





Invasive  
Species  
Centre

**EDD** **MapS** *Ontario*  
Early Detection & Distribution Mapping System



ntario  
Invasive Plant Council

# What are Invasive Species?

## Some definitions...

### Native:

- A species that has existed in a given area prior to European settlement

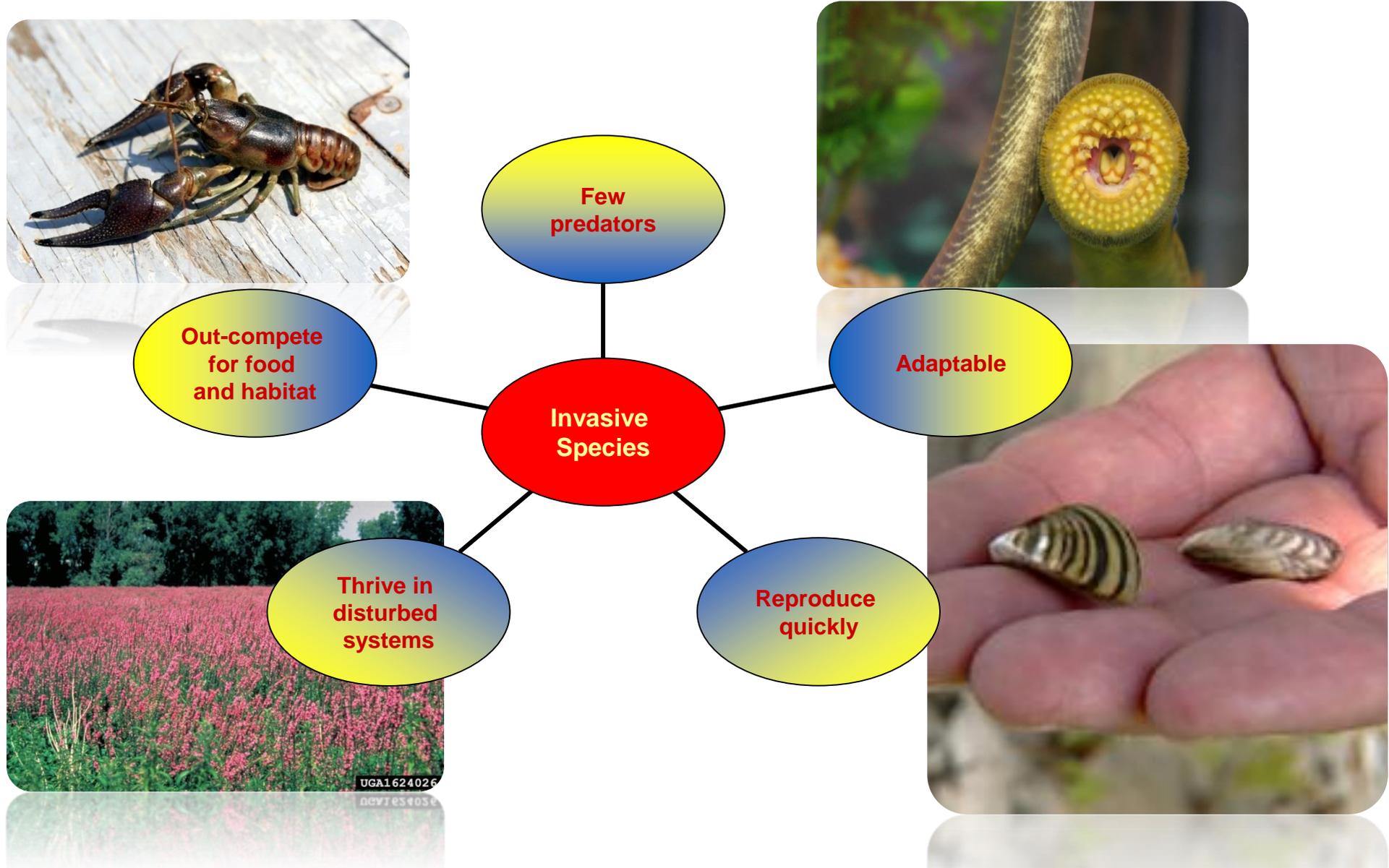
### Non-native:

- A species that has been introduced from another geographic region to an area outside its natural range.

### Invasive:

- Harmful alien species whose introduction or spread threatens the environment, the economy or society, including human health.

# What are Invasive Species?



The Invaders.....

