



Management and Control of Water Soldier (*Stratiotes aloides*) in Ontario

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Ontario Federation of Anglers & Hunters

Ontario Invasive Plant Council

Tuesday October 16, 2018

Invading Species Awareness Program

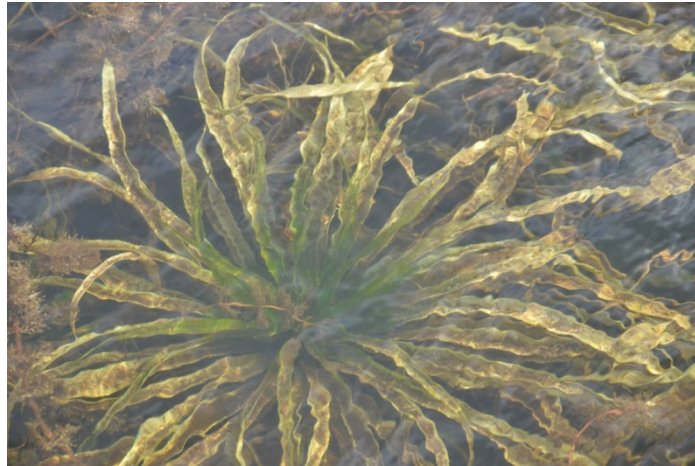
❖ Education/awareness partnership of the OFAH & MNRF

- Generate education & awareness
 - Focus on key pathways for introductions and/or spread
- Facilitate monitoring & early detection initiatives
 - Invading Species Hotline
 - EDDMapS Ontario
- Contribute to surveillance, control, & rapid response
 - Water soldier eradication, TSW



Water Soldier

- water soldier (*Stratiotes aloides*) is an aquatic invasive perennial plant, native to Europe
 - ▶ sharp serrated leaves can cut, when handled
- ▶ first wild occurrence in North America reported in Ontario in 2008
- ▶ common water garden plant
 - ▶ in Ontario, there was no regulatory authority to address ANY aquatic invasive plants until November 2016



Water Soldier

- vegetative reproduction
- forms dense colonies
 - forces out native vegetation
 - inhibits boating, fishing, swimming & other recreational activities
 - negatively impacts waterfront property values



Vegetative propagules (offset & turions)



M. DeBues



Flower

Without control, it WILL spread...



Summer 2013

V. McCulloch

Without control, it WILL spread...

Summer 2014



V. McCulloch

Without control, it WILL spread...

Spring 2015



Without control, it WILL spread...

August 2015



Water Soldier Initial Response

- no clear agency responsible for addressing aquatic invasive plants
- legislative gaps to address import, sale, possession and transport of aquatic invasive plants such as Water Soldier
- water soldier had no history of management in North America (or Europe); limited information available on control
- limited options for control (hand-pulling, Reward ®)
- established inter-agency working group to provide technical and field support to guide response



US Army Corps of Engineers

Water Soldier Response Timeline



Detection & Rapid Response

Initial herbicide treatments with emergency label extension for REWARD (diquat)

Manual removals

2009 to 2011



Research

Biology/ Life History

Control techniques

Surveillance

Lab/field efficacy testing of REWARD (diquat)

2012 -present



Policy Development

Legislative tools for prevention

Education and outreach

Label expansion approved for Reward

2012-present



Control & Eradication Plan

Development of an integrated management plan

Initiated Fall 2014/15

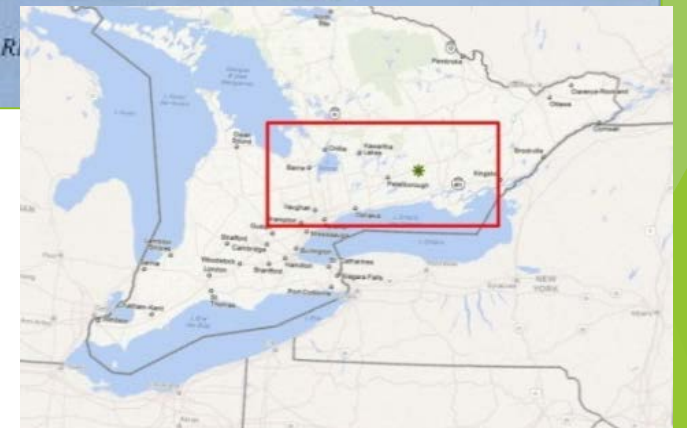
Trent-Severn Waterway

September 2008 –

- First report of water soldier in N. America – in the TSW
- Continue to monitor/manage – spread nearly 50km

