Invasive Species in Michigan Prioritizing Monitoring and Response Efforts

Michigan Natural Features Inventory

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Addressing Invasive species

- Overwhelming amount of information!
- Where do we begin?
- How can we be most cost effective?

Tribute to Ellen Jaquert et al:

- They are NOT everywhere
- Mucho bucks are wasted on un-winnable battles
- We need to prioritize effectively

Stop wasting your time on invasives workshop

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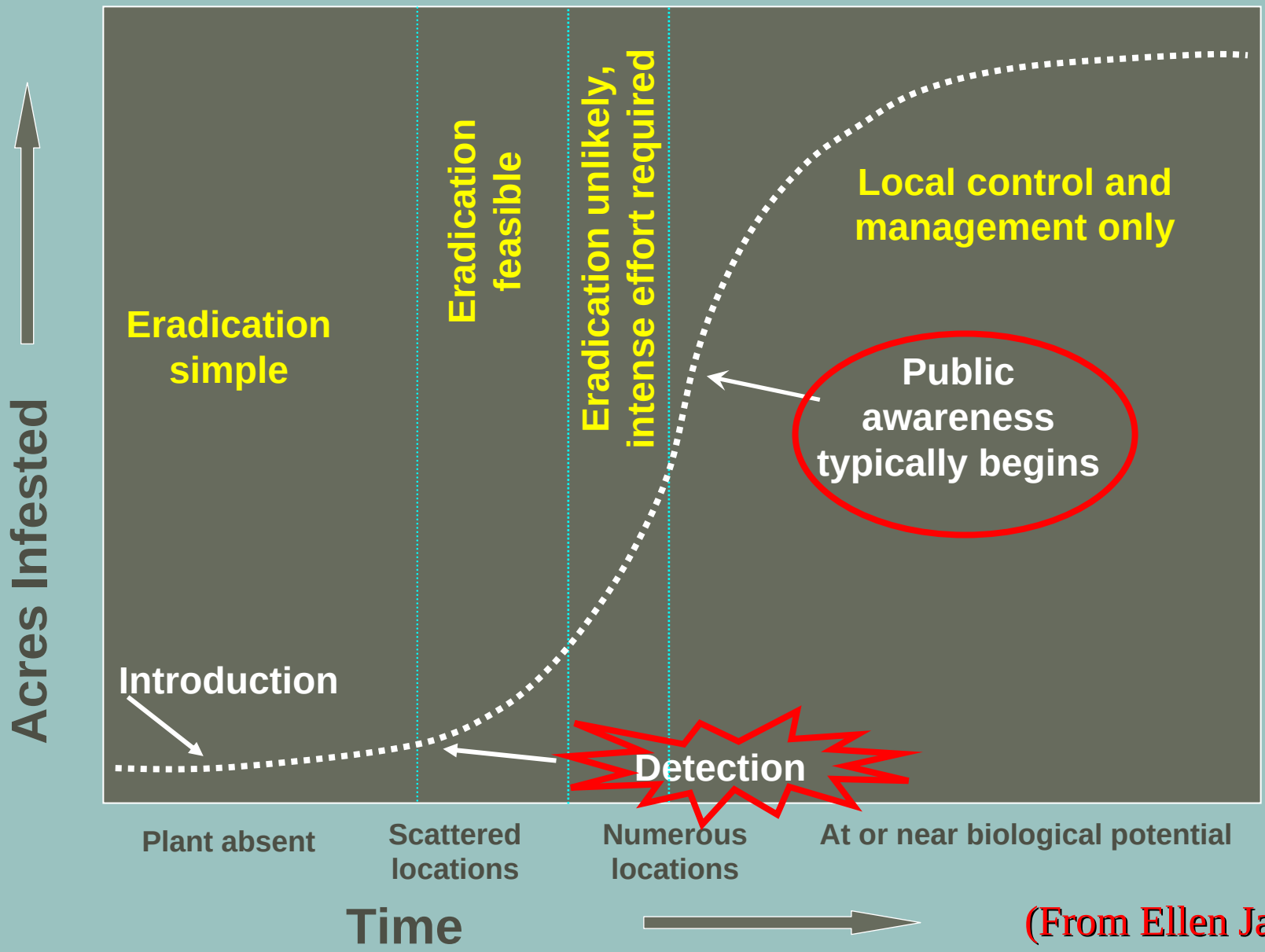
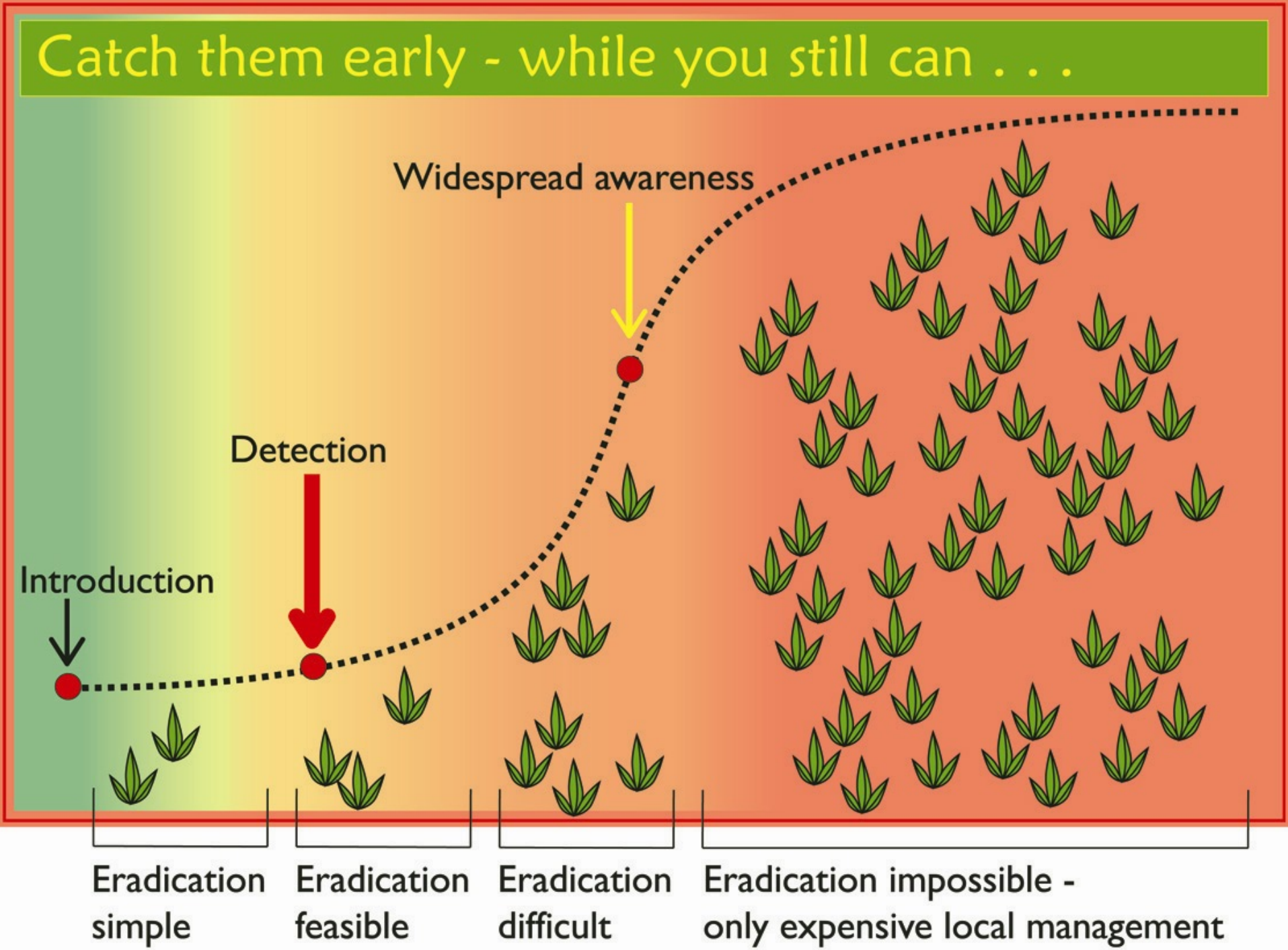
Weed Increase Over Time and Control Potential



