P.O. Box 1749
Halifax, Nova Scotia
B3J 3A5 Canada

Item No. 15.1.6
Halifax Regional Council
July 30, 2019

TO: Mayor Savage and Members of Halifax Regional Council

SUBMITTED BY: Original Signed
Chief Ken Stuebing, Acting Chief Administrative Officer

DATE: May 10, 2019

SUBJECT: Floating Yellow Heart – Little Albro Lake

ORIGIN

On October 30, 2018 the following motion of Regional Council regarding item 14.6.1 was put and passed:

"THAT Halifax Regional Council request a staff report on options for dealing with invasive Floating Yellow Heart in Little Albro Lake and the potential for cooperation with the Province to address this issue."

LEGISLATIVE AUTHORITY

Halifax Regional Municipality Charter, Section 59, (3) In addition to matters specified in this Act or another Act of the Legislature, the Council may adopt policies on any matter that the Council considers conducive to the effective management of the Municipality.

Halifax Regional Municipality Charter, Section 188, (1) The Council may make by-laws, for municipal purposes, respecting… (d) nuisances, activities and things that, in the opinion of the Council, may be or may cause nuisances, including noise, weeds, burning, odours, fumes and vibrations;

RECOMMENDATION

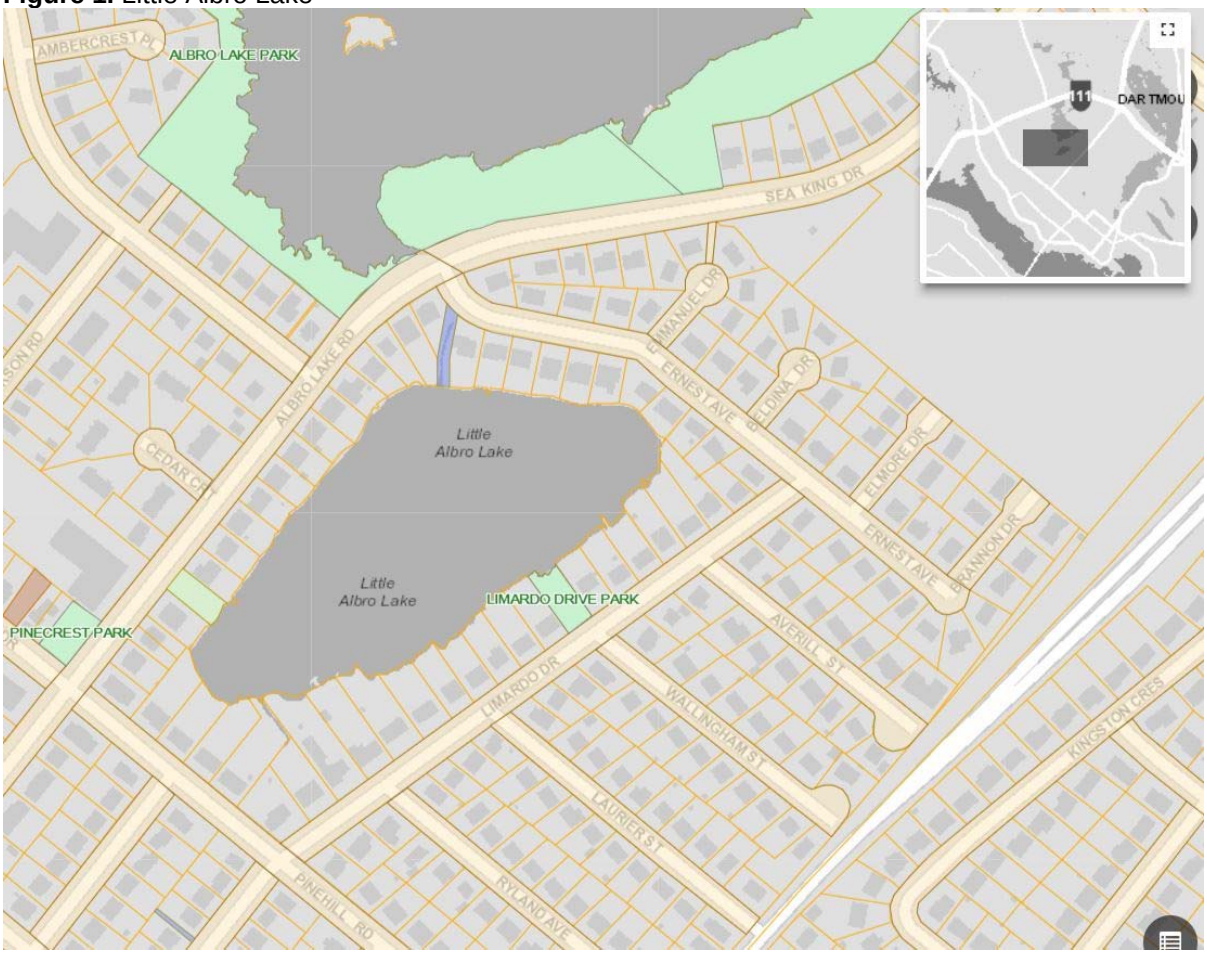
It is recommended that Halifax Regional Council:

Direct the Chief Administrative Officer to pilot the use of benthic mats to control the Yellow Floating Heart infestation at Little Albro Lake, contingent on regulatory approval from the Province of Nova Scotia and Government of Canada.

BACKGROUND

Yellow Floating Heart (YFH), a freshwater ornamental floating plant native to Eurasia, was unintentionally introduced to Little Albro Lake, Dartmouth (Figure 1), in 2006 and quickly grew to dominate the surface of the lake. The following paragraphs outline the Municipality's efforts to date to help manage YFH at Little Albro Lake.

Figure 1. Little Albro Lake



At the request of the area Councillor, Halifax Regional Council directed staff to provide a report regarding the eradication of the plant; this report[1] was presented to Council on July 31, 2007.

