

# Introduction to Invasive Plants



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# What are invasive plants?

Invasive plants are non-native species that have been introduced to areas outside of their native range, where they often thrive and out-compete and overtake endemic plant communities.



# What makes them invasive?

- Rapid growth to maturity & reproduction
- Lack natural enemies or pests in new ecosystem
- Highly successful seed dispersal, germination, and colonization
- Disperse over wide distances
- Rampant vegetative spread
- Compete aggressively for resources
- High cost to remove or control
- Tolerate variety of habitats



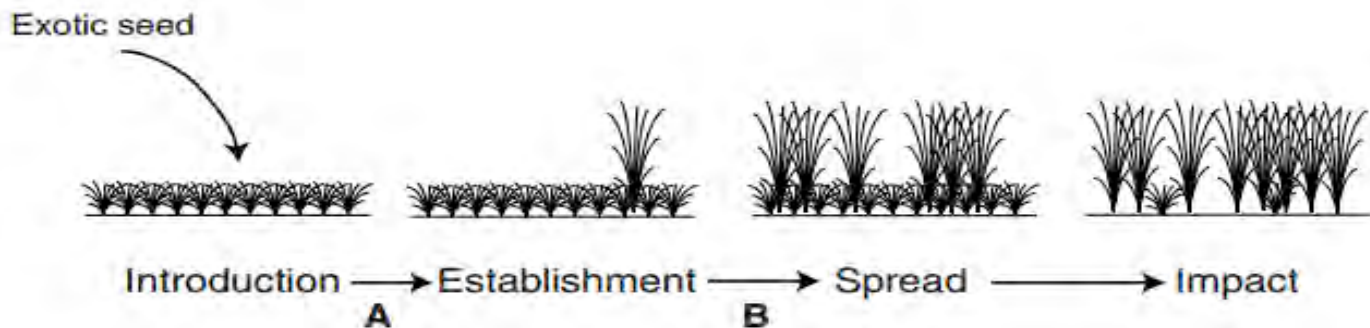
# How are they spread?



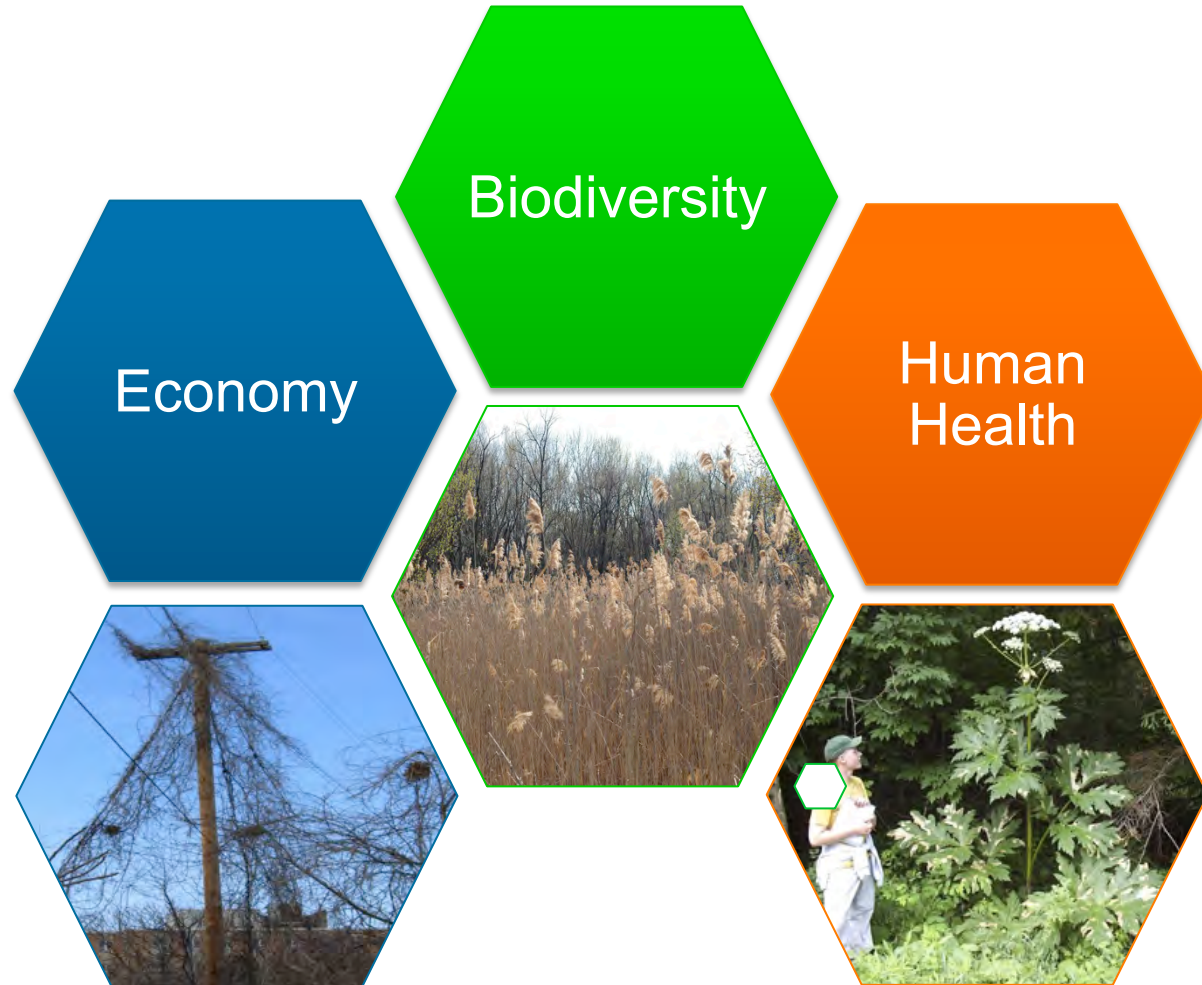
# Invasion!