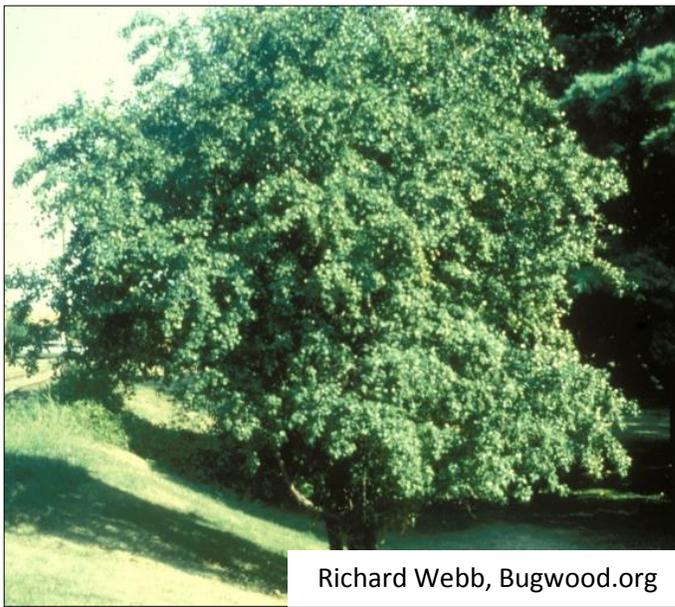
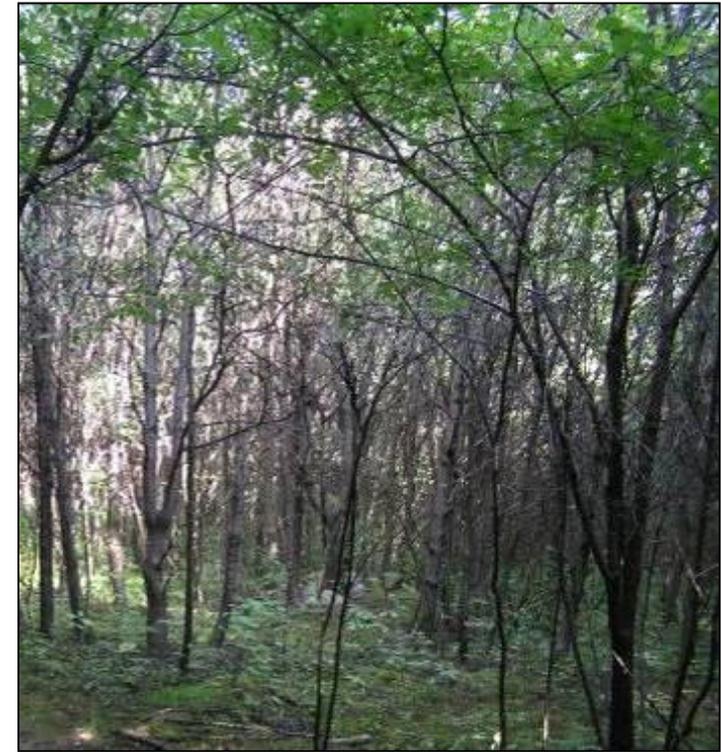
# Common Buckthorn (*Rhamnus cathartica*)

## What is it?

- European or Common Buckthorn is a shrub that reaches 6-7m in height and 25cm in trunk diameter
- Creates dense cover, shades out native species & alters soil chemistry
- Grows in most habitats (sun/shade/moist/dry)

## Pathway of Introduction and Spread

- Introduced in the late 1880's & used for hedgerows, and windbreaks
- Spread by birds and wildlife that eat the seeds and deposit them widely



