

GREAT INFESTATIONS

Connecticut's Response to Green Invaders

The second biggest threat to Connecticut's natural environment is invasion by alien plants and animals. (The top threat is loss of habitat to sprawling land development.) With few natural enemies, these species grow, spread, and multiply so fast they can transform healthy ecosystems into weed-choked woodlands and waterways in just a few years. Worse, many of our native plants and animals are deprived of light, nutrients and ultimately their continued existence. Collectively, invasive species are a silent but serious environmental problem for which Connecticut is not prepared.

For color photos and fact sheets on many invasive plants, an excellent resource is the Connecticut Invasive Plant Working Group's website at <http://www.hort.uconn.edu/cipwg/>

There are lakes and ponds in Connecticut where would-be swimmers and fishermen are confronted by solid mats of aquatic weeds extending from shore to deep water. There are thousands of acres of woodlands where the understory would be unrecognizable to Connecticut residents of an earlier time, so pervasive are the recent invaders.

What is an invasive species? Federal agencies have agreed on this working definition:

“an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health.”

These alien species have been landing on our shores for decades, but greater infestations are expected as a side effect of international trade. Despite numerous controls, plants and animals from distant ecosystems regularly hitch rides on boats and planes and find ideal opportunities here to grow and prosper.

From the tiny Zebra Mussel to stream-clogging Water Chestnut plants, invaders threaten to cost the state a lot of money in future years. Many species will turn out to be mere nuisances, while a few, if left alone, easily could be ecological disasters for Connecticut.

There is a narrow zone along the east coast running from the Chesapeake Bay to Maine where the forests have the highest percentages of non-native species in all of North America. Most of Connecticut falls into that zone.

While accidental introductions have been serious, many of the most damaging species were planted on purpose. Purple Loosestrife was planted widely because its graceful and pleasing bloom adds a beautiful element to green, wet landscapes. Mile-A-Minute may have “hitchhiked” on nursery stock that was planted as part of a butterfly garden in Greenwich. State agencies planted and promoted some of the worst offenders such as Autumn Olive and Japanese Barberry because of those plants' perceived value to wildlife and soil conservation. Government agencies, researchers, the horticultural industry, and hobbyists alike now agree that we have a problem.

The present challenge is to harness this universal concern to prevent new infestations and reduce the effects of the worst ones we already have.

Beauty Gone Bad

The following plants and animals were introduced purposely to America, then found their way to Connecticut, sometimes with further human assistance. The terrestrial plants were imported from overseas and used as ornamental plantings or to enhance wildlife habitat, and some aquatic species were used specifically to beautify water gardens.

Water Chestnut (*Trapa natans*)

First identified in Connecticut in 1999, Water Chestnut is an aquatic plant found in shallow areas of lakes and ponds and slow-moving rivers and streams. (This is not the species that produces the edible water chestnuts used in Asian cuisine.) It was originally introduced in 1877 in Massachusetts as an ornamental plant for a botanic garden. It has floating green leaves which are triangular and glossy, with toothed edges. It also has feathery submerged leaves, and hard seeds with four sharp spines. Water Chestnut is threatening to natural habitats because of its very dense growth, which can make fishing or recreation in an infested waterbody nearly impossible. It also shades out native aquatic plants. Water Chestnut is spread when floating leaf parts drift downstream, or get caught in the feathers of waterfowl. The most effective means of controlling the plant are early detection, hand-pulling, and mechanical harvesting, which must be repeated for 5-12 years to completely eliminate the population.



Fanwort (*Cabomba caroliniana*)

Native to the southeastern U.S., Fanwort is believed to have been spread through incidental release from aquariums. It can be identified by underwater fan-shaped leaves that are arranged opposite or in whorls along the stem. Its color may range from reddish brown to green, and it has small white flowers with yellow centers. It was first seen in Connecticut in 1937 in Deep River and three months later was found in Trumbull. Fanwort grows in muddy areas of stagnant or slow-moving water such as in streams, small rivers, lakes and ponds. It can crowd out native plants and interfere with recreational uses. Mechanical, biological, and chemical controls are used on Fanwort, and public education is needed to prevent further introductions.