In response to direction from Regional Council pursuant to the recommendations of the staff report, Mayor Kelly wrote a letter to the provincial Ministers of Environment & Labour (NSEL) and Natural Resources (NSDNR) to express the Municipality's concerns and to request that the Province i) complete a policy on invasive species and ii) identify suitable control options for YFH in Little Albro Lake (Attachment 1).

The Minister of NSEL responded to Mayor Kelly's letter in August 2007 to acknowledge its receipt and to indicate that provincial staff were investigating and would follow up upon the completion of their review (Attachment 2). In May 2008, NSDNR officials wrote to senior municipal staff to follow up on Ministerial correspondence (Attachment 3). In this letter, NSDNR addressed the jurisdiction of Invasive Alien Species (IAS), provincial policy and programs for IAS, and what the provincial government was prepared to do in

[1] Report available at http://legacycontent.halifax.ca/council/agendasc/documents/070731ca1114.pdf

regard to YFH in Little Albro Lake. Its lake-specific offers and comments are summarized as follows:

- Does not support a large-scale intervention to remove and control YFH in the lake
- Willing to assist with the prevention and early detection aspects of YFH
- Will support a workshop on YFH at Little Albro Lake, to be hosted by Dr. Cathy Conrad of Saint Mary's University [Community-Based Environmental Monitoring Network (CBEMN)], for residents near to the lake
- Offered to deliver a presentation to (Halifax Regional) Council and staff on Invasive Alien Species in general, with a focus on Yellow Floating Heart at Little Albro Lake

On June 23, 2009, the Municipality's Committee of the Whole (COW) received the presentation offered by NSDNR. The presentation provided some background information about invasive species, introduced the Invasive Alien Species Strategy for Canada, and summarized the roles of key provincial agencies with respect to invasive species. Following NSDNR's presentation, Council requested that Mayor Kelly write a letter to the Province requesting a ban on the sale and import of alien invasive species, and also directed staff to bring forward a policy for invasive alien plant control in Halifax. A copy of this letter is provided in Attachment 4.

On April 13, 2010, Regional Council approved an Alien Invasive Plant Species Action Plan[2] presented by staff. The Action Plan consisted of four key elements, as follows:

1. Work with other levels of Government, NGO's, and Community to identify Alien Invasive Species in Halifax Regional Municipality, to create a basic map of impacts in HRM and post on the HRM website;
2. Identify Provincial and Federal actions addressing Alien invasive Species and include in HRM communications;
3. Spend no new money on this Staff Action Plan and utilize existing staffing resources; and
4. Identify specific actions for inclusion in the Climate Change Risk Management Strategy developed under ClimateSMART.

The provincial Ministers of Agriculture and Natural Resources wrote back to the Mayor on August 26 and October 9, 2009, respectively (Attachments 5 & 6). This correspondence indicated that the Province would consider the Municipality's requests in the process of updating the *Nova Scotia Weed Control Act*, and in the development of the Natural Resources Strategy, both then underway.

The community-oriented workshop, referenced by NSDNR in its May 2008 letter to municipal staff, was held in October 2008. In support of that workshop, CBEMN developed a one-page factsheet to provide key information to area residents (Attachment 7).

Yellow Floating Heart (YFH) is an Invasive Alien Species – officially defined as "harmful alien species whose introduction or spread threatens the environment, the economy, or society, including human health". IAS have been recognized as a significant threat to Canada's economy and environment. Canada has responded to the threat by developing An Invasive Alien Species Strategy for Canada (2004), aquatic and terrestrial IAS action plans (2004), and an IAS funding program (2005-2010), and by addressing it through international and domestic commitments to conserving biological diversity. The IAS Strategy for Canada proposed a hierarchical response to the IAS challenge as follows:

1) Prevention of new invasions;
2) Early detection of new invaders
3) Rapid response to new invaders; and
4) Management of established and spreading invaders (via containment, eradication, and control).

DISCUSSION

[2] Report available at http://legacycontent.halifax.ca/council/agendasc/documents/100413ca1112.pdf

Although staff did not receive any notice of concerns regarding YFH between 2010 and 2018, residents living next to Little Albro Lake recently advised their councillor that it covers the lake surface, has overtaken the lake's native vegetation, and restricts any use of the lake for swimming or boating during the growing season each year (i.e., May – September).

Since YFH is now well-established in Little Albro Lake, only step four of Canada's IAS strategic hierarchy – management of established invaders – remains a viable response. The three management approaches – containment, eradication, and control - are distinct from one another and from among these options should be based on a risk assessment and clear understanding of each approach, its goals, expected effectiveness and cost-effectiveness.

The biology of YFH has been studied and is well understood. The plant produces many seeds which stay afloat for weeks before sinking, and can quickly and easily grow new roots, which promotes the likelihood of survival if transplanted from its original habitat. Seeds are also hairy, which facilitates their attachment to wildlife and waterfowl, which they may carry to other lakes. They may also attach to boat hulls and be transported to other lakes on those surfaces. Based on these characteristics, it is reasonable to expect that YFH may spread to new habitats (lakes) in the surrounding area.

Little Albro Lake drains into Halifax Harbour without passing through any other lake systems, so there is no risk of affecting new lakes by natural drainage alone. Despite the plant's successful occupation of the lake since 2006, its readiness to attach to surfaces which can facilitate its dispersal, and proximity of numerous urban lakes elsewhere in Dartmouth, no other local lakes are known to harbor YFH. Based on this evidence, and on the advice of the Curator of Botany for the Nova Scotia Museum, if YFH were to expand to other lakes, it would have done so by now. Since this is not the case, it would appear to be naturally contained, at least for now, and containment is therefore not recommended.

Control may be achieved through chemical or non-chemical approaches. A summary of these is presented below in Table 1.

