CONNECTICUT'S INVASIVE PLANT MANAGEMENT CALENDAR

"The Top 10 Invasive Plants"

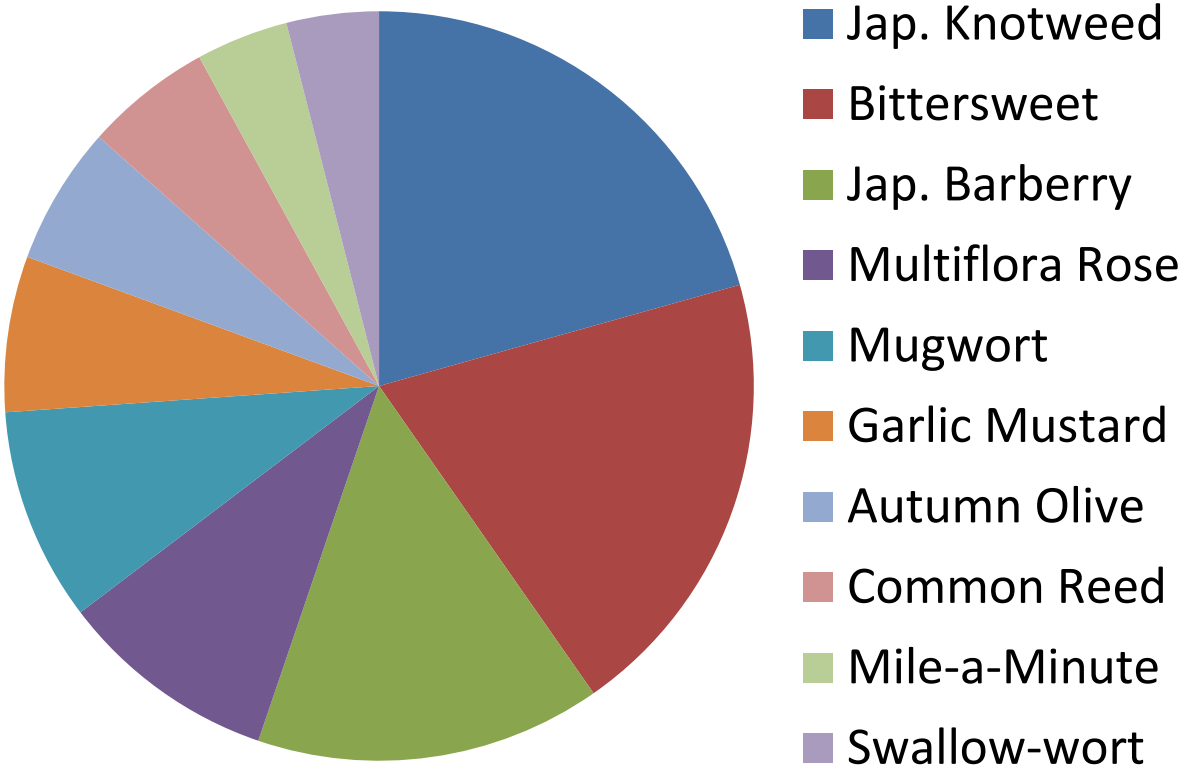
By Emmett Varricchio
and CIPWG collaborators

Connecticut Invasive Plant Working Group

About this presentation

- This presentation serves as a guide for the timing of the management of the Top 10 Invasive Plants of Concern identified during the 2016 CIPWG Symposium.

Connecticut Invasive Plant Working Group



When to manage?

- This presentation aims to give the best management practices (BMP) for timing the management for invasive plants.
- Each species in this presentation has different BMPs and associated times to manage
- However the best time to manage is now!

How to manage invasive plants

Mechanical Strategies

- **Cutting**: Effective at delaying/preventing seed production and depleting plants resources
  - -Follow-up is often necessary
- **Pulling**: Effective at removing seedlings and annuals
  - -Organize volunteers and have a pulling party
- **Mowing**: Effective at removing vegetation for other managements
  - -Repeated mowing is an effective control strategy for some plant species
- **Prescribed burn***: Effective at reducing vegetation allows for natives plants to reclaim
  - -Proper training should be used before using this method

***This guide doesn't go into the information regarding prescribed burns**

How to manage invasive plants (cont.)

Chemical Strategies*

- **Foliar Spray**: Effective at controlling large infestations of invasive plants

  -Foliar herbicide spray can kill non targeted species as well

- **Cut/Paint**: Effective at precise control

  -Disposal of cut material is important to consider

- **Injection**: Effective at precise control

  -This method is time consuming but non target effects are minimized

- **Pre-emergent**: Effective at preventing germination of seeds

  -Minimal injury occurs to established species

***Follow directions on the herbicide label and use personal protective equipment when preparing and managing invasive plants with herbicides.**

Disposal

- Disposal of invasive plants is an important consideration when managing invasive plants.
- Understand which species of plants will easily root when left on site.
- If mature seeds are present consider if removal will spread seeds.

Photo by Donna Ellis

Management Plan

1. Identify the Invasive Species of concern
2. Assess the infestation: Size, likelihood of spreading, etc
3. Figure out best control method timing based on season, plant growth stage, cost, etc
4. Implement control method
5. Disposal
6. Remediation
7. Repeat

Things to consider

- If you have missed the best management time for a specific species, don't just leave it until next year
  - The best time to manage is now!
- Consider the blooming period of the plant
  - Some herbicides are most effective when a plant is in bloom, however insects, including pollinators, will be present on insect pollinated plants in high numbers
  - Chemically manage just before or just after the blooming period to avoid spraying bees and other insects
- Consider whether or not you can follow up after management.
  - Use BMP to avoid spreading the infestation on site and elsewhere

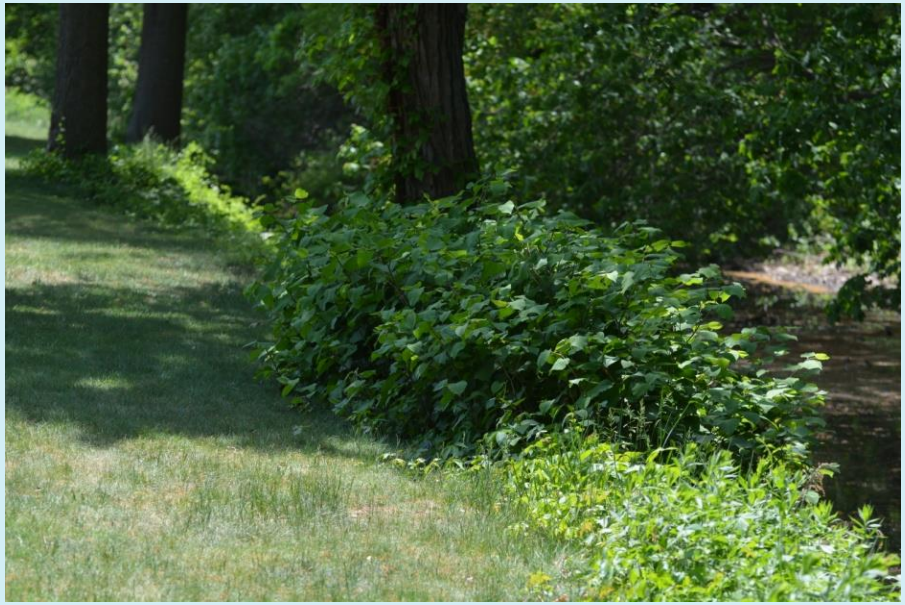
Lets meet the plants!