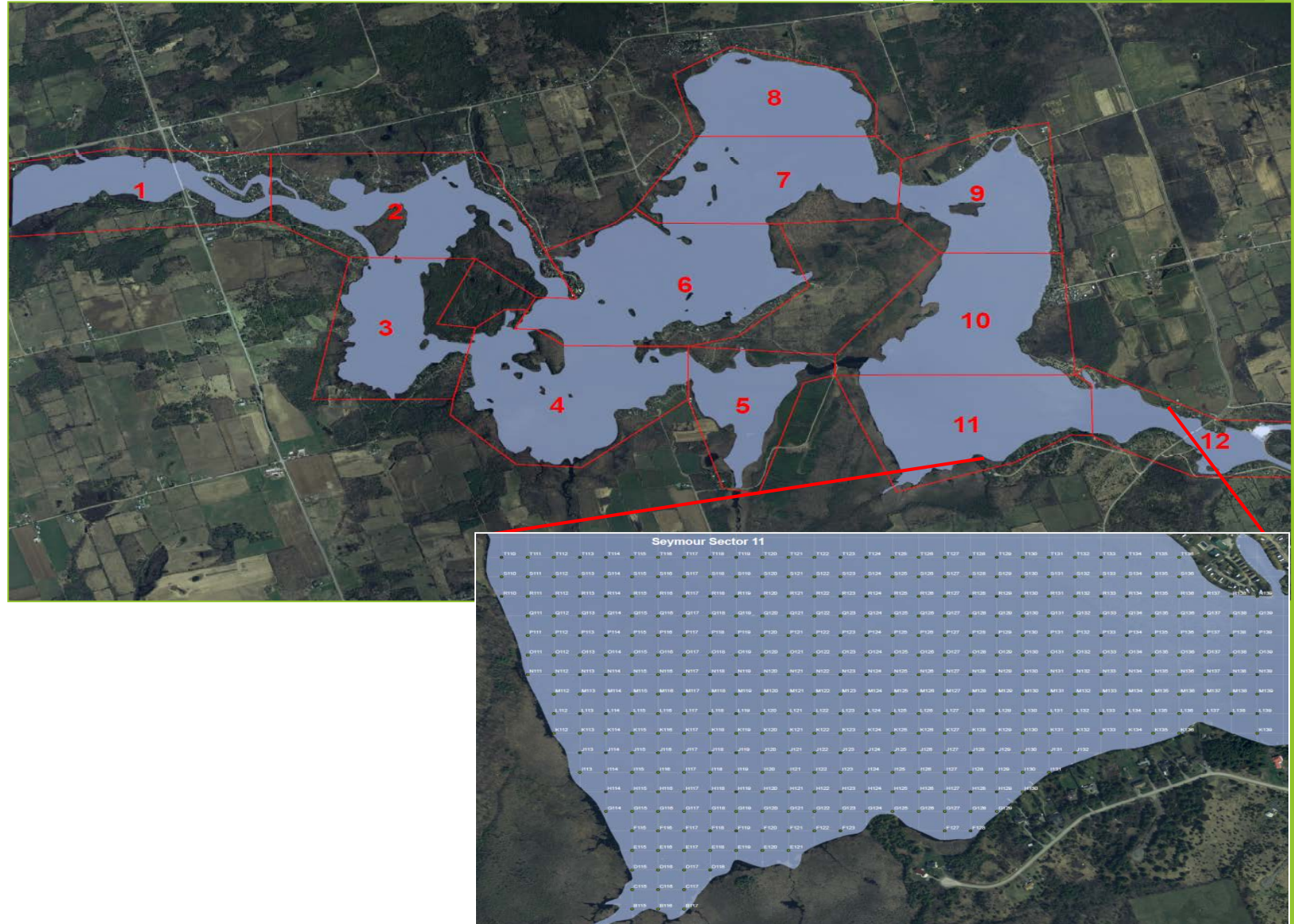
September 2015 –

- Second “wild” occurrence reported in Black River – eradicated in 2015/16
 - Continue to monitor – not observed since 2016