Control Type	Description	Additional Considerations
Mechanical (pulling, cutting, dredging)	Mechanical control of *Nymphoides peltata* is very difficult due to its ability to propagate vegetatively through fragments, and through underwater roots and rhizomes. Mechanical harvesting may create abundant plant fragments, potentially aiding in dispersal to new locations. Leaf petioles cut by mechanical harvesting will eventually form new leaves, requiring one or two cuts each spring and summer to maintain controlled areas. Nevertheless, these plants are sometimes controlled by cutting, harvesting, and covering with bottom barrier materials (synthetic and natural fibers). In severe infestations, excavation may be necessary to remove plants, rhizomes and seed in the sediment. However, both roots and rhizomes are able to withstand mechanical removal by dredging. Hand raking can be effective in very small localized areas where fishing or navigation lanes need to be created. The US Army Corps of Engineers has concluded that benthic mats can extremely effective at limiting plant growth and are often used as a low-cost rapid response tool to control establishment of new species. When implemented and properly maintained, textile and plastic benthic barriers can provide 100% control of existing covered vegetation.	The Oregon Dept. of Agriculture reports that the control of even small populations has proven difficult there. Bottom (benthic) barriers have successfully controlled YFH growth there with relatively minimal risk. The Thompson Rivers University (BC) recently concluded that benthic barriers can effectively control Yellow Flag Iris, an invasive riparian perennial. Dredging would require large land areas for dewatering sediment, which are not available at the lake's shoreline. It may cause significant environmental impacts, such as the removal of sediment-bound nutrients that support plant growth, reducing available fish habitat, increasing water column turbidity, among others.
Cultural	Use alternative native floating plants and keep	Given the complete lake surface

	contained within pots. Dewatering is usually not sufficient to control this plant because the below-ground propagules (rhizomes, stolons) often survive.	coverage by YFH, the likelihood of success with alternative native plants is low. Plants can also survive exposure on wet mud.
Biological	The (sterile) triploid grass carp (white amur) is a relatively nonselective herbivorous fish that may partially consume the seedlings and young, tender parts of floating heart, but usually only after it first consumes its preferred submersed plants such as native pondweeds. Grass carp do not eat water lilies in Washington and it is not known if they would readily eat yellow floating heart.	Researchers in Florida have demonstrated that grass carp do not eat *Nymphoides peltata*. In addition, Grass carp are highly invasive themselves and their introduction into a novel system could result in additional problems beyond YFH.
Chemical - Glysophate (Rodeo, Aquamaster products**)**	(Aromatic Amino Acid Inhibitors) **Rate:** Use a 2% v/v Rodeo or Aquamaster solution (1% a.e.) with an approved surfactant and spray to thoroughly wet the floating leaf surface **Timing:** Postemergence in late spring to mid-summer. **Remarks:** Repeated applications are generally necessary	1. Halifax has previously considered pesticide applications to control nuisance plants in Lake Banook and opted for a non-chemical control method (mechanical harvesting). 2. A UK-based study reported that a different chemical, Dichlobenil, is more effective than Glysophate, and recommends its use as the best treatment option for YFH infestation 3. Florida research results indicate that herbicides are good at removing surface leaves but poor at controlling the plant

Table 1. Summary of control methods for Yellow Floating Heart. Amended from the Weed Report for Yellow Floating Heart from Weed Control in Natural Areas in the Western United States.

Through review of current literature and in consultation with staff of Nova Scotia Environment (NSE), Nova Scotia Department of Lands and Forestry (NSDLF), and the Nova Scotia Museum (NSM), most control methods are likely to be expensive and ineffective. Benthic mats, however, are generally understood to be relatively low cost and potentially effective, and are thus worth further consideration.

Benthic mats are mats made of synthetic or natural materials that can be placed on a lake bottom to control nuisance and invasive aquatic plants by blocking their access to light during the growing season. Typically intended for only shallow and small areas, they are relatively inexpensive compared to other methods of weed control, easily applied, effective, and safe. Although the effectiveness of these mats for controlling YFH has not yet been shown via documented study, they have proven modestly effective for a variety of invasive aquatic weeds, including hydrilla, and pondweeds, and are thought to yield promise for YFH. Although benthic mats have not been used as a lake management technique in Halifax to date, their promise in this regard, in combination with the low cost and risk associated with their use, makes them a suitable candidate for a management control project for YFH.

Expected project costs would include materials, labour, monitoring, and reporting, assuming that the local market can supply qualified contractors. As a pilot project, the scope is not fixed, and the cost estimate is inherently uncertain, pegged at the “order-of-magnitude” level. The application of benthic mats would be subject to regulatory approval from Nova Scotia Environment for watercourse alteration and Fisheries and Oceans Canada for fisheries habitat protection, at minimum. It may take up to three months to develop a pilot project and to secure regulatory approval, which would delay mat installation until the fall. This would be near the end of the growing season and thus both decrease mat effectiveness and compromise the evaluation of its effectiveness. Accordingly, it may be prudent to delay mat installation until spring 2020.
In the absence of the application of benthic mats or other management (control) options, Yellow Floating Heart is expected to continue to cover the lake surface year over year, limiting access to the lake for

recreational purposes and dominating the composition of the lake's plant community. This option, while rational, may not be acceptable to the community or to Halifax Regional Council, given the request for management options. Therefore, doing nothing and thereby allowing YFH to continue to thrive is not recommended.

