

The background of the slide is a photograph of several aquatic insects, likely stoneflies, inside a clear petri dish. The insects are dark-colored with long, segmented bodies and long legs. They are scattered across the dish, with some showing their wings and others showing their legs. The lighting is bright, creating some reflections on the surface of the dish.

2011 Muskoka Stewardship Conference Nipissing University Muskoka Campus

Aquatic Invasive Species Monitoring

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Overview

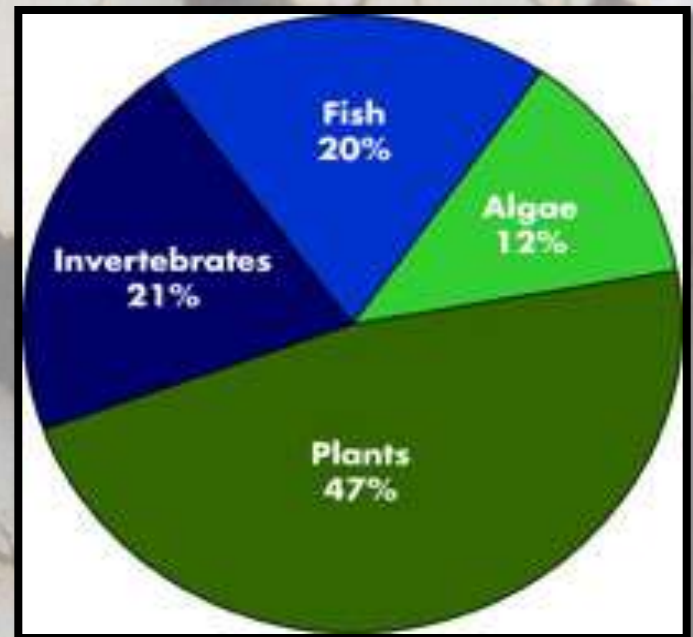
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Terminology

- **Alien Species**: species occurring outside historical known **natural** range due to intentional or accidental human activity (MNR& OFAH, 2008)
- **Invasive Species**: introduction of non-indigenous species into ecosystem causing harm to economy, environment, human health, recreation or public welfare (MNR & OFAH, 2008)
- **Native Invasive Species**: Invasive to ecosystem but native to country, ie: may be from another province (USDA, 2011)
- **Non-Native Invasive**: not indigenous (alien) to ecosystem,, introduced from other countries (USDA, 2011)
- **Aliases**: exotic alien, aquatic nuisance species (ANS), non-indigenous species

Why Be Concerned?

- Causes of decline in global biodiversity:
 - #1 – Habitat destruction
 - #2 – Invasive species
- Greater than 180 non-indigenous Aquatic Invasive Species (AIS) in Great Lakes Basin since 1800's
- Not all are invasive, many have significant ecological & economic impacts (MNR & OFAH, 2008)
- 53% of Invasives are aquatic (Environment Canada, 2011)



How They Invade

- Natural movement of species is through migration, change in climate , habitat destruction - normally occurs over several years
- Humans contribute to distribution through economic/social activities
- AIS are introduced to waterways by:
 - Ballast water from ships
 - Recreational & commercial boating
 - Aquarium and horticulture trade
 - Dumping of live bait
 - Live food fish industry
 - Fish transferred/introduced without prior authorization
 - Canals & water diversion

National Strategy & Action Plan

- In 2002, Aquatic Invasive Species Task Group created to address AIS by Canadian Council of Fisheries & Aquaculture Ministers (CCFAM) - minimize introduction of species & remediate current negative impacts
- 2006, Ballast water control, management regulations implemented 4 processes :
 1. Vessel must not exchange ballast water in restricted zones
 2. Treatment by chemical biocide or UV (as of 2008 none are approved)
 3. Discharge ballast water to reception facility
 4. Retention of ballast water on ship

(MNR & OFAH, 2008)

Monitoring Program for Communities

- OFAH Invading Species Awareness Program

<http://www.invadingspecies.com/indexen.cfm>

- Field guide to all species – information on: identification, collection & reporting

- Report A Sighting: online, step-by-step reporting form or toll free phone number