Richard Webb, Bugwood.org



Egg-shaped leaves have distinct veins curving towards the leaf tip



Native look-a-like:  
alternate dogwood

Twigs end in pointed, stout thorns



Berries (<1cm) become purplish/black in late summer



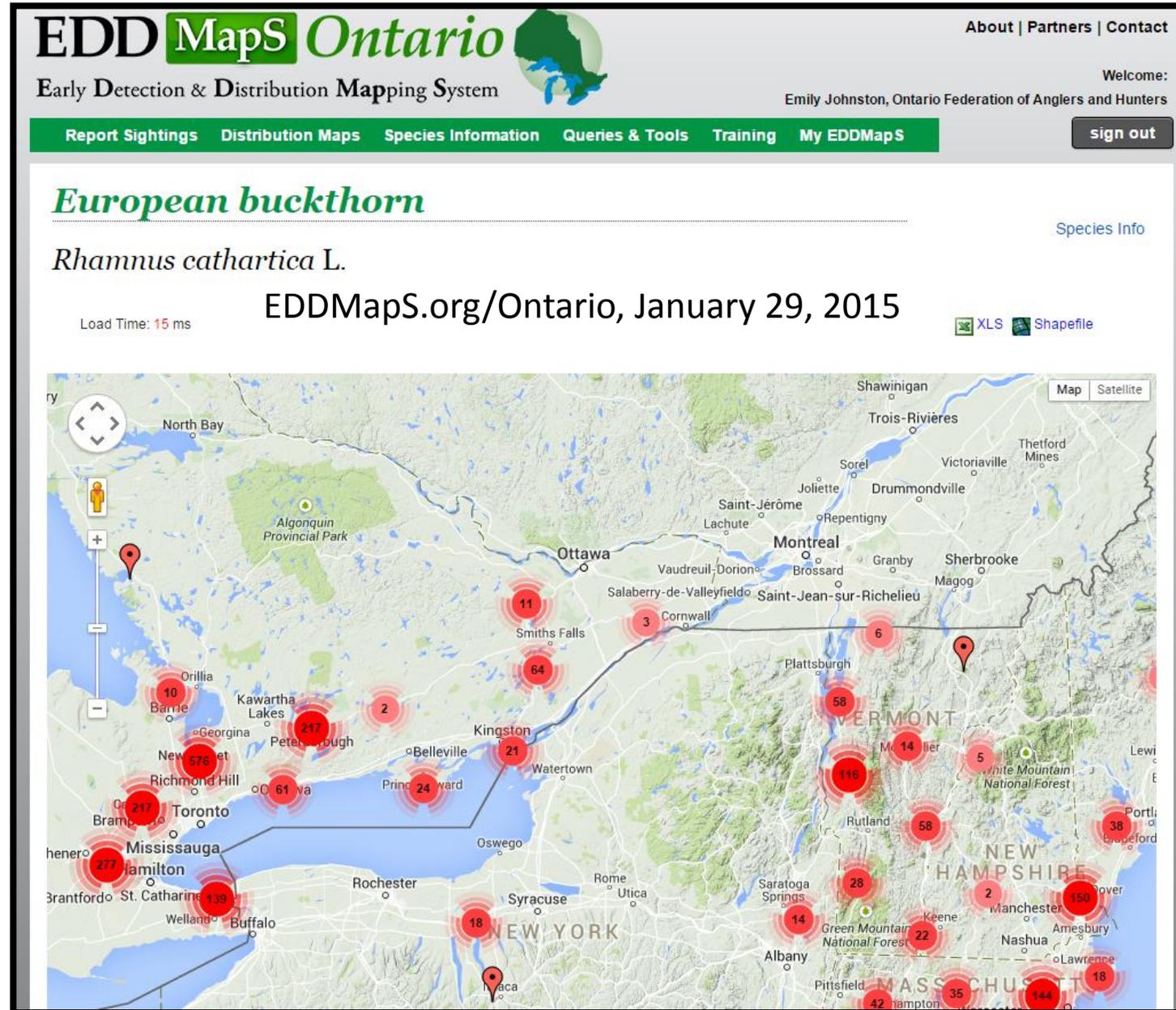
Orange inner bark



# Common Buckthorn – *Rhamnus cathartica*

## Distribution/Habitat

- Distributed widely across Ontario
- Once established, can spread quickly & create a monoculture
- Grows along roadsides, fence lines, woodland edges and in pastures, abandoned fields, and natural areas
- Once used for erosion control and stream bank stabilization



# Common Buckthorn – *Rhamnus cathartica*

## Impacts

- Create thick cover which shades out native vegetation.
- Possibly allelopathic, produce chemicals which prevent other species from growing nearby.
- Common Buckthorn is host to the Soybean Aphid (*Aphis glycines*) and the fungus that causes Oat Crown Rust.
- Sites invaded by Buckthorn often have a lower species richness count.
- Berries are eaten by birds and small mammals, the seeds have laxative properties, which causes them to be deposited quickly and widely.
- **This plant is listed on Ontario's Noxious Weed List**

Top: Soybean aphid colonies on buckthorn. East Lansing, MI, May 2006. Christina DiFonzo, Michigan State University, Bugwood.org. Bottom: Close-up view of aecia and pycnia of crown rust of oat (*Puccinia coronata*) on a leaf of its alternate host, common buckthorn (*Rhamnus cathartica*). Howard F. Schwartz, Colorado State University, Bugwood.org



# Look-alikes – Glossy Buckthorn (*Frangula alnus*)

## NON-NATIVE INVASIVE

- Alternate leaves, smooth wavy edges, not toothed. 5-10 fairly straight veins per side
- Greenish white to greenish yellow flowers, 6mm, solitary or in groups. 5 stamens, 5 petals, 5 sepals.
- Fruit red-brown turning black, solitary or in clusters in leaf axils, 2-3 seeds.
- Twigs minutely hairy, no terminal spine.
- 6-7 m tall and 25 cm diameter
- Found in wet or moist soils, but will grow in a wide variety of upland habitats.
- Also very invasive in our area



Photo courtesy of Freyja Whitten

# Look-alikes — Alderleaf Buckthorn (*Rhamnus alnifolia*)

## NATIVE

- Alternate leaves, toothed edges, tip of leaf acute point, smaller leaves more rounded.
- Greenish yellow flowers, 3mm, on short stalks, solitary at base of leaf stem. 5 stamens, 5 petals, 5 sepals
- Fruit turn a light red and then a deep black, 6mm diameter, 1-3 seeds.
- Twigs minutely hairy, no spines
- Usually less than 1m in height
- Moist to wet forests, thickets, marshy areas, lakes, streambanks, and wet meadows at mid-elevations.



Photo : Wasyl Bakowsky

# Garlic Mustard – (*Alliaria petiolata*)

## What is it?

Biennial herb: First year basal rosette, second year flowering stalk

Native to Europe (used as a kitchen herb)

First introduced in late 1800's

## Pathway of Introduction and Spread

Horticultural/Medicinal trade

Recreational activities

Contaminant in soil/mulch/nursery stock



Photo credit: S. Brinker (OMNR)

# Garlic Mustard – First Year Description



Photo credit: Ken Towle



- First year plants grow in basal rosette form (cluster of 3-4 leaves)
- Leaves are dark green, kidney or heart shaped, and have wavy edges
- When crushed the leaves give off a distinctive garlic odour
- Leaves will remain green through the winter, even under snow



