# Introduction to Invasive Plant Management

*Elements of a Successful Invasive Plant Management Project*

***Connecticut Invasive Plant Symposium***

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# Topics to cover

- *Elements of an effective invasive plant management program*
  - *Mapping (monitoring/record Keeping)*
  - *Prioritization*
- *Integrated Management*
  - *Manual/Mechnical*
  - *Judicious herbicide use*
  - *Revegetation/Restoration*

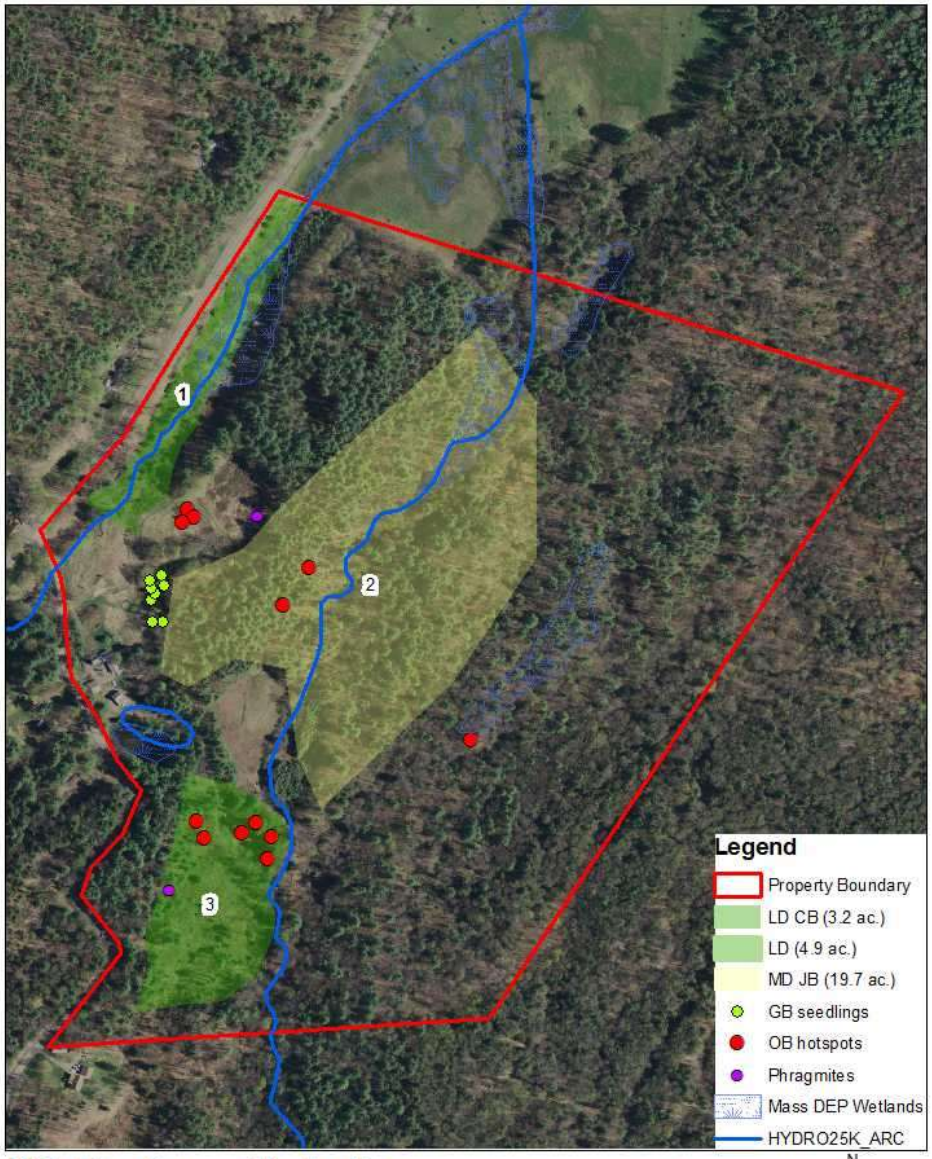
# Elements of a Successful Project

*Planning Framework*

- Goals- articulate intention for site
- Planning (Management Plan)
- Site Analysis
- **Mapping**
- **Prioritization**
- Initial, Follow-ups, ongoing Stewardship program
- Early Detection
- Success Criteria
- Monitoring
- Management Documentation
- Revegetation & Ecological Restoration Considerations