Examples of Aquatic Invasive Species

Didymo (*Didymosphenia geminata*) – aka “Rock Snot”

Characteristics: Microscopic single-celled organism, produces stalk, attaches to submerged surfaces (OFAH, 2008)

Impacts: Non-toxic - clogs water intakes & can change invertebrate communities (Bothwell Dr M, 2008)

- Creates thick mat on submerged surfaces, brownish-yellow colour (OFAH, 2008)
- Spread by attaching to boat, trailer, fishing gear, diving equipment, waders, etc. (OFAH, 2008)

Prevention: remove, leave away from water to dry in sun

Equipment: soak & scrub in:

Water above 60° C

2% solution of bleach

5% solution of salt

5% solution of antiseptic hand cleaner or dishwashing liquid



(Cook C, 2010)



(Cook C, 2010)

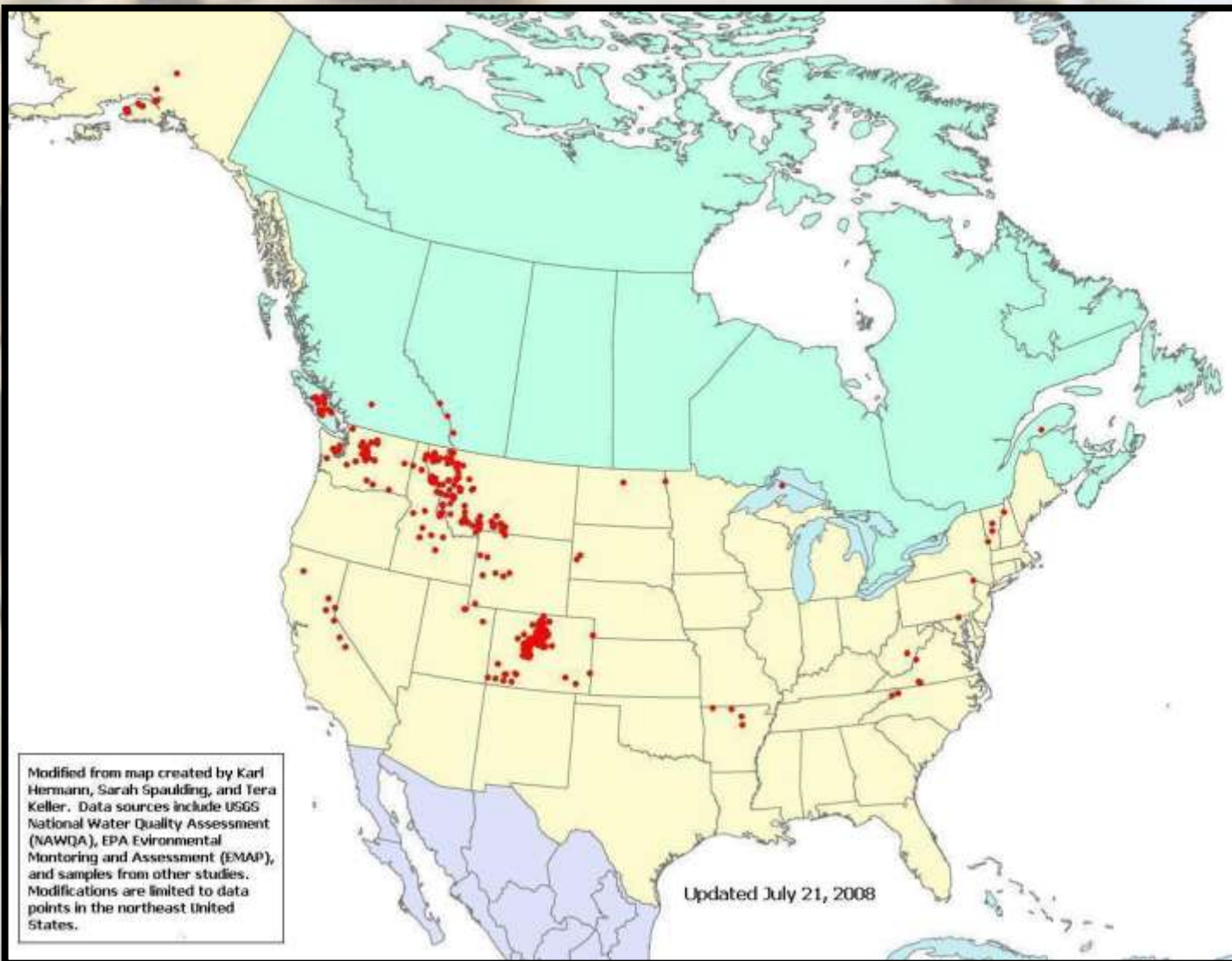


(Cook C, 2010)



