



Ontario's Response to Water Soldier



Water Soldier

- Water soldier (*Stratiotes aloides*) is an aquatic invasive perennial plant, native to Europe
 - Sharp serrated leaves can cut, when handled
 - Vegetative reproduction
 - Aggressively outcompetes.....
- 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



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



V. McCulloch

Challenges of “Rapid” Response in 2008

- No clear agency responsible for addressing aquatic invasive plants and lack of coordination between agencies
- Legislative gaps to address import, sale, possession and transport of aquatic invasive plants
- Water soldier had no history of management in North America (or Europe); limited information available on control
- Limited options for control (hand-pulling, diquat)

Water Soldier Response Timeline

- 2009 established inter-agency working group to guide and implement response



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



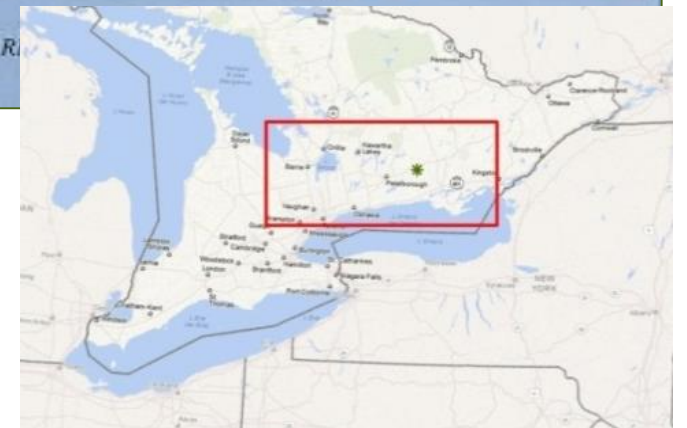
Trent Severn Waterway

September 2008 –

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

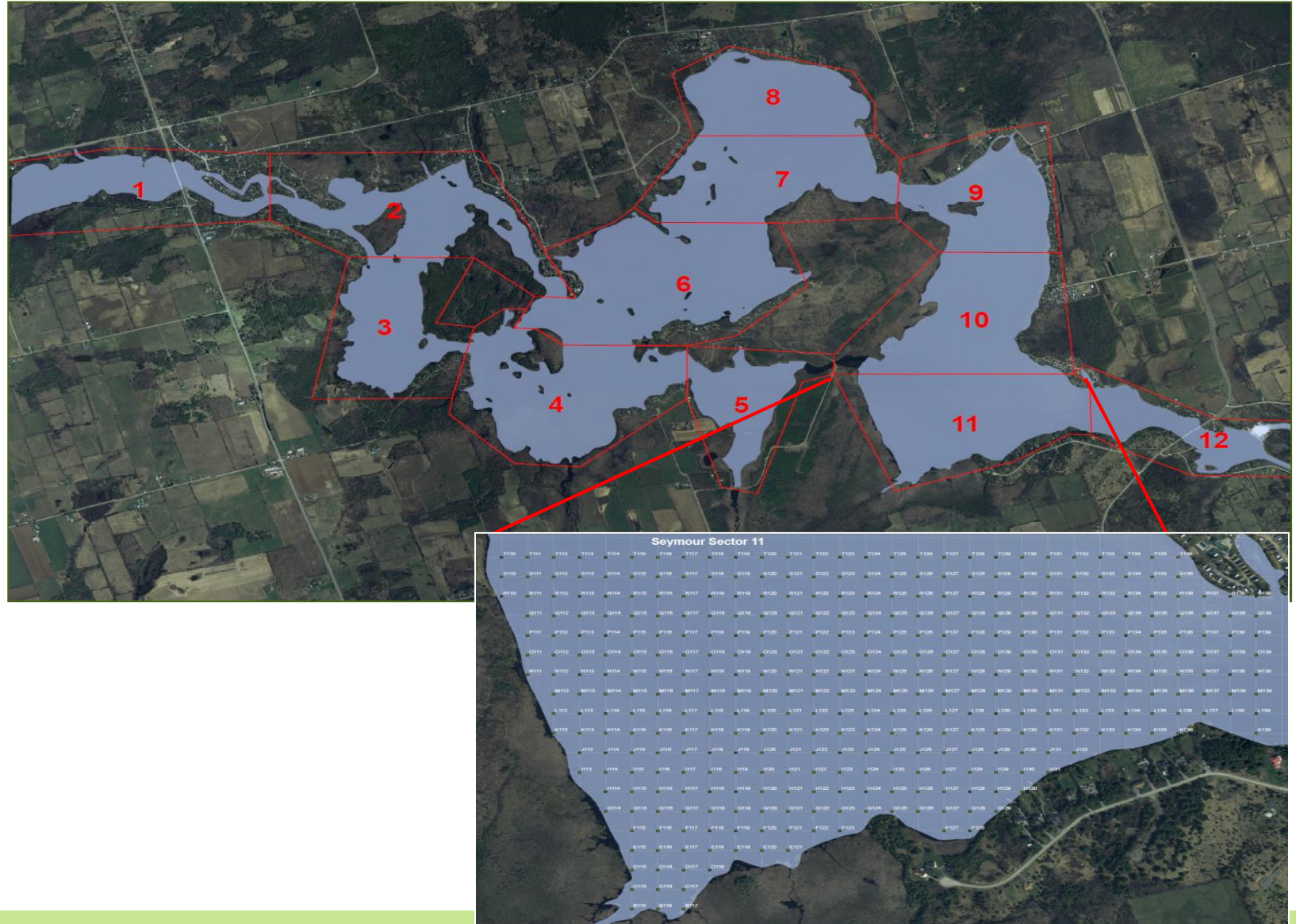
September 2015 –

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



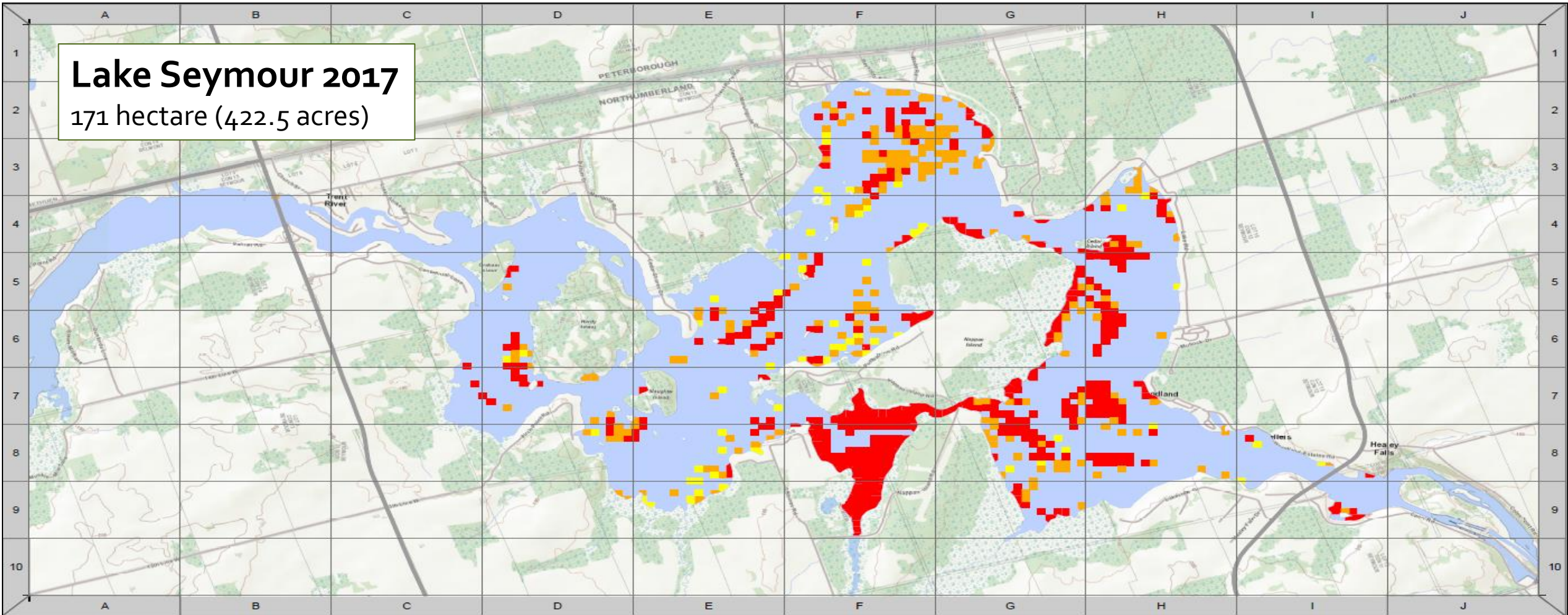
Water Soldier Management - Surveillance

- 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 2017

171 hectare (422.5 acres)



Legend

Water Soldier Values

- 1 - Single Plant
- 2 - Scattered Plants
- 3 - Dense Colony

Ontario Ministry of Natural Resources and Forestry - Peterborough District

Lake Seymour Water Soldier Occurrence

Summer 2017

Notes:

Produced by: Ministry of Natural Resources and Forestry, Peterborough District GIS Map Projection: UTM Zone 18, NAD 83