# Mapping

- Invasive species
- Distribution
- Area (acres or square footage)
- Density (cover class)
- Size: diameter & height (plant type/age: seeding, sapling, etc.)
- Non-target/native vegetation
- Sensitive resource areas (wetlands/NHESP)

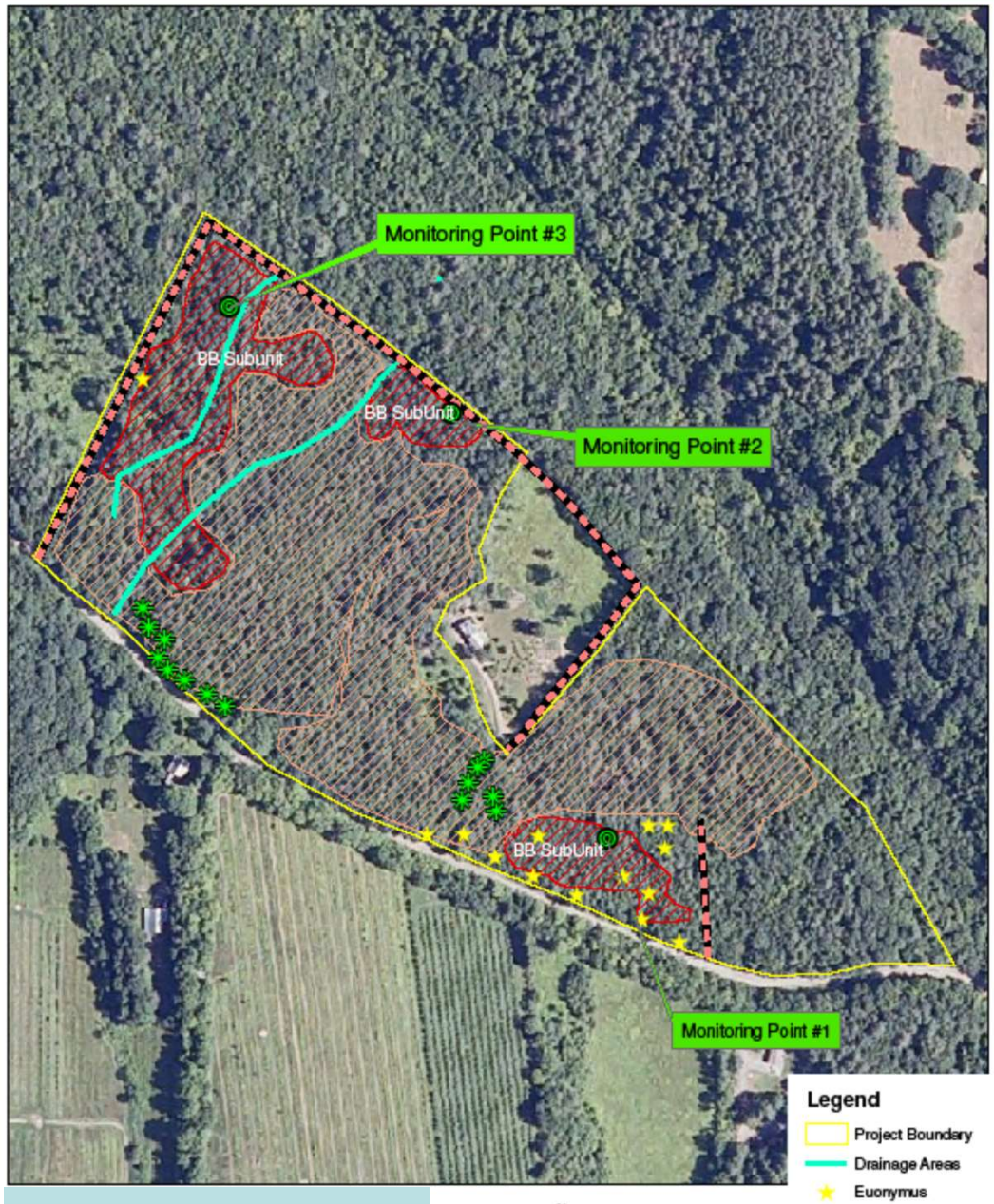



**Blake Farm Conservation Land**
**Invasive Plant Inventory Map**
Map prepared by C. Polatin 3/19/2016

# Glossy Buckthorn
# Small tree (> 7 ’ tall)

# Glossy Buckthorn
# Shrub (< 7’)

# Glossy Buckthorn Seedling (< 2')


Monitoring Point #3
BB SubUnit
BB SubUnit
Monitoring Point #2
BB SubUnit
Monitoring Point #1
Legend
Project Boundary
Drainage Areas
Euonymus
Garlic Mustard
Stone wall
LD GB
BB subunits
N
W
E
S

