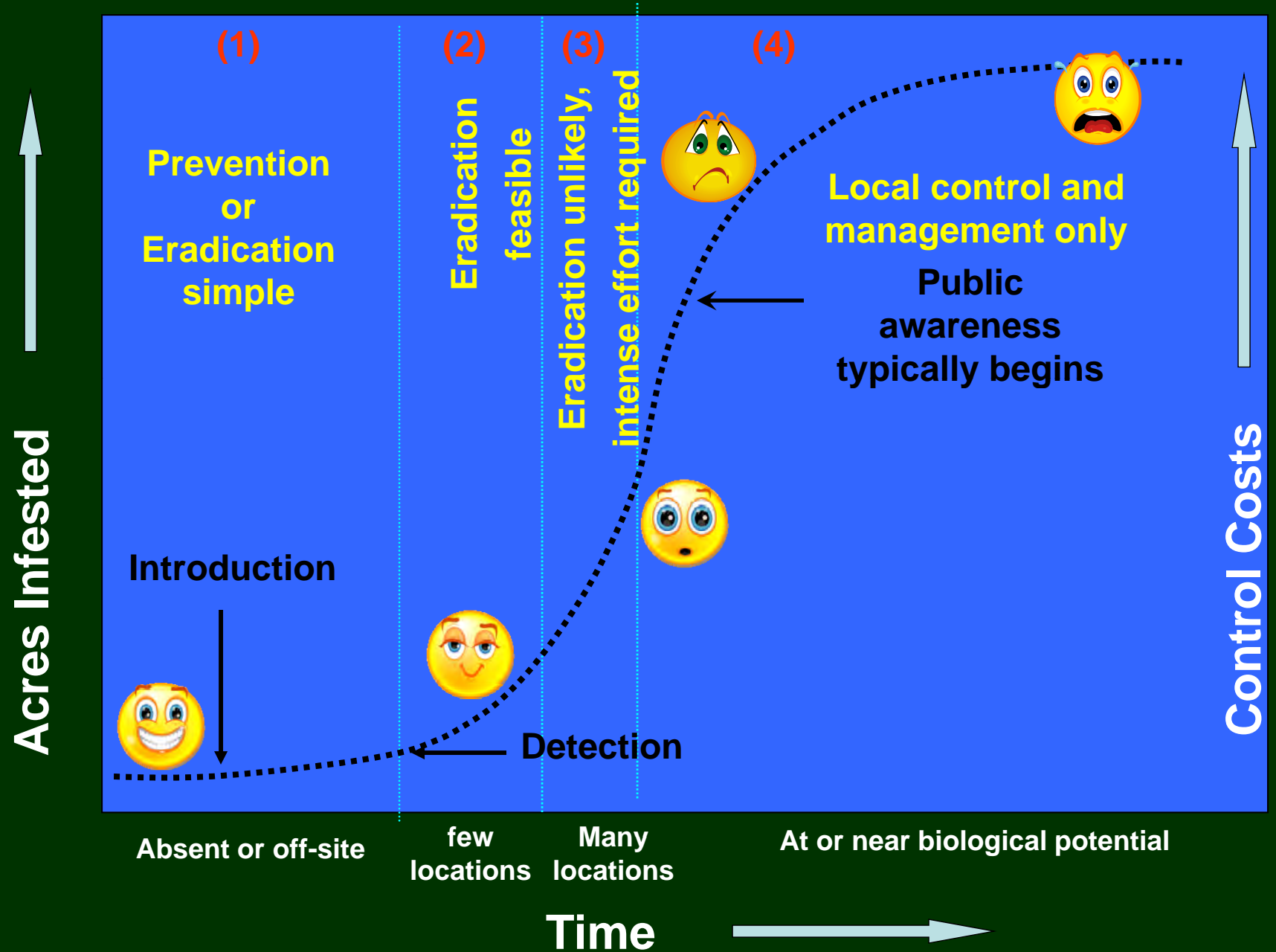


*Developing Early Detection Programs & Networks
to Abate the Invasive Species Threat*

Mandy Tu, Ph.D.
Contractor (currently)

Center of Invasive Plant Management
& USFWS National Wildlife Refuge System

Weed Increase Over Time and Control Potential

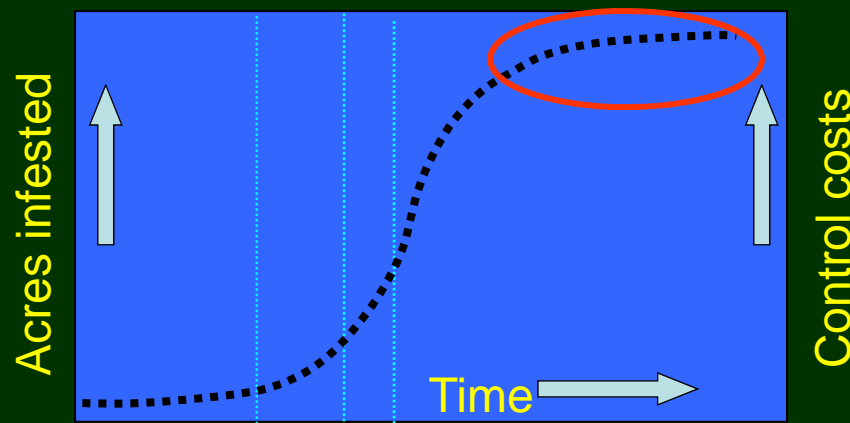


Modified from Hobbs & Humphries 1995

What many of us have been doing:

Invasive Plant Control & Management

- Work parties at local preserves
- Raise awareness: education & outreach

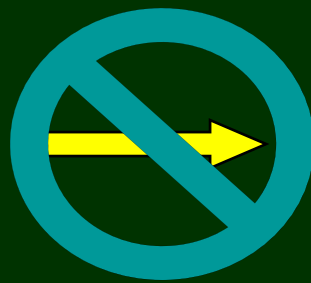
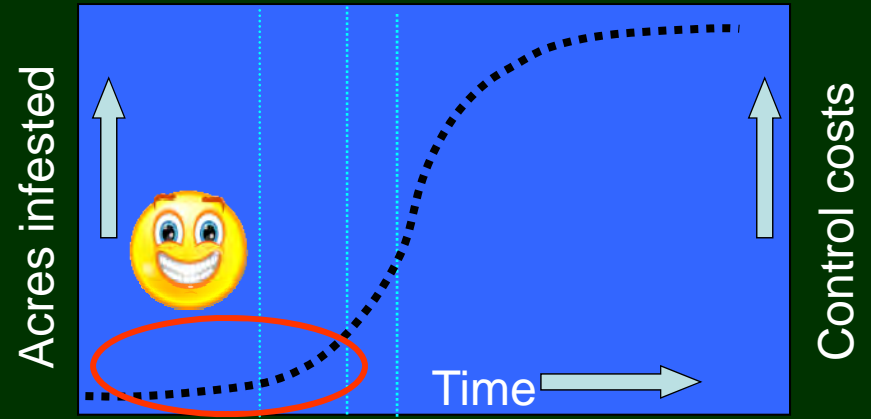


- Beneficial for high quality sites
- Creating “demonstration” sites

BUT...not being effective over the long-term and at large scales!

Most Effective:

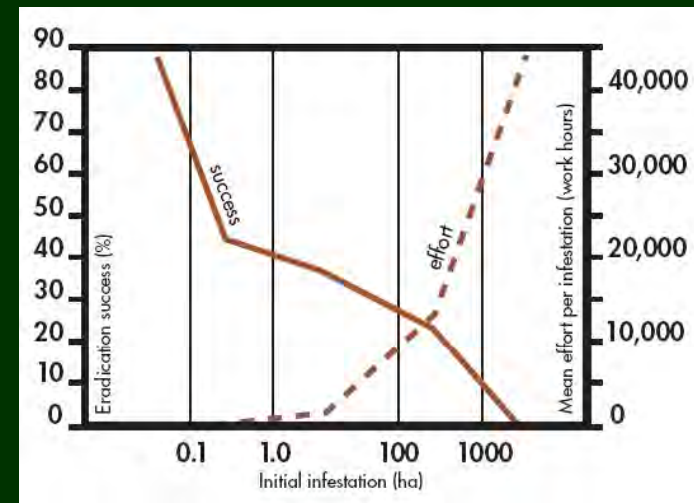
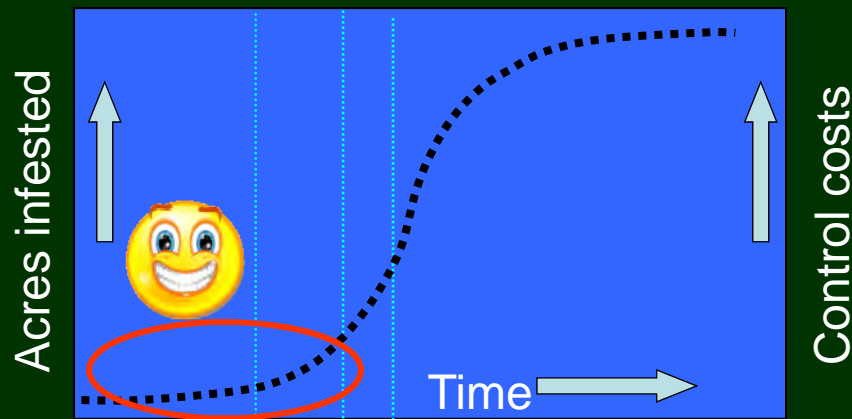
1. Prevention
2. Early Detection & Rapid Response!