## Invasion Process

- **Pathway**
  - Usually human mediated
- **Introduction**
  - When species arrives to an area beyond native boundary
- **Establishment**
  - If/when species survives, reproduction has to occur without human intervention
- **Invasion**
  - When measurable environmental & economic impacts occur



# Why do we care?



# Biodiversity

- Biological invasion is second to habitat destruction as the greatest cause of species endangerment and global biodiversity loss.
- Aquatic & terrestrial invasive species have contributed to the decline of half of imperiled species in the U.S.
- 400 of the 958 species are listed as threatened or endangered under the Endangered Species Act as a result of competition with, or predation by, invasive species.



# How are ecosystems affected?

- Displace native species
- Loss of habitat
- Alters ecosystem processes
- Change soil chemistry
- Overtake/kill native species
- Lower native species diversity





# Economic Impacts

- **Estimated damage & control costs of aquatic and terrestrial invasive species in the U.S. is more than \$137 billion annually (This is more than the combined total of all other natural disasters!)**
- **Impact open space and recreational areas**
- **Infrastructure impacts (i.e., downed powerlines)**
- **Power companies spend \$1.5 million controlling kudzu in the southeastern U.S.**



# Invasive Plants in MA

- MA Invasive Plant Advisory Group (MIPAG)  
<http://www.massnrc.org/mipag/>
- 35 **invasive** species
- 29 **likely invasive** species
- 3 **potentially invasive** species
- 19 species don't currently meet the invasive criteria but are being monitored



**Massachusetts** Invasive Plant Advisory Group

>> Home: About the Group  
>> Members  
>> Publications  
>> Contacts

Annotated Species Lists:

- Invasive (35)
- Likely Invasive (29)
- Potentially Invasive (3)

Not Currently Meeting Criteria (19)

Criteria

Definitions

Species Reviewed:

- Listed Alphabetically
- Listed by Category

Massachusetts Invasive Plant

About the group

The Massachusetts Invasive Plant Advisory Group [MIPAG] is a group of organizations and professionals concerned with the control of invasive plants. The group began in early 1995 as an outgrowth of an Invasive Plant Advisory Committee (now known as the Massachusetts Invasive Plant Advisory Group) charged by the Massachusetts Executive Office of Environmental Affairs with the task of advising the Commonwealth regarding which plants are invasive and how to control them.

MIPAG members represent research institutions, non-profit organizations, state and federal agencies. Because of this diversity of expertise, the group will encourage a cooperative effort among everyone concerned with the threat to the Commonwealth of invasive plants.

- [The group's work](#)
- [Funding and coordination](#)
- [Contacts](#)
- [Members](#)
- [History of MIPAG](#)

The group's work

MIPAG defines invasive plants as "non-native species that have established self-sustaining populations in Massachusetts, causing economic or environmental damage and becoming dominant and displacing native species." MIPAG has adopted this definition and a set of biologically-based criteria to identify plants suspected to be invasive in the state. Existing lists of invasive plants in the state are available on the MIPAG website.

# Invasive Plant Atlas of New England (IPANE)



Invasive Plant Atlas of New England



Home

Report Sightings

Distribution Maps

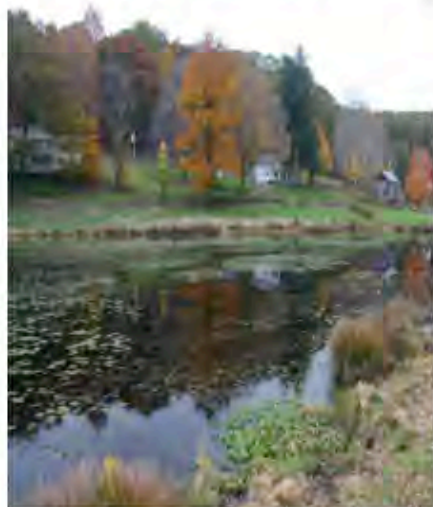
Species Information

Tools & Training

My EDDMaps

About

## Invasive Plant Atlas of New England



The Invasive Plant Atlas of New England's (IPANE) mission is to create a comprehensive web-accessible database of invasive and potentially invasive plants in New England that will be continually updated by a network of professionals and trained volunteers. The database will facilitate education and research that will lead to a greater understanding of invasive plant ecology and support informed conservation management. An important focus of the project is the early detection of, and rapid response to, new invasions.