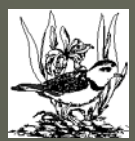
(From Ellen Jaquert)

Catch them early - while you still can . . .



The Ecological Society of America, Recommendations for US Policy

- Better manage pathways: PREVENTION
- More risk analyses: PREVENTION
- ⇧ active surveillance: EARLY DETECTION
- Emergency funding for RAPID RESPONSE
- Funding and incentives for COST-EFFECTIVE CONTROL of spread
- Establish National Center for Invasive Species Management: COORDINATION



Elements of strategy

- Define the problem
- Priority species by eco-region/watershed
- Centralized information (localized to Michigan)
- Early Detection and Rapid Response protocols
- Prioritizing long-term control efforts and restoration
- Monitoring and research
- Training
- Management guidance document
  - specific objectives and measures of success
  - roles and responsibilities
  - integrate and coordinate with other entities

The Hit List

- Many lists are out there – very confusing
- Official legal categories
  - Federal Noxious Weeds
  - MDA State Noxious Weeds
  - ISAC List – Transgenic and Nonnative organisms
    - Prohibited
    - Restricted
- Currently unofficial categories
  - Specific to various groups and organizations
  - These are important for early detection

The Better Hit List ☺

- All species with potential to impact Michigan's ecosystems
- Use existing information from places with similar habitat where they are known to be problems
- High threat invaders BEFORE they become abundant (be conservative)
- Identify highest priority species (invasiveness assessment ranks)
  - Priorities will vary by location

Abundance categories (from MIPN):

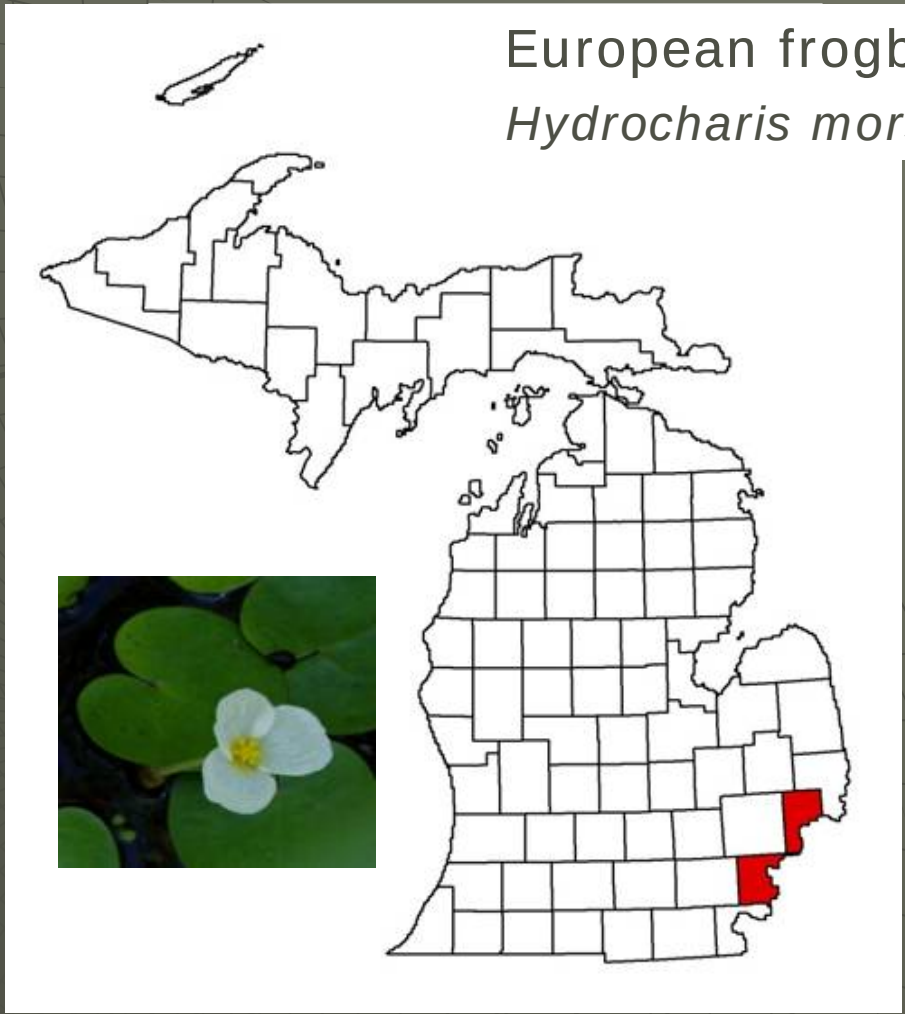
N – not present; not known in state

I – infrequent in state; not commonly seen
present in solitary populations
not in majority of counties

L – locally abundant; frequently seen in state
large or small populations

W – widespread; commonly seen in the majority of counties in large or small populations

Regionalized abundance makes sense



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Invasive Plants in (or approaching) Michigan*

