Common Invasive Plants ID and Management

Jenny Sanders, DER

Ale Echandi, DCR

Outline

1. **Introduction to Restoration**
2. **Introduction to invasive plant management**
3. **10 common invasive plants**
4. **Q & A**

What is Restoration?

"Ecological restoration is the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed."

Society for Ecological Restoration (SER) Primer (2004)

Slide: Alex Hackman, Restoration Ecologist & DER Cranberry Bog Program Manager

“Assisting in recovery” requires an understanding of how the whole system works *(like a doctor)*

How can one diagnose what is wrong with the patient?

How can one discern symptoms from causes?

How can one prescribe treatments?

Photos: Neponset River Watershed Association, www.neponset.org/

Slide: Alex Hackman, Restoration Ecologist & DER Cranberry Bog Program Manager

Source: https://www.bobvila.com/slideshow/no-more-mowing-10-grass-free-alternatives-to-a-traditional-lawn-47640

Ecological Restoration “recipe”

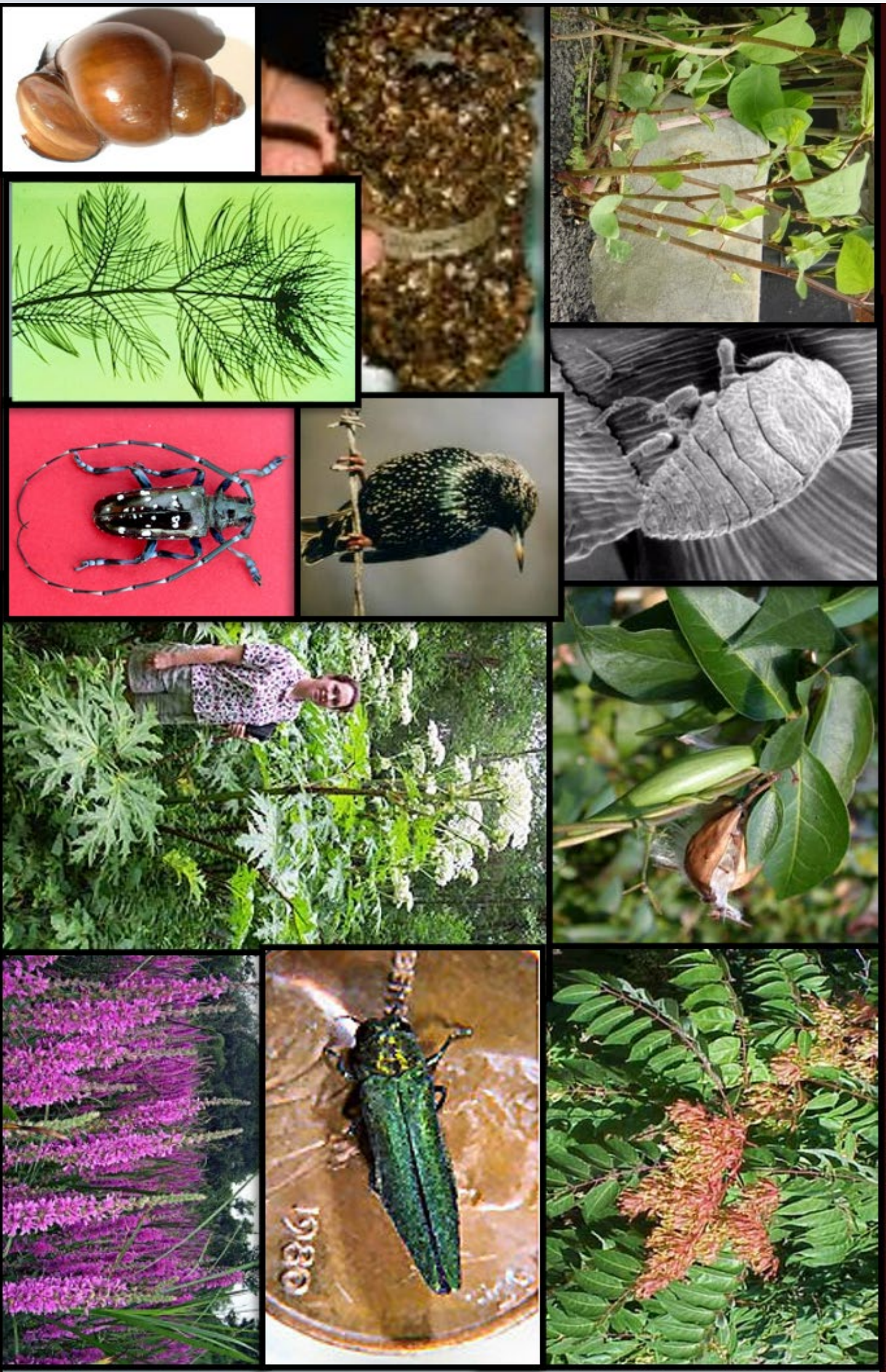
1. Diagnose the problem
2. Assess the conditions
3. Plan restoration actions

