Invasive Plants Impact Urban Forests!



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https://renzweedscience.cals.wisc.edu/

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A little about me…..

- Professor and Extension Specialist UW Madison 19 years
  - Invasive plant biology, spread, impacts, control and restoration
  - Goal is to create useful information
  - Disseminate it to improve efforts involving invasive plants

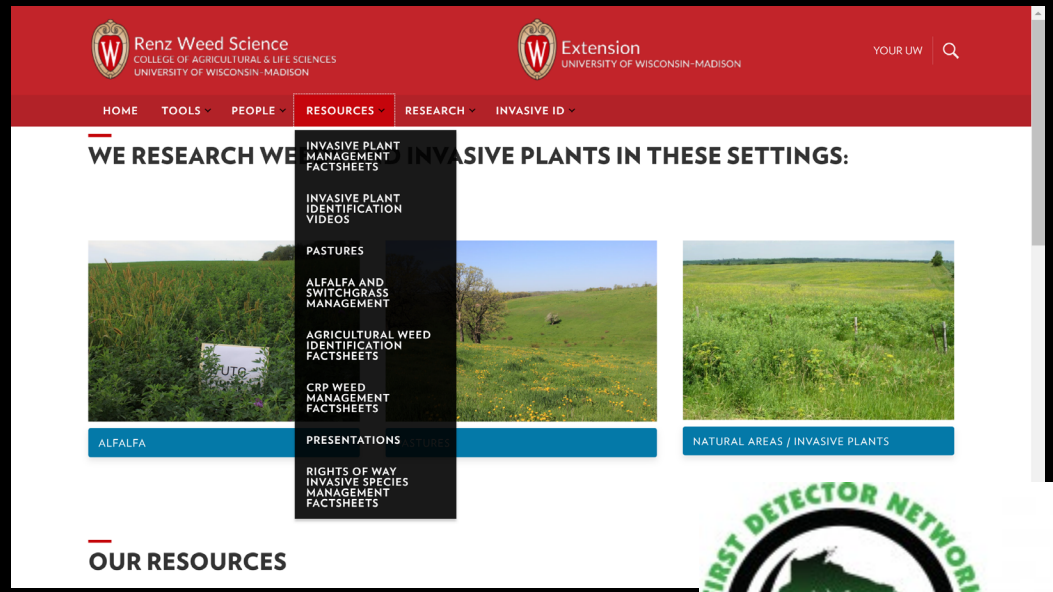
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Goals of our lab

- Research: improve management
  - effectiveness of methods
  - Impacts to surrounding environment
  - Integration with restoration
  - EDRR
- Education:
  - technical information
  - educational opportunities

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Wisconsin First Detector Network
Facilitating community science for invasive species in Wisconsin

Research includes many approaches



- Herbicides
  - Foliar (broadcast & IPT)
  - Basal bark/cut surface
  - Stem injection
- Mechanical/removal
  - Mowing
  - Cutting/chainsaw
  - Hand pulling
- Prescribed fire/burning
  - Directed flame
  - Prescribed fire
- Grazing
  - Cattle (dairy and beef)
  - Goats
- Revegetation







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Weed species we have researched in Wisconsin

- Herbaceous broadleaf plants (14)
  - Wild parsnip
  - Canada thistle
  - Crown vetch
  - Hedgeparsley
  - Teasel spp.
  - Garlic mustard
  - Plumeless thistle
  - Hill mustard
  - Queen Anne's lace/wild carrot
  - Leafy spurge
  - Perennial knotweeds
  - Sweetclovers
  - Birdsfoot trefoil
  - Goldencreeper
  - Garden valerian
- Woody (6)
  - Common and glossy Buckthorn
  - Bush honeysuckles
  - Autumn olive
  - Multiflora rose
  - Japanese barberry
  - Burning bush
- Herbaceous grasses (4)
  - Phragmites
  - Reed canarygrass
  - Smooth brome
  - Annual foxtails

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Goal for this AM

- Invasive species 101 (Mark)
- ID of common invasives (John)
- Management approaches (Travis)
- Developing a plan (Mark)
- Resources available to help (Matt)



What is an invasive species?

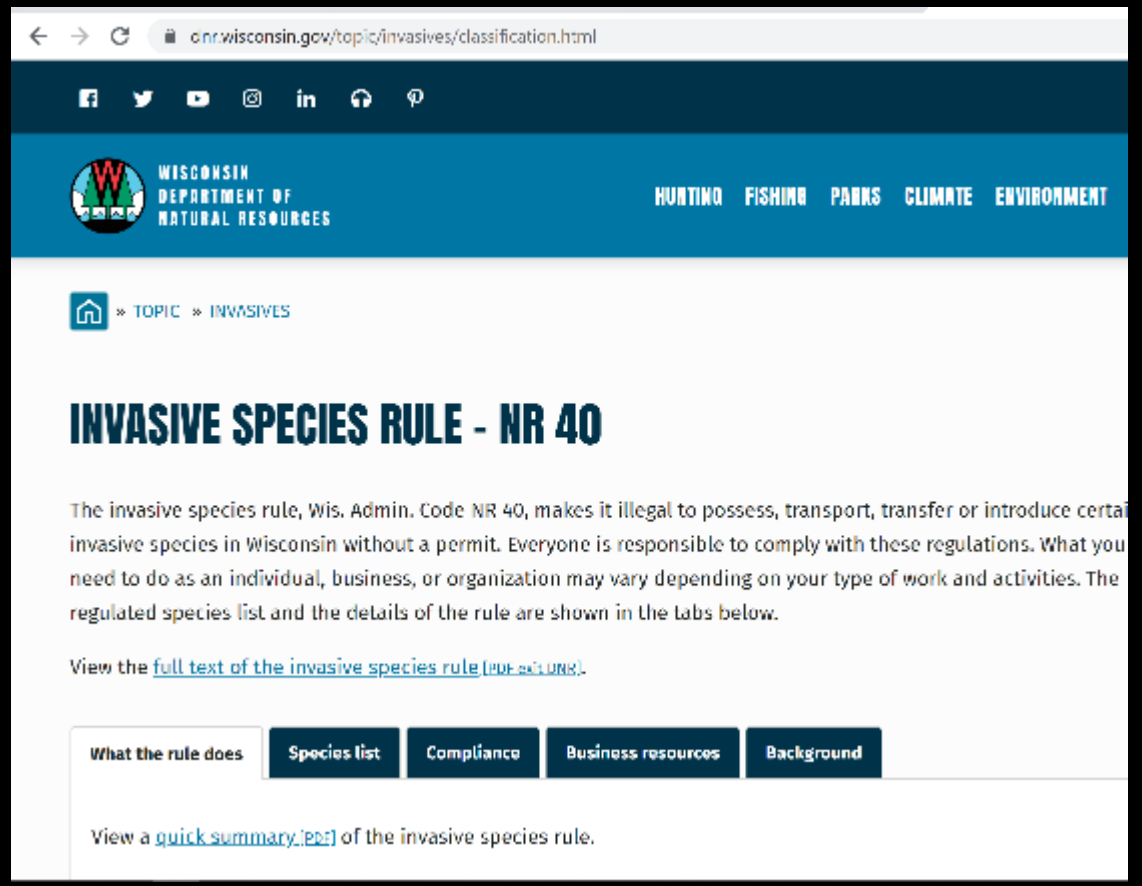
4 main points

1. Not native
2. Can persist/reproduce (without help)
3. Spread into other areas (dominate)
4. Introduction causes or is likely to cause harm
   - economic
   - environmental
   - harm to human health



Laws regulate invasive plants in Wisconsin

- NR40
  - >100 plants; prohibited/restricted
- Noxious weed law
  - Leafy spurge, field bindweed, Canada thistle
- Nuisance weed law
  - Purple loosestrife, multiflora rose
- Local ordinance



NR40 Classifications + Regulations

PROHIBITED



- Absent or small stands
- Control required
- No person may transport , **possess**, transfer or introduce

RESTRICTED



- Already established in state
- Control recommended
- No person may knowingly transport, transfer or introduce

PROHIBITED







RESTRICTED





Handout lists plants currently regulated and their status (P, R, split listed)

How impactful are invasives like buckthorn in understory of our forests?



Most of our forests should look like this…..



INVASIVE WOODY PLANTS OFTEN IMPACT INVADED LANDS

- Impacts to Vegetation
- Impacts to Wildlife
- Impacts to environment
  - Water
  - Soil
- Impacts to Humans
  - Profitability/economics
  - Health
  - Recreation



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Impacts to water and soil

Water

- Increased runoff
- Increased soil erosion
- Channelizing streams/rivers
- Higher water use than native plants



McEwan lab

Soil/Nutrient dynamics

- Nutrient loading (N)
- Change in soil pH
- Faster leaf litter decomposition
- Changes in microbial populations



Beretta

Impacts to wildlife (birds)

- Fruit is not good bird food
  - Lower fat content + energy density
  - Many are diuretic
- Can increase predation of native wildlife
  - Structure of shrubs
  - Presence of shrubs in grasslands



Economic impact

- Delays forest regeneration by 15-30%
- Cost to control
  - >$1,000 per acre for controlling dense infestations
  - Additional costs for follow-up trt and monitoring



Some woody invasive plants impact human health

- Japanese barberry:
  - Higher densities of blacklegged (deer) ticks
    - Lyme disease
- Amur Honeysuckle:
  - Higher densities of lone star ticks
    - Alpha-gal syndrome





Let’s look at an invaded urban park as an example





How long has it been invaded?

- likely >30 years
  - Consider size of shrubs and honeysuckle invasion in WI
- Impact has already happened
  - No desirable plants left
  - Environment/wildlife impacted
- Will take many years to return services
  - Will cost >$1,000+ /A

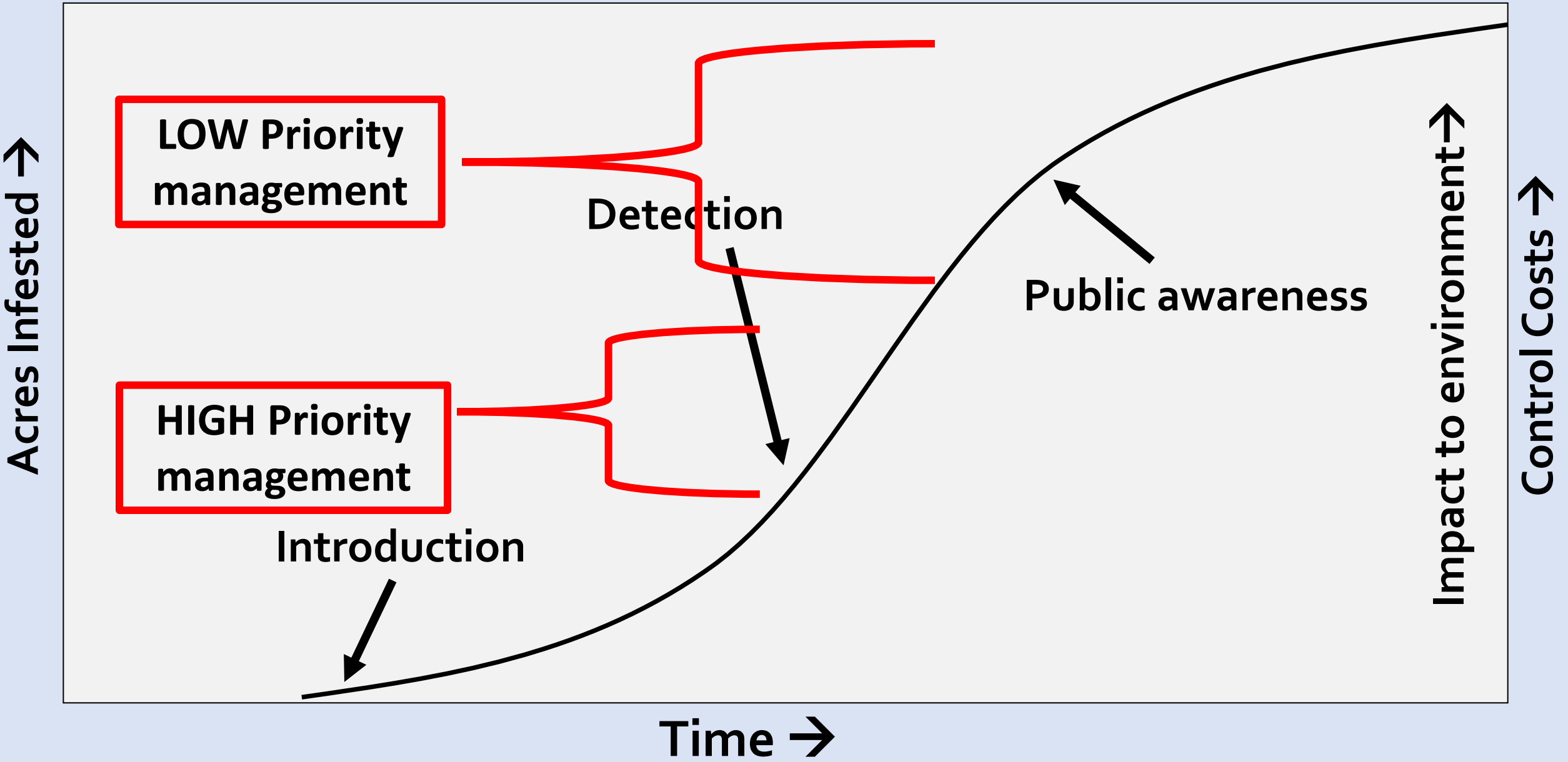


Can control but need to revegetate





Invasion Curve



Maybe we should focus on the left vs the right!





Early Detection and Rapid Response (EDRR)

- Benefits:
  - Costs to manage are low
  - Restoration/revegetation not needed
  - Impacts of ecosystem are minimized

- How to use
  - Monitor properties for invasive species
    - Document presence AND absence
  - Prioritize management when invasives found
    - Small infestations
    - Impactful invasive plants





Sometimes other areas that are heavily invaded still have a high priority

<u>High priority areas</u>

1. Early detections
   - Small infestations

2. Critical areas
   - important to land objectives



Summary of invasive species 101

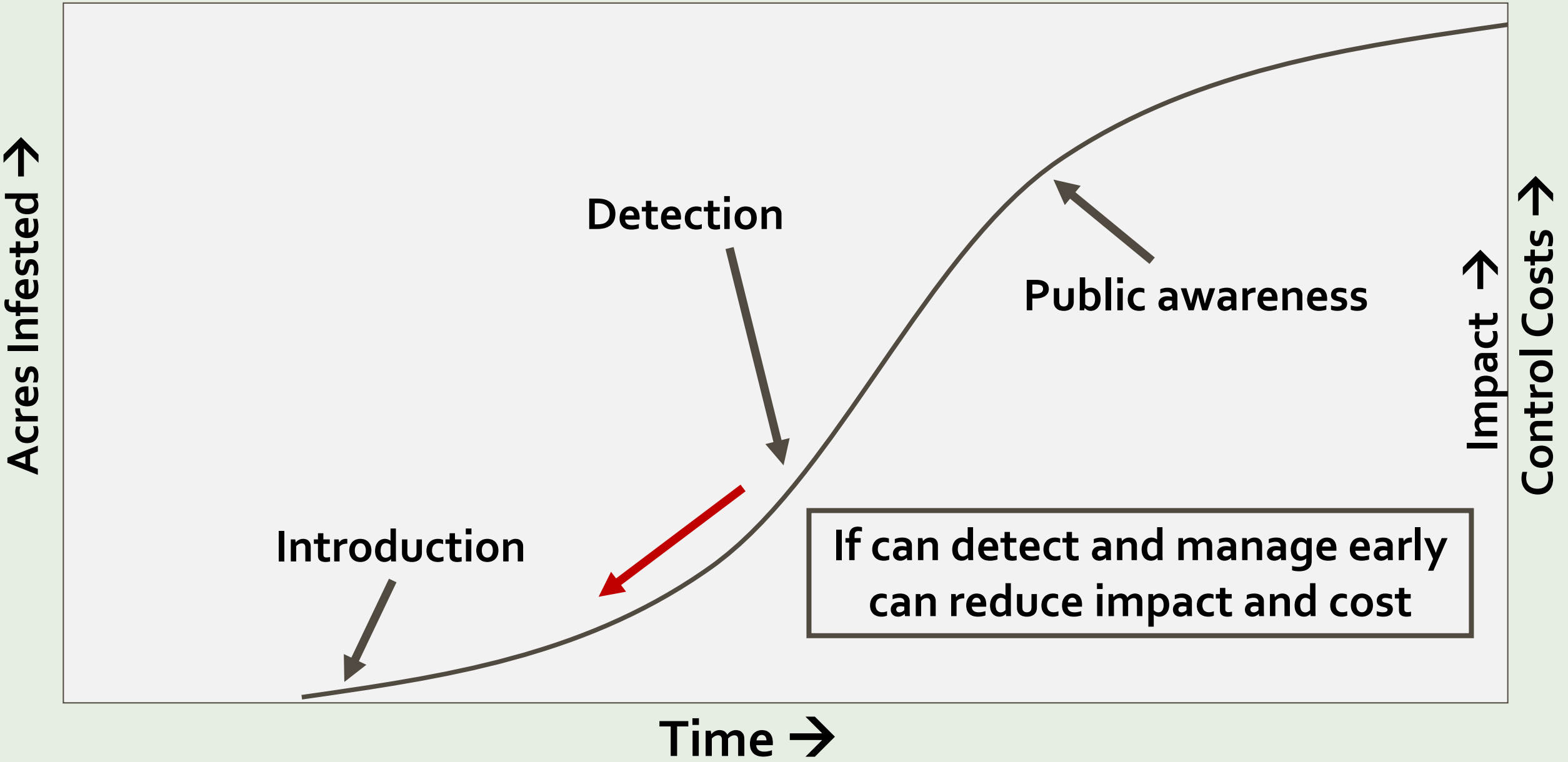
Invasive plant impact Wisconsin landscape

- Impact is species specific
  - plant and animal diversity
  - Ecosystem processes
  - Human health
  - Economics

- Early detection and management can prevent/minimize impact



Invasion Curve



Identifying Urban Forest Invasives

John Zaborsky, PhD



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Outline for today

1. Overview of identification process
2. Typical invasives in urban forests (USFS)
3. Species specific information
4. Resources to help



Resources

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WISCONSIN
DEPT. OF NATURAL RESOURCES

EDDMapS
find · map · track

eddmaps.org

WISCONSIN FIRST DETECTOR NETWORK

fyi.extension.wisc.edu/wifdn/tools/wicountylists

USFS Urban List

- Norway maple
- Garlic mustard
- Canada thistle
- Glossy buckthorn
- Honeysuckles
- Reed canary grass
- Common reed
- Common buckthorn
- Black locust
- Siberian elm

Outline for today

1. Early Detection and Rapid Response (*) and common invasives for our area
2. Species you want to review?
3. After lunch fieldtrip



First step: Growth Habit

- **Woody plants**
  - Clearly woody stems
  - Plants large and upright
- **Vines**
  - Stems twining or climbing
  - Stems not self-supporting
  - May be woody or herbaceous
- **Herbaceous plants**
  - Stems soft or hardened but not woody
  - Tall or short but self-supporting
- **Aquatic plants**
  - Growing underwater or rooted in it
  - Plants limp and/or floating, or erect
- **Grasses and Cat-tails**
  - Leaves fan-like and narrow
  - Tiny, unusual flowers



Second step: Branching

- You've determined the Growth Habit
- Now look at branching pattern
- There are three branching patterns/leaf arrangements in plants:
  - Opposite
  - Alternate
  - Whorled



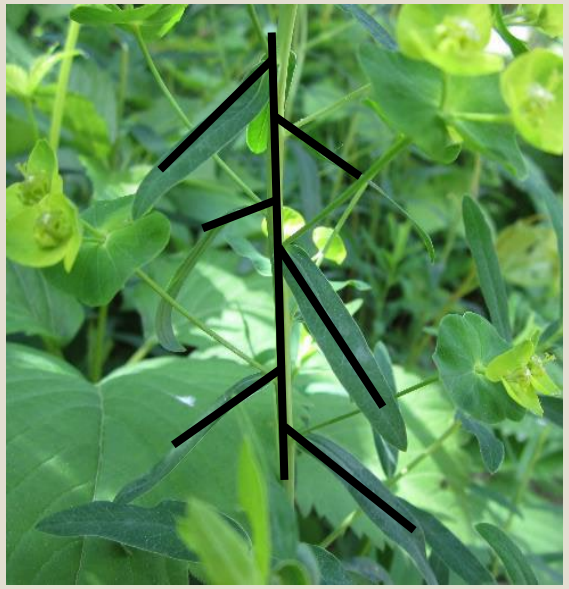




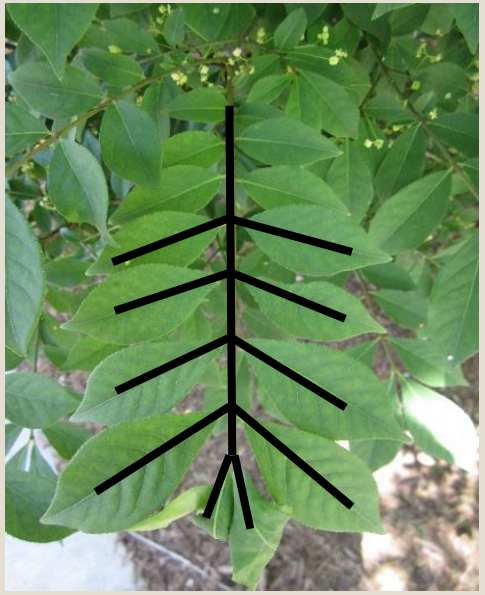
Branching patterns

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ALTERNATE



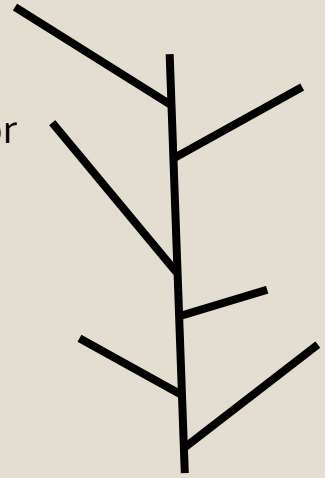
OPPOSITE

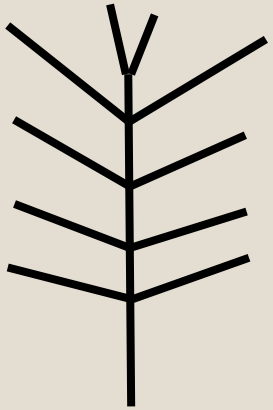


WHORLED

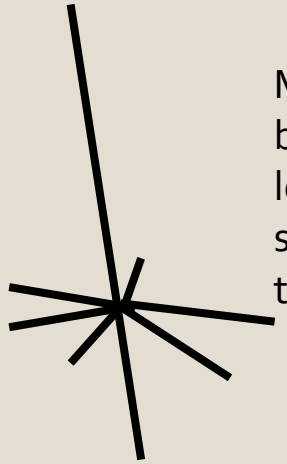


One branch or leaf from a point on the trunk or stem





Two branches or leaves from the same point on the trunk or stem

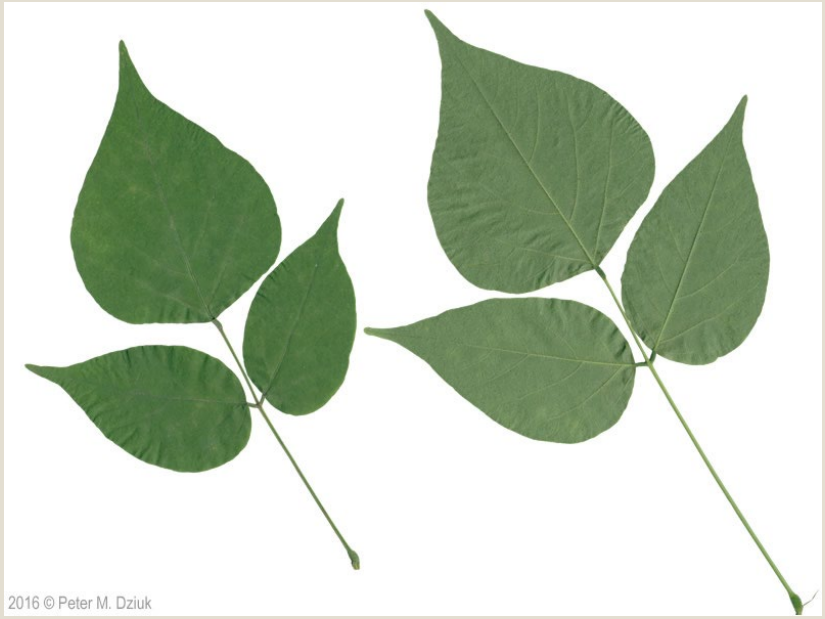


More than two branches or leaves from the same point on the trunk or stem

Third step: Leaf Division

- You've determined the Growth Habit
- You've determined Branching Pattern
- Now look at Leaf Division
  - Simple
  - Compound





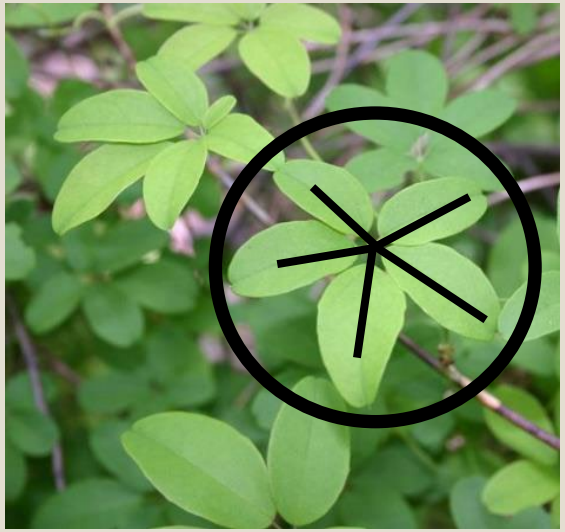
Simple vs. Compound Leaves

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SIMPLE



PALMATELY COMPOUND



PINNATELY COMPOUND



TRIFOLIATE



Each circle on this page shows **one leaf.**

A leaf is associated with an **axillary bud** at the petiole base.

Simple leaves have one, undivided blade.
Compound leaves have the blade divided into multiple **leaflets**.

Trifoliate leaves have 3 leaflets attached to one petiole.
Palmately compound leaves have leaflets attached to the same spot on the petiole.
Pinnately compound leaves have leaflets arranged in a line along a central axis.

