

Report To: Board of Directors

Subject: Wainfleet Bog Biederman Drain Re-Alignment Proposal

Report No: FA-39-21

Date: June 18, 2021

Recommendation:

1. **THAT** Report No. FA-19-21 RE: Wainfleet Bog Biederman Drain Re-Alignment Proposal **BE RECEIVED**.
2. **THAT** the Board **ENDORSE** staff recommended approach to the future management of drainage in Wainfleet Bog.
3. **AND FURTHER THAT** this report **BE CIRCULATED** to the City of Port Colborne and the Township of Wainfleet.

Purpose:

The purpose of this report is to update the Board on a request by 8Trees Inc. to relocate the Biederman Drain and seek a decision on the staff recommended approach in response to the request by 8Trees Inc..

Background:

The Wainfleet Bog is located approximately eight km northwest of the urban area of Port Colborne, within the Township of Wainfleet and the City of Port Colborne. The Wainfleet Bog historically was mined for peat which resulted in significant adverse impacts to this rare and unique ecosystem. The two largest landowners of the Wainfleet Bog are the NPCA and the Ministry of Natural Resources and Forestry, with NPCA having the largest land holdings. The Wainfleet Bog Conservation Area was acquired in 1995 by NPCA and is the largest of NPCA's Conservation Areas, at approximately 2,000 acres (800 hectares) in size. The Wainfleet Bog is a provincially, significant wetland and is the largest least disturbed bog remaining within the Carolinian region of Ontario. This rare ecosystem provides habitat to a variety of unique plants and animals as well as a suite of recreational uses.

Protected Area Designation 2021

In 2021, the Wainfleet Bog met the pan-Canadian standards for "protected areas" and was designated as a site under the 'Pathway to Canada Target 1' Initiative. This recognition acknowledges the ways in which the Wainfleet Bog is already being managed by the NPCA to

conserve biodiversity. Details of this Designation were presented to the Board (Report No. FA-19-21).

Wainfleet Bog Management Plan and Site Restoration Activities

A Management Plan and site Restoration Plan were developed by staff in 1997 with input from stakeholders and the community, with an objective to restore a healthier state of the Wainfleet Bog, provide passive recreation and educational opportunities, as well as include self-sustaining management strategies with little to no human intervention, multi-use site opportunities, and at minimal cost. NPCA staff continues to implement management actions aligned with the Management Plan. Monitoring of water levels, vegetation progress and site wildlife continues monthly and annually to assess the progress of the management plan. The plan continues to be relevant with ongoing reviews and updates to the management plan scheduled. A management plan update (as needed) will be scheduled in future years along with other NPCA lands as part of the recent CA Act updated regulation requirement.

Several drainage canals were created during the period that peat was mined in portions of the Wainfleet Bog. Although, these canals have been decommissioned since the peat mining halted. The canals still exist but are maintained open for wildlife use (turtles and fish) and some drainage on the east half. Dams made of peat (i.e., peat dams) were originally created (in 1998) with the purpose of blocking water flows leaving the bog via the canals on the western portion of the bog, with the intention of rehabilitating the NPCA Wainfleet Bog. The peat dams have effectiveness, although may not be as effective as desired due to damage inflicted by wildlife (e.g., burrows). Maintaining the appropriate level of water in the bog has been one of the objectives of the NPCA. Currently, water levels of the bog are primarily affected by evapotranspiration, drainage and beaver activity (i.e. beaver dams).

Site restoration activities on NPCA land have included: blocking peat canals with peat dams, creating surface indentations to mimic bog topography (hummocks and pools), planting native bog plants, cutting invasive European Birch trees, and installing boardwalks for passive recreation and educational purposes. This habitat mimics that required by the snakes and turtle Species at Risk populations. To date, the bog continues to be monitored and shows progress towards a more natural bog ecosystem. The bog is progressively retaining more water with more constant water levels (allowing for better recharge and discharge functions as well as more stable water levels), increased growth of *sphagnum* moss and associated peat accumulation, increased areas of bog shrubs and grasses, as well as continues to support species-at-risk populations of snakes and turtles as well as other bog species. The NPCA continues to monitor site features to ensure management plan goals are being met.