Multiflora Rose (*Rosa multiflora*)

Multiflora Rose is a climbing rose reaching a height of up to 15 feet. This shrub forms dense thickets with arching stems covered in sharp thorns. This Japanese native was first introduced in 1886 as a rootstock for cultivated roses. Later, the U.S. Soil Conservation Service promoted it as a soil erosion deterrent and many nurseries advocated it as a “living fence” for livestock. Birds are the main culprits for spreading its seeds. Multiflora Rose can be found along forest edges and open woodlands as well as roadsides, and prefers sunny areas and well-

drained soils. Multiflora Rose is susceptible to different management techniques. Many different herbicides have proven effective, as well as biological techniques such as insects (girdler beetles, rose seed chalcid wasp) and the Rose-rosette disease. Repetitive mowing and cutting has also proven successful.

Japanese Knotweed (*Polygonum cuspidatum*)

Japanese Knotweed is a perennial herbaceous plant found in many areas: neglected gardens, roadsides, stream banks, and wetlands. This weed grows in thick patches of up to three to six feet high, while extensive underground rhizomes may reach up to 60 feet in length, creating a dense network. It has reddish brown hollow stems, like bamboo, with greenish white egg-shaped flowers and small white flowers growing along stalks. Knotweed was first introduced from Japan for use as an ornamental plant and for use in controlling erosion. It is most competitive in moist, rich soil areas and easily transported via streams and rivers. Herbicides are the current control method. Knotweed is difficult to dig up due to its high rhizome densities. There currently are no known biological control agents.

Hydrilla (*Hydrilla verticillata*)

Hydrilla, an aquatic plant, was first found in 1960 in Florida and has since spread as far north as Massachusetts and as far west as California. Aquarium owners unwittingly might have released Hydrilla into Connecticut waters, though it also is known to hitchhike on the roots of other aquatic plants purchased from out of state sources. It grows rooted to the bottom of lakes, rivers, and ponds that are anywhere from a few inches to twenty feet deep. It tolerates many different levels of nutrients and pH, and has very effective means of reproduction, sprouting new plants from mere fragments of a stem. Hydrilla forms dense mats and shades out native vegetation, and can drastically reduce swimming or boating opportunities. Like Zebra Mussels, it can also obstruct water intake pipes, restricting water flow. Current control methods include mechanical harvesting and the use of herbicides.



Brazilian Elodea (*Egeria densa*)

Sometimes confused with and referred to as "the next Hydrilla," Brazilian Elodea is a submersed, rooted aquatic plant that can form impenetrable mats on the surface of a waterbody. These mats restrict water movement, trap sediment, and cause changes in water quality. Touted as a "good oxygenator," Brazilian Elodea was offered for sale in the United States in 1915. Thought to be introduced to Connecticut by unknowing aquarium owners, it was discovered in Fairfield County in 1992. It is widely sold in Connecticut pet shops under the name Anacharis. Last year, eradication efforts in a single, small pond in East Haddam cost about \$3,000. The success of this effort cannot be effectively evaluated for several years.

Winged Euonymus or Burning Bush (*Euonymus alatus*)

This plant was brought to the United States in the mid-nineteenth century from eastern Asia, but did not begin flourishing in Connecticut until the mid-1970's. It turns bright red in the fall, and is very popular as an ornamental shrub. Also widely used for landscaping along highways, its seeds can be easily scattered by animals. Winged Euonymus is a problem in woodlands, where it replaces native flora, and in other areas, where its roots can form dense mats below the surface of the soil. This matting, along with the shade the plants provide, creates an inhospitable environment for native plants. Management strategies for *Euonymus* include hand pulling and herbicides for younger plants, and the use of heavy equipment to remove larger shrubs.

Japanese Barberry (*Berberis thunbergii*)

Japanese Barberry is believed to have been introduced in the late 1800s, after its seeds were received at an arboretum in Massachusetts. It is found along fences, roadsides, in fields and open woods, and is one of the first shrubs to leaf out in the spring in forest understories, giving it a competitive advantage over native plants. Its autumn tones of bright red and orange have made it popular as an ornamental shrub. Its fruits are distributed by birds, making it easy for the plant to spread to other areas. The most effective means of management of Japanese Barberry is mechanical removal, and uprooted shrubs may be piled as cover for small animals. It can be found growing in front of the headquarters of the DEP and Council on Environmental Quality.