Yellow starthistle
(*Centaurea solstitialis*)

Justification for doing EDRR

“...following prevention, EDRR is the most efficient and effective way to minimize impacts from invasive species...”



Hobbs & Humphries 1995; Leung et al. 2002; Rejmanek & Pitcairn 2002; Chornesky et al. 2005; many others

Necessary Steps in a EDRR Network:

A National Early Detection and Rapid Response System for Invasive Plants in the United States

Conceptual Design

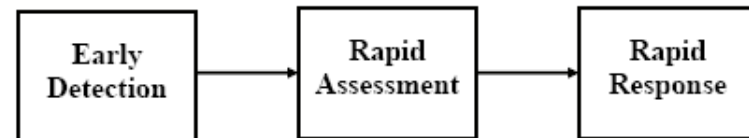


Crupina vulgaris infestation (foreground and inset)
Photos by C. Roche

Federal Interagency
Committee for the Management of
Noxious and Exotic Weeds

Washington, DC
September 2003

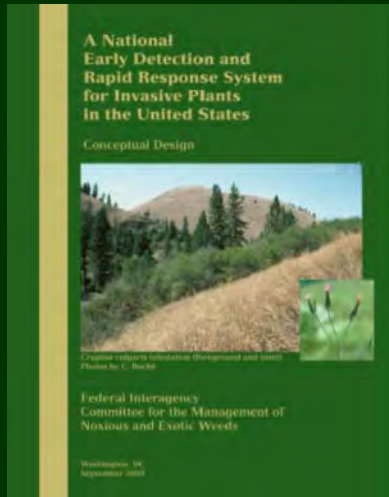
1. Detection and Reporting
2. Identification and Vouchering
3. Rapid Assessment
4. Planning
5. Rapid Response



FICMNEW 2003

<http://www.fws.gov/ficmnew/>

Necessary Steps in a EDRR Network:



1. Detection and Reporting:

A. Establish Early Detection Network

Professionals, amateurs, volunteers, enthusiasts

B. Develop a Volunteer Training Program

C. Create List of Target Species

D. Establish Toll-free Number & Website

Early Detection & Rapid Response!

Model programs:

1. At the site and/or CWMA scales
2. At the statewide or regional scales

Early Detection & Rapid Response!

Model programs:

- 1. At the site and/or CWMA scales*
- 2. At the statewide or regional scales**

National Park Service

Lassen Volcanic National Park

Park Botanist...



- Determined what was there & not already there
- Determined a short watch-list
- Made a 1-page color handout with photos
- Distributed to maintenance workers & trailcrews
- Report back to me!

Simple, but effective EDRR!

The Nature Conservancy - Oregon *Weed Watchers Program*

- Started in late 2006
- Modeled after TNC's MD/DC Chapter's Weed Watchers-Weed Busters Program
- Pilot for 5 TNC preserves using an Adopt-a-Preserve approach
- Expand in scale & scope after pilot year to regional & statewide scales



The Nature Conservancy - Oregon *Weed Watchers Program*

Goals:

To locate and manage recently emerged infestations of invasive exotic plants on high priority sites in western Oregon with assistance from an extensive network of volunteers.

Provide trainings, tools, materials, etc. to local CWMAs, and to also serve as a model (train-the-trainer) for local CWMA partners to start their own EDRR programs!



The Hit List

- We determined the most threatening invasive, exotic species to natural areas in western Oregon and developed short watch lists on which to focus
- The list helped us:
 - Prioritize our management efforts, and
 - Prevent volunteers from feeling overwhelmed by a large number of plants to identify



Weed watching tools and educational materials

- *Fact sheets*
- *Outreach materials*
- *Species lists for each CWMA*
- *Ppt presentations*
- *and more...*

WESTERN INVASIVES NETWORK
Early Detection and Rapid Response

Home | Invasives | Education | Tools | Student Partnerships | Report an Invader | Forum

Welcome to the Western Invasives Network Early Detection and Rapid Response to Invasive Species Website!

This website aims to promote Early Detection and Rapid Response (EDRR) to invasive species in Northwest Oregon and Southwest Washington by providing tools and information useful for detecting and reporting new invasive plants in the Northwest Weed Management Partnership (NWWMP).

On this site you will find identification and management information on plants targeted for early detection by each Cooperative Weed Management Area belonging to the Northwest Weed Management Partnership. Click on the map to learn about the invasive plants you can be looking for in your area. Please report the plants listed on this site to the 1-866-INVADER hotline.

Also featured on this site are educational materials from The Nature Conservancy's Weed Watchers Program, a forum to ask questions and share ideas, and a clearing house of links and information about building Early Detection and Rapid Response programs.

