vegetation, informal trails and other impacts to natural ecosystem functions.

Management Needs and Phase 2 Study Recommendations
The Phase 1 report recommends that the City review the data collected related to invasive species management and prepare an invasive species management plan to address the spread and growth of invasive species. Some invasive species management efforts are

already undertaken for hazardous invasive plants (e.g., Giant Hogweed), but control of invasive species that are not hazardous to humans should be considered for the long term health of natural areas. Invasive species can be highly detrimental to natural areas and are considered the second most significant threat to biodiversity after habitat loss according the World Conservation Union (an international organization working in the field of nature conservation and sustainable use of natural resources). As invasive species become established, they outcompete native, indigenous plants and harm biodiversity by displacing food and shelter for native wildlife. It is recommended that the Phase 2 Natural Heritage Management Plan Study provide direction on the management of this issue.

Ecological health is measured not only by the health of the vegetation, but also on the detection of disturbances such as unauthorized recreational activities, garbage, windthrow and ice damage. The Phase 1 report recommends that the City prepare an edge management and encroachment plan. There are numerous recorded instances of private land encroachment onto public lands including dumping, fence relocation, gardens, storage, shed and private recreational facilities. The City should review educational materials and enforcement tools to manage edge effects and encroachment on City-owned lands. Staff recommend that this matter be incorporated in the Phase 2 study.

The Phase 1 report recommends that a long-term monitoring framework be established and that monitoring be conducted every five years. The program should include the monitoring of non-native invasive species as part of an invasive species management plan to ensure that invasive species do not create irreparable damage to the City's natural heritage resources. The program should also look at the after effects of development on protected natural heritage features. While a detailed assessment was out of scope for Phase 1 of this Study, the impacts of roads on animal movement was highlighted as a matter that would merit further review as Markham becomes increasingly urbanized and as greenspace corridors are subject to increasing recreational pressures. Where roads are subject to reconstruction or widening, the accommodation of animal movement should be reviewed on a site-by-site basis. It is recommended that the development of a long term monitoring framework be incorporated into Phase 2 of the Natural Heritage Management Plan Study.

Conclusion and Next Steps

While the Phase 1 report for Natural Heritage Inventory and Assessment Study is generally considered complete, staff will consider additional minor technical agency comments prior to finalizing the document and posting it on the City's website. Funding for the Phase 2 Natural Heritage Management Plan will be considered through the 2022 capital budget process.

FINANCIAL CONSIDERATIONS

There are no financial implications related to the recommendations of this report. Resources for the Phase 2 Natural Heritage Management Plan Study will be requested through the 2022 budget process.

HUMAN RESOURCES CONSIDERATIONS
Not applicable.

ALIGNMENT WITH STRATEGIC PRIORITIES:
The update and review of the City's Natural Heritage Network is consistent with the goal to protect and enhance our natural environment and built form identified in Building Markham's Future Together 2020 – 2023 Strategic Plan goal 'Safe, Sustainable and Complete Community'.

BUSINESS UNITS CONSULTED AND AFFECTED:
There are no implications to external Departments. Staff have consulted with external agencies on this matter through a Technical Advisory Committee.

RECOMMENDED BY:

Arvin Prasad, MCIP, RPP
Commissioner of Development Services

ATTACHMENTS:
Attachment A: Phase 1: Natural Heritage Inventory and Assessment Study