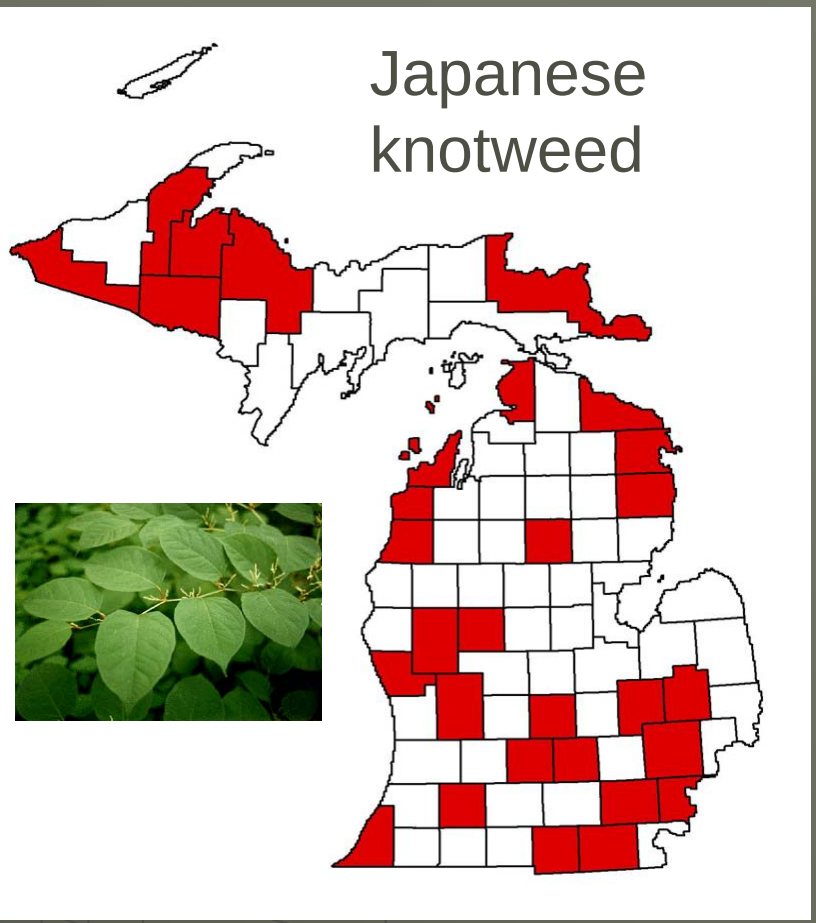
Known distribution by region and general habitat type - May 2007

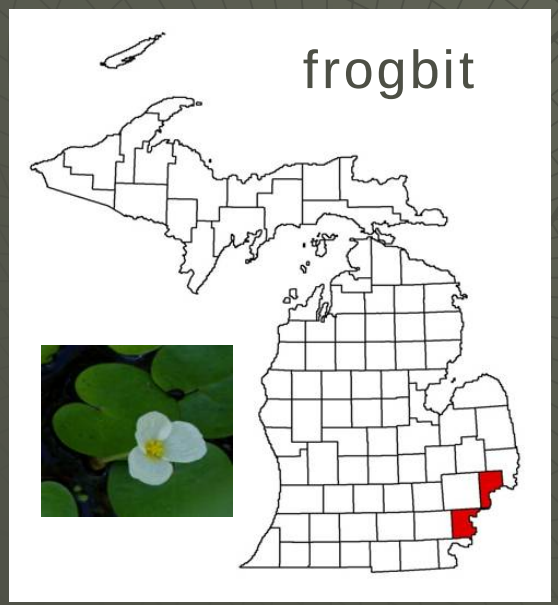
working list (compare to GLANSIS)
useful for prioritizing at multiple scales and habitats
distrib.maps, expert knowledge

Scientific Name	Common Name	Habitat					Region					Legal Status		
		Wooded Upland	Open Upland	Wooded Wetland	Open Wetland	Aquatic	SLP	NLP	EUP	WUP	MI	ISAC	Federal Noxious Weed	MDA Noxious Weed
Acer platanoides	Norway maple	■					L	I	I	I				
Ailanthus altissima	tree of heaven	■	■				W	I	N	N	L			
Alliaria petiolata	garlic mustard	■	■	■			W	L	I	I	W			
Alnus glutinosa	black alder			■	■		L	N	N	N				
Ampelopsis brevipedunculata	porcelain-berry		■				I	N	N	N				
Ampelopsis cordata	heartleaf peppervine		■		■		I	N	N	N				
Berberis thunbergii	barberry	■	■				W	I	I	L	W			
Bromus inermis	smooth brome		■				W	L	L	L				
Butomus umbellatus	flowering rush				■	■	L	I	N	N		R		
Cabomba caroliniana	Carolina fanwort					■	I	N	N	N				
Cardamine impatiens	bitter cress	■	■				I	N	N	N				
Carduus acanthoides	plumeless thistle		■				I	I	I	N	I			P
Carduus nutans	musk thistle		■				L	N	I	N	I			P
Celastrus orbiculata	Oriental bittersweet	■	■				W	I	N	N	L			
Centaurea diffusa	spreading starthistle		■				■	■	■	■				
Centaurea repens/picris/Acroptilon repens	Russian knapweed		■				■							P
Centaurea solstitialis	yellow starthistle		■				■	■						
Centaurea stoebe/maculosa/biebersteinii	spotted knapweed		■				W	W	W	W	W			P
Cirsium arvense	Canada thistle		■				W	W	W	W	W			P
Cirsium palustre	swamp thistle				■		N	I	L	L				
Cirsium vulgare	bull thistle		■				■	■	■	■				P
Convallaria majalis	lily-of-the-valley	■					I	I	I	I				
Coronilla varia	crown vetch		■				W	L	L	L	L			
Dipsacus fullonum/sylvestris	common teasel		■				W	I	I	I	L			
Dipsacus laciniatus	cutleaf teasel		■				W	I	I	I	L			
Egeria densa	Brazilian water-weed					■	N	N	N	N		P		
Eichhornia crassipes	water-hyacinth					■	I	N	N	N				
Elaeagnus angustifolia	Russian olive		■				L	N	N	N	L			
Elaeagnus umbellata	autumn olive	■	■				W	L	L	L	W			