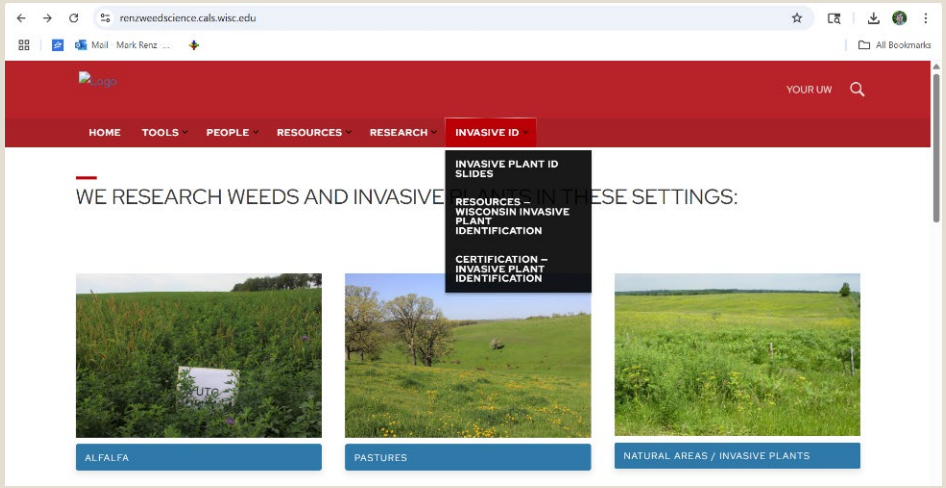
Identifying Plants

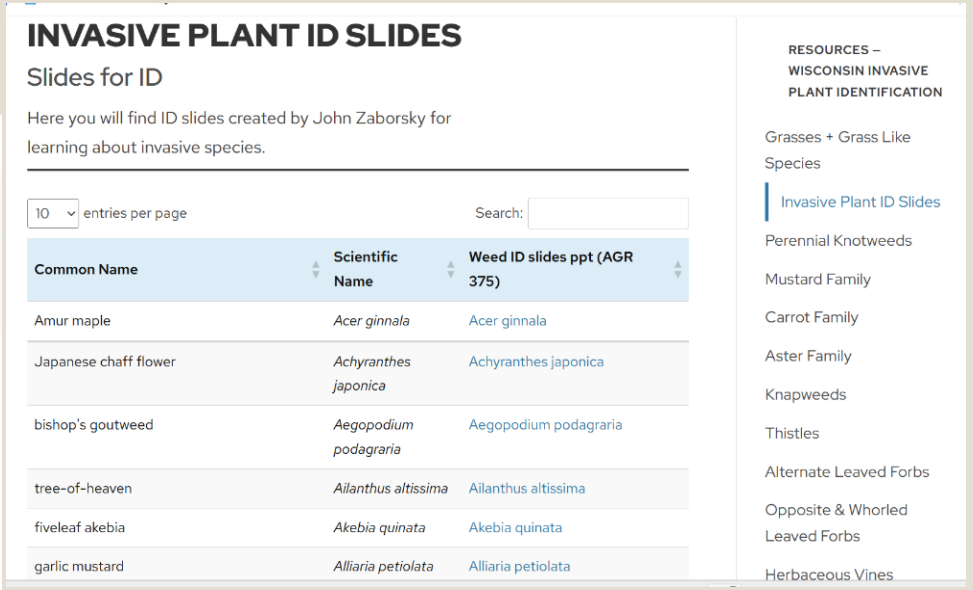
- Identify
  - Growth Habit
  - Branching Pattern
  - Leaf Division
- Also note other characters:
  - Flower color
  - Leaf margins
  - Leaf texture
  - Armature (spines, thorns)
  - Fruit (dry or fleshy)
  - Odors (foliage or flowers)
- Look at species information slides on the Renz Weed Science page
- Lastly, consider look alikes



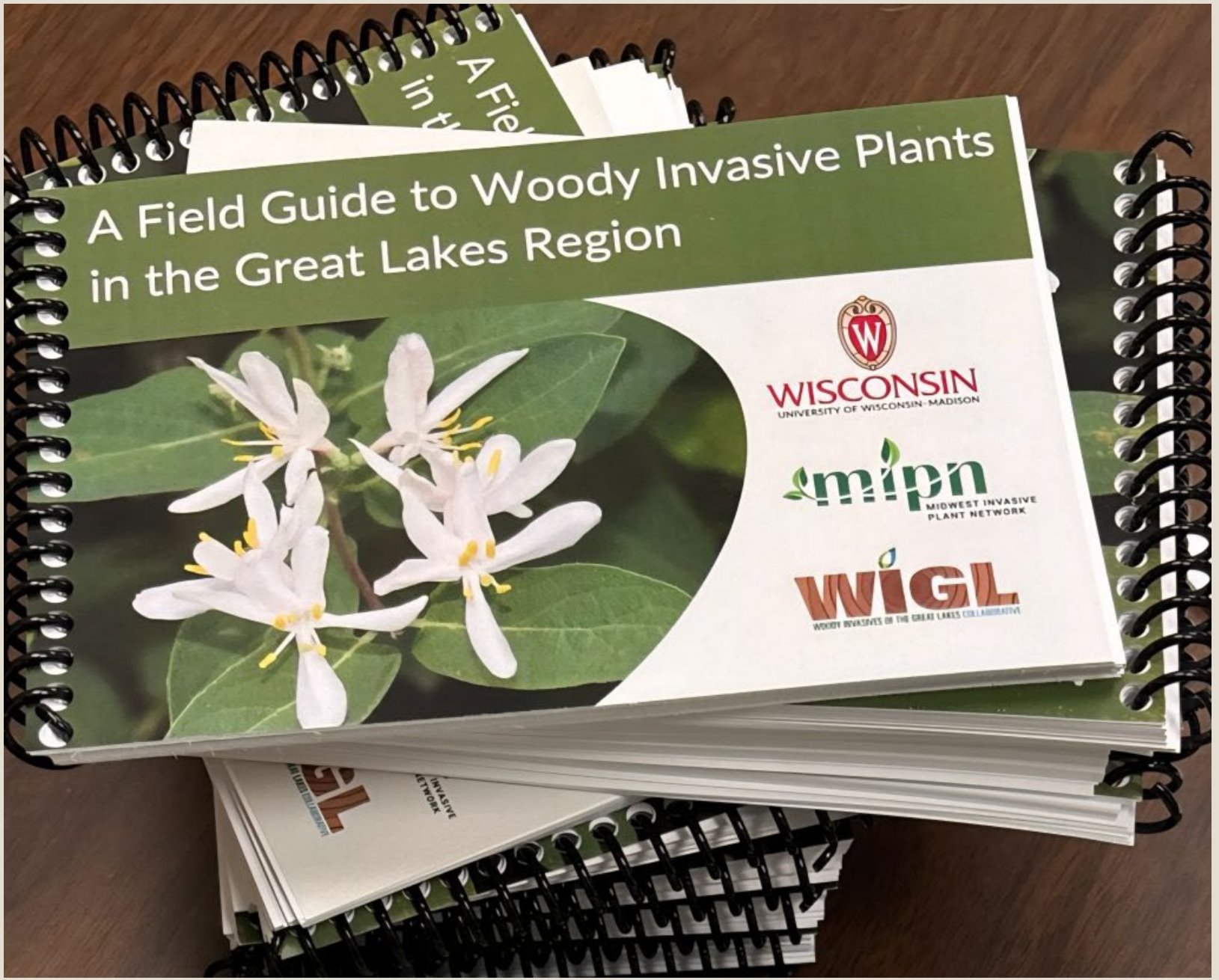
Identification will be hard at first

- Look up potential species on Renz Website





https://renzweedscience.cals.wisc.edu/


A Field Guide to Woody Invasive Plants in the Great Lakes Region
WISCONSIN
UNIVERSITY OF WISCONSIN-MADISON
mipn
MIDWEST INVASIVE PLANT NETWORK
WIGL

Woody Plants



Amur maple (*Acer ginnala*)

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Leaves opposite, simple

- Large shrub
- 1-3" long, with 3 pronounced lobes
- Leaf margins doubly-toothed





Amur maple (*Acer ginnala*)

Flower/fruit

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- Flowers are small, yellow-white; May-June
- Flowers showy and bloom after the leaves develop, unlike most other maples
- Fruit is a pair of samaras with large wings



© Paul Wray, Iowa State University, Bugwood.org

Amur maple look alikes

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Amur maple leaf



Amur maple samaras

Amur maple looks much like other maples in the genus *Acer*. It is most easily distinguished by its smaller leaves.

Species	Branching	Leaves	Seeds
Amur maple (*Acer ginnala*)	Opposite	Lobed, **3 lobes with center lobe much larger than side lobes**	2-winged samaras; **wings nearly parallel with angle <30 degrees**
Other maples (*Acer* spp.) N and N-N	Opposite	Lobed, more than 3 lobes	2-winged samaras; **wings with angles >45 degrees**

Norway maple (*Acer platanoides*)

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Leaves opposite, simple



- Large tree
- Leaves 4-7" wide
- 5-7 acuminate lobes
- Leaves exude milky sap
- Some varieties have purple or reddish leaves



Norway maple (*Acer platanoides*)

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Leaves opposite, simple



- Flowers borne before the leaves; held in rounded clusters
- Flowers bright yellow, with five petals; showy
- Fruits with large, widely spreading wings



Norway maple (*Acer platanoides*)

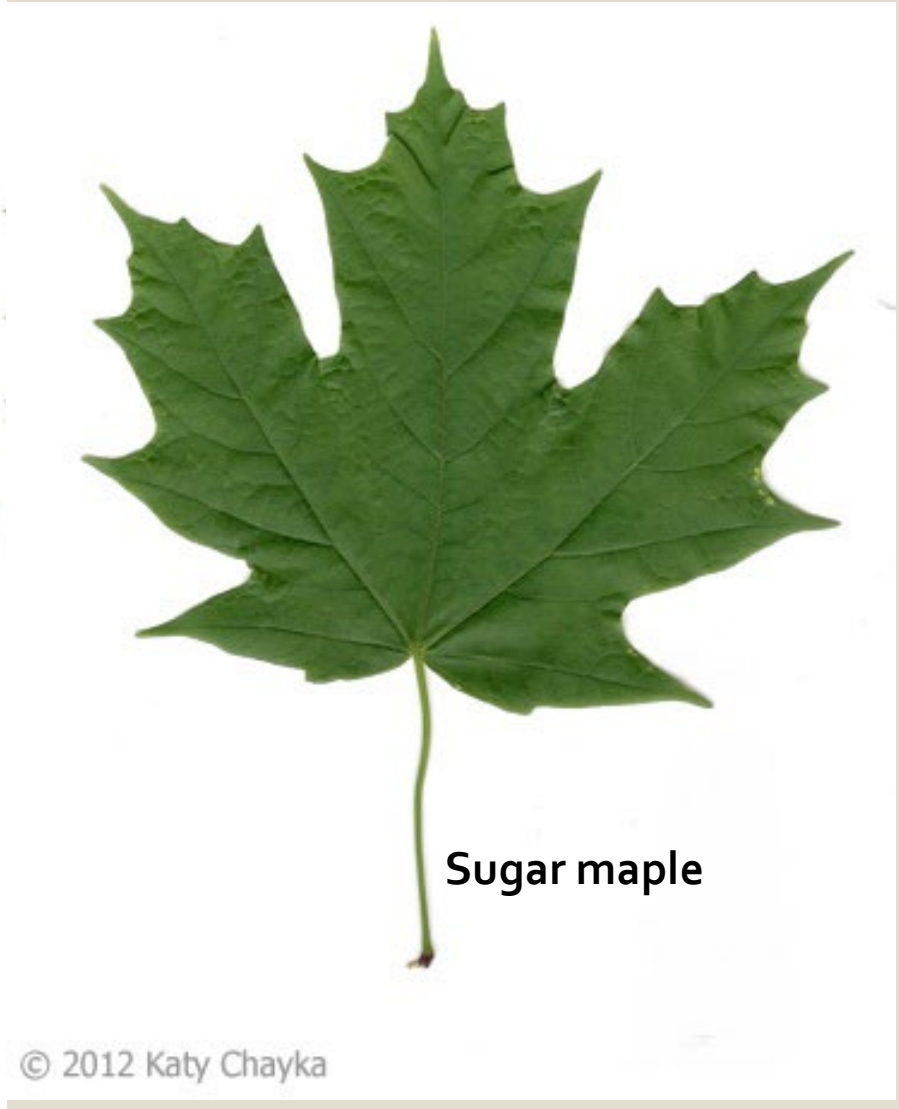
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Leaves opposite, simple



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Norway maple



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Sugar maple

*Tree-of-Heaven (*Ailanthus altissima*)

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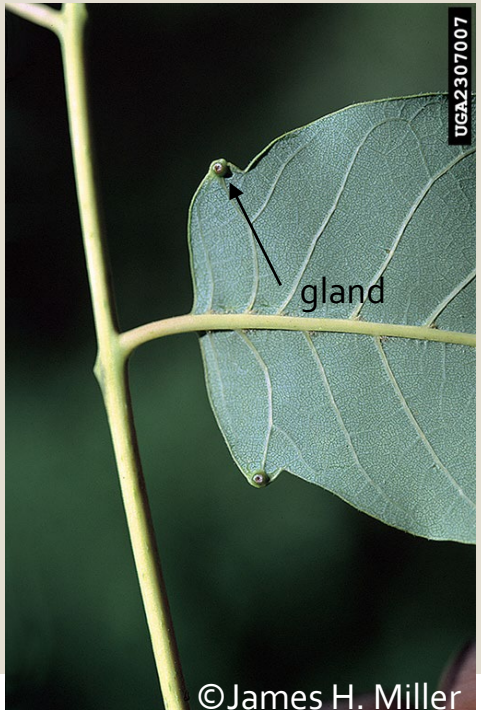
*Tree-of-Heaven (*Ailanthus altissima*)

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Leaves alternate, pinnately compound



- 1–4’ long, composed of 11–25 leaflets
- Leaflet has a smooth margin
- Gland present on underside of leaf
- Leaves have a strong odor when crushed.





Tree-of-Heaven look alikes

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Sumac *(Rhus)*
© Oregon State University



Tree-of-Heaven *(Ailanthus)*
© Franziska Hollweg



Ash (*Fraxinus*)



Walnut *(Juglans)*
© tree-guide.com

*European alder (*Alnus glutinosa*)

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Leaves alternate, simple



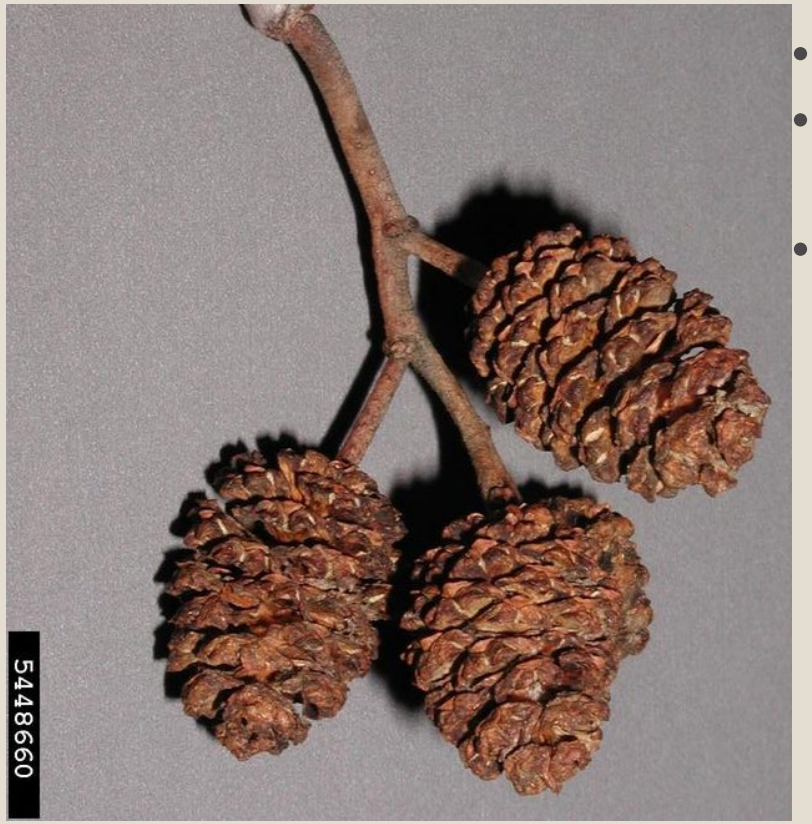
- 1-3.5" long, with a rounded or notched apex
- Leaves are doubly-toothed, sticky, and often shiny



*European alder (*Alnus glutinosa*)

Flower/fruit

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- Flowers are small and not showy; April-May
- Male flowers are thin catkins
- Female flowers are borne in somewhat woody catkins that look like pinecones
- Fruits are tiny samaras held in the "cones"



Japanese barberry (*Berberis thunbergii*)

Leaves alternate, simple

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- Up to 1" long, held in tight clusters above the stem spines; leaves on new growth widely spaced
- Leaf margins entire; leaves almost appearing whorled
- Branches with zigzag growth
- Inner bark bright yellow





Japanese barberry (*Berberis thunbergii*)

Flower/fruit

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- Flowers are cream-yellow, bowl-shaped, with 6 petals; April-May
- Flowers are borne hanging from the leaf clusters
- Fruit is a small red berry.



Barberry look alikes

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Japanese barberry (*Berberis thunbergii*) and common barberry (*Berberis vulgaris*) may be confused with **native** gooseberries (*Ribes* spp.), especially in the winter, since gooseberries are also shrubs with spines along their stems.

During the growing season, **leaf size and shape** make it easy to differentiate these species. Gooseberries have 3+ lobes per leaf and barberries have unlobed leaves.







Species	Inner bark	Leaves	Flowers
Common barberry (*Berberis vulgaris*) I	**Bright yellow**	Oval-shaped, but wider near the tip, toothed along the margins	Cream-yellow, 6 petals, bowl-shaped
Japanese barberry (*Berberis thunbergii*) I	**Bright yellow**	Oval-shaped, but wider near the tip, margins entire	Cream-yellow, 6 petals, bowl-shaped
Gooseberries (*Ribes* spp.) N	Brown/tan	Fan-shaped, **palmately-lobed**, the margins with small teeth	Whitish or yellowish, **5 petals**, tubular

Russian-olive (*Elaeagnus angustifolia*)

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Anne Pe

Russian-olive (*Elaeagnus angustifolia*)

Leaves alternate, simple

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- 1-4” long, covered in silvery hairs on both sides
- Small thorns on some branches



Russian-olive (*Elaeagnus angustifolia*)

Flower/fruit

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- Flowers yellow, tubular, with 4 petals.
- Flowers are borne singly, or in small clusters, in the leaf axils; June
- Fruit is small, gray, and berry-like



Autumn-olive (*Elaeagnus umbellata*)

Leaves alternate, simple

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- 2-3" long with silvery hairs beneath
- Brown or reddish scales often present on leaves and young stems
- Small thorns on some branches

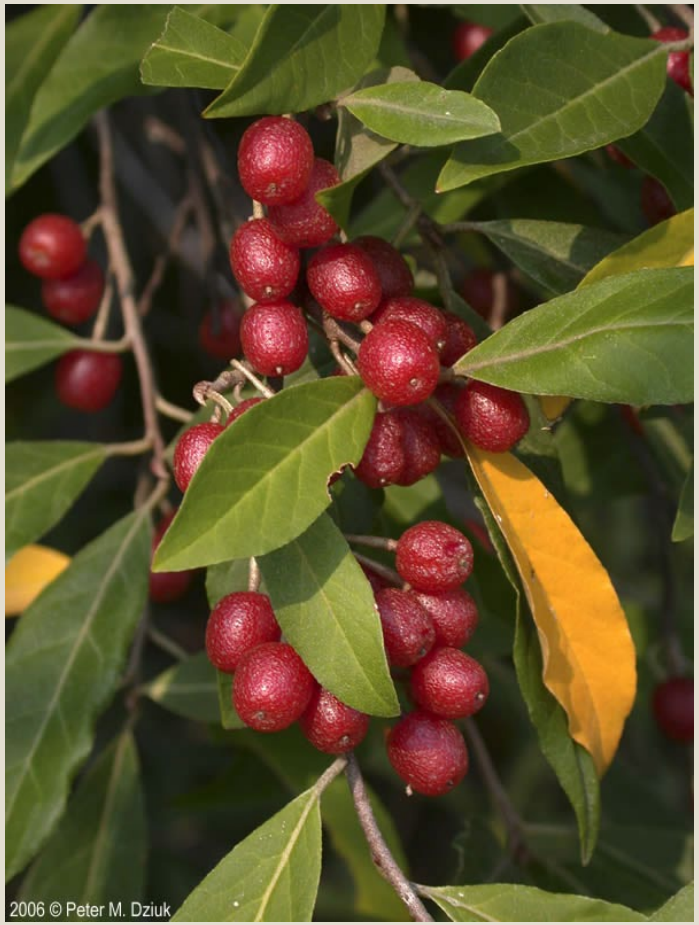




Autumn-olive (*Elaeagnus umbellata*)

Flower/fruit

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- Flowers creamy white to pale yellow, tubular, with 4 petals.
- Flowers are borne in small clusters with developing leaves; May-June
- Fruit is a small red berry.



Winged burning bush (*Euonymus alatus*)

Leaves opposite, simple

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- 1-2" long, tapered at both ends, margins toothed
- Stems have wings along their sides
- Foliage is bright red in fall



Winged burning bush (*Euonymus alatus*)

Flower/fruit

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© Walt Reutzel

- Flowers with 4 greenish yellow petals
- Flowers are borne in small clusters; April-June
- Fruit is a capsule that opens to expose red seeds.



European spindle (*Euonymus europaeus*)

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- Flowers with 4 greenish yellow petals
- Leaves egg-shaped, toothed margins, smooth below
- Stems **not** winged
- Fruit is a capsule that opens to expose red seeds.



Glossy buckthorn (*Frangula alnus*)

Leaves alternate, simple

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- 1.5-3” long, with prominent veins
- Leaf margins entire
- Young stems with speckled bark



Glossy buckthorn (*Frangula alnus*)

Flower/fruit

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© Chris Evans, University of Illinois, Bugwood.org

- Flowers are small, white, and have 5 triangular petals; May-June
- Flowers are borne in little clusters in the leaf axils
- Fruit is a black berry



© Rob Routledge, Sault College, Bugwood.org

Honeysuckles (*Lonicera* spp.)

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COLLEGE OF AGRICULTURAL & LIFE SCIENCES
UNIVERSITY OF WISCONSIN-MADISON

Leaves opposite, simple



Anne Pearce

- Leaves are 1–3” long in all species and hybrids
- Leaf margins are entire in all species and hybrids
- Leaves in Amur honeysuckle are long-tapered at the tip (below)



Honeysuckles (*Lonicera* spp.)

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Stems



- Stem pith is hollow in all non-native honeysuckles
- Older bark is shredding



Honeysuckles (*Lonicera* spp.)

Flowers/Fruit

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- Flowers are white or pink, distinctly bilaterally symmetrical, with 5 petals
- Flowers borne in pairs in the leaf axils; May-June
- Fruit is a red or orange berry



Honeysuckle look alikes

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- There are also a few **native** honeysuckles. Wisconsin and the Midwest have both shrubby and vining species (right and below).

- The native species (both shrubs and vines) have **solid stems,** unlike the non-native species.

- The native shrub species do not get as a large as the non-native species and almost **never** grow with them. They are mostly confined to higher quality habitats.





*Amur corktree (*Phellodendron amurense*)

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Leaves opposite, pinnately compound



- 10–15” long, smell citrusy when crushed
- Leaflets tapered to a pointy tip
- Bark is corky and ridged; inner bark is yellow





© Troy Kimoto, Canadian Food Inspection Agency,

*Amur corktree (*Phellodendron amurense*)

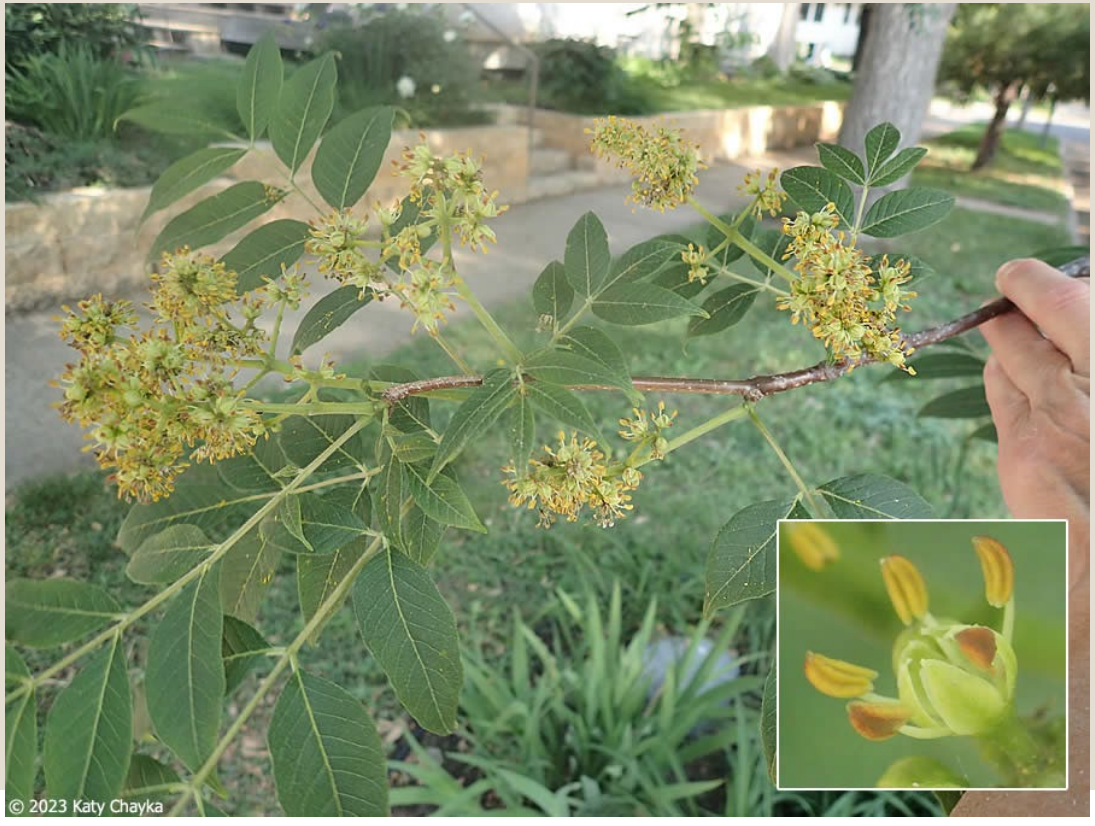
Flower/fruit

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© 2021 Virginia Tech Dept. of Forest Resources and Environmental Conservation

- Flowers are small and greenish; late spring
- Male & female flowers borne on separate plants in branched clusters
- Fruit is a small, black berry.



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Amur corktree look alikes

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Amur corktree (*Phellodendron amurense*) may be confused with other trees with pinnately compound leaves. It looks most like our **native** ashes (*Fraxinus* spp.), which also have opposite branching.

Ashes differ from corktree in having:

- Leaflets with toothed margins
- Inner bark **not** yellow
- Flowers that lack petals
- Fruits that are dry and winged







*Callery pear (*Pyrus calleryana*)

Leaves alternate, simple

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- 2-3" long, shiny, with toothed margins
- Leaf blade is thick, egg-shaped, and often has a prolonged tip
- Buds are woolly



© Michasia Dowdy, University of Georgia, Bugwood.org



© Ryan Armbrust, Kansas Forest Service, Bugwood.org

*Callery pear (*Pyrus calleryana*)

Flower/fruit

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- Flowers are white, showy, fragrant, and borne before leaf-out; April-May
- Fruit is brownish and resembles a small pear or apple; they are gritty in texture and contain numerous seeds

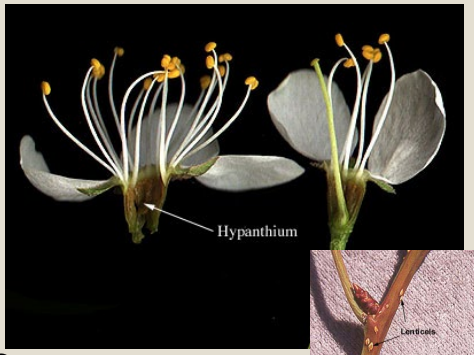




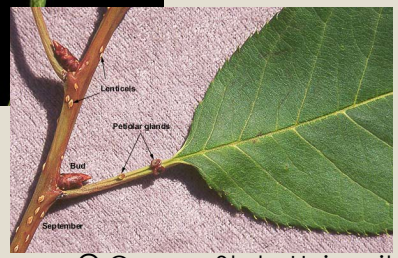
Callery pear look alikes

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Callery pear (*Pyrus calleryana*) can be confused with many other members of the Rose Family (Rosaceae) such as serviceberries (*Amelanchier* spp.), plums/cherries (*Prunus* spp.), hawthorns (*Crataegus* spp.), and apples (*Malus* spp.). Characters of the flowers and leaves will help to separate them.



© Mike Clayton

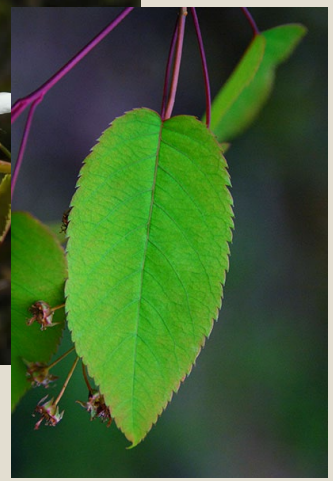


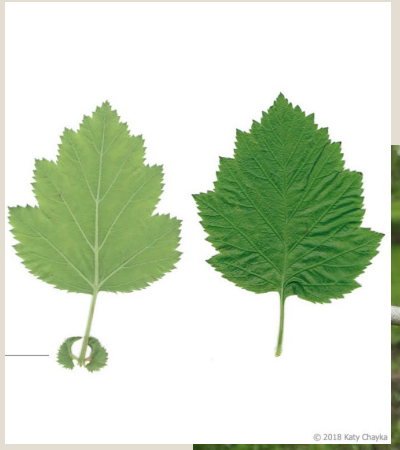
© Oregon State University

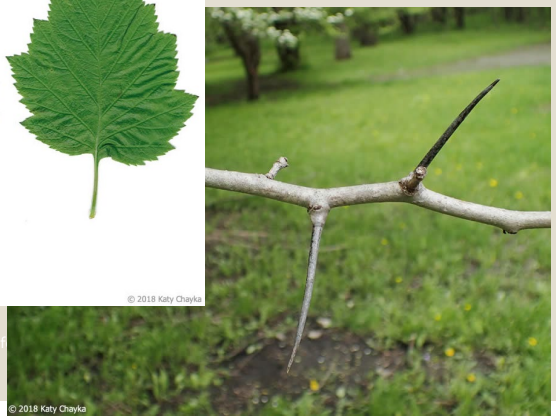
PLUMS/CHERRIES (left) have flowers that contain a single style. The ovary is superior, and the floral cup (hypanthium) is **not** fused to the pistil. The leaves are not glossy and are usually not as rounded at the bases; they have small glands at the base. The fruits contain one seed.

SERVICEBERRIES (right) have petals that are twice as long as wide and thin, dull leaves. The flower clusters have a central axis.









HAWTHORNS (left) have leaves that are coarsely-toothed, sometimes with small lobes. They also have large thorns and flower after leaves have formed.

APPLES (right) have thin, dull leaves, flower clusters without a central axis, and fruit flesh that is not gritty. They generally flower after leaves have formed.