(Bothwell, Dr M, 2008)

Didymo Distribution



(United States Environmental Protection Agency, 2011)

Spiny Water Flea (*Bythotrephes longimanus*)

Introduction: Ship ballast water

Characteristics: Hard outer shell, long tail
w/thorn-like barbs

Collects in jelly-like masses/clusters

Head – single large black eye, pair of
mandibles (USDA, 2011)

10-15 mm Tail, may have orange, blue,
green – red stripe runs half length of
tail (OFAH, 2011)

Impacts: Significant changes in
zooplankton (OFAH, 2011)

Reproduce quickly, monopolize food source

Spines affect growth/survival rate of
juvenile fish (OFAH, 2011)

Prevention: thoroughly wash boats, trailers,
fishing equipment, mooring lines, allow
to dry for 5 days

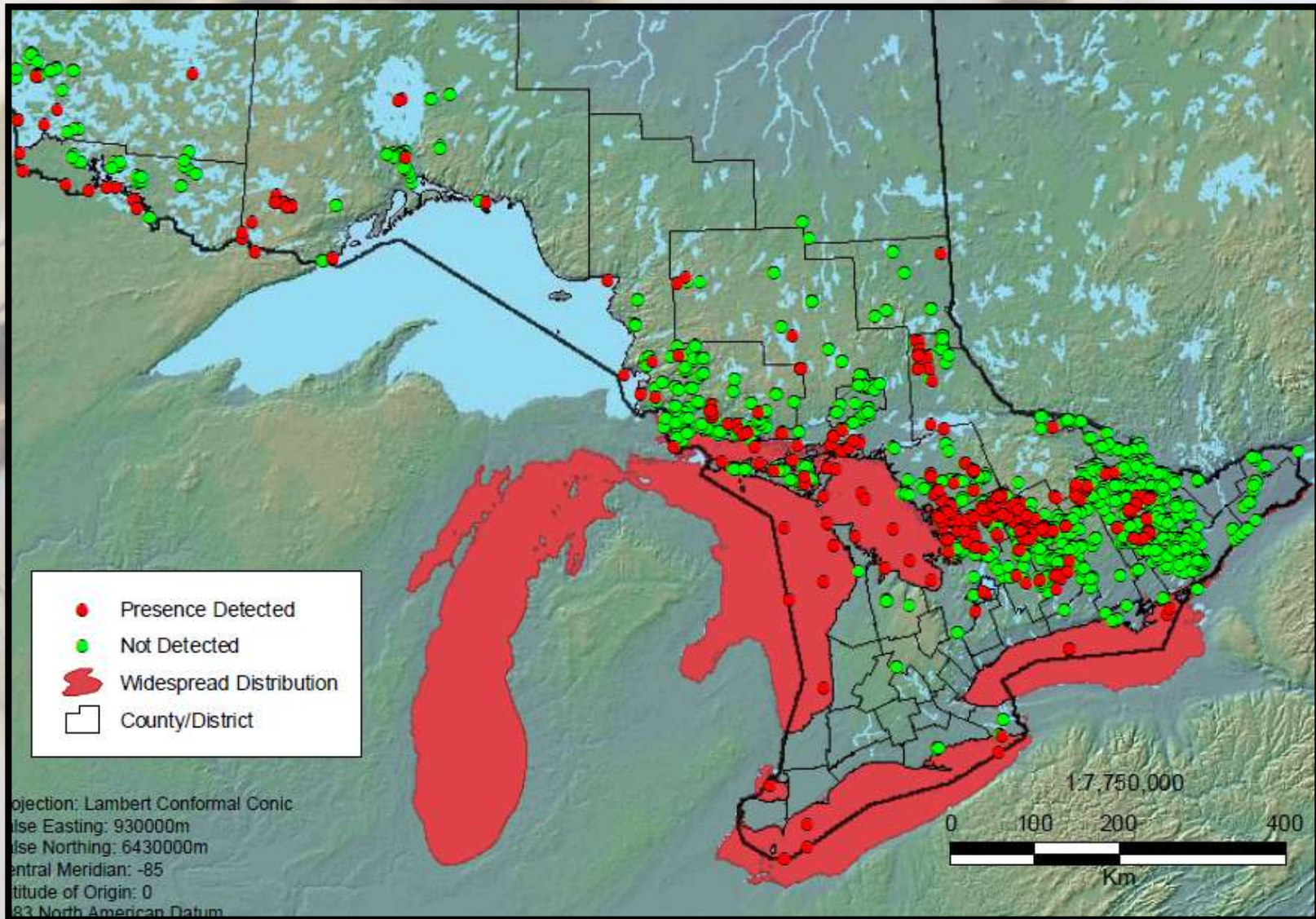


(Minnesota Department of Natural Resources, 2008)