### News

News from the IPANE Blog

## Statistics

95,006 County Reports

53,070 Point Reports

862 Species

## Recent Reports in IPANE

- ✓ winter creeper by Julie Richt in Berkshire County, Massachusetts
- ✓ by Andrew Mauch in Belknap County, New Hampshire
- ✓ Japanese knotweed by Doug Sullivan in Sullivan County, New Hampshire
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# Examples: Invasive Species



■ Purple Loosestrife



■ Phragmites



■ Yellow iris



■ Oriental bittersweet



■ Autumn olive



■ Japanese knotweed

# Examples: Invasive Species



■ Honeysuckle



■ Black Swallowwort



■ Garlic Mustard



■ Reed Canary-Grass

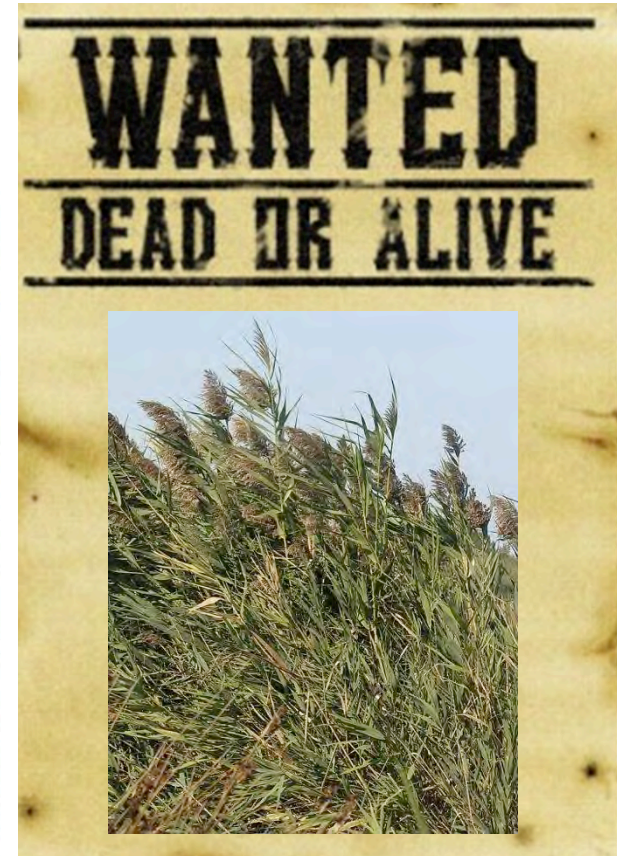
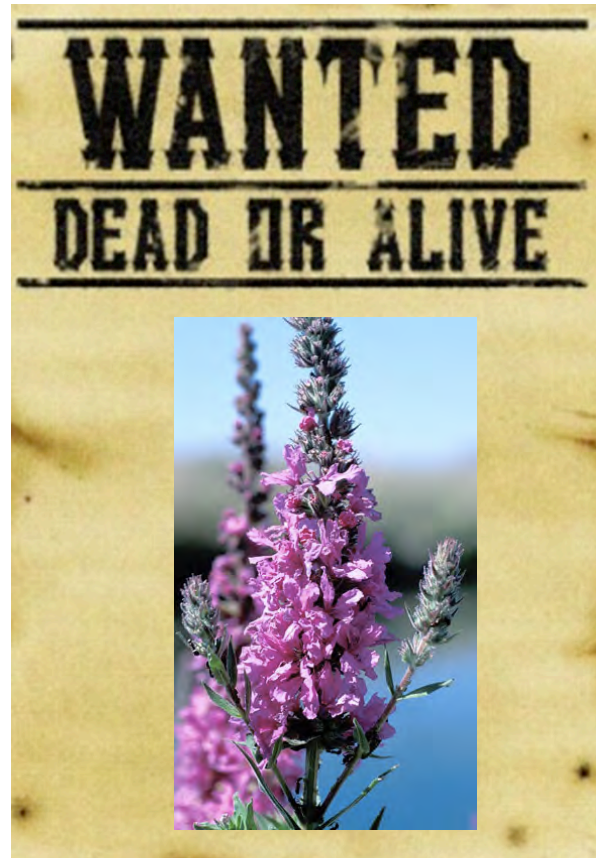
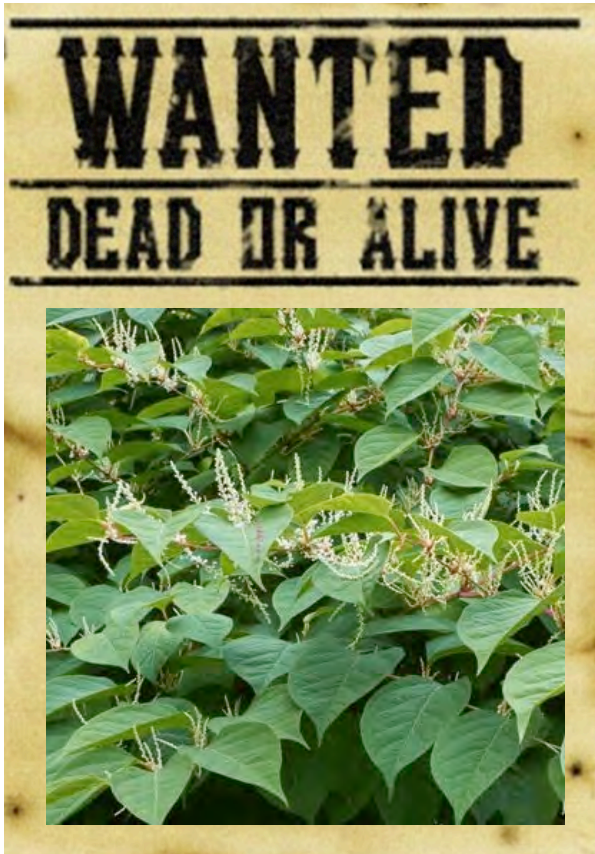