Asiatic Bittersweet (*Celastrus orbiculatus*)

Asiatic Bittersweet is native to Asia, but was used in Connecticut in the early 1900s as an ornamental plant. It thrives in almost any habitat, and prefers utility corridors, railroads and roadways. It is prolific along the Merritt Parkway in southwestern Connecticut. Woods along many miles of Connecticut's highways are now dominated by bittersweet. Bees help to pollinate the plants, and birds are a major factor in seed dispersal. Its ability to grow new shoots from its roots makes it very difficult to control. Asiatic Bittersweet forms impenetrable thickets, and tends to grow around the stems of other vegetation. It can easily strangle small trees and shrubs. The supporting plants, with additional weight from the bittersweet, are not as able to withstand strong winds and ice storms. American bittersweet, a native species, is very similar to Asiatic Bittersweet, and a distinction should be made when applying control methods. Mechanical removal and herbicides can be effective, but since the plant has a large seed bank, repeated efforts are needed over a period of several years to prevent regrowth.

Purple Loosestrife (*Lythrum salicaria*)

Able to produce 2.5 million seeds per plant each year, Purple Loosestrife is commonly found in Connecticut in many kinds of wetland habitats. Known for attractive purple flowers, it is a prolific seed producer, and can reproduce from shoot or root fragments as well. It was introduced in the 1800's, and can be found in all 48 contiguous states. Like many other invasive species, Purple Loosestrife is very dense and crowds out native vegetation. It offers little value to wildlife, and is listed as a noxious weed in many states. Cultivars of this



species are self-incompatible, but when crossed with a cultivar of a different flower type, or with Purple Loosestrife found in natural areas, they can produce seeds or viable pollen, which further contributes to the spread of this invasive plant. Control methods include hand-pulling and spot treatment with herbicides for new infestations. Several forms of biological control (including beetles, see page 10) are being studied for their effectiveness.

Garlic Mustard (*Alliaria petiolata*)

Garlic Mustard was most likely introduced by early settlers in the mid-1800s to be grown in herb gardens. It is a biennial herb which spreads rapidly in shady habitats, roadsides, moist forests, and along stream corridors. Unlike other plants that need ample light to grow, Garlic Mustard can thrive in closed canopy forests, making it an insidious invader. It can range in height from five to forty-six inches, and can easily be found advancing across state parks. Garlic Mustard spreads exclusively by seed, and increases in cover after being disturbed. It crowds out native vegetation, and in parts of Pennsylvania, the Garlic Mustard's advance has meant doom for the favorite wildflower *Trillium*. Control strategies for Garlic Mustard include burning, hand-pulling, and chemical controls.

Autumn Olive (*Elaeagnus umbellata*)

Autumn Olive was introduced to New England in the late 1800's and, in Connecticut, can often be found lining highways, forest edges, and in old fields. It tolerates dryness, wind, and air pollution very well, and can change soil nutrient cycles, making the soil inhospitable for native vegetation. Like many other invasive species, it grows quickly and produces an abundance of seeds, giving it an advantage over native shrubs. Management of Autumn Olive includes prescribed burning, mechanical removal, and herbicide application.

Norway Maple (*Acer platanoides*)

A European native, the Norway Maple populations in the United States either arose by escaping from cultivation, or reproducing from ornamental trees. This maple is desirable for its fall colors of pale yellow, or deep reddish purple in the case of the cultivar "Crimson King." It can tolerate various extreme conditions, including air pollution. The trees produce large quantities of seeds that are dispersed by the wind, and displace other plants in forests and along forest edges. The native sugar maple is often displaced by the dense-canopied Norway, which also competes with grasses and other plants. The Norway Maple leafs out early in the spring and is among the last trees to drop its leaves in fall, which gives it an advantage over native species. Hand removal of small Norway Maples, and girdling of larger trees are current management strategies.

Oops!