Common buckthorn (*Rhamnus cathartica*)

Leaves opposite, simple

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- 1-2" long, egg-shaped
- Leaf margins with rounded teeth; veins arch toward the leaf tip
- Leaves sometimes sub-opposite or nearly alternate
- Branches usually tipped with a small thorn





Common buckthorn (*Rhamnus cathartica*)

Flower/fruit

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- Flowers are small, green, and borne in round clusters along the branches; May-June
- Male and female flowers are borne on separate plants
- Fruit is a black berry



Multiflora rose (*Rosa multiflora*)

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Leaves alternate, pinnately compound



Anne Pearce, WIFDN

- 2–4" long, composed of 5-11 leaflets
- Leaflets have sharp teeth on the margins
- Stems have large, broad-based prickles
- Stipules are fringed



Anne Pearce



Leslie J. Mehrhoff, University of Connecticut, Bugwood.org

544999

Multiflora rose (*Rosa multiflora*)

Flower/fruit

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- Flowers ¾-1" wide with white petals and yellow stamens; very fragrant
- Female parts of the flower are fused into a little column
- Flowers borne in loose, upright clusters with spreading branches; June
- Fruit is red and berry-like.



Multiflora rose look alikes

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Multiflora rose *(Rosa multiflora*) looks like other rose species, which all have pinnately compound leaves with stipules, toothed leaflets, and 5-petaled flowers.

Multiflora rose is differentiated from other rose species by its **fringed stipules** at the base of leaves and **numerous, white flowers** (**native** roses have pink flowers). Additionally, multiflora rose's **prickles are large and noticeably curved downward**; prickles on other species are generally smaller and stick straight out from the plant or are only slightly curved.



Multiflora rose leaf with fringed stipules (above), compared to solid, wing-like stipules of other rose species (below)





Multiflora rose has large, downward curved thorns (above) that are distinct compared to stems of other rose species (other photos)





Vines



Asian bittersweet (*Celastrus orbiculatus*)

Leaves alternate, simple

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- 2-5” long, circular in outline, sometimes with a pointed tip
- Margins have rounded teeth
- Climbs by twining around other plants





© K

Asian bittersweet (*Celastrus orbiculatus*)

Flower/fruit

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© Chris Evans, University of Illinois, Bugwood.org

- Flowers are greenish, small, and not showy
- Flowers borne in the axils of the leaves; May-June
- Male and female flowers borne on separate plants
- Fruit is a capsule that opens to expose red seeds.



Asian bittersweet look alike

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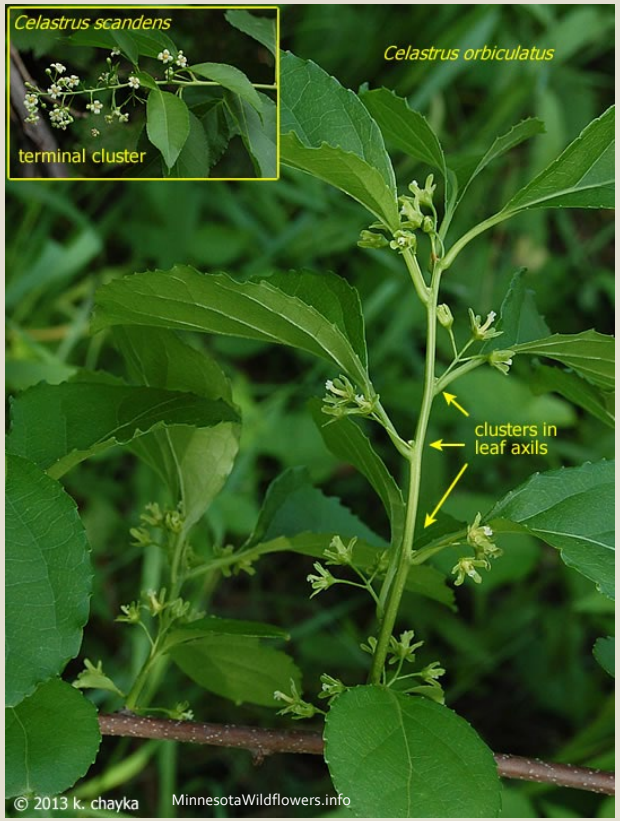
Invasive Asian bittersweet (*Celastrus orbiculatus*) is easily confused with the **native** American bittersweet (*Celastrus scandens*).



Asian bittersweet fruits

It is easiest to differentiate invasive from native bittersweet when the plants are flowering or in fruit.

Invasive bittersweet has **smaller clusters of flowers (and fruits) in leaf axils** while the native American bittersweet has **larger clusters of flowers (and fruits) at the ends of branches**.



Comparison of Asian and American bittersweet flower placement



American bittersweet fruits

The invasive and native bittersweets are also known to hybridize, which can make field identification difficult (or impossible!).

*Mile-a-minute (*Persicaria perfoliata*)

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Leaves alternate, simple



© Bruce Ackley, The Ohio State University, Bugwood.org

- 1.5-2.5" long, shaped like an equilateral triangle
- Stems covered in tiny prickles
- Plants often waxy/bluish



© Richard Gardner, Bugwood.org

*Mile-a-minute (*Persicaria perfoliata*)

Flower/fruit

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- Flowers are small, greenish-white
- Flowers borne in rounded clusters at the tips of stems; June
- Fruit is an achene (small seed with a shell) hidden by blue, fleshy sepals; thus, resembling a berry



Mile-a-minute (*Persicaria perfoliata*)

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Mile-a-minute vine *(Persicaria perfoliata*) may be confused with our **native** tearthumbs (*Persicaria arifolia* and *Persicaria sagittata*). These vines all have weak, prickly stems and triangular leaves.



Mile-a-minute vine **stems are reddish and covered in prickles**. **Leaves are equilateral triangles** with prickles on the undersides. **Cup-shaped** leaves along the stem are below clusters of flowers, followed by **pea-size metallic blue "fruits"**.



Native tearthumbs have **prickles along the stems**. Leaves are **triangular to arrowhead-shaped,** with lower leaves sometimes having triangular lobes at the base. The leaves below flower clusters are **lance-shaped**. Fruits are dry.

*Goldencreeper (*Thladiantha dubia*)

Leaves alternate, simple

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- 2-6" long, heart-shaped, hairy
- Margins have small teeth
- Climbs via tendrils



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*Goldencreeper (*Thladiantha dubia*)

Flower/fruit

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©Rob Hille

- Flowers are large, tubular, yellow; June-Sept.
- Male and female flowers are on separate plants
- Fruit resembles a hairy, red cucumber



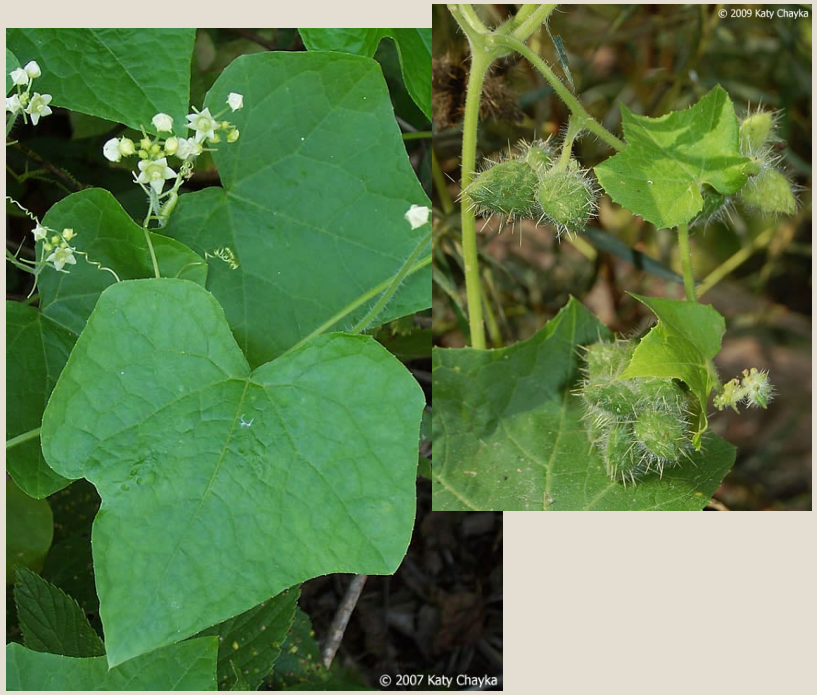
Goldencreeper look alikes

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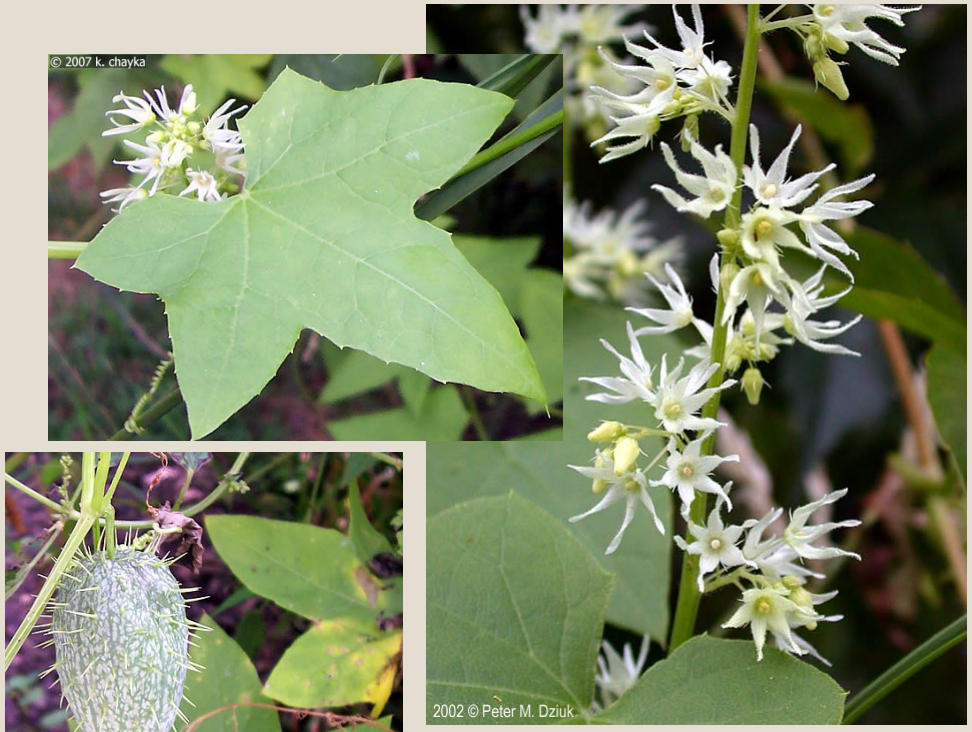
Goldencreeper resembles other members of the Cucumber Family (Cucurbitaceae) including the **native** wild cucumber (*Echinocystis lobata*) and bur cucumber (*Sicyos angulatus*), as well as cultivated summer and fall squashes.

All of these species are easily told apart when in flower: **all native and cultivated members of the family have male and female flowers on the same plant**. Goldencreeper has male and female flowers **on separate plants**. Only male goldencreeper plants have been found in the Midwest.

Wild cucumber (*Echinocystis lobata*) and bur cucumber (*Sicyos angulatus*) have small, white flowers. They both have prickly fruits, but they are **green**, not red.



Bur cucumber (*Sicyos angulatus*)

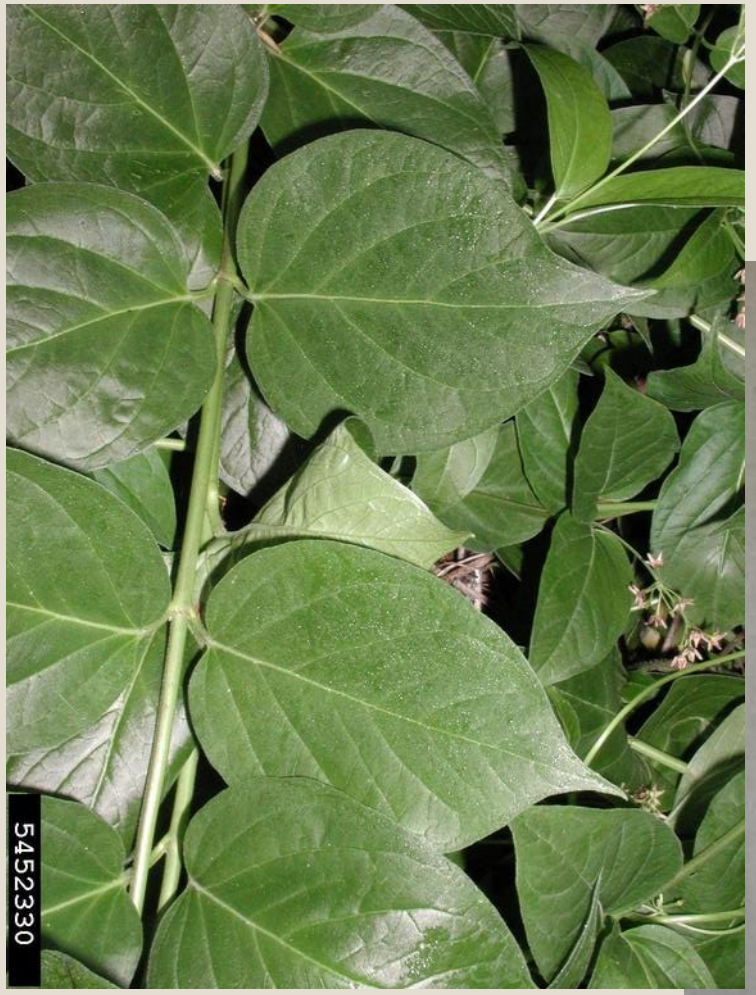


Wild cucumber (*Echinocystis lobata*)

*Swallowwort (*Vincetoxicum* spp.)

Leaves opposite, simple

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© Leslie J. Mehrhoff, University of Connecticut, Bugwood.org

- 3-4" long, oval, glossy, dark green
- Leaf margins are entire; sap is clear
- Stems twine around other vegetation



© Leslie J. Mehrhoff, University of Connecticut, Bugwood.org

*Swallowwort (*Vincetoxicum* spp.)

Flower

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Both species have small clusters of five-petaled flowers with a domed structure in the middle. They resemble tiny milkweed (*Asclepias* spp.) flowers.



Swallowwort look alikes

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Swallowworts somewhat resemble **native** milkweeds (*Asclepias* spp.) because their flowers are similar. However, milkweeds are **upright plants that never twine,** and they bear their flowers in large, usually rounded clusters. Most milkweed species have **milky sap**.





Herbs



Garlic mustard (*Alliaria petiolata*)

Leaves alternate, simple

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- 3" long, heart-shaped with toothed margins
- Pronounced veins on the leaves
- All parts of the plant have a garlicky odor



Seedlings

Garlic mustard (*Alliaria petiolata*)

Flower/fruit

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- Flowers are white, with four petals, 6 stamens
- Flowers borne at the tips of branches, elongating later in the season; May-June
- Fruit is a cylindrical capsule



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*Lesser celandine (*Ficaria verna*)

Flower/fruit

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Showy, bright yellow flowers with 8-15 petals
Flowers borne on long stalks from the leaves; April-May
Fruit is a hard, small achene; held in tight heads



*Lesser celandine (*Ficaria verna*)

Leaves alternate, simple

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- Leaves up to 1.5" long, usually held in a rosette
- Leaves heart-shaped, with entire or scalloped margins
- Roots tuberous
- Small bulbils produced along creeping stems



*Japanese stiltgrass (*Microstegium vimineum*)

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Spikelets



© Douglas Goldman, USDA CC BY-NC 4.0

- Inflorescence with 2-4 branches
- Spikelets borne in pairs: one stalked, one not
- Spikelets 3.7-6.5 mm long with 1-2 florets; flowering late summer-fall
- Lemmas with long awns



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*Japanese stiltgrass (*Microstegium vimineum*)

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Anne

*Japanese stiltgrass (*Microstegium vimineum*)

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Leaves alternate



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- Plants 1-3' tall; leaves 1.2-3.9" long
- Stems delicate, like a mini bamboo
- Leaves with a white midvein, tapered at both ends, smooth or sparsely hairy



Japanese stiltgrass look alikes

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Japanese stiltgrass (*Microstegium vimineum*) is similar to other **native** forest understory grasses. It is most easily confused with white grass (*Leersia virginica*), nimblewill (*Muhlenbergia schreberi*), and wirestem muhly (*Muhlenbergia frondosa*). While there are many technical characters separating these species, the easiest one to remember is that **JSG is an annual,** while all the others are perennial.



white grass



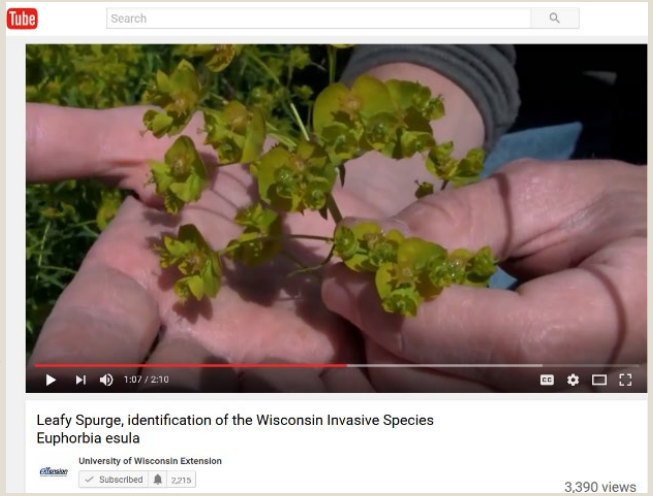
wirestem muhly



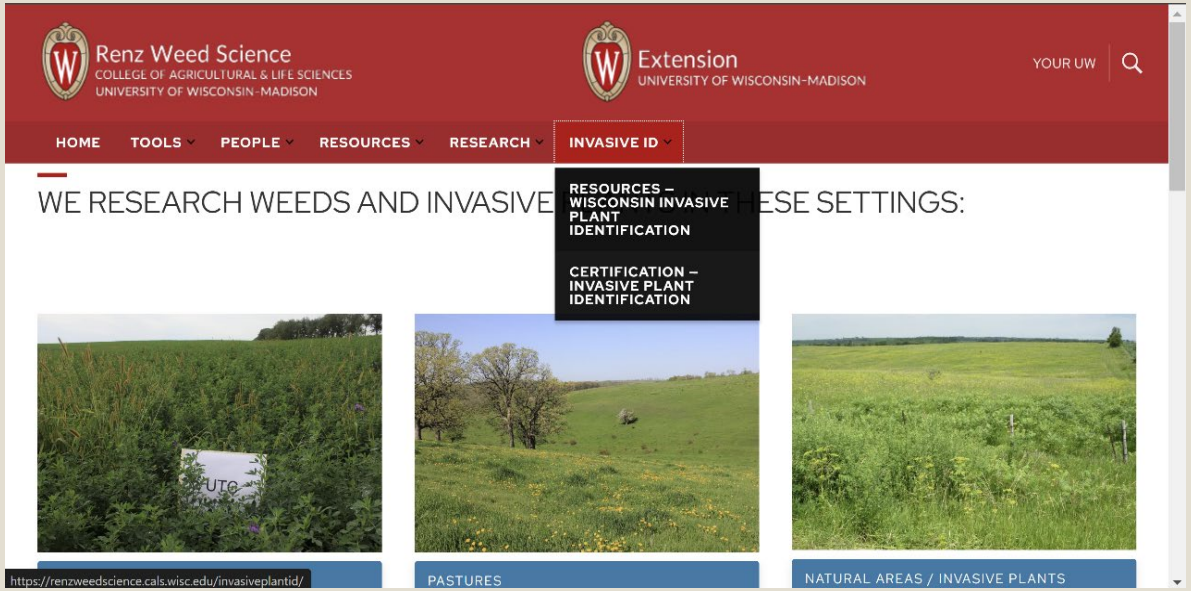
nimblewill

Plant Identification

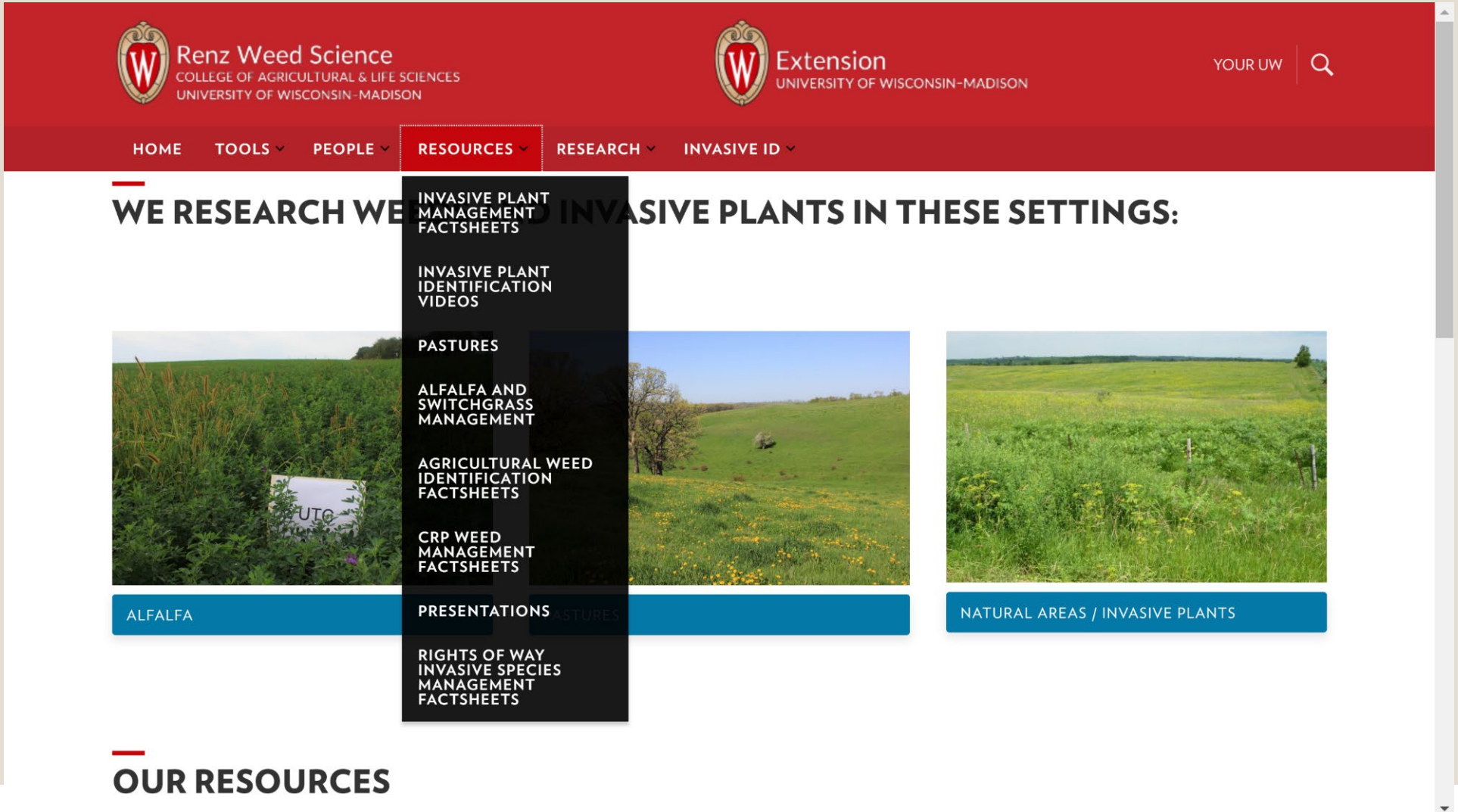
- Many resources, pick the one that fits your needs!
  - Books, guides, factsheets
  - Online resources
  - Mobile Apps
  - Expert opinion



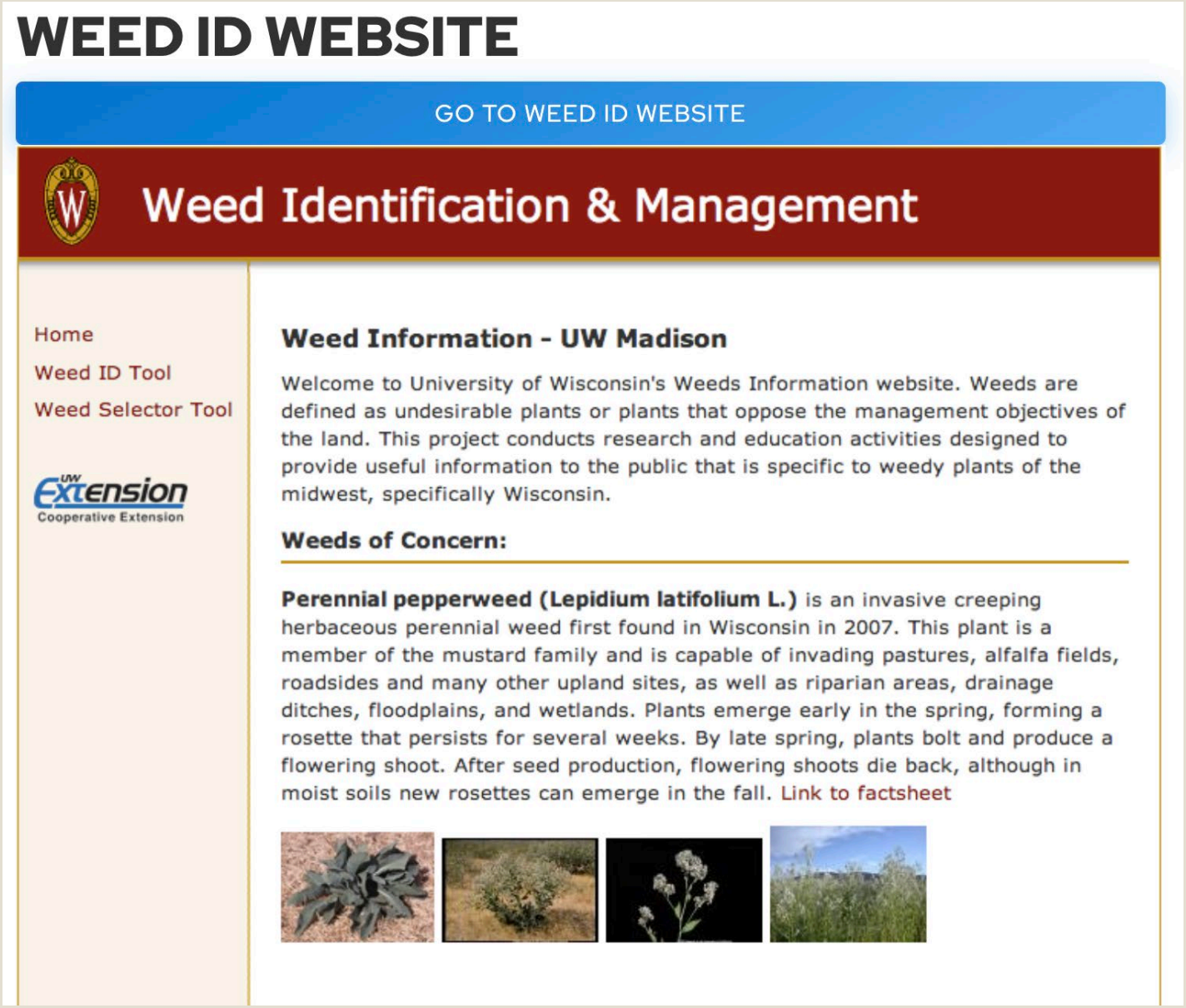




https://renzweedscience.cals.wisc.edu/



WEED ID WEBSITE



https://renzweedscience.cals.wisc.edu/tools/weed-id-website/

Summary

- Use factsheets, field guides, and apps to identify plants
- Report invasive species (EDDMapS)
- Reports are vetted by experts
- Prohibited species will be addressed by WDNR
- Also send reports or questions directly to our lab staff



ID apps?

Invasive Plant Management Options



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Extension
UNIVERSITY OF WISCONSIN-MADISON

Travis Wilson
Research Specialist – Renz Lab

Little Background

- Invasive species management and restoration for over 8 years
- Worked in forests, prairies, wetlands, and the desert
- Currently manage applied research projects in Renz Weed Science lab





ALFALFA



PASTURES



NATURAL AREAS / INVASIVE PLANTS

Renz Weed Science

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Goal of my talk

- Overview common management methods
  - Summary of how to apply
  - Positive aspects
  - Negative aspects
  - Comments/tricks to improve use
  - Herbicide recommendations



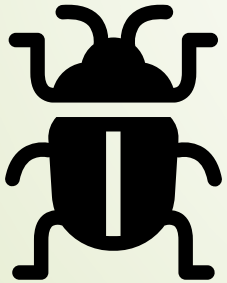


What management options are there?

- Manual removal
- Forestry mowing
- Fire
- Biological Control
- Herbicide











Details of the site will often dictate management

- Goals of the land
- Invasive/non-desirable plants present
- Desirable plants present
- Site specific conditions
- 💪 💪 💪 and $$$ available





Manual removal



Approach:

- remove root crown with device/digging

Positive aspects:

- less detrimental to sensitive species

Negative aspects:

- higher ground disturbance with high densities
- very labor intensive

Comments:

- specific tools designed for this task
  (ex. weed wrench)
- conifers don't need root crown removal

Forestry Mowing

Approach:

- large machinery mulches shrubs/trees (ex. Fecon)

Positive aspects:

- large areas in short time



Negative aspects:

- expensive, often contracted
- high level of disturbance
- needs solid ground

Comments:

- lots of mulch created
- follow-up treatment on resprouts required

Biological Control (goats)

Approach:

- place goats into infested areas, will eat leaves and strip bar

Positive aspects:

- impacts mostly woody species (selective)
- not an herbicide

Negative aspects:

- takes multiple years
- expensive if contracted
- lots of work to fence/water, herd

Comments:

- personal herd



Prescribed Fire

Approach:

- use largescale fire to remove unwanted species

Positive aspects:

- large area managed
- many native species thrive with fire
- not an herbicide

Negative aspects:

- follow up work
- safety risks
- resources needed to safely conduct burn

Comments:

- works best when coupled with other management









Propane Torch

Approach:

- Use torch to burn cut surfaces until bright cherry red color achieved on root crowns of woody plants or incinerating growing areas of herbaceous plants.