■ Winged Euonymus



■ Multiflora Rose

# Our Regional Targets



# Purple Loosestrife (*Lythrum salicaria*)

- Perennial herb or sub-shrub from Europe
- Grows in full sun to partial shade
- Needs open, moist soils
- Forms dense stands unsuitable for wildlife
- Displaces native wetland plants
- Tolerates shallow flooding



Photo: watershedcouncil.org

# Purple Loosestrife

- Purple flowers forming a tall spike
- Square stems with 4 to 6 sides
- Lance-shaped leaves
- Opposite, alternate, or whorled leaves
- One plant can produce up to 1 million seeds / year
- Grows 2 to 7 feet tall

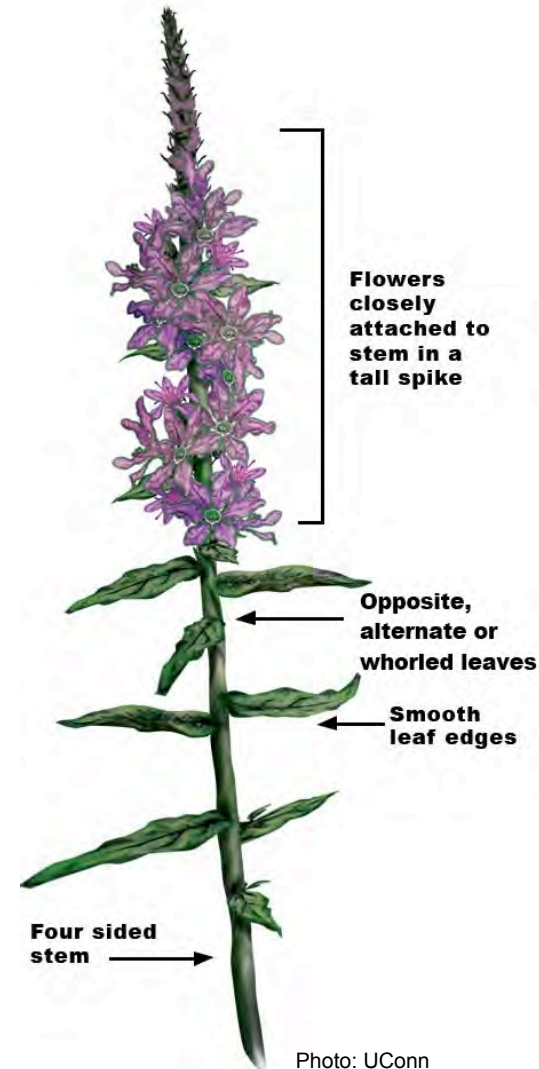


Photo: UConn



# Purple Loosestrife



# Purple Loosestrife

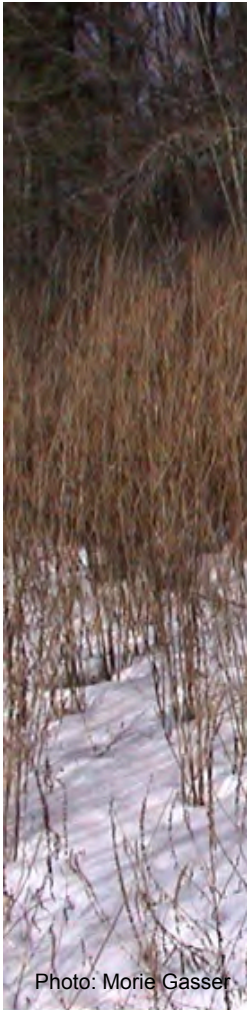


Photo: Morie Gasser



# Purple Loosestrife



# Common Reed (*Phragmites australis*)

- Tall perennial grass
- Tolerates freshwater & brackish conditions
- Forms dense monotypic stands
- Copious seed production



Photo: wikiwand.com

# Phragmites

- Spreads primarily through rhizomes
- Grows up to 13 feet tall
- Long, narrow leaves 1.5” wide
- Large feathery purple inflorescences July – September then turn straw colored when mature