Where are they?

- county maps – based upon current herbarium vouchers
- under-represent and over-represent





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MIPC Assessment Protocol:

- Biological Character: reproduction and dispersal.
- Impact: natural systems, managed landscapes, production systems, and constructed habitats.
- Distribution: current range in Michigan and beyond
- Control Methods: known methods of control.
- Control Effort: control efforts that are under way.
- Value in State of Michigan: value to commerce.
- Summary. Includes invasiveness ranks, a summary of supporting information, and the MIPC plan of action.

There are other ranking systems too, such as TNC's I-rank

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 persit 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; persistant 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.

http://web4.msue.msu.edu/mnfi/education/invasives.cfm

Prioritizing Dogma (a science and an art)

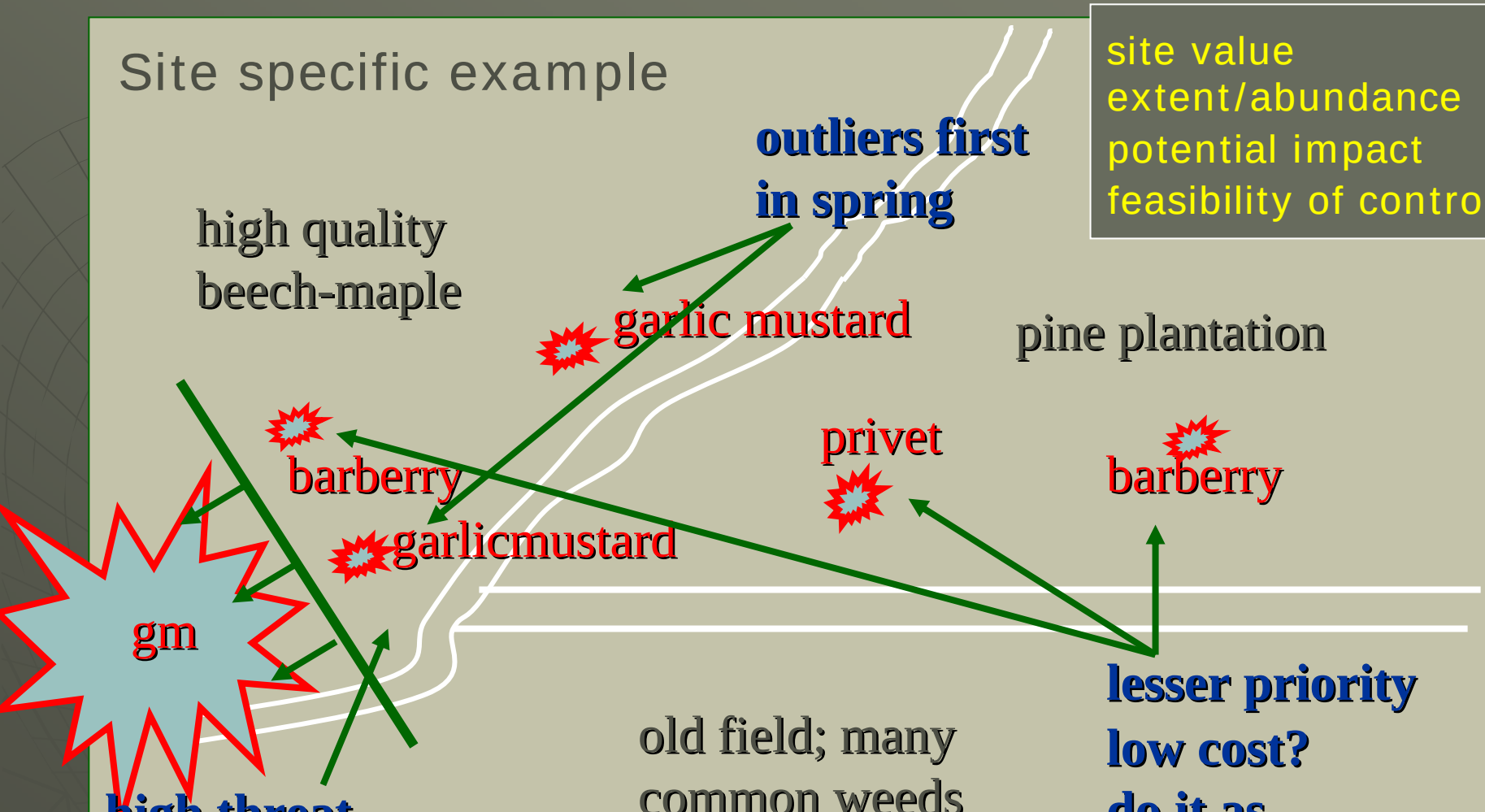
- Size and extent of infestation
- Potential impacts of invasive species
- Value of the site
- Difficulty of control

