Invasive Species Identification and Impacts Buckthorn, Honeysuckle, Garlic Mustard

Laura A.B. Giese, PhD
Ecologist/Assistant Professor
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Friends of the Mukwonago River

WHY?

Why are Invasives A Concern

- Natural checks and balances are missing
- Alter species composition
- Alter hydrology
- Alter carbon and nutrient cycling
- Alter available light
- Alter disturbance regimes
- Huge economic costs

Invasive Species Definition

Executive Order 13112 signed 1999
Established National Invasive Species Council

1) non-native (or alien) to the ecosystem under consideration and

2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health.

NR40 – Invasive Species Rule (9/09)

Illegal to possess, transport, transfer, or introduce certain invasive species in Wisconsin without a permit.

Everyone is responsible to comply with these regulations.

Prohibited Invasive Species*

- Not yet in the state or only in a few places
- Likely to cause environmental and/or economic harm
- Eradication and prevention is feasible

Regulations: Cannot transport, possess, transfer, or introduce without a permit.** ***Control is required.*** **DNR may order or conduct a control effort.**

* *Any viable part of the species is covered by these regulations.*

Restricted Invasive Species*

- Already widely established in the state
- High environmental and/or economic impacts are evident with these species
- Complete eradication is unlikely

R*egulations*: Cannot transport, transfer, or introduce without a permit.** Possession is allowed except for fish or crayfish.

Control is encouraged but not required.

Where Are Invasive Species?

- Found in every imaginable habitat
  - oceans, lakes, streams, wetlands,
  - croplands, rangelands,
  - natural areas, parks, forests,
  - urban environments, yards and gardens

How Bad Are Invasive Species?

- Produce skin irritation (Wild Parsnip)
- Trigger allergies (Cypress Spurge)
- Poison pets and livestock (St. Johnswort)
- Clog waterways (Eurasian Watermilfoil)
- Kill native trees (Garlic Mustard)
- Shade out crops, ornamentals and native flora (Buckthorn)

How Bad Are Invasive Species?

- Reducing biodiversity
- Altering hydrologic conditions
- Altering soil characteristics
- Altering fire intensity and frequency
- Interfering with natural succession
- Competing for pollinators
- Poisoning or repelling native insects
- Increasing predation on nesting birds
- Serve as reservoirs of plant pathogens
- Replace complex communities with single species monocultures
- Dilute genetic composition of native species through hybridization

How Many Plants are Invasive?

- 33,759 weeds Worldwide
- ~18,000 native plants in the U.S.
- ~3,300 nonnative plants in the U.S.
- 1,100 to 2,100 plant species reported as being invasive in the U.S.

Invasive Shrubs

Number of invasive shrub species in each state.

Contributing Factors

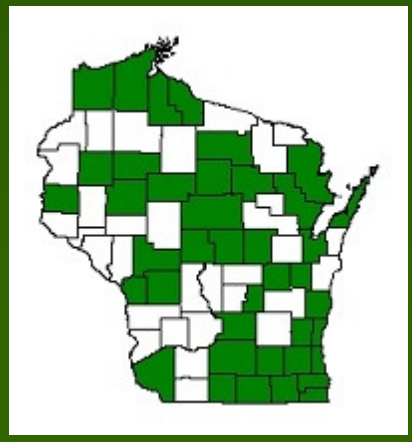
- Shade tolerant
- Abundant seed producers
- Rapid growth
- Thick canopies
- Longer season of growth
- Multiple dispersal strategies
- Pioneer species able to utilize disturbed sites
- Perennials able to utilize stored reserves
- Allelopathic – actively discourages natives
- Lack of native enemies

Common and Glossy Buckthorn

- 2 invasive species in WI
- Native to Europe
- Widely planted for hedgerows, starting in mid-1800s
- Both species restricted
- Glossy buckthorn cultivar Columnaris (tall hedge) is restricted. Excludes cultivars Asplenifolia and Fineline (Ron Williams)

Common buckthorn
(*Rhamnus cathartica*)

Glossy buckthorn
(*Frangula alnus*)
(*Rhamnus frangula*)