Photo: WisFlora



Photo: Chris Wahlberg

# Phragmites



# Japanese Knotweed (*Fallopia japonica*)

- Herbaceous shrub-like perennial
- Native to eastern Asia
- Seeds emerge 2 weeks after flowering
- Spreads vegetatively
- Rhizomes 30' long!
- Requires sunlight
- Normally doesn't grow in forest understory



# Japanese Knotweed

- Stems are hollow, smooth, & swollen at joints
- Broad leaves are oval, round, or heart-shaped & pointed tips
- Greenish-white flowers in August – September





# Japanese Knotweed



# Across the Pond...

## The Telegraph

Home Video News World Sport Business Money Comment Culture Travel Life W

HOME » FINANCE » PROPERTY

### Homeowner turned down for mortgage due to Japanese Knotweed in garden

A homeowner who tried to remortgage his £400,000 property had his application refused because of a type of weed in his garden.

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11:40AM BST 26 May 2010

### Homeowners who fail to control Japanese knotweed face criminal prosecution under new anti-social behaviour laws

Home Office guidance updated this week says people can be fined up to £2,500 for not controlling invasive plant in move designed to tackle problem in residential areas

 156   0  2  158  Email



# Eradication vs. Control

## ■ ERADICATION

- Attained when no target plants are detected in the initial infested area for 3 consecutive years
- Practical only for small populations/introduction phase
- Complete eradication often unlikely
- Restore site to full native conditions

## ■ CONTROL

- Reduce size of existing population
- Prevent additional spread
- More realistic goal
- Containment strategy



# Early Detection & Rapid Response

- **MONITOR** regularly to detect invasive plants before they establish
- **LEARN** to easily identify invasive plants
- **ENGAGE** others to help monitor
- **REMOVE** any newly detected plants before they become established



# Prioritization Techniques

- Identify Important Resources to Protect
- Identification of Priority Plants to Manage
- Density & Extent of Priority Species
- Accessibility & Location
- Level of Effort
- Surrounding Habitat Type & Quality
- Visibility & Outreach



# Prioritization

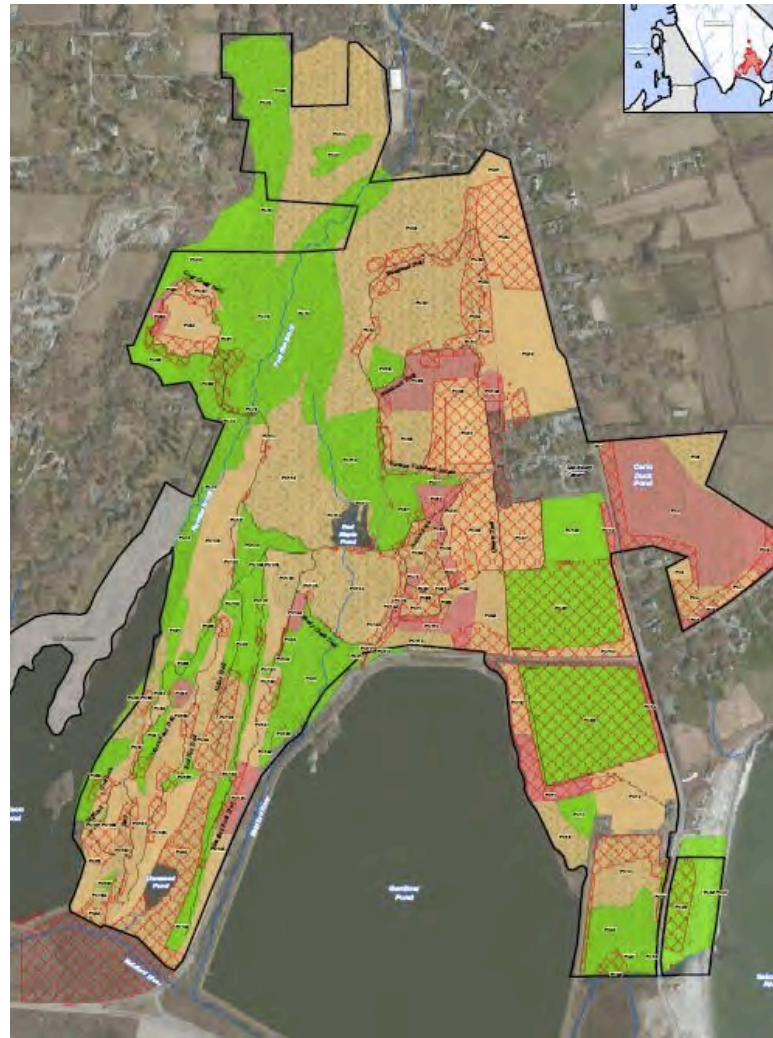
Prioritize populations for management based on:

1. The significance of the resource
2. The existence of effective control methods
3. The degree of invasiveness of the species
4. The potential for long-term control

