

The “Dirty Dozen”:



Identification, Ecology, and Management Options for Invasive Vegetation on Cape Cod

A publication of Safe Harbor’s Environmental Education Initiative

By Gordon Peabody, Safe Harbor Environmental Services
Edited by Alexis Doshas, Safe Harbor Environmental Services

This first edition compilation of invasive vegetation on Cape Cod consists of species we have found to be problematic and aggressive. There are many species that are also considered invasive and this publication does not attempt to represent them all.

This publication may be copied, circulated, and shared for educational purposes only. This work may be cited but in no way should it be altered, transformed, built upon, or used as an endorsement of other work, including commercial purposes. Reference our Habitat Revegetation Cookbook designed to help select native vegetation for specific habitats on Cape Cod, for initial plantings and for incorporation with invasive vegetation removal.

2010 Gordon Peabody, Safe Harbor

Where do invasive plants come from, and why do we care?

Non-native “invasive”, or “bully” vegetation, takes over disturbed areas where native plants have been removed, stressed or damaged, resulting in a change in the natural habitat. Disturbances can be from storms, climate change or human activity (anthropogenic) impacts. Invasive plants aggressively outgrow and out-compete native plants for sunlight, moisture, and nutrients, and do well in a variety of conditions. Some invasive plants exhibit (allopathic) characteristics that chemically inhibit competition from native plants. These aggressive plant behaviors may create a feedback loop contributing to an invasive monoculture which replaces native biodiversity. The loss of these native plants may have a far reaching impact on the natural food web, possibly displacing species, such as pollinating insects and birds, reliant on the food source. Native vegetation supports native animal populations 10-50 times more than invasive vegetation, as well as the natural landscapes we cherish. The loss of native vegetation has economic and ecological consequences for Cape Cod’s limited resources.

What can we do about invasive vegetation?

Prevent establishment of invasive vegetation:

Use of native soils and planting of native plants after a disturbance is crucial. Native plants are available as transplants, plugs, seeds, and potted plants and are available at your local nursery; refer to our Revegetation Cookbook for recommendations of suitable native plants.

If topsoil has been removed, it can be replaced with native compost, available free at your local transfer station and should be used in moderation.

Prior to construction projects, consider using excavation equipment to remove native vegetation and soils which can be stored on site and replanted after construction.

In areas where invasive vegetation has become established, options for removal and management:

For small scale areas (yards)

- 100% removal of invasive vegetation may be followed by replanting of native vegetation (see Safe Harbor's Habitat Revegetation Cookbook).

Native plants are available as transplants, plugs, seeds, and potted plants and are available at your local nursery.

For large scale areas

- where invasive vegetation is already established, a transition from invasive to native vegetation should be implemented over several years. We recommend developing a management plan. It may be helpful to contact a landscape or environmental professional. Safe Harbor offers free consultations.

Management Tool Kit

A combination of methods to manage invasive vegetation may be most effective. Below is a list of techniques currently being practiced. New and innovative methods for combating invasive vegetation are always being created as our knowledge of them broadens, and will be updated periodically.

Mechanical Control-

Physical removal- of small patches of invasive plants

Care should be taken to include all roots if possible and to dispose of accordingly:

Never compost invasives; many can resprout or spread seeds. Dispose of the aggressive plants and all parts in black plastic bags.

The black bags will cook the plants.

Tarping- Smother the plants: for low growing and herbaceous (non-woody) invasive plants, cover the area completely with black plastic and secure with landscaping staples.

May take from 3-6 months for complete die off, depending on the plant.

Cutting-Target invasive vegetation in the fall, before seed release, when their carbohydrate cycle is weak, and regrowth is slow.

Mowing –Mowing down plants should be repeated often.

Burning-For large areas, controlled burning of the invasive plants may be incorporated. The use of a hand torch is recommended for sensitive or small areas.

Biological-

Insect introduction; the use of natural predators has been proven successful with some invasive plants

Animal grazing –

Grazing by goats or sheep has been found to retard growth of invasive plants. Local farmers and/or environmental professionals may make animals available to rent.

Herbicides; natural and chemical-

Natural methods:

“**Burn-Out**”, a lemon and vinegar mixture wiped or sprayed on leaves, encourages dehydration.

Cut & drip, cut invasive plant stalk and drip with a kosher salt solution

Chemical methods:

Chemical herbicides interfere with a plants ability to store carbohydrates. They may be incorporated for extremely aggressive species or extensive infestations. Applying herbicides directly by painting on to foliage with a paintbrush, as opposed to spraying, minimizes exposure to the applicator, the neighboring vegetation and the soil and groundwater supply. Utilizing tarps or cardboard to mask the surrounding area, in the case of spraying, is also effective.