The potential for co-operation with the Province of Nova Scotia on addressing Yellow Floating Heart and other invasive alien species is high. The key provincial department for potential collaboration is NSDLF. The provincial government introduced Bill 116[3], the "Biodiversity Act", in March 2019. This Act, intended to provide for an "integrated framework of legislation that supports the stewardship, conservation, sustainable use and governance of biodiversity in the Province", specifically enables the development of regulations respecting the prevention and management of invasive or alien species. The regulatory development process will include opportunities for consultation with stakeholders, including the Halifax Regional Municipality, on their scope, application, and enforcement. Municipal staff will engage with the Province in the development of these regulations. However, it should be noted that swimming in Little Albro Lake would need to be restricted in the area of the mats, so as to not disturb or risk pulling out the mats, thereby reducing their effectiveness. Furthermore, since mats tend to be placed in shallow areas, and are tethered down with sand bags or blocks, they will need to be brightly marked to reduce any tripping hazard.

Despite the presence of a strong provincial lead agency in NSDLF, consideration should also be given to the roles of the federal government, aboriginal governments, the academic community, non-governmental organizations (NGOs), and the community at large. The roles played by these parties was summarized in the Invasive Alien Species Strategy for Canada[4]. The roles of key federal and provincial agencies are further described below in Table 2.

Government Department / Agency	**Role**
Environment & Climate Change Canada	Coordinates federal agency on invasive species, regulates international trade
Fisheries and Oceans Canada	Lead federal agency on marine aquatic invasive species
Canadian Food Inspection Agency	Lead federal agency on agriculture including regulated plant pests
Nova Scotia Environment	Lead provincial agency on the management and regulation of water resources and aquatic ecosystems
Nova Scotia Lands and Forestry	Lead provincial agency on biodiversity protection and promotion, including invasive alien species
Nova Scotia Museum	Key advisor on natural science, historical, and cultural matters of interest to the province, via Botany and Zoology Curators

Table 2. Roles of Federal and Nova Scotia Agencies in managing Invasive Alien Species

The many shared responsibilities and interests in understanding and managing the threat of IAS in Nova Scotia was recognized in the late 2000s with the establishment of the Invasive Species Alliance of Nova Scotia[5]. The Alliance' membership was comprised of representatives from relevant federal, provincial, and aboriginal governments, as well as Acadia and Cape Breton University and three NGOs. Although this group folded in early 2012, it is currently reforming, with representation from all former member agencies and more. The Alliance hopes to capitalize on the successes of other provincial and territorial associations,

[3] Refer to Bill 116 at https://nslegislature.ca/legc/bills/63rd_2nd/1st_read/b116.htm

[4] Strategy available online at https://www.canada.ca/en/environment-climate-change/services/biodiversity/invasive-alien-species-strategy.html

[5] Refer to organization website at http://www.invasivespeciesns.ca/

such as the development of web-based distribution mapping systems for invasive species that allow for citizen science reporting and real-time tracking of occurrences. Municipal staff will participate in the Alliance to keep abreast of the latest information on invasive alien species in Nova Scotia, to influence the development of communications to address issues relevant to Halifax, and to facilitate collaboration with other interested and empowered agencies across the province. These benefits align with Actions 1 and 2 of the Action Plan approved by Regional Council in April 2010.

FINANCIAL IMPLICATIONS

The estimated cost for the proposed benthic mat pilot project is $25,000, at an order-of-magnitude level. This cost can be accommodated by the current operating budget for account D935 (Energy & Environment). This cost may impact the 2019/20 budget, but if securing the regulatory approvals delays the mat installation, the cost may not occur until 2020/21 budget. Any future costs related to the control of Yellow Floating Heart recommended through the development of a project to that end would be considered as part of capital and/or operating budgets and, as such, would return to Council for approval.

RISK CONSIDERATION

Yellow Floating Heart currently restricts recreational opportunities on Little Albro Lake and negatively impacts the lake ecology. It also represents a potential risk to aquatic recreational activities and ecosystems at other Halifax area lakes. Although the risk of YFH spread to nearby lakes is considered low, this report promotes the adoption of a risk-based management and response framework that leverages partnership opportunities to maximize effectiveness.

By taking initiative and spending money and resources on YFH, the municipality may be setting a precedent with the Province of Nova Scotia. It is clear the Province owns and regulates lake systems. However, the Province has historically declined to act on this issue, as outlined in their correspondence.

COMMUNITY ENGAGEMENT

No community consultation was required or completed as part of this report.

ENVIRONMENTAL IMPLICATIONS

The proposed actions respond to current impacts to recreational opportunities and biological diversity. The staff recommendation poses a minor environmental risk to the existing lake ecology and any resident fish populations. That risk is mitigated by strict provincial and federal regulations and policies designed to identify, assess, and approve only those activities that impose acceptably low risks.

ALTERNATIVES

1. Halifax Regional Council may choose not to take any action to control Yellow Floating Heart in Little Albro Lake.

2. Halifax Regional Council may choose to develop a project to control Yellow Floating Heart based on other forms of control. This alternative is not recommended for reasons outlined in this report.

ATTACHMENTS

Attachment 1. Letter from Mayor Kelly to Ministers (2007)

Attachment 2. Letter from Environment and Labour Minister to Mayor Kelly (2008)
Attachment 3. Letter from Natural Resources Staff to Halifax Staff (2008)
Attachment 4. Letter from Mayor Kelly to Ministers (2009)
Attachment 5. Letter from Agriculture Minister to Mayor Kelly (2009)
Attachment 6. Letter from Natural Resources Minister to Mayor Kelly (2009)
Attachment 7. Yellow Floating Heart Factsheet (2008)

A copy of this report can be obtained online at halifax.ca or by contacting the Office of the Municipal Clerk at 902.490.4210.

