

Invasive Species in Michigan Prioritizing Monitoring and Response Efforts

Michigan Natural Features Inventory

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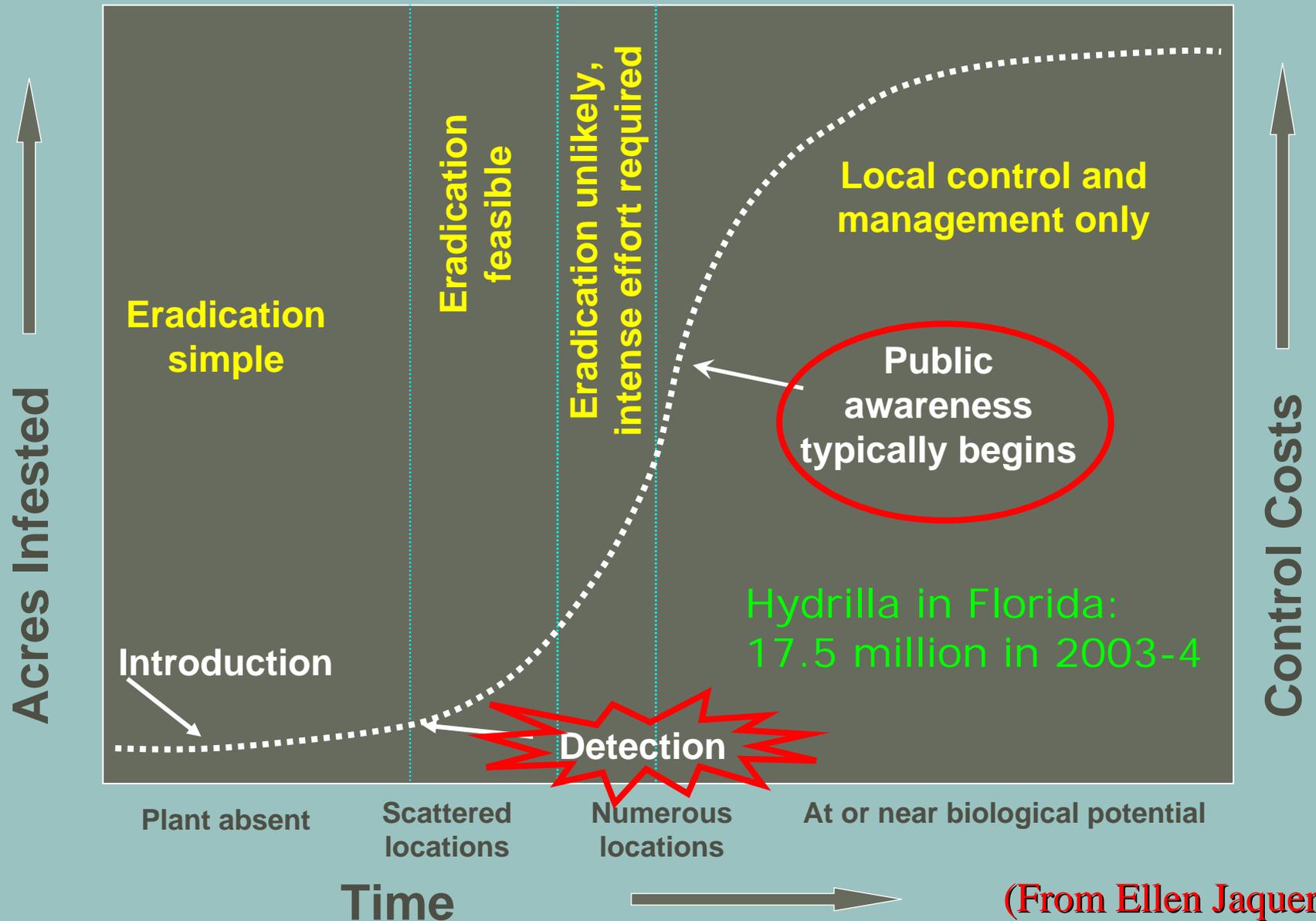
Statewide Monitoring Protocols
for Early Detection

Statewide monitoring:

- ◆ Why?
- ◆ Challenges
- ◆ EDRR – guidelines from NISC
- ◆ Early Detection Needs
- ◆ Prioritization Approach
- ◆ Some MNFI work
- ◆ Summary



Weed Increase Over Time and Control Potential



(From Ellen Jaquert)

By the time you are in the control and management strategy, the cost is huge and the failure rate is high.