30 acres


Invasive Plant Inventory

March 24, 2016

Density Class

VL: 13.5 ac | L: 4.1 ac | M-: 3.3 ac | M+: 2.5 ac | H: 1.1 ac | VH: 3.0 ac

N

0 40 80 160 240 320 Yards

Map prepared by Land Stewardship Inc
Based on information collected by Andrew Morrison, March 2016

# Summary Figures

Michael Bathory
Homestead Parcel
intended to accompany parcel map from April 5, 2016

| UNIT | SPEC | DENS | SIZE | AREA |
|---|---|---|---|---|
| 1 | JB | 2 | 3 | 2.04 |
| | HS | 1 | 3 | |
| 2 | OB | 3 | 6 | 0.03 |
| | OB | 2 | 3 | |
| 3 | JB | 3 | 3 | 0.73 |
| | HS | 2 | 3 | |
| | MR | 1 | 4 | |
| 4 | OB | 2 | 3 | 0.11 |
| 5 | HS | 3 | 4 | 0.06 |
| | OB | 2 | 3 | |
| 6 | HS | 3 | 4 | 0.37 |
| | JB | 2 | 3 | |
| 7 | JB | 2 | 3 | 1.00 |
| | WE | 1 | 1 | |
| 8 | JB | 3 | 3 | 0.87 |
| 9 | JB | 3 | 3 | 0.36 |
| | OB | 5 | 3 | |
| | OB | 3 | 7 | |
| | WE | 3 | 4 | |
| 10 | JB | 1 | 2 | 5.48 |
| | HS | 1 | 2 | |
| 11 | JB | 2 | 3 | 0.91 |
| 12 | JB | 1 | 2 | 8.03 |
| | GB | 1 | 4 | |
| 13 | MR | 5 | 5 | 0.94 |
| 14 | OB | 4 | 7 | 2.02 |
| | MR | 4 | 4 | |
| 15 | OB | 4 | 4 | 0.15 |
| | OB | 3 | 7 | |
| | JB | 2 | 3 | |
| 16 | GB | 3 | 5 | 1.37 |
| | HS | 3 | 5 | |
| | OB | 2 | 3 | |
| | MR | 2 | 4 | |
| 17 | GB | 3 | 5 | 1.09 |
| | MR | 2 | 4 | |
| 18 | JB | 3 | 3 | 1.25 |
| | OB | 2 | 2 | |
| | GB | 1 | 4 | |
| 19 | OB | 2 | 7 | 0.17 |
| | OB | 6 | 5 | |
| | GM | * | * | |
| 20 | OB | 5 | 4 | 0.22 |
| | OB | 4 | 7 | |
| | MR | 3 | 4 | |
| | HS | 3 | 5 | |
| 21 | HS | 4 | 4 | 0.21 |
| | OB | 5 | 3 | |
| | OB | 3 | 7 | |
| | JB | 3 | 3 | |
| | | total acreage | | 27.40 |

| PT# | SPEC | SIZE | AREA |
|---|---|---|---|
| 662 | GB | 4 | single |
| 663 | OB | 2 | cluster |
| 664 | JK | 5 | 0.15 ac |
| 665 | GB | 4 | single |

SPEC - Species Abbreviation Codes

| *code* | *common name* | *scientific name* |
|---|---|---|
| AO | autumn olive | Elaeagnus umbellata |
| CB | common buckthorn | Rhamnus cathartica |
| CR | common barberry | *Berberis vulgaris* |
| GB | glossy buckthorn | *Frangula alnus* |
| GM | garlic mustard | *Alliaria petiolata* |
| HS | honey suckle | *Lonicera spp.* |
| JB | japanese barberry | *Berberis thunbergii* |
| JK | japanese knotweed | *Polygonum cuspidatum* |
| MR | multiflora rose | *Rosa multiflora* |
| OB | oriental bittersweet | *Celastrus orbiculatus* |
| WE | winged euonymus | *Euonymus alatus* |