Report Prepared by: Cameron Deacoff, Water Resources Specialist, 902.490.1926

Attachment 1

Halifax Regional Municipality

Peter J. Kelly
Mayor

1841 Argyle Street
PO Box 1749
Halifax, Nova Scotia
Canada B3J 3A5

Tel: (902) 490-4010
Toll free: 1-800-835-6428

Fax: (902) 490-4012
Email: kellyp@halifax.ca
Website: www.halifax.ca

August 1, 2007

Honourable Mark Parent
Minister of Environment & Labour
Province of Nova Scotia
P. O. Box 697
Halifax, NS B3J 2T8

Honourable David Morse
Minister of Natural Resources
P. O. Box 698
Halifax, NS B3J 2T9

Dear Minister Parent and Minister Morse:

Over the past several years, a floating aquatic plant has been growing increasingly common in Little Albro Lake, Dartmouth, and has reached the point of being a nuisance to local residents. The plant was identified in 2006 by researchers at Saint Marys University (SMU) as Floating Yellow Heart (*Nymphoides peltata*), an invasive Asian species used as an ornamental pond plant. This species has become an invasive pest in several US states. It roots in bottom sediments, and produces surface leaves and yellow flowers which are similar in appearance to indigenous water lily species.

Waterbodies in Nova Scotia, including all lakes, are provincial property. Any intended control measures for an aquatic plant will depend upon the province to approve and initiate any actions. HRM staff have conferred with staff of the Departments of Environment and Labour, and Natural Resources on this issue. Department of Natural Resource staff have indicated that they are concerned that this species may become a more wide-spread problem in Nova Scotia. They also indicated that the province will develop policy on invasive species, as a matter of provincial jurisdiction.

This plant is now a significant nuisance in Little Albro Lake, and has the potential to spread and become a widespread problem affecting many lakes in HRM and the province. On behalf of

concerned HRM residents, I request that the province complete the policy on invasive species as quickly as possible. On behalf of HRM Council, I also ask that the province immediately identify suitable control options for Floating Yellow Heart in Little Albro lake, and undertake any possible actions this year to control and eliminate this invasive species from Little Albro Lake before it can become more prevalent.

I look forward to your positive response.

Respectfully, I remain

Original Signed

Peter J. Kelly
Mayor

cc Halifax Regional Council

Attachment 2

2007-00818

Nova Scotia
Environment and Labour
Office of the Minister

PO Box 697
Halifax, Nova Scotia
Canada B3J 2T8

Our File Number:
10700-40

AUG 28 2007

Mayor Peter J. Kelly
Halifax Regional Municipality
1841 Argyle Street
Halifax, NS B3J 3A5

Dear Major Kelly:

Thank you for your letter of August 1, 2007, to Minister Morse and myself regarding an invasive aquatic plant in Little Albro Lake, Dartmouth.

I am responding for my colleague as well as myself. We recognize that Floating Yellow Heart and many other invasive species are an issue that needs to be addressed in the province by all Nova Scotians.

Staff from the departments of Natural Resources and Environment and Labour have met, both with your staff and internally, to discuss the Floating Yellow Heart issue. They are continuing to investigate the plant and the conditions at Little Albro Lake.

We will be in contact with further details once our review of the Little Albro Lake situation is complete.

Sincerely,

Original Signed By

Mark Parent
Minister

cc Hon. David Morse

bcc: N. Vanstone
P. Underwood
K. MacNeil
D. Briggins
E. MacAulay
Prepared by J. MacDonald, NSEL and J. Towers, DNR
DM 10091//Log 2007-00818

NOVA SCOTIA
Natural Resources

Attachment 3

www.gov.ns.ca

Wildlife Division
136 Exhibition Street
Kentville, NS B4N 4E5

22 May 2008

Dr. Tony Blouin
Manager, Environmental Performance
Halifax Regional Municipality
Alderney Gate
40 Alderney Drive, 2nd floor
Dartmouth, NS B2Y 2N5

Dear Dr. Blouin:

I am writing to you in follow-up to the letter sent to Mayor Peter Kelly by Minister Parent on 28 August 2007 regarding Yellow floating heart, an invasive plant in Little Albro Lake. The Departments of Environment and Natural Resources offered to contact you after further investigations were made and more information gathered in relation to the issues raised in Mayor Kelly's letter to the Province in early August 2007. Specifically, we address three issues; jurisdiction of Invasive Alien Species, provincial policy and programs for Invasive Alien Species and what the provincial government is prepared to do in regard to the Yellow floating heart in Little Albro Lake.

Jurisdiction of alien invasive species is complicated because no comprehensive legislation, or policy, exists for these species. For this reason jurisdiction is shared across levels and departments in governments. For example, there are aspects of existing provincial legislation that addresses forest insect pests, transport of fish including non-native species, import and export of wildlife and the control of weeds. There is also federal law that can be used to have some influence over Invasive Alien Species. There are clearly gaps where no legal or policy tools exist to deal with some invasive alien issues. Our policy as a government has been to acknowledge that Invasive Alien Species is an emerging and important issue that we need to address and that we need to work together to address priority problems as they arise and within our capacity to deal with them.

The provincial government has also been involved with federal, provincial and territorial efforts to develop a national strategy: *An*

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Invasive Alien Species Strategy for Canada. This document approved by Ministers outlines the challenges and progress to date, as well as a way forward. You may download a copy of this document at: http://www.ec.gc.ca/eee-ias/

Provincially, government has been working to clarify and coordinate their roles with respect to invasive alien species. For example, Natural Resources will focus on the impacts and control of forest pests, mitigating the impacts of invasive alien species on species at risk and natural ecosystems, and the coordination of provincial involvement with national and international efforts, especially for terrestrial species. Fisheries and Aquaculture are focusing on fish and other aquatic species and working on national efforts for aquatic invasive Alien Species. The Department of Agriculture continues to work on problem invasive or toxic weed species including those that are alien in origin. The Department of Transportation has become interested in how highways and infrastructure development and maintenance may exacerbate Invasive Alien Species problems. The Department of Environment's mandate is to manage water resources and protect all beneficial uses including drinking water supply, aquatic life habitat, recreational use, and agricultural uses. Their role in the management of invasive species is to support any appropriate actions by interest groups such that no beneficial water use is compromised. Any work to manage invasive species, in or near a watercourse that may impact the water resource would require an approval from a Regional Office of Nova Scotia Environment.