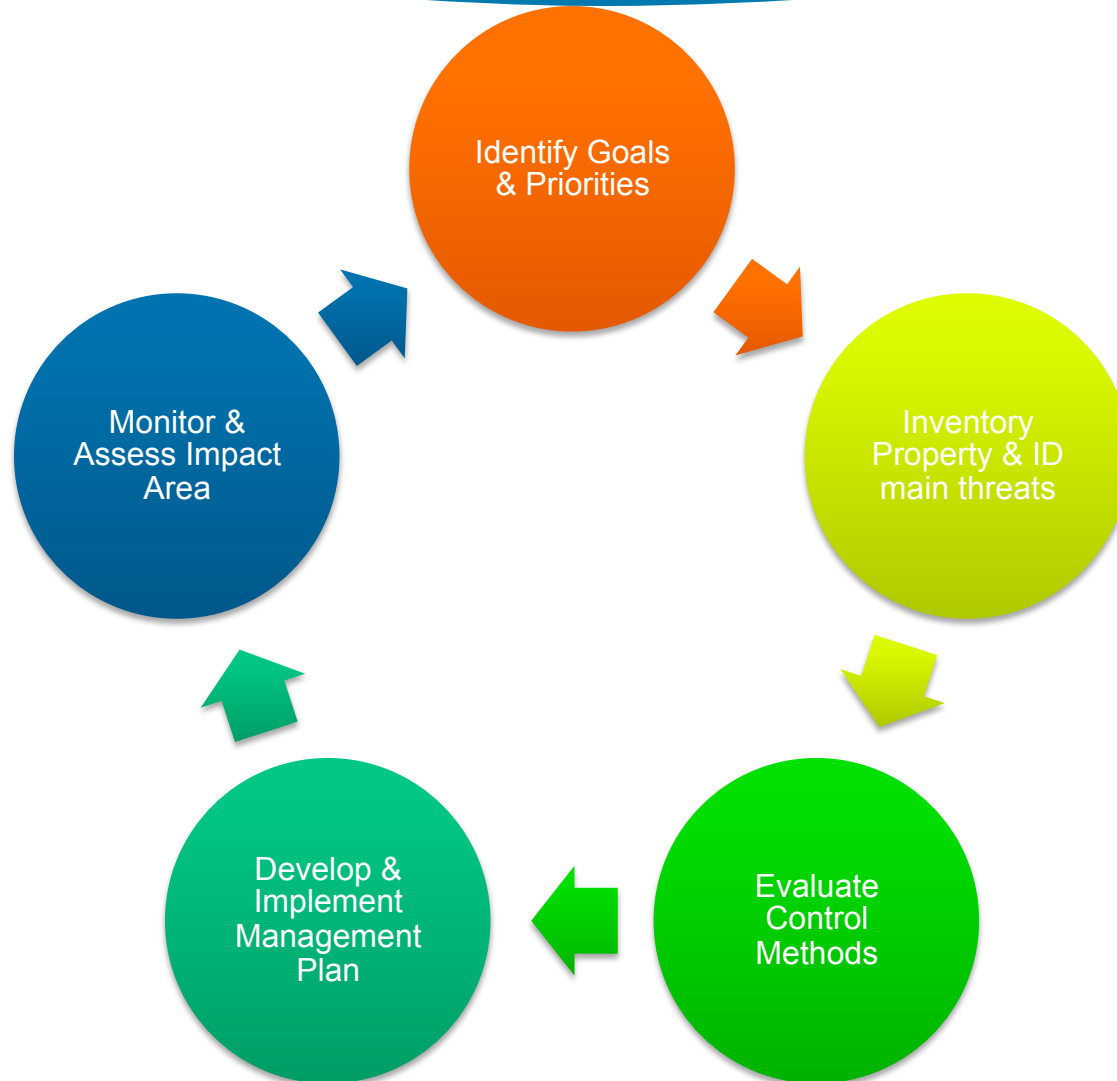


Photo: Laurie Sanders

# Prioritization



# Adaptive Management





# Management Methods

- **PREVENTION, PREVENTION, PREVENTION!**
- **Manual and/or Mechanical Control**
- **Chemical Control**
- **Manual & Chemical Controls**
- **Biological**



# Manual & Mechanical

## ■ Mechanical = Physical removal of invasive species

### Pros:

- Efficient control option
- Appropriate for sensitive areas
- Inexpensive

### Cons:

- Requires special equipment
- Site accessibility issues
- Re-sprouting may occur
- Requires follow up treatment & vigilant monitoring



# Weed Wrench

- Metal tool useful on small trees and shrubs
- 4 sizes → Heavy, Medium, Light, Mini
- Jaws clamp strongly on stem
- Lever plant out of the ground



# Root Talon

- Effective on shallow rooted plants and saplings
- Lightweight alternative to weed wrench
- Shaped like a pick-axe and easily transportable



# Hand Pulling

- Effective on seedlings
- Practical for small herbaceous plants & aquatics
- Pull from base of plant to remove roots



# Mowing & Cutting



# Chemical Management

- Application of herbicide
- Cut-stem method
- Foliar spray
- Injection or “Bloody Glove”