Content and design of this website was done through the **Partners in Prevention Initiative**, which engages students in invasive species science through a unique partnership between Western Invasive Network and students and teachers of McMinville High School and South Eugene High School. High school students designed and built this website, developed the

Forum
Need help with identifying a new plant invader? Have a question or a comment? Visit our **Forum** to chat with community members and learn more information.

<http://www.westerninvasivesnetwork.org/>

How it Works:

Weed Watchers...

- *Learn the weeds.*



- *Look for weeds.*



- *Document weeds.*



- *Report weeds.*



Weed Watchers
Invasive Plant Detection Report

Use this form as a reminder of the information that will be requested when you call (1-866-INVADER) or go on line (<http://www.weedmapper.org/>) to report an encountered invasive plant.

Weed Watcher (s) _____ Date _____

1) Species Found: _____

2) Estimate the number of Individuals/acres: _____

3) Growth Stage (circle one): Flower Fruit Vegetative

4) Relative Frequency (circle one): Spot Patch Solid Stand

5) Type of location (circle one):
Roadside Field Forest Riparian Aquatic Urban Other

1-866-INVADER

The Results...



We began to manage many infestations...



... on the land we protect!

What have we accomplished?

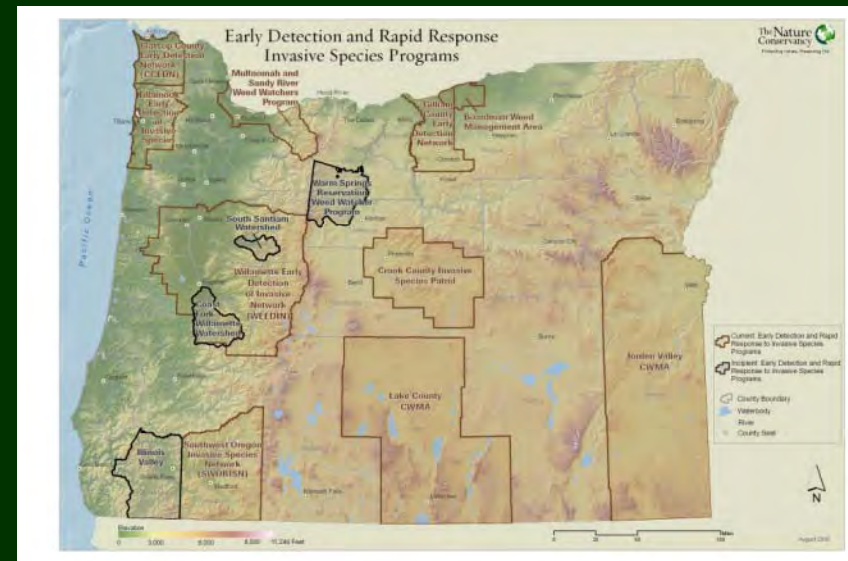
- From 2006-2009, 20 EDRR trainings workshops were held with 500+ people attending, representing at least 20 different agencies/organizations.
- Over 60 visit & hit reports were received from trainees. 24 (of those 60) were considered high priority for rapid response; 15 have been removed (and possibly locally eradicated) and 9 are actively being controlled...so far.
- At least 7 other agencies/organizations will be starting their own EDRR programs!
- Not just local control...but strategic, targeted control!

What have we accomplished?

Building the capacity of others...

- Statewide ID and reporting website
- Regional contacts (from CWMA's and Watershed Councils) identified for each region, that will assess, confirm, and carry-out the Rapid Response
- Train-the-Trainer events now being hosted by others.

The screenshot shows the Oregon Invasive Species Online Hotline website. The header features the Oregon state logo and the text "Oregon Invasive Species Online Hotline". The main content area is titled "Help stop the spread of invasive species in Oregon" and includes a "Report an Invader" button. Below this, there is a "Where Have the Invaders Been Found?" section with a map of Oregon showing various locations marked with red pins. The map includes a legend for "Current Early Detection and Rapid Response to Invasive Species Programs" and "Recent Early Detection and Rapid Response to Invasive Species Programs".