Slide: Alex Hackman, Restoration Ecologist & DER Cranberry Bog Program Manager

Embrace uncertainty

Photos: J. Sanders (top left), unsplash.com (top right and bottom)

Name the Invasive!



Invasive Species

- Federal: "an **alien species** whose **introduction** does or is likely to cause **economic or environmental harm** or **harm to human health**" as per Executive Order 13112: Section1. Definitions (1999)

- Massachusetts Invasive Plant Regulations:
  - Prohibited Plant List
  - Massachusetts Invasive Pest Advisory Group (MIPAG)
    - Of the **2263** plant species in Massachusetts that have been documented as native or naturalized (established newcomers introduced directly or indirectly by man), about **725** (32%) are naturalized. Of these, recognized **69** are recognized as "Invasive," "Likely Invasive," or "Potentially Invasive."

How did they get here and how are they spread?

- **People/Development**
  - Intentional plantings- ornamentals/agriculture
  - Inappropriate disposal/removal
  - Dumping (yard waste)
  - Use of contaminated material (stone dust, compost, loam, etc.)
  - Hikers, bikers, pets, farm animals
  - Stormwater runoff
  - Vehicles, machinery, mowers, boats, firewood
  - Shipping containers/commercial transport

- **Natural Conditions/Phenomena/Factors**
  - Rivers, streams, lakes and ponds
  - Rain, wind, tornados, storms, etc.

- **Wildlife**
  - Birds and mammals: seed dispersal
  - Herbivory and preferences or lack thereof

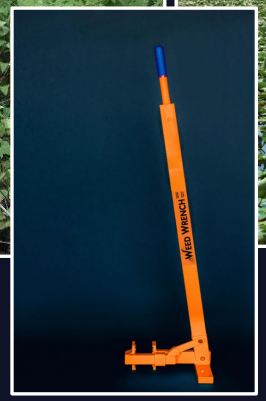
Why do we care about invasive plants?

- Local Ecosystem functions
  - Rare species & their habitats
  - Biodiversity – one v. multiple species
  - Food web and natural selection
  - Natural plant communities
- Protection of historical/cultural resources
- Recreational and scenic impacts
- Coupled with climate change- reduction in ecosystem resilience and increase impacts to biodiversity
- Doug Tallamy, Are Alien Plants Bad? SuAsCo CISMA Presentation

Invasive Plants- General Characteristics

- Habitat generalist- can survive anywhere
- Grow early, fast and for a long time
- Self-pollinating, cloning or easy pollination
- Prolific seed producers
- High dispersal ability
- Phenotype plasticity (ability to alter growth form to suit current conditions)
- Secrete chemicals (Allelopathy and toxins)
- Not native= no natural predators, pathogens or parasites