Rob Routledge, Sault College, Bugwood.org



# 1<sup>st</sup> year lookalikes – Creeping Charlie or Ground Ivy (*Glechoma hederacea*)

Garlic Mustard leaves  
Photo courtesy of Rod Krick

- Native to Europe and Southwestern Asia
- 5-50 cm in height
- Leaves: in runners, not rosettes
  - Hairy upper surface, smell minty when crushed
  - Kidney- to fan-shaped, opposite, 2-3 cm in diameter,
  - The stems are attached in the middle of the leaf
- Flowers: purple, funnel shaped, grow in clusters, flowers from May - July



Photo courtesy of Christian Fischer

# 1<sup>st</sup> year lookalikes –Native Violets (*Viola* spp.)

- Low growing
- Leaves:
  - Rosette or along stems; species dependent
  - Kidney shaped to broadly oval with heart-shaped bases and pointed tip
- Flowers: five petals, lower petal is usually larger and spurred at the base.
- Usually purple, appear in early spring/summer.

Photo courtesy of Tom Barnes,



Photo courtesy of Ken Towle

# Garlic Mustard – Second Year Description

Second year plants can grow up to 1m in height.

Leaves are triangular and sharply-toothed, 3-8 cm in diameter and grow alternately along stem.

Flowers are white with four petals and bloom in May

Seed pods are called “siliques” and look like a small thin bean, one plant can produce 150 siliques with up to 22 seeds in each.



Photo credit: Wasyl Bakowsky

Left: 2<sup>nd</sup> year plants,  
Right: Siliques, flowers  
and 2<sup>nd</sup> year leaves



© 2008 K. Chayka

## 2<sup>nd</sup> year lookalikes – Dame's Rocket (*Hesperis matronalis*)

Native to Eurasia, member of the Brassicaceae family,  
biennial or short lived perennial

Also forms a basal rosette in the 1<sup>st</sup> year,

1 m or taller

Stems: multiple, hairy

Leaves:

- No petioles, leaves attached directly to main stem

- Long and narrow/lance shaped leaves

- Short hairs and toothed margins

- Flowers: fragrant, pink, purple or white, 4 petals, flowers  
in early summer

Seed pods: 5-14cm long, 2 rows of seeds.



Photo courtesy of Christian Fischer



Mark Frey, The Presidio Trust ,  
Bugwood.org

## 2<sup>nd</sup> year lookalikes – Early Saxifrage (*Saxifraga virginica*)

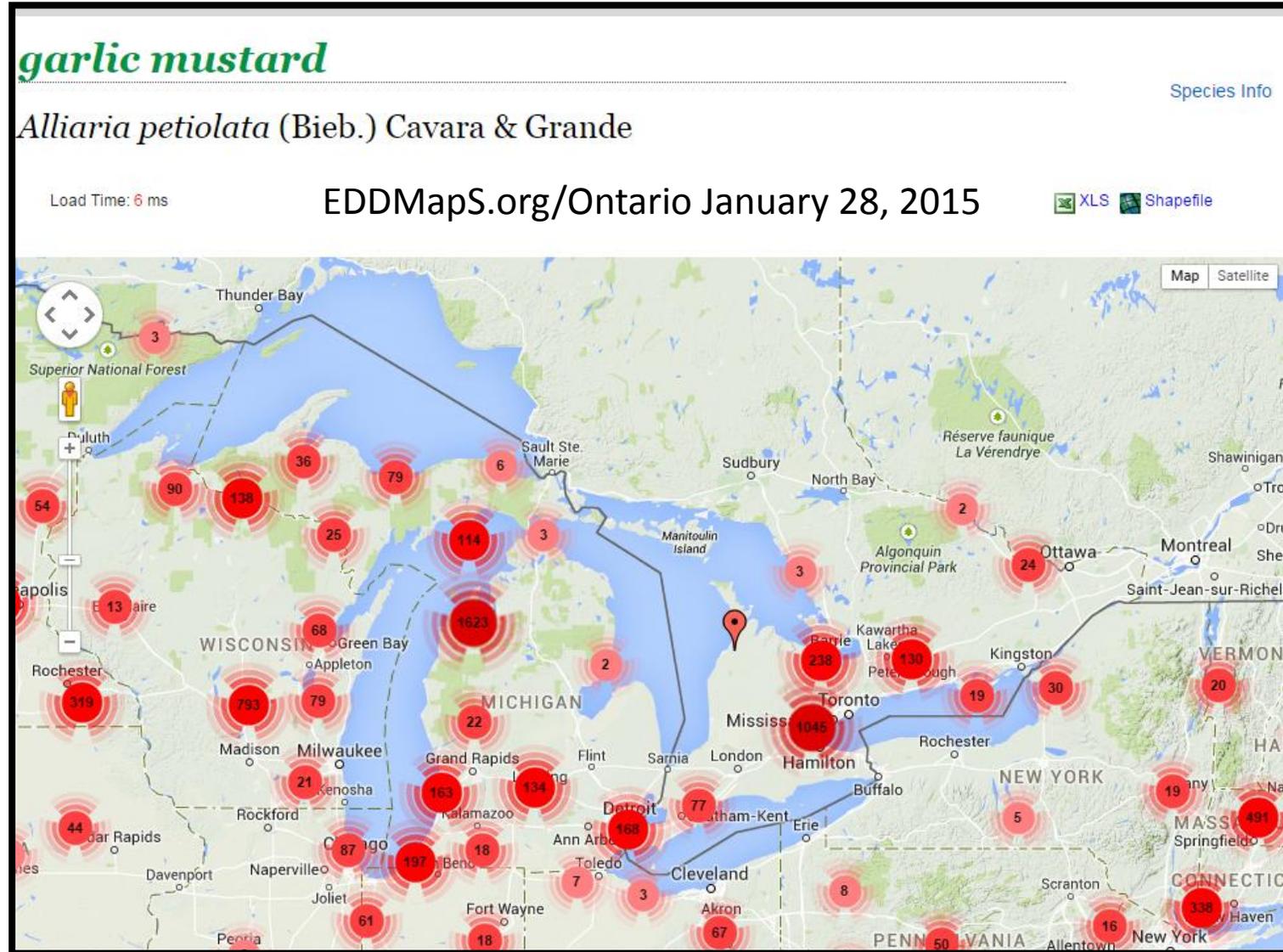
- Native to Ontario
- Up to 30cm
- Stems smooth to slightly hairy, leafless
- Basal leaves only
- Flowers: white, 5 petals, blooms in early May, in loose branched clusters.