Eating-

Many creative recipes have been inspired by the abundance of invasive vegetation; and think of the satisfaction!

See:

<http://www.csmonitor.com/Environment/LivingGreen/2009/0903/invasive-plants-from-pest-to-pesto>

A note on chemical herbicide use:

Though these steps may seem tedious the protection of native species and groundwater are important. **Glyphosate** herbicides are recommended because they are biodegradable (Rodeo™ is the best option for areas abutting bodies of water, and sensitive areas; Round-up™ and Habitat™ are also recommended but are deadly to aquatic life and contain risk of contamination to drinking water supply). Consult with a landscape or environmental professional with additional questions regarding herbicide applications, and always wear protective gear during application. See: http://www.hc-sc.gc.ca/cps-spc/pest/part/protect-proteger/use-utiliser/_home-maison/index-eng.php for more detailed information.

A *combination* of these practices, along with a multi-year management plan which includes the reestablishment of native species is the best recipe for success. Refer to the recommended management controls listed for each invasive.

Links:

The Nature Conservancy-<http://www.invasive.org/gist/esadocs.html>

USDA-<http://www.invasivespeciesinfo.gov/plants/controlplans.shtml#bro>

www.naturalbiodiversity.org

University of Rhode Island-

http://www.uri.edu/cels/ceoc/ceoc_programs_clp_imcp.html

The Invasive Species Cookbook: Conservation through Gastronomy *J.M. Franke. 2007. Wauwatosa, WI: Bradford Street Press. Paper, \$24.95. 111 pages.*

Links to recipes-

<http://nbiinin.ciesin.columbia.edu/ipane/weedwisdom/recipe.htm>

An invitation:

*Please feel free to contact **Safe Harbor** with your questions. Our office overlooks Duck Creek Marsh at 95 Commercial Street in Wellfleet, MA. Give us a call and come by for a cup of coffee.*

Email: gordonsafeharbor@yahoo.com or phone: 508.237.3724

Asian Bittersweet or Oriental Bittersweet

Celastrus orbiculatus

Introduced to U.S. in 1876.

Identification:

A tangled or high-climbing vine with nearly circular leaves.

Buds small, pointed, sharply set nearly at right angles to stems.

Stems round, hairless, thornless, brown.

Leaves 2"-5". Climbs to 60'.

Flowers small, green, clustered, Bloom time: May-June.

Fruits: ornamental clustered orange-colored pods that open to reveal scarlet seed-coverings, Sept.-Dec. or longer.



Ecology:

Found as scattered plants to extensive infestations in forest openings, margins, and roadsides as well as in meadows.

Colonizes by prolific vine growth and seedlings, and spreads by bird- and other animal-dispersed seeds and collection by humans for decorative purposes (wreaths, etc.)

Management Techniques:

Thoroughly wet all leaves with one of the following herbicides in water with a surfactant (a wetting agent used to lower the surface tension of water) from July to October: Garlon 4, Garlon 3A at 3-percent solution, or 14% triclopyr (pathfinder™) as a 4-percent solution (8 ounces per 3-gallon mix). An advantage to using triclopyr is grasses, sedges, liliaceous plants, etc., will not be killed and will remain to prevent soils from being completely exposed. These remaining plants often dominate sprayed sites a year after treatment. Triclopyr is also the active ingredient, in relatively dilute form, in the Ortho product Brush-B-Gone which, unlike Garlon, is not a restricted use chemical.

Regular, weekly mowing is effective, however mowing 3 to 4 times a year promotes aggressive regrowth.

Autumn Olive

Elaeagnus umbellate

Introduced to U.S. in 1830.

Identification:

A shrub marked with distinctive rusty and silvery scales.

Leaves egg-shaped to elliptic, green above, silver brown and scaly below. Smooth to wavy-edged.

Twigs may be somewhat spiny and marked with brown and silver scales. Leaves 1"-5", Height to 12'.

Flowers silvery yellow, fragrant, Bloom time: June-July.

Fruits reddish and juicy, small, elliptic, fleshy and edible, but dry, July-Oct.



Ecology:

Grows well in a variety of soils including sandy, loamy, and somewhat clayey textures with a pH range of 4.8-6.5. It has nitrogen-fixing root nodules which allow it to thrive in poor soils.

Drought tolerant and may invade grasslands and sparse woodlands.

Typical habitats are disturbed areas, roadsides, pastures and fields.

Control and Management

Seedlings and sprouts can be hand-pulled when the soil is moist to insure removal of the root system.

