

July 29, 2024

**City of Hamilton  
Haldimand County  
Regional Municipality of Niagara  
Local Area Municipalities**

**SENT ELECTRONICALLY**

**Report No. FA-38-24 RE: Watershed Natural Assets Analysis and Valuation**

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At the Board of Directors meeting held on July 19, 2024, the following resolution was passed:

**Resolution No. FA-82-2024**

Moved by: Stew Beattie

Seconded by: Donna Cridland

**THAT** Report No. FA-38-24 RE: Watershed Natural Assets Analysis and Valuation  
**BE RECEIVED;**

**AND THAT** a copy of Report No. FA-38-24 RE: Watershed Natural Assets Analysis  
and Valuation **BE CIRCULATED** to NPCA watershed municipalities.

Those interested can learn about the value of nature-based solutions in the watershed [here](#). A copy of Report No. FA-38-24 is enclosed for reference and associated appendices are available on request.

Staff leading this initiative invite Councils or staff to reach out if they are interested in how a Natural Assets Analysis can support their municipal asset management planning. I welcome you to connect with me via email at [mdavis@npca.ca](mailto:mdavis@npca.ca) if there is interest in learning more.

Sincerely,



Melanie Davis  
Manager, Office of the CAO & Board  
Niagara Peninsula Conservation Authority  
905.788.3135 ext. 250

cc: Chandra Sharma, CAO / Secretary – Treasurer  
Leilani Lee-Yates, Director, Watershed Strategies & Climate Change  
Natalie Green, Manager, Climate Change & Special Programs  
Tara Gaade, Program Coordinator, Watershed Strategies & Climate Research  
Cathy Coverdale, Manager, Financial Services

**Report To: Board of Directors**

**Subject: Watershed Natural Assets Analysis and Valuation**

**Report No: FA-38-24**

**Date: July 19, 2024**

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**Recommendation:**

**THAT** Report No. FA-38-24 RE: Watershed Natural Assets Analysis and Valuation **BE RECEIVED**;

**AND THAT** a copy of Report No. FA-38-24 RE: Watershed Natural Assets Analysis and Valuation **BE CIRCULATED** to NPCA watershed municipalities.

**Purpose:**

To inform the Board of Directors about the results of the NPCA's watershed natural asset analysis, assessment and valuation project, including the Town of Fort Erie case study.

**Background:**

Nature is a valuable infrastructure asset critical for mitigating and adapting to the effects of climate change. With its role in watershed-based natural resource management, the NPCA is a key leader in implementing local climate change adaptation and mitigation initiatives such as water monitoring, flood forecasting and warning, floodplain mapping and flood infrastructure risk management, ecosystem restoration and stewardship, land securement, and natural asset management.

In 2019, the NPCA Board of Directors declared a climate change emergency through approval of Resolution No. 174-2019 recognizing the critical need to act on the impacts and effects of climate change across the NPCA watershed. More recently, climate change was identified as a critical priority under the NPCA's 2021-2031 strategic plan which includes numerous climate-related actions across six strategic priorities. The relevant strategic plan's goals and actions have been integrated within the NPCA's Climate Change Action Plan (CCAP) which is currently being implemented and finalized by staff (refer to FA-39-24 for more information).

The CCAP aims to achieve the following three objectives:

1. Build climate change resilience within the Niagara Peninsula watershed and NPCA properties
2. Reduce NPCA's carbon footprint to achieve net-zero greenhouse gas (GHG) emissions by 2050
3. Engage with NPCA staff, partners, and stakeholders to accelerate local climate change action

Following the December 2022 approval of the CCAP framework (Report FA-50-22), extensive staff engagements were conducted to help shape the details/actions of the plan, including updating the six updated key outcomes as follows:

- Outcome 1 Targets for corporate GHG reduction established
- Outcome 2 Understand climate change impacts and vulnerabilities to the Niagara Peninsula watershed jurisdiction, including on NPCA properties.
- Outcome 3 Increase climate change resiliency throughout the watershed.
- Outcome 4 Enhanced climate change resiliency at NPCA properties.
- Outcome 5 Improved corporate sustainability practices
- Outcome 6 Collaboration with external partners to advance research and on-the-ground climate action.