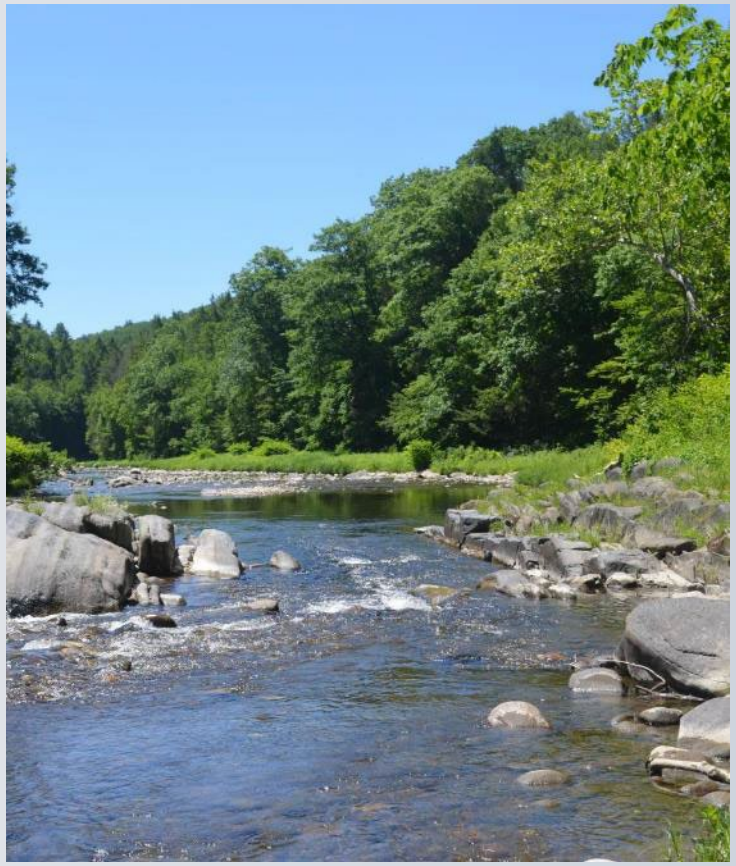

How are they managed?

Depending on the plant's biology, once established, invasive plants may be managed…

- Manual
- Mechanical
- Cultural
- Chemical
- Biocontrol
- IPM- Combination of above!

NEVER a one year/one time project!

Management Considerations



- Time a year
- Sensitive Resources:
  - Wetlands
  - Water Supply
  - Rare Species
  - Cultural Landscapes & Archeological Sites
- Long Term Project Sustainability
- Disposal

Disposal

Research the plant,
understand how it grows and spreads!

- **Brush piles**: generally acceptable for woody invasive shrubs. Remove seeds/seed heads. Never stockpile in a wetland!
- **Bagging/Solarization**
- **Tarping and Drying**
- **Chipping**
- **<u>Burn Permits</u>**
- Encourage your local DPW to obtain DEP permits for invasive disposal

-john.fischer@ state.ma.us
DEP Commercial Waste Reduction and Waste Planning

Did you know?

There are no designated areas in the state for disposal of invasive plants.

Massachusetts Department of Environmental Protection (Mass DEP) regulations 310 CMR 19.017 ban landfill, transfer, or combustion facilities from accepting yard waste except for recycling or composting

Woody Plants	Method of Reproducing	Methods of Disposal
Norway maple *(Acer platanoides)* European barberry *(Berberis vulgaris)* Japanese barberry *(Berberis thunbergii)* autumn olive *(Elaeagnus umbellata)* burning bush *(Euonymus alatus)* Morrow's honeysuckle *(Lonicera morrowii)* Tatarian honeysuckle *(Lonicera tatarica)* showy bush honeysuckle *(Lonicera x bella)* common buckthorn *(Rhamnus cathartica)* glossy buckthorn *(Frangula alnus)*	**Fruit and Seeds**	**Prior to fruit/seed ripening** Seedlings and small plants ▪ Pull or cut and leave on site with roots exposed. No special care needed. Larger plants ▪ Use as firewood. ▪ Make a brush pile. ▪ Chip. ▪ Burn. **After fruit/seed is ripe** Don't remove from site. ▪ Burn. ▪ Make a covered brush pile. ▪ Chip once all fruit has dropped from branches. ▪ Leave resulting chips on site and monitor.
oriental bittersweet *(Celastrus orbiculatus)* multiflora rose *(Rosa multiflora)*	**Fruits, Seeds, Plant Fragments**	**Prior to fruit/seed ripening** Seedlings and small plants ▪ Pull or cut and leave on site with roots exposed. No special care needed. Larger plants ▪ Make a brush pile. ▪ Burn. **After fruit/seed is ripe** Don't remove from site. ▪ Burn. ▪ Make a covered brush pile. ▪ Chip – only after material has fully dried (1 year) and all fruit has dropped from branches. Leave resulting chips on site and monitor.

