Slide 1 Introduction

Slide 2 Definitions - review

Native plants: indigenous to this region

Present due to natural range extension; occurs in a particular region without direct or indirect human intervention

Present at the time of European colonization

Slide 3 Exotic/Alien plants

Occurs artificially beyond historic range

Includes species that have moved from one area to another within the U.S.

From another region, continent, ecosystem or habitat

Slide 4 Invasive Plants

Not native to North America

Generalist species can grow in many different conditions - often why we grow them!

Colonizers of disturbed areas – caution with fill….

Produce abundant fruits and seeds and/or far-reaching root systems

Aggressively compete with and displace native plant communities

Some species are allelopathic, capable of altering soil chemistry to their competitive advantage.

In New England, more than a third of regional flora is non-native.

Only 10 percent of regional flora is categorized as invasive.

It is interesting to note that goldenrod species, which are native to the US, are much admired by British gardeners, and are becoming a nuisance invasive in the British Isles.

Slide 5 MIPAG – ID of group and invasive definition

Slide 6 ecosystem service slide…. A properly functioning wetland resource provides essential ecosystem services.

They include the products we extract like food and fuel, water storage, pollination and flood

mitigation, recreation and cultural values, and indirect but essential services such as

photosynthesis, nutrient cycling and soil formation

In short, our human economy depends on services performed free of charge by ecosystems.

Slide 7 Threats to freshwater wetlands…listed

Slide 8 global climate change….consideration must be given to the role of global change and its effects on both native and invasive plants.

Slide 9 Hardiness zone map - included to illustrate the northward shift of hardiness zones over the past 25 years. A warming climate favors invasive plant species in a number of ways, including extended growing season, disruption in predator/prey timing, and increased CO2 levels.

Slide 10 Heavy precipitation map documents increase in heavy precipitation events since 1958 – impacts on wetlands as well as flora and fauna; cycles of extreme moisture and drought have developed – challenging for native plants that have evolved with current climate conditions. Invasive plants adapt more easily to changing conditions.

Slide 11 Deer pressure - we must consider the role of strong deer pressure in our region - favors invasive plants. Deer tend to preferentially browse native species, leading to greatly decreased regeneration as illustrated by this deer exclosure.

Slide 12 Now let's look at some of invasive plants that are frequently associated with jurisdictional wetlands Glossy buckthorn. Found in moist conditions like floodplains, streambanks, although it will also grown in uplands. Can cnfuse it with speckled alder; GB has flowers and fruits that develop conintuoulsy throughout the growing season. Alder has duller leaves, toothed margins, catkins and tiny cones.

Slide 13 Bark is similar; alder leaves not glossy, have toothed margins.

Slide 14 progression from seedling to understory – animated

First seedling photo take in December – leaves still green

Dense understory of seedlings. When cutting glossy buckthorn, we have found that debris must be stacked to dry. If stacked in moist conditions the branches will resprout.

Slide 15 Japanese barberry

Once a popular ornamental; fall color; good hedge – impenetrable; pollution-tolerant

Slide 16 Often grows in floodplains, damp areas in forest, swales, etc.

Leafs out early – can see green blanket in spring before other plants are green; as is typical of IP in this region, hold leaves later in the growing season. Fall color also makes the blanket – easy to see in the forest understory then. Bright yellow pith.

Slide 17 – Association between Japanese barberry and black legged or deer ticks. Researchers at CT Agricultural Experiment station noticed this when students were conducting studies of JB populations – seemed to have more ticks on them. Developed research method to compare tick populations in JB areas versus no barberry areas

Slide 18 This slide depicts differences in tick population densities among JB infested sites, controlled sites and those with no barberry present.

Slide 19 Purple loosestrife introduced as horticultural plant for color and shape. Escaped cultivation – found in wetland areas, along the banks of ponds, lakes and streams

Slide 20 Square stem is characteristic. Forms dense monocultures in wetland areas. Persistent seed heads can be seen in fall and winter # of seeds per plant

Slide 21 Biocontrol has been successfully deployed – galerucella beetle releases will, over the course of several years, reduce populations to the degree that native plants can become reestablished.

Works best on large infestations – beetle available commercially, or can be reared by volunteer groups.

Slide 22 Japanese knotweed – also introduced as horticultural specimen plant; thought to be helpful in erosion control. Very aggressive competitors with native riparian plant species.

Develops monocultures; dense network of rhizomes and thick overstory prevent native plants from growing. Spreads by rhizomes. Root system can extend tens of feet beyond visible plants, will sprout from root fragments. Repeated cutting/mowing can deplete plants sufficient to kill them over time, but must be consistently done. Digging not recommended as broken root fragments will grow.

Slide 23 Will grow through concrete and asphalt, can damage foundations.

Slide 24 funny things to do with JK….

Slide 25 Biocontrol has been developed – psyllid called *Aphalara itadori* member of a family of jumping plant lice found all over the world. Tend to be very host specific. This makes them very useful in biocontrol because they can be released to kill one type of plant without affecting other wildlife. Found in Japan – speaks to the issue of coevolution of plants and predators as a way to understand why relocated plants can become invasive.