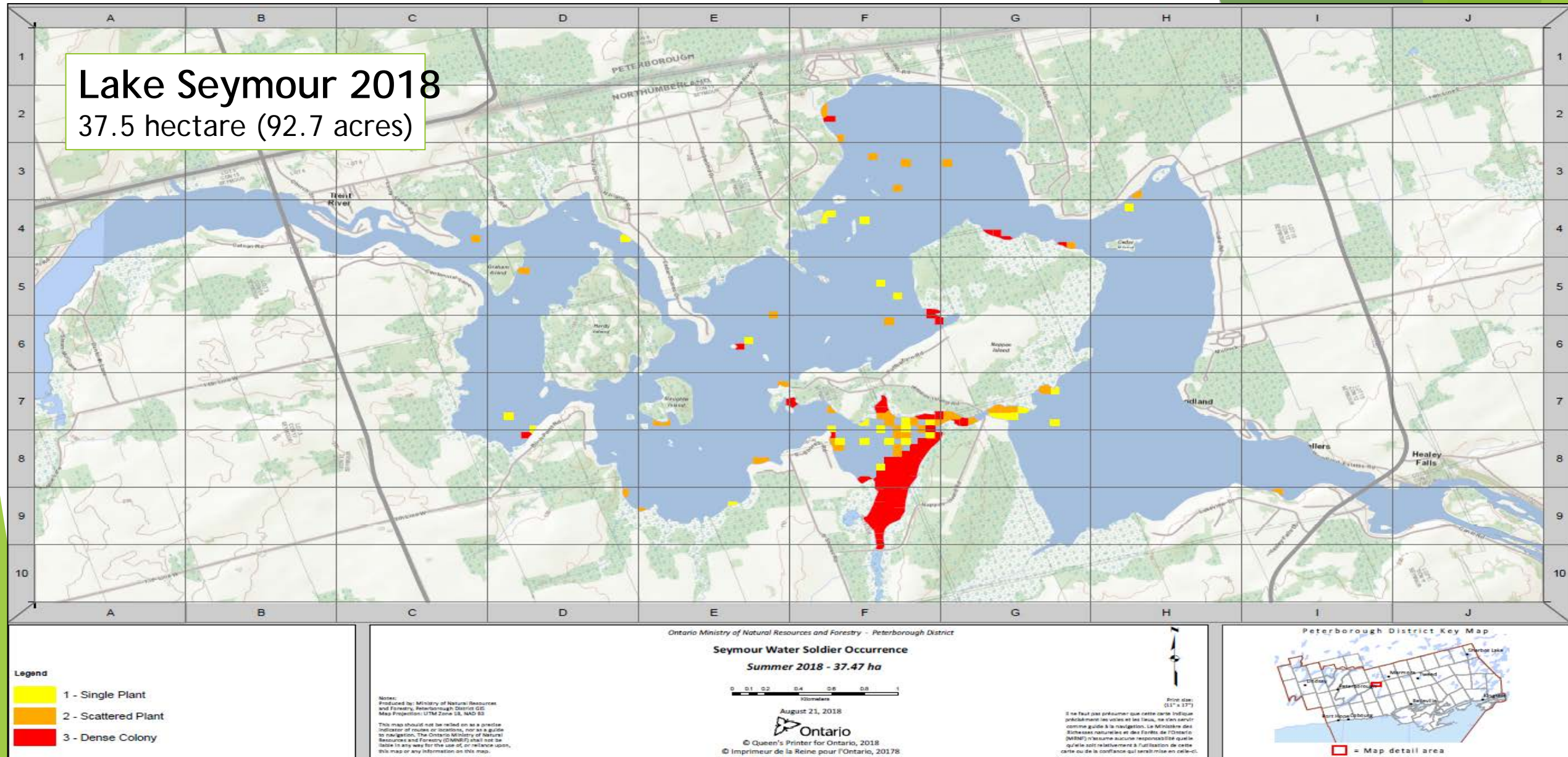
Water Soldier Management - Surveillance

- 50m x 50m grid of approx. 50 km reach of TSW
- at each point intercept recorded:
 - depth
 - Water Soldier (ranking 0-3)
 - "top 3" plant species
- monitoring completed July-August each year



Lake Seymour 2018

37.5 hectare (92.7 acres)



*Lake Seymour is part of the TSW

Herbicide Application - Approach

- ▶ landowner notification (>24hrs prior to application)
 - ▶ shoreline residents within treatment area are notified via “in person” visit, or notice on door
- ▶ application timing – (October)
 - ▶ optimal to reduce non-target impacts, but water soldier is still vulnerable
 - ▶ fewer recreational users
- ▶ site conditions = shallow waters (0.5-1.5m) with many obstacles
 - ▶ use of airboats reduced sediment disturbance and increased accessibility



Water Soldier Pre-Treatment

August 2015



V. McCulloch

Water Soldier Post-Treatment

July 2016



Post-Treatment Results

June 2017



Post-Treatment Results

July 2018



MNRF

Education & Outreach

WATER SOLDIER

THE EFFORTS TO CONTROL WATER SOLDIER ON THE TRENT SEVERN WATERWAY ARE ONGOING.

The Ontario Federation of Anglers and Hunters will be hosting a Water Soldier Open House to discuss details of monitoring and proposed control efforts. To learn more, the public is invited to drop in at the

Campbellford Community Resource Centre
65 Bridge Street, Campbellford, Ontario

AUGUST 29, 2018, 3PM – 7PM



Water Soldier Management Technician delivering an identification training to the volunteers on the Trent River for Water Soldier Watch Day (OFAH, 2018).