Positive aspects:

- non-chemical

Negative aspects:

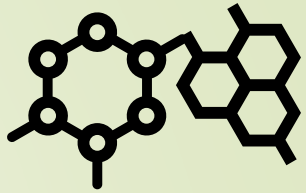
- fire hazard

Comments:

- good to use on rainy days
- our lab hasn't seen good results, but others have



Herbicides



Effective control

- one application can kill shrub/tree
- integrates well with other methods
- often most cost effective in large infestations

Different applications methods

- foliar, cut surface/stump, basal bark, hack and squirt

GET TRAINING

Be aware of unwanted impacts

- injure desirable species (ex. Oaks)
- use near water
- "ring of death" around target plant



Preparation and Safety



- PPE
  - safety glasses/goggles
  - latex/neoprene gloves
  - proper field clothes
  - closed toe shoes
- make sure you mix on a flat surface
- always start with small amount of water/oil when mixing, then follow with herbicide product
- make sure to AGITATE the mix!







Cut Surface Application

Approach:

- cut stem, apply 5-25% solution to cut surface
- apply as soon as possible after cutting

Positive aspects:

FOLLOW PRODUCT LABEL

- targeted treatment
- effective for larger diameter trees/shrubs

Negative aspects:

- lots of work removing material

Comments:

- some formulations mix with water, others mix with oil (bark oil/kerosene)
- avoid heavy snow/moisture
- only treat cambium (living outer ring of the plant)

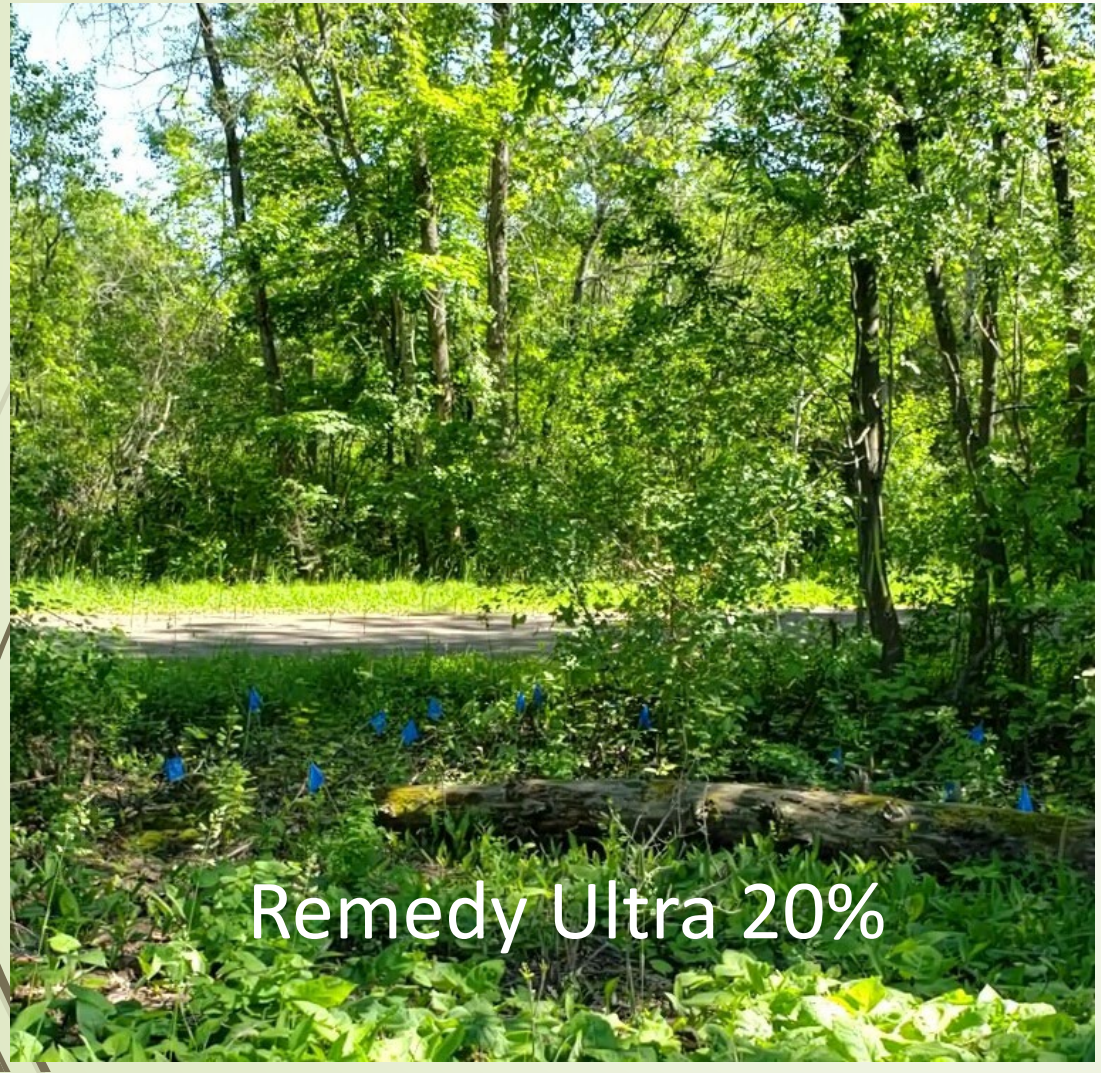
Effective on huge/old shrubs and small new plants





Herbicide comparison

Selective VS. Non-selective





Buckthorn Blaster

Filter: Availability Price

Sort by: Featured 7 products



Buckthorn Blaster™ DELUXE Duo Kit (5 tips, 3 caps, 2 bottles, PLUS 1 Mark-It-Blue & a Tip Remover Tool))

$39.99 USD



Buckthorn Blaster™ Duo Kit (5 tips, 3 caps, 2 bottles)

$19.99 USD



Buckthorn Blaster™ Refillable Bottle (No cap/No tip)

$8.99 USD



Buckthorn Blaster™ Replacement Tips (5-pack)

$9.99 USD

Basal Bark Application



Approach:

FOLLOW PRODUCT LABEL

- apply 15-25% solution
- at least 12" up stem around base of entire plant
- make sure bark is dry

Positive aspects:

- targeted treatment
- don't have to cut down tree/shrub

Negative aspects:

- doesn't work as well for large stems

Comments:

- always mix with oil (bark oil/kerosene)

Hack and Squirt Application



Approach:

FOLLOW PRODUCT LABEL

- make cuts at 45° through cambium layer then inject 50-100% herbicide solution
- make 1 "hack" for every 2-3 inches of diameter above 3 inches

Positive aspects:

- targeted treatment
- don't have to cut down tree/shrub

Negative aspects:

- using high solution of herbicide

Comments:

- 3 inches or larger





Foliar Application

Approach:

FOLLOW PRODUCT LABEL

- add dilute (1-3%) concentration
- apply onto leaves TO THE POINT OF RUNOFF

Positive aspects:

- limit off target movement of herbicide in the soil
- cheap & fast

Negative aspects:

- higher potential for off-target drift

Comments:

- Apply spring through fall (actively growing)
- Scales well for area
- Shouldn't spray over head level with backpack
- Weather should be considered: rain and extreme temps may impact effectiveness

If applying to resprouts, wait for regrowth



Picture of shrub with limited regrowth (knee high)



Picture of shrub with lots of regrowth (waste high)

Results improve with more regrowth

Vastlan 3% early (June after winter mowing)



Vastlan 3% late (Aug. after winter mowing)



Bush honeysuckle control 1 year after foliar treatment to resprouting shrubs

Comparison of herbicide methods

Method		Cost	Non-target injury	notes
Foliar	IPT or entire area	Cheapest (fastest to apply, low herbicide rate)	High potential if herbicide not selective	Can apply to range of shrub/tree sizes
Cut surface	IPT only	Most expensive (time to remove stem, high herbicide rate)	Low potential except near base of treated tree if **use residual herbicide**	Can apply to range of shrub/tree sizes
Basal bark	IPT only	Moderately expensive (high herbicide rate)		Works best on small diameter plants
Stem injection	IPT only	Moderately expensive (high herbicide rate)		Hard to apply on small diameter plants

Some herbicides used can cause non-target injury and/or persist in the soil

Integrated Pest Management

- Best to include more than one management approach
- Going to take time to see results, don't rush



Herbicide Recommendations

Renz Weed Science
Invasive Plant Management Factsheets





enzweedscience.cals.wisc.edu

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- INVASIVE PLANT MANAGEMENT FACTSHEETS
- INVASIVE PLANT IDENTIFICATION VIDEOS
- PASTURES
- ALFALFA AND SWITCHGRASS MANAGEMENT
- AGRICULTURAL WEED IDENTIFICATION FACTSHEETS
- CRP WEED MANAGEMENT FACTSHEETS
- PRESENTATIONS
- RIGHTS OF WAY INVASIVE SPECIES MANAGEMENT FACTSHEETS

WE RES IVE PLANTS IN THESE SETTINGS:



ALFALFA



PASTURES



NATURAL AREAS / INVASIVE PLANTS

	Morrow's honeysuckle Tartarian honeysuckle	
Helianthus mollis Lam.	ashy sunflower	09142023
Celastrus orbiculatus	Asian bittersweet	A3924-25
Lotus corniculatus	bird's-foot trefoil	A3924-29
Robinia pseudoacacia	black locust	A3924-17
Vincetoxicum nigrum	black swallow-wort	A3924-01
Ligustrum spp.	border privet common privet	A3924-31
Cirsium vulgare Cirsium palustre Carduus nutans Carduus acanthoides	bull thistle European marsh thistle musk thistle plumeless thistle	A3924-16
Cirsium arvense	Canada thistle	A3924-04
Rhamnus cathartica Frangula alnus	common buckthorn glossy buckthorn	A3924-02
Tanacetum vulgare	common tansy	A3924-32
Dipsacus spp.	common teasel cut-leaved teasel	A3924-14
Campanula rapunculoides	creeping bellflower	A3924-05

MANAGEMENT OF



INVASIVE PLANTS IN WISCONSIN

Brendon Panke and Mark Renz

Invasive plants can thrive and aggressively spread beyond their natural range, disrupting ecosystems. The *Management of Invasive Plants in Wisconsin* series explains how to identify invasive plants and provides common management options. Management methods recommend specific timings for treatment, as well as expected effectiveness. For more information, go to: fyi.uwex.edu/weedsci/category/invasive-plants-of-wisconsin.

A3924-02

Common buckthorn (*Rhamnus cathartica*) Glossy buckthorn (*Frangula alnus*)

Buckthorn is an understory shrub or small tree 10–25' tall. Both species grow in shrub or tree form and possess prominent leaf scars in the winter. A cut branch exposes yellow sapwood and orange heartwood. **Common buckthorn** has brown to silver bark that is shiny when young and dark grey to black and scaly when mature. Buds are found in pairs at the end of branches, are covered in dark scales, and resemble a hoof. Twigs often end in stout thorns. **Glossy buckthorn** has gray to brown lenticels and lacks thorns. Buds lack scales, are hairy, and are found at the end of branches.

Legal classification in Wisconsin: Restricted, including all cultivars except 'Asplenifolia' and 'Fineline' (Ron Williams).

Leaves: Ovate or elliptical, with prominent veins curving toward tip. Stay green late into fall. **Common buckthorn** has mostly opposite leaves, 1–2.5" long, with tiny teeth. **Glossy buckthorn** has mostly alternate leaves, 2–3" long, with entire margins, a glossy upper surface, and dull underside that can be hairy.

Flowers: Small and clustered where the leaf attaches to the stem (leaf axil). **Common buckthorn** has fragrant, greenish-yellow, four-petaled flowers that bloom from late spring. **Glossy buckthorn** has small, pale-yellow, five-petaled flowers that bloom from spring to first frost.

Fruits and seeds: Both species have abundant clusters of round, 0.25" diameter fruit. **Common buckthorn** is dioecious; thus only female trees have black fruit. **Glossy buckthorn** is monoecious and produces red fruit that turn to black when ripe.

Roots: Extensive fibrous root system extending from a woody crown.

Similar species: Alder buckthorn (*R. alnifolia*; native) is < 3' tall with thornless twigs. Lance-leafed buckthorn (*R. lanceolata*; native) is less than 6' tall, found in wet areas and on dry limestone slopes, and has alternate leaves, 2–6" long, gradually tapering to a point at the tip. Carolina buckthorn (*R. caroliniana*; native), found in the southern Midwest, is 10–30' tall with toothed, mostly alternate leaves, 2–3" long.

Ecological threat:

- **Common buckthorn** invades the understory of southern oak, oak-beech, maple, and riparian woods. It also invades prairies, savannas, hedgerows, pastures, old fields, roadsides, and rocky sites.
- **Glossy buckthorn** invades wetter sites with more organic soils than *R. cathartica*. Invades alder thickets, calcareous fens, wetlands, heath-oak woods, pine woods, spruce woods, pastures, fencerows, roadsides, slopes of ravines, wet prairies, marshes, sedge meadows, sphagnum bogs, and tamarack swamps.

UW Extension

- Both buckthorns are characterized by prolific reproduction by seed, long-distance dispersal ability, wide habitat tolerance, and high levels of phenotypic plasticity (i.e., adjusting physical appearance to maximize productivity across environmental conditions).
- Both leaf out very early and retain leaves late into the growing season, providing a longer growing season than native plants.

Non-chemical control

Removal

Effectiveness in season: 90–100%
Season after treatment: 70–90%

Plants ≤ 0.4" diameter are easily pulled from moist soil. Larger diameters (0.5–1.5") can be dug or pulled. To prevent resprouting, remove above-ground growth and root crown. Dig before plant produces seeds.

Mowing

Effectiveness in season: 70–90%
Season after treatment: < 50%

Mowing removes above-ground growth of established plants and prevents additional seed production, but rarely kills plants. Established plants persist after mowing for many years. If possible, mow in the winter to avoid damaging desirable vegetation and compacting soil. If mowed material is mulched on the soil surface, it can reduce seedling recruitment. Pairing mowing with another technique, such as foliar spray of herbicide, increases effectiveness. Cutting before seed is produced in summer and again after the plant has resprouted in fall will reduce vigor of resprouts the following year, but will not kill plants. If seeds are present when removed, avoid movement off of the site unless material can be transported without spreading fruit to other locations.

Prescribed burning

Effectiveness in season: 50–70%
Season after treatment: < 50%

Spring burns can kill germinating seedlings and suppress above-ground growth of established plants, depending on fire intensity. After the fire, established plants will resprout; this management method is not recommended unless integrated with other techniques. Burning stimulates seedling germination, but 5–6 years of repeated burning will reduce buckthorn seedbank. A five-second application of flame with a propane torch around the stem will kill plants ≤ 2" diameter.

Manipulation of the environment

Effectiveness in season: < 50%
Season after treatment: < 50%

Underplanting with a vigorous, shade-tolerant woody species, such as sugar maple, competes with buckthorn plants. This reduces the light level in the forest, reduces productivity of established buckthorn, and prevents seedling germination.

Chemical control

Pre-emergence

Apply herbicide directly to soil. These products will only damage plants that germinate after the herbicide has been applied. They will not damage established plants. Use lower rates on areas where less dense populations are expected and higher rates on areas where denser populations are expected.

napropamide*

Effectiveness in season: 70–90%
Season after treatment: < 50%

Common name: Devrinol 50-DF

Rate: 1.8–7.1 lb/A (0.9–3.6 lb a.i./A)

Timing: Apply prior to germination of seedlings. While spring applications will maximize control, fall or winter applications may also suppress seedlings, depending upon environmental conditions.

Remarks: Reduced efficacy can be expected if < 0.6" of rainfall occurs within 2–3 days of application.

Caution: Do not apply directly to water or to areas where surface water is present. Do not apply more than once a year. Avoid using napropamide in areas where soils are composed of more than 10% organic matter. Napropamide remains in the soil for up to a year, depending on application. Maintenance of a vegetative buffer strip is required between the areas napropamide is applied and surface water features or sensitive terrestrial habitats. Overspray or drift to desirable plants should be avoided, since even minute quantities of the spray may cause severe injury to plants.

pendimethalin*

Effectiveness in season: 70–90%
Season after treatment: < 50%

Common name: Pendulum Aquacap

Rate: 90 fl oz/A (2.7 lb a.i./A)

Timing: Apply prior to germination of seedlings. While spring applications will maximize control, fall or winter applications may also suppress seedlings, depending upon environmental conditions.

Remarks: Reduced efficacy can be expected if < 0.5" of rainfall occurs within 30 days of application.

Caution: Do not apply directly to water or to areas where surface water is present. Do not exceed applications of 67 fl oz/A on home lawns, parks, schools, and playgrounds. Overspray or drift to desirable plants should be avoided since even minute quantities of the spray may cause severe injury to plants.

Foliar

Apply directly to individual plants or broadcast across an infested area. Broadcasted foliar applications are typically the most cost-effective treatment in dense infestations. Use lower rates on smaller plants and less dense populations and higher rates on larger plants and denser populations.

glyphosate*

Effectiveness in season: 50–70%
Season after treatment: < 50%

Common name: Roundup

Rate:
broadcast: 1.7–3.7 lb a.e./A
spot: For a 3 lb a.e./gal product: 1.0–2.0% (0.03–0.06 lb a.e./gal)

Timing: Apply when target species is actively growing and fully leafed out.

Remarks: A wick application of a 33–75% solution (1.49–3.38 lb a.e./gal) of the product is effective on shorter plants that are taller than desirable species.

Caution: Use product labeled for aquatic use if potential exists for solution to contact surface waters. Applications can result in bare ground since glyphosate is not selective. Overspray or drift to desirable plants should be avoided, since even minute quantities of the spray may cause severe injury to plants.

triclopyr*

Effectiveness in season: 90–100%
Season after treatment: 90–100%

Common name: Garlon

Rate:
broadcast: 128–256 fl oz/A (4.0–8.0 lb a.e./A)
spot: 1.0–2.0% (0.04–0.08 lb a.e./gal)

Timing: Apply when target species is actively growing and fully leafed out.

Caution: Use product labeled for aquatic use if potential exists for solution to contact surface waters. Use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination. Overspray or drift to desirable plants should be avoided since even minute quantities of the spray may cause severe injury to plants.



Cut stump

Cut a stem of a plant near the base and apply herbicide to the cut surface that remains rooted in the ground. Apply as soon as possible after cutting, but no later than one hour after cutting. Do not use this method if there is heavy sap flow or snow covers the cut surface. Use lower rates on smaller plants and higher rates on larger plants.

glyphosate*

Effectiveness in season: 90–100%
Season after treatment: 50–70%

Common name: Roundup

Rate: For a 3 lb a.e./gal product: 20–50% (0.6–1.5 lb a.e./gal)

Timing: Apply any time of year.

Caution: Use product labeled for aquatic use if potential exists for solution to contact surface waters. Applications can result in bare ground since glyphosate is not selective. Overspray or drift to desirable plants should be avoided, since even minute quantities of the spray may cause severe injury to plants.

imazapyr*

Effectiveness in season: 90–100%
Season after treatment: 70–90%

Common name: Stalker

Rate: 6.0–9.0% in oil (0.1–0.2 lb a.e./gal)

Timing: Apply any time of year.

Remarks: Products containing this active ingredient can have different instructions for mixing. Labels will recommend mixing the product in a water- or oil-based carrier (e.g., basal bark oil). Consult the label to determine the appropriate carrier.

Caution: Use product labeled for aquatic use if potential exists for solution to contact surface waters. Applications can result in bare ground since imazapyr is not selective and can remain in the soil for several months to more than a year, depending on application rate. Overspray or drift to desirable plants should be avoided, since even minute quantities of the spray may cause severe injury to plants.

picloram*

Effectiveness in season: 90–100%
Season after treatment: 50–70%

Common name: Tordon K

Some products containing picloram are restricted-use in Wisconsin.

Rate: 50–100% (1.0–2.0 lb a.e./gal)

Timing: Apply any time of year.

Caution: Do not apply directly to water or to areas where surface water is present. Use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination. Remains in the soil for more than one year, depending on application rate, and has the potential to contaminate surface runoff water during this timeframe. Maintenance of a vegetative buffer strip is recommended between the areas picloram is applied and surface water features. Overspray or drift to desirable plants should be avoided since even minute quantities of the spray may cause severe injury to plants. Do not compost treated plants since herbicide can persist through composting process.

triclopyr*

Effectiveness in season: 90–100%
Season after treatment: 90–100%

Common name: Garlon

Rate: 20–30% in oil (0.8–1.2 lb a.e./ gal)

Timing: Apply any time of year.

Remarks: Products containing this active ingredient can have different instructions for mixing. Labels will recommend mixing the product in a water- or oil-based carrier (e.g., basal bark oil). Consult the label to determine the appropriate carrier.

Caution: Use product labeled for aquatic use if potential exists for solution to contact surface waters. Use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination. Overspray or drift to desirable plants should be avoided since even minute quantities of the spray may cause severe injury to plants.



triclopyr*

Effectiveness in season: 90–100%
Season after treatment: 90–100%

Common name: Garlon

Rate: 20–30% in oil (0.8–1.2 lb a.e./ gal)

Timing: Apply any time of year.

Remarks: Products containing this active ingredient can have different instructions for mixing. Labels will recommend mixing the product in a water- or oil-based carrier (e.g., basal bark oil). Consult the label to determine the appropriate carrier.

Caution: Use product labeled for aquatic use if potential exists for solution to contact surface waters. Use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination. Overspray or drift to desirable plants should be avoided since even minute quantities of the spray may cause severe injury to plants.

Hack-and-squirt

Using a hand axe, make cuts every 3–4" around the trunk 6–18" above the ground. Apply the herbicide solution into the cut area. Do not use this method if there is heavy sap flow. Use lower rates on smaller plants and higher rates on larger plants.

glyphosate*

Effectiveness in season: 50–70%
Season after treatment: 50–70%

Common name: Roundup

Rate: For a 3 lb a.e./gal product: 50–100% (1.5–3.0 lb a.e./gal)

Timing: Apply any time of year.

Caution: Use product labeled for aquatic use if potential exists for solution to contact surface waters. Applications can result in bare ground since glyphosate is not selective. Overspray or drift to desirable plants should be avoided, since even minute quantities of the spray may cause severe injury to plants.

imazapyr*

Effectiveness in season: 50–70%
Season after treatment: 70–90%

Common name: Stalker

Rate: 6.0–9.0% in oil (0.1–0.2 lb a.e./gal)

Timing: Apply any time of year.

Remarks: Products containing this active ingredient can have different instructions for mixing. Labels will recommend mixing the product in a water- or oil-based carrier (e.g., basal bark oil). Consult the label to determine the appropriate carrier.

Caution: Use product labeled for aquatic use if potential exists for solution to contact surface waters. Applications can result in bare ground since imazapyr is not selective and can remain in the soil for several months to more than a year, depending on application rate. Overspray or drift to desirable plants should be avoided, since even minute quantities of the spray may cause severe injury to plants.

picloram*

Effectiveness in season: 50–70%
Season after treatment: 70–90%

Common name: Tordon K

Some products containing picloram are restricted-use in Wisconsin.

Rate: 50% (1.0 lb a.e./gal)

Timing: Apply any time of year, except during drought conditions.

Caution: Do not apply directly to water or to areas where surface water is present. Use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination. Remains in the soil for more than one year, depending on application rate, and has the potential to contaminate surface runoff water during this timeframe. Maintenance of a vegetative buffer strip is recommended between the areas picloram is applied and surface water features. Overspray or drift to desirable plants should be avoided since even minute quantities of the spray may cause severe injury to plants. Do not compost treated plants since herbicide can persist through composting process.

picloram + 2,4-D*

Effectiveness in season: 50–70%
Season after treatment: 70–90%

Common name: Pathway

Some products containing picloram are restricted-use in Wisconsin.

Rate: 100% (picloram: 3% + 2,4-D: 11.2%)

Timing: Apply any time of year.

Caution: Do not apply directly to water or to areas where surface water is present. Use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination. Remains in the soil for more than one year, depending on application rate, and has the potential to contaminate surface runoff water during this timeframe. Maintenance of a vegetative buffer strip is recommended between the areas this product is applied and surface water features. Overspray or drift to desirable plants should be avoided since even minute quantities of the spray may cause severe injury to plants. Do not compost treated plants since herbicide can persist through composting process.



Basal bark

Apply herbicide in a ring around the entire stem. Applications should be made at least 6" wide (6–18") to the base of a woody stem. Ideal for stems ≤ 6" in diameter. Use lower rates on smaller plants and higher rates on larger plants.

imazapyr*

Effectiveness in season: 50–70%
Season after treatment: 90–100%

Common name: Stalker

Rate: 6–12% in oil (0.1–0.25 lb a.e./gal)

Timing: Apply any time of year.

Remarks: Products containing this active ingredient can have different instructions for mixing. Labels will recommend mixing the product in a water- or oil-based carrier (e.g., basal bark oil). Consult the label to determine the appropriate carrier.

Caution: Use product labeled for aquatic use if potential exists for solution to contact surface waters. Applications can result in bare ground since imazapyr is not selective and can remain in the soil for several months to more than a year, depending on application rate. Overspray or drift to desirable plants should be avoided, since even minute quantities of the spray may cause severe injury to plants.

triclopyr*

Effectiveness in season: 50–70%
Season after treatment: 90–100%

Common name: Garlon

Rate: 1.0–5.0% in oil (0.04–0.2 lb a.e./gal)

Timing: Apply any time of year.

Remarks: Products containing this active ingredient can have different instructions for mixing. Labels will recommend mixing the product in a water- or oil-based carrier (e.g., basal bark oil). Consult the label to determine the appropriate carrier.

Caution: Use product labeled for aquatic use if potential exists for solution to contact surface waters. Use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination. Overspray or drift to desirable plants should be avoided since even minute quantities of the spray may cause severe injury to plants.



Herbicide information is based on label rates and reports by researchers and land managers. Products known to provide effective control or in common use are included. Those that do not provide sufficient control or lack information for effectiveness on target species have been omitted.

References to pesticide products in this publication are for your convenience and not an endorsement of one product instead of a similar product. You are responsible for using pesticides in accordance with the label directions. *Read the label before any application.*

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Online resources:

Wisconsin First Detector Network Eddmaps/ID resources:

https://fyi.extension.wisc.edu/wifdn/get-involved/report-invasive-species/

Renz Weed Science Lab – Department of Plant and Agroecosytem Sciences

https://renzweedscience.cals.wisc.edu/

North American Invasive Species Association:

Naisma.org

Midwest Invasive Plant Network:

Mipn.org

Eddmaps homepage:

https://www.eddmaps.org

Questions?

- Travis Wilson
  - Research Specialist – Renz Lab
    - Current Research Trials

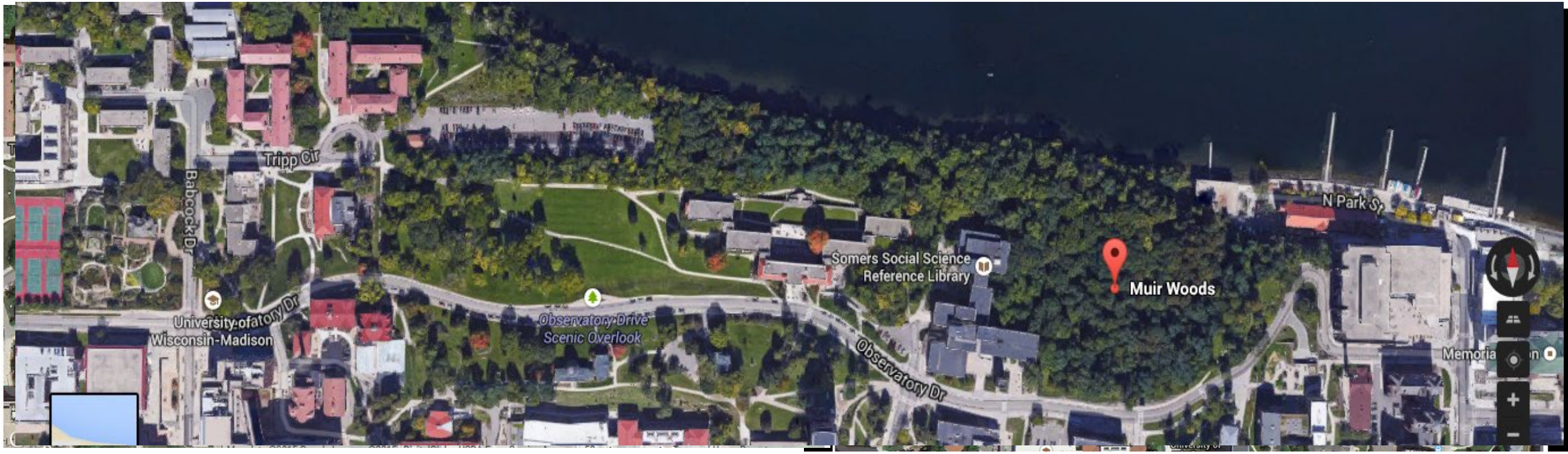


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How to develop a successful management program



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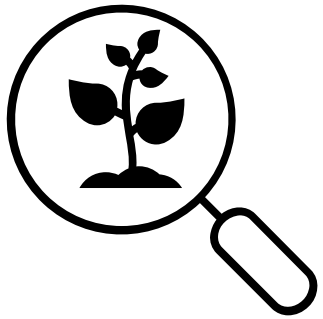
Mark Renz (mrenz@wisc.edu)

Professor and Extension Weed Specialist

https://renzweedscience.cals.wisc.edu/

Need to be methodical!