(Jaeger Miehl, AL , 2010)

Spiny Water Flea Distribution



(OFAH, 2011)

Rusty Crayfish (*Orconectes rusticus*)

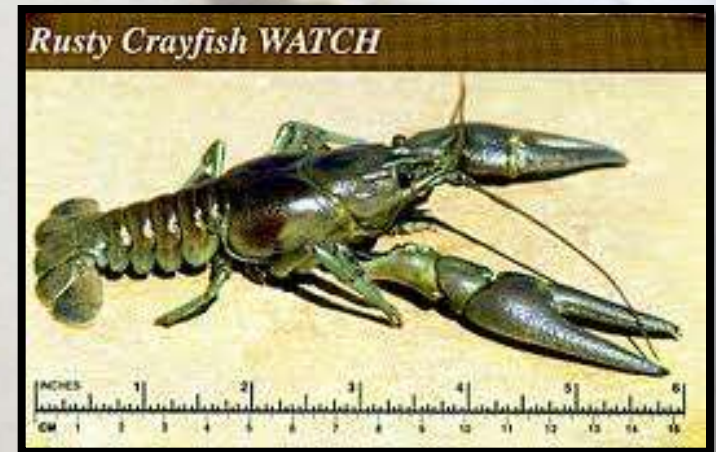
Introduction: 1960's; used as bait by fishermen

Characteristics: Brown body, greenish-rusty coloured claws w/dark bands near tip, prominent rusty patches either side of carapace. Average 10 cm (4 inches) long, not including claws (OFAH, 2011)

Impacts:

- can consume twice as much food as native species
- Outcompetes native species for best daytime hiding locations
- More aggressive mannerisms
- Native species have been displaced in Kawartha Lakes & Northern Ontario (OFAH, 2011)

Prevention: *When fishing, crayfish must be used in same waterbody where caught, dispose of unused crayfish* (OFAH, 2011)

