

Ecologically Invasive Plants

What are they and what to do about them

Invasive plants are non-native or exotic plants that were introduced by human activity and quickly established. Many non-native plants are well known agricultural or horticultural species. Most of these do not escape cultivation or have minimal impacts on natural communities if they do spread. Invasive species rapidly disperse and establish, displacing native plants and altering ecological processes like fire occurrence and nutrient cycling. Due to their rapid growth, efficient means of seed dispersal, and tolerance of a wide range of environmental conditions, invasive plants outcompete with native species for sunlight, nutrients, and space.

Natural predators and disease, which controlled their populations in their native habitat, are lacking. Native species that are threatened or endangered are particularly susceptible to displacement. As the diversity and populations of native plant species decrease, wildlife habitat is reduced. Occasionally, invasive species will reproduce with natives and produce hybrids. This changes the gene pool in an area and can reduce biodiversity. If biodiversity decreases, the ecosystem becomes more vulnerable to disease and pests. Of the 4000 estimated non-native plants in the United States, over 300 are considered highly invasive. Half of these were introduced for horticultural purposes. Others arrived in seed mixes, packaging materials, and by other means. In Connecticut, the Department of Environmental Protection has identified 87 invasive plant species that occur in natural areas, parks, and other areas throughout the state. Reestablishing Ecosystem Balance Human activity often disrupts natural cycles by creating disturbances that provide ideal conditions for invasive plant species. With this in mind, land managers should develop goals to control problem species and restore ecological processes.

Management goals can be achieved in two ways: prevention and eradication and control. Prevention Preventing invasive species from establishing in an area is critical to any invasive species control plan. Early detection and control is more effective than trying to eradicate or control large populations. Prevention will save time, effort, and money.

Two ways to reduce establishment are

- 1) avoid introducing known invasives and
- 2) reduce land disturbance and soil exposure.

Many invasives are still sold for gardening and landscaping, wildlife habitat enhancement, and erosion control. Aquatic invasives are introduced by boat propellers and ballast/bilge water, released from aquariums, or attached to ornamental plants shipped from growers. Be careful to inspect nursery-supplied aquatic plants and remove all plant material from boats and boating equipment before traveling between waterbodies. As an alternative for landscaping and erosion control, promote the use of native species or non-invasive ornamentals. In balanced ecosystems, natural disturbances like fire and flooding keep the populations of introduced species in check.

Human disturbance enables potentially invasive species to spread. Whenever possible, avoid disturbance to the soil and canopy. Disturbances associated with trail and road construction create ideal conditions for establishment of invasive species. In fact, in natural areas these species often first appear at trail heads and along parking lots. Where disturbance is unavoidable, plant native species to establish a natural community and eliminate introduction sites for invasives. Eradication and Control Methods Permanent eradication of invasive species is time consuming and often expensive. The time and resources available and the risks involved may dictate whether eradication is feasible. Where introductions are recent and populations are not well established, eradication may be possible. However, controlling population size is often more practical and will allow native vegetation to co-exist and thrive.

Efforts to control invasive species require patience, as several years may be needed to achieve desired results. Control methods are divided into three categories: mechanical, chemical, and biological. Determining which method is most suitable will depend on the species involved, the size of the population, surrounding environmental conditions, the management objectives for the area, and the resources available. In many cases, combining control methods may be more effective. **Mechanical Control Methods** Mechanical control methods include hand-pulling, use of hand-tools to cut, dig up, or girdle, mowing, and prescribed burning. Hand-pulling can control small annual or biennial species or seedlings of woody species. Remove as much of the root system as possible since many species can regenerate from root fragments. For large populations of herbaceous (soft-stemmed) species, hand tools like weed whips or hoes can be effective.

Shrubs and tree saplings can be removed with a weed wrench, designed to pull up the entire plant. Large trees can be girdled by removing bark from a 2-inch wide band around the trunk about four feet from the ground. Girdling effectively kills the plant by cutting off the flow of nutrients (sugars) from the crown to the roots. While many species can resprout from the roots or lower trunk, repeated cutting of sprouts will eventually kill the plant. Combining cutting or girdling with herbicide treatment will greatly increase control of woody species. In plant communities adapted to or dependent on fire, prescribed burning is preferred since this method mimics a natural process. Many invasive species are not adapted to fire and, thus, are effectively controlled by burns.

However, fire is not an appropriate control method in all communities. Land managers should first consider their conservation goals and experience. Prescribed burns are not appropriate if used for invasive species control only. They are best suited to areas where the goal is to maintain a fire-dependent community. Conducting a prescribed burn requires extensive training and experience. The time of year the burn is conducted and the intensity of the fire will greatly influence how native species respond. **Chemical Control Methods** Herbicide use is effective, but is best reserved for severe infestations or where non-chemical methods are inadequate. Different herbicides have different application methods and target species. Research these carefully and apply according to label instructions. In Connecticut, herbicide applicators may need to be licensed, especially if working in wetlands or on waterbodies. A license can be obtained by passing a written examination on the safe and effective handling and application of herbicides in specific categories.

Licensing does not qualify an individual to apply all herbicides. Herbicides are categorized as either Restricted Use or General Use. Any person who purchases, mixes, applies, or disposes of a Restricted Use herbicide must be licensed. Applicators of General Use herbicides must be licensed if working in wet areas or applying to land other than their own. For wetland applications, an operator's permit is required in addition to licensing. For more information on herbicide licensing and operator permits, contact: Pesticide Program Connecticut Department of Environmental Protection 79 Elm St. Hartford, CT 06106 (860) 424-3369 Herbicides can be applied in two ways, as a foliage spray or brushed/sprayed onto cut stems or basal bark. Workers should wear protective clothing and gear, including coveralls, rubber boots and gloves, eye protection, and a respirator or gas mask. After use, clothing should be washed and gear thoroughly cleaned. In Connecticut, the Department of Environmental Protection recommends the use of glyphosate-based herbicides.

Glyphosate is a phosphonoglycine found to be relatively nontoxic to animals and humans. It is absorbed by most soils and broken down by microorganisms. Half-life in the soil ranges from 1-174 days. Glyphosate is a non-selective herbicide that kills all vegetation. It is translocated throughout the plant from the place of contact, and is most effective applied late in the growing season when plants are translocating to the roots. Foliar sprays are used to apply herbicide to the leaves. They are effective on large populations, but put non-target plants at risk. Apply just enough spray to cover the leaves, but not so much that it drips off. Do not spray under windy conditions as this may kill surrounding native plants. If the herbicide label recommends, dyes can

be added to make the herbicide more visible to the applicator. Walking backwards through a treatment area will reduce applicator exposure. Cut stump or cut stem treatments are used on woody species or large, stout-stemmed herbaceous plants. Shrubs or trees are cut down and the herbicide applied directly to the living tissue or sapwood around the edge of the stump just inside the bark.

Plants are best cut at the end of the growing season so that the herbicide is absorbed and transported to the roots. Injection treatment, also known as frilling or the "hack-and-squirt" method, is the application of herbicide to cut areas in a woody stem. Cuts are made with an axe and the herbicide painted, dripped, or carefully sprayed into the fresh cut. Basal bark treatment is appropriate for small woody plants with smooth, thin bark. Apply herbicide to a 6-12 inch wide band of bark around the base of the trunk, 6-12 inches from the ground. Biological Control Methods Biological control uses a plant's natural enemies, usually insect herbivores or microbial pathogens, to control a population. Highly host-specific organisms must be used to minimize impacts to non-target species. Pre- and post-treatment monitoring of non-target species is critical to a biocontrol program.