Photo courtesy of Mason Brock

# Garlic Mustard – Distribution/Habitat

- Prefers edge habitats and moist soils, bordering forests and rivers
- Prefers shady conditions (like forest floors) but can also be found in full sun
- Can be found in temperate forests, agricultural fencerows, public right of ways and residential lands
- Spreads only by seed



# Garlic Mustard – *Alliaria petiolata*

## Impacts

- Garlic Mustard can enter and establish itself within a healthy forest site
- Once introduced, it out-competes native plants, by producing allelopathic chemicals in the roots which alter soil chemistry, making it impossible for anything else to grow.
- Populations can double in size every four years
- It's a major threat to native woodland species like trout lily and trilliums



Photo of Infestation: Steven Katovich, USDA Forest Service, Bugwood.org

# Dog-strangling Vine



# Dog-strangling Vine

(*Cynanchum rossicum* and *C. louisae*)

- Introduced from Ukraine, Russia, first noted in Toronto, ON in 1899.
- A perennial plant, grows in dry to moist soils, usually in meadows and forest edges.
- Grows 1 to 2 m high by twisting up trees and other plants.
- Opposite lance-shaped leaves with waxy sheen
- Small, pinkish flowers (June-July)
- Bean-shaped seed pod (July-Sept)
- Seed pods look similar to milkweed, but thinner
- Yellowing leaves (Sept-Oct)
- Distinctive root – pink-red, crown and rhizomes



Opposite, glossy leaves 4-6 cm long

Seed pods similar to milkweed



Flowers: *C. rossicum*: pinkish, *C. louisae*: purple, 5 petals



# Look-alikes – the strangling vines (swallowworts)

## ❑ Black DSV (Black Swallowwort, *C. nigrum*)

- More common in USA; isolated areas in the GTA, Ottawa and S. QC
- Flowers much darker; purple to almost black
- Hairs on the inner surface of the petals

## ❑ White Swallowwort (*C. vincetoxicum*)

- Cream-coloured flowers; not yet well-established in North America
- Sparse in the north eastern U.S.
- Some records of escapes in Ontario; no records of established populations



Photos courtesy of:  
Bugwood.org (Top)  
Jennifer Gibb (Bottom)

# Look-alikes – Sunflower (*Helianthus* spp.)

- Seedlings can resemble DSV
- Grow as erect plants; do not twine
- For most *Helianthus* species in Ontario, only the lowermost leaves are opposite
- Distinct tri-nerved leaf (three ridges extending from the petiole on the back of the leaf, instead of one down the centre)



Photo courtesy of W.D. Bakowsky

# Look-alikes – Milkweed (*Asclepias* spp.)

## Common Milkweed (*Asclepias syriaca*)

- Warty protuberances on seed pods
- Pods much larger than the DSVs
- Variety of flower colour □ (green, purple, white)

## Butterfly Milkweed (*A. tuberosa*)

- Showy orange flowers
- Alternate leaves

## Swamp Milkweed (*A. incarnata*)

- Seed pods most similar in size and shape
- All milkweeds grow erect; do not twine or coil like DSV



