Invasive plant management to promote migratory birds

Kelly Kearns, Invasive Plants Coordinator
Endangered Resources, WI DNR
608-249-0619  kelly.kearns@wisconsin.gov
• What characteristics make some plants invasive?
• Impacts of invasive plants on migratory birds
• Common invaders in the region and new species to be aware of
• Prioritizing management and control
Globally, Invasive species lead to animal extinctions

• Of 680 known animal extinctions
  - 170 have causal factors determined
    - 91 (54%) partly caused by invasives
    - 34 (20%) primarily caused by invasives
      (Primarily birds)
Characteristics of invasive species

⭐ Grow and mature quickly
Eurasian Bush Honeysuckle
- leafs out early
- attracts early nesting birds
- nests have near 100% predation

Increase in generalist frugivores
Decrease in sensitive insectivores
Common buckthorn fruits cause bird diarrhea resulting in a net energy loss.

(Rhamnus cathartica)
Characteristics of invasive species

- Grow and mature quickly
- Reproduce prolifically
From This . . .

(One plant amidst the wildflowers)
To This !! In just a few years

(Garlic mustard will take over)
Characteristics of invasive species

- Grow and mature quickly
- Reproduce prolifically
- Have effective dispersal techniques
Japanese Hedge-Parsley (*Torilis japonica*)
Japanese knotweed (Polygonum cuspidatum)

- Spreads by root fragments
- Forms dense clones on shorelines
Effects of Japanese knotweed infestations in riverine areas

- Reduced occurrence and diversity of native riparian vegetation (Bimova, 2004)
- Low abundance and taxanomic diversity of phytophagous insects (Beerling 1993)
- Reduced green frog foraging success (Maertz 2005)
- Highly allelopathic (Inoue, 1992)
Characteristics of invasive species

- Grow and mature quickly
- Reproduce prolifically
- Effective dispersal techniques
- Often have defenses like toxins, spines, or thorns
Black locust  
*(Robinia pseudoacacia)*

- Spreads clonally by underground stems
- Reaches or exceeds tree canopy
- Thorns on stems, avoided by grazers
- Seeds and pods are toxic to horses
Wild parsnip (*Pastinaca sativa*)

Phytophotodermatoxic
- Burns skin on humans and animals
Poison Hemlock
(Conium maculatum)

Prohibited/Restricted
Characteristics of invasive species

❖ Grow and mature quickly
❖ Reproduce prolifically
❖ Effective dispersal techniques
❖ Often have defenses like toxins, spines, or thorns
❖ Outcompete natives for nutrients, water and space
Honeysuckle invasions slow growth of mature trees
Reed canary grass (*Phalaris arundinacea*)

- High seed production
- Extensive root and rhizome system
- > 6000 dormant buds/sq. meter
- Does well with high nutrients and sediments
- Excludes most other plants
Reed Canary Grass

Song Sparrow +
Sedge Wren +
Swamp Sparrow -

Blandings Turtles -
Purple loosestrife (*Lythrum salicaria*)

- Eliminates sedge meadow species
- Destroys habitat for meadow-obligate species
Common reed grass
(*Phragmites australis*)

- Spreads on open beaches and lake shores
-Eliminates beach nesting habitat
- Eliminates habitat for rare dune species
Characteristics of invasive species

- Grow and mature quickly
- Reproduce prolifically
- Effective dispersal techniques
- Often have defenses like toxins, spines, or thorns
- Outcompete natives for nutrients, water and space
- Alter soil chemistry and structure
Legumes increase soil nitrogen, favoring invasives

Yellow Sweet Clover

Black Locust

Kudzu
Garlic Mustard  (*Alliaria petiolata*)

- Decreases beneficial mycorrhizae
- Slows tree growth
- Prevents regeneration of native trees
- Decreases forest litter depth
Leaf Litter
- Very high in N + high pH
- Causes associated litter to decompose rapidly
- Retards success of native species
- Increases earthworm abundance