As a province, explicit comprehensive policy and program development for invasive alien species may be linked to the Natural Resources Strategy Process covering Parks, Minerals, Forests and Biodiversity. We expect that citizens and groups concerned about Alien Invasive Species will communicate their concerns to government through this forum and that government will respond.

With regard to Little Albro Lake and Yellow floating heart, in the absence of a single responsible department or policy that would address this, several departments have examined this issue and met to assess this problem. Based on examination of the available information and evidence on the control of Yellow floating heart, the provincial government is not willing to support a large scale intervention to remove and control the plant from Little Albro Lake.

We have done extensive research regarding different options for managing Yellow floating heart. A brief summary is attached. Research included conducting a survey across North America to provide guidance

in assessing management or control options. A lot of useful information including a description of management and/or control options being used, and a general indication of their effectiveness was compiled. According to most people with experience with Yellow floating heart, regardless of whether a chemical or physical removal method was used to control the infestation, repeated efforts are required. Even with repetition, the complete eradication of the plant is very unlikely. In short, removal and control would be very expensive, ongoing, could involve herbicides, extensive excavation, waste management issues, and may result in undesirable side effects.

Control and removal is also not a priority because the lake ecosystem has been substantially modified and degraded through the history of development in the area. In fact, attempts to control the plant could make environmental conditions in the lake worse. The rapid and substantial growth of the plant in the lake is at least partially indicative of high nutrient levels flowing into the lake from development and maintenance of lawns and gardens and other activities. A significant reduction in macrophytes such as yellow floating heart could cause algal populations in the lake to bloom with undesirable turbid green water resulting. The plant is limited to shoreline sections of the lake and has been slowly expanding its distribution within the lake over 5 years. There are other invasive and non-native species in the lake that have been introduced consciously or inadvertently by local residents. The plant growth does impede swimming and paddling, but poses no human health risk. While we respect the views of the landowners around the lake that are seriously concerned about this issue, presence of the plant in the lake is more of an inconvenience and aesthetic issue.

The province is willing to assist with the prevention and early detection aspects of the yellow floating heart issue. As is the case with most invasive alien species, prevention and education are essential. We have had correspondence with Dr. Cathy Conrad, Professor at Saint Mary's University who has been working on this issue and is interested in working on communication and outreach to the Little Albro Lake community on this Yellow floating heart. We are willing to work with the Municipality and with Dr. Conrad with this work. Dr. Conrad has planned a workshop for this September that will involve residents around Little Albro Lake. Emphasis on preventing the spread of this and other species needs to be a priority for government and the public.

I would also like to offer to make a presentation to Council and Staff on Alien Invasive species including the Little Albro Lake issue. The management of invasive alien species is a rapidly developing and relatively complex field.

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A workshop with the community and a presentation to Council would help with the challenges and information needs of the Little Albro Lake issue. However, water related issues tied to any proposed activities for management of Yellow floating heart would need to be addressed separately through the Department of Environment.

Thank you.

Sincerely,

Original Signed

Mark F. Elderkin for
Dr. J. Sherman Boates
Manager, Biodiversity

c David Briggins, Manager, Water and Wastewater Branch, Dept. of Environment

Julie Towers, Director of Wildlife, Dept. of Natural Resources

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Yellow Floating Heart in Little Albro Lake, Dartmouth, Nova Scotia –
Assessment of Management & Control Options

Background

Yellow Floating Heart (Nymphoides peltata), is a plant that is not native to Nova Scotia. It can form dense mats of floating vegetation that shade native aquatic plants growing below the water. In extremely dense patches, water may become stagnant, resulting in lower levels of oxygen, which can negatively affect fish and other aquatic organisms.

Yellow Floating Heart (YFH) has been identified in Little Albro Lake in Dartmouth, Nova Scotia and is considered an invasive plant. In the summer of 2007, it covered up to 20% of the lake, including approximately 85% of the shoreline The plant most likely originated as an ornamental plant in a private water garden adjacent to the lake. It is believed to have first appeared in Little Albro Lake as early as 2002 or 2003.

Residents around the lake have expectations that this nuisance plant will be removed and are frustrated that no action has been taken by government agencies.

This aquatic plant has the ability to germinate readily. Seed hairs can easily attach to waterfowl and other animals, enabling it to be spread widely It is likely this plant will appear in other waterways within Nova Scotia

Survey and Summary of Findings

Yellow Floating Heart has been reported in many other parts of North America. Nova Scotia Environment (NSE) initiated a survey of areas within Canada and the United States where YFH has been found. NSE has compiled this information into a summary table, which includes a description of management and/or control options being used, and a general indication of their effectiveness.

The two most common control methods used are:

- chemical, such as aquatic herbicides
- physical, such as mechanical removal

According to most people with experience with YFH, regardless of which method is used to control the infestation, it will require repeated efforts. Even with repetition, the complete eradication of the plant is very unlikely.

Relevant Example: Brown's Inlet in Ottawa, Ontario

Brown's Inlet is a pond hydraulically connected to the Rideau Canal The pond has experienced a similar infestation of Yellow Floating Heart to that present on Little Albro Lake The area of Brown's Inlet is about 2 ha. Management efforts, so far, have included dredging, installation of bottom tarps and hand-removal of the plant. Management has occurred, at least in part, because of pressure from residents living around the pond. Those involved in the response effort have included representatives from Agriculture Canada, Canadian Food Inspection Agency, City of Ottawa, Fisheries and Oceans Canada, National Capital Commission, Ontario Federation of Anglers and Hunters, Ontario Ministry of Natural Resources, Parks Canada - Rideau Canal and Rideau Valley Conservation Authority.