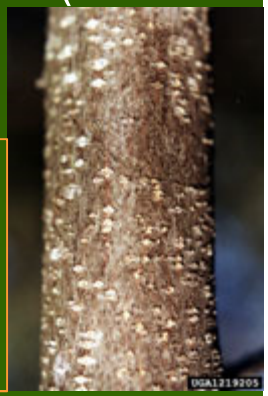
(WDNR 2011 and 2013)

Common Buckthorn

Common Buckthorn

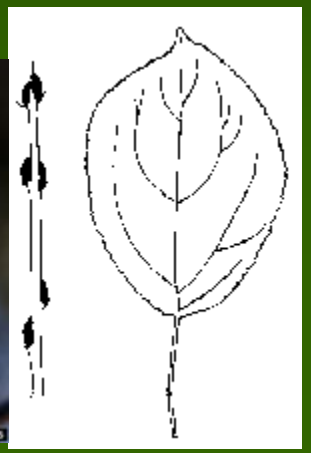
- Leaves simple, opposite, bluntly toothed; 1-2.5” ovate
- Leaves w/3-5 curved parallel veins
- Twigs tipped with sharp thorn
- Buds pressed to stem (resembles buck’s hoof w/thorn)
- Berries black w/several seeds (on female plants only)

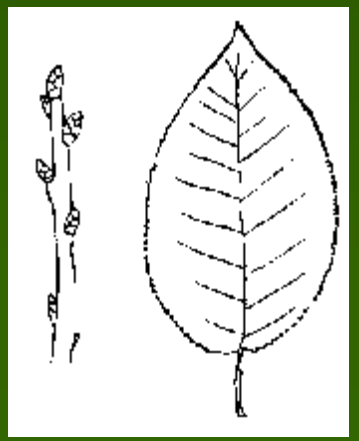
Gray to Brown Bark w/light-colored lenticels



Cherries & Plums

- Leaves alternate
- Buds often clustered near tips
- Berries red or black with single hard seed
- Some species have thorns





Glossy Buckthorn

Smooth leaf edge, Alternate leaves,
7-9 pair of leaf veins
Hairy rusty-colored terminal bud

Wetland Habitats

Time of year

- Fall: Both buckthorn species hold their leaves later than native trees
- Spring (May): flowers are small, yellow-green, not very showy

Common buckthorn flower

Glossy buckthorn flower

How do I recognize buckthorn?

There are native look-alikes

Common buckthorn

Red Twig Dogwood

Grey Dogwood & Buckthorn

Make sure its buckthorn!!

