

Invasive Species Pilot Project: Site Visit Report

Waterbody: Trout Lake

Visit Date: August 16th, 2018

Preamble:

The Federation of Ontario Cottagers' Associations (FOCA) is a non-profit, voluntary organization serving as an information centre-providing assistance and leadership to Ontario's cottage associations and their members. The following study was conducted as part of FOCA's 2018 Aquatic Invasive Species Program. Invasive species are one of the top threats to the integrity of aquatic ecosystems, to the quality of the recreational experience on the water and to the economic success of rural communities.

Aquatic invasive species can enter a lake via natural pathways such as wind, water and animal dispersal. However, these natural pathways are not as common for species introduction, and rather as a means of spreading the invasive species after arrival. The leading cause for invasive species introduction is through human activity. Aquatic invasive species can be unintentionally transported from one water source to another via shipping containers, vehicles, recreational boats. Additionally, aquatic invasive species are also commonly introduced intentionally via aquarium and ornamental pond industries.

FOCA is increasingly concerned about the potential impacts of introduced species and the effect they will have on the quality of life in Ontario. Through the involvement of local residents and their associations, individuals can be more efficient in addressing the important challenges of preventing the introduction of invasive species, controlling their spread and mitigating their impact. FOCA thanks the local associations for their dedication and commitment to the ongoing stewardship of Ontario's valuable freshwater resources.

Lake Overview:

The Trout Lake Campers Association (TLCA) actively aims to address optimal lake health through maintaining and improving water quality by taking phosphorus samples dating back to 1990 as well as continuous monitoring of invasive species. The primary focus in having this site visit was to provide information to the TLCA regarding invasive aquatic species and to conduct an inventory of what invasive species might be present within Trout Lake. In addition,

an inventory of native species would also be conducted, followed by suggested next steps and current AIS control measures. To meet the needs of the TLCA, we conducted a field visit (via watercraft) to various aquatic plant beds and shoreline vegetation sites around Trout Lake.

Site Observations:

The field visit on August 16th , 2018 consisted of 9 sites in total throughout Trout Lake. (**Figure 1**). Site descriptions and field notes can be found in **Table 1**, with coordinates for all sites listed in **Table 2**.

Figure 1. Map of sites visited on Trout Lake on August 16th , 2018



Table 1: Site description and field notes for sites visited on Trout Lake on August 16th , 2018.

Site	Site Description	Field Notes
1	Left of launch Depth: 2 ft Shoreline Structure: Emergent Vegetation	Plant Species Present: <i>Nuphar variegata</i> (Yellow pond lily), <i>Pontederia cordata</i> (Pickerel weed), <i>Potamogeton natans</i> (Floating-leaf pondweed), <i>Lythrum salicaria</i> (Purple loosestrife)
2	Depth: 2 ft Shoreline Structure: Emergent vegetation	Plant Species Present: <i>Ruppia maritima</i> (Widgeon grass), <i>Lythrum salicaria</i> (Purple loosestrife), <i>Pontederia cordata</i> (Pickerel weed), <i>Nymphaea odorata</i> (White water lily), <i>Sparganium eurycarpum</i> (broadfruit bur-reed), <i>Potamogeton amplifolius</i> (Large-leaf pondweed), <i>Potamogeton natans</i> (Floating-leaf pondweed), <i>Utricularia vulgaris</i> (Common bladderwort), <i>Megalodonta beckii</i> (Water Marigold), <i>Vallisneria americana</i> (Tape Grass), <i>Brasenia schreberi</i> (Water-shield)
3	Depth: 1 ft Shoreline Structure: Emergent vegetation *most dense area of <i>Lythrum salicaria</i> (Purple loosestrife)	Plant Species Present: <i>Lythrum salicaria</i> (Purple loosestrife), <i>Eriocaulon aquaticum</i> (sevenangle pipewort), <i>Pontederia cordata</i> (Pickerel weed), <i>Nymphaea odorata</i> (White water lily), <i>Sparganium eurycarpum</i> (broadfruit bur-reed), <i>Ruppia maritima</i> (Widgeon grass)
4	Depth: 2 ft Shoreline Structure: Emergent vegetation	Plant Species Present: <i>Eriocaulon aquaticum</i> (sevenangle pipewort), <i>Lythrum salicaria</i> (Purple loosestrife), <i>Pontederia cordata</i> (Pickerel weed), <i>Nymphaea odorata</i> (White water lily), <i>Najas flexilis</i> (Water nymph), <i>Potamogeton amplifolius</i> (Large-leaf pondweed)
5	Depth: 6 ft Shoreline Structure: Emergent	Plant Species Present: <i>Lythrum salicaria</i> (Purple loosestrife), <i>Pontederia cordata</i>