Non-Woody Plants	Method of Reproducing	Methods of Disposal
garlic mustard *(Alliaria petiolata)* spotted knapweed *(Centaurea maculosa)* ▪ Sap of related knapweed can cause skin irritation and tumors. Wear gloves when handling. black swallow-wort *(Cynanchum nigrum)* ▪ May cause skin rash. Wear gloves and long sleeves when handling. pale swallow-wort *(Cynanchum rossicum)* giant hogweed *(Heracleum mantegazzianum)* ▪ Can cause major skin rash. Wear gloves and long sleeves when handling. dame's rocket *(Hesperis matronalis)* perennial pepperweed *(Lepidium latifolium)* purple loosestrife *(Lythrum salicaria)* Japanese stilt grass *(Microstegium vimineum)* mile-a-minute weed *(Polygonum perfoliatum)*	**Fruits and Seeds**	**Prior to flowering** Depends on scale of infestation Small infestation ▪ Pull or cut plant and leave on site with roots exposed. Large infestation ▪ Pull or cut plant and pile. (You can pile onto or cover with plastic sheeting). ▪ Monitor. Remove any re-sprouting material. **During and following flowering** Do nothing until the following year or remove flowering heads and bag and let rot. Small infestation ▪ Pull or cut plant and leave on site with roots exposed. Large infestation ▪ Pull or cut plant and pile remaining material. (You can pile onto plastic or cover with plastic sheeting). ▪ Monitor. Remove any re-sprouting material.
common reed *(Phragmites australis)* Japanese knotweed *(Polygonum cuspidatum)* Bohemian knotweed *(Polygonum x bohemicum)*	**Fruits, Seeds, Plant Fragments** Primary means of spread in these species is by plant parts. Although all care should be given to preventing the dispersal of seed during control activities, the presence of seed doesn't materially influence disposal activities.	**Small infestation** ▪ Bag all plant material and let rot. ▪ Never pile and use resulting material as compost. ▪ Burn. **Large infestation** ▪ Remove material to unsuitable habitat (dry, hot and sunny or dry and shaded location) and scatter or pile. ▪ Monitor and remove any sprouting material. ▪ Pile, let dry, and burn.

January 2010

Common Invasive Plants

Trees

- Tree of Heaven
- Buckthorn (Glossy & European)
- Norway Maple

Shrubs

- Autumn Olive
- Burning Bush
- Japanese Barberry
- Multiflora Rose
- Exotic Shrub Honeysuckles
- Large Gray Willow/Rusty Willow

Herbaceous

- Japanese Knotweed
- Garlic Mustard
- Purple Loosestrife
- Common Reed *(Phragmites)*
- Reed Canary Grass
- Japanese Stilt grass
- Wild Chervil
- Spotted Knapweed
- Cypress Spurge & Leafy Spurge

Vines

- Mile-a-minute
- Oriental Bittersweet
- Swallow worts (Black & Pale)
- Porcelain Berry

Tree of Heaven

Origin: Taiwan and Central China

Introduction: horticultural and cultural (medicinal properties)

Preferred Habitat: Disturbed areas/forested edges

Spread: Seeds (wind), suckers and resprouts (dioecious tree)

Threats: fast-growing tree, prolific seeded, stump sprouts. Allelopathic. Toxic and smelly sap. Roots damage infrastructure. Main host of the Spotted Lantern Fly.

Management:

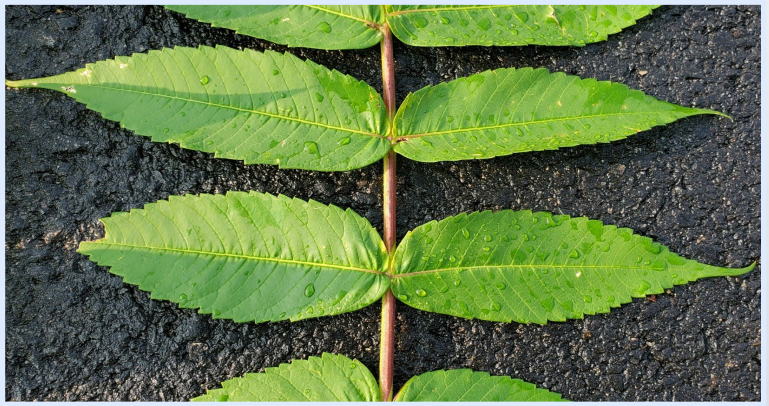
- Pull (check for resprouts)
- Cut/Slash and spray
- Biological: Native Fungus (PA- Purdue Testing)
- Disposal: chip, burn, wildlife brush pile

Look a like: Staghorn sumac

- But no delicious berry clusters to make tea!

Tree of Heaven v. Staghorn Sumac

Leaves & stem



Bark

Fruit/Seeds

Glossy Buckthorn

Origin: Eurasia. Africa

Introduction: ornamental shrub & wind break

Preferred Habitat: anywhere, including wetlands. Typically associated with disturbances.

Spread: Seed (attractive fruit), stump sprouts

Threats: fast grower/shading, prolific seeder/seed bank, flowers early and seeds may remain into the fall/winter. Allelopathic (leaf litter, roots, bark and fruit).