There are native look-alikes

Common Buckthorn

Grey Dogwood

Black Cherry

Red Twig Dogwood

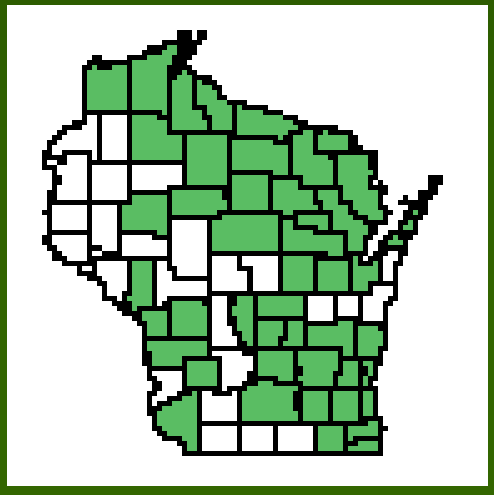
Native Buckthorn

Common Buckthorn
20-25’ tall
Upland

Glossy Buckthorn
20’ tall
Wetland/Upland

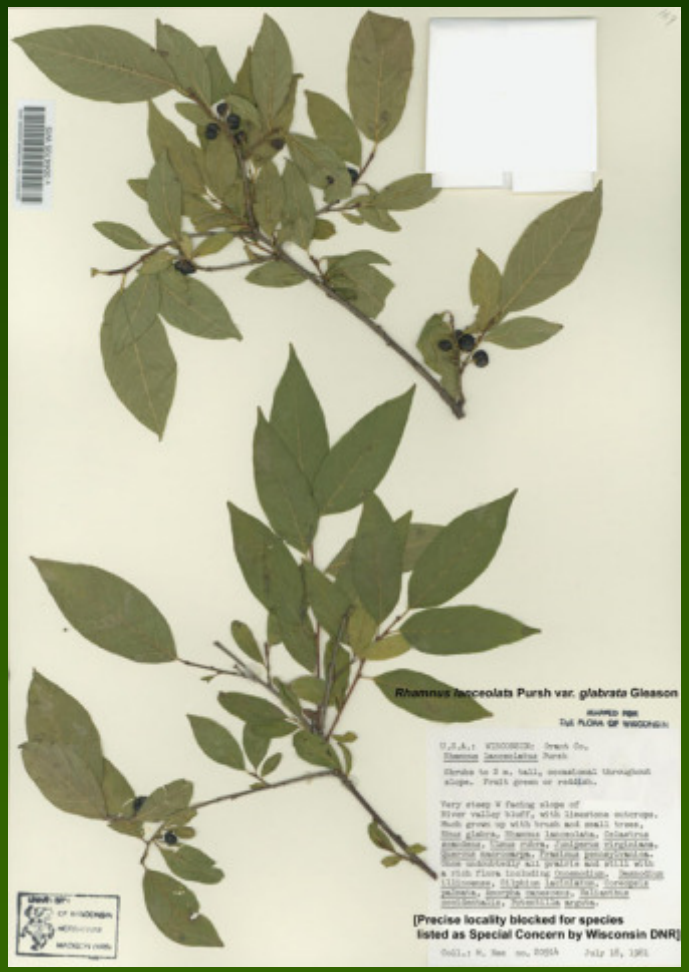
Alder-leaf Buckthorn
(*Rhamnus alnifolia*)

Less than 3’ tall
Spineless twigs
Woodlands/Wetlands
Larval host/nectar source for pale swallowtail



Native Buckthorn

Lanced-leaved Buckthorn
(*Rhamnus lanceolata ssp. glabrata*)
Less than 6’ tall
2-6” alternate leaves
Dry to moist, calcareous soils
State Special Concern

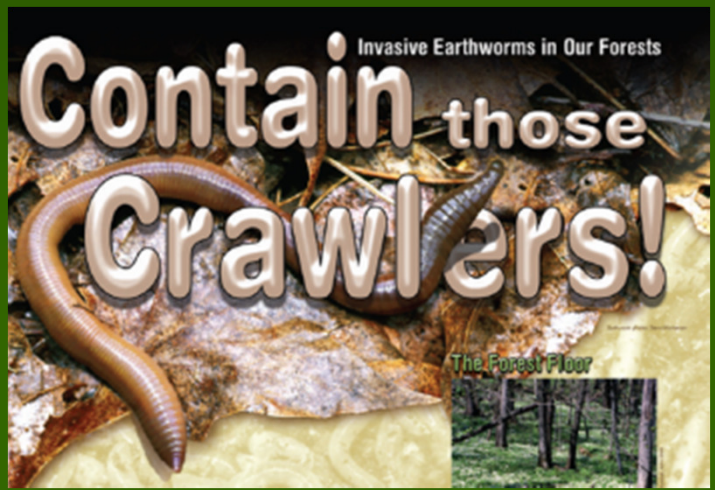


Why is Buckthorn so invasive?

- Growing season 58 days longer
- Seeds
  - lay dormant in the soil for 5-6 years
  - germinate in full sun or shady locations
  - float on water for a week and remain viable
- Seeds and fruit contain allelopathic chemicals that inhibit native vegetation growing nearby
- No natural predators
- Re-sprouts vigorously after basal pruning

Ecosystem Impacts

- Changes soil nitrogen, increase soil pH
- Reduces leaf litter layer
- Possible facilitation of earthworm invasions
  - All earthworms are non-native to WI
- Possible effects on native plants through allelopathy or competition
- Shades out other plants
  - contributes to erosion
- Degrades wildlife habitat