Note: On larger plants, cutting alone results in thicker, denser growth.

Grazing by goats could be incorporated.

It can be effectively controlled using any of several readily available general use herbicides such as glyphosate.

Japanese Honeysuckle

Lonicera japonica

Introduced to the U.S. in 1806.

Identification:

An aggressive imported vine forming dense tangles climbing over underbrush or sprawling over open ground.

Twigs and leaves densely hairy, green on both sides, and purplish beneath.

Upper leaves not united; lower leaves often lobed, such as white oaks.

Foliage often evergreen, leaves 1 ½" – 3 ½".

Flowers ½"- 1", mostly single white or yellowish, hairy inside, bloom time: April-July.

Fruits black berries, Sept.-Nov.



Ecology:

Colonizes disturbed areas including roadsides, open banks, old fields, forest edges, and managed forests. Tolerant of a wide variety of soil conditions and is especially aggressive in disturbed bottomlands and floodplains. It invades native plant communities after natural or human disturbances such as wind throw, insect outbreaks, road building and logging.

Control and Management:

Hand-pulling of vines and root systems may be effective. Pull out by the roots in winter, aim the roots upward and tie them in place to avoid damage to tree. The absence of light energy causes the trailing vines to decline precipitously next year, with minimal soil disturbance. Do not pull it out of the trees and watch for native vines (moonseed, trumpet vine, native grape etc.). Cut and wipe with Roundup (glyphosate, 20%) in winter or late fall to avoid natives.

Grazing by goats or sheep could be incorporated.

Common Reed

Phragmites australis

Eurasian genotypes considered exotic and invasive, North American types considered native

Identification:

A tall perennial grass with creeping rhizomes that may make a dense vegetative mat. The leaves are rolled in the shoot, no auricles are present, and the ligule is a fringe of hairs. Leaf blades around ½' wide, up to 1 ½' long, flat, and glabrous. The leaf margins are rough and the sheaths are overlapping. The panicle is large and showy, but plants rarely produce viable seed. Most reproduction occurs vegetatively.



Caroline Savage

Ecology:

Tidal and non-tidal brackish and freshwater marshes, river edges, shores of lakes and ponds, roadsides, disturbed areas.

Control and Management

Areas with large, established, populations of *Phragmites* are best restored using herbicides. . One successful method includes applying glyphosate herbicide (Rodeo) into the individual hollow reed “stumps” left after cutting. The herbicide is absorbed and transported to the rhizome, and the underground part of the plant was killed. Other options include mowing, prescribed burning, grazing, and the cut & drip method.

Tree of Heaven

Ailanthus altissima

Introduced to the U.S. in 1748

Identification:

A fast growing small to large tree with very large leaves having 11-41 leaflets.

Leaflets not toothed, except near base.

Twigs hairless, yellow-brown, stout with continuous yellowish pith.

Buds small, brown-woolly: end buds false.

Leaf scars very large, somewhat triangular, with numerous bundle scars. Bark gray-brown, smooth, or with narrow light-colored grooves.

Leaves 12"-24" or more. Height 80'-100'; diameter 1'-2'.

Flowers small, yellowish, clustered, male blossoms with foul odor bloom time: June-July.

Fruits dry, narrow, 1-seeded, winged, Sept.- winter.



Ecology:

A common tree in disturbed urban areas, where it sprouts up just about anywhere- including alleys, sidewalks, parking lots, and streets.

Seedlings are known to pop up by the hundreds in recently planted fields and as persistent thickets in rocky, un-tillable areas.

Control and Management:

Elimination requires diligence, due to its abundant seed production, high seed germination rate, and vegetative reproduction. Stump application or girdling with the use of herbicides has been found to be effective; however, follow-up with foliar application on any resprout is required.

Establishing a thick cover of trees (non-invasive and preferably native) or grass sod will help shade out and discourage establishment of seedlings.

Grazing by goats could be incorporated.

Cypress Spurge

Euphorbia cyparissias L.

Introduced from Eurasia as an ornamental plant in the 1860's; widely planted in cemeteries and often called graveyard weed or graveyard spurge.

Identification:

An erect herbaceous to semi-woody perennial plant in the Spurge (Euphorbiaceae) family that grows 6-12" in height. Whorled bright green leaves, .4-1" and and wide. Flowers bright yellow green turning purple-red as they mature. Bloom time: May through August.