Management:

- Repeated pulling
- Repeated cutting- cut below ground
- Buckthorn Baggies ©
- Cut stump/herbicide
- Disposal: chip, burn, wildlife brush pile

Look a like: Cherry trees

- No smell
- Orange inner bark/roots

Burning Bush

Origin: China/Japan

Introduction: ornamental (fall favorite), hedgerows, urban adaptability

Preferred Habitat: anywhere, but wet areas

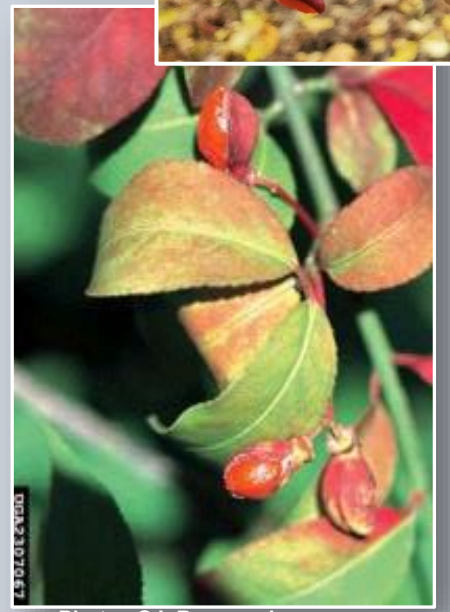
Spread: Seed (attractive fruit), suckers, cuttings

Threats: fast grower/shading, prolific seeder, flowers early and seeds may remain into the fall/winter. Allelopathic (leaf litter, roots, bark and fruit).

Management:

- Repeated pulling (remove entire root system)
- Cut/stump herbicide
- Disposal: chip, burn, wildlife brush pile

Look a like- winterberry, chokeberries



Photos ©J. Bugwood.org

Japanese Barberry

Origin: East Asia

Introduction: ornamental

Preferred Habitat: anywhere but most common in mature forests, fields and forest edges

Spread: Seed (attractive fruit) and shoots

Threats: fast grower/shading, leaf litter changes soil chemistry, threat to public health

Management:

- Pull
- Weed wrench
- Repeated cutting
- Cut stump/herbicide
- Disposal: chip, burn, wildlife brush pile

<u>Tick Study</u>

Multiflora Rose

Origin: Japan, Korea and Eastern China

Introduction: ornamental/root stock for other roses

Preferred Habitat: anywhere, including wet areas

Spread: Seed (attractive fruit) and branches (canes) that root into the ground.

Threats: fast grower/shading, prolific seeder, impenetrable thickets

Management:

- Repeat cutting or mowing 3-6 times per growing season
- Cut/stump herbicide
- Disposal: chip, burn, wildlife brush pile

Look a like- native roses (fringed v. smooth stipule)

- Look for the caterpillar

Asiatic Bittersweet

Origin: East Asia

Introduction: ornamental; erosion control along highways

Preferred Habitat: anywhere, but wet areas or in deep shade

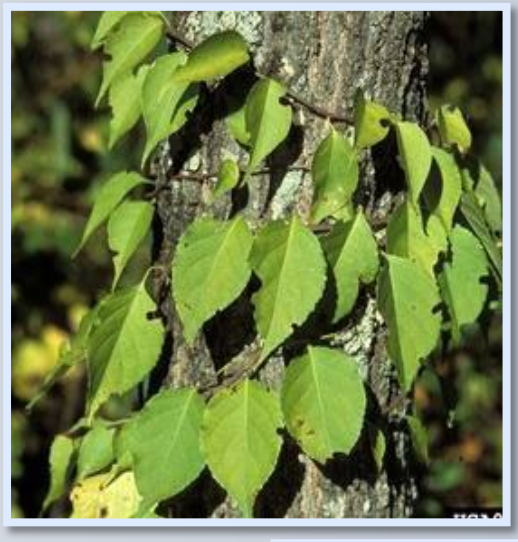
Spread: root suckers, attractive fruit with high sugar content, decorations.

Threats: fast grower, smother and kills trees, competing and hybridizing with native bittersweet

Management:

- Pull and monitor
- Repeated cutting
- Cut stump/herbicide
- Disposal: cut and leave in place; brush pile if no seed; bag and burn.