The species described below are believed to have been introduced accidentally to North America. Some aquatic plants and animals were carried in the ballast of ocean-going vessels, and unknowingly deposited in our waters. Scientists are uncertain as to how some terrestrials may have established here. A few, like Garlic Mustard, might have been planted for specific

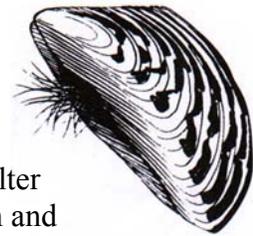
purposes (such as herbal or kitchen use, in the case of Garlic Mustard) many decades ago, but exploded in numbers only recently.

Pacific Shore Crab (*Hemigrapsus sanguineus*)

Also called the Asian or Japanese shore crab, this invader measures a mere two to three inches across. The crab's identifiable features are three spines along each side of its shell, and a light-and-dark banding pattern on its legs. It spawns more often, shares the same habitat, and is more aggressive than native species. With an appetite for young fish, shellfish and aquatic plants, scientists believe it is too early to say what kind of an impact the crab will have. However, this species, discovered on Connecticut's shore in the 1990s, has already begun to disrupt the ecosystems in Long Island Sound. Pacific Shore Crabs share the same habitat as juvenile green crabs and mud crabs, and as the former multiplies the latter decline.

Zebra Mussel (*Dreissena polymorpha*)

The Zebra Mussel was introduced to the United States in the mid-1980's when ocean-going ships released infested ballast water into the Great Lakes. It is a freshwater mollusk usually less than an inch long that can attach itself to almost any substrate. The mussels do not have any effective natural predators, and are distributed by carriage on boats, trailers, or fishing gear, or by birds and other animals. Adult mussels can filter up to a quart of water per day, consuming the plankton usually eaten by fish and other shellfish. They can clog industrial or power utility pipes, and damage boat engines and hulls. They can survive out of the water for up to seven days. Optimal control methods are to prevent new introductions, and educate the public with regard to thoroughly cleaning boating and fishing equipment. Mussel populations in water intake structures can be controlled by chlorination, surface coatings, and heating.



Asiatic Clam (*Corbicula fluminea*)

First reported in the Connecticut River in 1990 this freshwater species prefers shallow, warm, well-oxygenated water. Juveniles are dispersed by water currents, and a typical brood is 35,000 during a lifetime. The Asiatic Clam is considered a nuisance for the same reasons as the Zebra Mussel: dense colonies can restrict water flow at intake structures, and competition with other aquatic animals can lead to their population reductions. Preventing introductions is currently the best method of control, as populations already established cannot be eliminated. Nature provides some help in the Connecticut River -- many of the clams cannot withstand cold temperatures in the winter. Other control methods include filters or screens, chlorination and mechanical removal.

Eurasian Watermilfoil (*Myriophyllum spicatum*) and Variable Watermilfoil (*Myriophyllum heterophyllum*)

Eurasian Watermilfoil is a submerged aquatic plant that was first documented in the 1940's in Washington, DC, and has since spread to forty other states, including Connecticut. It is found in lakes, rivers, ditches, ponds, and reservoirs, usually in waters less than thirty feet deep. It has long, branching stems near the surface and soft, feathery leaves, attached in whorls of four, but sometimes 3-5. Eurasian Watermilfoil can form dense mats of tangled vegetation, effectively interfering with boating, fishing and swimming. Another invasive aquatic plant, Variable Watermilfoil, is native to southeastern and central United States, but has found its way into New England. This is a cause for concern because Variable Watermilfoil is starting to spread into the same territories as Eurasian Watermilfoil. Control methods include mechanical harvesting, biological (one weevil's appetite for Eurasian Watermilfoil is being researched), and chemical treatments.

Mile-A-Minute or Devil's Tearthumb (*Polygonum perfoliatum*)

Mile-A-Minute, though its name is somewhat exaggerated, can grow a remarkable six inches in a day. Native to Korea, China, Japan, India and Taiwan, it was first reported in Greenwich, Connecticut in 1999, and efforts were made to eradicate it. However, in 2001, Mile-A-Minute was discovered on properties adjacent to the site where it was first noticed. This weed forms dense mats that smother other vegetation. Hard frost will kill it, but its seeds survive the winter, germinating again the following year. Birds and small mammals eat its fruits, helping to distribute the plant. Current management techniques for Mile-A-Minute include cutting, mowing, or hand pulling. Herbicides can be effective in agricultural settings. The Connecticut Mile-A-Minute population is the first in New England, adding urgency for the state to respond quickly.