Japanese Knotweed

Polygonum cuspidatum

Japanese Knotweed *Polygonum cuspidatum*

- Herbaceous Perennial
- Habitat
  - Moist soils such as riverbanks
  - Roadsides
- Reproduction
  - Primarily vegetative, spreads underground
  - Limited seed production



Japanese Knotweed *Polygonum cuspidatum*

Management

- Mechanical
  - Cutting: Schedule 3 to 4 times a year
    -Don't leave cuttings to root

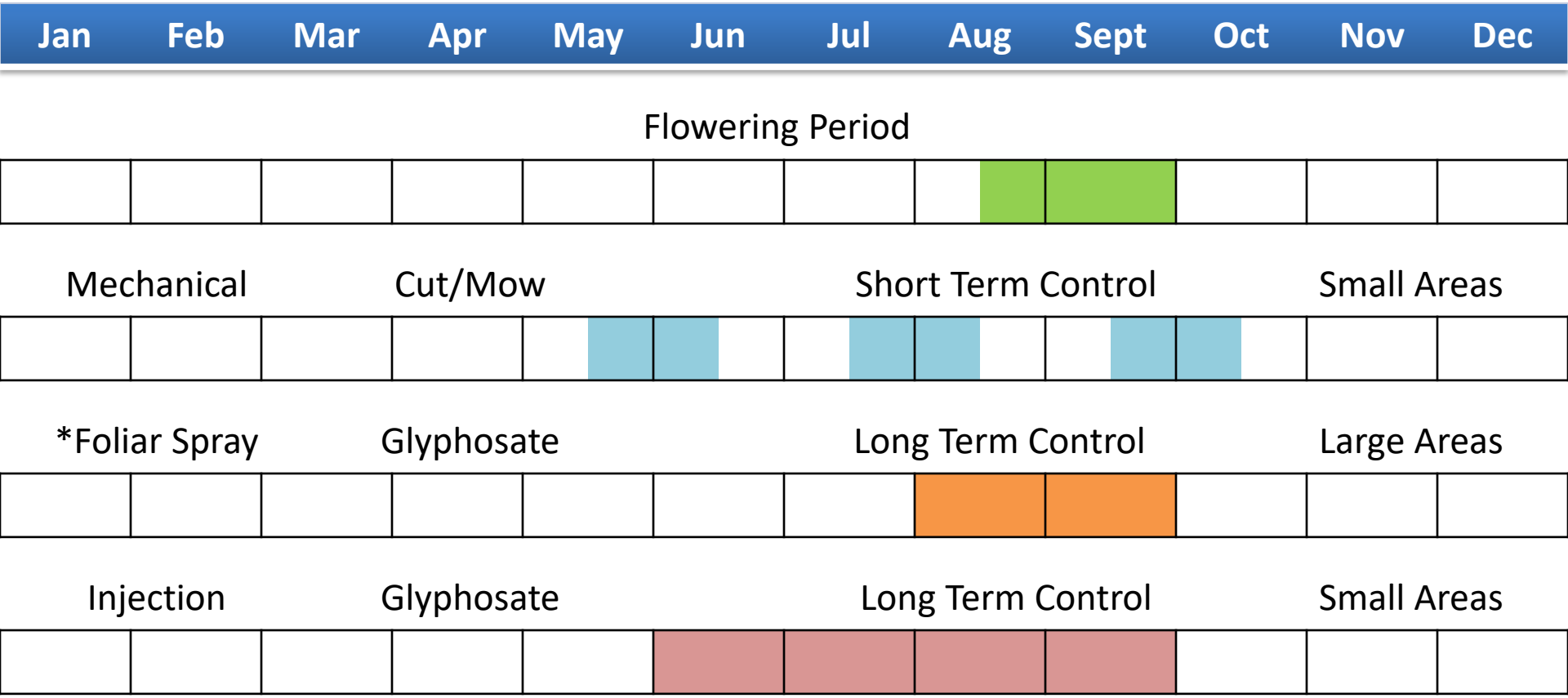
    Mowing: Can be effective but spreads cuttings that may root
- Chemical
  - Foliar Spray: Glyphosate during late August-September is very effective and fast
  - Stem injection: Glyphosate is also effective from June-September

Chris Evans, University of Illinois, Bugwood.org

See timing on following slide.

Japanese Knotweed

Polygonum cuspidatum



*Most effective management technique(s)

Notes: Foliar spray is most effect for Japanese Knotweed during flowering, care should be taken not to spray during peak pollinator hours.

Disposal: Japanese knotweed cuttings readily root, even small stems, do not compost.

Tips: Stem fragments will readily root, clean off equipment before leaving management site

Oriental Bittersweet

Celastrus orbiculatus

Oriental Bittersweet *Celastrus orbiculatus*

- Perennial Woody Vine
- Habitat
  - Forests/Edges of forests
- Reproduction
  - Seeds
  - Birds readily disperse seeds

Oriental Bittersweet *Celastrus orbiculatus*

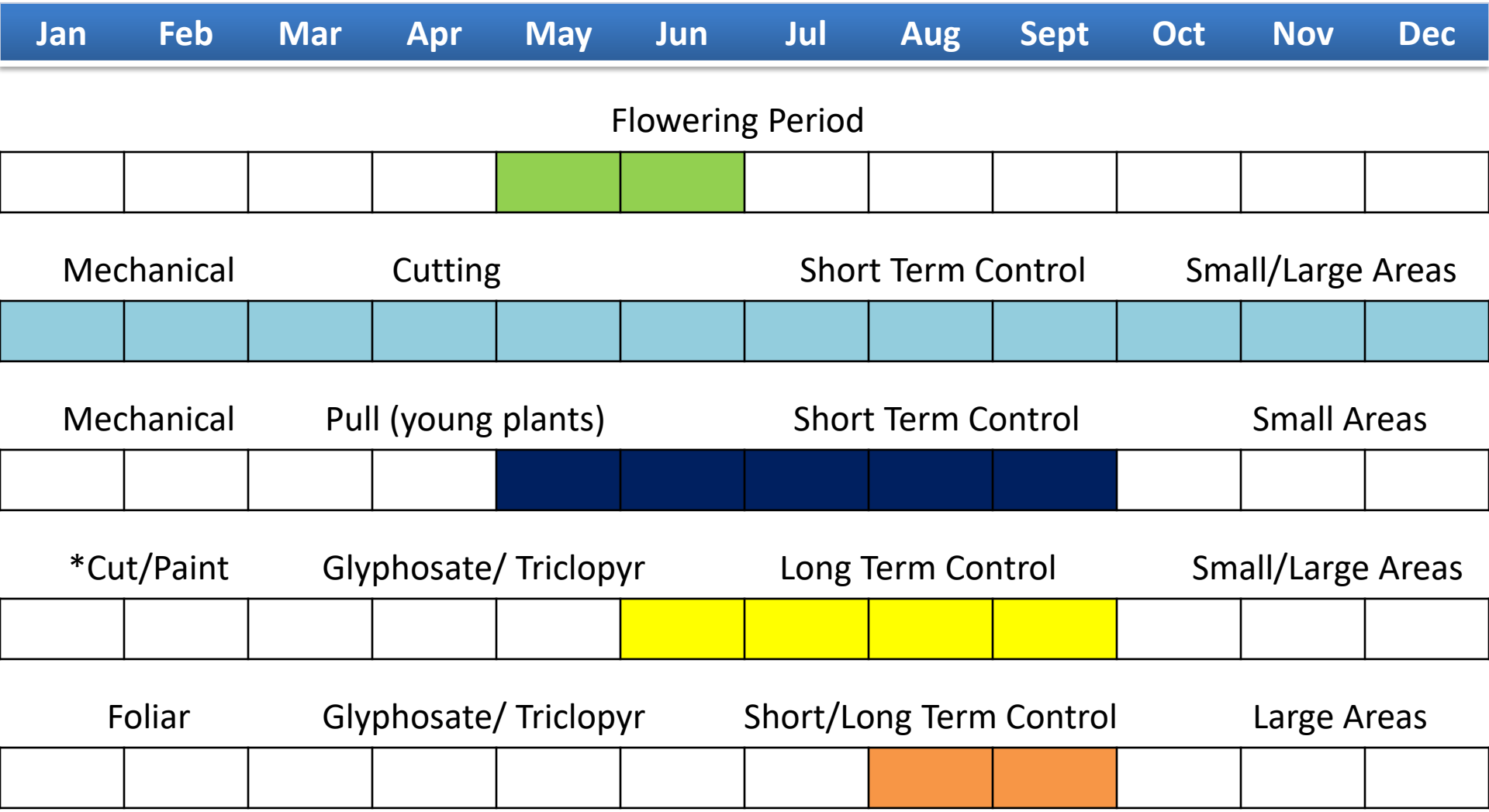
Management

- Mechanical
  - Cutting: Effective at stopping growth
    -Plants will respond by sending out more shoots so follow-up is necessary
  - Pulling: Effective for young plants
- Chemical
  - Cut/Paint: Glyphosate/ Triclopyr is effective during the growth period
  - Foliar: Glyphosate/Triclopyr is effective moderately effective during late summer

See timing on following slide.