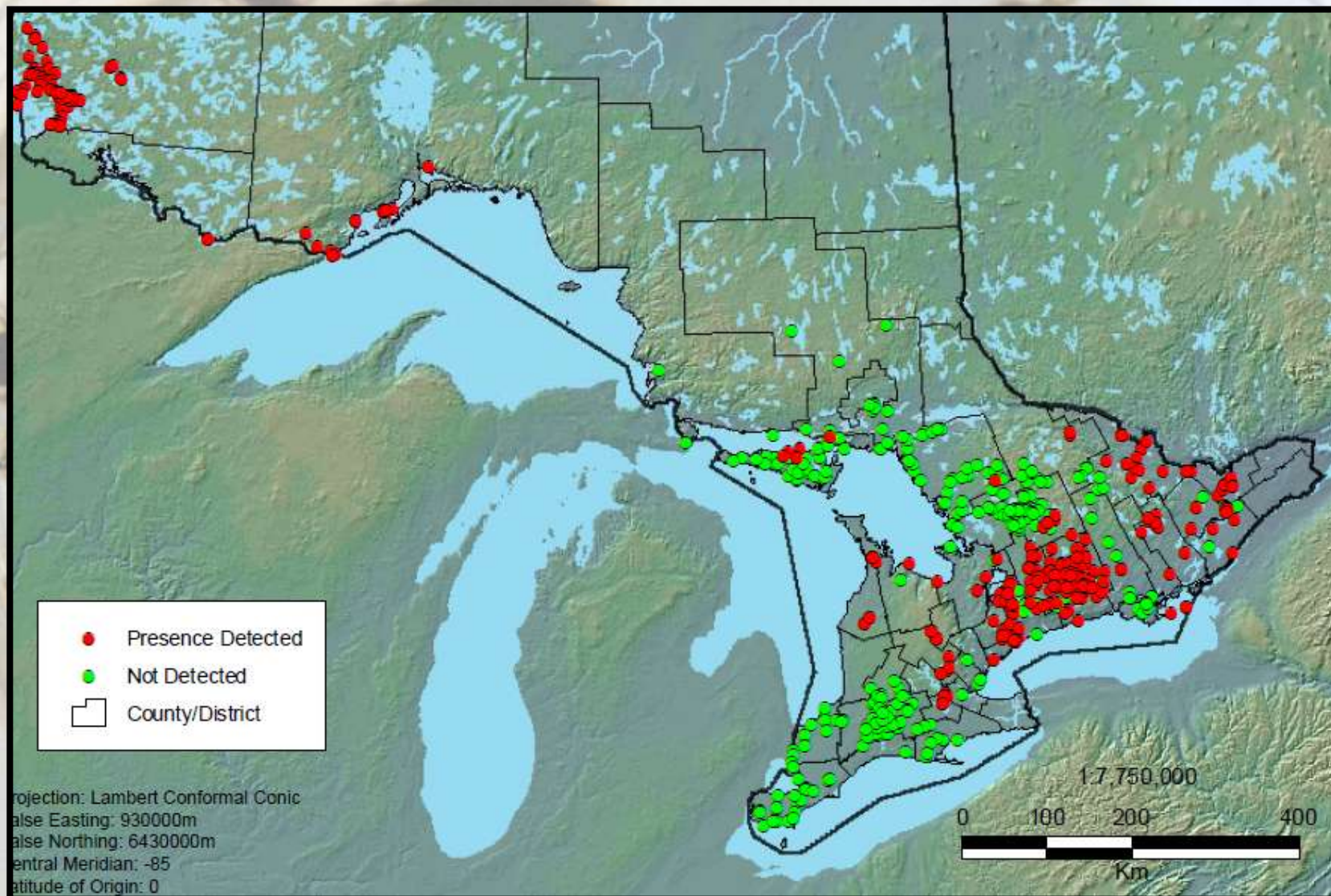


(US Fish & Wildlife, 2009)



(Westaby D, 2011)

Rusty Crayfish Distribution



(OFAH, 2011)

Round Goby (*Neogobius melanostomus*)

Introduction: St. Clair River, 1980's from Europe
in ship ballast water

Characteristics:

Mottled brown colour, resemble native sculpins

Unique pelvic fin fused underneath body
forming suction disk, enables suction to
bottom of waterbody in fast currents

Prominent black spot on first dorsal fin

Impact:

Very abundant in St. Clair River, Lake Erie, parts
of Lake Ontario.

Aggressive fish, can spawn several times each
season

Displaces native sculpins, logperch

Feed on zebra mussels

Prevention:

Learn to identify Round Goby's, if found, kill

Do not use as bait fish

Always drain water from boat after fishing

Never dump live fish from one water body to
another

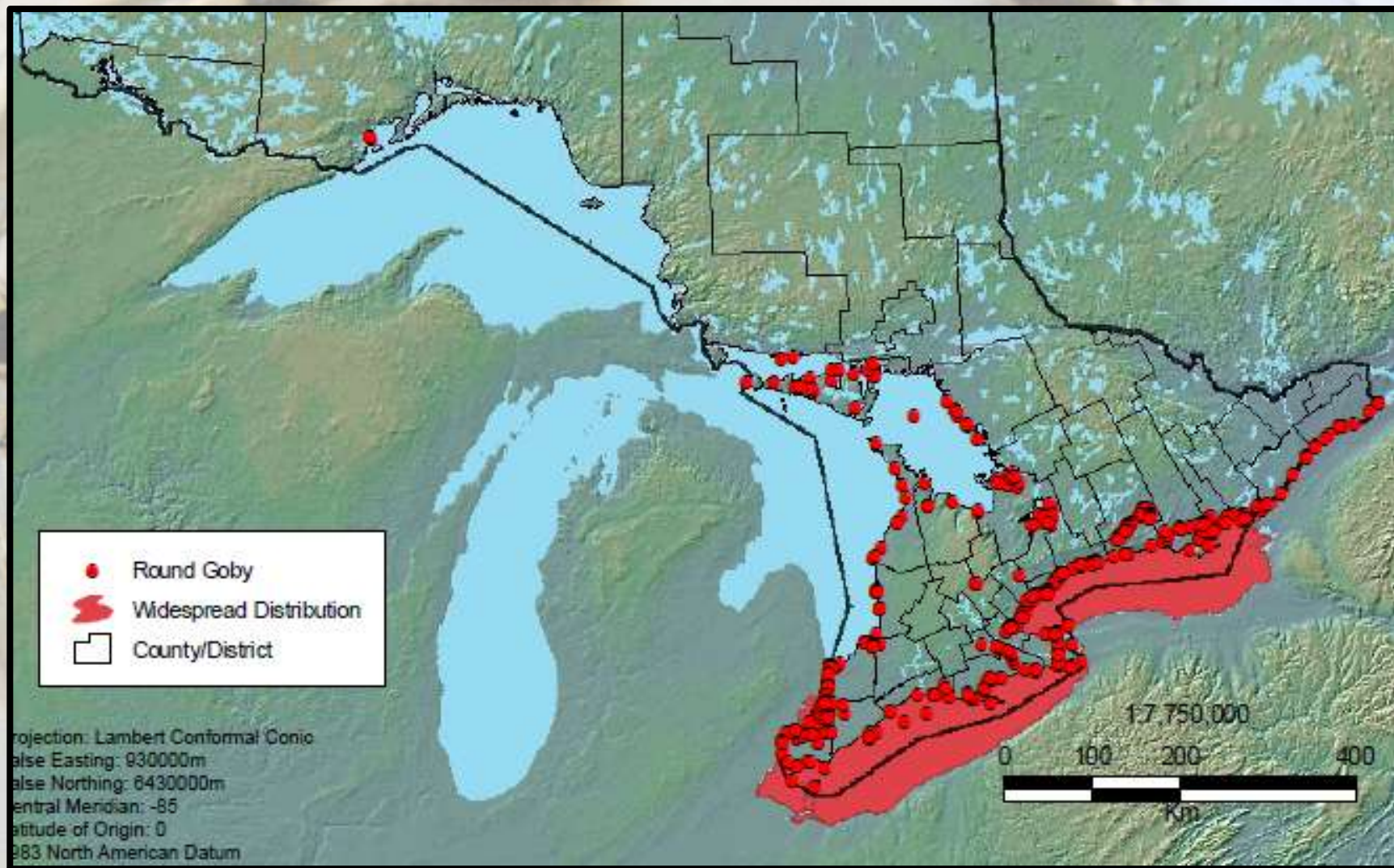


(Crossman, Holm, 2011)



(Toronto Region Conservation Authority, 2011)

Round Goby Distribution



Eurasian Watermilfoil (*Myriophyllum spicatum*)

Characteristics: Submerged, rooted plant arranged in whorls with feathery leaves (OFAH, 2008)

Impacts: Forms dense mats that block out sunlight for other plants.

Stem fragments drift to new areas forming new mats (OFAH, 2008)

Out-competes native plants, changing diversity/water quality (OFAH, 2008)

Interferes with recreational activities i.e swimming/boating (OFAH, 2008)

Prevention:

- Checking and cleaning boats and trailers
- Hand-pulling
- Dredging
- Herbicides
- Biological Control (weevil)



(OFAH, 2011)



(Outdoor Alabama, 2008)

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Questions

Zebra mussel



Sea lamprey



Fanwort



Asian carp