Challenges:

- ◆ It's hard to detect rare things!
- ◆ It's time consuming to train non-professionals
- ◆ It's hard to implement adequate monitoring protocols within context of other monitoring work
 - extra time
 - extra cost
 - differing sampling methods – many taxa
 - optimal locations may be different
- ◆ No one size fits all
- ◆ Standardized monitoring protocols are in their infancy
- ◆ Monitoring can facilitate spread of some species



Mandate:

- ◆ cost of ecosystem impacts > cost of implementing monitoring?
 - Hydrilla in Florida: 17.5 million in 2003-2004
- ◆ Hydrilla success story – California
 - limited to 30 lakes for 28 years (MI Sea Grant)
 - eradicated from 2/3 of them
- ◆ It can be done!
- ◆ Education, will, and wisdom
 - people protect what they understand and care about



Early Detection & Rapid Response

- ◆ National Invasive Species Council guidelines - three phases:
 - Detection
 - Rapid Assessment
 - Rapid Response



1. EDRR – Detection

- Active detection networks
- Passive detection networks
- Research (what contributes to invasions?)
- Training
- Stakeholder approval
- Voucher specimens
- Authoritative verification
- Data accessibility
- Integration of detection technologies
- Syndromic surveillance (damage by invaders)
- Communication
- Biological shifts



2. EDRR - Rapid Assessment

- ◆ Preliminary risk assessment for high priority species
- ◆ Rapid risk assessment of newly detected species
- ◆ Consistent data definitions and interoperable formats (build data to support risk assessments)
- ◆ What data can we collect during the detection process that can inform this phase of EDRR?



3. EDRR - Rapid Response:

- ◆ Support for planning
- ◆ Standing teams
- ◆ Previous training
- ◆ Rapid response manuals
- ◆ Rapid response teams set appropriate schedules for action
- ◆ Dynamic rapid response plans
- ◆ Stakeholder input
- ◆ Adequate flexible and available funding
- ◆ Cooperation with non-affected areas
- ◆ Understand and follow all relevant laws
- ◆ Concepts of closest available forces and total mobility
- ◆ Public outreach



Needs for monitoring/detection:

- ◆ Prioritized hit list and monitoring points
- ◆ Trained monitors
- ◆ Identified monitoring goals:
 - baseline data of ecosystems prior to infestation (syndromic)
 - **early detection of new species or infestations**
 - implementation monitoring
 - effectiveness of treatment
 - research baseline data
- ◆ Appropriate sampling methods
- ◆ Minimum data standards
 - what, where, how much
 - treatable? enough data to do a rapid risk assessment?
- ◆ Equipment
- ◆ Reporting mechanism
- ◆ Coordination



Early Detection Field Guide



Japanese Knotweed

Polygonum cuspidatum

Habit: Perennial, herbaceous shrub reaching 3 m (10 ft); although it is larger than many woody shrubs, stems die but stalks persist through winter; growth form is a circular colony with interior plants dying as colony advances outward.

Leaves: Simple, alternate, broad, 8-15 cm long, 5-12 cm wide with an abruptly pointed tip and a flat base.

Stems: Upright, round, hollow, glaucous, often mottled; swollen nodes surrounded by a papery membrane; persistent dead stalks look like bamboo.

Flowers: Numerous, small, green-white flowers on a slender stalk arising from the leaf axils and near the ends of stems; blooms August-September.

Fruits/Seeds: Fruits are 3-winged, 8-9 mm, seeds are dark and glossy, wind and water dispersed.

Habitat: Semi-shade tolerant; found along roadsides, stream and river banks, wetlands, wet depressions and woodland edges; can tolerate a wide array of soil and moisture conditions.

Reproduction: Primarily through rhizomes or fragments; does not reproduce significantly by seed; spread by flood waters

Similar Species: Virginia knotweed (*P. virginianum*) - not shrub-like, flowers on a slender spike.

Comments: Forms dense thickets that shade out natives; aggressive rhizomes can damage pavement; once established, stands are extremely difficult to eradicate.

Monitoring & Rapid Response: Monitor riverbanks, stream and pond edges, particularly downstream from known occurrences; can be identified most readily while in bloom, in August and September; cutting or mowing at least 3 times per season can reduce rhizome reserves; biweekly cutting preferable; foliar herbicide application effective; provides best control when plants have been cut, allowed to resprout to 3' tall and then treated; hand pull seedlings, not larger plants as new colonies can develop from cut stems or rhizomes; continued control efforts are required to keep this species in check.

Early detection mapping

- ◆ Photos of vouchers
- ◆ Hand drawn maps
- ◆ GPS points
- ◆ Hand-held computers with mapping software coupled to bluetooth GPS receivers
- ◆ Helicopter surveys
- ◆ Remote sensing – species signatures



Mapping/monitoring

- ◆ Use every available avenue
 - Professionals dedicated to invasive sp. monitoring
 - Professionals conducting other monitoring
 - Lake and stream associations...
 - The Stewardship Network
 - Conservation Stewards
 - Master Gardeners
 - Schools
 - Volunteers
 - Many others
- ◆ Easy to use on-line reporting system with quality control
- ◆ Centralized data storage and information management



Prioritized approach:

- ◆ Three pronged prioritization
 - high threat species
 - high risk pathways
 - ◆ commerce, trade, etc.
 - ◆ natural dispersal pathways
 - ◆ leading edges of priority species
 - high value sites