Research

Over the past several years, the NPCA has worked in partnership with the Ministry of Natural Resources and Forestry, Environment Canada National Water Research Institute, academic institutions, and other researchers on a variety of research initiatives including groundwater patterns, water budget and effective techniques for water retention, bog vegetation progression, turtle and rattlesnake habitat use and populations, wildfire effects, satellite imagery and hydrology analyses.

Water levels are monitored by the NPCA through a network of water wells across and surrounding the bog, while vegetation progress and snake and turtle population levels are monitored by the Ontario Ministry of Natural Resources and Forestry and the proponent to reduce overlap and

effectively use human and financial resources. The NPCA has provided the proponent (8 Trees Inc.) NPCA research permits to facilitate knowledge sharing of the Massasauga Rattlesnake and turtle populations (e.g. Spotted Turtle, *Endangered* status through the Provincial Endangered Species at Risk Act) for survival rates, habitat areas use and population levels (increasing, decreasing or maintained).

Biederman Drain Re-location Request from the Proponent (8Trees Inc.)

The Biederman Drain exists along approximately two thirds of the southernmost edge of the Wainfleet Bog. The proponent is proposing to relocate a segment of the Biederman Drain to a historic yet non-active drain location. This historic location falls on NPCA and private land within a Provincially Significant Wetland.

The City of Port Colborne is currently updating the engineering report for the Biederman Drain. 8Trees Inc. is requesting the NPCA, as a landowner, submit a petition to the City to relocate this section of the Biederman Drain as part of the engineer's report.

Research conducted by proponent indicates fluctuating water levels of the Wainfleet Bog in areas where the snakes hibernate/overwinter, which can adversely impact this *Endangered* Species by drowning or dehydrating the species while it hibernates. The NPCA notes the fluctuating water levels at the site are caused by site drainage, as well as high evapotranspiration from European Birch trees and beaver activity (dams), and management of beaver activity (i.e., removal of beavers and dams) in the Biederman Drain. The management of beaver activity and the impact of how this management affects the bog has not been quantified. These components have been addressed in the current NPCA restoration plan considering all site objectives. NPCA staff continues to monitor site restoration work, and work with 8Trees Inc. to gain clarity and evidence for these conclusions.

Discussion:

Under the *Drainage Act*, the following conditions must be met for this type of re-location activity:

- a) A petition must be made by the landowner in question to the Municipality (NPCA to the City of Port Colborne) to include the re-location in their Engineers Report.
- b) The landowner(s) is required to pay for the entire activity (approx. \$137 000 as per the preliminary estimate by the Port Colborne Drainage Engineer) this includes an allowance to the receiving landowners for the potential loss of land.
- c) An agreement must be made with the receiving landowners to receive the Drain (Currently two landowners are implicated). To date there is no known requests or intentions from the landowners in question to have the drain moved on their property.
- d) There is an important timing component where the City appointed the Engineer in late 2019. According to staff the Engineers report must be presented to the council within the next few months as the process has been delayed.
- e) There is a public process component where the Town Council-approved Engineer's report will flow through a public comment process. This report can be appealed. Appeals, if any, and associated delays are added to the cost of the project.

Note: NPCA Staff have spent a significant amount of time working with the proponent. to find a mutually aggregable solution that is least disruptive to the environment, financially viable and consistent with the objectives of the Management Plan.

Options

Three key options have emerged from discussions with NPCA staff and some key stakeholders in determining an approach that will contribute to the overall benefit of the Wainfleet Bog. A variety of factors, including ecology, social and recreation values, achievable results, financial costs, and balancing priorities are outlined below. The following section summarizes options and outlines key considerations for each option. Option Three is recommended by NPCA Staff.

Option 1: Status quo with current NPCA site management

Summary: Maintain the existing management regime. This aligns with the NPCA Site Management Plan and Restoration Plan (1997). Current focus is on monitoring existing restoration activities and adaptive management of the site, including community engagement through school programs to build awareness of the natural wonders of the Wainfleet Bog. Existing site restoration focuses on the western 3/4 of the bog, within the upper watershed areas, areas where peat canals are close together and water retention activities are the most effective. It also ensures a status quo area to the east to allow species to adapt to changing site conditions.

