

# Invasive Species Management Plan

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85 Pinehurst Drive  
Boxford, Massachusetts

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**W&S Project No:**

BOXF-0065



## 1. Initial Inventory of Material to be Removed

- 1.1 The first task to be completed within the treatment areas will be to inventory the existing conditions of the treatment areas and assess what invasive species are scheduled to be removed from the site. A professional wetland scientist will mark each shrub to be removed with orange surveyors tape.
- 1.2 Invasive species of concern at 85 Pinehurst Drive:
  - 1.2.1 Asiatic Bittersweet (*Celastrus orbiculatus*)
  - 1.2.2 Glossy Buckthorn (*Franqula alnus*)
- 1.3 Information sheets for each species attached.

## 2. Removal of Invasive Plant Material From Treatment Area

- 2.1 Use whole plant removal techniques for both species, the entire plant will be removed from the ground by hand pulling. Material will be cut, bagged and removed from site or removed for composting and or burning.
- 2.2 Roots of wood plants are to be removed carefully, and with slow, extraction methods, using hand tools.
- 2.3 Once roots are removed, hand tools are used to remove any broken roots by hand by a thorough inspection of the treated area is made to insure the maximum removal of broken roots and twig material is advanced.

## 3. Stabilization of Treatment Area

- 3.1 The treatment area is then seeded and hay mulched immediately, if applicable, to stabilize the area from erosive forces.
- 3.2 The treatment areas should be seeded with a drought tolerate, native grass seed mix at approximately 4 to 5 times the normal application rate to insure a dominant native plant community within the disturbed area. A shade or sun tolerant seed mix should be used where conditions dictate. A mixture of all three (3) seed mixes can also be used in areas where conditions vary.
- 3.3 Salt hay should be hand cast over the area to establish protection over the newly seeded areas and to act as a velocity attenuation system to reduce rilling and erosive forces of rain and/or snow and ice melt.

## 4. Long Term Monitoring and Aftercare

- 4.1 Routine surveys of each of the treatment areas will occur on a monthly basis during the first six months after initial removal of the invasive species material.



- 4.2 Inspections will be focused on removal of new invasive material principally starting from seed sprouts remaining from the plant extraction process.
- 4.3 Seedlings should be handpicked and placed in plastic bags or use 5 gallon plastic buckets to contain the material. Harvested material should be either composted or burned according to local fire department rules and regulations.
- 4.4 Routine surveys and harvests of invasive species should be made on a monthly basis for the first 6 months, post removal and quarterly thereafter until such time that the environmental monitor is confident that invasive species are controlled and new invasions are limited.
- 4.5 Annual inspection should then follow for the remainder of the 5 year monitoring period following the same harvesting protocol as in the initial inspection process.



## Pest Management – Invasive Plant Control

### Buckthorns – *Rhamnus cathartica* & *Frangula alnus*

#### Conservation Practice Job Sheet

NH-595



Common Buckthorn (*Rhamnus cathartica* L.)



Glossy Buckthorn (*Frangula alnus* Mill.)

#### Buckthorns

The buckthorns are native to Eurasia. They were probably introduced to the US before 1800 but did not become widespread until the early 1900s. They are now found throughout much of the central and northern United States and into Canada.

Common and glossy buckthorns are shrubs or small trees that readily invade natural areas, establishing dense, even-aged thickets which crowd or shade out native plants. The buckthorns reproduce sexually by seed and vegetatively through root suckering. Both buckthorns produce fruits that are readily eaten, and thus seeds are spread by wildlife.

Buckthorns generally leaf-out earlier and retain their leaves longer than many native shrubs. This trait, shared by many invasive shrubs, gives them a competitive advantage over native plants but also allows landowners to easily locate the invasive shrubs and determine their extent on a property.

#### Description

Both buckthorns have lenticels (raised corky areas) on the bark and the inner bark is yellow.

Common buckthorn has dull green, minutely toothed, oblong leaves that are opposite or nearly so on the stem. Leaves have 3-4 pairs of veins which curve

upward toward the tip. Branch stems end in small thorns that appear between the last pair of buds. Fragrant flowers with four greenish-yellow petals develop into black fruit (3-4 seeds) that may persist well into winter.

Glossy buckthorn has thin, alternate glossy leaves which are oblong to elliptical with more than 5 pairs of veins and with smooth or wavy margins. Buds are rust-colored and naked. Five parted, yellowish-green flowers ripen from red to black (2-3 seeds).