TNC Weed Template

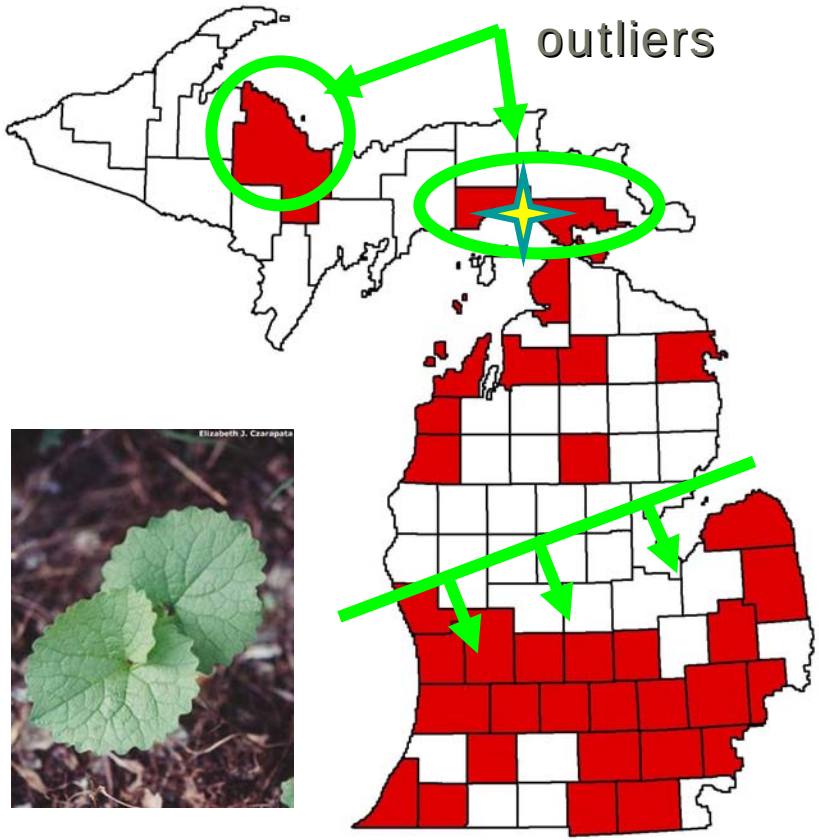
Common Name	Current Extent	Current/ Potential Impacts	Value of Habitat Infested	Difficulty of Control	**Sum**
Tree of Heaven	3	2	2	3	10
Reed Canary Grass	2	4	1	2	9
Asian Bush Honeysuckle	3	2	1	1	**7**