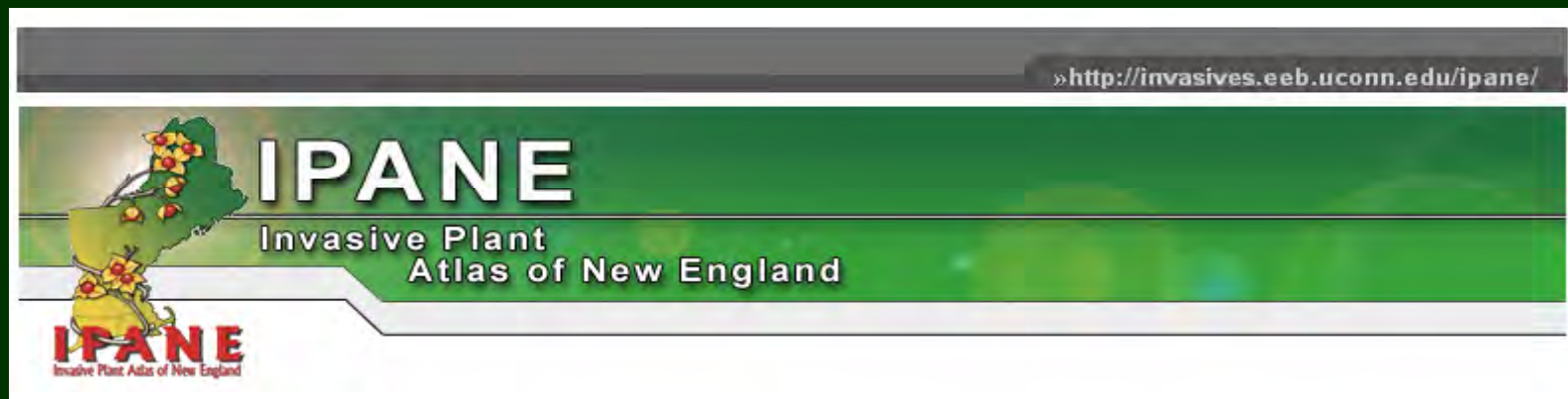


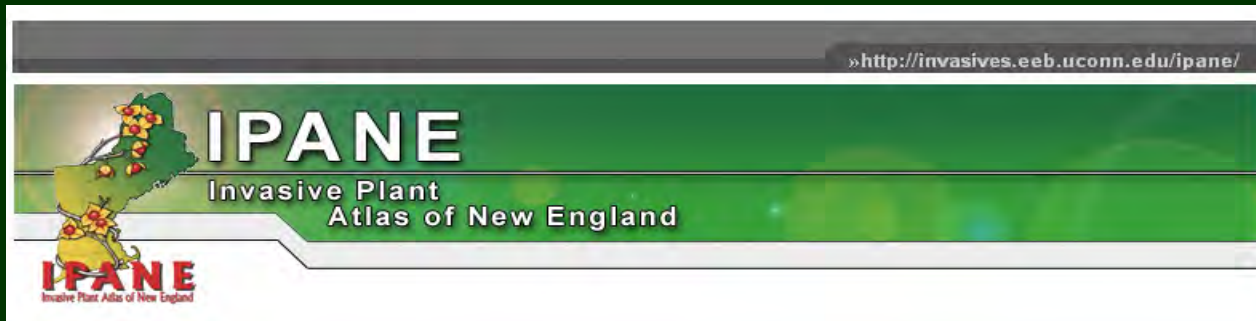
Early Detection & Rapid Response!

Model programs:

1. **At the site or CWMA scales**
2. *At the statewide or regional scales*

IPANE EDRR Network





Collaborative EDRR network involving 6 NE states! (Professionals, agencies, wildflower enthusiasts, etc.)

- Interactive regional database/website for viewing occurrences, extent of species, and weed id info
- Early Detection (watch) list of new invasives
- Volunteer training
- Reporting new occurrences

»http://invasives.eeb.uconn.edu/ipane/

IPANE

Invasive Plant Atlas of New England

NAVIGATION MENU

- Home
- Early Detection
- Catalog of Species
- Data & Maps
- Project Information
- Volunteers
- Related Links
- Noxious Weeds
- Discuss Invasives
- NE Plant Summit

Species List

[Early Detection](#) -> Species List (Scientific Names)

Early Detection List (Alphabetical by Scientific Name)

This is a list of Early Detection Species (EDS) for New England. This list is not meant to imply that all these species are EDS for each state. Rather, the associated table depicts which should be considered as EDS in each state. It is based on the biological potential of the species for widespread invasions into areas where it is not currently known. The list has been generated from a variety of different sources including herbarium specimens, published lists, literature, federal and state early detection efforts and the observations of numerous botanists and naturalists. The list is available in both scientific and [common](#) names. See [Catalog](#) for habitat information. Nomenclature is according to ITIS, the [Integrated Taxonomic Information System](#). This list supersedes all previous lists. **Newly discovered incursions of any of these species in states with fewer than 3 known occurrences should be reported immediately.**

Arthraxon hispidus (Thunb.) Makino	Hairy jointgrass
Butomus umbellatus L.	Flowerino-rush