Common Buckthorn
Non-native earthworms prepare the soil for non-native plant invasions
THE WORM FACTOR

Invasive Worms Encourage Invasive Plants

Soil profiles of areas lightly and heavily infested with exotic earthworms

Lightly infested

Herbaceous vegetation
Diverse

Litter and duff layer
Thick and spongy

Heavily infested

Herbaceous vegetation
Sparse and simple

Litter and duff layer
Almost totally absent

(A) Layer usually distinct

(O, A, E) Layers all mixed

(E) Layer distinct

(B) Layer

(C) Layer
Glacial till

Diagram courtesy of the University of Minnesota Agricultural Experimental Station
Without earthworms

With earthworms

Photos and diagram courtesy of University of Minnesota Agricultural Experimental Station
Studies in New York show “rise and fall” impact of earthworms on native salamander populations

Nuzzo, et al (study in process)
Characteristics of invasive species

- Grow and mature quickly
- Reproduce prolifically
- Effective dispersal techniques
- Often have defenses like toxins, spines, or thorns
- Store food reserves (plants), or compete effectively for food
- Alter soil chemistry and structure
- Few insects and diseases
Native trees and shrubs support high abundance and diversity of arthropods.

Non-natives support very few arthropods.
Porcelain Berry
(Ampelopsis brevipedunculata)

Oriental bittersweet
(Celastrus orbiculatus)
Characteristics of invasive species

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- Reproduce prolifically
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- Often have defenses like toxins, spines, or thorns
- Store food reserves (plants), or compete effectively for food
- Alter soil chemistry and structure
- Few insects and diseases
- Tolerate harsh environmental conditions or high disturbance
Spotted knapweed (*Centaurea maculosa*)

- Can withstand disturbance, poor soils, drought
- High seed production
- Animals avoid eating it
- Emits toxins into the soil
- Possibly carcinogenic
Impacts of Spotted Knapweed
Fewer Grasshoppers in Knapweed vs. Native Habitat

- **Knapweed**
- **Native**

No. adults

- **GOMP**
- **OEDI**
- **CYRT**

weed effect

$P < 0.0001$
Delayed Breeding in Knapweed vs. Native Habitat

Week of nest initiation

No. nests

Knapweed
Native

weed effect

$P = 0.01$
Delayed Breeding Reduces Reproductive Success

songbirds have a very limited breeding season ... delays further shorten it
Reduced Reproductive Success Impacts Site Fidelity

fewer adults return between breeding seasons
Aquatic invasives affect habitat of fish and waterfowl

Vectors:
- Humans
- Waterfowl
- Water
Japanese Stilt Grass
(Microstegium vimineum)

- Annual grass, spread quickly
- Blankets forest floor
- Increases flammability
- Eliminates ground flora
Some animals increase with invasive species presence, and improve habitat for invasives

Multiflora rose
(Rosa multiflora)
Pieris butterflies lay eggs on garlic mustard, but larvae are unable to develop.
Vines – climb and kill saplings and trees
- Act as ladders for predators
- Pull down snags and live trees

Oriental bittersweet (*Celastrus orbiculata*)

Black swallow-wort (*Vincetoxicum nigrum*)
Invasive shrubs increase Lyme’s Disease

• Barberry and Amur honeysuckle infestations increase presence of deer ticks infected with Lyme’s disease
Invasiveness varies due to:

- Location
- Habitat type
- Disturbance history
- Urban vs. rural – proximity to propagules
- Invasive characteristics of each species
- Combination of these and other factors…
Vectors for Plant Dispersal:

- Sales and intentional introduction
- Contaminants in ag products (livestock, hay, seed)
- Forestry operations
- Transportation corridors
- Recreation
- Wildlife
- Water and wind
What land managers can do:

- Prevent spreading seeds or other plant parts
- Learn to identify species likely to be found – BEFORE they are a problem
- Walk the land to monitor for infestations
- Prioritize species, areas and control efforts
  – Learn and follow recommended control methods
  – Follow-up monitoring
  – Plan restoration/planting carefully
Prioritizing Control Work