Oriental Bittersweet

Celastrus orbiculatus



*Most effective management technique(s)

Notes: Cutting bittersweet stems stimulates new growth, follow-up is necessary.

Disposal: Bittersweet can be left to compost on site if fruit isn't present/mature.

Tips: Don't rip down cut stems of bittersweet as it may damage the tree.

Japanese Barberry

Berberis thunbergii

Japanese Barberry *Berberis thunbergii*

- Woody Perennial
- Habitat
  - Forests and edge habitats
- Reproduction
  - Seeds
- Interesting Facts
  - A species of fruit fly *Rhagoletis meigenii*, found in Connecticut lays its eggs in immature fruit. The larva feed on the developing seeds and pupate in the soil.

Japanese Barberry *Berberis thunbergii*

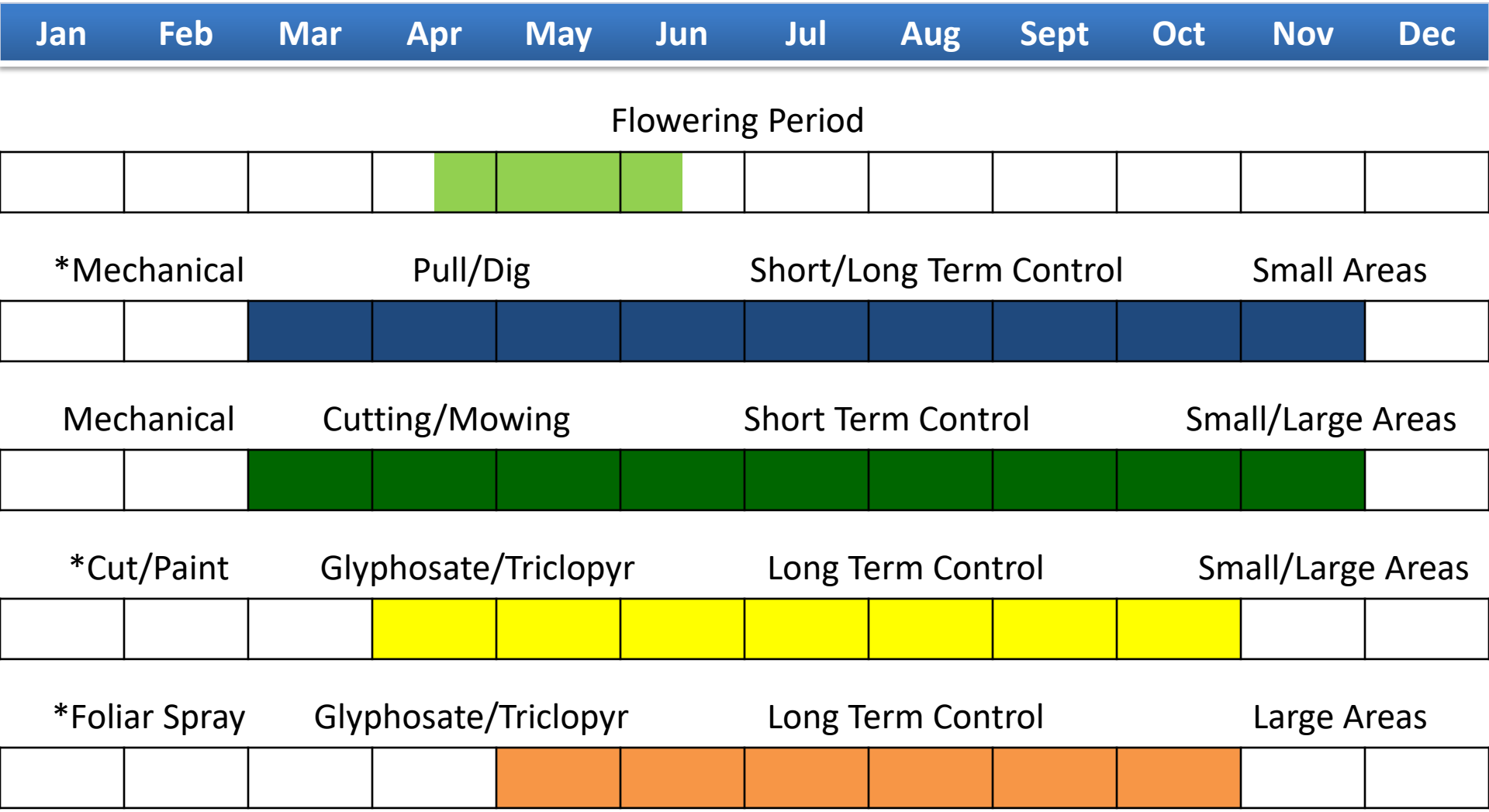
Management

- Mechanical
  - Dig/Pull: Use crowbars and hand-pullers to remove large plants
  - Mowing: Effective at clearing forest understory and preventing fruiting however plants respond by sending out new shoots
- Chemical
  - Cut/Paint: Glyphosate/Triclopyr
    -Very effective and targeted
  - Foliar Spray: Glyphosate/Triclopyr is also effective

See timing on following slide.

Japanese Barberry

Berberis thunbergii



*Most effective management technique(s)

Notes: Mowing/cutting can be effective at preventing plants from fruiting.

Disposal: Barberry can be left to compost on site if fruit isn't present/mature.

Tips: Pull barberry seedlings to save time later.

Multiflora Rose

Rosa multiflora

Multifloral Rosa *Rosa multiflora*

- Perennial
- Habitat
  - Edge habitat
  - Disturbed areas
- Reproduction
  - Seeds