#### Similar Natives

The native shrub Alderleaf Buckthorn (*Rhamnus alnifolia* L'Her) has alternate leaves with 8-9 pairs of veins and toothed margins. The leaf surface is puckered (like seer sucker fabric). The buds are scaly (not naked) but lack thorn tips of common buckthorn. Chokecherry (*Prunus virginiana*) is a common native shrub of hedgerows which has egg-shaped, alternate leaves that are finely and sharply toothed. Five parted white flowers are borne on dense, cylindrical racemes.

#### Control

As with all invasive species, buckthorns in natural areas are most effectively controlled by recognizing their appearance early and removing isolated plants before they begin to produce seed. With large

infestations, the largest seed-producing plants should be removed first.

Manual, mechanical and chemical methods are all useful to varying degrees in controlling buckthorns. Removing or killing plants will provide increased light at the site which may lead to a surge of seedlings in the following year. Prepare to monitor and control these outbreaks.

### **Biological Control**

There are no known biological controls of buckthorn.

### **Mechanical Control**

Mechanical controls include grubbing or pulling seedlings and mature shrubs, and repeated clipping of shrubs. Mechanical management requires a commitment to cut or pull plants at least twice a year for a period of three to five years. Cutting alone has resulted in limited success and may lead to vigorous re-sprouting. Grubbing or pulling by hand (using a Weed Wrench or a similar tool) is appropriate for small populations or where herbicides cannot be used.

Because disturbed, open soil can support rapid re-invasion, managers must monitor their efforts at least once per year and repeat control measures as needed. Limit soil disturbance whenever possible. Winter clipping should be avoided as it encourages vigorous re-sprouting.

### **Prescribed Burning**

Burning has met with mixed results and does not show great promise. Burns should only be used in fire-adapted plant communities. It is generally difficult to burn in dense buckthorn stands as the understory is typically well-shaded, allowing little fuel build-up.

### **Chemical Control**

**CAUTION: ALWAYS READ THE ENTIRE HERBICIDE LABEL. HERBICIDES ARE REGULATED AND MAY ONLY BE USED UNDER SPECIFIC CONDITIONS. CONTACT YOUR STATE DEPARTMENT OF AGRICULTURE FOR USE REQUIREMENTS, RESTRICTIONS OR RECOMMENDATIONS.**

Chemical control methods are best done during the fall when most native plants are dormant yet buckthorns are still actively growing. This lessens the risk of affecting non-target plants. The buckthorns' green leaves will provide easy recognition and allow for a thorough treatment at this time. Winter application of chemicals has proven to be successful

as well, and further lessens the risk of damaging non-target species.

Glyphosate (brand names Roundup, and for use near waterbodies, Rodeo) is a nonselective herbicide which kills both grasses and broad-leaved plants while triclopyr (brand names Garlon, Pathfinder, and others) is a selective herbicide that kills broad-leaved plants but does little or no harm to grasses.

**Cut Stump Treatments:** For 'cut stump' treatments, horizontally cut the stem near the ground. Do not cut the stem at ground level. Leaving some stem will allow another cut and application if there is sprouting. Apply a 20-25% solution of glyphosate or triclopyr<sup>3</sup> and water to the stump being sure to cover the outer, top 20% of the cut stem<sup>1,2</sup>. Herbicide must be applied immediately following the cutting. This treatment is best applied late in the growing season when the plant is transporting nutrients to its root system (August-October).

**Foliar Treatment:** For foliar treatments a 2% solutions of glyphosate and water can be used<sup>2</sup>. The treatment should be applied to the foliage late in the growing season. Do not cut down treated plants for at least a full growing season.

**Basal Bark Method:** This method is effective throughout the year as long as snow cover does not prevent spraying to the ground level. Apply a mixture of 25% triclopyr and 75% horticultural oil to the basal parts of the shrub to a height of 12-15 inches from the ground<sup>3</sup>. This mixture is also applicable to frill applications where herbicide is applied into the cambial layer of fresh cuts on the tree trunk<sup>3</sup>. Be sure to treat entire circumference of the stem in a band at least 12 inches wide. Thorough wetting is necessary for good control; spray until run-off is noticeable at the ground line. Do not apply to bark that's wet from heavy dews and rain.

<sup>1</sup> – From TNC ESA – Buckthorns

<sup>2</sup> - Wisconsin DNR Control Manual

<sup>3</sup> – Alien Plant Invaders Fact Sheets

### **Important Note**

Mention of specific pesticide products in this document does not constitute an endorsement. These products are mentioned specifically in control literature used to create this document.