1. Prohibited Species – Report and arrange to prevent seed set and spread wherever ever found
2. New species/populations for your area
3. Infestations in important areas
4. Populations adjacent to important resources (rivers, parks, natural areas)
5. Populations that might spread to new areas if not controlled

Oriental bittersweet
Japanese hops (Humulus japonicus) Prohibited/Restricted
Tall Manna Grass
*(Glyceria maxima)*

*Prohibited/Restricted*
Weed Increase Over Time and Control Potential

Prevention or Eradication simple

Eradication feasible

Eradication unlikely, intense effort required

Local control and management only

Public awareness typically begins

Introduction

Detection

Absent or off-site

few locations

Many locations

At or near biological potential

Acres Infested

Control Costs

Time
Control Methods

- Prescribed burn
- Pull
- Mow
- Leaf herbicide application
- Cut, treat stump
- Biological controls
Prescribed Burning

- Knocks back, but rarely kills brush and cool season grasses.
- Encourages warm season prairie grasses and forbs.

Caution!
Use carefully if controlling biennials.
Legume seeds are scarified and germination increases.
Bare soil may increase germination.
Burning with a propane torch
Pull

• Wear gloves.
• Be sure to get entire root.
• Breaking off the top may result in resprouting.
• Limit pulling to smaller patches.
• Pull before flowering or be sure to dispose of flower tops and viable roots/stems.
• Use leverage tools help to pull small trees and shrubs.
• Caution: Pulling disturbs soil and may create an ideal bed for weed seeds!
Dispose of carefully
- Burn or bury where possible
- Compost only if no seeds have formed
- Landfilling allowed for any ‘Prohibited’ or ‘Restricted’ plants
Mow

- Slows spread, but doesn’t kill most plants.
- Keeps brush from dominating grasslands.
- Mow just before the flowers open to prevent seed development and dispersal.
- May be necessary to re-mow several times a year.
Cut, then treat stump

• Herbicide is used to prevent resprouting.
• Best done in early fall to late winter to transfer herbicide to the roots.
• Apply only on the cut stumps.
• Use the correct type and rate of herbicide.

Photo by James H. Miller
Foliar Herbicide Application

- Follow label instructions exactly.
- Must be applied during growing season.
- Use sprayer, sponge applicator, wick, etc.
- May require multiple applications; effects may not be seen till next growing season.

Caution!

Avoid spraying on windy days--Non-target plants may be impacted

Spray success affected by timing, water ph, additives needed, weather, etc.
Plants with Biological Control Agents

Agents currently available for:
- Purple loosestrife
- Leafy spurge
- Spotted knapweed
- Eurasian water milfoil
- Multiflora rose
- Musk thistle

Agents being developed for:
- Garlic mustard
- Buckthorns
- Phragmites
- Tansy
- Japanese knotweed
- Swallow-worts
What we would like you to do...

For prohibited species:

• Verify the species (voucher or photo)
• Gather necessary info
• Report to Central Office:
  – Email- INVASIVE.SPECIES@WI.GOV
  – Phone- 608-267-5066

And possibly...

• Talk with landowner/land manager
• Assist with getting controls done
• Ensure follow-through control and monitoring
34 counties covered
9 more with interest
29 left to go
How can CWMAs work with you?

• Help prioritize work efforts
• Share grants, tools and resources
• Conduct staff training
• Assist with inventory work
• Coordinate data collection
• Assist with prohibited plant control
Mapping Invasive Plants

Maps and photos currently available:
UW Madison Herbarium
  www.botany.wisc.edu/wisflora/
UW Stevens Point Herbarium
  wisplants.uwsp.edu/WisPlants.html
Great Lakes Early Detection Network/NIISS
  www.GLEDN.org
EDMaps.org
Information and outreach

- WI Department of Natural Resources
  www.dnr.state.wi.us/invasives

- Midwest Invasive Plant Network
  www.MIPN.org

- Invasive Plants Association of WI
  www.IPAW.org