Common Reed (*Phragmites australis*)

Common Reed is a tall wetland grass found along marshes, riverbanks, and often in areas that have been disturbed or polluted, such as roadsides and dredged areas. In undisturbed areas, it is not considered invasive, and is actually native to America. Recent research at the University of Connecticut has shown that *Phragmites* is actually not native to Connecticut. Although the reed provides cover and nesting sites for some birds, it also displaces other native birds that depend on shorter grasses. Like many other invasive species, it shades out and competes with native vegetation. Some commercial cultivars are known to revert over successive generations to their original, aggressive forms; plant scientists continue to debate the severity of this risk.

Invasives on the Books

Connecticut's only law pertaining to invasive species was adopted in 2001, buried deep in Public Act 01-150. It directs the Commissioner of Environmental Protection to make recommendations and take action to control invasive plant species, create informational materials and educational activities, and maintain a list of nonnative invasive plant species -- all tasks the

Department has undertaken on its own in a limited way, as funds allow. The law contains no deadlines for action.

The University of Connecticut and the Connecticut Invasive Plant Working Group (CIPWG), have developed a list of invasive and potentially invasive species --"Non-native Invasive and Potentially Invasive Vascular Plants in Connecticut" -- but the list has no legal status. The DEP adopted the list as part of its 1998 policy on invasive species, but since the Department has neither staff nor resources dedicated to controlling invasive plants, it can take only limited action. It has an internal working group that manages invasives on a case-by-case basis. The Department's Lakes Management section exists largely because of the takeover of Connecticut's waterbodies by nuisance species. The Department has created some informational materials, but it does not have a coordinated public education campaign. Connecticut also lacks a comprehensive plan for addressing invasive species.

It is perfectly legal to own, sell, transport, distribute, plant, fertilize, and spread any of the species noted on the informal list of invasive species. Many plants on the list are widely available to gardeners and landscapers. In the summer of 2001, Council staff visited more than twenty nurseries and garden centers (mostly in person, but also via websites). Invasive species were found for sale at nearly one hundred percent of the stores. When the staff of these stores were asked if they sold Purple Loosestrife, Japanese Barberry, or various other species on the list, only one person indicated that she was aware of the invasive tendencies of these plants.

A Sampling of Responses of other Northeastern States to Green Invaders

State	Management Plan	Staff	Law Prohibiting Sale of Invasive Species
VT	Yes (Lake Champlain)	Yes	Yes (Zebra Mussel, Eurasian Watermilfoil, Water Chestnut, quagga mussel)
NH	No	Yes	Yes (milfoils, Fanwort, Water Chestnut, Purple Loosestrife, others)
ME	In progress	Yes	Yes (Water Chestnut, Milfoils, Hydrilla, others)
NY	Yes	Yes	Yes (Water Chestnut)
RI	No	No	No
MA	In progress	No	Yes (Water Chestnut)
CT	NO	NO	NO

Connecticut's Finger in the Dike: Responses to Date

The Connecticut Invasive Plant Working Group is the state's largest cooperative effort working on the invasive species problem. It consists of state and federal agencies, conservation organizations, garden clubs, universities, nurseries, and many other groups. Doing its best to educate the public and advocate appropriate policies, this group has no legal status and no funding, but is taking the lead in focusing the state's efforts on invasives. It has developed two

invasive plant posters, numerous fact sheets, and a website containing a breadth of information on invasive plants.

A publication on controlling invasives was produced by a subcommittee of the CIPWG, under the leadership of the Connecticut Agricultural Experiment Station. The DEP will provide assistance in printing the publication.