	vegetation	(Pickerel weed), <i>Nymphaea odorata</i> (White water lily), <i>Eriocaulon aquaticum</i> (sevenangle pipewort), <i>Nitella spp.</i> (Nitella)
6	Depth: 4 ft Shoreline Structure: Emergent vegetation	Plant Species Present: <i>Sparganium eurycarpum</i> (broadfruit bur-reed), <i>Pontederia cordata</i> (Pickerel weed), <i>Potamogeton amplifolius</i> (Large-leaf pondweed), <i>Najas flexilis</i> (Water nymph), <i>Eriocaulon aquaticum</i> (sevenangle pipewort)
7	Depth: 3 ft Shoreline Structure: Emergent vegetation	Plant Species Present: <i>Sparganium eurycarpum</i> (broadfruit bur-reed), <i>Pontederia cordata</i> (Pickerel weed), <i>Potamogeton amplifolius</i> (Large-leaf pondweed), <i>Najas flexilis</i> (Water nymph), <i>Eriocaulon aquaticum</i> (sevenangle pipewort), <i>Potamogeton robbinsii</i> (Robbin's pondweed), <i>Nymphaea odorata</i> (White water lily), <i>Lythrum salicaria</i> (Purple loosestrife), <i>Nuphar variegata</i> (Yellow pond lily), <i>Brasenia schreberi</i> (Water-shield)
8	Depth: 8 ft Shoreline Structure: Emergent vegetation/rocky	Plant Species Present: <i>Nymphaea odorata</i> (White water lily), <i>Pontederia cordata</i> (Pickerel weed), <i>Potamogeton natans</i> (Floating-leaf pondweed), <i>Utricularia vulgaris</i> (Common bladderwort)
9	Inflow and outflow zone Depth: 9.5 ft Shoreline Structure: Emergent vegetation	Plant Species Present: <i>Pontederia cordata</i> (Pickerel weed), <i>Nymphaea odorata</i> (White water lily), <i>Brasenia schreberi</i> (Water-shield), <i>Utricularia vulgaris</i> (Common bladderwort), <i>Eriocaulon aquaticum</i> (sevenangle pipewort)

Figure 2. Image of purple loosestrife observed along the southern shoreline.



Figure 3. Image of both submergent and emergent aquatic plants observed.



Table 2: Coordinates for sites visited on Trout Lake on August 16th , 2018

Site	Latitude (N)	Longitude (W)
1	46.17655°	80.48077°
2	46.22452°	80.58645°
3	46.21997°	80.58956°
4	46.21758°	80.57730°
5	46.21217°	80.55654°
6	46.21044°	80.54575°
7	46.19905°	80.54057°
8	46.19645°	80.52260°
9	46.18561°	80.49649°

Aquatic plants as bioindicators:

Aquatic plants are a great indicator of a lakes ecological condition because they are easy to observe and mostly non-mobile. This means they will indicate any long-term changes in the environment and act as a stable measure of overall lake health. Submerged macrophytes (aquatic plants) are capable of taking up nutrients from both the sediment pore water and overlying water, revealing changes in nutrient concentrations in their environment. *Najas flexilis* (Water nymph) cannot tolerate water pollution and therefore its presence in lakes is a sign of good water clarity. It also acts as a food source for waterfowl as well as food and protection for fish.

Other common aquatic plants that act as bioindicators of lake health include *Potamogeton pectinatus* (fennel-leaved pondweed), *Potamogeton amplifolius* (Large-leaved pondweed), *Vallisneria americana* (Tape grass), *Ranunculus longirostris* (Crowfoot), *Megalodonta beckii* (Water marigold), *Chara* (Muskgrass). Invasive species like Zebra mussels and Eurasian water-milfoil can decrease a lakes ecological status through increased plant biomass and loss of species diversity.

