Invasive Plants
What is to be Done -
and How to Do It

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Native Plant Species
Exotic/Alien Plant Species
Invasive Plant Species
Massachusetts Invasive Plant Advisory Group (MIPAG)

Definition of “Invasive”

“non-native species that have spread into native or minimally managed plant systems in Massachusetts. These plants cause economic or environmental harm by developing self-sustaining populations and becoming dominant and/or disruptive to those systems.”

varieties, subspecies and cultivars included
Dissipates stream energy for flood control

Produces wetland products (e.g., cranberries)

Sequesters sediment, contaminants, and nutrients

Provides habitat to support biodiversity

Provides aesthetic services and recreational opportunities

Releases slower and cleaner water

Provides long-term carbon and water storage

Replenishes groundwater
Threats to freshwater wetlands

✓ Filling, grading, removal of vegetation
✓ Building construction
  ✓ Changes in water levels and drainage patterns
  ✓ Diking and damming to form ponds, lakes and reservoirs
  ✓ Diversion of flow to or from wetlands
✓ Contamination from industry, agriculture, infrastructure

Invasive species
Global Climate Change

- Increased temperatures and increased rainfall
- Increased flooding
- Reduced recharge
- Degradation through conversion to agriculture
- Reduced carbon sink functionality
- Intermittent heavy precipitation and extended periods of drought
- Changes in duration and seasonality of flooding
- Reduction in biodiversity - wetland-specific plants, R/E species

- Changes favor generalist species tolerant a broad range of hydrologic conditions - overall loss of plant species diversity

- Increase in abundance of invasive species currently present, arrival of new invasive species
Climate change maps


Arbor Day Foundation Plant Hardiness Zone Map published in 2015.

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U.S. Global Climate Change Research Program
Observed Changes 1958 - 2012
Glossy buckthorn
Frangula alnus

Speckled alder Alnus incana
Glossy buckthorn

Speckled alder
Japanese barberry
Berberis thunbergii

All photos, Les Mehrhoff
Density of ticks with *Borrelia burgdorferi* – the causal agent of Lyme disease

Barberry infested forest ~ 120 ticks per acre
Forest without barberry ~ 10 ticks per acre

Connecticut Agricultural Experiment Station
Purple loosestrife  Lythrum salicaria

Les Mehrhoff
Galerucella calmariensis
Japanese knotweed
Polygonum cuspidatum
Japanese Knotweed

Tangy, similar to rhubarb
Eat raw or cooked in sweet or savory dishes.
Aphalara itadori
Phragmites (Common reed)
Phragmites australis

Photos: Joan Deely
Japanese stiltgrass
Microstegium vimineum
Japanese stiltgrass
Microstegium vimineum

White Grass
Leersia virginica
Stiltgrass

White grass

Photo, Les Mehrhoff
WPA Wetland Resources Areas

- Isolated land subject to flooding
- Bordering Vegetated Wetland
- Land Under Waterbodies and Waterways
- Bordering Land Subject to Flooding
- Riverfront Area
Management Approaches

• **Passive “Management”** – Nature manages itself
  -- Pristine
  -- Novel Ecosystems

• **Active Management** - mitigation of human impacts on natural systems
Weed Infestations & Control Potential

- Prevention or Eradication Simple
- Eradication Feasible
- Eradication Unlikely (Intense effort required)
- Local control and management only

- Introduction
- Detection

- Acres Infested:
  - Absent or off-site
  - few locations
  - Many locations
  - At or near biological potential

- Control Costs

- Time

Modified from Chippendale 1991; Hobbs & Humphries 1995
Department of Environmental Protection
Wetland Protection Act

- Any invasive plant control work within a jurisdictional wetland (as determined by DEP mapping and/or delineation by certified wetland scientist) must be permitted by the DEP.

- Permit applications are filed with Conservation Commission in the municipality where work will occur.

- Notice of Intent - fee, legal notice, etc.; Ecological Restoration Limited Project appendix. If r/e species present, need review by NHESP. Order of Conditions issued
  (Some towns/cities have adopted additional wetlands by-laws)

- Request for a Determination of Applicability - no fee, legal notice

Level 1 Management: Manual Methods
Know Your Seedlings

Glossy buckthorn

Oriental bittersweet

Japanese barberry

Japanese knotweed
Hand-pulling
Volunteers - Partners - Stakeholders
Buckthorn Baggies
Prep Cutting
Mowing
Propane Torch

Multiflora rose, Japanese barberry

Garlic mustard

Japanese stilt grass
Level 1 Permitting & Regulatory Considerations

- Approval from conservation commission for volunteer work days in wetlands and buffer zones, subject to advanced notification and updates & with warden/overseer
- Waiver of liability to participate as a volunteer on a habitat restoration project
- Annual meeting to discuss land management program with community members and neighbors
Level 2 Management
Judicious Herbicide Use

- **Integrate** management activities (cutting, mowing, etc.)
- **Targeted herbicide methods** to minimize amounts used
- **Timing** to maximize effectiveness of treatment
Cut Stem/Stump Application

- 20%-50% glyphosate product in water
- Applied immediately after cutting
- Can apply throughout the year, with the exception of sap season
Foliar Spot Treatment

Resurgent glossy buckthorn
< 2’ tall after prep cut
Hand Wiping
Stem Injection
Level 2 Permitting, Regulatory & Best Management Practices

- File RDA or NOI with conservation commission; Ecological Restoration Limited Project (Appendix A)
- Herbicide applicator license required for those applying Level 2 methods
- Advanced training for Level 2 applicators
- Post signs denoting work in progress in vicinity of work area, to include Reentry Interval timing for selected herbicide
Level 2, Continued

- Appropriate Personal Protective Equipment (PPE) for applicators
- Community meeting to discuss land management program with community members and neighbors
- Reporting as required to conservation commission
- **BRP WM04 license** required by the Office of Watershed Management for anyone applying chemicals to bodies of water.
Level 3 Management
Mechanical Methods

Field edge mowing

Concord, MA
Large-Scale Mechanical Methods

Excavator with Brontosaurus mower

Mass Audubon Drummil Farm
Lincoln, MA
Level 3 Permitting/Regulatory/ BMP Considerations

- File RDA or NOI depending on type of project and disturbance/alteration

- NOI filing may require Ecological Restoration Limited Project (Appendix A)
IP Treatment Sequence

**Year 1.** Initial treatments (combination of mechanical and chemical) - 90% control

**Year 2.** First follow-up treatment (targeted chemical) - 95% control

**Year 3.** Second follow-up treatment (manual or targeted chemical) - 99% control

Annual stewardship and maintenance (primarily manual) maintains 99% control
Northfield Mount Hermon School

Gill/Northfield
Longmeadow Flats Conservation Areas

Flood plain forest

Vernal pool
Oriental bittersweet

Japanese stilt grass

Japanese knotweed
Williams Property - Harvard
Common buckthorn, oriental bittersweet

Black swallowwort

Japanese barberry
Little Sippewissett Marsh Falmouth
Lathrop Retirement Community
Easthampton
Amherst

Residential property abutting town conservation land wet meadow.
Mowing only along boundary between residential property and town conservation land. Follow-up treatment to seedlings with propane torch

Hand-pulling only within marked wetland boundary

Foliar/CST outside of boundary
Invasive Plant Resources

www.eddmaps.org - ED and Distribution mapping

www.invasive.org - All-taxon compendium of all invasives


www.invasivespecies.gov - Programs, guidelines and management plans

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