Multifloral Rosa *Rosa multiflora*

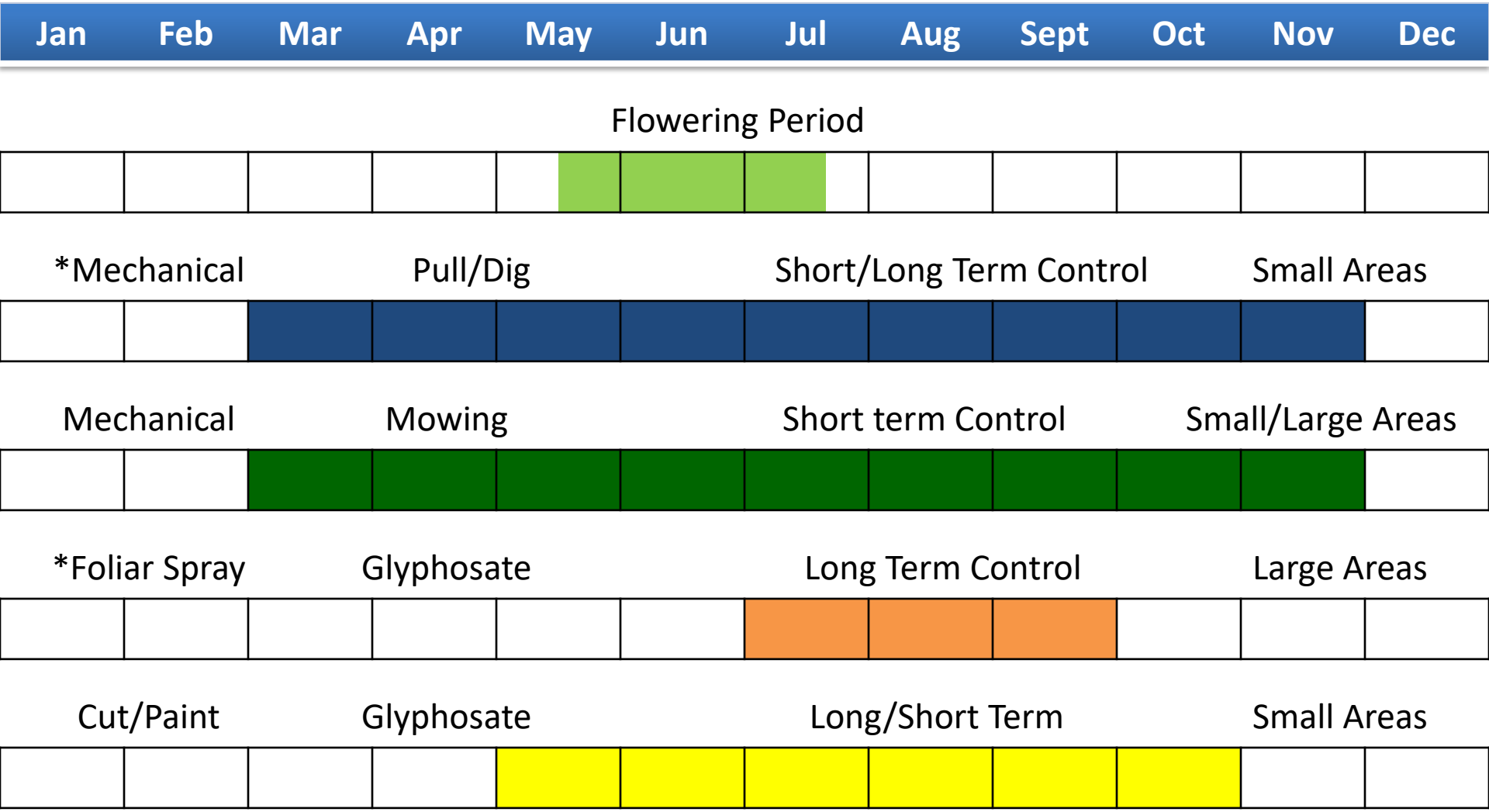
Management

- Mechanical
  - Mowing: Effective at clearing MFR and preventing flowering
  - Pulling/Digging: Effective but labor intensive
- Chemical
  - Foliar: Glyphosate is effective during the summer
  - Cut/Paint: Glyphosate is also effective after cutting back MFR

See timing on following slide.

Multiflora Rose

Rosa multiflora



*Most effective management technique(s)

Notes: Mowing if effective at clearing areas of large thickets and allowing for additional control.

Disposal: Plants can be composted as long as mature fruits aren't present.

Tips: Cut down Multifloral Rose in winter to make it easier to access site.

Mugwort

Artemisia vulgaris

Mugwort *Artemesia vulgaris*

- Herbaceous Perennial
- Habitat
  - Open sunny fields
  - Disturbed areas
- Reproduction
  - Prolific rhizomes
    -Can easily take over is not controlled
  - Limited seed production

Mugwort *Artemesia vulgaris*

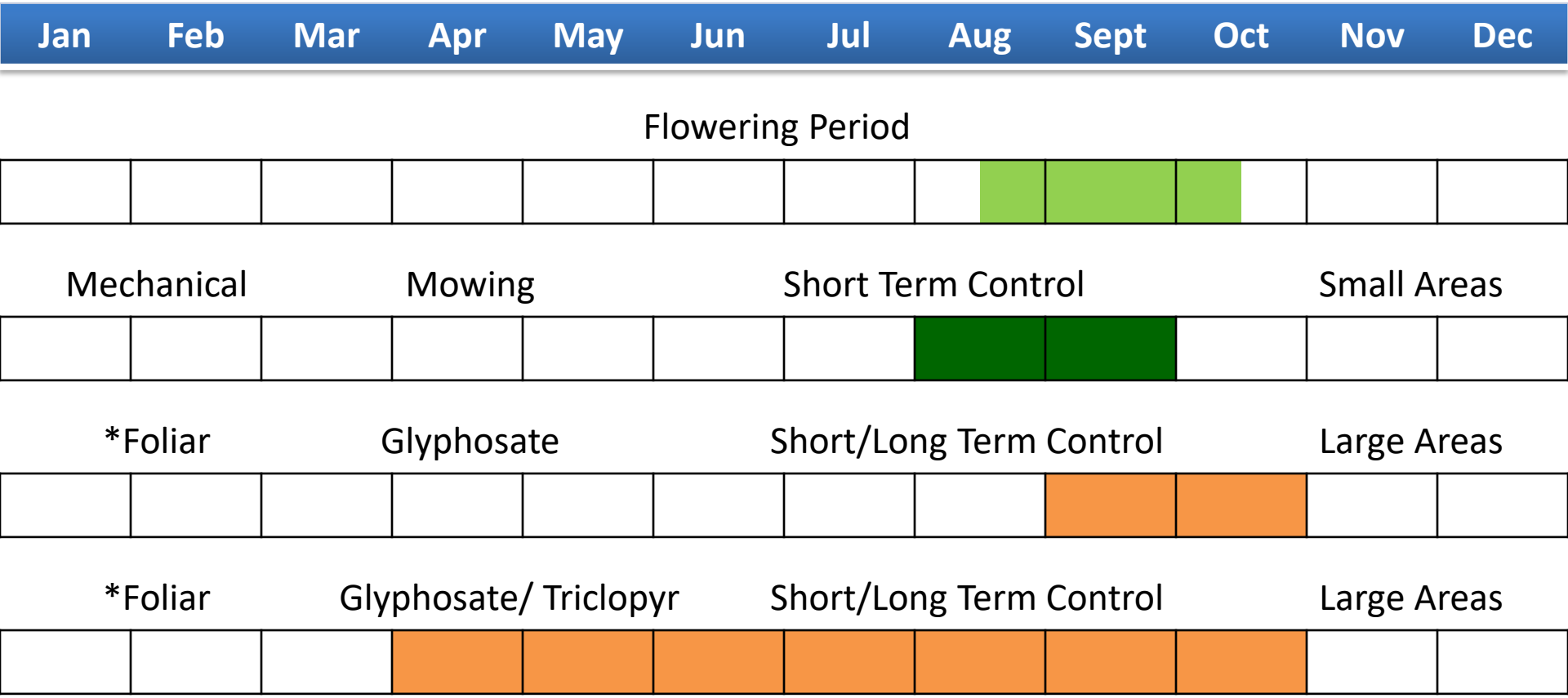
Management

- Mechanical
  - Mow: Even with repetitive mowing Mugwort may not be well controlled
    -Mow during flowering to control seed spread
  - Pull: Only effective in small areas due to extensive rhizomes
- Chemical
  - Foliar Spray: Glyphosate is effective late in the season late August-October
    -Glyphosate/Triclopyr is effective during growing stage

See timing on following slide.

Mugwort

Artemisia vulgaris



*Most effective management technique(s)

Notes: Mowing right before/during flowering stops seed production. Repetitive mowing throughout the year may control Mugwort as well.

Disposal: Mugwort cuttings will readily root, take care to clean equipment to prevent spread.

Tips: Mugwort is one of the toughest invasives to control, keep up management over time to achieve control.