Invasives and Trout Lake:

The assessment of invasive aquatic plant communities on Trout Lake was conducted using visual observation from a watercraft. The species listed in **Table 1** reflect the variety of native plants found which pose no threat to overall lake health. As a result of the field visit on August 16th, one invasive species was detected within Trout Lake, *Lythrum salicaria* (Purple loosestrife).

Purple loosestrife is a perennial, herbaceous wetland plant native to Asia and Europe that was introduced to North America in the 19th century. Its seeds were transferred through soil which was used as ballast in European sailing ships. Surprisingly, this plant is still not regulated as it is found in flower gardens and sold in nurseries today. Purple loosestrife can be identified by its pink and purple flowers from May to June which have five to seven petals 19 millimetres in length. It can grow up to one and a half metres in height and the leaves form in pairs or whorls of three and are oppositely arranged along the stem, which is woody and square in structure. Both the root and stem fragments can produce new roots and shoots, but primarily reproduction is through seeds.

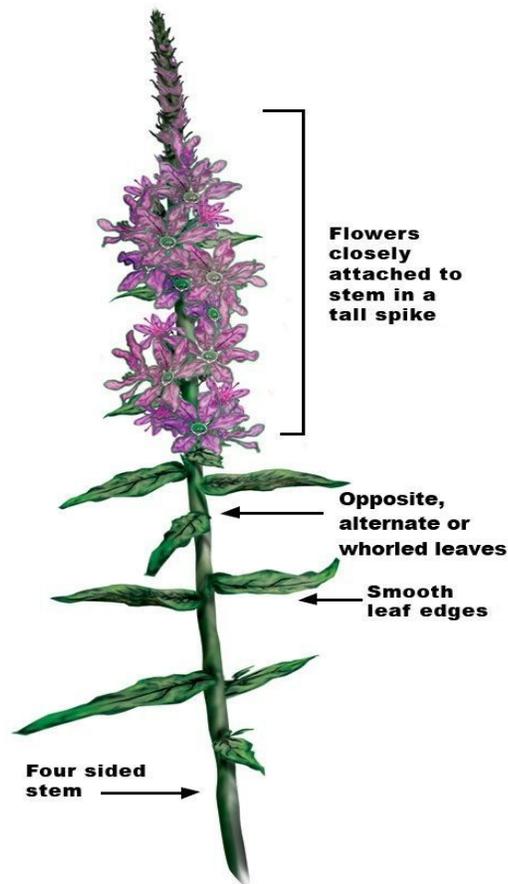
Purple loosestrife ranges from the Atlantic coast of North America into Canadian provinces and American states. Specifically in Ontario, it has spread throughout the Great Lakes-St. Lawrence River Basin where it can be found in water-filled meadows and roadsides, as well as river floodplains. Purple loosestrife is considered a highly invasive plant because it can rapidly degrade and lower the ecological status of an environment by way of decreasing biodiversity and wildlife, clogging irrigation and drainage ditches as well as choking out native vegetation. It does so by forming dense stands of thick rooted mats which can spread over large areas. It is critical to control purple loosestrife before it becomes locally established, which in turn will reduce its impacts on biodiversity, society and the economy. We recommend starting with smaller more isolated patches outside of more larger infested areas. From here concentrate on more highly active areas where people may come in contact.

The most effective time to manage purple loosestrife is in June, July and August when it is in flower. Management/removal techniques include hand pulling, but make sure to penetrate and remove the root system. In addition cutting the flower stalks before they can seed prohibits further propagation of this species around the waterbody, as one plant can produce up to two million seeds. When disposing, put plants in a plastic bag, seal tightly and put in garbage. Do not put plants in compost or natural areas because discarded flowers may produce seeds. It is important to actively monitor the removal of seedlings that may sprout after control efforts are carried out. When gardening or landscaping be sure to include native species only. Consider

planting native plant species once the purple loosestrife population is eradicated or under control as this will aid in natural succession and boost biodiversity throughout the area.