Fruit is three lobed and contains 1-3 egg shaped smooth gray seeds which splits and explodes, sending seeds to over 16 feet. Reproduces vegetatively through lateral root buds with a taproot that may reach 10 feet



Ecology:

Presently occurs in a wide range of sunny or partly shaded environments. Prefers dry to moist sandy, gravelly, or calcareous soils. Can be found in meadows, pastures, road edges, cemeteries, and other disturbed areas. In natural settings, it thrives in dunes, panes, coastal heathlands, grasslands, and calcareous glades.

Control and Management:

Manual control can be hard to achieve due to its extensive root system, for small scale pulling should include all roots. Gloves should be worn when handling, the white milky sap is a serious eye irritant (toxic). Mowing often spreads seed and increases density. It can be effectively controlled using glyphosate- based herbicides with repeated applications. Follow label and state requirements. Biocontrol has been successful. Eleven species of European insects were released in North America. Rhode Island has successfully used five chrysomelid beetles in the genus *Aphathona* and one cecidomyiid fly gall midge, *Spurge esulae* Gagne.

Japanese Knotweed

Polygonum cuspidatum

Also known as fleecflower, Himalayan fleece vine, monkeyweed, Hancock's curse, elephant ears, pea shooters, donkey rhubarb, sally rhubarb, Japanese bamboo, American bamboo, and Mexican bamboo

Introduced in the U.S. in the late 1800s

Identification:

Stems are stout, cane-like, hollow between the nodes, somewhat reddish-brown, 5 to 8 feet tall, and profusely branched. Leaves are thick and tough in texture, with short petioles, 2 to 7 inches long and about two-thirds as wide, spade-shaped with a truncate base and an abruptly narrowed leaf tip. An identifying character is the lack of hairs on the leaf undersides. Instead of hairs, there are low, bump-like structures (scabers) visible on the veins with a hand lens.

The flowers are small, creamy white to greenish white, and grow in showy plume-like, branched clusters from leaf axils near the ends of the stems.

The fruit is 3-sided, black and shiny.



Ecology:

Tolerate of a variety of adverse conditions including full shade, high temperatures, high salinity, and drought. Found near water sources, such as along streams and rivers, in low-lying areas, waste places, utility rights-of-way, and around old home sites.

Control and Management:

Grubbing is effective for small initial populations or environmentally sensitive areas where herbicides cannot be used, by using a digging tool to remove the entire plant including all roots. Juvenile plants can be hand pulled depending on soil conditions and root development.

Any portions of the root system not removed will potentially resprout. Injection of herbicides may be successful, when stalks are at mature height, after August 1st (cutting before August 1st will stimulate growth). One control recommendation is to cut knotweed stems in the spring and apply a foliar herbicide to the sprouts during the early fall of the same year. All plant parts (including mature fruit) should be bagged and disposed of in a trash dumpster to prevent reestablishment. Biological controls include the Japanese insect *Aphalara itadori*, which feeds on the sap of the superweed, stunting its growth. Culinary uses include substituting the stalks for rhubarb in pies, crumbles, and preserves. Controlled grazing by goats or sheep may be incorporated in a management practice.

Purple Loose Strife

Lythrum salicaria

Introduced in the U.S. in the early 1800s

Identification:

Wildflower with whorled, entire leaves.

Purple flowers in a dense spike.

Flowers showy, $\frac{1}{2}$ " - $\frac{3}{4}$ " wide, with 5 or 6 petals.

The leaves are lance-shaped, somewhat clasping the stem, and grow in pairs or sometimes in whorls of 3.



Ecology:

Invades many wetland types, including freshwater wet meadows, tidal and non-tidal marshes, river and stream banks, pond edges, reservoirs, and ditches.

Control and Management:

Small infestations may be pulled by hand, preferably before seed set. Successful hand pulling methods include winter pulling when the ground is wet, followed in the spring to remove any resprouts. This along with all methods, require a several year management plan.

For older plants, spot treating with a glyphosate type herbicide (e.g., Rodeo for wetlands, Roundup for uplands) is recommended, applied by controlled injection or spraying into stalk after seed head is carefully cut and bagged. These herbicides may be most effective when applied late in the season when plants are preparing for dormancy. However, it may be best to do a mid-summer and a late season treatment, to reduce the amount of seed produced. Controlled grazing by goats or sheep may be incorporated in a management practice.

Black Swallow-wort

Cynanchum louiseae

First collected in a botanical garden in Ipswich, MA in 1854

Identification:

Vine with entire leaves, dark-purple, fragrant flowers, about ¼” wide in small clusters in the axils.

Leaves egg-shaped, in pairs or sometimes whorled.

Fruit pods similar to those of the Milkweeds, 2”-6” long, late spring and summer.



Ecology:

Found exclusively in upland areas and tolerant of a range of light and moisture conditions.