DENS - Density Categories

| # | *code* | *density range* |
|---|---|---|
| 1 | VL | 0 - 5% |
| 2 | L | 6 - 25% |
| 3 | M-- | 26 - 50% |
| 4 | M++ | 51 - 75% |
| 5 | H | 76 - 95% |
| 6 | VH | 96 - 100% |

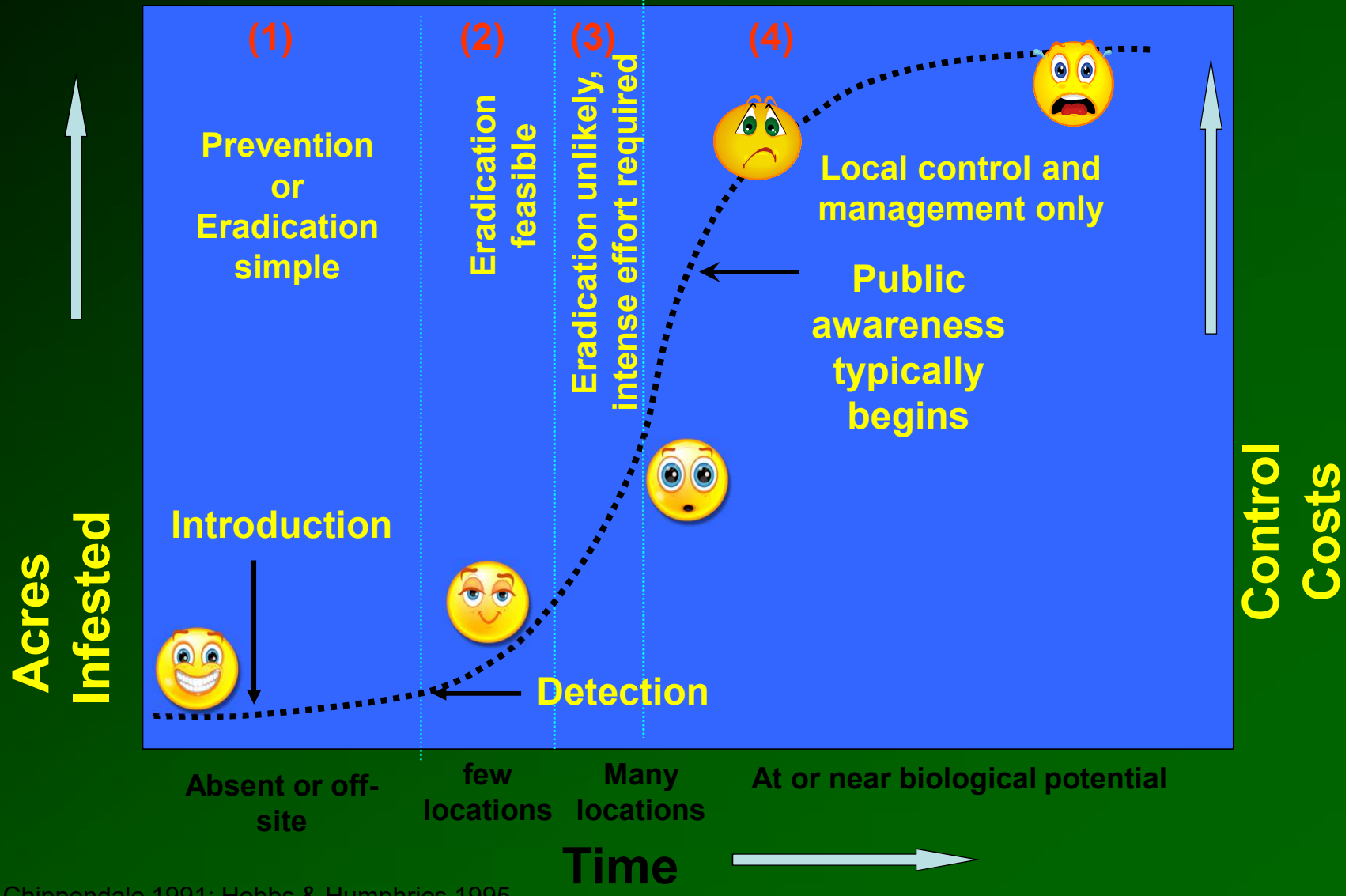
SIZE - size categories

| *code* | *size category* |
|---|---|
| 1 | 0 - 1' seedling |
| 2 | 1 - 2' immature |
| 3 | 2 - 4' |
| 4 | 4 - 6' |
| 5 | 6 - 8' |
| 6 | 8 - 12' |
| 7 | 12' + |