Other management options include mowing and cutting, flooding, burning, herbicide application (<http://pr-rp.hc-sc.gc.ca/lr-re/index-eng.php>), and biological controls. Biological methods are the use of an herbivore or other natural enemy to reduce established populations and is species selective which can provide long-term control. With extensive host-range testing, the introduction of four agents; the black-margined loosestrife beetle (*Neogalerucella californiensis* L.), the golden loosestrife beetle (*Neogalerucella pusilla* Duftschmidt), the loosestrife root weevil (*Hylobius transversovittatus*) and the flower weevil (*Nanophyes marmoratus*) have been most suitable and released in North America in the 1990s. This has been largely successful in reducing biomass of up to 90 percent in a single growing season.

Figure 4. Identification traits of *Lythrum salicaria* (Purple loosestrife).



Next Steps:

It is recommended that Trout Lake continue to monitor and educate cottagers on invasive aquatic plants, fish and invertebrates. Certain invasives like Eurasian Watermilfoil (*Myriophyllum spicatum*) are fast growing species and can quickly reach nuisance proportions and information regarding the distribution and abundance of these species throughout Trout Lake can be extremely valuable. Sampling of macroinvertebrates (snails, larvae, beetles, worms) around the lake for their distribution, abundance and productivity can also aid in signs of a healthy lake or lack thereof. Some potential next steps for TLCA is to increase awareness and monitoring for potential invasive species by:

- 1) Educate members of the TLCA about invasive plants, how to identify them and how to prevent their spread through:
 - Cleaning your boat and gear before entering the water and after of mud, mussels and vegetation.
 - Drain all standing water by pulling the plug on your tranm and live well at boat launch before you leave to stop the transfer of an aquatic invasive species from one waterbody to another
 - Dry or disinfect as some aquatic invasive species can survive up to 2 weeks out of water. You can leave your boat out in the sunlight for 2-7 days or clean your boat with hot water before entering a new waterbody
 - When gardening choose native or non-invasive species to plant and leave native trees and plants along; natural landscapes offer the best defense
- 2) Host field-orientated workshops to help familiarize the public with invasive species identification and habitats
- 3) Install signage regarding invasive species in high traffic, boat launching areas
- 4) Upload invasive species distribution information to EDDMapS Ontario
- 5) Organize TLCA members and volunteers to perform periodic monitoring

Information and Learning Resources:

- 1) List of plant species found in Trout Lake during the field visit on August 16th . :

Common Name	Scientific Name
Pickerel weed	<i>Pontederia cordata</i>

White waterlily	<i>Nymphaea odorata</i>
Large leaf pondweed	<i>Potamogeton amplifolius</i>
Yellow pond lily	<i>Nuphar variegata</i>
Water Nymph	<i>Najas flexilis</i>
Robbin's pondweed	<i>Potamogeton robbinsii</i>
Broadfruit bur-reed	<i>Sparganium eurycarpum</i>
Water Marigold	<i>Megalodonta beckii</i>
Widgeon grass	<i>Ruppia maritima</i>
Purple loosestrife	<i>Lythrum salicaria</i>
Common bladderwort	<i>Utricularia vulgaris</i>
Tape Grass	<i>Vallisneria americana</i>
Water-shield	<i>Brasenia schreberi</i>
Sevenangle pipewort	<i>Eriocaulon aquaticum</i>
Nitella	<i>Nitella spp.</i>
Floating-leaf pondweed	<i>Potamogeton natans</i>

- 2) FOCA- A Shoreline Owner's Guide to Invasive Species:
<https://foca.on.ca/invasive-species-guide/>
- 3) FOCA- Invasive Species Overview: <https://foca.on.ca/invasive-species/>
- 4) Early Detection and Distribution Mapping System Ontario (EDDMapS):
<https://www.eddmaps.org/ontario/>
- 5) Ontario Regulated Species List:
<https://www.ontario.ca/page/stop-spread-invasive-species>
- 6)
 - a. Ontario Invading Species Awareness Program- Purple Loosestrife:
<http://www.invadingspecies.com/purple-loosestrife/>
 - b. Best Management Practices - Purple Loosestrife:
<http://www.ontarioinvasiveplants.ca/wp-content/uploads/2016/07/Purple-Loosestrife-BMP-April-2016-final.pdf>
 - c. Garden and Landscaping plant recommendations:

<http://www.ontarioinvasiveplants.ca/resources/grow-me-instead/>

7) Regulations

- a. Invasive Species Act: <https://www.ontario.ca/laws/statute/s15022>
- b. Public Lands Act:
<https://www.ontario.ca/laws/regulation/r13239#BK11>