Photo courtesy of W.D. Bakowsky

# Other Look-alikes

## Dogbane (*Apocynum* spp.)

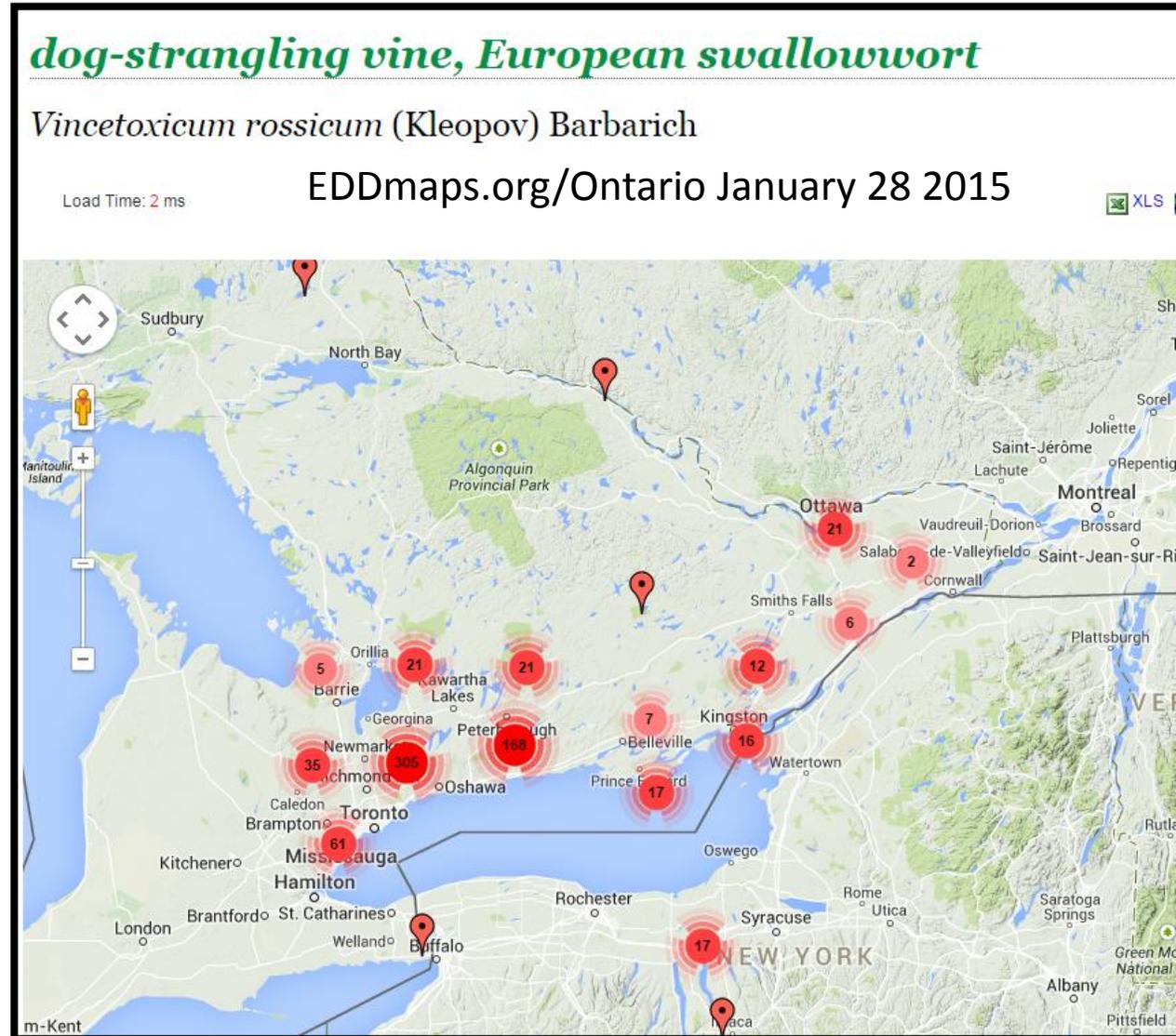
- Seedlings resemble DSV
  - Maturing stems turn purple, grow erect, do not twine
  - Leaves are usually drooping and often longer and more narrow
- Other vines – all climb by tendrils
- Wild grape (*Vitis riparia*),
  - Wild Cucumber (*Echinocystis lobata*),
  - Virginia creeper (*Parthenocissus quinquefolia*).