- Additional costs on future water management structures noted by the proponent notes, but not detailed or estimated in costs.
- Restoration has included blocking internal canals, creating surface indentation/bog topography of hummocks and pools, planting (of wet and dry bog species) and cutting invasive European Birch trees (known to have high evapotranspiration rates).
- The primary component of the site restoration plan was implemented in 1997-2004 and continues with site monitoring of the management plan objectives. Additional “active” restorative management may be taken, however there are wildfire constraints that need to be managed with the piling of felled trees. This is linked to local wildfire prevention and management with local municipal partners.
- NPCA’s site monitoring program of groundwater levels (across and around the bog), plant progression and species at risk population health levels are annually assessed to determine if management activities need to be modified for the overall benefit of the bog. The nature and complexity of the bog requires continuous monitoring to determine how the hydrology, vegetation and wildlife are progressing.
- NPCA continues to work with its’ partners on the monitoring program components data for determining if any adaptive management needs.

Option 2: Move section of Biederman Drain.

Summary: The proponent identifies moving a section of the Biederman drain. This will result in decreasing fluctuating water levels in the center of the NPCA bog property. This will in turn theoretically improve the habitat of the *Endangered* Massasauga Rattlesnake. Anticipated impacts of activities proposed may include:

- Abandonment of a 1.2km section of Biederman Drain, the reinstatement of the abandoned non-active 1930s drain alignment, and the construction of an engineered dam at a single control point for the entire NPCA property in the future.
- A formal *Drainage Act* process is required where relevant landowners request the movement of the drain in question. Unless the relevant landowners request it, no action occurs.
- The Township of Wainfleet Council did not support the proponent’s request to move the drain. Council would consider other options to achieve the goals of bog and support goals of the NPCA, with recommendations to pursue alternative options to facilitate achievement of goals

other than the Biederman Drain engineer's update. For example, blocking of canals in the bog (Option 3 in this report).

- The proposed location of the new drain is within a Provincially Significant Wetland which is contrary to the current NPCA Policy. All other drains that are proposed within Provincially Significant Wetlands are rejected by NPCA due to non-conformance with NPCA Policy.
- Negative effects to a Provincially Significant Wetland.
- Unknown whether intended positive impacts would be realized and a significant amount of uncertainty remains whether this would be effective. If the water levels rise too high or drop too low, the bog will transition into another less desirable ecosystem.
- Beaver dams and populations are controlled downstream of the Wainfleet Bog along the Biederman Drain and have been known to cause fluctuating water levels in the bog. Therefore, even if the proposed segment of drain were to be moved, it is not guaranteed to have the intended positive effect as similar impacts will still be realized which are outside the scope of this approach.
- The ballpark estimated cost of the proposed drain movement is \$137 000, with possible increase due to actual costs realized. Further, NPCA will be required to pay new costs associated with drainage maintenance on an ongoing basis.
- Additional costs on future water management structures noted by the proponent notes, but not detailed or estimated in costs.
- More research is needed to determine the potential impacts. An Environmental Impact Study will need to be submitted that fully characterizes the pathway of effects (both positive and undesirable) including recommendations that will be followed to the satisfaction of NPCA staff. 8Trees Inc. would remain as the proponent and therefore would be responsible for the development of the Environmental Impact Study.
- The NPCA would have greater flexibility on site activities as this section of the drain would no longer require maintenance access by the Township.

Option 3 -STAFF RECOMMENDED: Control drainage of two or more canals on NPCA property.

Summary: Add control structures to select canals that drain the east of the NPCA portion of the Wainfleet Bog that outlet to the Biederman Drain. The best type of water control structures will be assessed (i.e., sluice gates or using flashboard risers potentially in combination with the use of clay dams). This is anticipated to increase water levels in the east portion of the NPCA owned bog and achieve better stability in hydrology.

NPCA staff will need to undertake the addition of two or more water control structures where there are currently no control structures on select canals to achieve an enhanced hydrology of east sections of the NPCA owned bog. The control structures could be manually adjusted by NPCA staff as often as needed to achieve desired water levels in NPCA owned portion of the bog. Beaver mitigation designs would be required for dam maintenance to ensure water is being held.