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Kilometers

August 30, 2017

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Print size: 11" x 17"

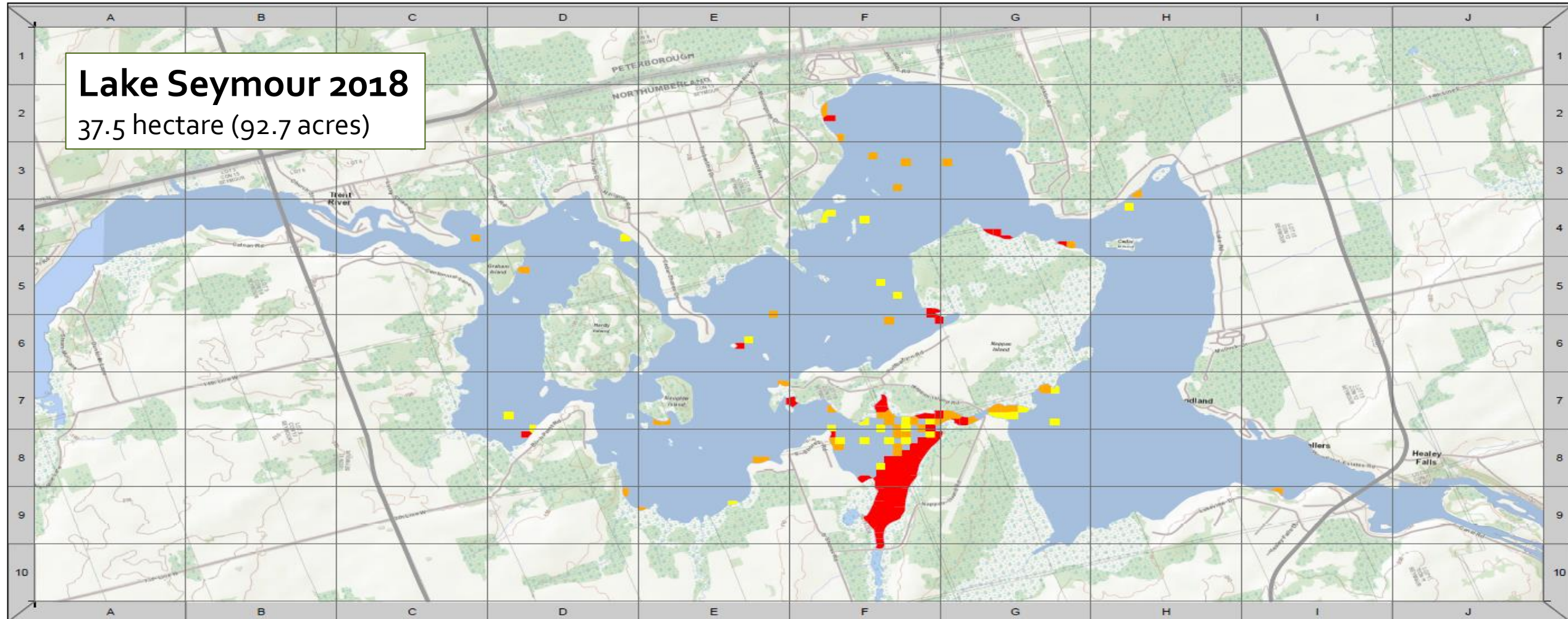
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*Lake Seymour is part of the TSW

Lake Seymour 2018

37.5 hectare (92.7 acres)



- Legend**
- 1 - Single Plant
 - 2 - Scattered Plant
 - 3 - Dense Colony

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Ontario Ministry of Natural Resources and Forestry - Peterborough District

Seymour Water Soldier Occurrence Summer 2018 - 37.47 ha



August 21, 2018



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Proje. étar:
014° x 17°

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= Map detail area

*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 – (early 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 reduces sediment disturbance and increases accessibility