**Disposal**

Small, pulled shrubs should be hung in trees to prevent re-rooting. Larger, pulled shrubs may be piled or piled and burned, roots up, to prevent re-establishment. Cut stems may be piled or piled and burned. Chip once all fruit has dropped from branches. Leave resulting chips on site as buckthorns will spread by seeds.

**Information and Recommendations compiled from:**

- The Nature Conservancy - Element Stewardship Abstract (and references therein)
- Invasive Plant Atlas of New England (IPANE)
- Vermont Invasive Exotic Plant Fact Sheets
- CT NRCS Invasive Species ID Sheets
- Wisconsin Manual of Control Recommendations for Ecologically Invasive Plants (DNR)
- Alien Plant Invaders of Natural Areas (NPS)
- Newcomb's Wildflower Guide





# American and Oriental Bittersweet Identification

**I**nvasive species are one of the greatest threats to native ecosystems. They can crowd out native species and change the natural nutrient cycling processes that take place in ecosystems.



Oriental bittersweet

One of the best ways to combat invasive species is by identifying small infestations and removing them.

One invader threatening midwestern ecosystems is oriental bittersweet (*Celastrus orbiculatus*). This woody vine was introduced to the eastern United States in the mid-1800s. It has spread from the east to the south and west and is now moving into midwestern natural areas. Oriental bittersweet can be found in a variety of habitats, from roadsides to interior forests and sand dunes. It has the ability to girdle and overtop adjacent vegetation – often to the detriment of native species. To halt the spread of oriental bittersweet, significant control measures are needed.

However, a native bittersweet species, American bittersweet (*Celastrus scandens*), can be mistaken for oriental bittersweet. Although American bittersweet is also a



American bittersweet

vine and climbs on nearby vegetation, it does not appear to grow as rapidly or as large as oriental bittersweet. In the northeastern United States, American bittersweet is declining because of habitat change and possible hybridization, while in the Midwest, it is still common.

Because the two bittersweet species look so similar, there can be difficulty knowing

which plants to target for control. Using fruit and leaf characters, the two species can be discriminated from each other. However, certain traits are more reliable for correct identification than others. Classically, the position of the fruit and flowers on the stems has been cited as the most definitive means of discriminating between the species.

Oriental bittersweet has fruit and flowers located in the leaf axils along the length of the stem. American bittersweet, however, only has fruit and flowers in terminal clusters. There is also a difference in the color of the capsules surrounding the ripened fruit in the fall. Oriental bittersweet has yellow capsules, while those of American bittersweet are orange. Another difference in color is the pollen color of the male flowers. The pollen of oriental bittersweet is white while that of American bittersweet is yellow.

Some less definitive fruit traits for discrimination are size of the fruits and number of seeds per fruit. American bittersweet has generally larger fruit than oriental bittersweet. If fruits have a volume of greater than 250 mm<sup>3</sup>, there is a 90% probability of a plant being American bittersweet, while if the fruit has a volume of 115 mm<sup>3</sup> or less; it has a 90% chance of being oriental bittersweet. Values in between these numbers overlap to some extent between the species. Similarly, if the fruit has one or fewer seeds, it is 90% likely to be American bittersweet, while five or more seeds have a 90% chance of being oriental bittersweet. The greater number of seeds of oriental bittersweet gives it a reproductive advantage over the native species.