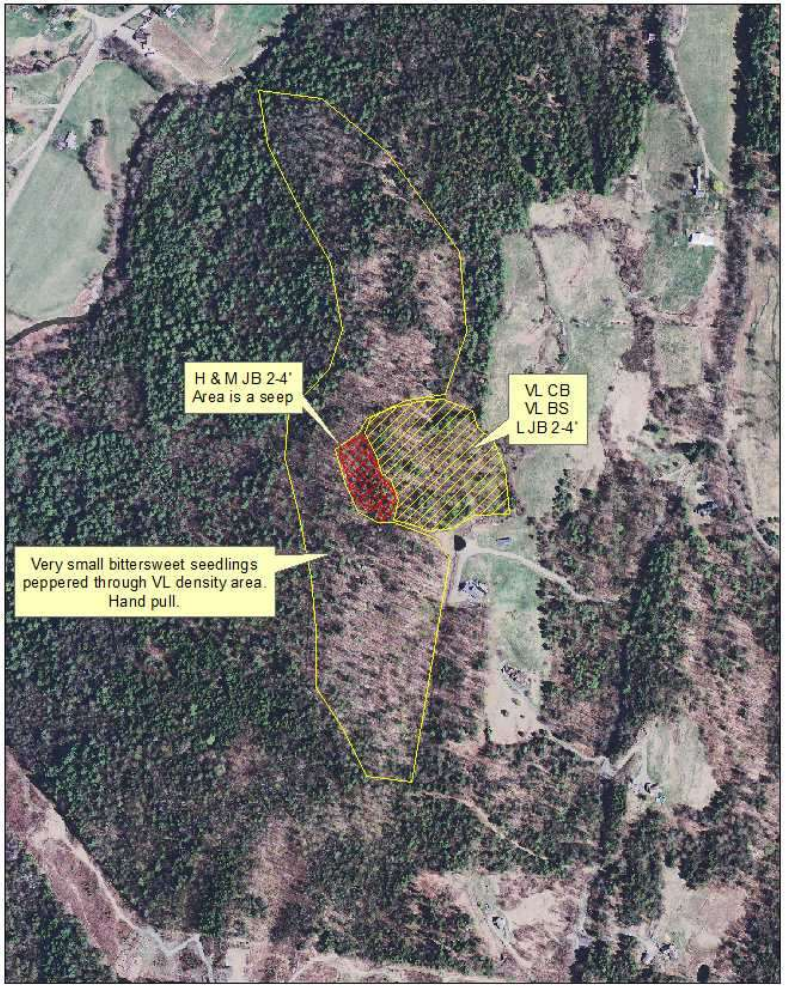
# Prioritization

**E** **arly**
**D** **etection**
**R** **apid**
**R** **esponse**

# Weed Infestations & Control Potential




Modified from Chippendale 1991; Hobbs & Humphries 1995



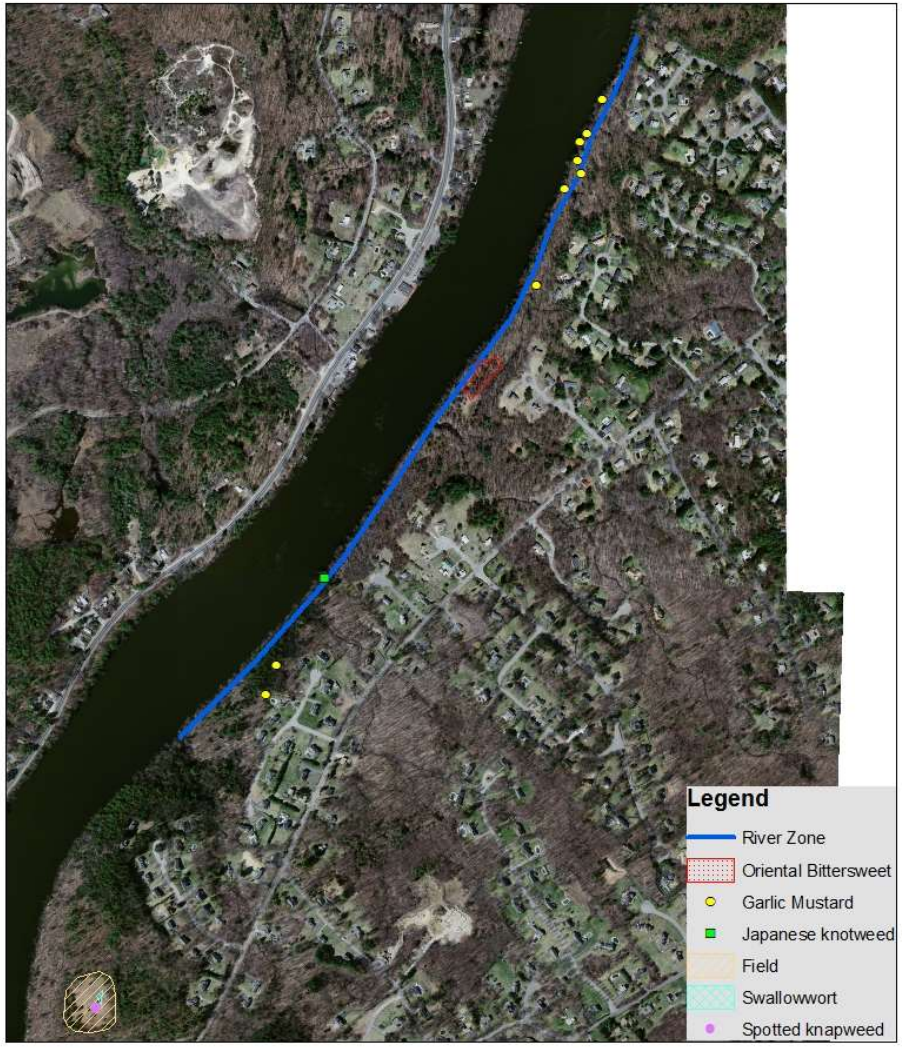

Proposed Invasive Plant Management Areas
Griffith Property 1076 Melendy Hill Road Guilford, VT
Map prepared by C. Polatin, Polatin Ecological Services, LLC 1/13/2015 based on field assessment with forester Lynn Levine 5/29/2015.

700 350 0 700 Feet

N
W E
S

**Legend**

- Very Low Density
- Moderate
- High Density Japanese Barberry




**Deer Jump Reservation**
**Proposed Invasive Plant Management Areas**
**9/9/14**

Map prepared by Polatin Ecological Services, LLC
based on gps information collected by Chris Polatin and
Brian Colleran during a site visit 7/22/14. Aerial orthophoto (2008)
acquired through MassGIS.