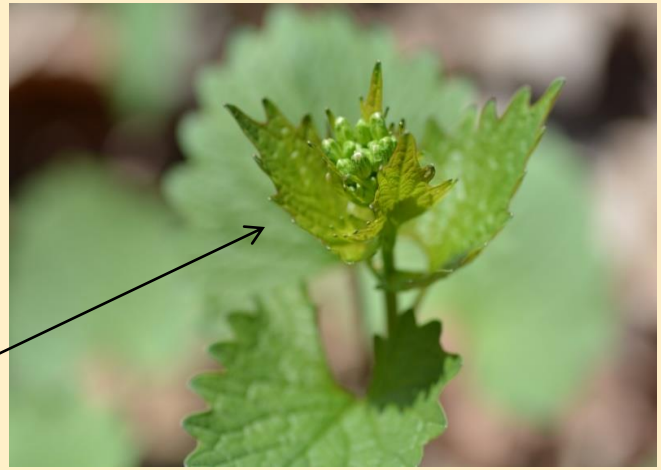
Garlic Mustard

Alliaria petiolata

Garlic Mustard *Alliaria petiolata*

- Herbaceous Biennial
  - Second year flower
- Habitat
  - Forests
  - Disturbed areas/roadsides
- Reproduction
  - Seeds
- Interesting Facts
  - Plants can produce 3500 seeds
  - Produce cyanide compounds which can kill other plants

Garlic Mustard *Alliaria petiolata*



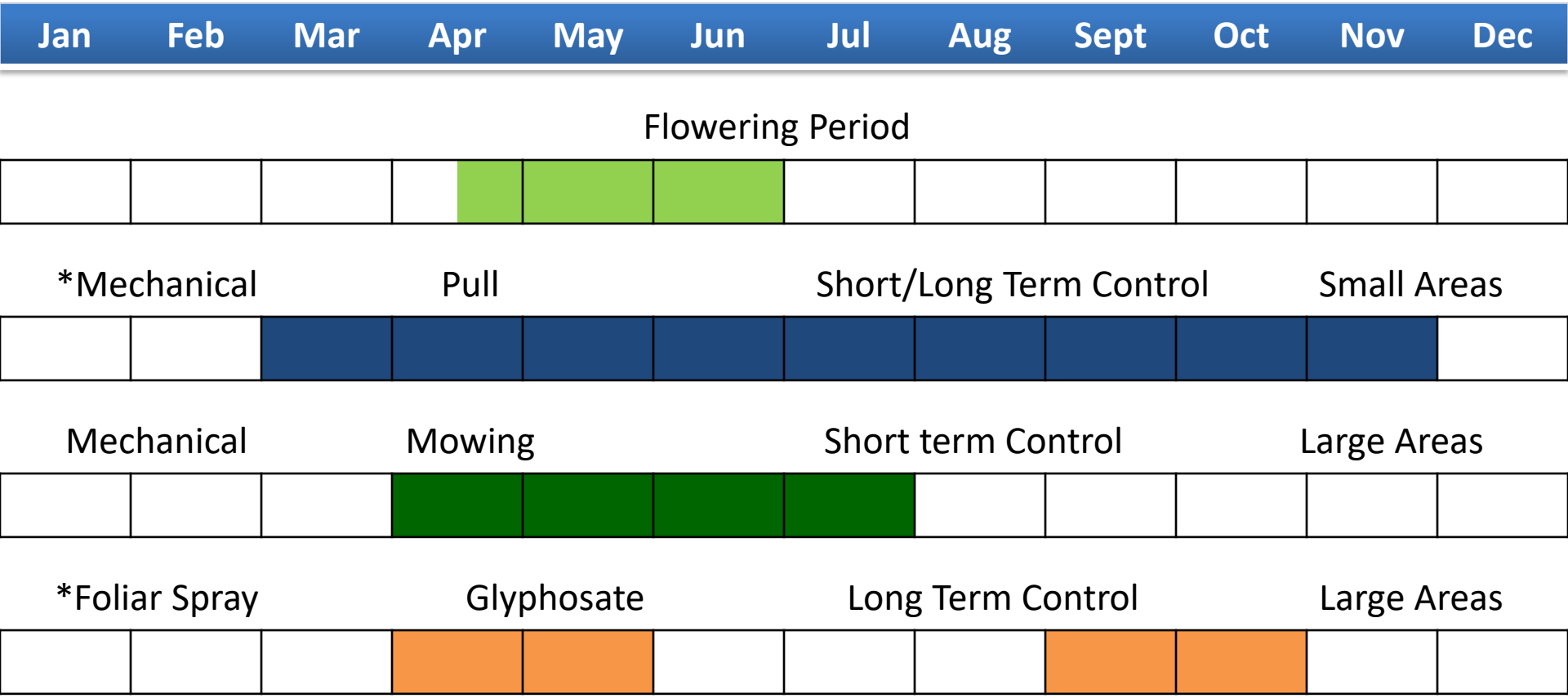
Management

- Mechanical
  - Pulling: 2nd year plants in spring and 1st year plants in the fall
    - Can leave plants to dry on site if not in flower
- Chemical
- Foliar Spray: Glyphosate/Triclopyr once early in the season and again later

See timing on following slide.

Garlic Mustard

Alliaria petiolata



*Most effective management technique(s)

Notes: Pull second year plants in the spring months and the first year plants in the fall.

Disposal: Leave plants without flowers on site after pulling.

Tips: Pull early in the season before flowers begin to elongate.

Autumn Olive

Elaeagnus umbellata

Autumn Olive *Elaeagnus umbellata*

- Perennial tree
- Habitat
  - Edge habitats and areas in full sun
- Reproduction
  - Seeds
- Interesting Facts
  - Mature trees may produce upwards of 20,000 to 54,000 fruits
  - Autumn Olive is able to fix nitrogen

Autumn Olive *Elaeagnus umbellata*

Management

- Mechanical
  - Cutting: Effective at preventing fruiting

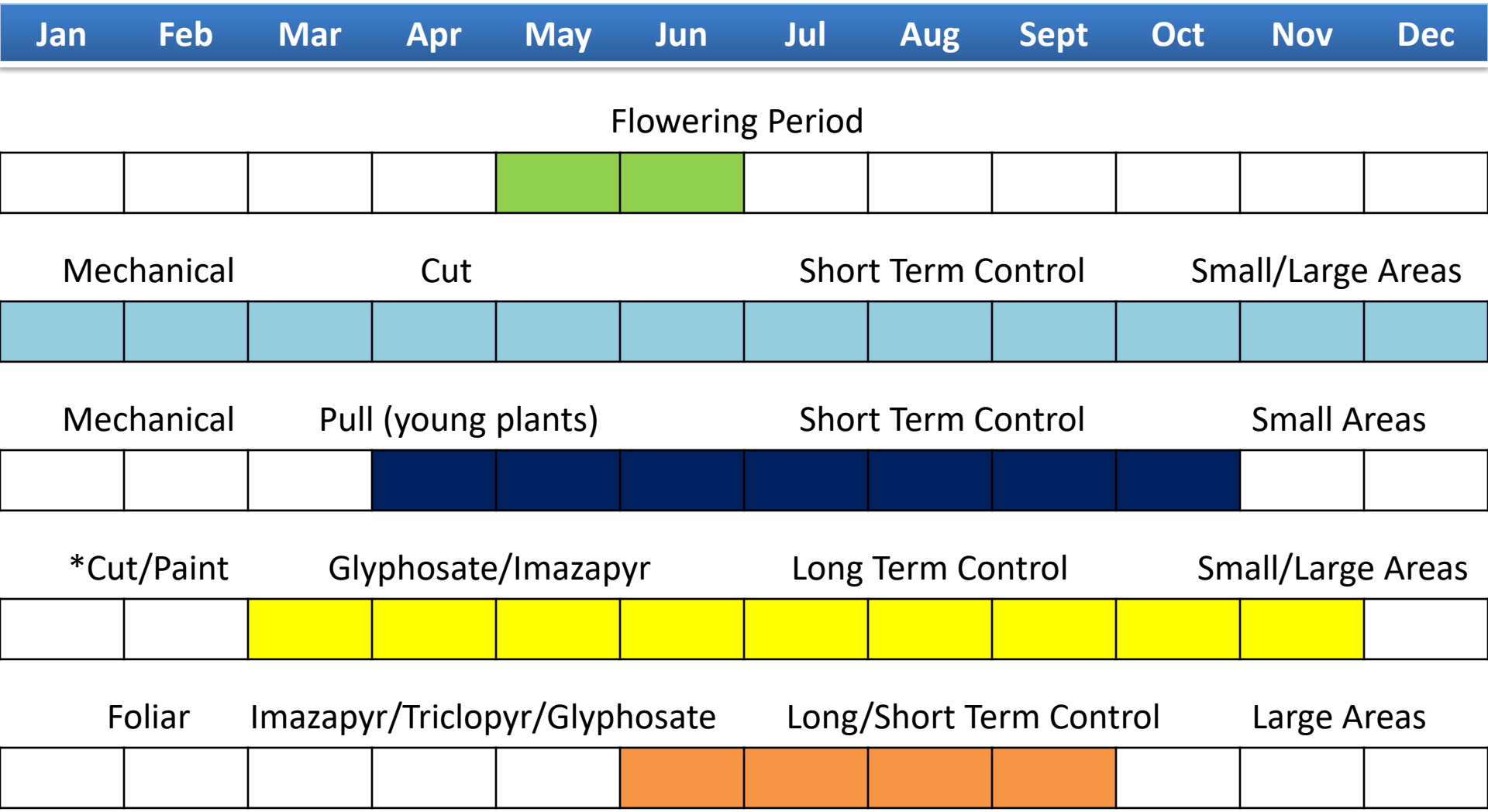
    -Plants will respond by sending out more shoots so follow-up is necessary
  - Pulling: Effective for young plants
- Chemical
  - Cut/Paint: Glyphosate/ Imazapyr is effective
  - Foliar: Imazapyr/Glyphosate/Triclopyr is moderately effective during late summer