The most recent control measure used in Brown's Inlet was the installation of bottom tarps over the entire area of the lake. Currently, tarps only cover two-thirds of the lake. Tarps covering the other third were removed because of concerns regarding the effect of the tarps on wildlife. YFH continues to be present in the pond, and has been for roughly 30 years, despite numerous initiatives by various agencies to control and/or eradicate it.

Based on the information gathered, efforts in Nova Scotia should be focused on early detection and prevention Early detection will increase the success rate of any control measure. Prevention, such as banning the sale of this and other exotic, invasive plants in Nova Scotia will diminish the possibility of other infestations.

Attachment 4

Halifax Regional Municipality

Peter Kelly
Mayor

1841 Argyle Street
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HALIFAX REGIONAL MUNICIPALITY
JUL 2 7 2009
S.G
MUNICIPAL CLERK

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MUNICIPAL CLERKS OFFICE
Distributed to:
☑ Councillors Meeting Regional Council
☑ Mayor
☑ CAO Date: June 23/09
☑ DCAOs
☑ Solicitor Item No. Info # 5
☑ Communications
☑ Other J. Church, A Fillmore, Phil Townsend, C. Beacoff

July 24, 2009

Honourable John MacDonnell
Minister of Natural Resources
Minister of Agriculture
Province of Nova Scotia
P. O. Box 2223
Halifax, NS B3J 3C4

Dear Minister MacDonnell:

Re: Request for a Ban on the Importation and Sale of Alien Invasive Species

Over the past several years, a floating aquatic plant has been growing increasingly common in Little Albro Lake, Dartmouth, and has become a nuisance to local residents. This plant has been identified as Floating Yellow Heart (*Nymphoides peltata*), an Alien Invasive Species (AIS) originating in Asia that is used as an ornamental pond plant.

This plant has become abundant in the nearshore area of the lake, and its presence has limited the potential for shoreline residents to swim, boat, and otherwise use the lake for recreational purposes. The presence of Yellow Floating Heart also impacts the local environment. Its presence on the surface results in the shading of native aquatic species growing below the surface. In very dense mats, it can reduce oxygen availability for fish, insects, and other aquatic organisms.

At the request of Halifax Regional Council, Nova Scotia Environment surveyed the use and effectiveness of management options employed in over 25 other jurisdictions across North America to control Yellow Floating Heart. Of the five options pursued, none were perceived to be 100% effective, and all were either very expensive or time-consuming, requiring persistent application.

Halifax Regional Municipality (HRM) staff have conferred with staff of the Departments of Environment and Natural Resources on

this issue, and Halifax Regional Council was briefed on the subject by provincial staff on June 23, 2009. Several factors were identified as contributing to the establishment of Yellow Floating Heart, one of which is the fact that it is legal to import and sell botanical species that are known to act as alien invasive species in non-native habitats. In fact, the presence of Yellow Floating Herat in Little Albro Lake is a direct result of a resident purchasing the plant at a local store and introducing it along the shoreline as an ornamental plant, not appreciating its invasive quality.

Yellow Floating Heart is not the only AIS known in HRM. Other invasive species that have made a home here include the Brown Spruce Longhorn Beetle (*Tetropium fuscum*) , the European Fire Ant (*Myrmica rubra Linnaeus*), Glossy Buckthorn (*Rhamnus frangula L.*), Himalayan Balsam (*Impatiens glandulifera*), Smallmouth Bass (*Micropterus dolomieui*), Chain Pickerel (*Esox niger*), Japanese knotwood (*Polygonum cuspidatum*), Eurasian Watermilfoil (*Myriophyllum spicatum*), Garlic Mustard (*Alliaria petiolata*), and Purple Loosestrife (*Lythrum salicaria*), amongst others. Staff from the Department of Natural Resources indicate that approximately 1/3rd of all 1750 vascular plant species in Nova Scotia are exotic; approximately 60 of these are thought to be invasive.

By definition, alien invasive species are "harmful species whose introduction or spread threatens the environment, the economy or society, including human health." Environmental threats posed by AIS include impacts on provincially and federally-listed Species at Risk, alteration of habitats, nutrient cycling, contaminant absorption, pest control by native species, the integrity of native biological diversity, and a host of other essential ecosystem functions. Economic threats include the impacts on the lumber, agricultural, and fishing industries; several million dollars have been spent to manage the impact of Brown Spruce Longhorn Beetles on Halifax parklands alone.

In recognition of the fact that AIS is among the most serious threats to the ecological and economic well-being of the planet, the federal government developed an Invasive Alien Species Strategy for Canada in 2004. This strategy identified four key priorities for managing AIS, as follows: 1) Prevention of New Introductions; 2) Early Detection; 3) Rapid Response & 4)

Containment, Control and Eradication. This mirrors the response of other jurisdictions surveyed by Nova Scotia Environment in 2008, which emphasized the importance of prevention and early detection.

Alien Invasive Species can be introduced into new areas by many means - truck rail and boat-based transportation, ballast water, aquacultural escapes, the live food industry, intentional introductions and ornamental plants or disposals, among many dozens of others. Nova Scotia has many roles to play in the management of AIS. Of these, one of the most effective steps that can be taken is to limit the introduction of AIS into our province by establishing a ban on the import and sale of alien invasive species.

On behalf of Halifax Regional Council, I request that the province implement a ban on the importation and sale of alien invasive species.

I look forward to a positive response to our request.

Respectfully, I remain

Original Signed

Peter Kelly
Mayor

cc Honourable Sterling Belliveau, Minister of Environment & Fisheries and Aquaculture, Province of Nova Scotia
Honourable Lisa Raitt, Natural Resources Canada
Honourable Jim Prentice, Environment Canada
Honourable Gail Shea, Fisheries and Oceans Canada
Honourable Gerry Ritz, Canadian Food Inspection Agency
HRM Regional Council
Andy Fillmore, Manager of Sustainable Environment, HRM

Attachment 5

NOVA SCOTIA

Agriculture
Office of the Minister

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HALIFAX REGIONAL MUNICIPALITY
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August 26, 2009

RECEIVED
SEP - 8 2009
MAYOR'S OFFICE

Ref. # M66

Mayor Peter Kelly
Halifax Regional Municipality
1841 Argle Street
P. O. Box 1749
Halifax, NS B3J 3A5

Dear Mayor Kelly:

Thank you for your letter on behalf of the Halifax Regional Municipality indicating your concerns over the sale of invasive species in Nova Scotia.