Photo courtesy of W.D. Bakowsky

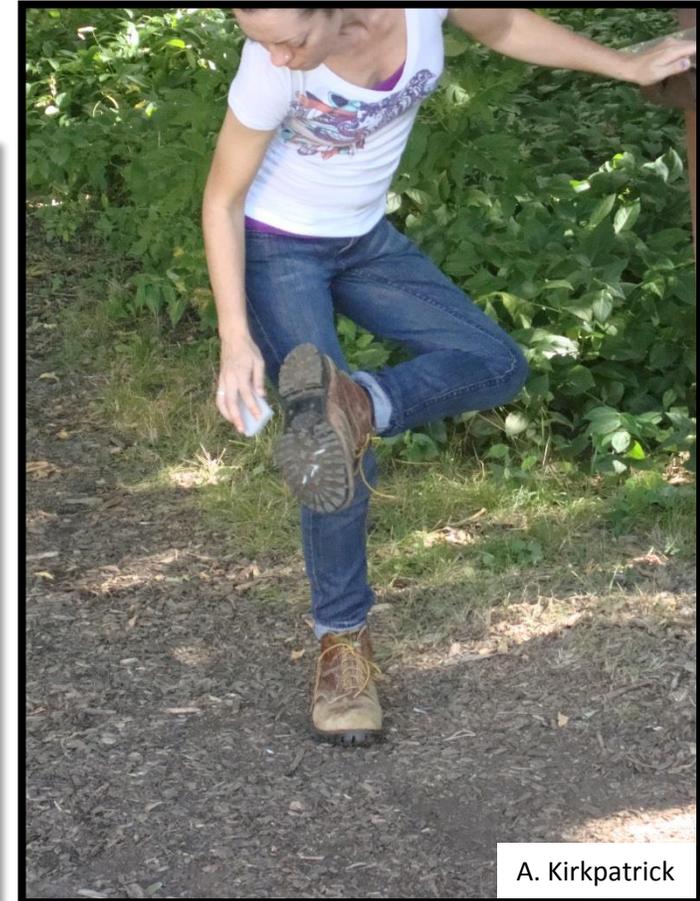
# Distribution/Habitat

- Invades closed-canopy forests and dominates understorey
- Thrives in calcareous (limestone-based) soils
  - Old fields
  - Ravines (DVP Toronto)
  - Great Lakes coasts
  - Stream banks
  - Plantations
  - Tallgrass prairies and alvars
  - Along roads and highways
  - Nationally found in British Columbia, Ontario, and Quebec



# Pathways of Introduction and Spread

- DSV first arrived in Ontario through a horticultural or accidental introduction, and was further introduced multiple times in different regions. The first recorded specimen was collected in Toronto in 1899.
- WIND and water
- Equipment (ATV tires, construction vehicles)
- People



# Impacts

## Biodiversity and Wildlife

Monospecific stands out-compete native plants for space, water and nutrients

Allelopathic chemicals impact on neighboring native plants

Monarch butterfly population impacts

Browsers (deer) avoid it

Threat to rare vegetation and habitats

## Agriculture

Can infest Corn and Soybean fields and pastures

Livestock won't eat it

Hinders animal movement

## Recreation

Hinders walking, cycling, skiing, snowshoeing



Wikimedia Commons



Photo: E. Johnston

## Forestry

Can suppress and/or outcompete native tree seedlings, young saplings, groundcover plants and impacts their regeneration

Site preparation and weed control measures

Makes tree marking, walking access and chainsaw operations more difficult

# Japanese Knotweed- (*Fallopia japonica*)

## Description and Pathways of Spread

- Perennial, herbaceous plant in the Buckwheat (Polygonaceae) family (a.k.a. Mexican Bamboo, Fleeceflower, Japanese Polygonum or Huzhang).
- Native to eastern Asia.
- Grows vigorously in full sunlight, but will also grow in deep shade.
- Prefers moist soils in riparian areas and wetlands and disturbed areas along roadsides, rail-beds, old homesteads, and forest edges.
- Salt tolerant and able to survive in extreme climates and in contaminated soils.
- Introduced to NA via the horticulture industry in late 19<sup>th</sup> century for use as an ornamental, for erosion control, and as livestock forage.
- First recorded in Niagara Falls ON 1901
- In world's top 100 worst invasive species

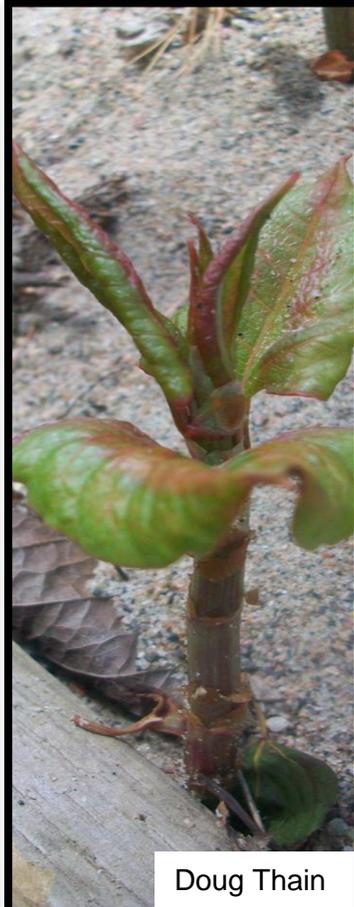


Photo by Freyja Whitten

# Japanese Knotweed

## Leaves

- Oval to triangular, pointed tip and flat at base on a long petiole
- Alternate on stem in a distinctive zig-zag pattern
- 10-17 cm long, 7-10 cm wide



## Stems

- Woody, hollow, smooth, purple-green, up to 2.5 cm in diameter
- Jointed with reddish-brown nodes surrounded by papery sheath (stipule)
- Die back in fall; dead stalks stand over winter
- New stems in spring, resemble asparagus spears; red-purplish in colour
- Can grow 8 cm (3 in) per day
- Large, bamboo-like clumps, 1-3 m high

# Japanese Knotweed

## Flowers & Fruit

### Flowers

- Small, white-green, bloom in sprays near end of stem in late July/August-October
- Produced in branching panicles (clusters)
- Panicles usually longer than the closest leaves (key ID feature)

### Fruit

- Seeds are winged, triangular, shiny and very small
- Dioecious: much of the JK in ON thought to be a male-sterile clone; when pollination occurs, it is unknown if seeds are viable



# Japanese Knotweed

## Rhizomes

- Quickly develops large, underground root systems (rhizomes)
- Account for two thirds of total plant mass
- Extend more than 2 m deep and 14-18 m away from parent plant
- Spread outwards at a rate of 50 cm per year in optimal conditions
- Stem or rhizome as small as 1cm can produce new plants within 6 days if submerged in water



Pieces of the stem or rhizome can produce new plants, as seen in this photo of improperly disposed soil with Knotweed fragments.