As part of the NPCA's climate change initiatives (related to CCAP outcomes 2, 3, 4, and 6), NPCA initiated a project to undertake a natural asset inventory, analysis and valuation project for the Niagara Peninsula watershed. The project also included a case study application of natural asset management approaches for the Town of Fort Erie and help them meet regulatory requirements for incorporating green infrastructure into asset management plans.

In September 2023, staff provided an update on the NPCA's asset management initiatives including tangible capital asset management planning, the watershed natural heritage asset project, and overview of a pilot project with the Town of Fort Erie (Report FA-38-23).

### **Discussion:**

Natural or green infrastructure, also called nature-based solutions, are those natural or human-made elements that provide essential services to people and the environment, such as carbon uptake (i.e., sequestration) and storage, protecting against flood and erosion, supporting biodiversity, providing shade/cooling effects, improving water quality, and many human health and recreational benefits.

In Q3 of 2023, in accordance with corporate procurement policies, NPCA retained Green Analytics to support the completion of a watershed-wide natural asset management project using NPCA's recently updated natural areas inventory and ecological land classification data. The purpose of the project was to: create an inventory of natural assets across three levels ranging from general natural areas to specific ecosystem types, better understand the

state of the assets through an ecosystem-based condition assessment, and estimate the value of natural assets using replacement cost and provision of ecosystem services.

The information from this project is critical for watershed management, land acquisition, conservation area land planning, natural asset management, financial planning, and targeted habitat restoration.

### Natural Asset Inventory

The final report, attached as Appendix 1, shows that altogether agricultural, natural, and pervious area assets cover 83.5% of the NPCA's watershed. Agricultural land dominates the natural asset composition within the NPCA watershed, covering 52.6% of the watershed while natural assets comprise 28.1% of the NPCA watershed.

### Condition Assessment

A condition assessment was conducted using a desktop approach to produce a high-level evaluation of an asset's ability to provide ecosystem services, such as nature-based recreation, air pollution filtration, and storm water attenuation.

To assess natural asset condition, a set of nine indicators were used following the approach outlined in the Canadian Standards Association (CSA) for natural asset inventories. The indicator criteria were categorized into either landscape context (e.g., percent of forest cover, percent wetland cover, extent of adjacent permeable land uses) or physical context (e.g., interior habitat, natural area patch shape, road density, proximity to watercourses, forest proximity to other natural assets, and wetland proximity to other natural assets).

The underlying assumption for natural asset condition assessments is that an asset in "good" condition (from an ecological perspective) is anticipated to be able to provide a "good" level of ecological services. The condition assessment found that 59% of the watershed's natural assets are in 'good' condition and 40% in 'fair' condition. Notably, 89% of wetland assets rated as good and other natural assets generally rated fair.

### Replacement Costs

In the context of tangible capital asset management processes, a replacement cost includes the comprehensive costs for replacing and maintaining an asset through its lifecycle; however, estimating replacement costs for natural assets can be challenging because natural assets are irreplaceable in an ecological sense, may not have a historical or capital construction cost, and gain more value as they age (unlike capital assets that depreciate over time).

Using the established natural asset guidance and scientific literature, the estimated replacement costs for the natural assets within the Niagara Peninsula watershed was estimated to exceed \$10 billion, based on per unit restoration costs. Overall, forest assets account for 46% and wetlands account for 44% of the total replacement cost. It is important

to note that the estimate accounts for the complexity and extended time required to restore natural assets.

### Ecosystem Service Valuation

Natural assets support climate change mitigation efforts through carbon sequestration, where carbon is removed from the atmosphere and stored within the asset. They also support climate adaptation efforts through the provision of other ecosystem services, such as stormwater attenuation, supporting biodiversity, and more.

The amount of carbon sequestration and storage was evaluated for forest and non-forest assets in the NPCA watersheds. The study found that forest assets, including forested wetlands, within the NPCA jurisdiction exhibit carbon sequestration rates ranging from 0.25 to over 2.5 tonnes of carbon per ha annually. Carbon storage for forest assets within the NPCA watershed surpasses 1.3 tonnes, with a weighted average of approximately 261 tonnes per ha. Sequestration rates for non-forest assets were derived from literature and vary by asset type ranging from 0.3 to 2.16 tonnes carbon per ha.