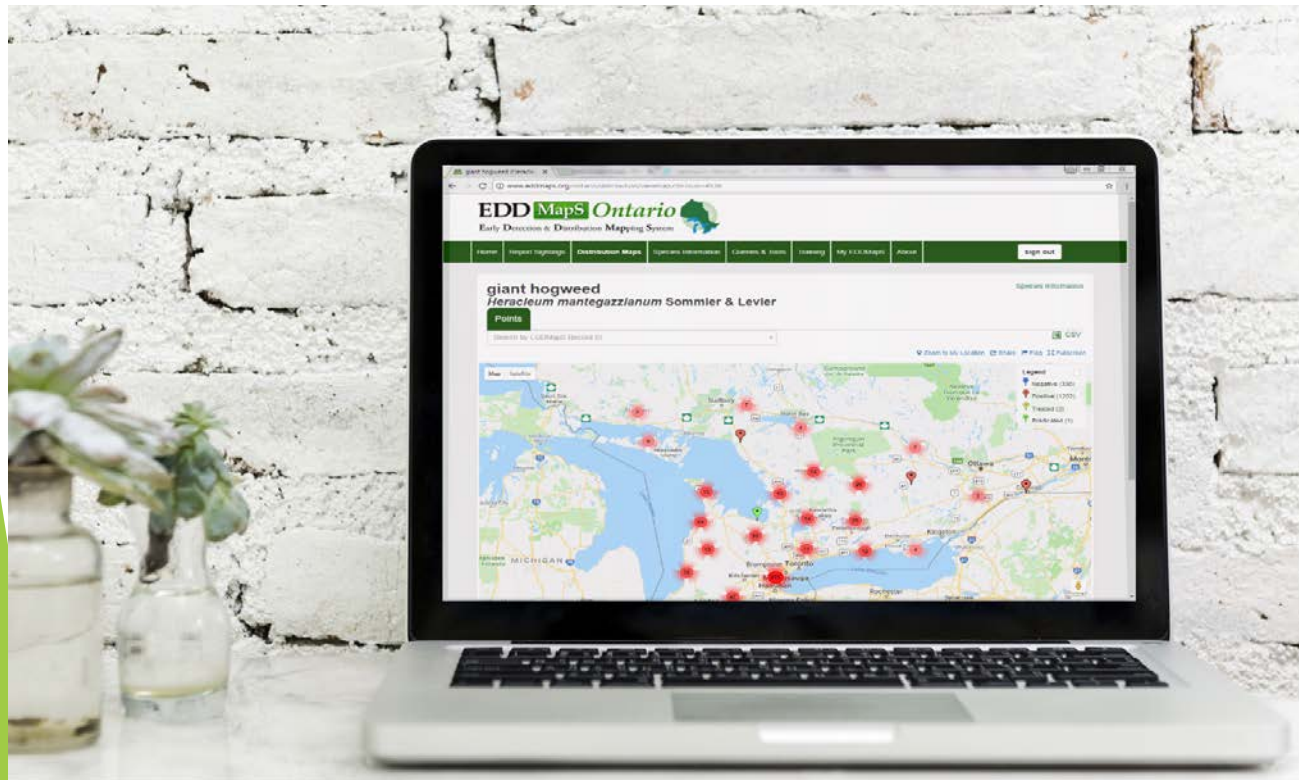
Invading Species Hotline

1-800-563-7711

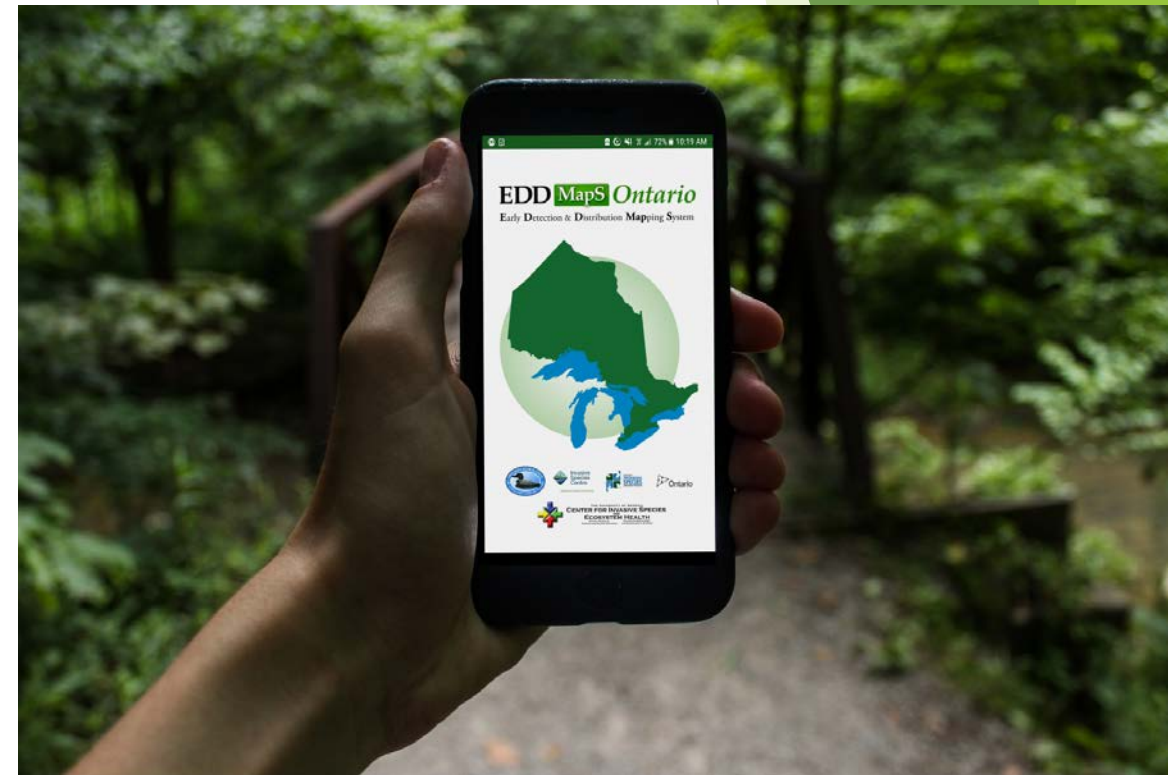


EDDMapS Ontario

Website



Mobile



Water Soldier Management – Private Ponds



Water Soldier Management – Private Ponds

- OFAH works with landowners to eradicate water soldier in private ponds
- ▶ property owners offered support to the OFAH
- ▶ OFAH hired a licensed herbicide applicator to coordinate treatment of ponds in 2017 & 2018
 - 2017 – 3 ponds
 - 2018 – 10 ponds



Key Lessons Learned...

- ▶ **Project Leadership**
 - ▶ Government leadership is necessary to coordinate large-scale control efforts with support from agency partners
- ▶ **Public Engagement**
 - ▶ Strong public support for use of herbicide over-water, as the most effective control tool
 - ▶ On-going communications/outreach are important
- ▶ **Research Support is Critical**
 - ▶ Understanding biology, reproductive strategies, and efficacy of control tools for new plants is essential to effective management
- ▶ **Access to Effective Herbicide Tools**
 - ▶ Diquat is the only registered product available for overwater use in Canada for control of aquatic vegetation
 - ▶ it is fortunate that REWARD is effective on water soldier – it may not be effective on other aquatic invasive plants that threaten Ontario