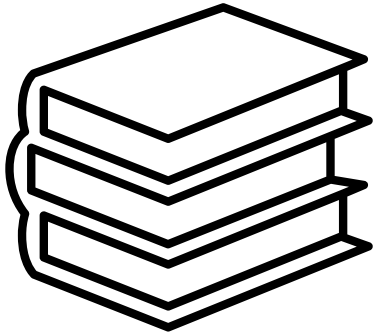
Five step approach



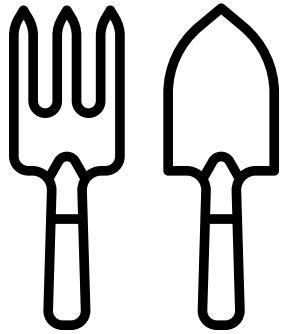
IDENTIFY



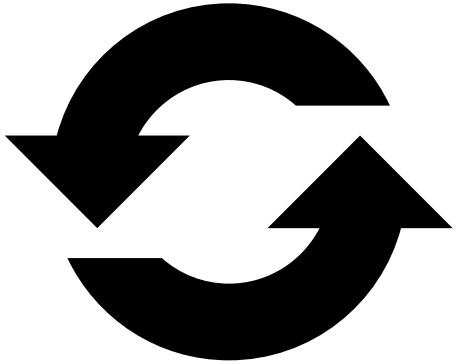
MAP



RESEARCH



CONTROL



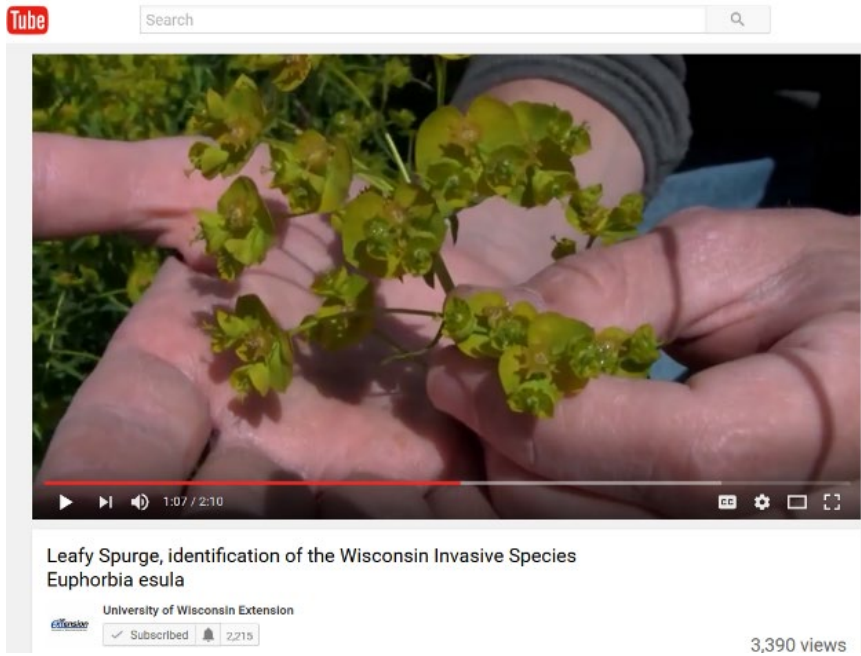
ADAPT

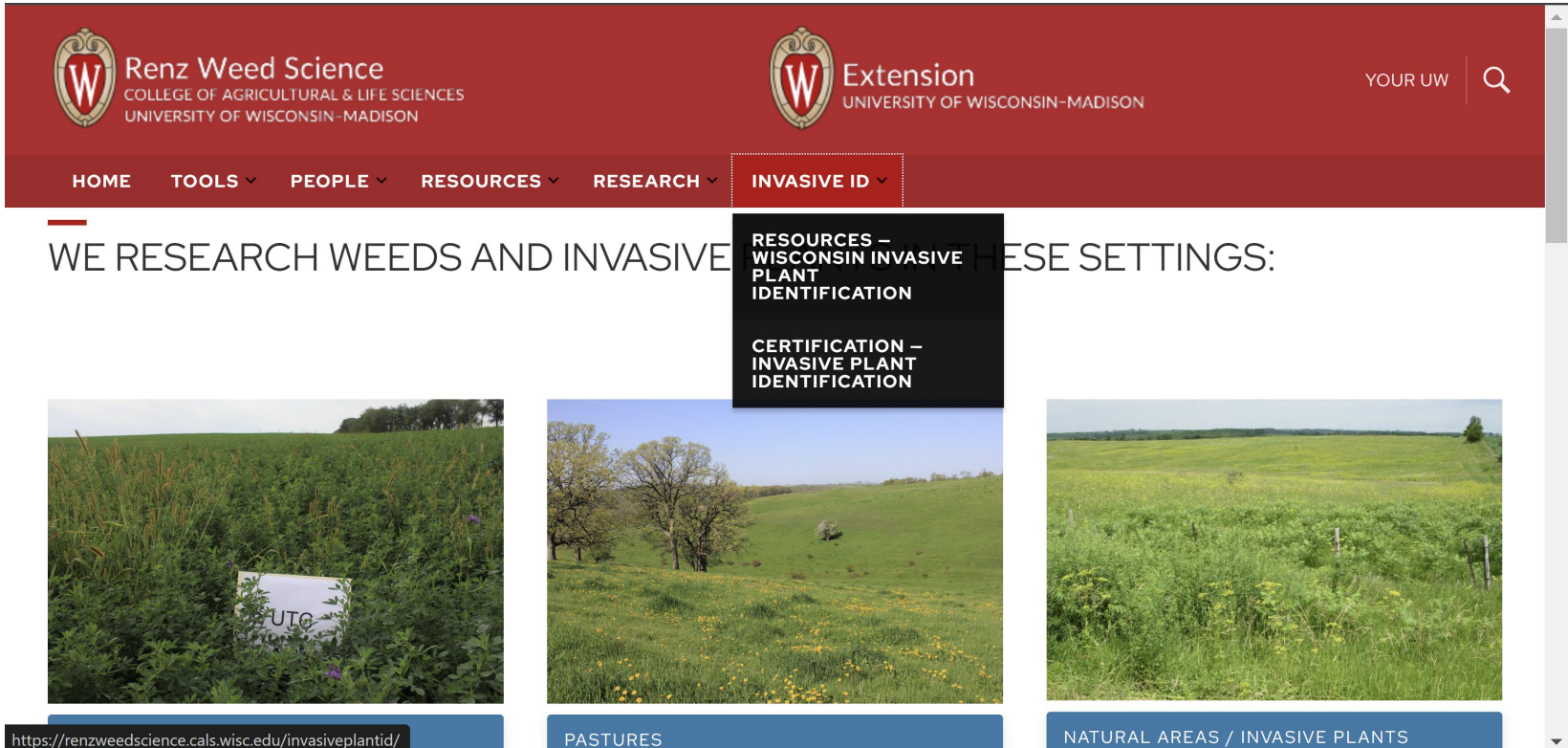
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UNIVERSITY OF WISCONSIN-MADISON

Step 1: Plant Identification

- Many resources, pick the one that fits your needs!
  - Books, guides, factsheets
  - Online resources
  - Mobile Apps
  - Expert opinion







Step 2: distribution of population

Critical for selection of management techniques

- Map if possible
- Look for source of population



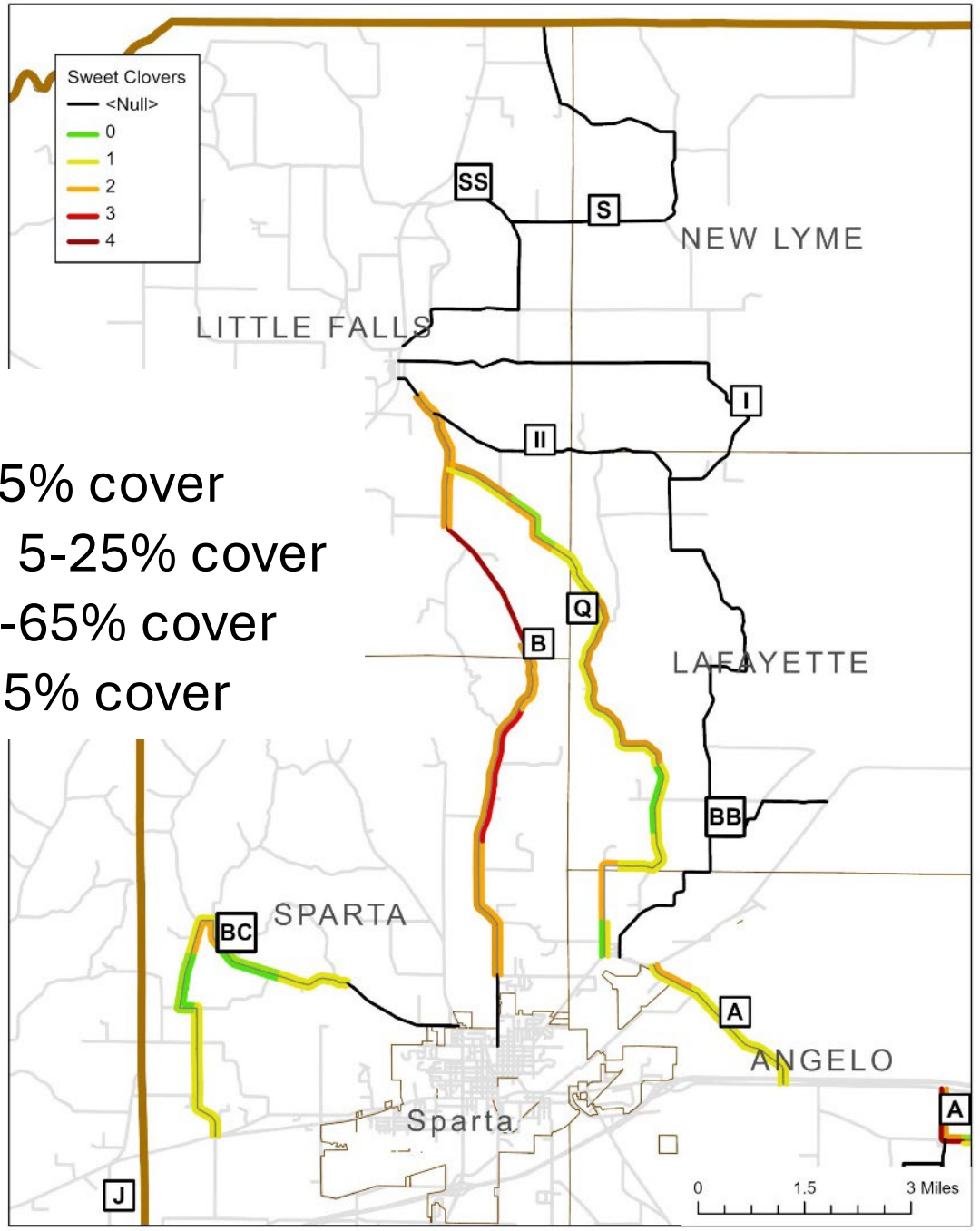


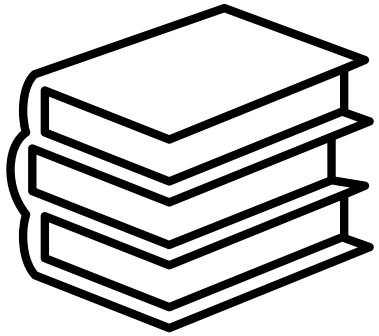
Step 2: distribution of population

Tools for monitoring:

- Many choices/options
- Pick the option that fits
  - Cost range
  - Skillset
  - Management goal

0 = absent;
1 = rare; plant <5% cover
2 = uncommon; 5-25% cover
3 = common 26-65% cover
4= dominant >65% cover





Research

biology of invasives

- How do they impact the site
- How did they get to the site/spread?
- Effective control techniques
- How long will propagules/seeds persist?

	Common buckthorn
What produces fruit?	Female plants only!
What spreads?	Seed from fruit
How spread?	Birds, water, human activities
Distance spread	1-2 miles by birds
Adult survival	>50 years
Seed survival	2-3 years

Knowing biology of plant helps with control

Simple perennial (crown)



creeping perennial (rhizomes/creeping roots)

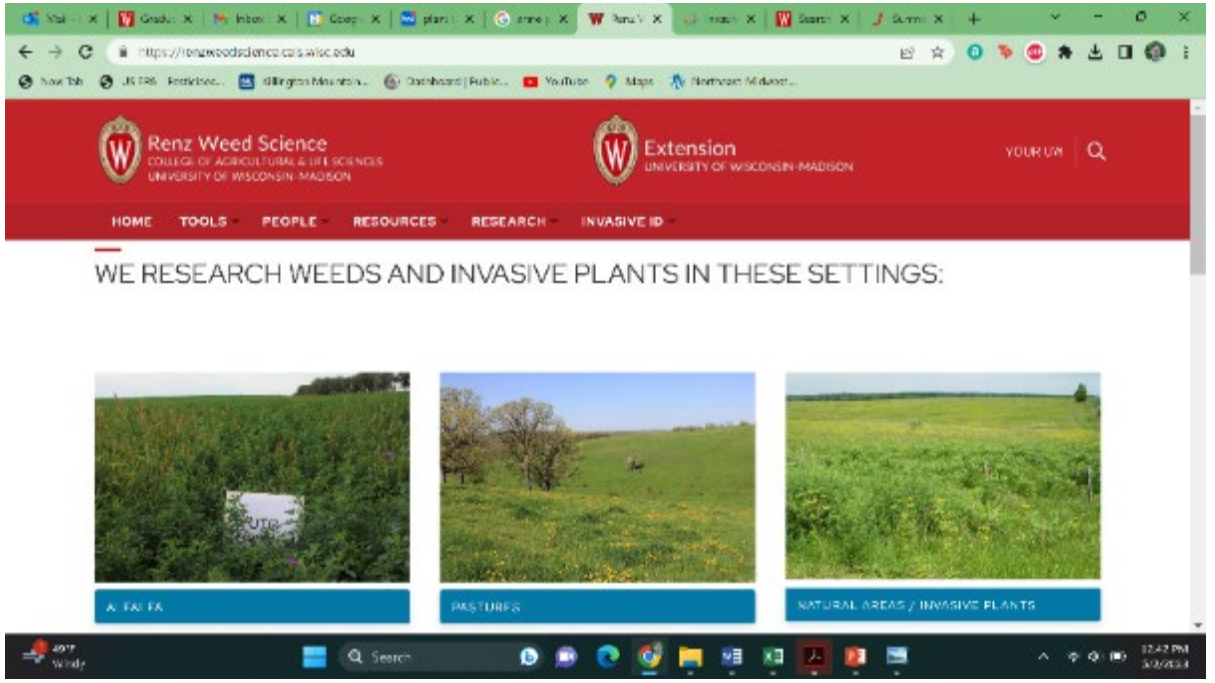


Research

Effective control techniques & cost

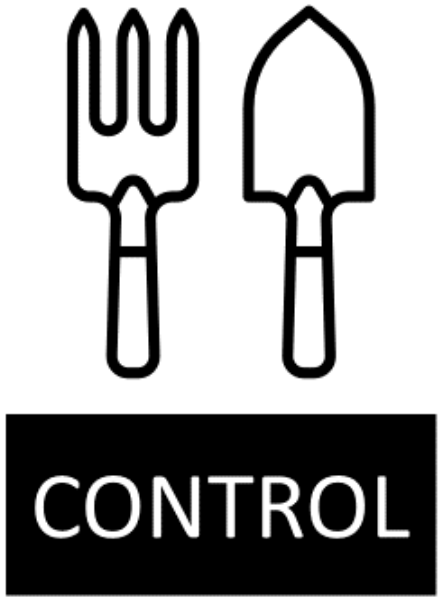


woodyinvasives.org



https://renzweedscience.cals.wisc.edu/

Ask others for advice, seek expert opinions



Conduct control techniques

Follow recommendations

- Appropriate timing
- Appropriate intensity/rate
- Applying at wrong timing is often a reason for failure!





Change management over –time to attain goal

ADAPT







Think about capacity for continued effort.....

Plan for multiple years (3+)
Large sites will need longer.....









Prevent woody invasives from establishing!

- Estimate > 2% cover woody shrubs impacts grasslands

- Management when invasion is limited
  - Cheap
  - Many options available
  - Impact to ecosystem limited/absent
  - Desirable plants abundant



Let’s look at some scenarios

Japanese stiltgrass



common buckthorn



Let’s look at some scenarios: biology

Japanese stiltgrass

- PROHIBITED
- Annual grass
- Spreads by seed movement by
  - Equipment, Water, Animals



- Seed lives for 2-3 years in soil
- Germinates early, flowers September

Common buckthorn

- RESTRICTED
- Woody perennial
- Spreads by seed moved by birds
  - 2 mile radius





- Seed lives for 2-3 years in soil
- Separate male and female plants

Approaches to management: *small pop. (100 ft^2)*

Japanese stiltgrass

- Map property
- Look in surrounding area
  - Adjacent properties
  - Upstream/waterways
- Try and figure out how it got there
  - Equipment
  - Water
  - Animals
- PREVENT SEED PRODUCTION
  - Hand pull, propane torch, or herbicides in August
- Repeat mapping and management for three years then assess

Common buckthorn

- Map property
- Look in surrounding area
  - Adjacent properties within a 2 mile radius
- PREVENT SEED PRODUCTION by removing fruit producing plants
  - Hand pull, Herbicides
- Remove non fruit producing plants
  - Hand pull, Herbicides, Fire
- Repeat mapping and management for three years then assess

After 3 years you should see no seedling recruitment!

Approaches to management: large pop. (25 acres)

Japanese stiltgrass

- Map property & surrounding area
- Try and figure out how it got there
  - Equipment
  - Water
  - Animals
- PREVENT SEED PRODUCTION
  - ~~Hand pull, propane torch, or~~ Herbicides
    - Residual herbicide **spring prior to germination**
    - Follow-up with handpull or spot propane, foliar herbicide
- Repeat management for two years
- Map in Yr 3 to evaluate if can spot trt remaining plants

Common buckthorn

- Map property & surrounding area
- Prevent spread and reduce area invaded
  - Manage as time/resources allow
- Yr 1: Cut surface trt on all fruit producing plants
- Yr 2: Cut surface on large trees on perimeter & establish grasses
- Yr 3: Cut surface inner trees
- Yrs 4-7: Remove juvenile plants
  - Burn, spray resprouting plants
- Continue to monitor periodically throughout process

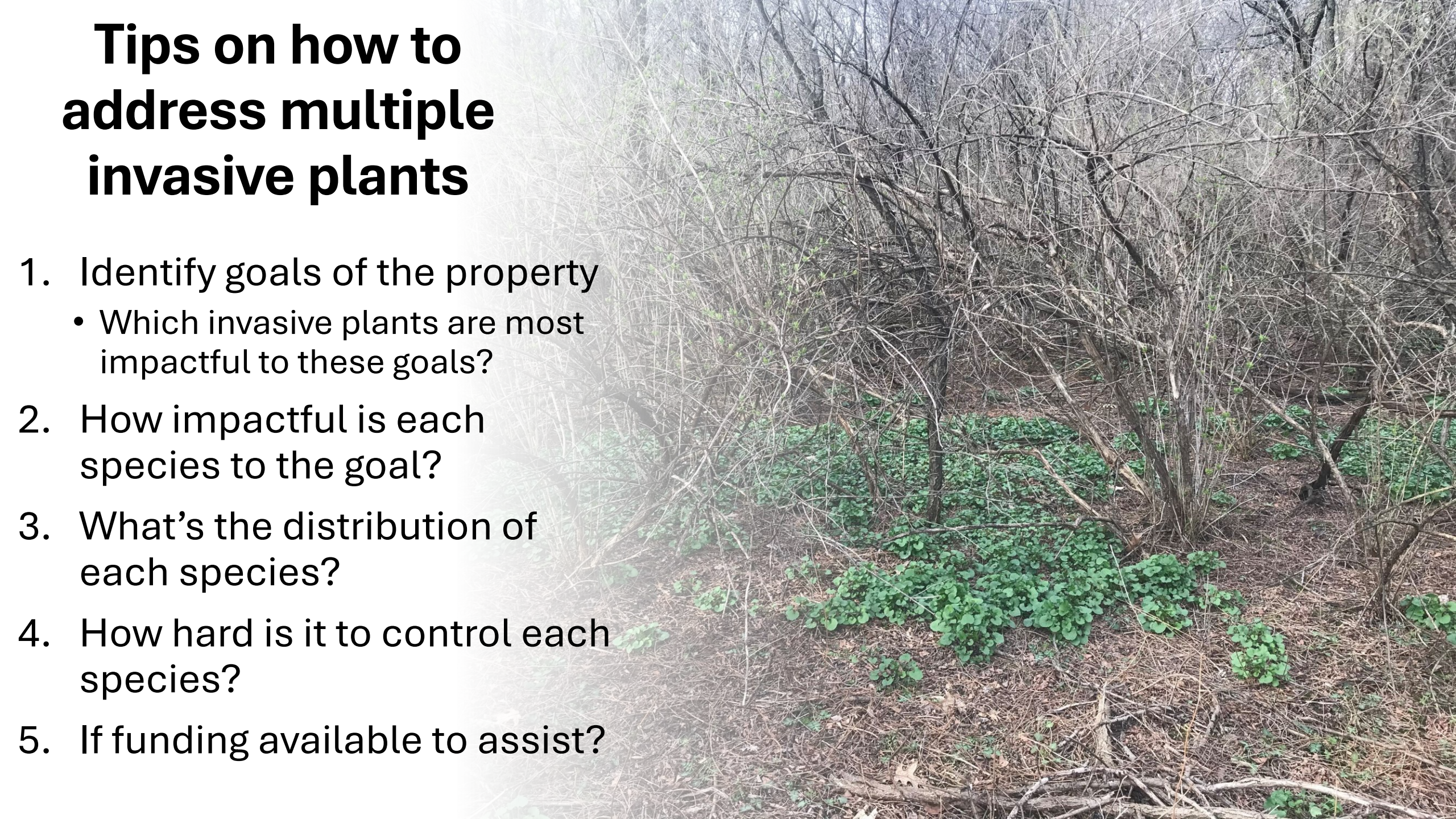
Usually it is more complicated than examples

- Multiple invasive plants
- Don’t manage all the land where invasions occur
- Land features/terrain make management difficult
- Budgets are limited
- Limited staff / expertise



Tips on how to address multiple invasive plants

1. Identify goals of the property
   - Which invasive plants are most impactful to these goals?
2. How impactful is each species to the goal?
3. What's the distribution of each species?
4. How hard is it to control each species?
5. If funding available to assist?



Don’t manage all the land where invasions occur

- Enlist the help of organizations that can help you work with other land managers

- WI DNR: prohibited plant
- Local CISMA
- County/City staff



Budgets/staff time are limited: USE VOLUNTEERS

- When directed, volunteers can help with management activities
  - MATT WILL DISCUSS IN MORE DETAIL…..





Ask for help if struggling to develop a plan

- Lots of experts are available and willing to assist
- Both non-profit and for hire……

WISCONSIN DEPT. OF NATURAL RESOURCES

Extension
UNIVERSITY OF WISCONSIN-MADISON

Last Updated March 2020

WISCONSIN RESTORATION CONTRACTORS

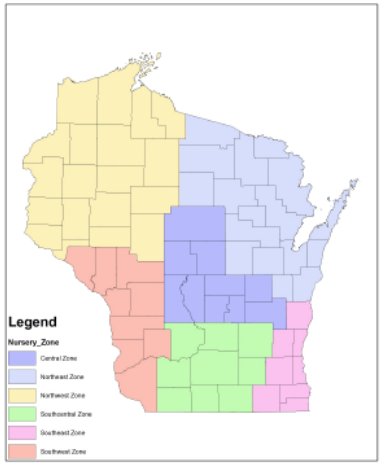
The following companies and individuals operate as consultants or contractors in Wisconsin and the surrounding areas. This list was compiled by the Natural Heritage Conservation Program, Wisconsin Department of Natural Resources. This list does not imply any endorsement or recommendation by the Wisconsin DNR. Revisions or additions to the list should be sent to NHC, WDNR, PO Box 7921, Madison, WI 53707 (Attn: Kelly Kearns), phoned in at (608) 267-5066, or e-mailed to Kelly.Kearns@Wisconsin.gov.

The following lists are divided up by region of Wisconsin. Companies are listed once in the primary region they are located. Companies outside of Wisconsin but within 50 miles of the state are also included. Check the regions near your project area. The regions are as follows:

- Statewide
- Northwestern Wisconsin
- Northeastern Wisconsin
- Central Wisconsin
- Southwestern Wisconsin
- South Central Wisconsin
- Southeastern Wisconsin
- Upper Peninsula and Western Michigan
- Eastern Minnesota
- Northern Illinois

Contract grazing services working throughout the state of Wisconsin are listed at the end of this list.