Scientists at the University of Connecticut are cataloging the introduction and spread of invasive species, and are assisting with public education efforts. The University's Department of Ecology and Evolutionary Biology, along with the UCONN Library, Center for Geographic Information and Analysis, and various other institutions have collaborated on a project called IPANE, which stands for Invasive Plant Atlas of New England. The website (www.eeb.uconn.edu/invasives/ipane) specifically focuses on invasive plant species detection and awareness throughout the Northeast. As part of the project, a core of trained volunteers will assist in spotting and reporting the locations of the numerous invasive plant species. IPANE will help with the "early detection and response of invasive plant species" around Connecticut and New England. It will contain a catalog of species including name, description, photographs, as well as the first reported sighting of the species, and much more. The site also shows the specific locations in towns where the species has been found, and will also provide a database where the public can directly report sightings of invasive plants.

The DEP has adopted an internal policy that discourages the planting of invasive species and disturbing soil in ways that favor invasive species. Other state agencies also have responded to the threat. The Department of Transportation (DOT) no longer will plant species that appear on the DEP's list. However, neither the DEP nor the DOT have funds to remove the enormous stands of invasive plants planted in previous years; these are likely to remain as sources of seed for decades to come, perhaps for centuries.

Nonprofit conservation organizations are contributing significantly to the fight against invasives. The New England Wildflower Society is setting up a sophisticated monitoring network, and many groups are doing much more than government to inform the public.

The plant industry has responded to the threat as well. A new brochure being developed by the Connecticut Florists, Greenhouse Growers, and Nursery and Landscape Associations depicts various species of invasive plants that participating nurseries voluntarily have agreed not to sell. The brochure lists twenty or so plants that would be highly destructive if they were to become widespread, but they are species with little or no economic investment at this time.

The Connecticut Chapter of The Nature Conservancy is spending hundreds of thousands of dollars per year to control invasive terrestrial species on some of its inland properties. Over the next several years, the total cost will probably be in the millions of dollars. This fact should be recognized when people discuss the economic benefits of selling some of these same invasive species.

The state has attacked a few invaders head on:

Pulling up the Water Chestnut: Muddy Work on the Hockanum

Since 1999, Water Chestnut has been found in Connecticut in Keeney Cove (Glastonbury), the Hockanum River (East Hartford), the Podunk River (South Windsor), and in two private ponds in Eastford. For the past several years, the DEP, contractors and volunteers have manually pulled Water Chestnut out of Keeney Cove and the Hockanum River. Not including staff time and volunteer efforts, the contract expenses totaled nearly \$23,000. The DEP currently has no set policy on controlling invasive species on private property, and efforts are left largely to volunteers, including DEP staff working on their own time. Monitoring of these sites will continue for 7-10 years, since seeds can lie dormant for many years. If allowed to become established in Connecticut, Water Chestnut has the potential to become the dominant plant in the shallow waters of the Connecticut River. Massachusetts, New Hampshire, South Carolina, Arizona and Florida have legislation that prohibits the possession, distribution or transport of Water Chestnut.

Purple Loosestrife: Meet the Beetles

Several species of beetles are being used as biological controls for Purple Loosestrife. The insects defoliate the plants, and stands have been reduced in Canada, New York, and Oregon. Care was taken to make sure the beetles would only eat the targeted species, and not turn into pests themselves. In 1996, a pilot program in Connecticut saw the release of two beetle species into loosestrife stands in Storrs and Haddam, with encouraging results. The plants were several feet shorter and did not produce as many flowers as plants in nearby stands. Currently, there are 27 long-term monitoring sites throughout the state, and 200,000 beetles acting as experimental biological control agents for Purple Loosestrife management.

Fretting Over Zebra Mussels

In 1998, Zebra Mussels were found established in East Twin Lake in Salisbury. The animals need high concentrations of calcium in the water in order to survive, and this is both good news and bad. Since calcium requirements are a limitation, many waterbodies in Connecticut are not believed to be prone to infestation. However, the freshwater portion of the Housatonic River and its associated hard-water lakes remain susceptible, though there is no evidence of infestation at this time.

Levels of public awareness appear strong among fishermen, water users in industrial facilities, and lake association members, but pleasure boaters, jet ski operators, and the general public are not as aware of the problems presented by Zebra Mussels. The DEP has created an informational video, and has posted signs at boat launches informing the public about the mussels. The Boater's and Angler's Guides also present ways to help control their spread, but eradication does not seem likely.