Natural assets also provide numerous additional ecosystem services such as nature-based recreation, air quality regulation, stormwater regulation, habitat preservation, and contribution to crop productivity. The report assessed these select ecosystem services delivered by natural assets within NPCA's watershed. Using established methods and scientific literature, the value of the ecosystem services was estimated at \$331 million to \$463 million, annually. Nature-based recreation and stormwater regulation were identified as the most valuable services. It is important to note that the study only examined a subset of ecosystem services as noted and that the value is considered an underestimate of the true value of natural asset service provision.

### Supporting our Municipal Partners: Fort Erie Natural Asset Inventory Pilot Project

As part of this watershed analysis project and through a collaborative approach with the Town of Fort Erie, NPCA staff led a Fort Erie natural assets inventory and assessment project to help the municipality fulfill the requirements of *O. Reg. 588/17*. Given the NPCA's role in watershed-based natural resource management, most of the natural asset data was readily available and up to date. NPCA staff filled critical data gaps relating to urban street trees while other green infrastructure data were provided by the Town of Fort Erie.

The Fort Erie natural asset project provides an evaluation of the municipality's natural assets and their capacity to deliver services. The report showcases the inventory, condition, risks, level of services, ecosystem service valuations, and replacement costs associated with Fort Erie's natural assets, which include various land covers such as forests, wetlands, and waterbodies. This information will help the Town of Fort Erie meet its asset management planning requirements for green infrastructure under *O. Reg. 588/17*.

The final report was provided to municipal staff for incorporation into the Town's asset management plan and approval by Council at their [July 8, 2024 meeting](#).

## Next steps

With the completion of the watershed natural assets analysis and valuation project, NPCA staff will continue to advance our work in this emerging field and will develop a workplan to:

- Integrate natural asset information into NPCA asset management planning process and policies, as applicable.
- Complete data collection at NPCA conservation areas to fill remaining data gaps related to enhanced assets, such as park, trees, and trails.
- Determine best practices for data management and sharing.
- Continue to collaborate with Conservation Ontario and other conservation authorities engaged in natural asset initiatives (i.e., Toronto & Region, Credit Valley, Halton Region, Lake Simcoe Region, and Ausable Bayfield) to support knowledge sharing and build a community of practice amongst Ontario's Conservation Authorities and municipal partners in natural asset management.
- Explore additional opportunities to support watershed municipalities, as appropriate, by providing natural asset inventory and valuation information.
- Develop a program to update the watershed natural asset inventory as new data becomes available and conduct field-based condition assessment and risk assessments to detect changes over time, enabling proactive management and early identification of threats for timely intervention.

## **Financial Implications:**

The Watershed Natural Assets Analysis and Valuation project was supported through the approved operational budgets. The NPCA entered a partnership with the Town of Fort Erie to complete the Fort Erie Natural Asset Inventory Pilot Project with cash and in-kind contributions from both partners.

## **Links to Policy/Strategic Plan:**

Goal 2.3 – Lead the implementation of sustainable technologies and green infrastructure best practices for climate resiliency and sustainability.

Goal 4.1 – strengthen government relations toward collective outcomes and impact

Goal 6.3 – Improve asset management and close the state of good repair

## **Related Reports and Appendices:**

Appendix 1: Final Report Niagara Peninsula Watershed Natural Asset Analysis & Valuation

Appendix 2: Presentation by Amy Taylor, Green Analytics, Niagara Peninsula Watershed Natural Asset Analysis and Valuation

**Co-Authored by:**

*Original Signed by:*

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Natalie Green, M.Sc., PMP, Manager, Climate Change & Special Programs  
Tara Gaade, Program Coordinator, Watershed Strategies & Climate Research  
Cathy Coverdale, CPA, CGA, Manager, Financial Services

**Reviewed by:**

*Original Signed by:*

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Leilani Lee-Yates  
Director, Watershed Strategies and Climate Change

**Submitted by:**

*Original Signed by:*

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Chandra Sharma, MCIP, RPP  
Chief Administrative Officer/Secretary-Treasurer