A handful of release sites in US and Canada – results are not yet in

Slide 26 Phragmites found in association with fresh and brackish waters. Up to 15' tall – dense understory. Example of Pamet River showing leaders of phragmites way outpacing rate of native plant regeneration.

Slide 27 very dense monoculture stems grow very close together; very little else grows here, reduced access to light and nutrients.

There is a native phragmites. The two have likely hybridized to an extent.

Slide 28 Japanese stilt grass. Annual grass prefers moist areas – margins of wetland resource areas.

Slide 29 Can form dense understories that prevent native plant regeneration. Heavy deer pressure in forested settings can result in uniform JSG carpets – where deer have been controlled by fencing, JSG frequency declines as natives return to compete with it – not eliminated completely

Slide 30 JSG leaves have characteristic light colored central stripe. Seed head develops into distinct right-angel configuration. Can be easily confused with white grass, a perennial grass with below ground level rhizomes.

Gently tugging on these grasses helps with ID – JSG pulls up readily, white grass will offer resistance.

JSG appears purplish in fall. White grass is yellow

Slide 31– more images of the roots

Slide 32 WPA resource areas – we are considering only terrestrial invasives, so land under water is not relevant for now.

Slide 33 Begin management approaches

Slide 34 Awareness curve – best to begin control efforts when populations are small – easier, more effective and less costly. However, once awareness of problem begins, often infestation has gotten to the point where control is more difficult, costly, and less effective. Early detection/rapid response is important.

Slide 35 DEP WPA and general guidelines

Slide 36 Level 1 management – Important to successful control efforts because there often is so much to do when planning invasive management. Level 1 management methods can involve the public, and can provide opportunities for outreach and education. Can help to empower people – maybe begin handpulling efforts at periphery of invaded area in advance of more specialized removal work.

Slide 37 know your seedlings

Side 38 hand pulling – be careful with disposal to avoid spreading; enthusiastic volunteers

Slide 39 people power available for help

Slide 40 Buckthorn baggies – best for large specimen – labor intensive. One of a number of creative options for Level 1 Management. Removing large buckthorn specimens presents a good opportunity for hand pulling seedlings that will come up once sunlight is reintroduced to the ground.

Slide 41 – prep cutting to reduce height of plants for future foliar, and to reduce amount of herbicide needed. I some instances, dedicated repeat cutting can reduce IP.

Slide 42 mowing - same

Slide 43 propane torch – good for some species, not useful for other. Expensive due to cost of propane and labor. Limited usefulness in sensitive areas.

Slide 44 Level One permitting

Slide 45 Level Two management

Slide 46 Judicious use of herbicide – use least amount that can be effective; combine with manual methods, and pay attention to timing to maximize effectiveness.

Slide 47 CST – blue dye added to mark treated stumps – very targeted.

Slide 48 Cut bittersweet vines – CST treatment, vines left to dry in trees to avoid damage to trees.

Side 49 Foliar spot treatment – can use shields to protect desirable species.

Slide 50 Hand wiping – used in sensitive areas, or around desirable, rare/endangered plants.

Slide 51 stem injection – labor-intensive, limited number of plants/acre.

Slide 52 Level Two permitting

Slide 53 Level Two permitting, cont'd

Slide 54 Level Three - very high density infestations; field edges

Slide 55 Boom spraying; foliar hydrospraying

Slide 56 Mechanical – Davco mower reduces woodies, facilitates restoration efforts

Slide 57 Even bigger equipment - pictures on the right illustrate restoration of the area after mowing and replanting.

Slide 58 Permitting at this level. Once level 3 management work is completed, landowners should return to consideration of Level 1 management, and should be prepared to continue this level of work for years to come. Protect investment in the work and keep treated sites from returning to invaded conditions.

Slide 59 Summary of typical treatment sequence

Slide 60 SAMPLES – NMH RDA we filed for the school with Gill and Northfield CCs - RDA

Slide 61 Longmeadow – NOI and CPA funding for some portions; NOI filed with CC

Slide 62 IP present in Longmeadow

Slide 63 Harvard CC – town permitted

Slide 64 sample plants – also PL and porcelain berry

Slide 65 Little Sippewissett –worked with local person who filed with Falmouth CC. We have been doing maintenance work for several years here – we requested permission from the CC as part of the Certificate of Compliance to do this work, as long as targeted methods are used, and our employees do the work.

Slide 66 Native revegetation – happens fairly rapidly in salt marsh – spartina, glasswort, sea lavender, etc.

Slide 67 – Lathrop – volunteers, CPA $$, fund raising from residents, etc. we filed NOI with Easthampton CC

Slide 68 Riddle – NOI, restrictions on conservation land - we filed NOI with Amherst CC

Slide 69 Follow-up at Amherst site – hand pulling and propane torch for multiflora rose seedlings.

Slide 70 Resources