Chemical Warfare on Hydrilla

First reported in Connecticut in 1995, Hydrilla is currently present in three small ponds in Mystic, North Stonington, and Wilton. The two ponds in the southeastern part of the state were treated with herbicides, which at first was believed to have eradicated the populations. Unfortunately, both infestations are still present. The control costs for these two small ponds to date totals about \$11,000.

Common Reed: Million Dollar Weed

Phragmites control and spot eradication in Connecticut often has resulted in the restoration of tidal wetlands. The usual approach is to improve the flow of brackish or salt water into the wetlands; this impedes the growth of *Phragmites*, with reductions in mosquitoes and increases in bird life. Where necessary, the reed is treated with herbicides. The DEP has many success stories in these restoration projects, though the success does not come cheaply. Six projects done in 1999-2000 totaled more than \$730,000. Over the years, funds spent on controlling *Phragmites* dwarf the amounts spent on managing other species. The plant continues to be a problem in both coastal and inland wetlands.

The state's effort to control *Phragmites* is something of an exception in the war against green invaders, because the plant is widespread and well established. Most invaders that fit this description are beyond the ability of any organization to treat effectively, except in limited sites and circumstances. Many invasive plants never can be eradicated from Connecticut's landscape. This fact underscores the importance of moving quickly to battle and eradicate newly-discovered infestations of those plants which have not yet become established or widespread, such as Hydrilla, Mile-A-Minute, and Water Chestnut. (It might not be impossible to eradicate a species, even one that is common and widespread, if the need is great enough. In the 1920s and 1930s, the Common Barberry was almost extirpated from midwestern states of the wheat belt because it harbored a serious rust disease that affected wheat. Legions of children and adults were enlisted as "Rust Busters" to root out the Barberry.)

RECOMMENDATIONS

Setting priorities

Eradication of widespread invasive species from natural habitats is not a realistic goal for the foreseeable future. Connecticut's priorities should be to prevent new infestations and to control the spread of the most harmful species into sensitive areas. The Council recommends the following six specific steps:

RAPID RESPONSE TO NEW INVASIONS

1. **Connecticut must develop an effective capability for rapid response to NEW reports of harmful infestations, both on public and private lands.** This team, which could be coordinated by any number of agencies, must have resources on hand (much like chemical emergency response teams) and legal authority to take immediate action.

Explanation: The opportunity to stop a species occurs when it grows in only one or two places in the state. When Water Chestnut was discovered in two locations, the DEP responded with a combination of staff time (as it was available from other projects), volunteers, and small grant funds. Though not yet eradicated, the colonies are getting smaller. When it was discovered in a third place, the DEP did not respond because the plant was growing in a private pond – even though the landowner sought help. Why wait for the seeds to be dispersed by waterfowl into more waterways before taking action?

PLAN THE CAMPAIGN

2. **The DEP should be provided authority and funds to prepare a comprehensive plan, within one year, that would define priorities for battling invasive species.** This plan, with references to specific species and means of control, should define priorities for both state and private lands.

Also, when the DEP acquires land, it should assess the threat from invasive species and how that threat can best be managed. (This recommendation should not be allowed to slow the DEP's efforts to save outstanding lands from the number one threat, which is misplaced development.)

Explanation: Many species will never be eradicated from Connecticut's fields and forests, and would be low priority for control. However, those same species could be ecological nightmares in designated natural areas. A plan would help the state assess what needs to be done and when.

PREVENT ACCIDENTS

3. **Improve information campaigns to prevent the spread of species that are introduced accidentally.** The Governor and General Assembly should require the DEP to create

information campaigns about preventing the spread of species that are introduced accidentally. Connecticut will need to work with regional bodies to better control species that “hitchhike” on boats and plant pots. An informed public will be essential.

PUT SOMEBODY IN CHARGE

4. **The Connecticut Invasive Plant Working Group** has organized itself to discuss the problems of invasive species and work cooperatively toward solutions. This body, representing numerous agencies and organizations as well as private companies, is a commendable example of cooperative work in the sphere of public policy. To the extent state government can further the work and status of this body, it should do so.