Wisconsin Nursery and Consultant List Zones



Summary

- No one correct way to manage invasive plants
  - Need to research and develop a plan that fits your situation the best

- Requires many P's
  - **P**reparation & **P**lanning
  - Include **P**revention tactics in management to be **P**roactive
  - **P**atience as results take time
  - **P**ersistence, often multiple years are required
  - Revegetation as **p**lants are needed to **p**revent reinvasion



Evaluating the effectiveness and cost of integrated approaches to manage woody invasive plants

Mark Renz (mrenz@wisc.edu)
Professor/Extension Specialist
University of Wisconsin-Madison
https://renzweedscience.cals.wisc.edu



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Multi-year approach to manage invasive shrubs









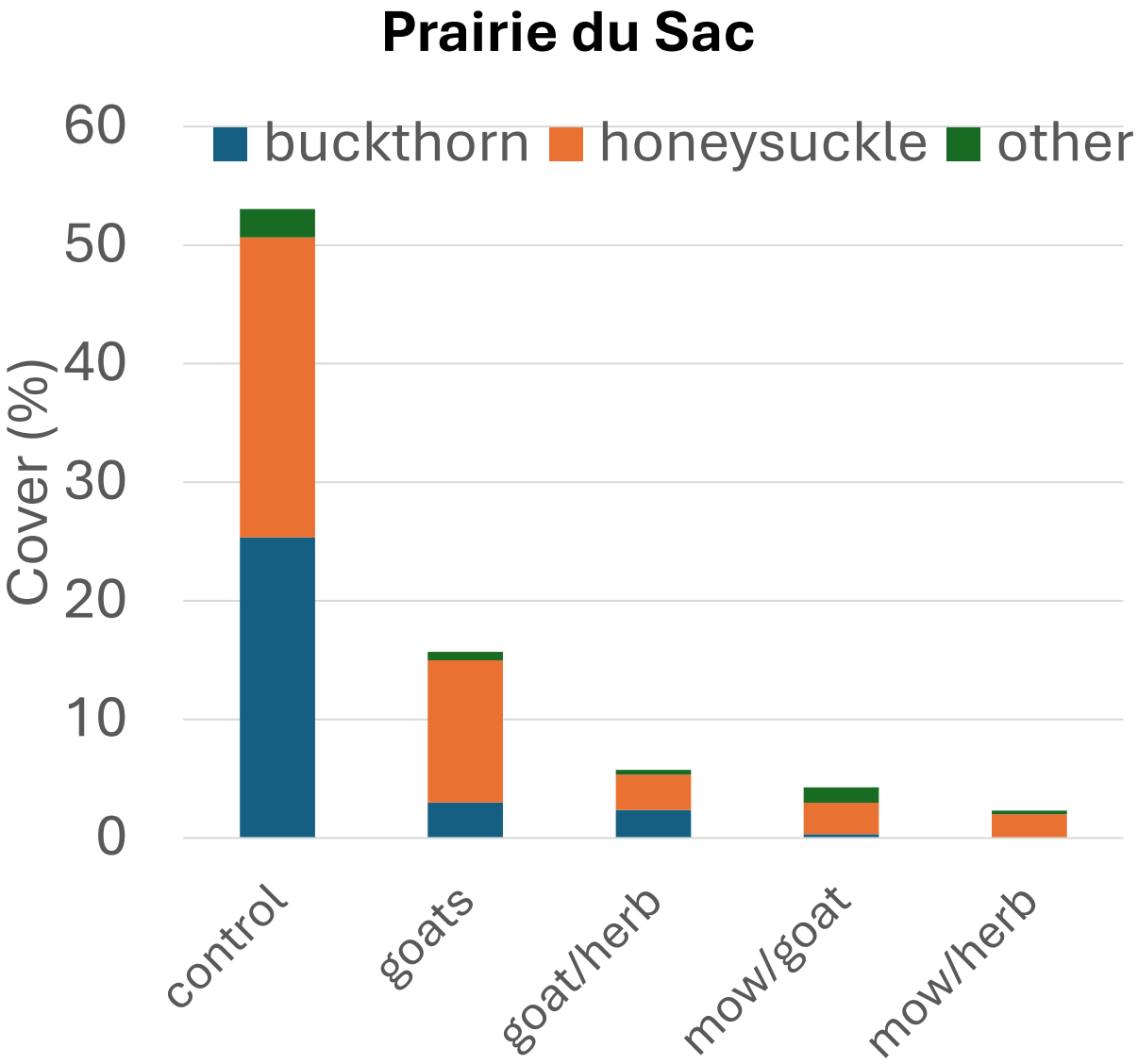
HERBICIDES

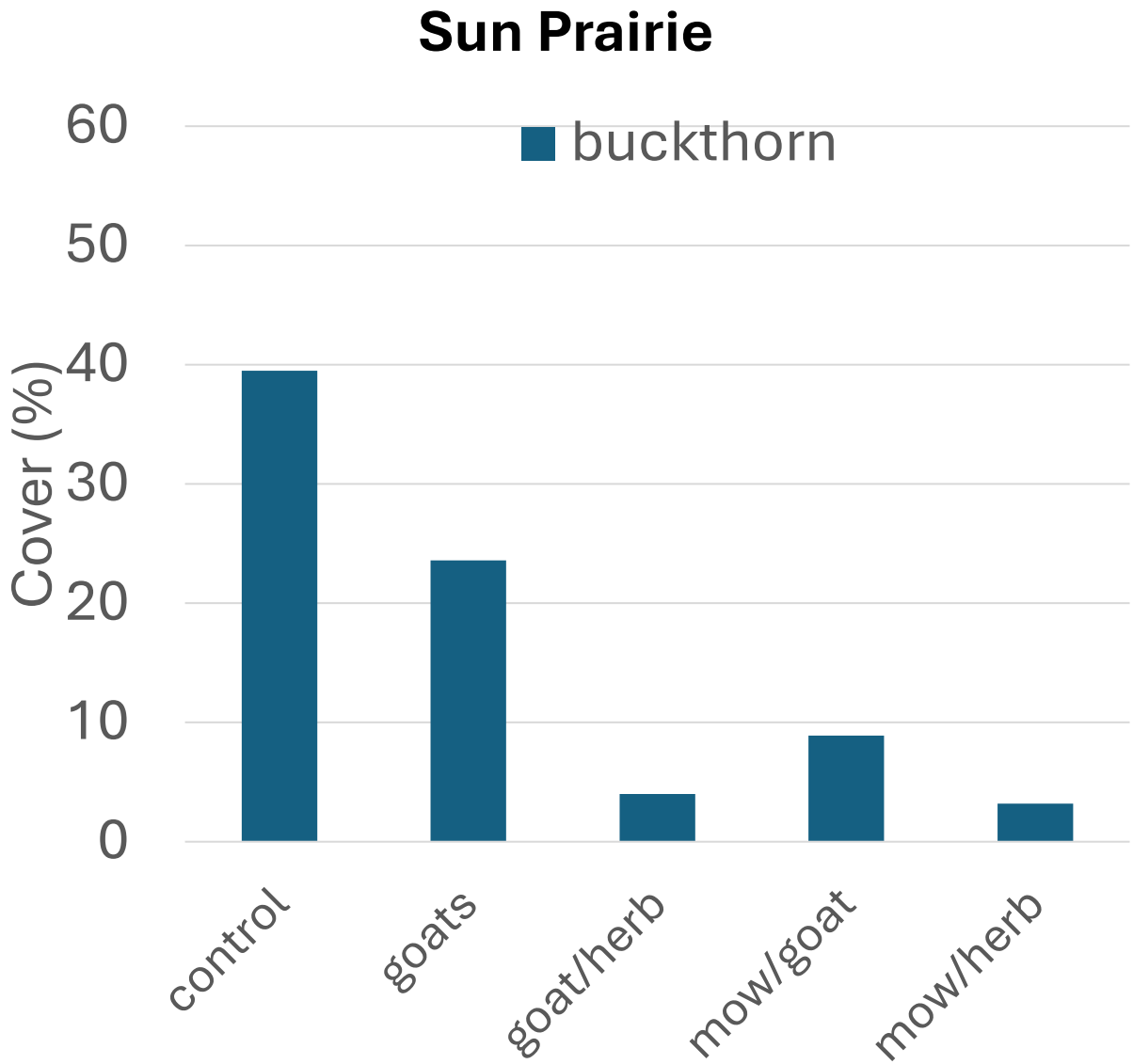
Trt #	Year 1 method	Year 2 method	abbreviation
1	CONTROL	CONTROL	Control
2	GOATS	GOATS	Goats
3	GOATS	HERBICIDE	Goats/herb
4	MOW	GOATS	Mow/goats
5	MOW	HERBICIDE	Mow/herb

OAT GRAZING

Invasive shrub cover June third year

after two years of treatment





Prairie du Sac







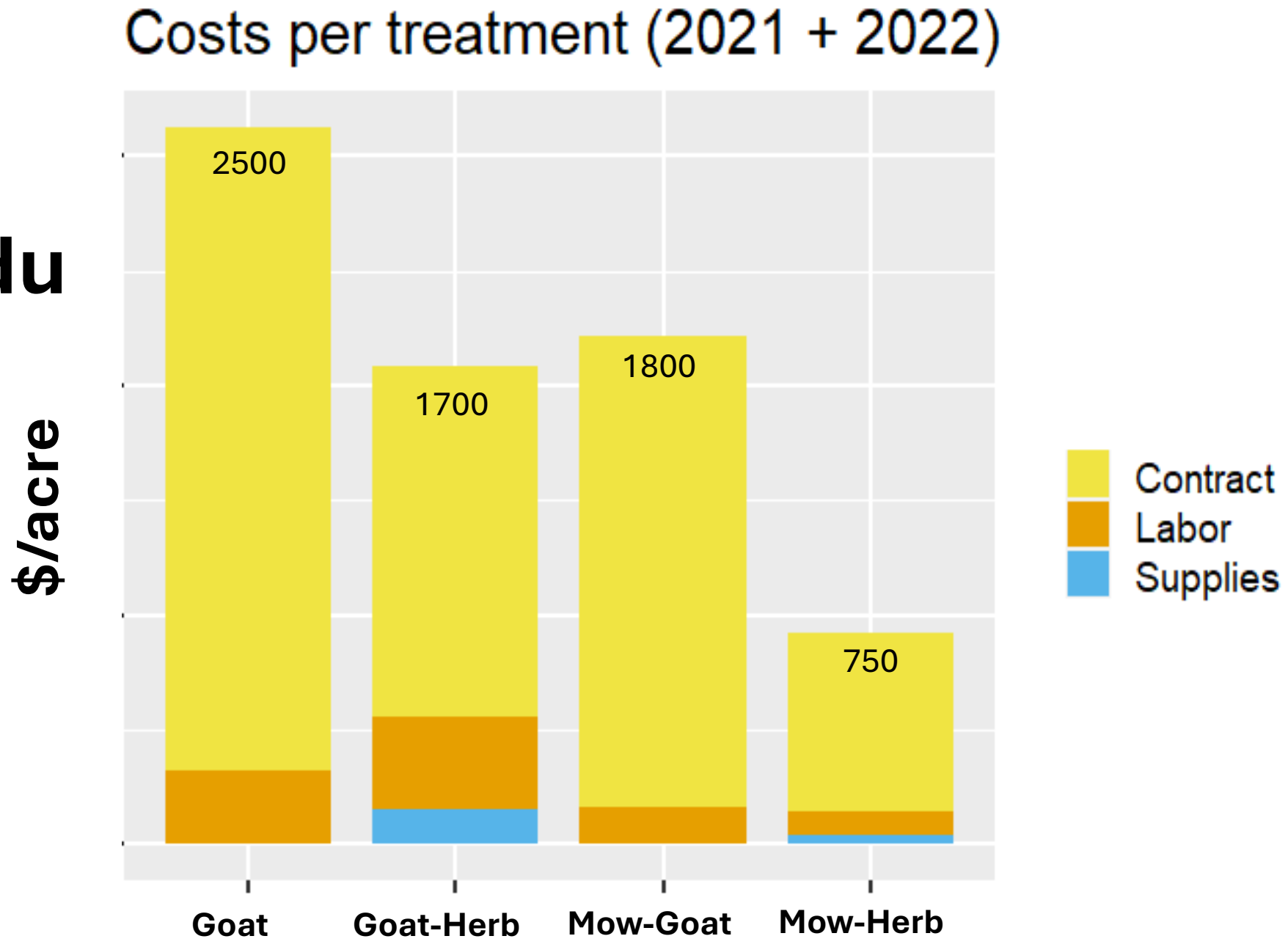
REGROUND
ACILITATES
INVASIVE
SHRUB
EEDLINGS

Sun Prairie





Cost (Prairie du Sac



SUMMARY

Invasive Shrub control

1. All treatments reduced cover
   - Integrated approaches kept below 10% cover
     - Goats/herb, mowing/goats, mowing/herb
2. Integrating techniques were needed to reduce shrub density
   - Two years of goat grazing did not kill invasive shrubs
3. Mowing/herb was much cheaper than other treatment
   - Goats for 2 yrs 3x in cost
   - Mowing/goats or goats/herb 2x in cost

Manage the forest!

1. Understory vegetation prevents invasive shrub germination
2. Assess your understory
   - What plants are present (good/bad)
   - How much light hits forest floor
3. How to promote?
   - Actively revegetate
     - As soon as management
   - Thin forest if limited light

Questions?



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Mark Renz mrenz@wisc.edu
https://renzweedscience.cals.wisc.edu/

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COLLEGE OF AGRICULTURAL & LIFE SCIENCES
UNIVERSITY OF WISCONSIN–MADISON

Resources available to assist in identification, reporting, management, and volunteerism

Matthew Wallrath - Outreach Specialist
Wisconsin **F**irst **D**etector **N**etwork Coordinator
University of Wisconsin - Madison
mrwallrath@wisc.edu Office: 608-262-9570



Boozhoo!

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UNIVERSITY OF WISCONSIN–MADISON



ALFALFA



PASTURES



NATURAL AREAS / INVASIVE PLANTS

A statewide community science network supporting invasive species education and volunteer opportunities

WISCONSIN FIRST DETECTOR NETWORK



Nelson Institute for Environmental Studies
UNIVERSITY OF WISCONSIN-MADISON

Washington Conservation Corps
AMERICORPS
A
WASHINGTON

dnr.wi.gov

Upper Sugar River Watershed Association

WALLRATH
FRUIT and FOREST

ORCAS ISLAND
YOUTH CONSERVATION CORPS

SAN JUAN COUNTY
LAND BANK

Forest health and regeneration











Definition of "Invasive Species"

Nonindigenous species whose introduction causes or is likely to cause economic or environmental harm or harm to human health.

WI Statutes 23.22(1)(c)



Wild parsnip (Pastinaca sativa). Leslie J. Mehrhoff, University of Connecticut, Bugwood.org



Wild parsnip burns. Andrew Link, Lacrosse Tribune 2013

Clean your gear,





To prevent the spread of invasive species

IDENTIFICATION RESOURCES





A3924-20

Multiflora rose
(Rosa multiflora)

Brendon Panke, Ryan deRegnier, and Mark Renz

Invasive plants can thrive and aggressively spread beyond their natural range, disrupting ecosystems. The *Management of Invasive Plants in Wisconsin* series explains how to identify invasive plants and provides common management options. Management methods recommend specific timings for treatment, as well as expected effectiveness. For more information, go to: fyi.uwex.edu/weedsci/category/invasive-plants-of-wisconsin.

Multiflora rose is a perennial shrub with arching stems that grow up to 15' tall. Stems are covered in stiff, curved thorns.

Legal classification in Wisconsin: Restricted

Leaves: Leaves are alternate and pinnately compound with 7–9 oval, toothed, 0.5–1" leaflets. Leaflets are smooth on the upper surface. Underside is lighter in color than the upper side and covered in small hairs. The base of each leaf stalk bears two fringed bracts.

Flowers: Late spring to early summer. Flowers are white, 1–2" in diameter, and grow in clusters on the shrub.

Fruits and seeds: Round, red fruits (rose hips) develop from flowers over the summer and are 0.25" in diameter. These dry to an angular, dry fruit with each containing one seed (achene).

Roots: Shallow fibrous roots extend from a woody crown. Arching stems can root when in contact with the ground.

Similar species: Native rose species have pink flowers and lack bracts at the end of the leaf stalk (petiole).

Ecological threat:

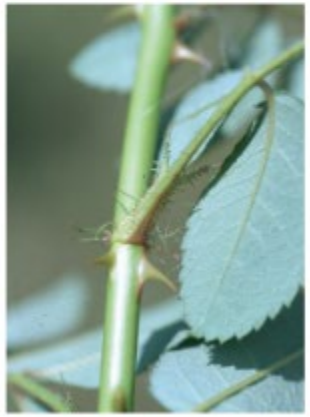
- Invades prairies, grasslands, pastures, savannas, open woodlands, and forest edges.

Non-chemical control

Removal

Effectiveness in season: 90–100%
Season after treatment: 50–70%

Removing plants is an effective individual plant treatment if soil conditions allow for the removal of the root crown. Plants will resprout from root crowns if they are left in the ground. Heavy equipment (e.g., a bulldozer) is effective for clearing severely infested areas, as long as the root crowns are removed. When using heavy equipment, it may be advantageous to remove the top few inches of soil to remove rose seeds as well. When using these techniques, assess the potential for soil erosion. Reseed with desirable species if needed.



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YOUR UW

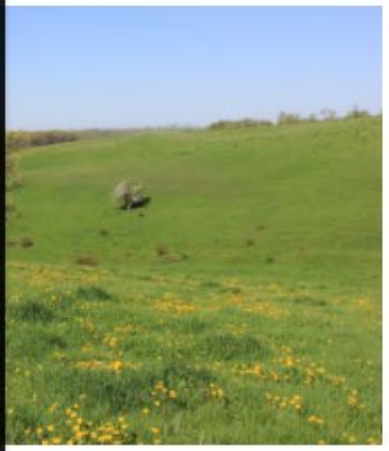
HOME | TOOLS | PEOPLE | RESOURCES | RESEARCH | LINKS | INVASIVE ID | VIRTUAL OFFICE HOURS

- INVASIVE PLANT MANAGEMENT FACTSHEETS
- INVASIVE PLANT IDENTIFICATION VIDEOS
- PASTURES
- ALFALFA AND SWITCHGRASS MANAGEMENT
- AGRICULTURAL WEED IDENTIFICATION FACTSHEETS
- CRP WEED MANAGEMENT FACTSHEETS
- PRESENTATIONS
- RIGHTS OF WAY INVASIVE SPECIES MANAGEMENT FACTSHEETS

WE RESEARCH WE[ED] IN[VA]SIVE PLANTS IN THESE SETTINGS:



ALFALFA



PASTURES



NATURAL AREAS / INVASIVE PLANTS

RenzWeedScience.cals.wisc.edu

WIFDN and Renz Lab: factsheets, publications, tools, videos & links to collaborators and online resources



Wisconsin Invasive Plant Identification
tree-of-heaven - *Ailanthus altissima*

Life History: Tree-of-heaven is a rapidly-growing tree that can reach 80' tall with trunk diameters of 1–5'. Has previously been planted as an urban street tree. It is the main host of the destructive spotted lanternfly.

Leaves: Alternate, pinnately compound, 1–4" long. Each leaf is composed of 11–25 leaflets. Leaflet has a smooth margin, except near the base where there is one or more teeth with glands. Leaves and male flowers have a strong odor reminiscent of rancid peanut butter.

Stem/Root: Perennial taproots and lateral roots, which are both capable of generating shoots. Taproots typically grow 6' deep, whereas lateral roots can spread up to 90', depending on the soil.

Young trees grow fast from long roots, leading to shady dense stands

Small glands are in the lobe on the base of leaflets

Flower/Fruit: Flowers yellow-green with 5–6 petals in terminal inflorescences 8–16" long. Male and female flowers are borne on separate plants in late spring. Fruit is 1.5" turning pink to tan, papery with two wings extending from a seed.

Similar Plants: Native sumacs and compound leaf trees like ashes hickory, black walnut, butternut, and pecan can be told apart up close as they all have completely toothed (serrated) leaf margins. Tree-of-heaven has smooth margins and can be further distinguished by the strong odor when leaves are crushed.

Colorful fruit on a female tree

Bark is bumpy, grey to brown

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Revised 9/2023

Visit renzweedscience.cals.wisc.edu
Layout by Matthew Wallrath
Photos by Richard Gardner and Karan Rawlings





MANAGEMENT OF

INVASIVE PLANTS IN WISCONSIN

A5924-33

Tree-of-heaven
(*Ailanthus altissima*)

Brendon Panke and Mark Renz

Invasive plants can thrive and aggressively spread beyond their natural range, disrupting ecosystems. The *Management of Invasive Plants in Wisconsin* series explains how to identify invasive plants and provides common management options. Management methods recommend specific timings for treatment, as well as expected effectiveness. For more information, go to: fyi.uwex.edu/weedsci/category/invasive-plants-of-wisconsin.

Tree-of-heaven is a rapidly-growing tree that can reach 80' tall with trunk diameters of 1–2'. It has smooth stems with pale-gray bark and light brown twigs. Leaves and male flowers have a strong odor reminiscent of rancid peanut butter.

Legal classification in Wisconsin: Restricted

Leaves: Alternate, pinnately compound, 1–4' long. Composed of 11–25 leaflets. Each leaflet has a smooth margin, except near the base where there is one or more teeth with glands.

Flowers: Late spring. Small, yellow-green with 5–6 petals in dense, terminal inflorescences that are 8–16" long. Male and female flowers are borne on separate plants (dioecious).

Fruits and seeds: Fruit are 1.5" long and green turning pink to tan. The fruit are papery and have two wings extending from a seed at their center. The fruit develop on female plants from late summer to early fall and can remain on the tree through winter.

Roots: Perennial taproots and lateral roots, which are both capable of generating shoots. Taproots typically grow 6' deep, whereas lateral roots can spread up to 90', depending on the location.

Similar species: Native sumacs (*Rhus*) and ash trees like ash (*Fraxinus*), hickory (*Carya*), black walnut, butternut, and pecan (*Juglans*) can be distinguished from tree-of-heaven by having completely toothed (serrated) leaf margins. Tree-of-heaven can be further distinguished by the odor of the leaves and male flowers.

Ecological threat:
- Invades fields, forest edges and openings, and disturbed areas such as abandoned lots, roadsides, fencerows, and cracks in pavement. It is especially prevalent in urban areas where it has been planted abundantly.
- Seed can persist in woodland areas and germinate when light levels increase, usually because of disturbance.

Non-chemical control

Removal

Effectiveness in season: 90–100%
Season after treatment: 70–90%

Pulling and digging up seedlings when soil conditions are amenable are effective single plant control. The entire root must be removed since root fragments can resprout. Root suckers and shoots are not good targets for pulling or digging since they are attached to an existing root system and are difficult to remove.

Mowing

Effectiveness in season: 50–70%
Season after treatment: 50–70%

Mowing or cutting is not usually recommended as tree-of-heaven can resprout vigorously from the stump or rhizomes. Mowing or cutting small or young infestations can be effective if repeated for many years in heavily shaded habitats. Cutting female trees before seeds are present can prevent seed production, but additional control is required to reduce population size. Mowing has been most successful when combined with a herbicide treatment. If seeds are present when mowed, avoid movement off a be

UW Extension Cooperative Science on NPM

hot



Best mobile plant ID apps?

Madeline Lesniak says…

1. Picture This (for novices, learners and seasoned identifiers alike. Best info layout in my opinion)
2. Pl@ntNet (for more seasoned identifiers)*
3. Google Lense (but it doesn't work as easily for Apple, use Apple Photo app; not always as reliable)
4. iNaturalist (good but crowd sourced verification))
5. ~~Seek~~ (overall I would never recommend this one)

Invasive Species Calendar at fyi.extension.wisc.edu/wifdn



When to Look→ Invasive Species Calendar




(All)
(Multiple valu...
(All)
(All)
(All)
(All)
on Name
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
aple
goutweed
eaven
ustard-flowering year
ustard-rosette
n berry
rvil-flowering year
rvil-rosette
e + common barberry
bellflower
thistles-rosettes
ss thistle
istle
bittersweet
Life Stage
dormant or bare branches
green vegetation present
flowers present
mature fruits or seeds pre...
leaves changing color
Life Stage refers to the life stage of the species that is most dominant and/or most easily detectable in a given month.
Detectability
undetectable
low
medium
high
Detectability refers to how easy it is to find and/or identify the species in a given month.

Wisconsin Invasive Species Calendar

The Calendar provides an overview of when to look for invasive species based on the best available life stage & detectability information collected by WIFDN & partne
timing of life stages & detectability will vary with weather conditions in a given year & across the state. We welcome your feedback to improve the accuracy of the cale
Contact us at WIFDNcoordinator@gmail.com.

Use the dropdown lists to create a custom calendar

Habitat	Form	Detectability	Life Stage	Month	Scientific Name	Common Name
(All)	(All)	(Multiple valu...	(All)	(All)	(All)	(All)

Scientific Name	Common Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Acer tataricum	Amur maple												
Aegopodium podagraria	bishop's goutweed												
Ailanthus altissima	tree of heaven												
Alliaria petiolata	garlic mustard-flowering year												
	garlic mustard-rosette												
Ampelopsis brevipedunculata	porcelain berry												
Anthriscus sylvestris	wild chervil-flowering year												
	wild chervil-rosette												
Berberis spp.	Japanese + common barberry												
Campanula rapunculoides	creeping bellflower												









WISCONSIN FIRST DETECTOR NETWORK

INVASIVE SPECIES CLEARINGHOUSE

Early detection lists

A goal of the Wisconsin First Detectors Network (WIFDN) is to direct professionals and volunteers in early detection of invasive species. Below is a clearinghouse of lists with links to factsheets and known distribution* of the most important early detection plants, insects, and diseases and animals.

University of Wisconsin Extension experts are most concerned about the spread of these organisms and preventing establishment in Wisconsin. WIFDN recommends learning how to identify these species to help the state with reporting observations that will inform management.

Jump to list:

Terrestrial plants

Aquatic plants

Insects

Diseases

Animals

Click common names for ID resources and map links to find distribution information.

These lists are current as of April 2025.

Terrestrial plants

Print Excel CSV Copy

Show All entries

Search:

Scientific Name	Common Name	Maps
Ailanthus altissima	tree-of-heaven	link
Conium maculatum	poison hemlock	link
Ficaria verna	lesser celandine	link
Glyceria maxima	tall manna grass	link
Humulus japonicus	Japanese hops	link
Microstegium vimineum	Japanese stiltgrass	link
Phellodendron amurense	Amur corktree	link
Pyrus calleryana	Callery pear	link
Thladiantha dubia	goldencreeper/red hailstone	link
Vincetoxicum nigrum	black swallowwort	link
Heracleum mantegazzianum	giant hogweed	link
Scientific Name	Common Name	Maps

Showing 1 to 11 of 11 entries

Thanks to Mark Renz, Matt Wallrath and John Zaborsky (terrestrial plants and animals, contact: mrwallrath@wisc.edu), Paul Skawinski (aquatic plants and animals, pskawins@uwsp.edu), PJ Liesch (insects, pliesch@wisc.edu), and Brian Hudelson (diseases, hudelson@wisc.edu) for consulting on species and adding links to these lists.

For more on a topic information visit:

Terrestrial plants – Renz Weed Science plant ID

Aquatic plants and animals – Aquatic Invasive Species Monitoring

Insects – UW Insect Diagnostic Lab

Diseases – Plant Disease Diagnostics Clinic

Animals – APHIS Wildlife Operational Activities

Search

Search all of CALS for a topic

Search

**Note: These species tend to be underreported so maps are incomplete. We request professionals and participatory scientists scout and make records at* Eddmaps.org

Scoping Invasive Species Train the Trainer Module



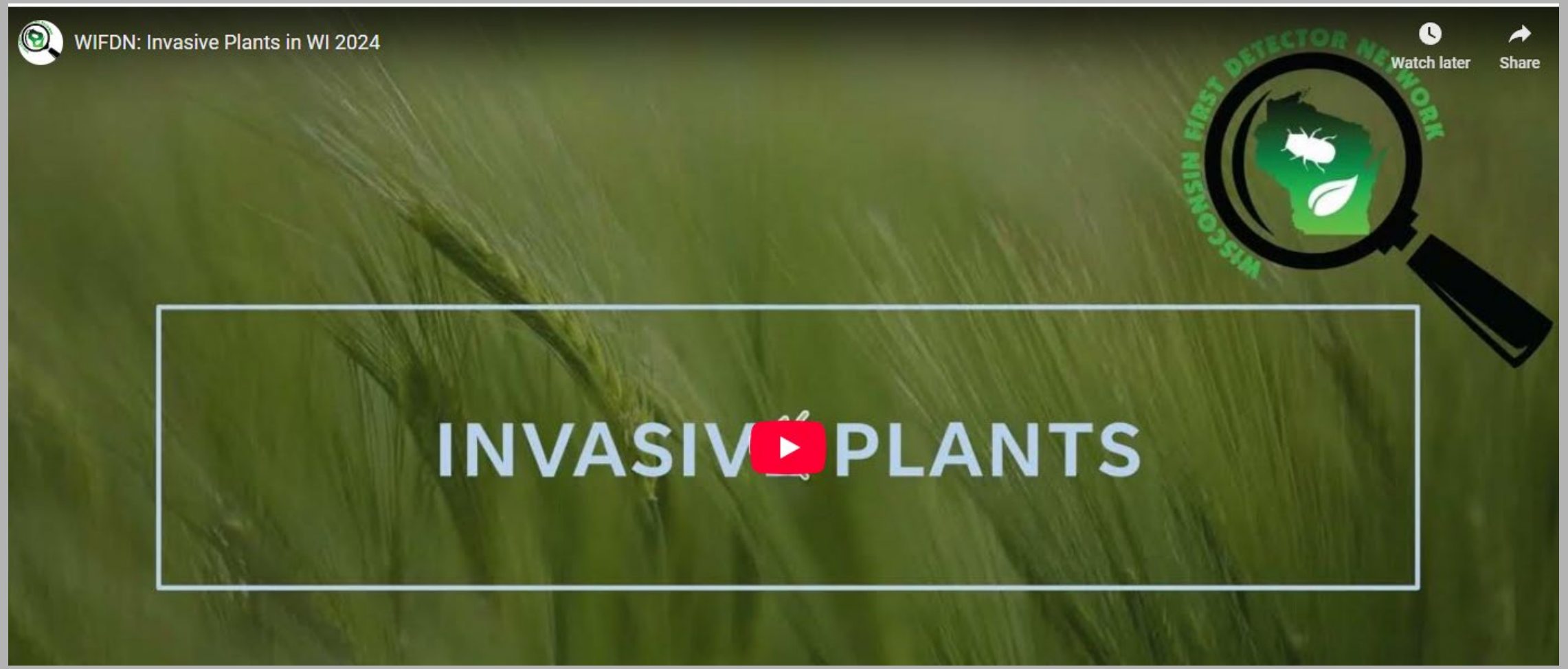
Scoping Invasive Species Train the Trainer Module



Learn | ID | Reporting | Links | County occurrence lists | Tools

Welcome to the Scoping Invasive Species training module landing page! Whether you are just getting started a seasoned expert looking for resources, we hope the information below helps you navigate our webpage, where you can find resources to improve your invasive species knowledge and share your skills in your community. This is meant to be a linked process of learning that will take a few steps to explore. Our goal at the Wisconsin First Detector Network (WIFDN) is to empower you to ID, map, and manage invasive plants in your community.

Scoping Invasive Species Train the Trainer Module



Scoping Invasive Species Train the Trainer Module

Now is the time to take action

Training communities is as the heart of WIFDN, so scroll on to find a list of resources for further knowledge.

If you are interested in leading a training on these topics yourself, you can find a **Microsoft PowerPoint version** of talking points to modify for your needs.

Continue to WIFDN resources

We have highlighted ID, reporting, our tools page, resource links, and our known county occurrence list of species as of 2024. Use the buttons below to navigate to different sections of our page, and find this page again in our **"Tools"** website heading.

Learn | **ID** | **Reporting** | **Links** | **County occurrence lists** | **Tools**

WIFDN engages in focused training for different groups around the state. Contact us at WIFDNcoordinator@gmail.com to set up a community event in your part of Wisconsin!

Scoping Invasive Species Train the Trainer Module

Learn

Learn about invasive species in Wisconsin by exploring the pages below.