Photo by: BC Ministry of Forests, Lands and Natural Resource Operations

# Distribution and Habitat

## ❑ Ontario

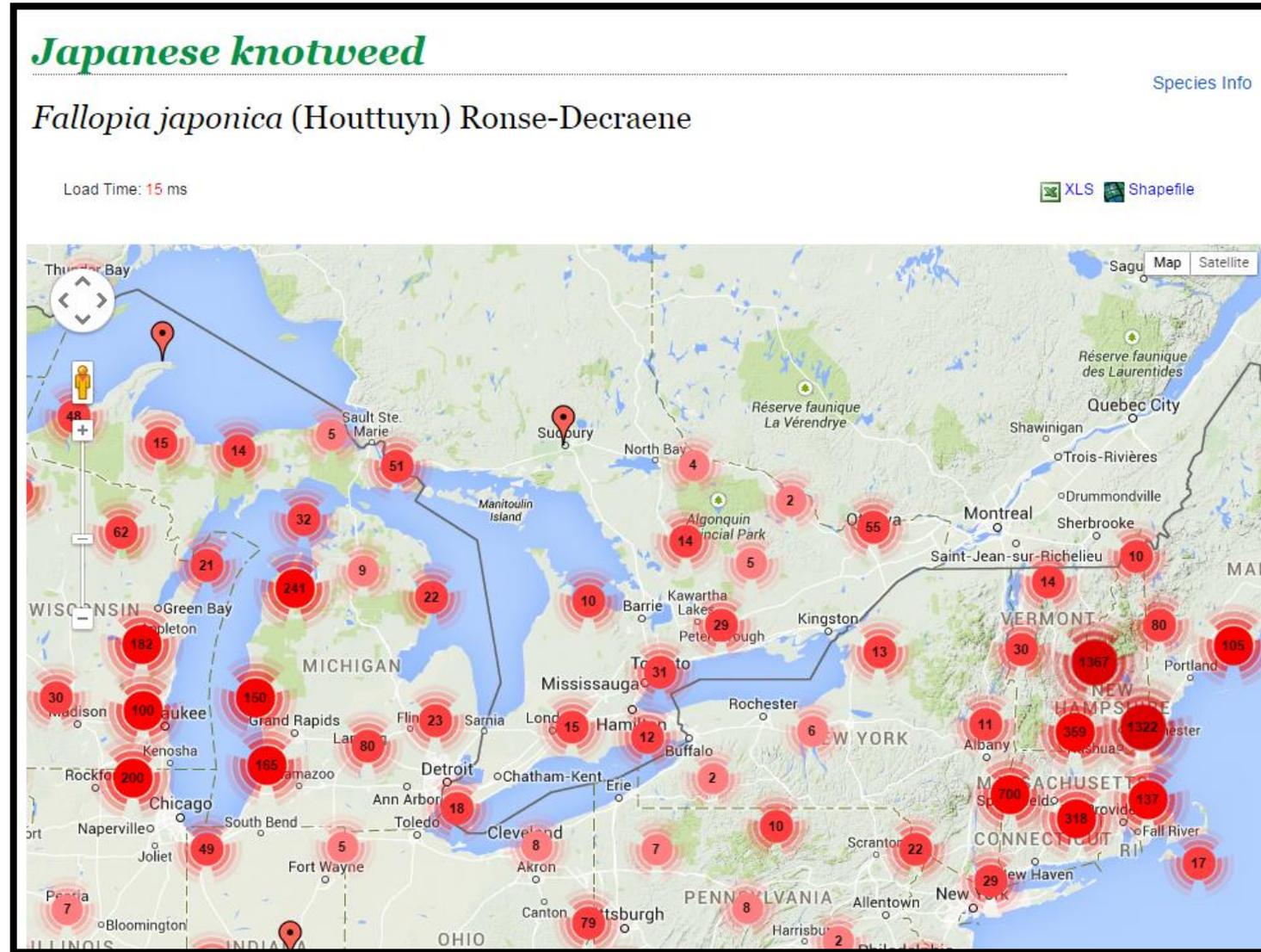
- S. ON, N. ON - Sault Ste.- Marie and Thunder Bay

## ❑ Nationally

- Primarily in ON, QC, and the Atlantic Provinces
- Isolated populations in Winnipeg, MB and BC

## ❑ Internationally

- Widespread in NE USA
- Europe, Australia and New Zealand.



# Japanese Knotweed – Habitat



Photos by: Bugwood.org (4) BC Ministry of Forests, Lands and Natural Resource Operations (above)

# Impacts - Biodiversity

- Severely degrades wetland and riparian habitats quality
- Dense thickets reduce sunlight penetration >90%
- Eliminates native groundcover species completely
- Decreases number of native amphibian, reptile, bird or mammal populations (e.g. native Green Frog, *Rana clamitans*)
- May be allelopathic



# Impacts - Infrastructure and Recreation



## Infrastructure

- **Grows through concrete or asphalt**
- Root systems, while extensive, do not hold soil as well – soil banks can become unstable and prone to erosion and flooding
- In the UK, developers must dispose of soil with knotweed fragments at hazardous waste facilities

## Recreation

- Block or interfere with water access