Anticipated Pro's

- No *Drainage Act* applications or changes to the municipal process are needed. NPCA has full ability to implement immediately without impediment from the *Drainage Act*.
- Increase likelihood of stability of desired water levels in east section of the bog to maintain or further rehabilitate the bog ecosystem. Saturated areas affecting surrounding dam areas before long term desired water levels in the bog centre as intended.
- Decrease in fluctuations of water levels in the east by holding back more water manually in order to meet desired water levels.

- Easy access for site maintenance and can easily change water levels and adaptively manage.
- Potential increase in surface waters across the site would positively affect more Species at Risk habitat for the Massasauga Rattlesnake and Spotted Turtle as well as the overall bog ecosystem.
- Can be done at any time during the growing season, including next budget year.
- Potential mitigation of current theorized flooding of snake hibernacula for Species at Risk.

Anticipated Con's

- Additional cost from current baseline management of bog (~ballpark estimates could range from \$5000- \$20 000 for control structure build out).
- Potential ongoing costs associated with maintenance and management of designs as well as unseen costs.
- Staff time required to conduct research into design and understanding of potential pathways of effects and determine plan to mitigate unintended consequences (if any).
- Potential increase in water levels may impact access for existing recreational activities
- Potential flooding of snake hibernacula (if not mitigated).
- Potential short-term negative effects to vegetation and wildlife with rising of water levels
- Mitigations needed to address aquatic Species at Risk.

Note: An overall benefit could be sought and likely would not be onerous.

Proposed Next Steps Should the Board endorse Option 3, NPCA staff propose the following approach:

- NPCA staff will further research appropriate structures to use and on which canal outlets to the Biederman Drain would have the intended effects of further rehabilitating the NPCA owned portion of the Wainfleet Bog.
- NPCA staff will work to identify estimated inundation areas of water impoundment options associated with control structures. Existing topographic information and estimates of where areas may be inundated exists and can be readily attained through MNRF. Targeted inundation areas will be established working closely with key MNRF staff. This will also include avoidance and mitigation measures to reduce negative effects to Species at Risk. Where appropriate, NPCA staff will gain the necessary permits from MNFR/MECP in advance of any required work. NPCA will work within the allowable conditions of such permits for where they apply.
- NPCA staff will create a standing committee. NPCA will develop methods to achieve the proposed recommendation and bring it the committee for discussion and NPCA decision. Such a Committee will also help to achieve the NPCA goal of encouraging surrounding bog landowners for coordinated bog restoration efforts. Through this committee, efforts will be made to revitalize and update the 1997 Management Plan to ensure currency with the conditions of the bog, new information and any necessary adaptive management that is recommended. Through this committee, NPCA staff will consider recommendations from the experts who would sit on this committee on the water heights to be impounded to maintain an optimal hydrology for species at risk. A detailed terms of reference and implementation plan will be developed in 2022.
- NPCA staff, along with relevant partners (e.g. MNRF staff) will create an ecological monitoring plan that will identify appropriate ecological monitoring to ensure the targeted hydrology is reasonably attained through the control structures. This monitoring plan will also

have response plans for several potential scenarios with management actions. For example, determining if the levels are too high or too low and what measures should be taken and when.

Financial Implications:

Option One has no additional anticipated financial implications.

Option Two carries by far the greatest financial implication with a preliminary estimate of \$137,000 plus any unknown costs and additional annual drain maintenance costs of the drain.

Option Three (NPCA staff recommended) will have a modest increase in budget requirements. The budget for Option Three (i.e. Control structures) will need to be more fully understood although could be ballparked to \$5,000 to \$20,000.

Costs of managing an expert committee will be absorbed within staff workplans in 2022.

Note: Estimates are very approximate.

Links to Policy/Strategic Plan:

Links to the Policy and Strategic Plan through recognition of an existing Conservation Area and the values of its ecological significance and biodiversity for furthering the conservation objectives of the NPCA.

Related Reports and Appendices:

None

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