Site specific example

site value
extent/abundance
potential impact
feasibility of control



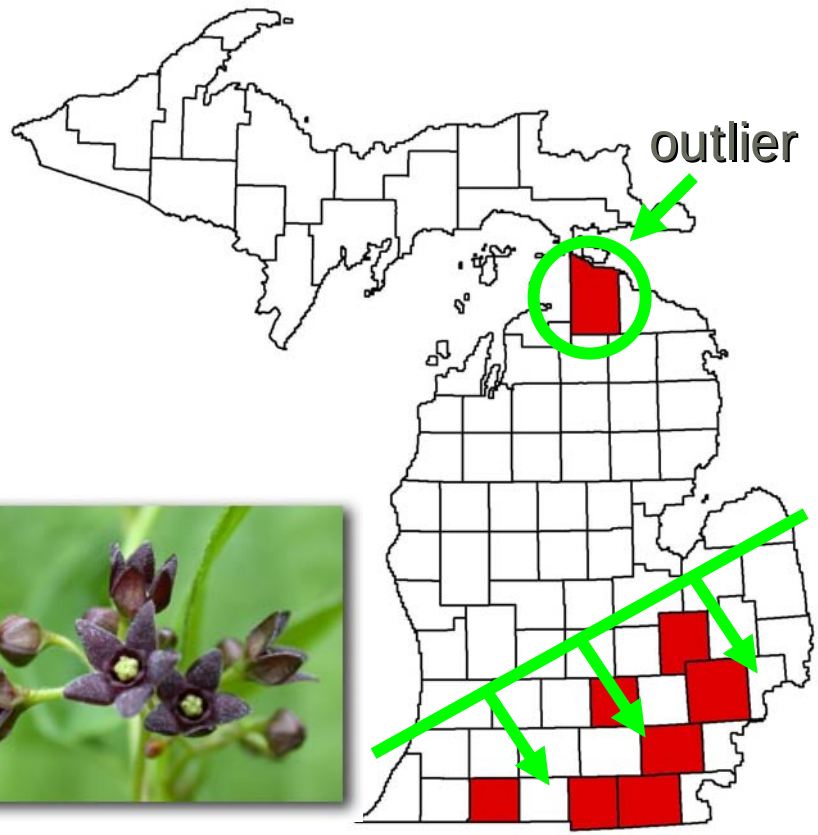
garlic mustard



- outward from high value sites
- contain centers of spread
- block dispersal pathways

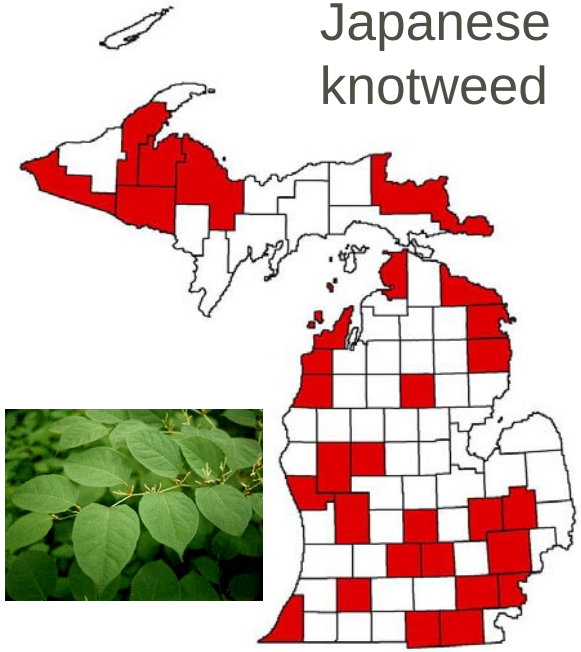
biggest impact in state

swallow-wort

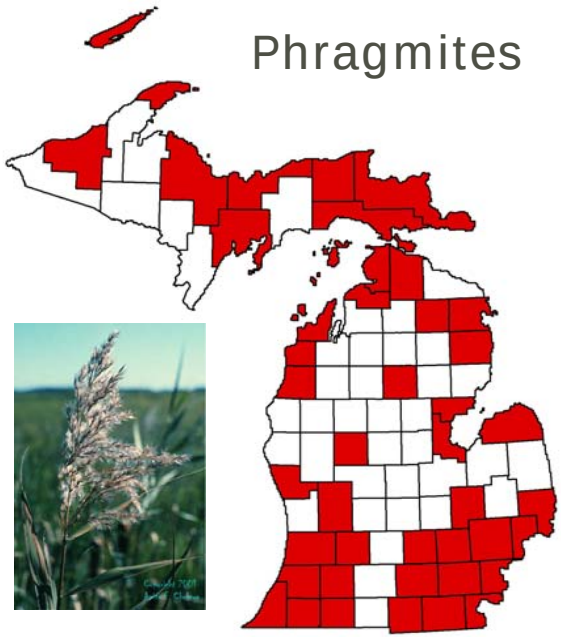


- **Value of the site****
- Extent and abundance
- Potential impacts
- Feasibility of control

Japanese knotweed



Phragmites



Need better maps!
& decision-making process!

- currently in small patches in northern Michigan
- potential impacts are high
- goal:
  - statewide eradication?
  - Northern Michigan eradication?
  - UP eradication?
  - Local eradication?
  - Do nothing?

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Mapping

- essential for effective prioritization
- one of key reasons for control failure
- everyone wants to do it but just can't quite find the time
  - quick and dirty – what, where, how much
  - intermediate – potential treatments
  - detailed site maps – specific treatments; track over time
  - research – statistical sampling