It has been reported to occur above the high tide line of some rocky coastal areas where it can tolerate relatively high salt concentrations.

Control and Management:

Early detection and removal is the best approach for preventing the establishment and spread of this plant. Stay out of patches that are actively dispersing seeds, unless you plan to collect and dispose of the seeds carefully. Clean all machinery that has traveled through swallow-wart patches. .

Implementation of a multi-year integrated management approach accompanied by intensive revegetation efforts is the most effective control method. Native species that can provide significant competition (for light, nutrients, etc.) early in the growing-season, have the highest likelihood of promoting control.

For large established infestations, chemical control is the most effective means. Two systemic herbicides - Garlon 4 (triclopyr ester) and Roundup Pro (glyphosate) – have been found to be effective.

Controlled grazing by goats or sheep may be incorporated in a management practice.

Common Buckthorn

Rhamnus cathartica

Introduced in the U.S. as early as 1849

Identification:

A European medium-sized to large shrub with twigs ending in sharp spines.

Leaves elliptic, hairless, fine-toothed.

A few may be alternate rather than opposite.

Twigs dark and unlined, buds have several scales.

Inner bark yellow. Leaves 1 ½" - 2".

Height to 16'. Flowers small, greenish clustered, bloom time: May-June. Fruits dark and berrylike.



Ecology:

Prefers lightly shaded conditions. Invades mainly open oak woods, and deadfall openings in woodlands. Tolerant of many soil types, well drained sand, clay, poorly drained calcareous, neutral or alkaline, wet or dry.

Control and Maintenance:

Prescribed fire is one method proposed for controlling. Burning every year or every other year in established stands may be required for 5-6 years or more, from late March to early May. Fire will top kill a mature plant, but resprouting does occur, a flame torch is the recommended method. Uprooting of 1" diameter seedlings by hand or up to 1 ½" diameter using a weed wrench is effective, but care should be taken to avoid excessive disturbance to the soil, which can release buckthorn seeds stored in the soil. Controlled grazing by goats or sheep may be incorporated in a management practice.

Queen Anne's Lace

Daucus corota

Introduced from Europe many years ago, no date determined

Identification:

Wildflower with alternate, divided leaves. White flowers in umbels. Stem covered with bristly hairs; bracts beneath the umbel deeply and narrowly lobed. Umbels 2"-4" wide, with (usually) 1 purple floret in the center; become concave in fruit to form a "bird's nest". 1'-3' high. Bloom time: summer and fall.



Ecology:

Invades virtually all types of habitats, especially, recovering grasslands and can be persistent on clay soils. Declines as native grasses and herbaceous plants become established.

Control and Management:

Hand pulling or mowing in mid to late summer before seed set, has proved most effective. Abundance in sandy soil generally declines on its own as natives become reestablished.

Jimsonweed

Datura stramonium

Also known as Thorn Apple, Flowering Tobacco, angel's trumpet, devil's trumpet, Jamestown weed, loco weed, moonflower

Origins not known

Identification:

A coarse weed with large (2 ½-4" long) funnel-shaped flowers. Bloom time: summer and fall. The color of the flowers varies from white to violet to lavender. Leaves are egg-shaped, pointed, coarsely toothed, 2-8" long. Fruit a spiny pod, 2" long. Ill-smelling and poisonous. Nightshade Family.

All parts are toxic.



Ecology:

Grows in warm to moderate conditions. Often found in waste places, on the side of highways and high traffic roads due to its high tolerance for disturbance.

Control and Management:

Jimsonweed can be controlled by destroying the seed source. It can be mowed or cut to remove existing populations. Some herbicides can be used if the growth of the population is harder to control.

Norway Maple

Acer platanoides

Introduced in the U.S. in 1756

Identification:

A large deciduous tree with a broad, rounded crown. Introduced from Europe; resembles Sugar Maple but has more leaf teeth. Field mark: milky sap evidenced when leafstalk is broken. Buds large (over 3/16"), green or reddish, and blunt. Leaves 2-8". Height 40'-70'; diameter 1'-2'.



Ecology:

Spreading from planted areas to upland areas. Grows in upland and wetland habitats, especially common in woodlands with colluvial soils. A generalist that can grow in full sun or complete shade and in dense sand.

Control and Maintenance:

Pull seedlings when soil is moist. Dig out larger plants, including the root systems. Cut down large trees. Grind out the stump, or clip off re-growth. Girdle tree by cutting through the bark and growing layer (cambium) all around the trunk. Girdling is most effective in spring. Cut down, and paint the cut stem or stump with glyphosate (or triclopyr). Clip off re-growth or paint with glyphosate.