Look a like: native bittersweet (rare species in MA)



Nutritional Differences
Invasive vs. Native Berries

Invasive

- Multiflora rose: 0.9% Fat
- Honeysuckles: 0.7% Fat
- Common buckthorn: 0.5% Fat
- Oriental bittersweet: 2.6% Fat

Native

- Arrowwood viburnum: 48.7% Fat
- Northern spicebush: 48% Fat
- Gray dogwood: 34.9% Fat
- Virginia Creeper: 23.6%

Research "suggests that removal of invasive fruit-bearing shrubs or plants will not negatively impact migrating birds when high-quality native fruit-bearing shrubs are available." Pagano (2013)




Japanese Knotweed

Origin: Asia

Introduction: ornamental, forage and erosion control

Preferred Habitat: anywhere, but prefers full sun

Spread: Seed (attractive fruit), rhizomes, stems

Threats: fast grower/shading (8” a day!), prolific seeder, flowers early and seeds may remain into the fall/winter. All it takes is ½” fragment of knotweed to start a new population. Rhizomes can remain dormant for over 20 years. Allelopathic. Damage to infrastructure.

https://www.jksl.com/japanese-knotweed-removal-how-to-kill-guide/

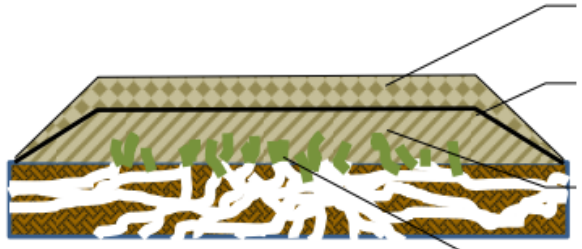
https://vtinvasives.org/news-events/news/a-new-way-to-treat-knotweed

Management:

- Pull
- Repeated cutting/mowing
- Herbicide: foliar/injections
- Cultural: choking and smothering
- Excavation

Edible!

<u>Biocontrol- Aphid approved in 2020</u>



https://www.agriculture.nh.gov/publications-forms/documents/japanese-knotweed-bmps.pdf

Garlic Mustard

Origin: Europe

Introduction: introduced by settlers for food or medicinal purposes

Preferred Habitat: anywhere, but very wet wetlands

Spread: Seeds (biannual)

Threats: early grower, prolific seeder, seedbank survival, potentially toxic to a threatened butterfly

Management:

- Survey during first year stage: remain green throughout the winter
- Pull second year growth
- Cut prior to seeding
- Foliar herbicide
- Cultural: grazing & smothering
- Do nothing
- Disposal: do not compost! Solarize away from soil if taproot present. Burn.

Edible plant! Tupperware parties- smells and tastes like pesto

Interesting research

Early Detection/ Priority Species

- Not as common
- Difficult to manage
- Significant ecosystem damage

✓ ***Swallow Wort***
✓ ***Mile a Minute***

Swallow Wort *

Origin: Europe

Introduction: introduced to the US from Europe as ornamentals in the 1800s.

Preferred Habitat: anywhere except wet areas

Spread: Seed (feathery seeds), self fertilizing. Pods can mature independently from the parent plant.

Threats: fast grower/shading, prolific seeder, allelopathic (root), crowds out native counterparts

Management:

- Pull (if a small population but it will resprout!)
- Repeated cutting (prior to flowering/fruiting)
- Foliar herbicide
- Disposal: brush pile or solarize if no flower/pods; if flowered/pods- bag and cook or bag and burn.

Mile A Minute*

Origin: East Asia

Introduction: experimental introduction to OR and MD followed by unintentional introduction in PA.