- **What are invasive species**?
- Learn about **invasive species identification and impacts**
- Tips for **managing invasive species**
- Visit **invasive plant organizations**

ID **Reporting** **Links** **County occurrence lists** **Tools**

Scoping Invasive Species Train the Trainer Module

Learn

Report Invasive Species

Learn | ID | Links | County occurrence lists | Tools

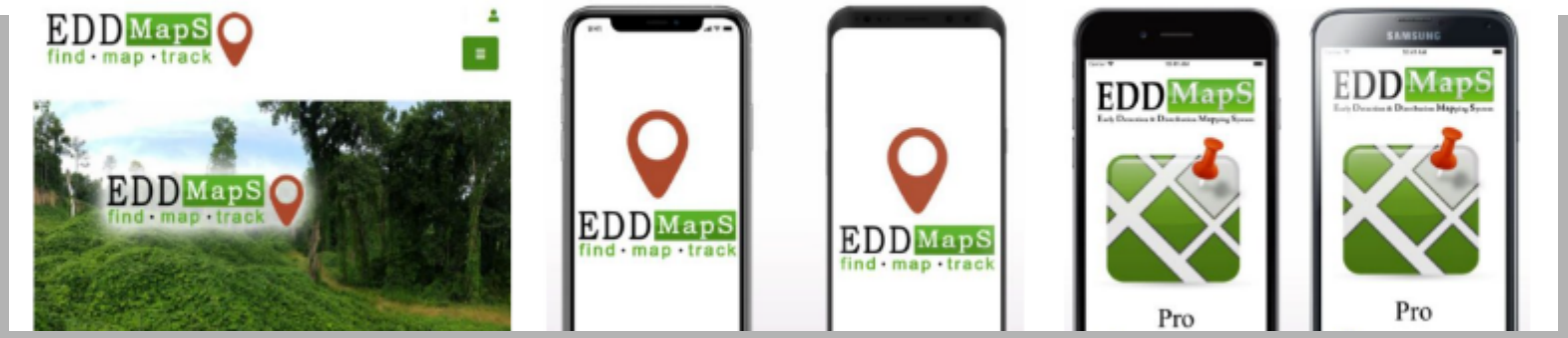
Learn about

- What
- Learn
- Tips fo
- Visit in

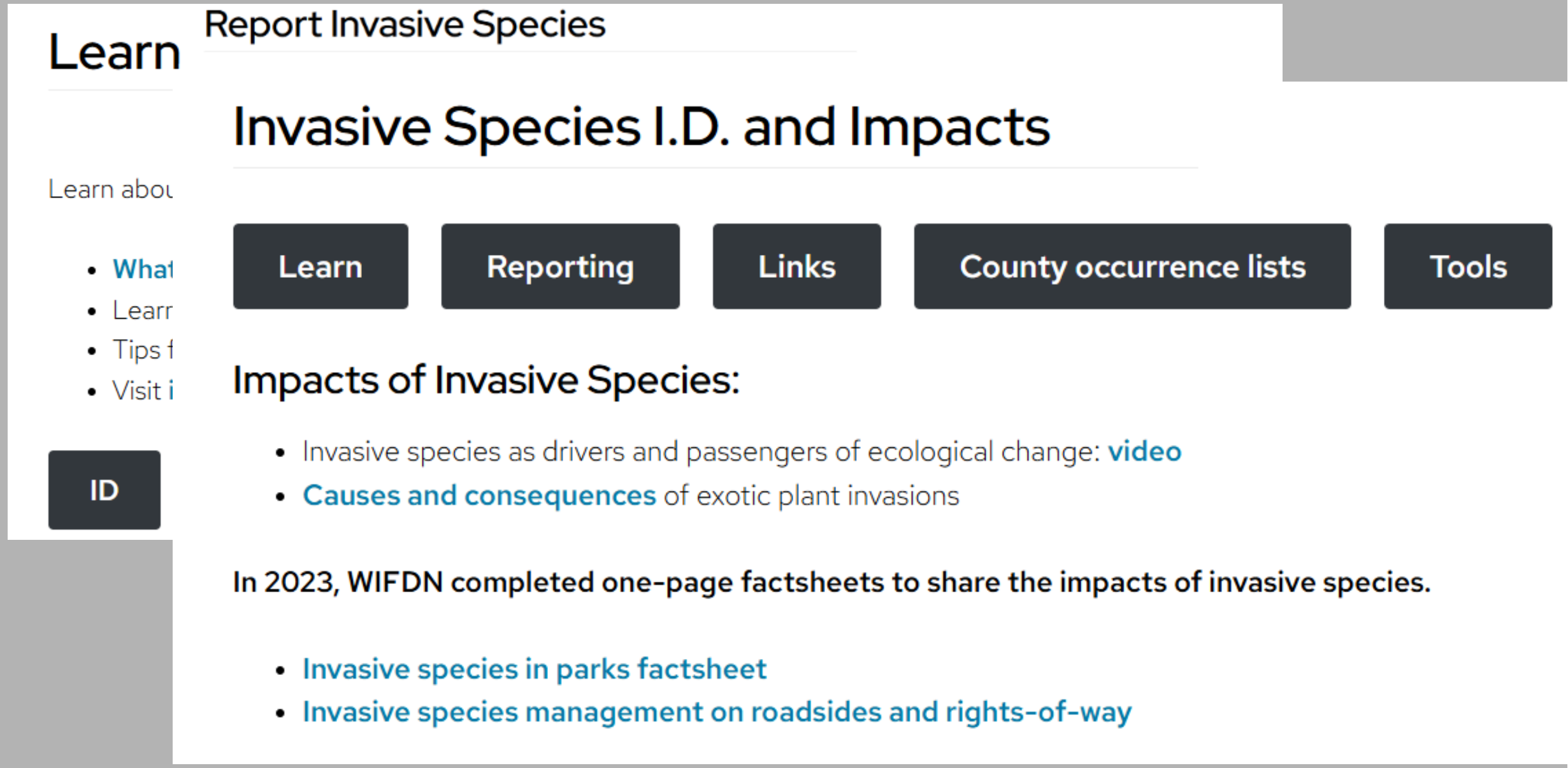
ID

How to Get Started

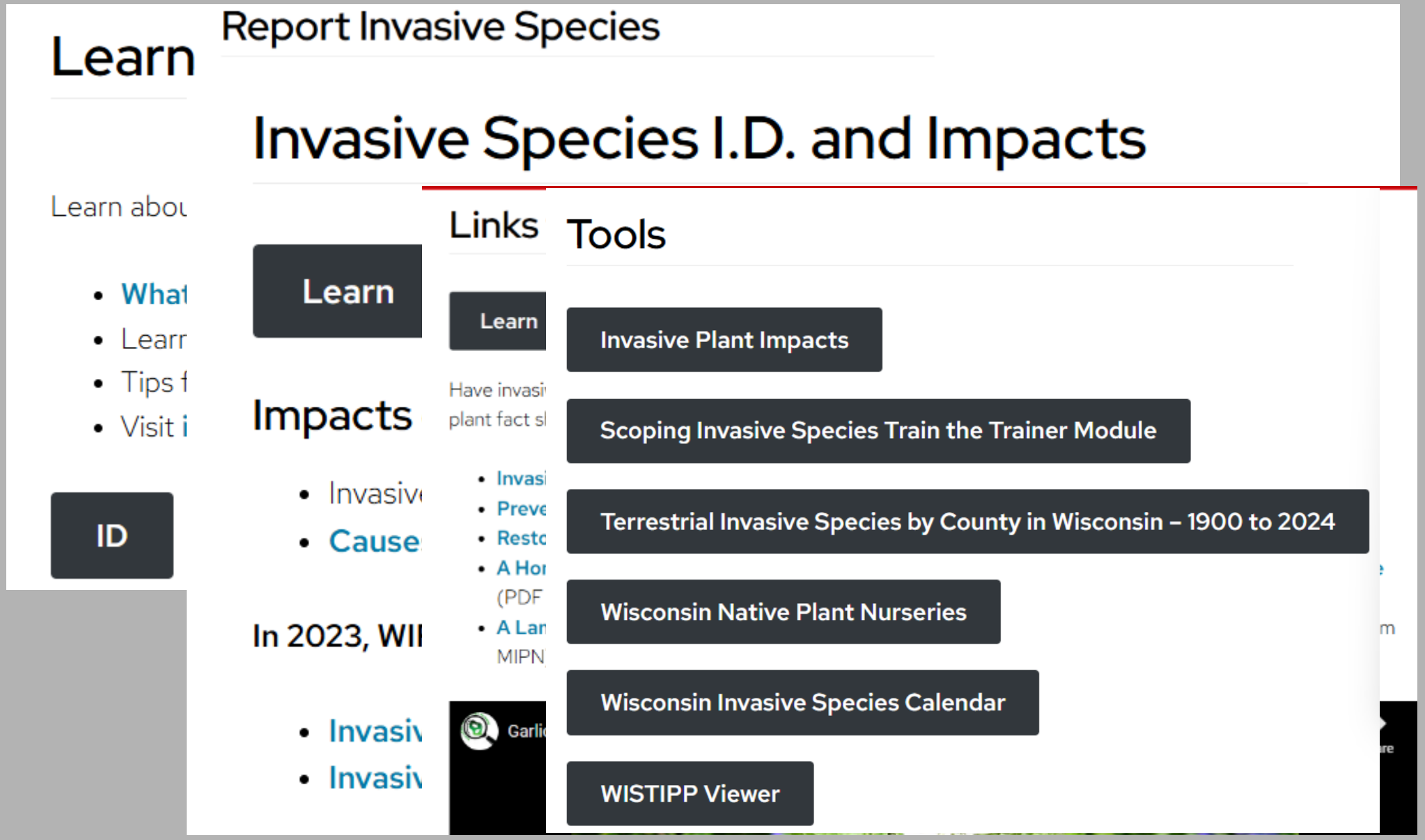
1. **Learn how to identify some invasive plants**. Whether you're new to invasive plants or know many already, you can learn more at our **Invasive Plant Identification Resources** page.
2. **Choose your reporting tool from the options below**. Most people will use the EDDMapS App. There are links to training resources for each option. Contact WIFDN if you need help getting started!
3. **Go outside and map the invasive plants you find**. You can record what you see while doing other activities, or go somewhere specifically to map invasive plants.
4. **Submit your reports**. If you're using one of the apps, don't forget to upload your reports!
5. **Contact WIFDN if you have questions**. We're here to help! If you have questions about the reporting tools, identifying plants, or anything else, let us know! Email us at WIFDNcoordinator@gmail.com



Scoping Invasive Species Train the Trainer Module



Scoping Invasive Species Train the Trainer Module



Scoping Invasive Species Train the Trainer Module

Tools

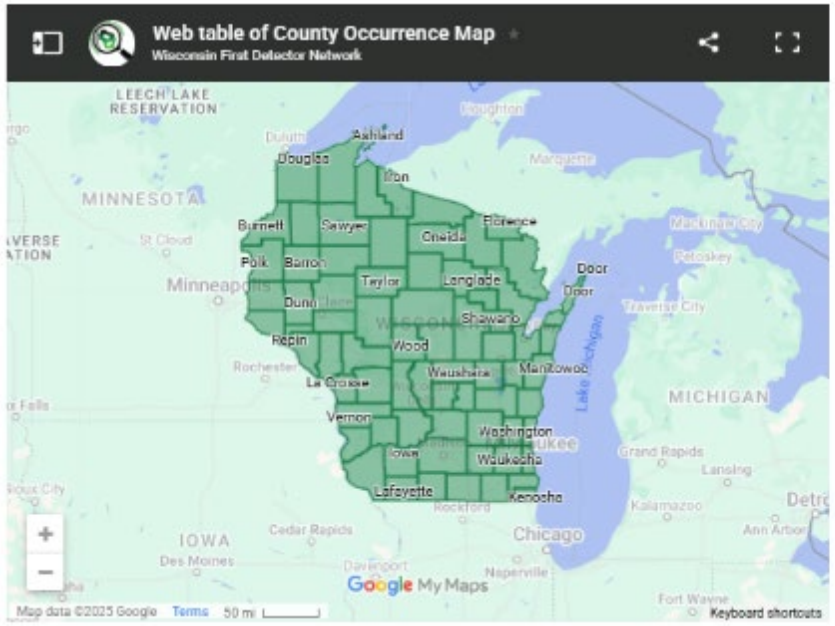
- Invasive Plant Impacts
- Scoping Invasive Species Train the Trainer Module
- Terrestrial Invasive Species by County in Wisconsin – 1900 to 2024
- Wisconsin Native Plant Nurseries
- Wisconsin Invasive Species Calendar
- WISTIPP Viewer

Scoping Invasive Species Train the Trainer Module

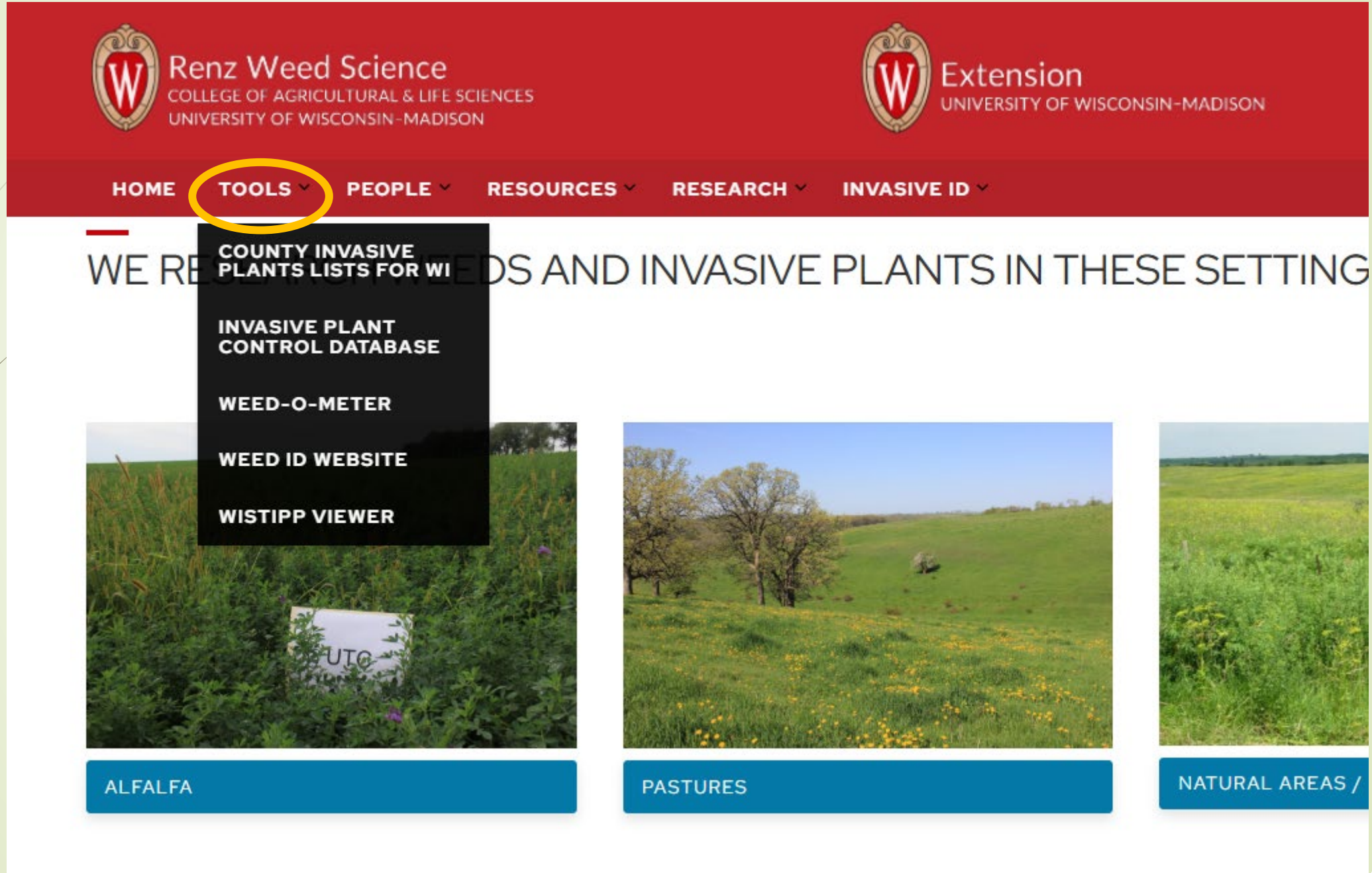
COUNTY INVASIVE PLANTS LISTS FOR WI 1900-2024

WIFDN has generated an interactive table that contains invasive and potentially invasive plant species from 1900 to 2024 in Wisconsin. While it largely follows Wisconsin NR40, WIFDN staff has worked to add other species at a high risk for destructive spread in the state.

Find your county of interest below! Zoom in to see county names or click the [ ] to make it full screen. By clicking on a county shape, you can then click a link in the description that will download a list of species occurrences for that county.



County Invasive Plants List for Wisconsin: https://renzweedscience.cals.wisc.edu/



County Invasive Plants List for Wisconsin: https://renzweedscience.cals.wisc.edu/



WIFDN has generated an interactive table that contains invasive and potentially invasive plant species from 1900 to 2024 in Wisconsin. While it largely follows Wisconsin NR40, WIFDN staff has worked to add other species at a high risk for destructive spread in the state.

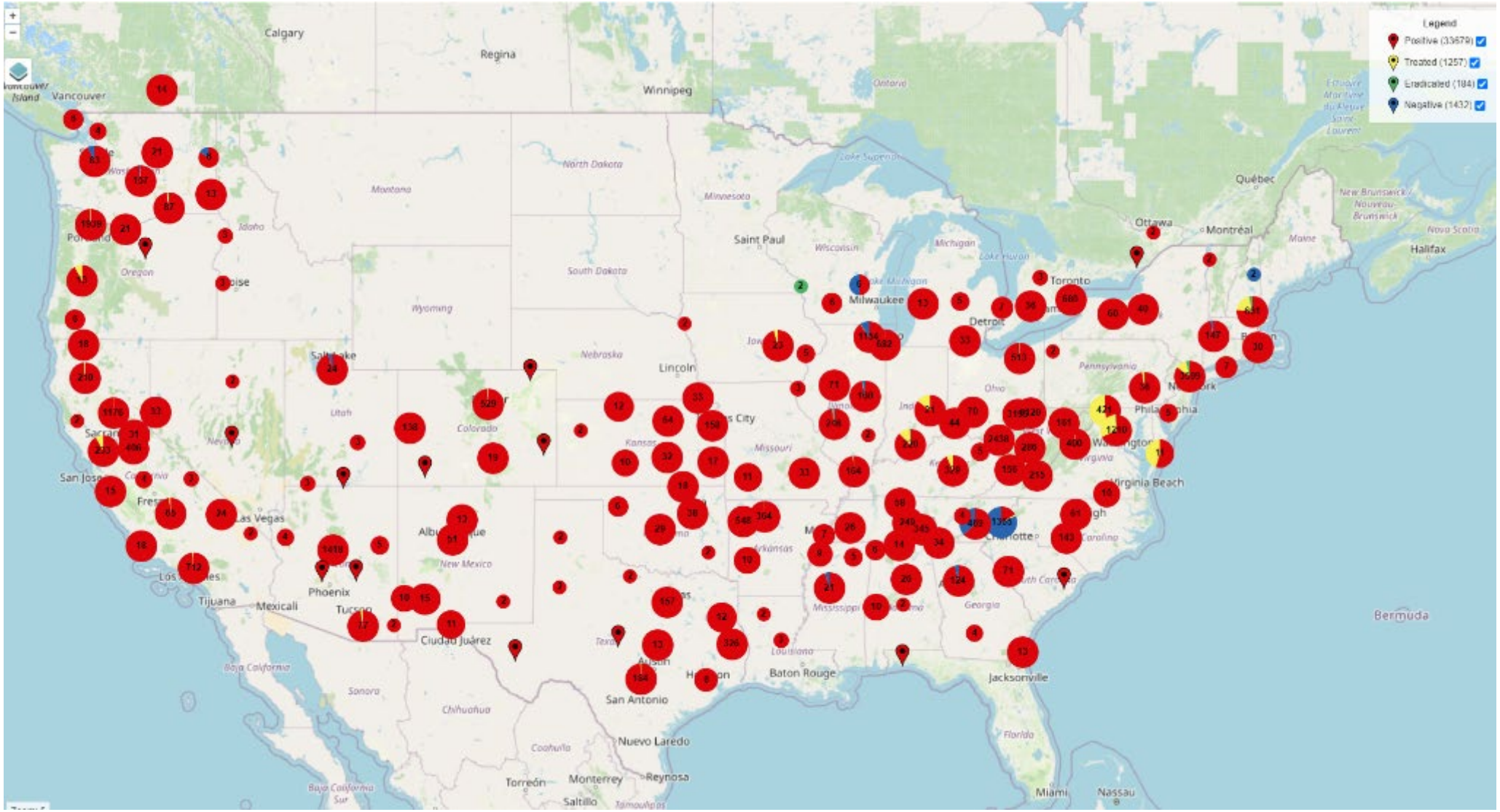
Click here to download the master table of all counties by tab in a spreadsheet, or find

County Invasive Plants List for Wisconsin: https://renzweedscience.cals.wisc.edu/

SciName	ComName	WI_Status	COUNTY_NAME	NR40_Classification	FREQUENCY
Acer ginnala	Amur maple	invasive	Milwaukee	Universally Restricted	2
Acer platanoides	Norway maple	invasive	Milwaukee	Universally Restricted WISC Recommendation	5
Ailanthus altissima	tree-of-heaven	invasive	Milwaukee	Universally Restricted	99
Alliaria petiolata	garlic mustard	invasive	Milwaukee	Universally Restricted	39
Alnus glutinosa	European black alder	invasive	Milwaukee	Universally Restricted	10
Ampelopsis glandulosa var. brevipedunculata	porcelain-berry	invasive	Milwaukee	Universally Prohibited	1
Anthriscus sylvestris	wild chervil	invasive	Milwaukee	Restricted	4
Artemisia absinthium	absinth wormwood	invasive	Milwaukee	Universally Restricted	2
Artemisia vulgaris	mugwort	invasive	Milwaukee	Universally Restricted WISC Recommendation	2
Barbarea vulgaris	yellow rocket	introduced	Milwaukee	Unregulated	3
Berberis thunbergii	Japanese barberry	invasive	Milwaukee	Universally Restricted	10
Berberis vulgaris	common barberry	invasive	Milwaukee	Universally Prohibited	1
Butomus umbellatus	flowering rush	invasive	Milwaukee	Universally Restricted	1
Campanula rapunculoides	creeping bellflower	invasive	Milwaukee	Universally Restricted	2
Carduus nutans	musk thistle, nodding thistle	invasive	Milwaukee	Universally Restricted	1
Celastrus orbiculatus	round leaf bittersweet	invasive	Milwaukee	Universally Restricted	7
Centaurea nigrescens	alpine knapweed, Tyrol knapweed	invasive	Milwaukee	Universally Restricted	1
Centaurea stoebe	spotted knapweed	invasive	Milwaukee	Universally Restricted	4
Centaurea stoebe ssp. micranthos	spotted knapweed	invasive	Milwaukee	Universally Restricted	20
Chelidonium majus	greater celandine	invasive	Milwaukee	Universally Restricted	9
Cirsium arvense	Canada thistle	invasive	Milwaukee	Universally Restricted	25
Cirsium vulgare	bull thistle	invasive	Milwaukee	Unregulated	21
Conium maculatum	poison hemlock	invasive	Milwaukee	Restricted Frontier	1
Convallaria majalis	lily of the valley	introduced	Milwaukee	Unregulated	6
Cynoglossum officinale	houndstongue	invasive	Milwaukee	Universally Restricted	6
Daucus carota	Queen Anne's lace, wild carrot	invasive	Milwaukee	Unregulated	12
Digitalis lanata	Grecian foxglove	invasive	Milwaukee	Universally Prohibited	5
Dipsacus	teasel	invasive	Milwaukee	Unregulated	500
Dipsacus fullonum	common teasel	invasive	Milwaukee	Universally Restricted	3
Dipsacus laciniatus	cutleaf teasel	invasive	Milwaukee	Universally Restricted	4
Eichhornia crassipes	common water hyacinth	invasive	Milwaukee	Universally Prohibited	1
Elaeagnus angustifolia	Russian olive	invasive	Milwaukee	Universally Restricted	2
Elaeagnus umbellata	autumn olive	invasive	Milwaukee	Universally Restricted	6
Epipactis helleborine	helleborine	invasive	Milwaukee	Universally Restricted	2
Euonymus alatus	winged burning bush	invasive	Milwaukee	Universally Restricted	5
Euonymus europaeus	European spindletree	invasive	Milwaukee	Universally Restricted WISC Recommendation	13

Iowa | Iron | Jackson | Jefferson | Juneau | Kenosha | Kewaunee | La Crosse | Lafayette | Langlade | Lincoln | Manitowoc | Marathon | Marinette

eddmaps.org


Legend
Positive (33679)
Treated (1257)
Eradicated (184)
Negative (1432)
Calgary
Regina
Winnipeg
Vancouver
Vancouver Island
Montana
North Dakota
Minnesota
Ontario
Québec
Ottawa
Montréal
Halifax
Saint Paul
Milwaukee
Toronto
Detroit
Wyoming
South Dakota
Nebraska
Lincoln
Salt Lake
Utah
Colorado
Kansas
Missouri
Pennsylvania
Ohio
Virginia Beach
San Jose
Las Vegas
Phoenix
Tijuana
Mexicali
Tucson
Ciudad Juárez
New Mexico
Arkansas
Mississippi
Georgia
Baton Rouge
Jacksonville
San Antonio
Nuevo Laredo
Monterrey
Reynosa
Torreón
Miami
Nassau
Bermuda



Visit Eddmaps.org to create account

Red fields are required.

Species

Pest (?) :

pestilence wort (Petasites hybridus)

Infestation

Status: (●) Positive (?) ( ) Negative (?) ( ) Treated (?)

Observation Date (?):

04/28/2021

Infested Area (?):

1599.842 sq feet

Survey Area (?):

1 acres

Habitat (?):

Riparian

Percent Cover (?):

Trace (Less than 1%)

Abundance:

Dense Monoculture

Plant Description:

[x] Mature [ ] Sapling/Immature [ ] Seedling/Rosette [x] In Flower [ ] In Fruit [ ] Seeds [ ] Dormant/Dead [ ] Unknown

Location

In addition to State and County, please provide details by placing a marker or listing the physical address on where the sighting occurred.

State:

Wisconsin

County:

Latitude (?):

42.8870614

Must be expressed in Decimal Degrees (XX.XXXX), and DATUM NAD83/WGS84.

Longitude (?):

-89.3514202

Must be expressed in Decimal Degrees (XX.XXXX), and DATUM NAD83/WGS84.

lat/long conversion tools | place marker at position | clear map

Location Description/Nearest Address:

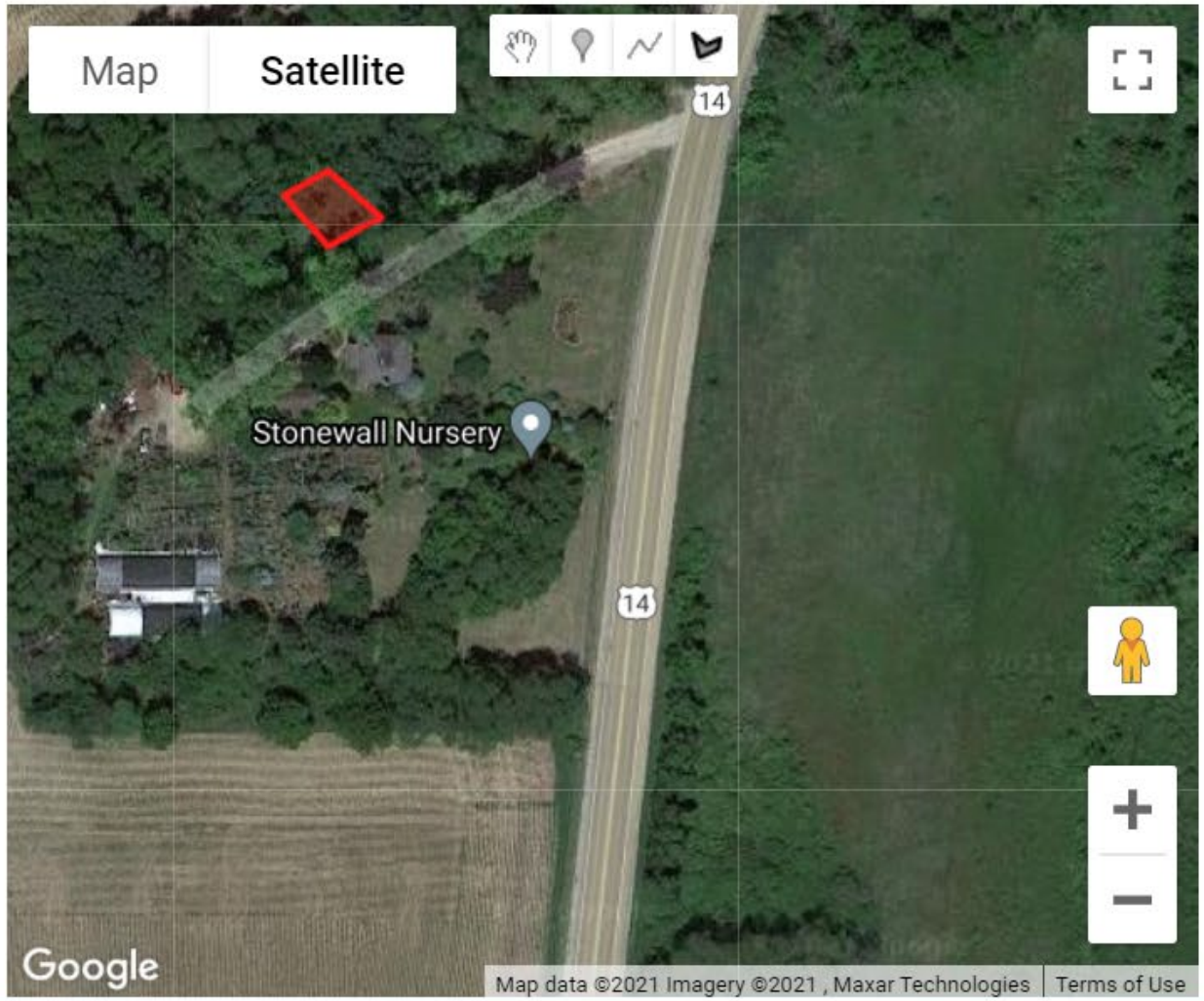
Stonewall Nursery
763 US-14
Oregon, WI 53575

Streambank to upland in riparian zone 30 NW of main house.