PHASE OUT THE REPEAT OFFENDERS

5. **Discourage the spread of invasive species already established.**

The eradication of some invasive species is a challenge almost hopeless. Nonetheless, it would be a mistake, ecologically and economically, to encourage their spread into areas not currently infested. There is no sound reason to continue spreading and planting these species, as there are non-invasive substitutes for virtually all of these plants. With ample warning, the horticultural industry should be able to switch from the invasive to the safe.

The Council recommends the following four specific actions to help control the spread of species that are already established in Connecticut:

- A. The Governor and General Assembly should assign one agency with responsibility for informing the public about the dangers of invasive species, and appropriate adequate funds. This publicity program should include annual surveys to measure the campaign’s effectiveness. The goal of the campaign should be to have Connecticut residents purchasing non-invasive plants instead of invasive ones.
- B. The responsible agency should work closely with the horticultural industries on plans to inform the public.
- C. The Governor and/or General Assembly should direct all state agencies to 1) refrain from planting any species on the list of invasive species prepared by the DEP, and 2) insert into all construction and maintenance contracts and economic development grants a standard provision that prohibits use of state funds for the planting of any species on the DEP’s list.

KEEP DANGEROUS SPECIES OUT

6. **Prevent deliberate introductions of dangerous species by discouraging their sales.** This pertains to species not yet established widely in Connecticut, and in which no Connecticut grower has a significant investment. For these, **the Council recommends establishment of a list of species that by mutual agreement should never be sold, transported, or grown in Connecticut.** These are the plants so harmful that they should be regarded as biological

pollution; their escape should be prevented in the same way particularly harmful chemicals are prohibited.

The horticultural industry has expressed a strong opposition to statutory prohibitions on any specific plants, citing the potential spread of such an important precedent. Voluntary controls could be effective, but there must be a governmental agency, such as the Connecticut Agricultural Experiment Station, that ultimately must decide on the composition of the list. Instead of naming any species in statute, **the Council offers this recommendation (for species that are not yet widespread):**

The General Assembly should adopt a statute with the following provisions: A body with official status should be directed to work with the horticultural industries to develop a plan to prevent the sale, culture and transport of the most harmful species, with special reference to those species that are not yet widespread in Connecticut. It will be difficult to achieve universal consensus on individual species, excepting a few very harmful species having limited economic investment, so this panel will have to be constructed and/or appointed carefully. It could be an existing body, such as the Connecticut Agricultural Experiment Station, the University of Connecticut, or a designated subcommittee of the Connecticut Invasive Plant Working Group. This plan would rely on voluntary removal of dangerous invasives from the marketplace, with no penalty provisions. However, this plan **must** include a provision for annual inspection and monitoring. Once a list is established, defining the species which the industry associations pledge to not sell, personnel would have to inspect points of sale around the state. If this cooperative approach is found to be effective, then no legal prohibitions would be necessary.

Also, to help in the discovery of new invasive species in the wild, the University of Connecticut should continue implementation of its innovative, grant-funded Invasive Plant Atlas of New England (IPANE).

Explanation: It makes no sense for the taxpayer or conservation organization to wage war on the Water Chestnut while fellow citizens sell and grow the same plant elsewhere in their community and state. The most direct route would be statutory prohibition on the transport and sale of species on a list. However, the industries that grow and sell these species wish to avoid such mandates, and have offered voluntary controls instead. Voluntary controls could be effective, although they must be coordinated with oversight by a public agency, as required.

Acknowledgments and Notes

The information in this report was gathered in several ways. Personal interviews were held with many individuals from state agencies, universities, and other organizations. At its January, 2002 meeting, the Council solicited comments on its draft report from experts from the University of Connecticut, the Connecticut Invasive Plant Working Group, The Nature Conservancy, the Department of Environmental Protection, and the Connecticut Nursery and Landscape Association. Conclusions about the relative risks of invasive species were drawn from information gathered from these interviews as well as from journal articles and research organizations.

Council staff and interns examined state lands affected by invasives, and also visited nurseries. The Council is grateful for the helpful comments received from all parties, and notes that many of their suggestions were incorporated into the final version of the report. While acknowledging that there is not a consensus among all parties on the recommendations, the Council hopes that the body of this report reflects much of the current thinking on the problem of invasive species in Connecticut.