N
W E
S

1,000 500 0 1,000 Feet


07/22/2014


07/22/2014

# Seedlings

Common buckthorn

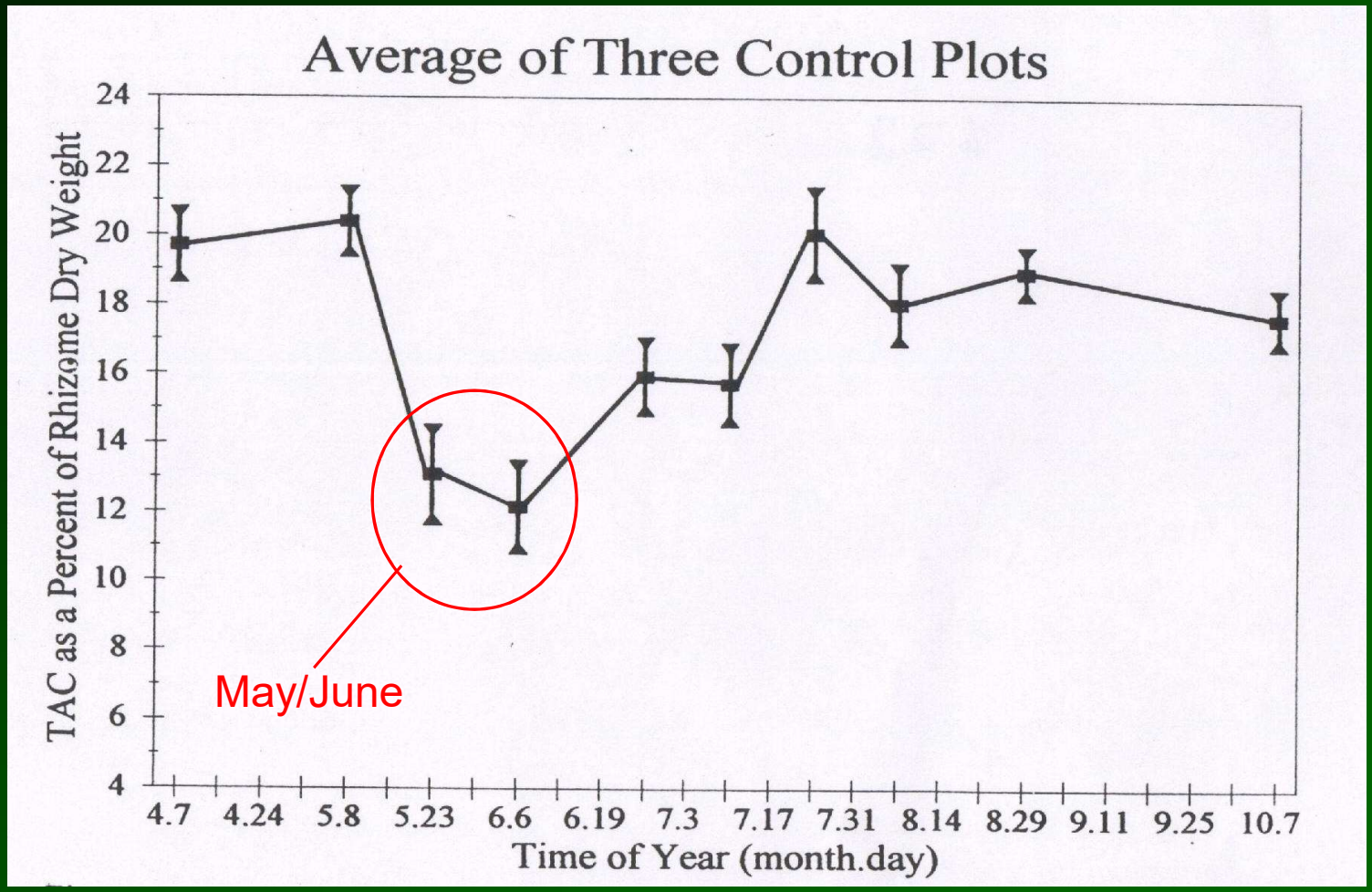
Japanese barberry

Bittersweet

Japanese knotweed

# Integrated Management

## The Importance of Timing Management Activities




(Droege, 1996)