Ownership:

Private Landowner*

* If reporting infestation on private land, be sure to have landowner's permission.



Manage Reports

Search...

Record ID	Common Name	Scientific Name	Location	Date	Review Status	Manage
8809803	common reed	Phragmites australis	Grant, Wisconsin, United States	03/10/2021	Reviewed & Public	View | E
8777257	Japanese knotweed	Reynoutria japonica	Richland, Wisconsin, United States	08/16/2020	Reviewed & Public	View | E
8777256	Japanese knotweed	Reynoutria japonica	Richland, Wisconsin, United States	08/16/2020	Reviewed & Public	View | E
8777255	Japanese knotweed	Reynoutria japonica	Richland, Wisconsin, United States	08/16/2020	Reviewed & Public	View | E
8777254	Japanese knotweed	Reynoutria japonica	Richland, Wisconsin, United States	08/16/2020	Reviewed & Public	View | E
8777253	purple loosestrife	Lythrum salicaria	Grant, Wisconsin, United States	09/17/2020	Reviewed & Public	View | E
8777252	Japanese knotweed	Reynoutria japonica	Richland, Wisconsin, United States	08/16/2020	Reviewed & Public	View | E



EDDMapS

With the EDDMapS app, we've united our existing invasive species and pest citizen science reporting and identification tools under one app.



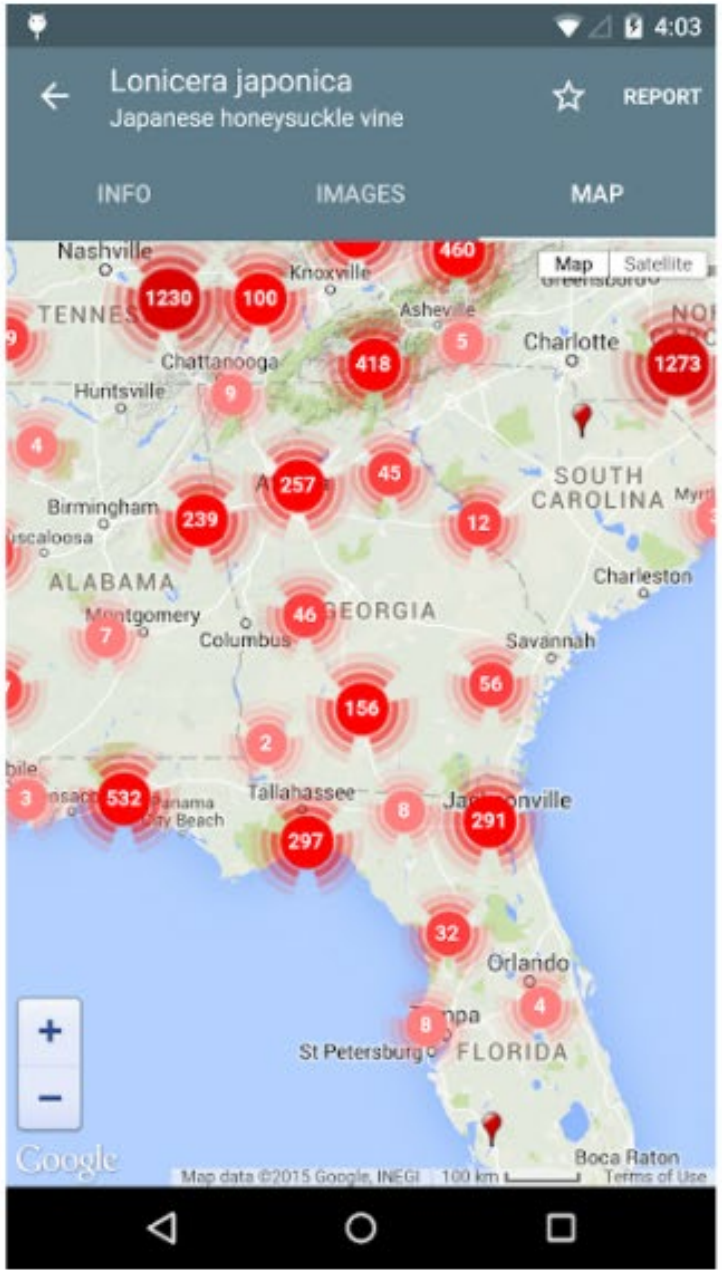
EDDMapS Pro

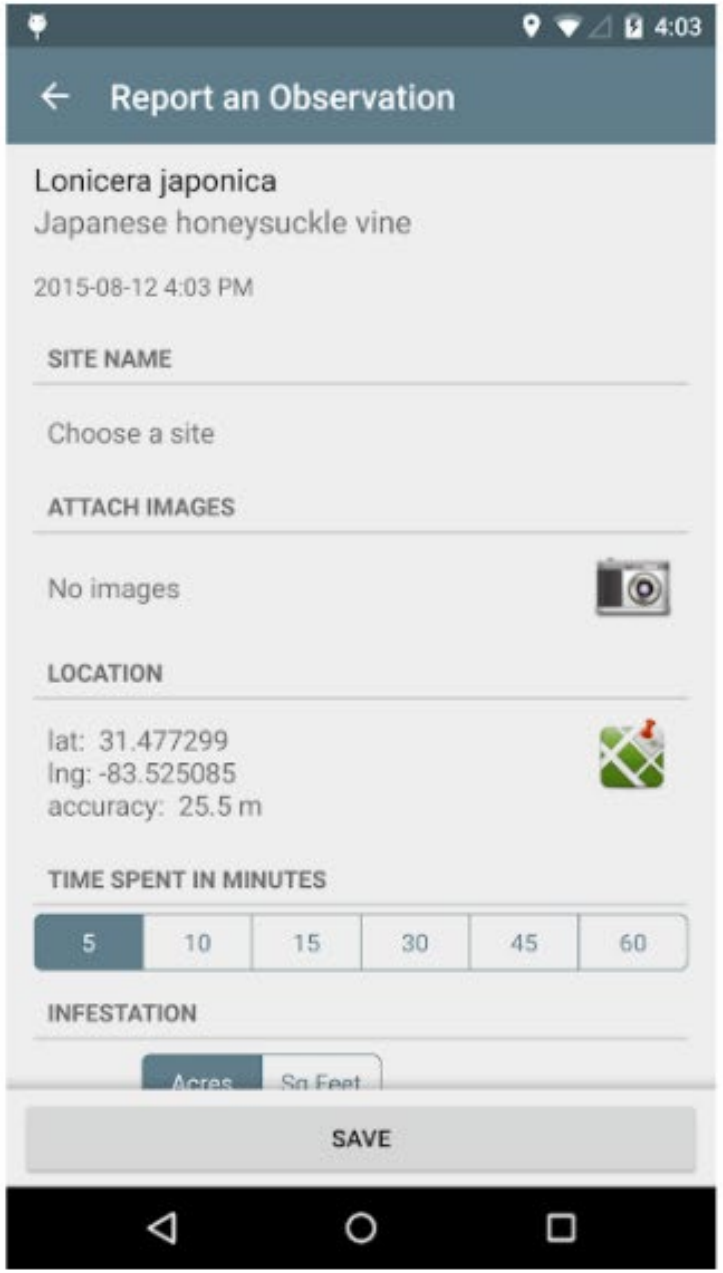
EDDMapS Pro is an app for reporting invasive species. The app has the ability to download offline map data if users are going to be in areas where internet coverage may not be available.

Available on the App Store

ANDROID APP ON Google play

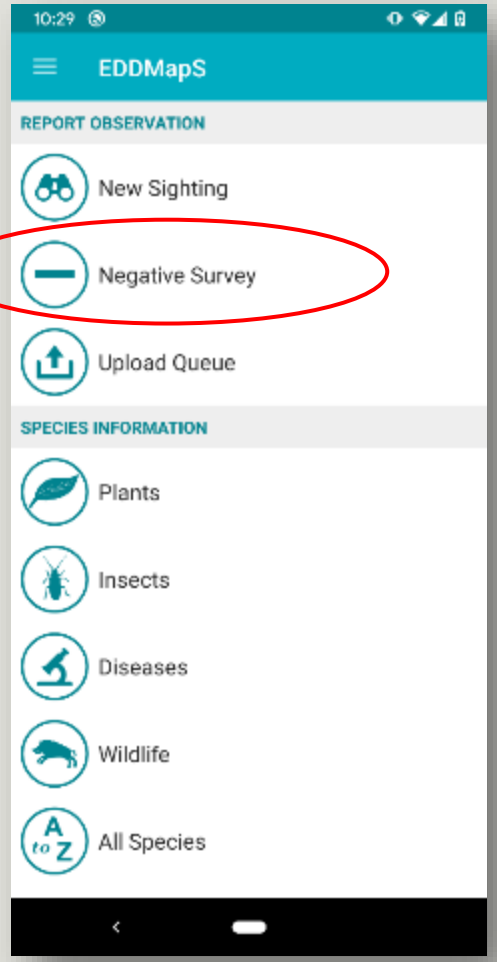

4:02
Lonicera japonica
Japanese honeysuckle vine
REPORT
INFO
IMAGES
MAP
UGA2308104
Chuck Bargeron, University of Georgia

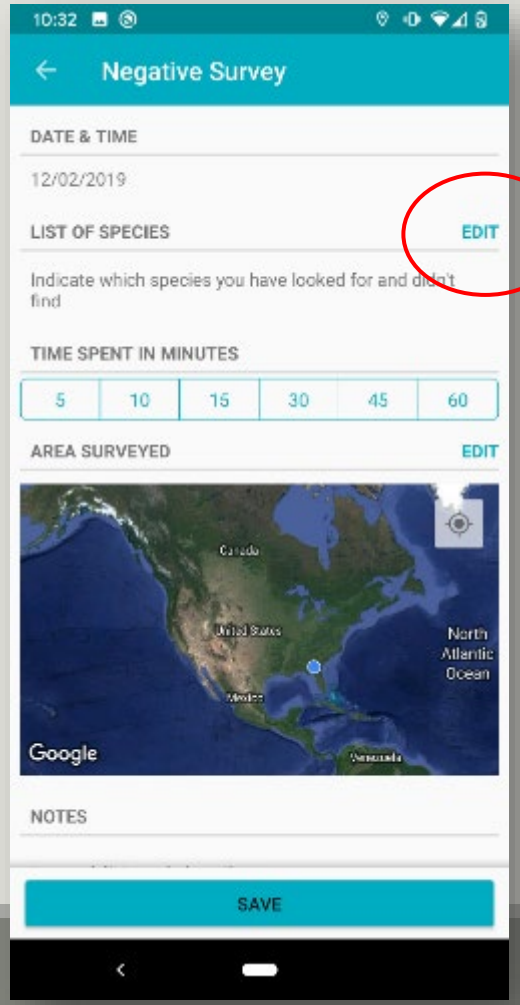

4:03
Lonicera japonica
Japanese honeysuckle vine
REPORT
INFO
IMAGES
MAP
Nashville
Knoxville
Chattanooga
Huntsville
Charlotte
Birmingham
ALABAMA
GEORGIA
SOUTH CAROLINA
Charleston
Montgomery
Columbus
Savannah
Tallahassee
Orlando
St Petersburg
FLORIDA
Boca Raton
Map
Satellite
Google

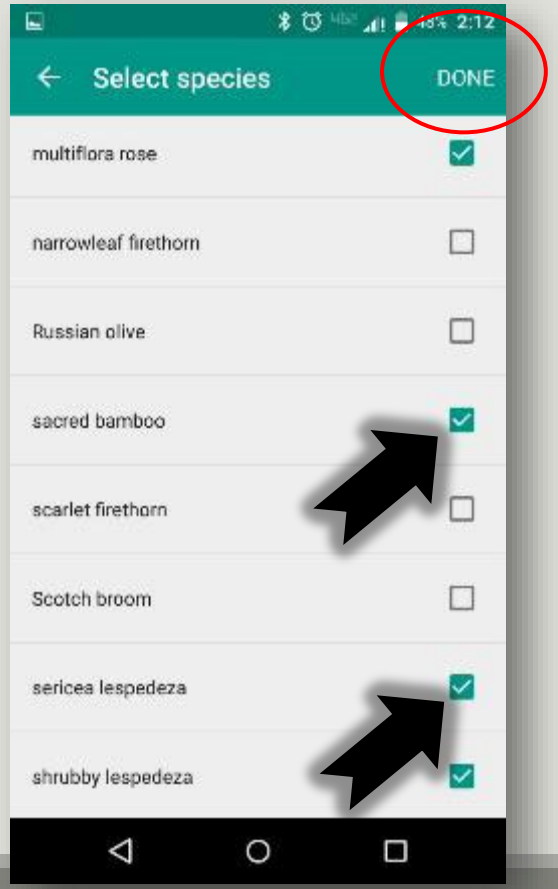

4:03
Report an Observation
Lonicera japonica
Japanese honeysuckle vine
2015-08-12 4:03 PM
SITE NAME
Choose a site
ATTACH IMAGES
No images
LOCATION
lat: 31.477299
lng: -83.525085
accuracy: 25.5 m
TIME SPENT IN MINUTES
5
10
15
30
45
60
INFESTATION
SAVE

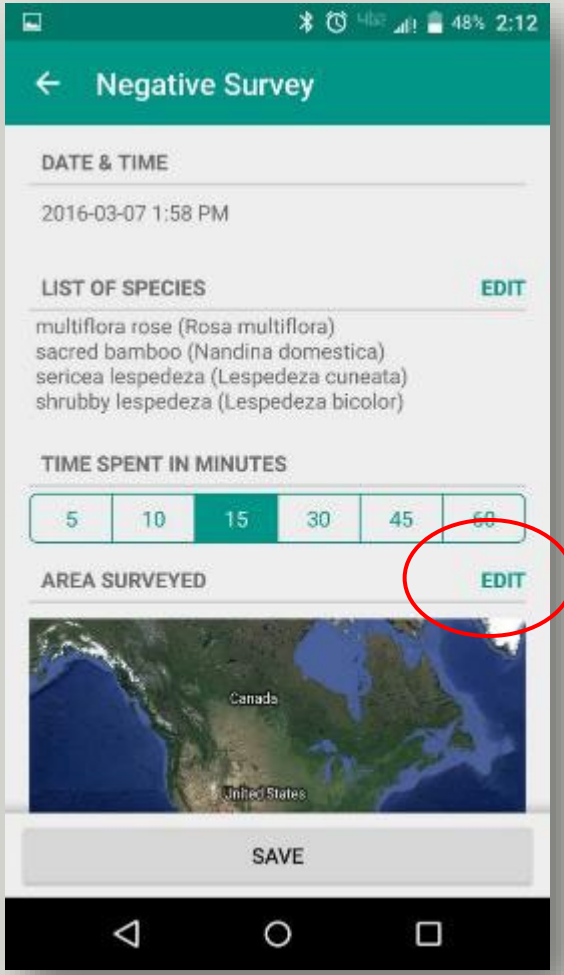
Reporting with the Smartphone App

- ✓ Click Negative Survey in main menu
- ✓ Click Edit to add all species surveyed
- ✓ Click Edit in Area Surveyed to map it









Reporting Forms - Negative Surveys - Mapping

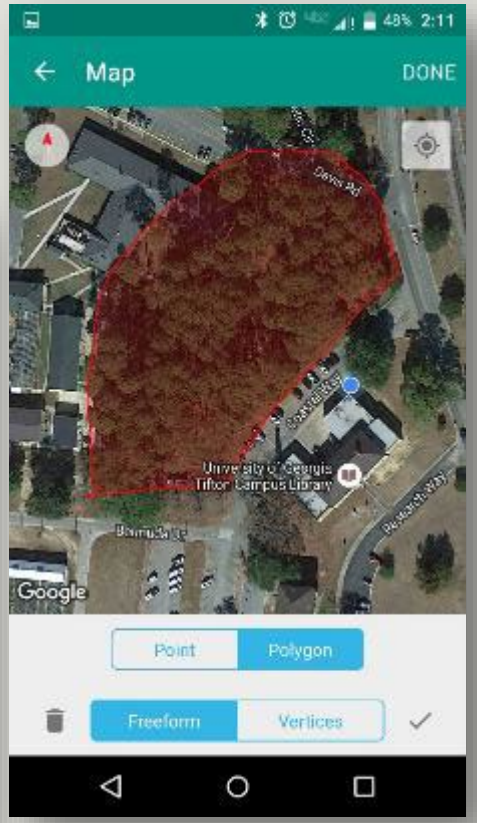
Zoom In



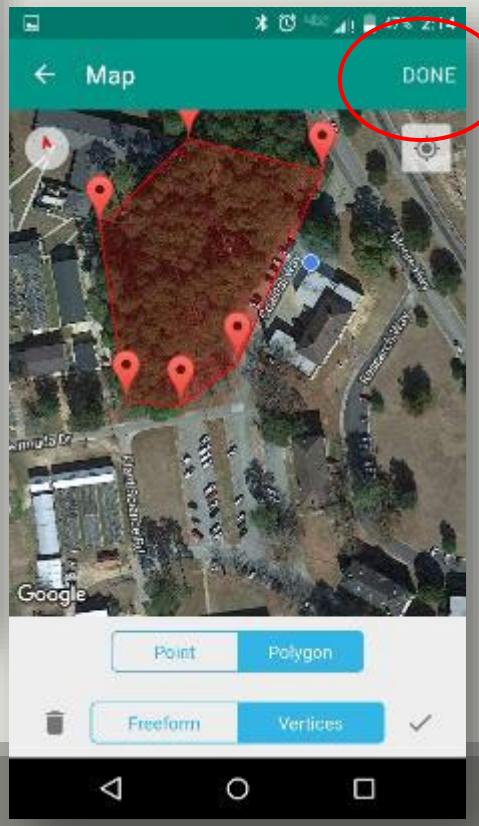
Point



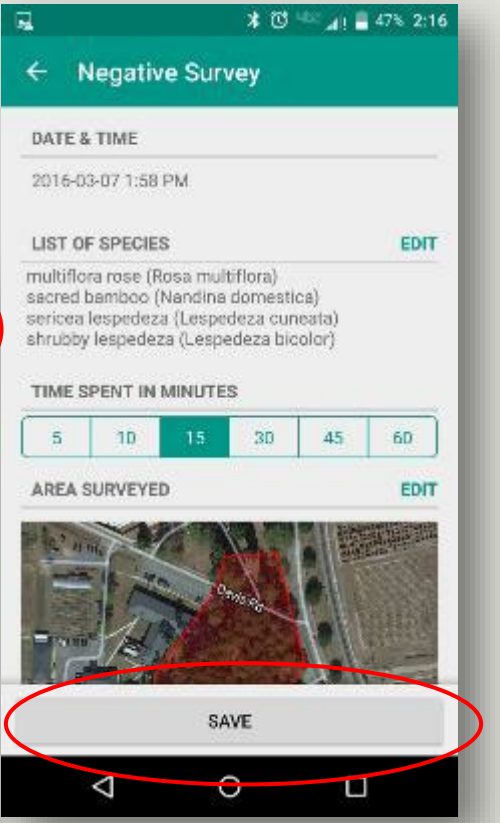
Freeform



Vertices



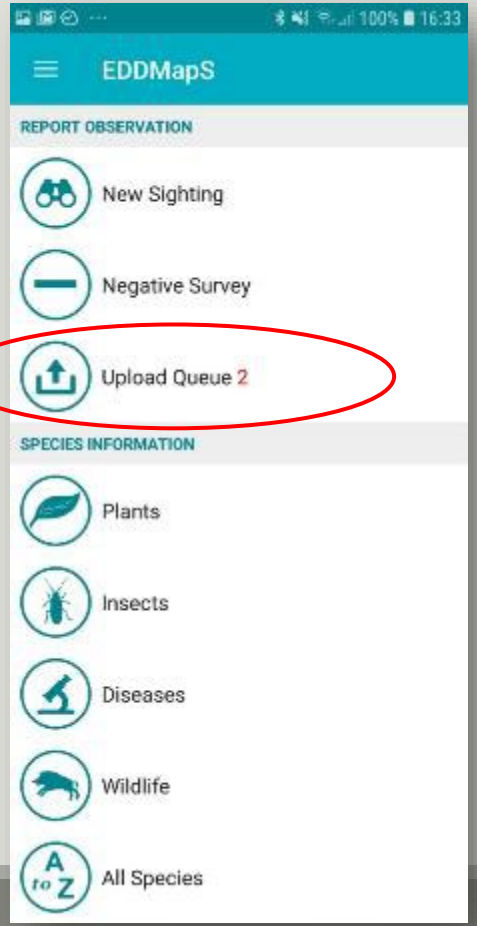
Save



Upload Queue

- ✓ Save all reports to your device
- ✓ Upload after connecting to WiFi
- ✓ Saves your data and your device's battery

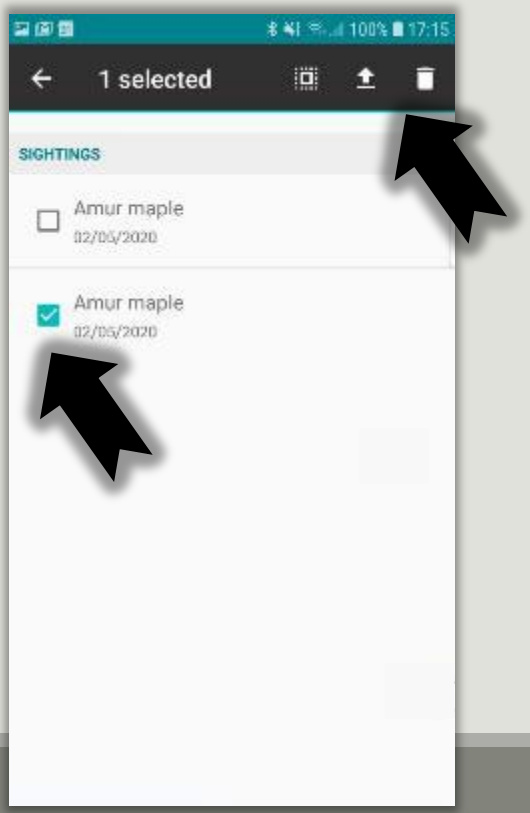
of Records in Queue



Records in Queue



Tap Record to edit or Tap box to delete or upload



Empty Queue



EDDMapS find · map · track

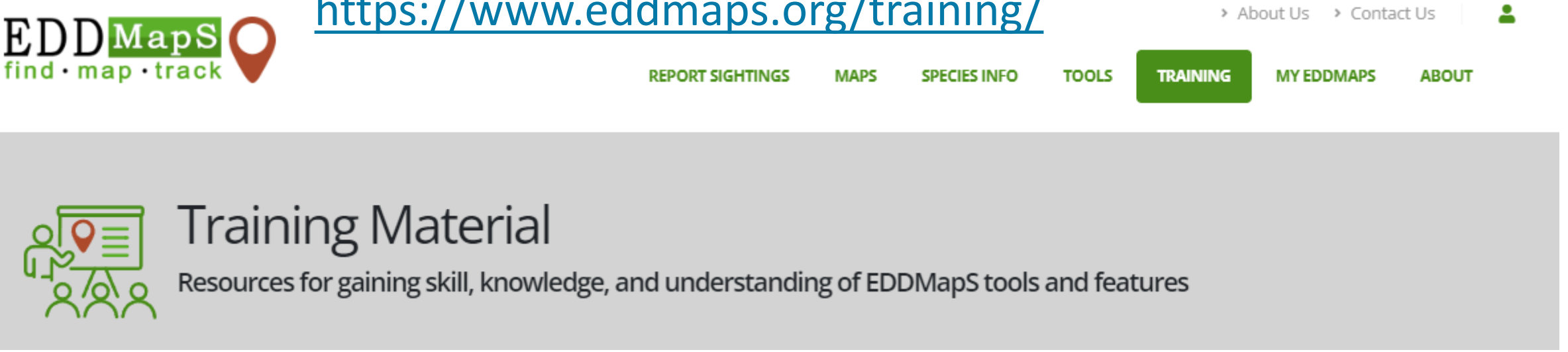


WIFDN is here to help with EDDMAPS!

If you have questions or want to train your team, contact Matt – mrwallrath@wisc.edu

+ Quality training docs and videos at https://www.eddmaps.org/training/

EDDMapS
find · map · track




Hey fellas,
let's report that big ol'
tree of heaven
der by the trucks!
EDDMapS
find · map · track

Volunteer to monitor for invasive species!

Report sightings: SLF has not yet been found in Wisconsin and early detection is critical. Report any suspected detections to the Wisconsin Department of Agriculture, Trade and Consumer Protection (**DATCP**) at **this page** (See "Report a Spotted Lanternfly Sighting" in the menu).



Spotted lanternfly adults and late-instar nymphs on a plant. Photo credit: Richard Gardner, Bugwood.org

hort.extension.wisc.edu/articles/spotted-lanternfly

State of Wisconsin

Department of Agriculture, Trade and Consumer Protection

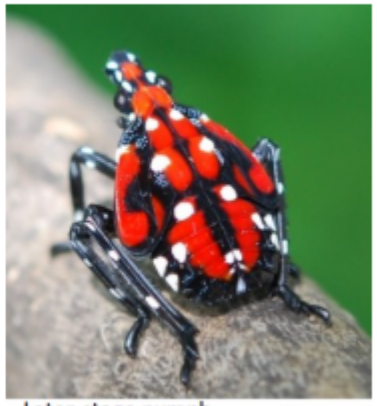
SLF.WI.GOV

The wingless nymphs that emerge from eggs are black with white spots. Later stage nymphs are red and black with white spots. The adults have wings that are pinkish purple with black spots when folded. When outspread, the upper wings are white to tan, and the lower wings have distinctive red, black and white markings. The tips of both sets of wings are dark brown to black. Adults are 1 inch long and 1½ inch wide when wings are outspread.



First-stage nymph

L.M. Davis



Later-stage nymph

L. Berringer

Dispersal

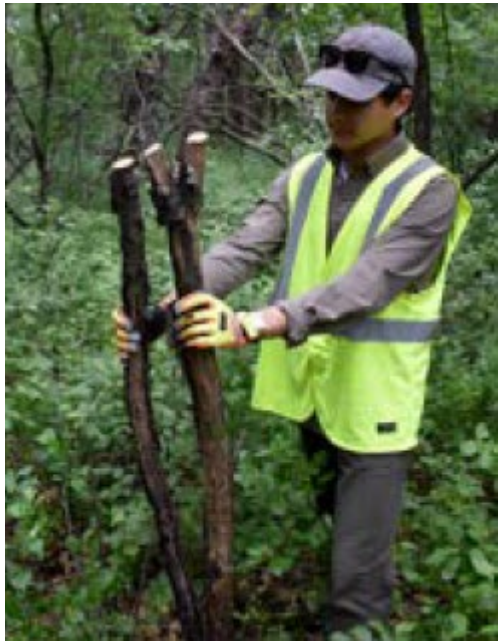
SLF travels only short distances on its own, by walking, jumping, or flying. They are weak fliers. This is a hitchhiking insect. It moves on nursery stock, firewood, rail cars, trucks, shipping containers, bricks, stone, and other materials moved by humans. It is most likely to move as egg masses.

Reporting

If you suspect you have found spotted lanternfly, please **report it immediately**. If possible, take photos, and note the location.

Critical period cutting

A HOW-TO GUIDE FOR REMOVING LARGE BUCKTHORN



Interested in doing some participatory science around woody invasive control?

MORE DETAILS AND INFO:

fmr.org/CPC

WISCONSIN INVASIVE SPECIES COUNCIL ANNOUNCES INVASIVE SPECIES ACTION AWARDS WINNERS



Recipients of the 2025 Invasive Species Action Awards stand with their plaques during the recognition ceremony held at the Wisconsin Cranberry Research Station on June 4.

WISCONSIN INVASIVE SPECIES COUNCIL ANNOUNCES INVASIVE SPECIES ACTION AWARDS WINNERS



Recipients of the 2025 Invasive Species Action Awards stand with their plaques during the recognition ceremony held at the Wisconsin Cranberry Research Station on June 4.



Recipients of the 2025 Invasive Species Action Awards



Renz Weed Science
COLLEGE OF AGRICULTURAL & LIFE SCIENCES
UNIVERSITY OF WISCONSIN–MADISON

WISCONSIN FIRST DETECTOR NETWORK

Thank you!

Matthew Wallrath - Outreach Specialist
Wisconsin **F**irst **D**etector **N**etwork Coordinator
University of Wisconsin - Madison
mrwallrath@wisc.edu Office: 608-262-9570

Agenda for the afternoon

12:10- 1pm	LUNCH	
1:00-1:15	TRAVEL TO FIELD	
	FIELD	
1:15-1:45	Demonstration of management techniques (5 min to move)	TRAVIS
1:45-2:15	Practice plant identification (5 min to move)	JOHN
2:15-2:45	How to monitor for invasive plants with EDDMapS (5 min to move)	MATT – download the app at eddmaps.org
2:45-3:00	Summary/survey	