Preferred Habitat: anywhere, but prefers open sunny areas

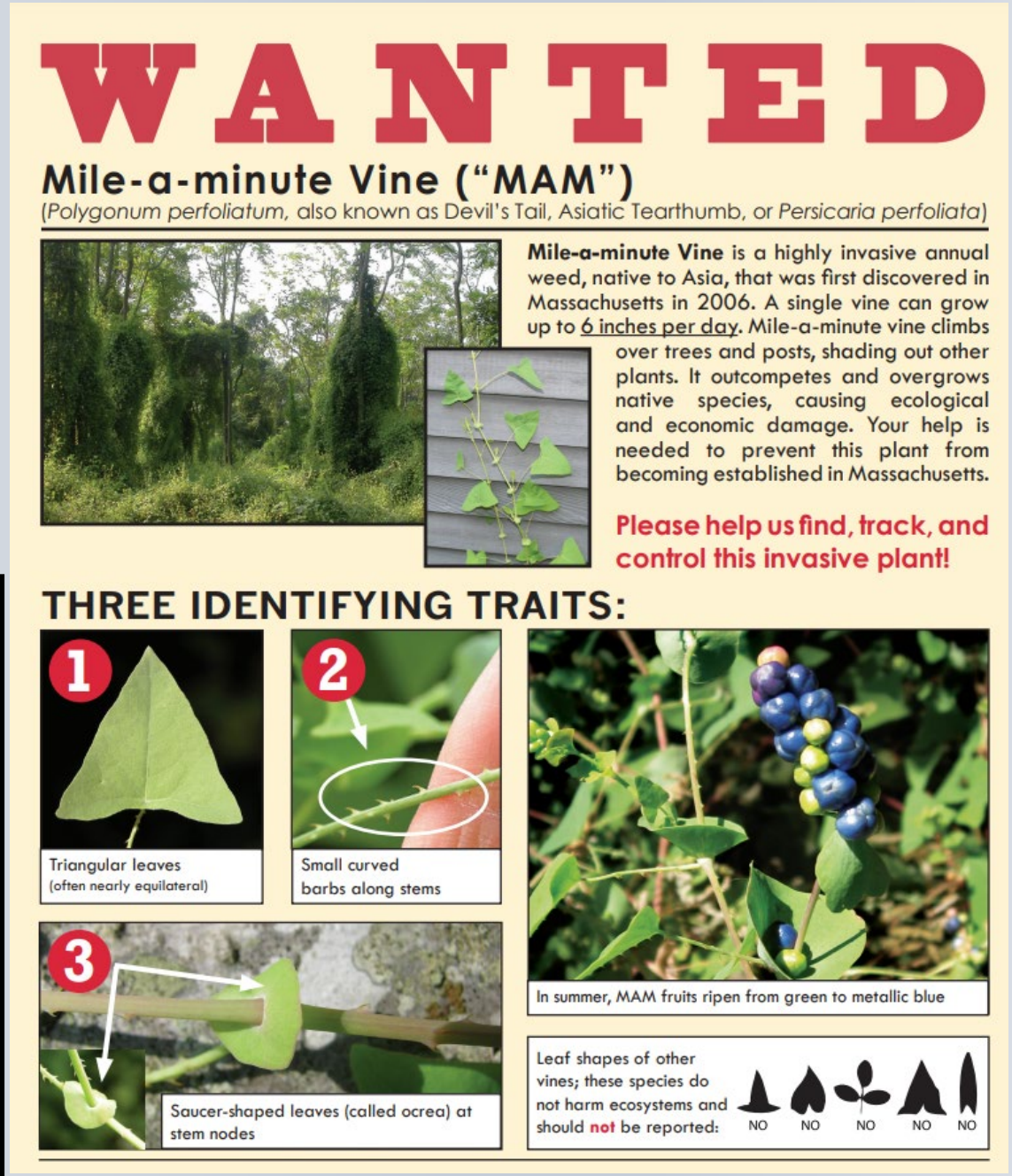
Spread: Seed (attractive fruit) and resprouts