# Level 1:
# Manual Methods

# Hand-pulling



# Community/Volunteers/Partners/Stakeholders



# Level 2

# Judicious Herbicide Use

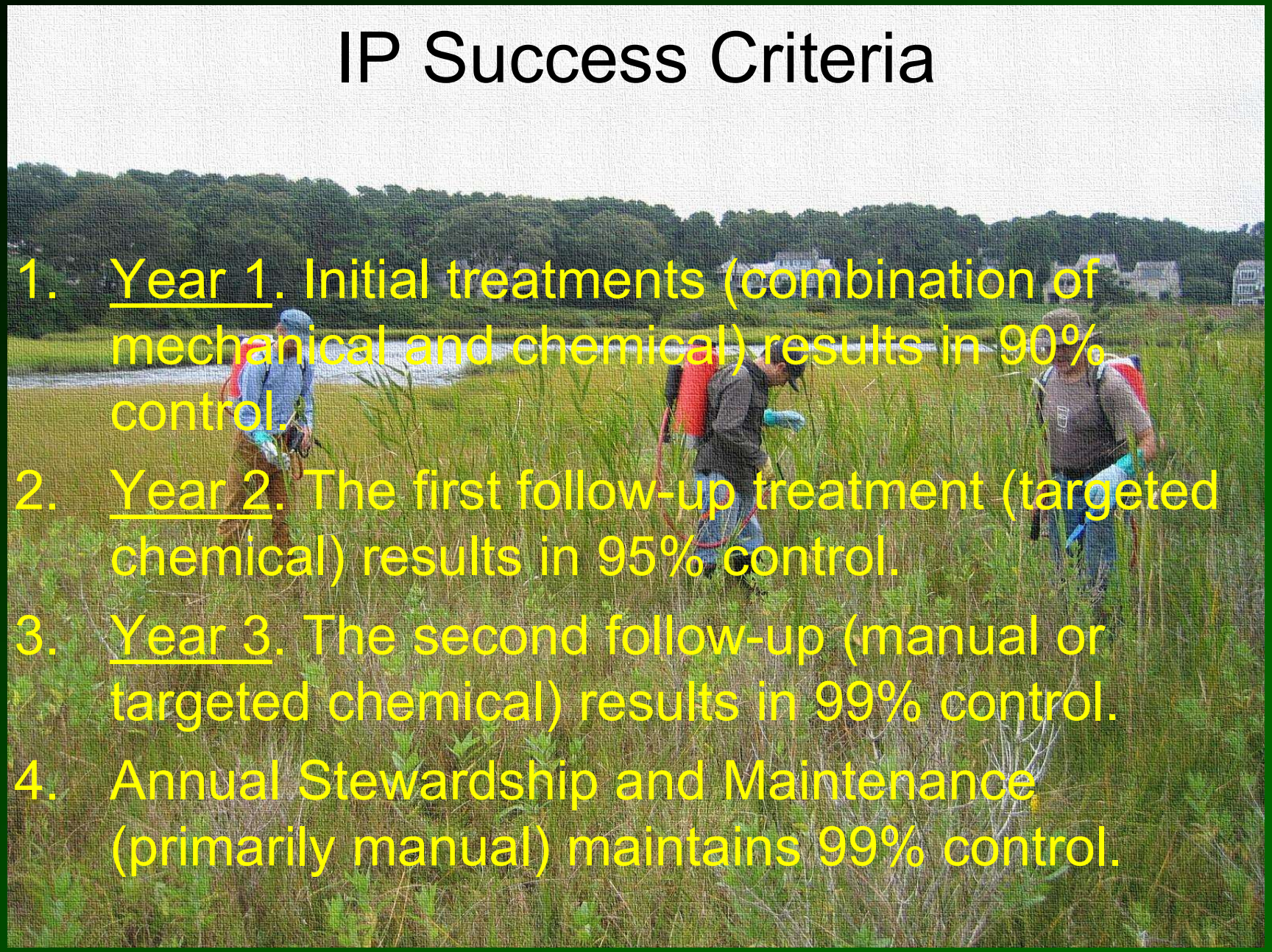
- **Integrate** management activities (cutting, mowing, etc.).
- Use **selective** herbicide methods that minimize amount used.
- **Timing** to maximize effectiveness of treatment
- Glyphosate & Triclopyr (active ingredients) based **general use herbicides**.
- Always read and follow the **label** directions, safety & environmental precautions.

# Cut Stem/Stump Application

- 20%-50% glyphosate product in water (apply immediately after cutting).
- Timing: Anytime, but sap season. Wait till late spring/early summer

# Mechanical Methods
# Small-Medium Scale

# IP Success Criteria



1. Year 1. Initial treatments (combination of mechanical and chemical) results in 90% control.
2. Year 2. The first follow-up treatment (targeted chemical) results in 95% control.
3. Year 3. The second follow-up (manual or targeted chemical) results in 99% control.
4. Annual Stewardship and Maintenance (primarily manual) maintains 99% control.

# Upland IP Management

2011

2012

2013

2014

# Active Revegetation

# Wetland IP Management

2008

2009

2010


2011

2012

# Glyphosate (Roundup, Rodeo, etc.)

- Derivation of glycine, an amino acid
- Inhibits an essential plant enzyme (EPSP synthase).
- Blocks production of aromatic amino acids: phenylalanine, tryptophan, tyrosine
- Non-selective herbicide
- Systemic – translocates to meristems/roots.
- Gradual yellowing (chlorosis) – newest leaves first.
- Non-volatile, but still need to avoid spray drift.

# Glyphosate – Environmental Fate

- Very stong adsorption (binding) to soil particles:
  - No herbicidal activity in soil (inactivated).
  - Not mobile in soil.
- Minimal potential for leaching into groundwater or contamination of surface waters via runoff.
- Readily biodegraded by bacteria, fungi
- Half life in soil: generally short, but variable.
- Very low toxicity to most non-target organisms.
- Due to surfactants in most glyphosate products – Not approved for aquatic sites.
- Rodeo, AquaPro formulations approved for water.

# Triclopyr
## (Garlon, Renovate, Tahoe)

- Disrupts normal plant hormone (auxin) function – abnormal elongation & division of plant cells.
- Selective herbicide – most grasses, sedges tolerant.
- Controls broadleaf weeds, woody plants.
- Systemic –translocates to meristems/roots.
- Initial symptoms appear rapidly – distorted growth (leaf cupping, stem twisting).
- Formulations: Ester (Garlon 4) more volatile than amine (Garlon 3A).