Regional Early Detection List

»http://invasives.eeb.uconn.edu/ipane/

IPANE

Invasive Plant Atlas of New England

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Table by States

[Early Detection](#) -> Table by States and Life Forms

EARLY DETECTION SPECIES BY STATE

SPECIES	ME	NH	VT	MA	RI	CT
TREE						
Paulownia tomentosa	0	0	0	?	?	+
SHRUBS						
Lonicera maackii	0	0	0	+	0	+
Rubus phoenicolasias	0	0	0	+	+	+
HERBACEOUS PLANTS						
Butomus umbellatus	1	0	+	0	0	1
Cardamine impatiens	1	2	0	1	0	+
Cirsium palustre	0	H	0	H	0	0
Cynanchum rossicum	1	1	0	+	2	+
Froelichia gracilis	0	1	3	+	0	+
Glaucium flavum	0	0	0	+	+	H
Heraclium mantagazzianum	3	+	0	+	?	+
Impatiens glandulifera	+	0	?	+	0	H
Lepidium latifolium	0	0	0	+	0	+
Polygonum perfoliatum	0	0	0	0	1	2
Ranunculus ficaria	1	1	0	+	1	+
Senecio jacobaea	1	0	0	3	0	0
WOODY VINES						
Lonicera japonica	1	?	?	+	+	+
Pueraria montana subsp. lobata	0	0	0	2	0	2

Early Detection List by State



IPANE
Invasive Plant
Atlas of New England

IPANE
Share the Atlas of the Invasive

Home
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Catalog of Species
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Project Information
Volunteers
Related Links
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Discuss Invasives
NE Plant Summit

Records Database

Select one species from the list below:

By scientific name, or
 By common name

Scientific names:

- Butomus umbellatus
- Cabomba caroliniana
- Callitriche stagnalis
- Cardamine impatiens
- Carex kobomugi
- Celastrus hybrida
- Celastrus orbiculatus
- Centaurea biebersteinii

Select a task by clicking the radio button and then click "Submit Selection":

Formatted display as table
 Export as comma-delimited text file

Try our new beta version of Records Database:
<http://www.uconn.edu/corn.edu/cgi-bin/ipane.db2.pl>

Copyright ©2001 University of Connecticut

Records Database of Occurrences/Specimens

Records Database

Species you selected (scientific name): *Butomus umbellatus*

Note: Data may be incomplete.

Scientific name	State	County	Town (county subdivision)	Minor designation	Locality	Collection date	Habitat	Collector
<i>Butomus umbellatus</i>	VT	Chittenden	South Burlington	Queen City Park	Lake Champlain at mouth of Potash Brook	11/9/1963	lake shore	William D. Countryman
<i>Butomus umbellatus</i>	VT	Addison	Ferrisburg		South Slang; Little Otter Creek	6/15/1968	unspecified	Frank Conklin Seymour
<i>Butomus umbellatus</i>	ME	Androscoggin	Greene	Little Sabbattus Pond	north end of Sabbattus Pond near Hooper Brook Inlet	6/19/1999	pond	Susan Hayward
<i>Butomus umbellatus</i>	CT	Hartford	Hartford	Riverside Park	along Connecticut River	6/21/1978		Harry E. Ahles
<i>Butomus umbellatus</i>	VT	Franklin	Highgate	Highgate Springs	north on route 7 & Tyler Place over bridge	6/23/1965	unspecified	Roberta G. Poland
<i>Butomus umbellatus</i>	VT	Addison	Ferrisburg		South Slang of Little Otter Creek (at Lake Champlain)	6/24/1980	stream	G. E. Crow
<i>Butomus umbellatus</i>	VT	Franklin	Highgate		shore of Missisquoi Bay, Lake Champlain	7/11/1963		William D. Countryman

Records Database

Select the fields in which you are interested from the list below:

- State
- County
- Town (county subdivision)
- Minor designation
- Locality
- Longitude
- Latitude
- Collection date

Note: "Scientific name" will always be the first field.

Sort the records ascendingly by:

Genus, Species, and Collection date

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- NAVIGATION MENU
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Regional Maps

Select one species from the list below:

- By scientific name, or
- By common name

Scientific names:

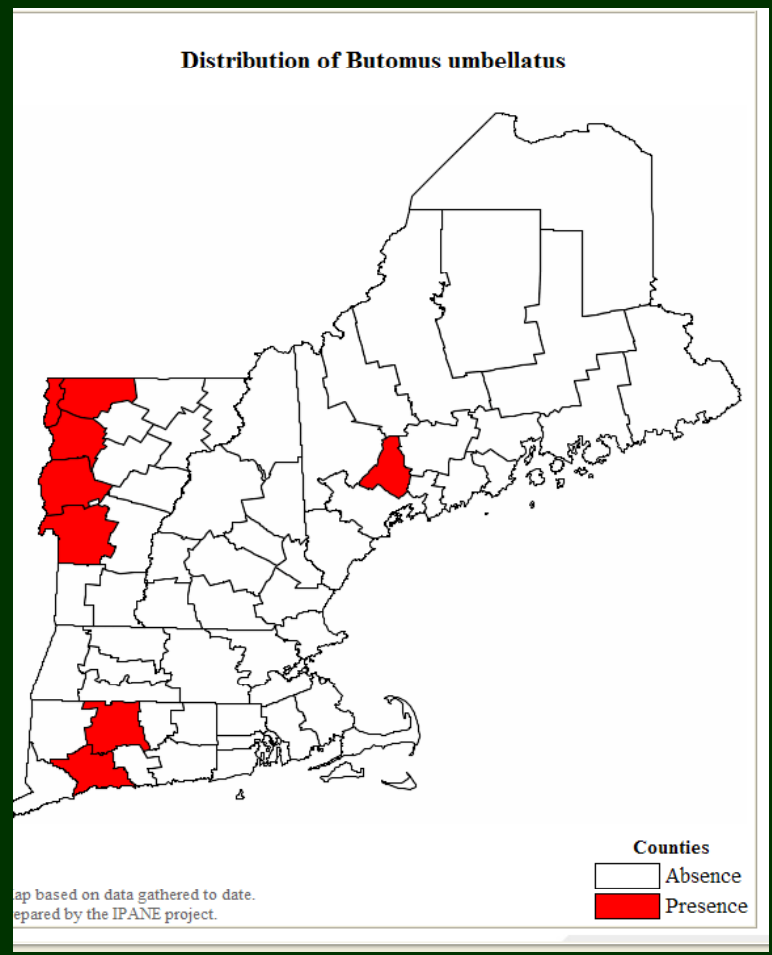
- Berberis vulgaris
- Bromus tectorum
- Butomus umbellatus**
- Cabomba caroliniana
- Callitriche stagnalis
- Cardamine impatiens
- Carex kobomugi
- Celastrus hybrida

Select a study area by clicking the radio button and then click "Submit Selection":

- The whole New England area
- One or more states
- One or more counties
- One or more towns (county sub-divisions)

Submit Selection


Distribution Maps... →



http://invasives.eeb.uconn.edu/ipane/

IPANE

Invasive Plant
Atlas of New England



Butomus umbellatus

(Flowering rush)

NAVIGATION MENU

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- Project Information
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Common Name(s) | Full Scientific Name | Family Name Common | Family Scientific Name | Images | Synonyms | Description | Similar Species | Reproductive/Dispersal Mechanisms | Distribution | History of Introduction in New England | Habitats in New England | Threats | Early Warning Notes | Management Links | Documentation Needs | Additional Information | References | Data Retrieval | Maps of New England Plant Distribution

COMMON NAME

Flowering rush

FULL SCIENTIFIC NAME

Butomus umbellatus L.


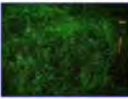





FAMILY NAME COMMON

Flowering rush family

FAMILY SCIENTIFIC NAME

Butomaceae

IMAGES

		
Flowers	Habit	Flowers
		
Fruit	Incursion	Roots
		
Habitat		

NOMENCLATURE/SYNONYMS

Synonyms: *Butomus umbellatus* f. *vallisnerifolius* (Sagorski)

..and Invasive Plant Identification Information

DESCRIPTION

[Botanical Glossary](#)

Butomus umbellatus is perennial, aquatic herb that grows on freshwater shorelines. It can be found in water several meters deep, and its flowering stem can reach up to 1m (3.3ft.) above the surface of the water. The 0.6-0.9m (2-3ft.) long ensiform leaves can be erect or floating on the water's surface. The leaves are three angled, fleshy and have twisted ends. The plants flower from the summer to the fall depending on the depth of the water. The flowers are arranged in a bracted umbel. The bracts are purple-tinged, and numerous flowers are on long, slender ascending pedicels. The flowers and sepals are 3-merous and are 2-2.5cm (0.8-1in.) in diameter. They can be white to deep pink, to purplish brown in color. The submersed form of this plant does not have flowers, and has narrow, long thin leaves. The flowers produce beaked fruits that are dark brown 1cm (0.4in.) long which split at maturity releasing the seeds. Often, the plant does not flower (as is the case with some populations in Connecticut) which makes its identification more difficult.

Page References Bailey 131, Crow & Hellquist 3, Fernald 92, Flora of North America 4, Gleason & Cronquist 632, Holmgren 602, Magee & Ahles 129, Newcomb 118. See reference section below for full citations.

SIMILAR SPECIES

Sparganium spp. (Bur-reeds)

The leaves of *Butomus umbellatus* and *Sparganium* spp. look similar when is not in flower. However, when *Butomus umbellatus* is in flower, they do not look alike.

For VOLUNTEERS: Training and reporting information

»http://invasives.eeb.uconn.edu/ipane/



IPANE

Invasive Plant Atlas of New England

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For Volunteers

[Become a volunteer!](#)

[Online Reporting Form](#)

[Instructions](#) for entering data online

Downloadable Field Forms (Please Print these files, or Save to your Computer.)
 Click here for the terrestrial form in [doc](#) or [pdf](#)
 Click here for the aquatic form in [doc](#) or [pdf](#)

[Calendar of Events](#)

[Report a Sighting](#) Please use this form (**in addition to your field form**) to alert us to the presence of early detection species or new locality for any IPANE species in a county or state (this will allow us to react quickly and look for your field form at this location).