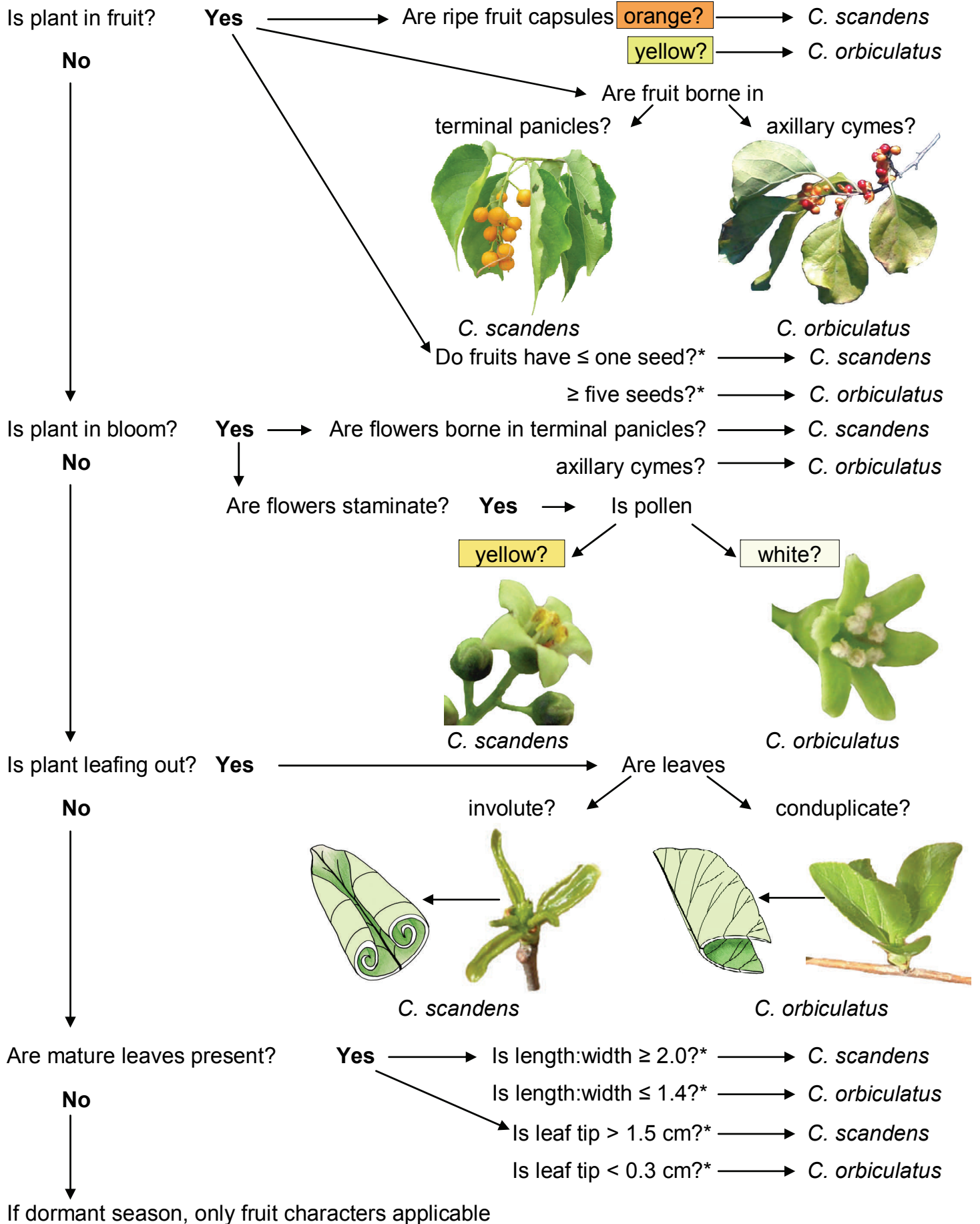
The problem with using fruit and flower traits for discriminating between the two species is that, for fruits, only mature

female plants have this character available for identification. In terms of flowers, only mature male and female plants have these present, and only for a brief time of the year during the spring.

Vegetative traits apply to plants regardless of their sex or maturity. The most definitive vegetative trait is the posture of the leaves at leaf out of the first buds in the spring. The leaves of oriental bittersweet are conduplicate (two sides of the leaf folded against each other) and tightly packed in the bud when they emerge in the spring. The leaves of American bittersweet are involute (leaf margins rolled in like a scroll) and not as tightly packed in the bud.

Other leaf traits are not as reliable as the leaf-out posture. Although the ratio of length-to-width (length:width) of the leaves is generally greater for American bittersweet, this trait is quite variable. If the length:width of the leaf is greater than or equal to 2, there is a 90% chance of the plant being American bittersweet, while if the ratio is less than or equal to 1.4, there is a 90% chance of it being oriental bittersweet. The tips of the leaves of American bittersweet are also generally longer than those of oriental bittersweet. Plants with leaf tips of 1.5 cm or greater have a 90% chance of being American bittersweet, while plants with leaf tips of 0.3 cm or less have a 90% chance of being oriental bittersweet.

By using these traits, plants could be marked at the appropriate time of year (spring or fall) for control at a later point. In this manner the invasive species can be targeted without harming the native. The key on the next page summarizes the key traits for discrimination of these two species in the field.



\* Indicates a 90% probability of correct identification based on the data collected for this study. Colors in text boxes are to be used as a guide only, actual colors seen in the field may differ.