Leslie J. Mehrhoff, University of Connecticut, Bugwood.org

See timing on following slide.

Autumn Olive

Elaeagnus umbellate



*Most effective management technique(s)

Notes: Trees will resprout vigorously after cutting, follow-up is necessary.

Disposal: Remove trees with mature fruit from site to prevent fruit from dispersing.

Tips: Leaf out occurs early and plants can be identified by their sliver tinted leaves.

Common Reed

Phragmites australis

Common Reed *Phragmites australis*

- Perennial Grass
- Habitat
  - Wetlands
- Reproduction
  - Seeds
  - Rhizomes

Photo by Great Lakes Phragmites Collaborative

Common Reed *Phragmites australis*

Management

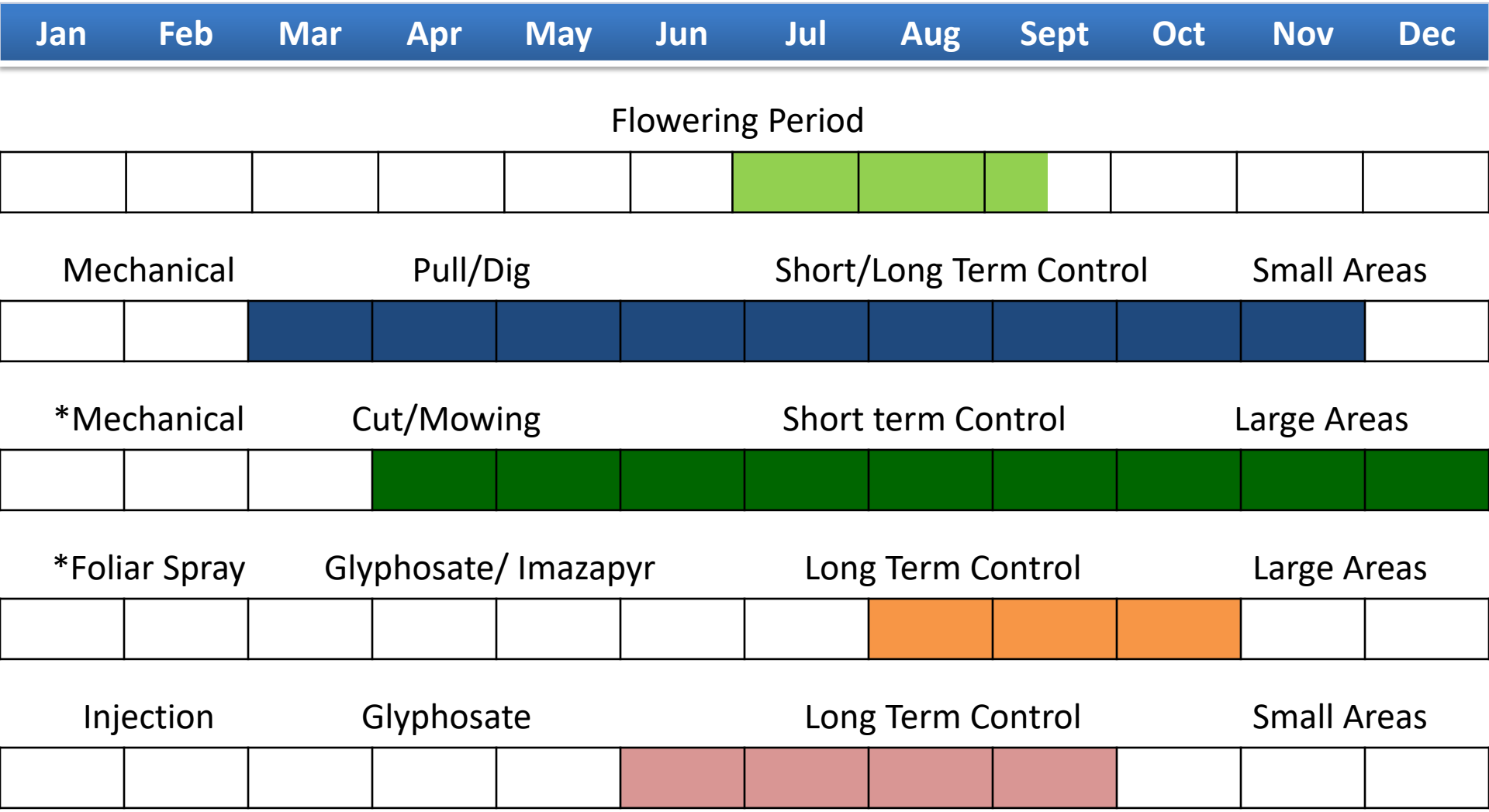
- Mechanical
  - Mowing: Effective at slowing the spread, useful after herbicide treatments as well
  - Pulling/Digging: Can be effective but is labor intensive
- Chemical
  - Foliar: Aquatic formulations of Imazapyr or Glyphosate
  - Injection: Glyphosate is also effective

Photo by Dave Hanson, MnDOT.

See timing on following slide.

Common Reed

Phragmites australis



*Most effective management technique(s)

Notes: Multiple years of foliar sprays can lead to control.

Disposal: Plants can be mowed down after herbicide.

Tips: Care should be taken in aquatic habitats with the use of equipment and herbicides.

Mile-a-Minute Vine

Persicaria perfoliata

Mile-a-Minute Vine *Persicaria perfoliata*

- Annual Herbaceous Vine
- Habitat
  - Disturbed areas, fields, edges
- Reproduction
  - Seeds
- Interesting Facts
  - A biological control, a weevil *Rhinoncomimus latipes*, has been released to control MAM populations in Connecticut.