Water Soldier Pre-Treatment

August 2015



V. McCulloch

Water Soldier Post-Treatment

July 2016



MNRF

Post-Treatment Results

June 2017



MNRF

Post-Treatment Results

July 2018



MNRF

Education & Outreach



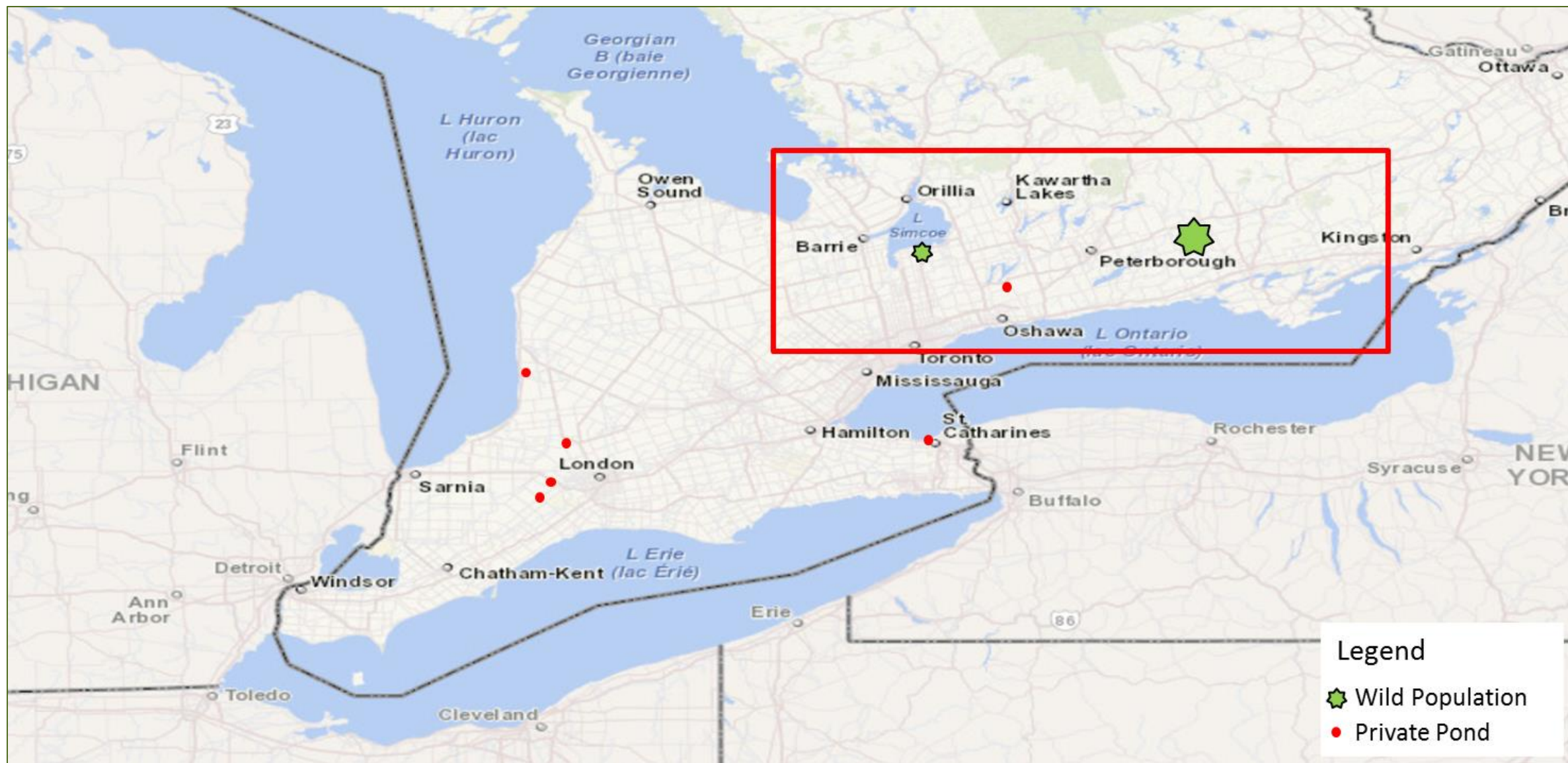
eddmaps.org/ontario

Invading Species Hotline
1-800-563-7711



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

Water Soldier Management – Private Ponds



Water Soldier Management – Private Ponds

- OFAH works with landowners to eradicate water soldier in private ponds (off-line)
- Property owners offered support from the OFAH
- OFAH hired a licensed herbicide applicator to coordinate treatment of ponds in 2017 & 2018
 - 2017 – 3 ponds
 - 2018 – 10 ponds



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

Response – Lessons Learned

- **Leadership & Coordination**
 - Inter-agency working group has been key to addressing numerous inter-jurisdictional challenges
 - Clarifying roles/responsibilities is important for future response actions
 - Great Lakes Governors and Premiers' "Least Wanted" AIS List provided a key tool to prioritize response
 - Regional panels/members are an important resource for sharing information, networking, seeking advice
- **Policy & Legislation**
 - Ontario's Invasive Species Act, provided an important tool to address pathways for **new** introductions
 - But! Education/ outreach is critical to support implementation of the legislation
- **Research Support is Critical**
 - Understanding biology, reproductive strategies, and efficacy of control tools for new plants is essential
- **Access to Effective Herbicide Tools/Management**
 - Diquat is only registered product for overwater use in Canada for control of aquatic vegetation
 - Access to additional herbicides would help diversify our approach for water soldier and other plants

Questions?



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