[Discuss invasive species](#)

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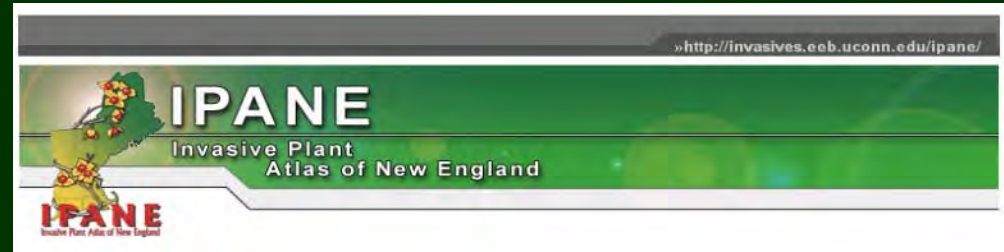
Report Sightings

Use this form to alert us to sightings of invasive species and activate our early detection network, or to ask questions of our experts. This is a communication tool: reports are not entered into our database from this form (a complete field form is necessary for inclusion in the database). Please attach a digital photograph if possible.

We require your name, a note to our staff, and either a e-mail address or a phone number.
 ** indicates a required field

Your Name **	<input type="text"/>
Your E-mail **	<input type="text"/>
Your Phone **	<input type="text"/>
Do you want to send a copy of this message to yourself?	<input type="radio"/> Yes <input checked="" type="radio"/> No
Your note to our staff **	<input type="text"/>
We can also accept pictures as further documentation. They must be either a (.gif, .jpeg, or .png).	<input type="text"/> <input type="button" value="Browse..."/>
<input type="button" value="Send message"/> <input type="button" value="Reset"/>	

IPANE Network:



- Really works at a regional-scale!!
- Involves multi-state collaboration & communication
- Trains lots of volunteers, more eyes on ground
- Involves local action

All volunteers who submit 10 field forms will receive the fashionable IPANE T-shirt!



Arizona Invasive Species Map

Invasive Species Information

Identify Information

Common Name	Scientific Name	County
Bermudagrass	Cynodon dactylon	Maricopa, AZ
red brome	Bromus rubens	Maricopa, AZ
red brome	Bromus rubens	Maricopa, AZ
red brome	Bromus rubens	Maricopa, AZ
red brome	Bromus rubens	Maricopa, AZ
buffelgrass	Pennisetum ciliare	Maricopa, AZ
red brome	Bromus rubens	Maricopa, AZ
red brome	Bromus rubens	Maricopa, AZ
Bermudagrass	Cynodon dactylon	Maricopa, AZ

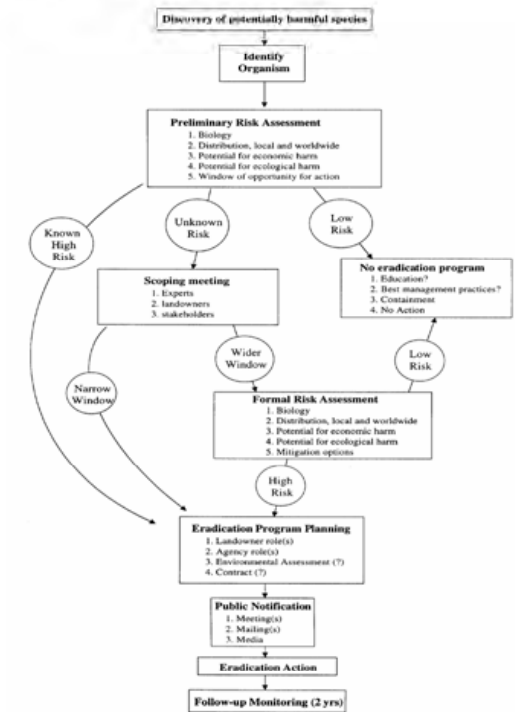
- Online, GIS-based
- All-taxa
- Available in Arizona!

www.imapinvasives.org

Critical Components to EDRR:

1. Define your scale & scope
2. Determine what you have and what you don't have (survey & inventory)
3. Set priorities
4. Coordinate efforts internally & with external partners
5. Create short Watch Lists
6. Designate format pathways for:
 - a. Reporting new invaders
 - b. Confirming the ID, assessing the threat, and
 - c. Who will carry out the Rapid Response
7. Always try to think in larger scales!

Flow Chart, Responding to a New Invasion



In Conclusion:

*Can we really work to exclude future
invasive species threats?*

YES!!

- Long-term commitment and dedication
- Consider working with partners, at increasingly larger scales (or outside of your boundaries)
- Continue doing weed management/control at the site-level, but...
- Put significant resources towards prevention and early detection and rapid response, at both site- and larger-scales!