Mile-a-Minute Vine *Persicaria perfoliata*

Management

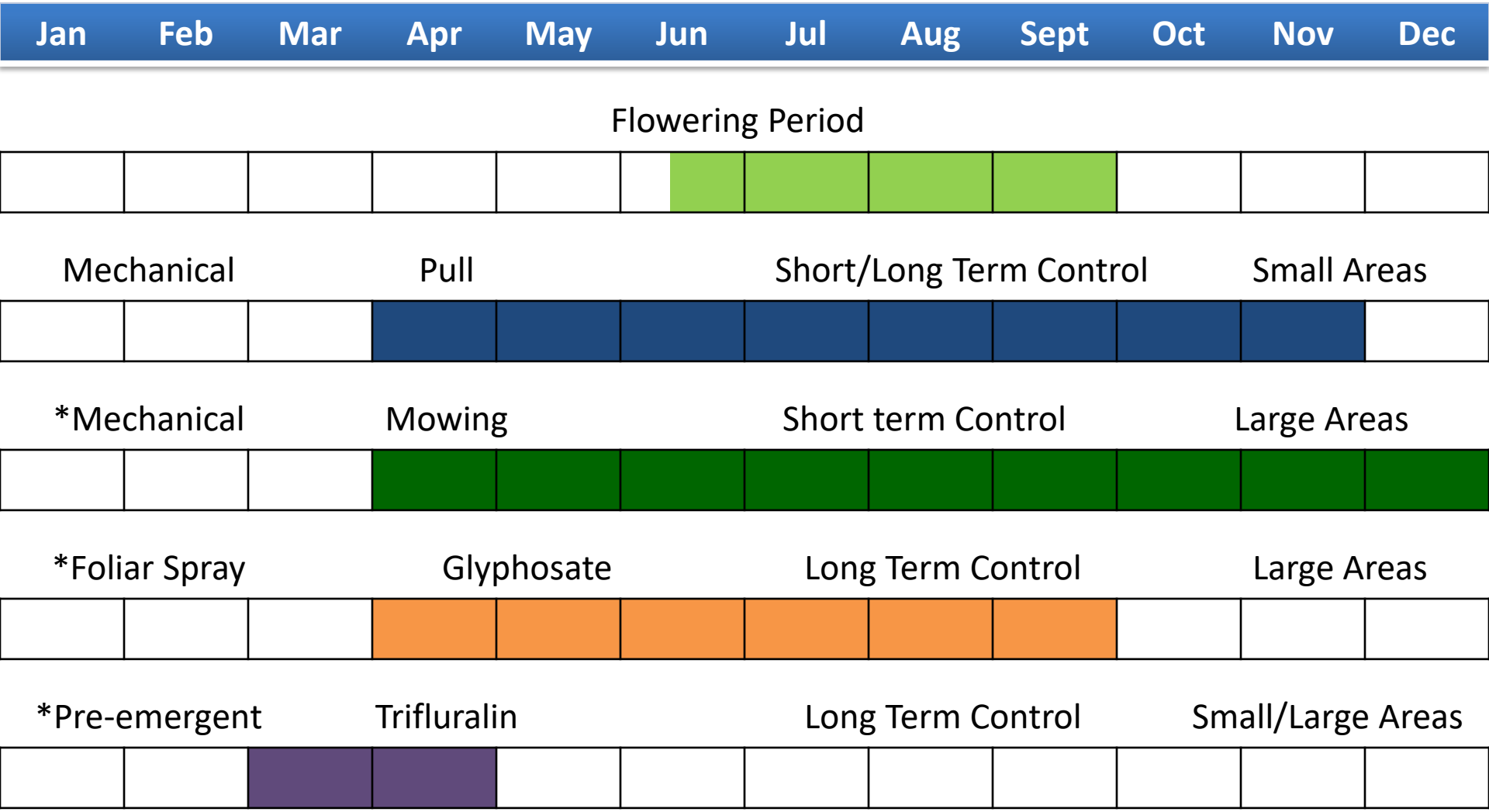
- Mechanical
  - Pulling: Can be very effective
    - -Seeds can survive upwards of 7 years in soil so follow-up is necessary

    Mowing: Effective at preventing flowering, weed whacking is also effective
- Chemical
  - Foliar: Glyphosate during the summer months
  - Pre-emergent: Trifluralin during late March-April

See timing on following slide.

Mile-a-Minute Vine

Persicaria perfoliata



*Most effective management technique(s)

Notes: Pulling early in the season, before flowering, can reduce the population considerably.

Disposal: Leave bagged plants on site to allow the weevils to pupate and fly away.

Tips: Return to sites every year to evaluate population size.

Black Swallow-wort

Cynanchum louiseae

Photo by Donna Ellis

Black Swallow-wort *Cynanchum louiseae*

- Perennial Herbaceous Vine
- Habitat
  - Fields, roadsides, sunny areas
- Reproduction
  - Seeds
- Interesting Facts
  - Swallow-worts are related to milkweeds and Monarch butterflies will lay eggs on them, however the caterpillars will not develop.

Photo by Donna Ellis

Black Swallow-wort *Cynanchum louiseae*

Management

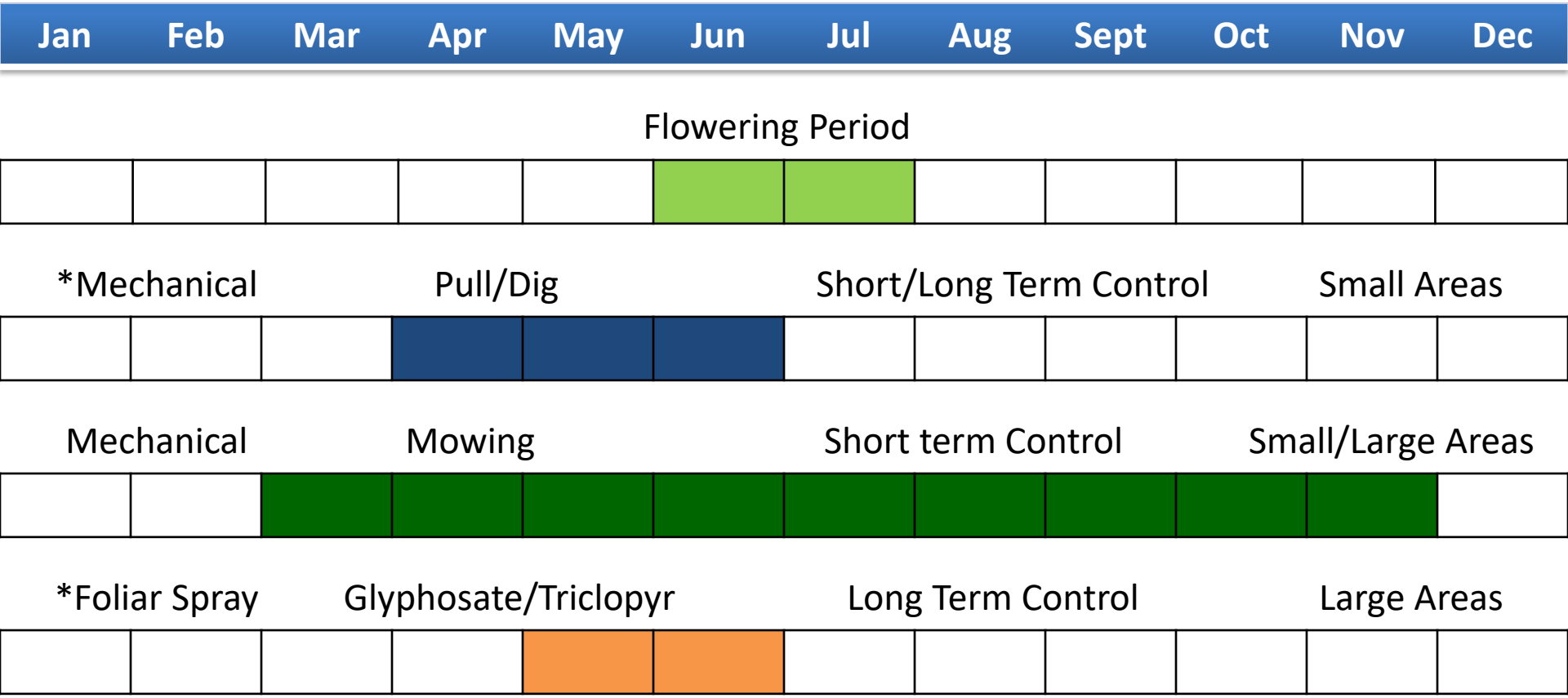
- Mechanical
  - Pulling/Digging: Effective but labor intensive
    -Since this species has a large perennial root system pulling is difficult
  - Mowing: Effective is continuously mowed during year
- Chemical
  - Foliar: Glyphosate/Triclopyr is effective before and during the flowering period
    -Seedpods may still mature after spraying

Photos by Donna Ellis

See timing on following slide.