## Pros:

- Most effective and efficient in most cases

## Cons:

- Labor intensive
- Requires specialized training/licenses
- Requires repeated applications
- Inappropriate in sensitive areas



# Other Forms of Control

## ■ Biological

- Introduction of biological agent from invasive species' native range

## ■ Ecological Control

- Impact competition for light and soil resources

## ■ Prescribed Burning

## ■ Water fluctuations

## ■ Prescribed Grazing





# Disposal



University of Connecticut

College of Agriculture and Natural Resources  
Department of Plant Science and Landscape Architecture



## Guidelines for Disposal of Terrestrial Invasive Plants

Produced by:  
The Connecticut Department of Energy and Environmental Protection and the University of Connecticut, 2011

### INTRODUCTION:

Efforts to control invasive plants may generate large amounts of plant material and soil or sediment containing viable parts. This material must be appropriately managed or it could contribute to the reestablishment and spread of the species at the controlled site, the disposal site or landfill, or anywhere in between or beyond. In many cases, plants may regrow in future years. It is very important to monitor sites after control efforts to prevent invasive plants from reestablishing and re-invading the area. In general, it is best to control plants early in the season, before they begin to flower. In some cases, fruits and seeds can continue to mature even on plants that have been uprooted, so it is important to check plants for flowers before deciding on a disposal option. It is advisable to leave plants controlled by herbicides in place instead of removing them.

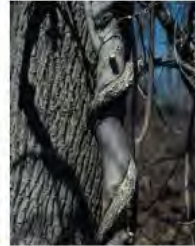
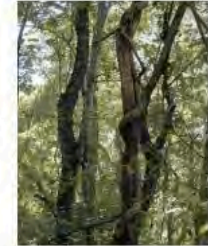
This document focuses on the disposal of invasive plant material after control work takes place and does not include information about invasive plant control. Once control activities have concluded, please use these general guidelines to dispose of invasive plant materials as safely and effectively as possible. Visit the website of the Connecticut Invasive Plant Working Group ([www.hort.uconn.edu/cipwg](http://www.hort.uconn.edu/cipwg)), use other resources, or ask a gardening or landscape professional for advice and information on controlling invasive plants on your property. Additionally, remember that each situation is unique and this document is intended only as a basic guide.



A purple loosestrife invasion in Wethersfield, CT. Photo by Donna Ellis.

### TREES, SHRUBS, AND WOODY VINES

The best time to dispose of invasive plants is before plants flower and produce seed. After flowers, fruits, or seeds develop, minimize movement of the plants to prevent unnecessary dispersal. Leave plants on site if possible. Do not compost plants that are actively flowering or fruiting and do not bring to a transfer station, compost site, or brush processing site that may compost or mulch the material.



Asiatic bittersweet, a woody vine, can damage trees as it grows. Photos by Donna Ellis (left) and Les Mehrhoff, IPANE (right).

Method	Description
<b>Air dry</b>	<b>Plant development stage: Prior to flowering.</b> Small seedlings can be pulled and left with roots exposed to dry out. This material can be left on site or can be composted once it is fully dead and dried.
<b>Chip and compost</b>	<b>Plant development stage: Prior to flowering.</b> Chip and use as mulch on site, or add to compost once fully dead and dried. <b>If during or after flowering,</b> chip but do not compost. Leave on site and monitor. Do not send to a commercial or municipal compost site.
<b>Construct brush piles</b>	<b>Plant development stage: Prior to flowering.</b> Consider using larger woody plants to construct brush piles for wildlife habitat. Pile all material into a single location. Visit <a href="http://www.ct.gov/deep">www.ct.gov/deep</a> (search "Brush Piles") for information about building brush piles from the Connecticut Department of Energy and Environmental Protection. Make sure all material is <b>fully dead and dried</b> before use. Note: brush piles may create ideal habitat for mice and ticks. Do not construct brush piles near areas of human habitation. <b>If during or after flowering,</b> cover brush pile to prevent spread by birds, etc.
<b>Incinerate</b>	<b>Plant development stage: During or after flowering.</b> Incineration of material may be a viable option if it can be bagged and transported securely to an incinerator. Contact your town to determine if your regular solid waste/trash is incinerated.
<b>Gather material and burn</b>	<b>Plant development stage: During or after flowering.</b> Burn <b>only</b> in accordance with all federal, state, and local laws and ordinances and permits. Monitor weather conditions prior to burning to avoid burn bans. See "Seed Mats"

[http://cipwg.uconn.edu/wp-content/uploads/sites/244/2014/01/InvasivePlantDisposal\\_2014-01-23.pdf](http://cipwg.uconn.edu/wp-content/uploads/sites/244/2014/01/InvasivePlantDisposal_2014-01-23.pdf)

# Monitoring

- Develop monitoring schedule as part of management plan
- Provides data needed to determine effectiveness of control and necessary follow-up treatment
- Establish fixed photo points to record changes over time
- Inspect once annually during the growing season at a minimum