Threats: fast grower/shading, prolific seeder

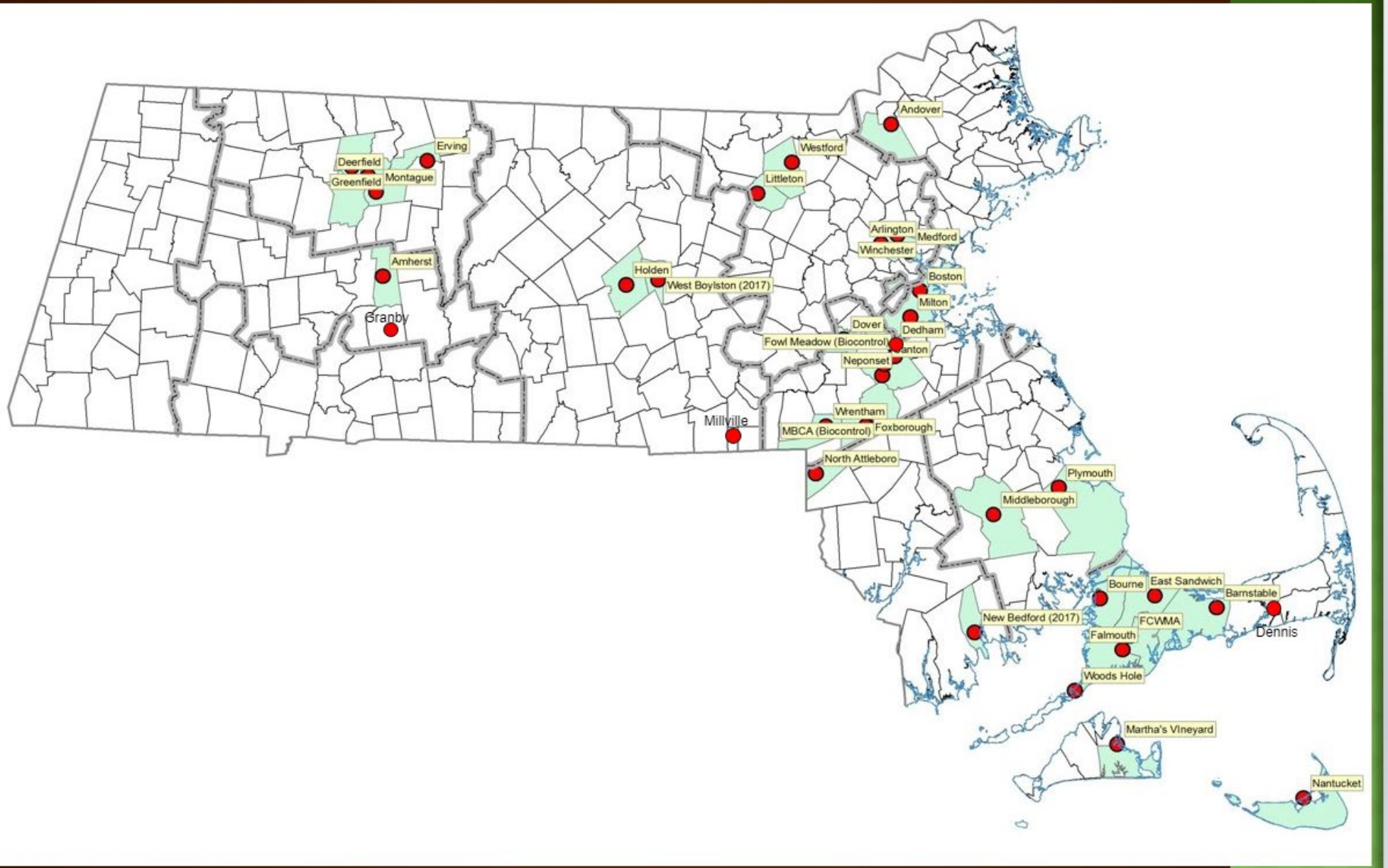
Management:

- Pull prior to seeding
- Herbicide: pre and post emergent
- Disposal: no flowers/seeds, leave on site; otherwise, bag and cook or bag and burn.
- **Outreach Flyer**

Report to MDAR!



MILE-A-MINUTE VINE: Distribution



Map courtesy of MDAR (2019)

Help protect native plants and animals by following these six easy guidelines:

1. Verify that the plants you are buying for your yard or garden are not invasive. Replace invasive plants in your garden with non-invasive alternatives. Ask your local nursery staff for help in identifying invasive plants!

2. When boating, clean your boat thoroughly before transporting it to a different body of water.

3. Clean your boots before you hike in a new area to get rid of hitchhiking weed seeds and pathogens.

4. Don't "pack a pest" when traveling. Fruits and vegetables, plants, insects and animals can carry pests or become invasive themselves. Don't move firewood (it can harbor forest pests), clean your bags and boots after each hike, and throw out food before you travel from place to place.

5. Don't release aquarium fish and plants, live bait or other exotic animals into the wild. If you plan to own an exotic pet, do your research and plan ahead to make sure you can commit to looking after it.

6. Volunteer at your local park, refuge or other wildlife area to help remove invasive species. Help educate others about the threat.

- The Nature Conservancy

Useful Resources

- Invasive Plant Control Database (Midwest specific)
- Strategic Recommendations for Managing Invasive Plants in Massachusetts (2005)
- Mistaken Identity, Invasive v. Native Plants (Mid Atlantic)
- MDAR Publications and Fact Sheets
- UNH Publications and Fact Sheets
- Native Plant Information and pollinator pages:
  - County Checklist
  - Growing Wild, DCR Pollinator Initiative
  - Native Plant Trust – Go Botany
  - UMass Dartmouth Gegear Lab
- Helpful identification and reporting tools:
  - INaturalist
  - Invasive Plant Atlas of New England (IPANE)