Black Swallow-wort

Cynanchum louiseae



*Most effective management technique(s)

Notes: Foliar sprays earlier in the year may kill foliage but plant will resprout shoots.

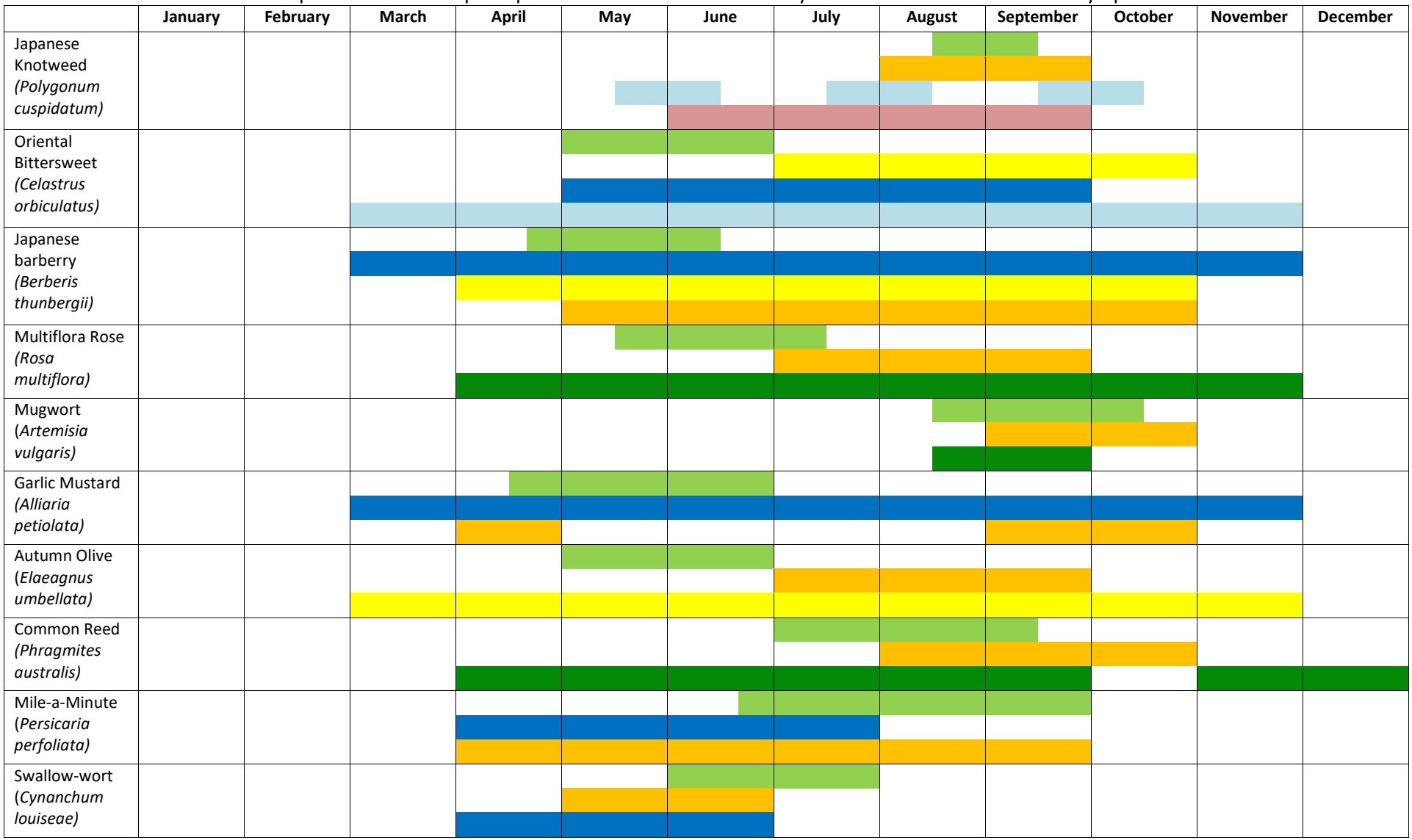
Disposal: Vines without rhizomes attached can be composted, rhizomes should be allowed to dry before disposal.

Tips: Continue to monitor sites after managing as rhizomes may produce additional shoots from any rhizomes underground.

Connecticut Invasive Plant Management Calendar

Created by Emmett Varricchio and members of The Connecticut Invasive Plant Working Group

These species were the Top 10 species of concern as identified by attendees of the 2016 CIPWG Symposium



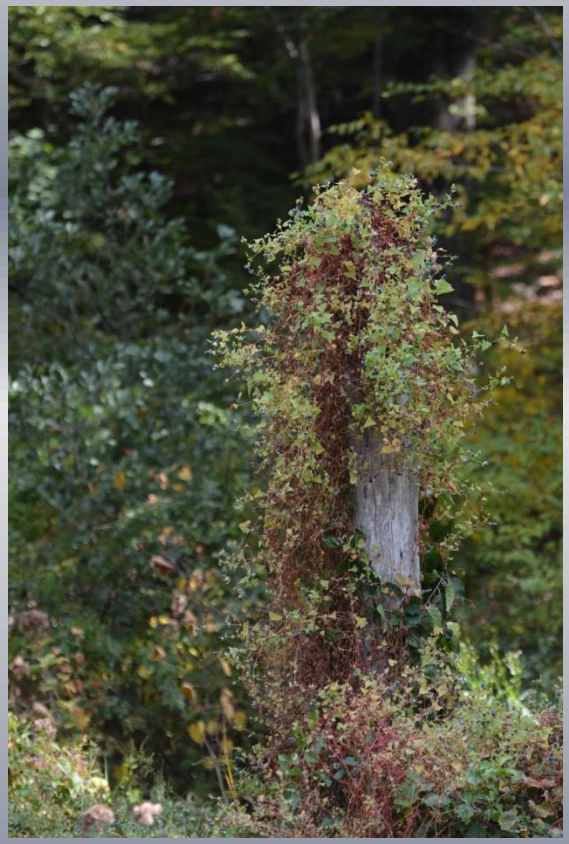
Note this calendar serves as a working draft of best management practices for managing invasive plants in Connecticut.

Please use proper safety practices when working with herbicides and equipment.

For additional information please visit https://cipwg.uconn.edu/ and download the 2018 Symposium Presentation titled Connecticut's Invasive Plant Management Calendar "The Top 10 Invasive Plants"

Thank you to all those who helped with the development of this calendar

- Christian P Allyn, Invasive Plant Solutions
- Jatinder Aulakh, CAES
- Frank Belknap, Manchester Conservation Commission
- Carole Cheah, CAES
- Michelle Clifford, East Granby Land Trust
- Sylvia Dorsey, Volunteer with New Haven Land Trust
- Donna Ellis, UConn, CIPWG
- Peter Fritsch, Master Gardener
- Rose Hiskes, CAES
- Marcia Kilpatrick, JT, Hampton Conservation Commission
- Josh Knox, The Trustees
- John Leto, CAES Experiment Station Associates
- Todd Mervosh, TM Agricultural & Ecological Services
- Ruth Miller, North Central Conservation District
- Bill Moorhead, Consulting botanist/plant community ecologist
- Donna Naser, Former Aspetuck Land Trust volunteer Land
- Kathleen Nelson, Mad Gardeners
- Mike Papa, Artscape organic care lc
- Peter Picone, DEEP
- Charles Rosenfield
- John Triana, RWA
- Tom Zetterstrom, NW CT Invasive initiative
- The entire CIPWG Symposium Planning Committee



As a reminder the best time to manage invasive plants is now!

Contact: emmett.varricchio@gmail.com