# Restoration

- Use restorative plantings for large-scale management areas
- Native plants will limit resources available for invasive re-establishment
- Select native plants that exist in surrounding habitat
- Smaller areas may not need restorative plantings
- Plantings can be selected to target certain habitat goals (i.e., birds, butterflies, mammals)



# Management Considerations

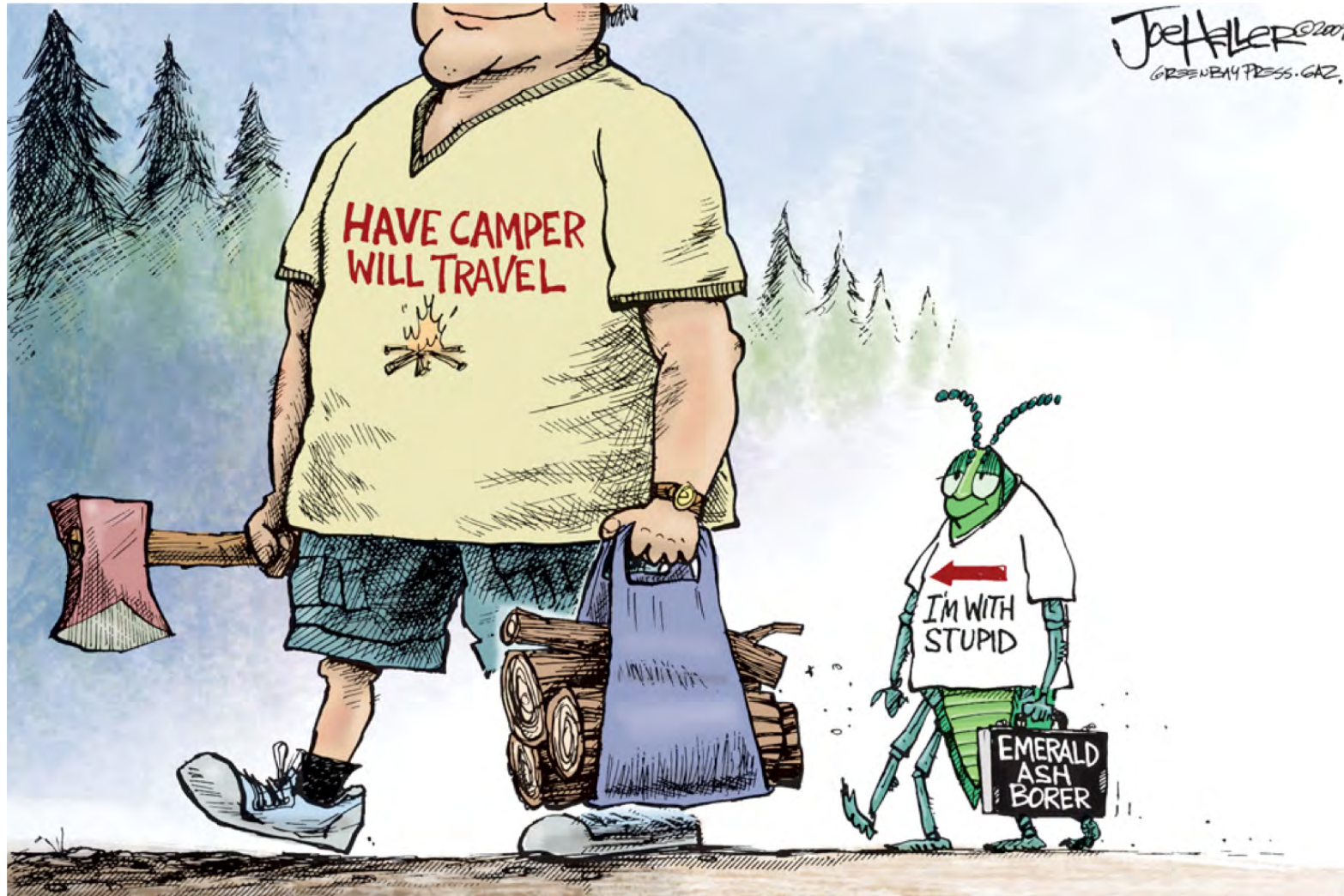
- **Wetlands & Open Water**
  - Possible herbicide restrictions
- **Sensitive/Rare Species**
  - Mowing considerations
  - Herbicide restrictions
- **Desirable species (native plants)**
  - Select removal methods carefully
- **Regulatory implications**
  - Wetlands Protection Act (310 CMR 10.00)
  - Local Ordinances/Bylaws & Policies
- **Always consult with the local Conservation Commission prior to working in or near wetlands**

# Resources

- **Connecticut Invasive Plant Working Group (CIPWG)**
  - <http://cipwg.uconn.edu>
- **MA Audubon**
  - <http://www.massaudubon.org/learn/nature-wildlife/invasive-plants>
- **USDA**
  - <http://www.invasivespeciesinfo.gov/plants>
- **MIPAG**
  - <http://www.massnrc.org/mipag/>
- **IPANE**
  - <https://www.eddmaps.org/ipane/>



# Questions?



# Contact Information

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