High value sites (MNFI):

- ◆ **Biodiversity Atlas** – available next week
 - **Coarse level GIS analyses*** - need field testing
 - ◆ high quality aquatic communities & rare species occurrences
 - best landscape context
 - ◆ potentially unique lakes or river segments
 - ◆ concentrations of SGCN (species of greatest conservation need)



MNFI Monitoring efforts

- ◆ Surveys for listed native mussels
 - DEQ-CZM, DEQ-CMI, USFWS, MDNR
- ◆ 45 Mussel Species Native to Michigan
 - * 3 Federally & State-listed as Endangered
 - * 5 State-listed as Endangered
 - * 2 State-listed as Threatened
 - * 8 State-listed as Special Concern



Native mussels

- ◆ Gone from the Detroit River
- ◆ Lower Peninsula: zebra mussels the number one threat at all sites surveyed
 - Grand, St. Joe, Huron, Tittabawassee, Shiawassee, Cass, Muskegon, Manistee, Au Sable, Pere Marquette
- ◆ Upper Peninsula: no zebra mussels at survey sites so far
 - Munuskong, Pine, Tahquamenon,
 - Menominee to be surveyed this year

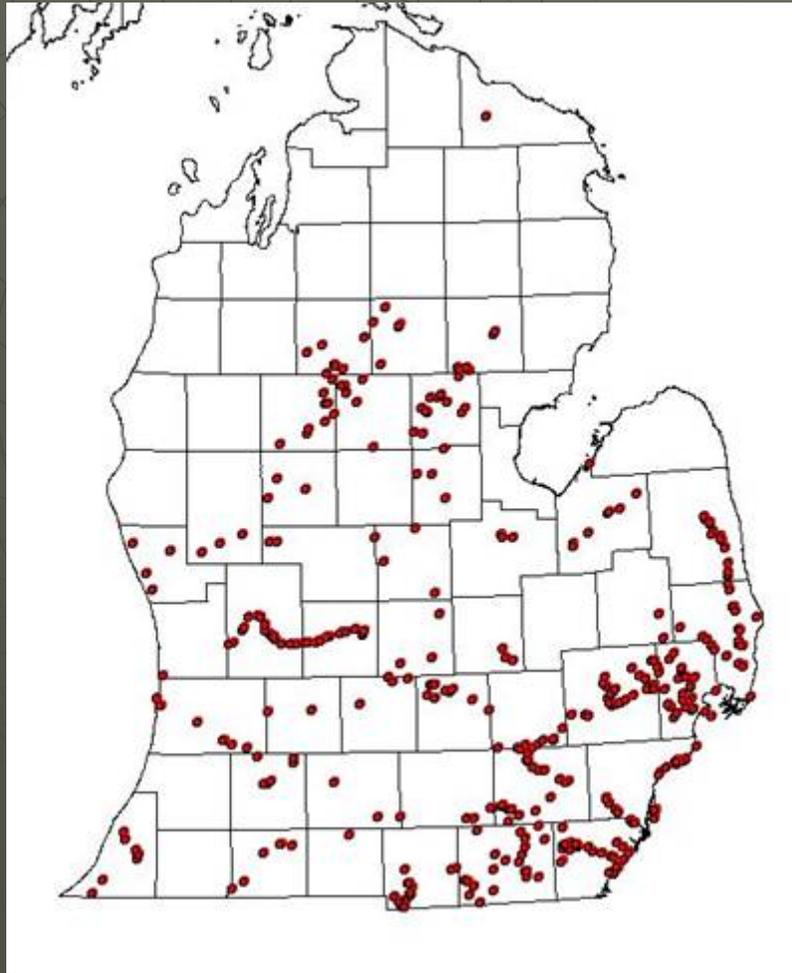




Dreissena polymorpha (zebra mussels)
attached to a native unionid mussel



Documented occurrences of listed native mussels in MI



overlay other high value categories to prioritize sites for monitoring

Survey coverage not great in upper Michigan yet



Pond surveys:

- ◆ less boat traffic; less likely impacted
- ◆ ~45 sampled for baseline data statewide
 - water quality
 - bugs
 - habitat
 - macrophytes
- ◆ no invasive mussels found



Future MNFI work:

- ◆ Vernal pools
- ◆ Ground truthing of biodiversity atlas sites
- ◆ Historical coastal occurrences data to identify potentially important sites
 - habitat
 - life histories
 - locations
 - timing of collection
- ◆ Predicted migration sites for changing ecological conditions, e.g. climate change



Summary:

- ◆ ID priority monitoring sites and species
 - High value sites
 - Pathways of spread
 - High threat species
- ◆ Field guides for all priority species
- ◆ Detector networks and training
- ◆ Species specific monitoring protocols
- ◆ Centralized data collection and information dissemination
- ◆ Identified roles and responsibilities