Ecological Impact

Scientific studies reveal Midwestern frogs decline, mammal populations altered by invasive plant

- Common Buckthorn releases emodin, a chemical toxic to frog and amphibian embryos
- *Lincoln Park Zoo Allison Sacerdote-Velat, Ph.D. and Northern Illinois University Richard King

Ecological Impact

Presence of the invasive shrubs in forest preserves and natural areas correlates to increased prevalence of carnivores

- Carnivores prey more easily on native bird eggs and nestlings when nests are built in buckthorn and honeysuckle compared to nests built in native shrubs or trees.
- *Ken Schmidt of Texas Tech University and Chris Whelan of Illinois Natural History

Ecological Impact

Alters wildlife distribution and attracts some carnivore species

- Significantly more coyotes, raccoons and opossums in buckthorn invaded areas and significantly fewer white-tailed deer.
- *Director of the Urban Wildlife Institute Seth Magle, Ph.D.

Economic Impacts - Buckthorn

- Forms dense thickets
  - Shades out hardwood regeneration
  - Excludes herbaceous plants
  - Hinders trail & woods use
- Overwintering host for soybean aphids – a pest of soybean crops
- Host for a crown rust fungus that impacts oat crops

Exotic Honeysuckles


Tartarian

Lonicera tartarica


Bell's

Lonicera x bella

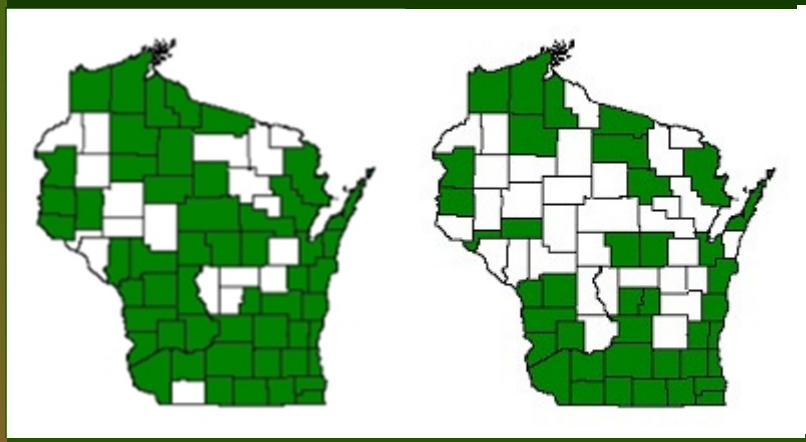

Amur

Lonicera maackii


Morrow

Lonicera morrowii

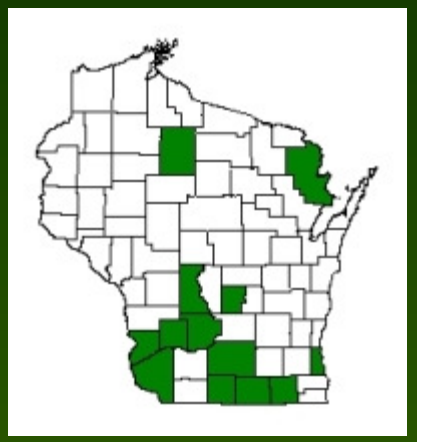
Exotic Honeysuckles



Bell's

Morrow's

Tartarian



Amur

Bell's, Morrow's, Tartarian - Restricted

Native vs Invasive Honeysuckles

Native Shrubs

Shorter, sparser growth forms
White pith/often solid stem
Leaves develop 1-2 wks later/drop earlier
Wetland Habitats

Invasive Shrubs

Dense, multi-stemmed; 6-12’ tall
Older stems have shaggy, peeling bark
Stems hollow between nodes
Upland Habitats

Ecological Traps – Asian Honeysuckles

- Abundant berries
- Cardinals, robins, catbirds – generalists
- Acadian flycatcher – specialist – avoids honeysuckle
- Berries poor in protein and fat birds need for energy and fitness
  - Male cardinals paler in color
  - Less attractive as mates
- Number of plant eating insects - caterpillars - drop dramatically
  - warblers and chickadees rely on caterpillars for 90% of diet during breeding season

Garlic mustard

- First year plants
  - Heart shaped rosette
- Second year plants
  - Triangular leaves, toothed
  - White flowers (4 petals)
- Crushed plants smell like garlic

(DNR 2011)

Garlic mustard – Look-alikes

Motherwort
(*Leonorus cardiaca*)
Non-native

Violets
(*Viola* spp.)