 - access to additional herbicides would help to diversify our approach to controlling water soldier and other invasive aquatic plants

Response WILL Continue...

- ▶ inter-agency working group will continue to work together to address water soldier
- ▶ management approaches
 - will be adapted according to circumstances as understanding of the plant evolves over time
 - ▶ research
 - ▶ policy development
 - ▶ experience with control/management techniques
- ▶ excited/hopeful to build off of the recent success we have seen in some parts of the infestations
 - ▶ (e.g., 78% reduction L. Seymour, eradication in Black River)





Connect With Us!



info@invadingspecies.com



[@invspecies](https://www.instagram.com/invspecies)

TO REPORT INVASIVE SPECIES:

1-800-563-7711

www.EDDMapS.org/Ontario



ONTARIO'S
**INVADING
SPECIES**
AWARENESS PROGRAM

Questions?



- ## Risk Assessment

Uses scientific information to make decisions about how to prevent possible invaders and manage those that have already arrived

The species' biological characteristics

Harm the species has had (or is likely to have) on the natural environment

Ontario's process involves estimating the likelihood of being introduced, becoming widespread and evaluating the potential consequences of an invasion

Dispersal potential of the species

Social or economic impacts of the species

Water Soldier Eradication Efforts



Physical Removal

- Efforts on-going each year
- Reserved for pocket satellite populations

Mechanical Removal

- Trialed in 2015
- 90 cubic yards removed over 7 days (approx. 1 acre)



Shade Cloth Enclosures

- Trialed in 2016
- Polyethylene shade cloth tested on 3 populations for 2 month periods (10x10 plots)
- 99-100% biomass reduction
➡ limited to small populations

Ontario's Invasive Species Act, 2015

- Invasive Species Act came into force November, 2016
- provides Ontario with the power to classify invasive species as “prohibited” or “restricted”
 - prohibitions include: import, possession, transport, propagation, buying, selling, trading, etc.
- water soldier was among the first species to be regulated as a prohibited species under this Act

Prohibited Species			Restricted Species
Fish:	Aquatic Invertebrates:	Plants:	Plants:
<ul style="list-style-type: none">• Bighead Carp• Silver Carp• Grass Carp• Black Carp• Stone Moroko• Zander• Wels Catfish• All species in the Snakehead family	<ul style="list-style-type: none">• Killer Shrimp• Yabby (crayfish)• Golden Mussel	<ul style="list-style-type: none">• Hydrilla• Brazilian elodea• Water Soldier• Water Chestnut• Parrot feather	<ul style="list-style-type: none">• Phragmites• Dog-strangling vine (2)• Japanese Knotweed