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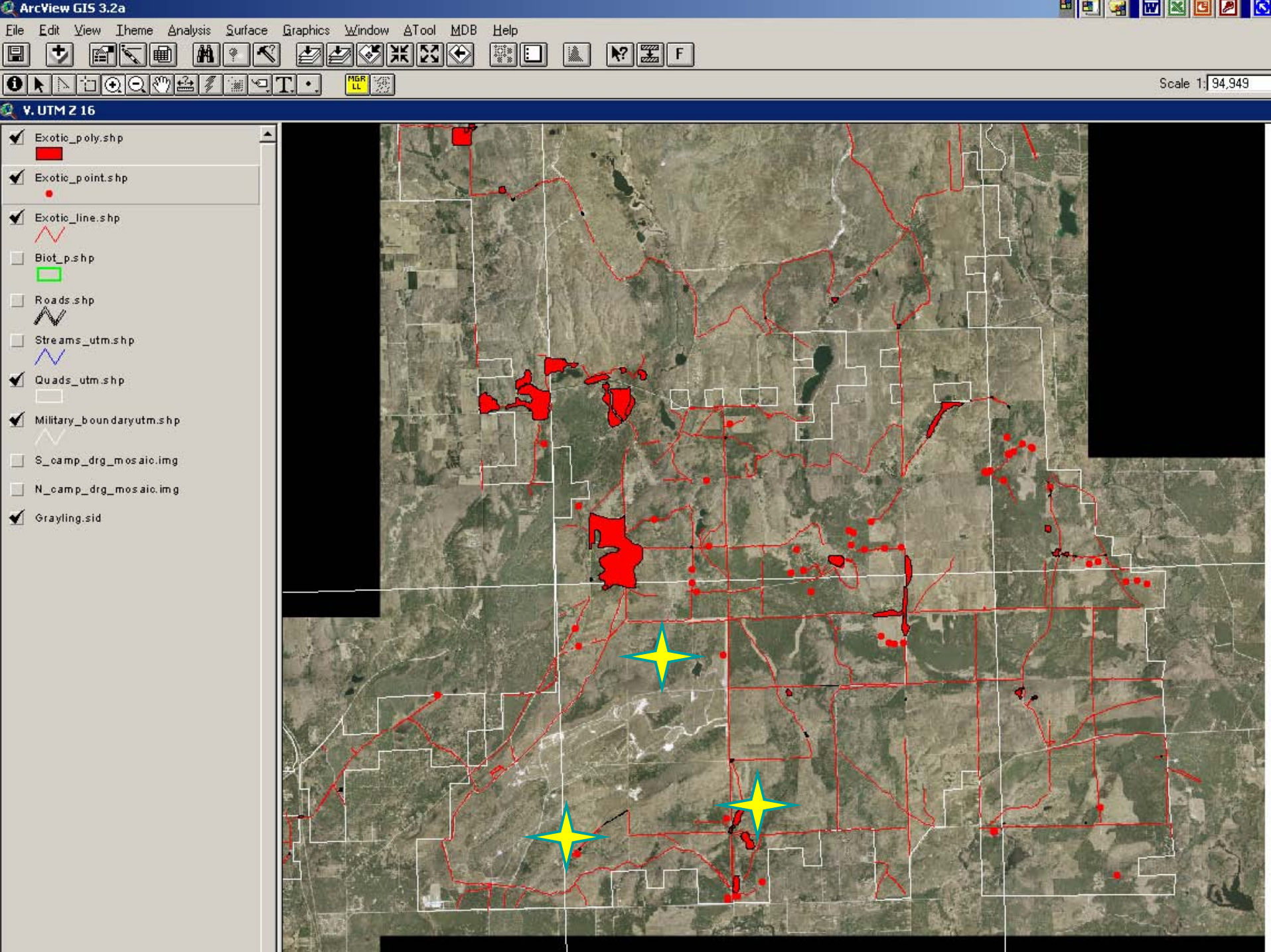
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Reasons for response failure:

- Unrealistic goals
- Lack of detection or assessment up front
- Inappropriate control methods, timing, techniques, etc.
- Lack of follow-up
  - most control will require long-term monitoring
- Inadequate capacity or designation of infrastructure to respond

Needs

- We can waste enormous time trying to be perfect!
  - identify high value sites
  - user friendly mapping tools and training
  - rapid coarse scale mapping of high threat species
  - aggregate data to assess statewide, regional priorities
  - multi-jurisdictional funding mechanism to implement early detection, rapid response, and prioritized control (build capacity to respond)
  - create detection networks, strike teams

Mapping/monitoring

- Use every available avenue
- Easy to use on-line reporting system with quality control
- Three pronged prioritization
  - high value sites
  - high threat species
  - high risk pathways
    - commerce, trade, etc.
    - natural dispersal pathways

Monitoring invasive species in MI

1. Collection of species distribution data – MSU research and extension (Michigan Natural Features Inventory– MNFI), TNC and other partners

2. Data analysis and database hosting – MSU Invasive Species Initiative

3. State-wide reporting and educational website (Collaboration between MNFI, partners, and researchers)

Long-term: Contribute to larger area (regional, national) databases