Stan Gilliam

Ground Ivy
(*Glechoma hederacea*)

G.A. Cooper @ USDA-NRCS PLANTS Database

Garlic mustard

- Produce as many as 3,000 seeds per plant
- Seeds survive up to 10 years in the soil
- Alters soil chemistry by adding chemicals that prevent the growth of other plant species
  - Sinigrin and root chemicals (phytotoxins) inhibit growth of grasses/herbs (allylglucosinolate or 2-propenylglucosinolate)
- Forms a single-species carpet on the forest floor

Garlic mustard suppress native tree seedling growth

- Chemicals have been found to affect mychorrhizal fungi associated with native trees, resulting in suppression of native tree seedling growth

Garlic mustard displaces native wildflowers

- Native wildflowers (e.g., spring beauty (*Claytonia virginica*), wild ginger (*Asarum canadense*), bloodroot (*Sanguinaria canadensis*), trilliums (*Trillium* species), Dutchman's breeches, hepatica and toothworts (*Cardamine/Dentaria*))
- Wildlife species deprived of essential food sources
- Deprived of vibrant display of beautiful spring wildflowers

Blanket coverage strategy
Outcompetes by aggressively monopolizing light, moisture, nutrients, soil and space

Garlic mustard toxic to butterfly larvae

- Three native butterfly species
  - West Virginia white (*Pieris virginiensis*)
  - mustard white butterfly (*Pieris oleracea*)
  - falcate orange-tip (*Anthocharis midea annicka*)
- Host plant - "toothworts" (*Dentaria*)
- Chemicals in garlic mustard toxic to the eggs of the butterflies
  - failure to hatch when laid on garlic mustard

5x the species and 22x the number of caterpillars are found on native plants

Ecological Impact

42% of threatened and endangered species have declined as a result of encroaching invasive plants and animals