The Nova Scotia Weed Control Act has been in place to protect the agriculture industry from noxious weeds in Nova Scotia since the late 1960's.

This Act is currently being updated and we intend to include an Invasive Species Section to address noxious weeds anticipated as having a negative impact on agriculture in the province.

Yours truly,

Original Signed

John MacDonell,
Minister

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☑ Councillors Meeting Regional Council
☑ Mayor 23
☑ CAO Date: June ~~30~~/09
☑ DCAO s. G. Kaiser, Wayne Anstey
☑ Solicitor Item No. ~~13.1~~ Item # 5 (Info)
☑ Communications
☑ Other J. Church, M. Labrecque
S. MacKinlay.

NOVA SCOTIA
Natural Resources
Office of the Minister

PO Box 698, Halifax, Nova Scotia, Canada B3J 2T9 • Telephone

Attachment 6

OCT - 9 2009

Mayor Peter Kelly
Halifax Regional Municipality
PO Box 1749
1841 Argyle Street
Halifax, NS B3J 3A5

Dear Mayor Kelly:

Thank you for your letter concerning Alien Invasive Species.

I would like to commend Halifax Regional Municipality (HRM) Council and staff for their interest in the Alien Invasive Species problem and for their progressive views on the importance, management and regulation of Alien Invasive Species. In particular, I note your committed efforts to bring attention to, and address, the challenging issue of Yellow Floating Heart *(Nymphoides peltata)* in Little Albro Lake, Dartmouth.

It is my understanding from discussions with staff that there has been an unexplained population die-off in the Floating Heart population in the lake this year. This is certainly a surprising outcome, but one that I am sure comes as a relief to residents and users of the lake. However, the growing and ubiquitous problem of invasive plants and animals remains a very important regulatory and stewardship challenge for us all.

The provincial government, as mentioned in earlier correspondence, has been working to address the Alien Invasive Species problem within the province and with federal government partners including the Canadian Food Inspection Agency. We are still working to build capacity and coordination around the Alien Invasive Species issue and this will take time and concerted effort.

In regard to your request to "ban the import and sale of Alien Invasive Species," I will certainly take this under consideration. It is clear, however, that such an approach would be complicated, have potential implications across many departments and sectors and would require considerable research and consultation before it could be implemented.

.../2

The department is currently in Phase 2 of the Natural Resources Strategy 2010 process which involves reviewing strategic direction on forests, parks, minerals and biodiversity. I will ensure your concerns are addressed to the Panel of Experts for the biodiversity component of the Strategy process.

Yours truly,

Original Signed

John M[ac]Donell
Minister

Is Yellow Floating Heart in your backyard?

Attachment 7

What is Yellow Floating Heart?

- an invasive species in Nova Scotia; and has been identifed in Dartmouth's, ***Little Albro Lake***
- an aquatic, bottom rooted perennial plant native to Europe and Asia
- established itself in several areas of North America

Identification

- vigourous plant that produce stems that run below the water's surface
- heart-shaped leaves float on the water's surface
  - leaves measure 3 to 10 cm in diameter
  - wavy, slightly scalloped edges
  - usually have a pink or purple tinge on the underside
- yellow flowers
  - 3 to 4 cm in diameter
  - 5 petals aranged like a star

Important!!! - *Yellow Floating Heart is similar to Yellow Pond Lily.*

(a) Yellow Floating Heart is identifiable by its 5 fringed petals (invasive)
vs.
(b) Yellow Pond Lily has a "cup-like" flower (native to eastern Canada)

Reproduction

- have abundant, viable seeds that are flat, oval and measure approximately 3 mm in length
- have the ability to germinate readily and float with the aid of hairs on the edges
- seed hairs attach easily to waterfowl and other animals, therefore causing wide dispersion

What are the Impacts?

- can form dense mats of floating vegetation that shade native aquatic plants growing below the water
- in extremely dense patches, water may become stagnant, resulting in lower levels of oxygen
  - this negatively affects fish and other aquatic organisms

Habitat

- grows in various substrates (sand, mud, gravel), in littoral areas ranging from the damp mud along the waters edge to water depths of 4 m
- prefers slow-moving waters:
  - lakes, rivers, ponds, reservoirs, marshes
- Annual Cycle: between June and August
- Yellow Floating Heart can be bought in local retail garden centres and via the internet
  - plants can escape from private gardens to natural water systems from:
    - flooding
    - waterfowl or other animals
    - intentional introduction

You Can Help!!!

- If you sight Yellow Floating Heart:
  - take a photograph or collect a sample (keep it in water)
  - contact the Saint Mary's Community-Based Environmental Monitoring Network to report a sighting:

    E-mail: environmental.network@smu.ca

    Phone: 902.491.6243
- Never release aquatic plants, invertebrates, or fish into natural waterways, drainage ditches, storm drains or sewers
- Choose water garden sites that are isolated
- Do not collect plants from the wild or ornamental gardens; consider using only native aquatic plants
- Clean boats, propellers, trailers, scuba gear, fishing gear and other water equipment to prevent the spread of hitch hiking seeds
  - rinse with hot water (>40°C); or spray with high pressure water; or dry them in the sun for at least 5 days

Little Albro Lake, Dartmouth, NS:

(a) May 9, 2007

(b) May 27, 2007

Sources:
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Prepared by **CBEMN**: Jody Armstrong (2007)