Economic Impacts

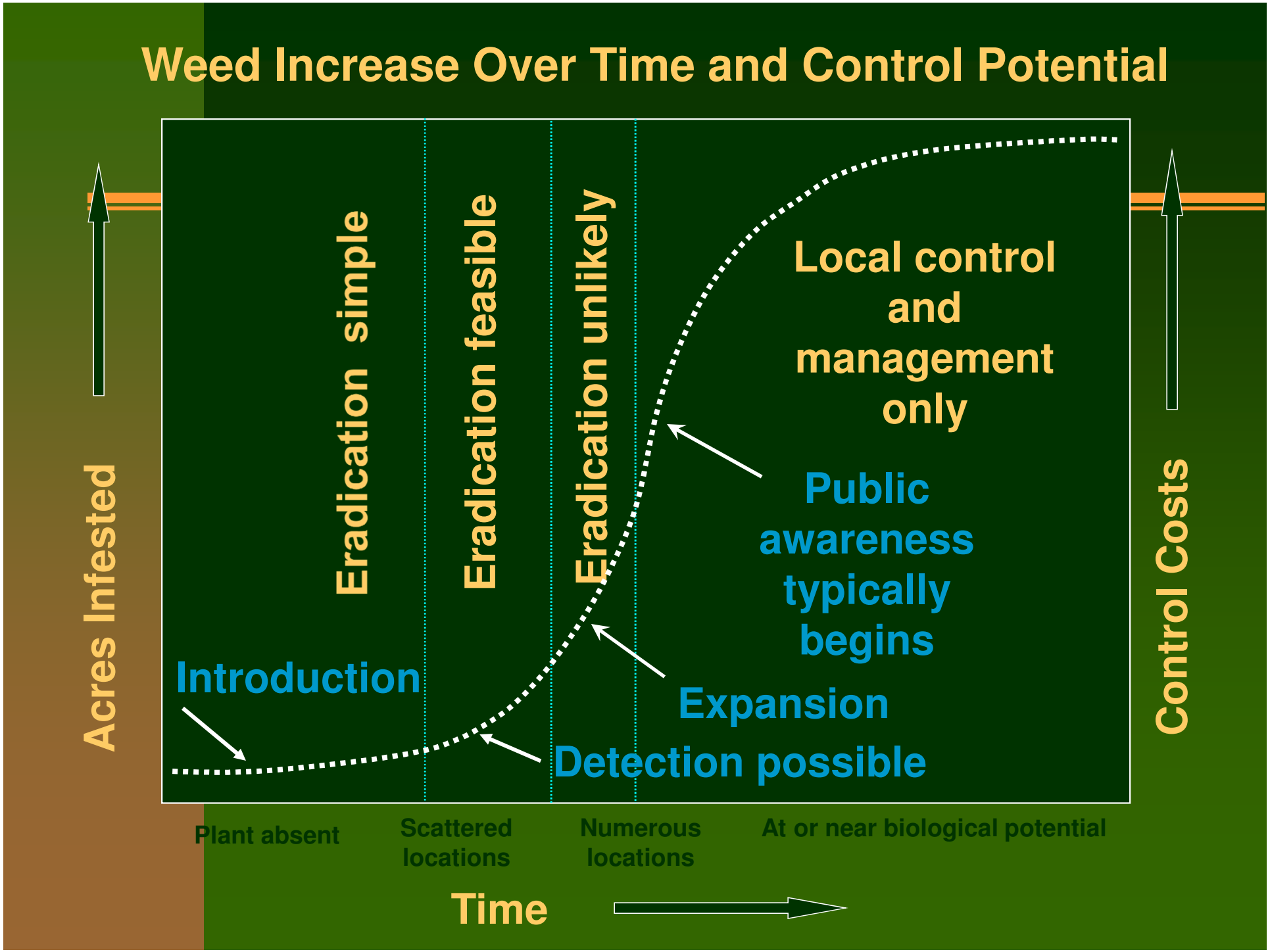
- Damage done by invasive plants alone costs the U.S. an estimated $34.7 billion a year.
- Annual cost to control invasive plants: NPS ($2 million) and FWS ($10 million)

Economic Impacts

- 200 Acre Anoka Nature Preserve
- $179,000 project; 2008, MN DNR
- 22 Semitrailers hauled away vegetation, including buckthorn (20 Tons each)
- Used as fuel at a energy plant in St Paul (20 trucks fuels ½ day)
- 1 of 24 projects that have received state grants to remove invasive plants from parks, preserves, and other areas

Ecos Impacts

- Invasive plants can harm the natural heritage of our wetlands, prairies, forests, lakes, and rivers.
- Invasive plants can decrease your ability to enjoy hunting, fishing, mushroom collecting, bird watching, and other recreational pursuits.
- The longer we wait, the more expensive it will be to control invasive plants.


Weed Increase Over Time and Control Potential
Acres Infested
Control Costs
Eradication simple
Eradication feasible
Eradication unlikely
Local control and management only
Public awareness typically begins
Introduction
Expansion
Detection possible
Plant absent
Scattered locations
Numerous locations
At or near biological potential
Time

Prevention is the Best Strategy

- Far cheaper and easier than pest suppression and habitat restoration
- More effective when management is based on collaboration between neighbors and government entities

Ecological Consequences of Invasions

- Change the rules of the food web
- Disrupt pollinators – co-evolved with native plants
- No insects – no species diversity
- No beautiful woodlands
- Unbalanced ecosystems

Native Plant Sales

- Retzer Nature Center May 10, 2014
- Pewaukee River Partnership May 10, 2014
- UW-Madison Arboretum May 10, 2014

Acknowledgements

- Susan Burks –(MNDNR Forestry / Invasive Species Program Coordinator)
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- Jeff Kante (Village of Chenequa Forester)

Questions?