



DID YOU KNOW?

If you raise tomatoes in your garden, chances are you till the soil, periodically add lime, nutrients, and water, and you attempt to control "pests" such as weeds, insects, and woodchucks. It takes a lot of effort to raise a nice crop of tomatoes in a specially designated place on your property, and many people have done so for many years. Have you started to find over the years that tomato plants are growing in the woods, on the side of road, or in other farm fields – growing freely without any assistance or management? No, of course not, because tomatoes, while an introduced species, are not invasive.

Oriental Bittersweet, however, is an invasive species that may come to your front door as a decorative, seasonal wreath. Through seed and berry dispersal, this plant can easily establish and grow in your yard and woodland area.

It can take anywhere from 8 years to 388 years (average 147 years) for non-native or introduced species to "become" invasive. Ecologists often refer to the issue of invasive species as "an explosion in slow motion."

Working for Biodiversity and Protection from Invasive Species

What are invasive species?

Invasive species are organisms that have been **introduced** into an area where they did not originate or evolve, and that usually have no natural enemies (Westbrooks, 1998). According to the Federal Executive Order on Invasive Species, "invasive species means an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health."

Invasive species are **non-native** – sometimes referred to as "exotic" or "alien" species--that have been introduced by humans either on purpose or accidentally (as a result of our methods of shipping and transportation, etc.). These species can "get a hold" and out-compete native species. Not all non-native species are invasive, in fact, it is estimated that only 1% of all introduced species become invasive. The vast majority of introduced species cannot thrive without the aid of cultivation or human management.

What are some other commonly used terms?

Naturalized species are non-native species considered to be well established and growing without human aid, even though they originated in another area. Most naturalized species are not invasive. Some examples of naturalized species include Asiatic Dayflower, Mouse-eared Chickweed, Deptford Pink, Ring-necked Pheasant, and House Finch.

Native species are species that naturally evolved within a region or ecosystem and are better adapted, more appropriate and ecologically suited to that area. Most native species have natural "enemies" and are balanced through ecosystem conditions and competition. And yes, there are some native species such as poison ivy and green brier that are considered "aggressive" or "pests" by human standards. However, they do not alter the surrounding ecosystem habitat and processes, and they also provide food and cover for local wildlife.

What are the characteristics that make a species invasive?

- Rapid growers.
- Mature quickly (have short juvenile periods).
- The timing of their life cycle is different from native species. In the case of many invasive plants, they break dormancy earlier in the season or keep growing later in the season, as well as flower, fruit, and disperse seed at different times giving them an "unfair" advantage for soil nutrients, sunlight, etc.
- Produce many fruits, seeds, or offspring. In the case of many invasive plants, seeds can remain dormant and viable in the soil for many years.
- Disperse and spread fruits, seeds, spores, etc. easily through wind, stormwater runoff, and by birds that feed on the fruits and seeds.
- "Crowd out" other species. In the case of plants they may have dense foliage that shades out other species and dense, shallow root systems that do not allow any "extra room."
- Some plant species are allelopathic, producing chemicals that inhibit the growth of other plants.
- Able to thrive in a broad range of environmental conditions including disturbed and/or polluted sites.
- Lack natural enemies or other "checks & balances."

What are some specific examples of how non-native, invasive species have been or continue to be introduced?

- Through the trading and importing of plants and seeds that have been used for agricultural crop production and ornamental landscaping. A few of the many landscape plants include Oriental Bittersweet, Japanese Honeysuckle, and Multiflora Rose. Other organisms, such as insects and plant diseases, can be contained within these "foreign" plants and is the

ABOUT 60% OF INVASIVE SPECIES HAVE RESULTED FROM HORTICULTURE, ANOTHER 25% RESULTED FROM AGENCY AND OTHER PROFESSIONAL "RECOMMENDATIONS" FOR SOIL AND WATER CONSERVATION, AND THE REMAINING 15% WERE ACCIDENTAL.

method by which Dutch Elm Disease and the Chestnut Blight were brought to the US.

- Through our methods of transportation. Everything from the ballast water of ships, sheep wool, packing crates, and car tires can travel many miles over a relatively short time and provide a perfect means for "hitchhikers." The large red seaweed *Grateloupia doryphora*, and Asian Shore Crab, which now grow throughout Narragansett Bay were "introduced" via ballast water.
- Through the release or escape of exotic pets or aquarium plants. Fanwort is an example of an aquarium plant that has become invasive in RI.
- Through construction and the moving of soil and other "fill." The soil from one area can potentially contain and introduce seeds and organisms to another area. Furthermore, common forms of erosion and sediment controls on construction sites include staked hay bales, which are often imported from Canada. It is believed that Nodding Thistle came to RI this way.

Why, exactly, are invasive species such a big concern?

Loss of biodiversity and basic ecological processes

The ecosystems of the world consist of millions of animals, plants, protists, fungi, bacteria, and viruses that interact with the physical environment. Each ecosystem has its own combination of organisms. Non-native invasive species usually alter the natural succession or function of an ecosystem over the long term. This happens because native species are out-competed or overtaken by an invasive species, which often leads to one or more native species becoming extinct in that ecosystem. All of the other organisms in the ecosystem that depended on or co-existed with the now-extinct natural species are now adversely impacted. These impacted species (often 12 different species per one species in temperate climates, as many as 30 species in the tropical rainforests) must either change to adapt or also become extinct.

Such a loss of biodiversity and basic ecological processes can affect our agricultural food production, water quality protection, and health care worldwide.

Grave economic impacts and expense

Invasive species cost the United States an estimated \$123 billion annually in direct economic losses each year, affecting food crops, golf courses, the growing of turf and ornamentals, industrial sites, forestry, aquatic sites, recreational areas, municipal water supplies – the list is ongoing and extensive. This figure does not include damage to native species and ecosystems. Worldwide, the costs are even higher.

What are some common, widespread invasive species in Rhode Island?

Some **animal species** include the Norway Rat, Rock Dove, House Sparrow, European Starling, Mute Swan, Monk Parakeet, Japanese Shore Crab, and Green Crab.

Some **plant species** include Purple Loosestrife, Multiflora Rose, Autumn Olive, Glossy Buckthorn, Japanese Honeysuckle, Asiatic Bittersweet, and many others.

Some **plant species** that are agreed to be invasive in Rhode Island, but more information about the invasiveness of their cultivars is still needed include Norway Maple, Japanese Barberry, Burning Bush, and Morrow and Bella Honeysuckle.

Some **potentially invasive plant species** include Water Hyacinth, Eurasian Water-milfoil, Water-chestnut, and Mile-a-minute Weed (known from one site in the state).

Assessed by the Rhode Island Invasive Species Council during 2001

*Norway
Maple*

What can I do to make a difference?

Invasive species are a serious problem that is not going to disappear—many of them are here to stay. Attempts at controlling or eradicating the problem can be a daunting prospect, both financially and due to the intensity of labor required. But there are some things that each of us can do at the individual level, the biggest being to prevent further introduction of non-native species.

Use the *Record of Woodland Area Plans and Activities* sheet to record actions you plan to take and develop a time frame for accomplishing activities. Refer to the list of contacts and resources listed at the end of this factsheet for specific information and assistance with these activities.

- When landscaping or enhancing wildlife habitat in your backyard and woodlands, use native species. Learn which plant species are considered invasive to Rhode Island and the New England region and avoid planting them. Consult with the URI Cooperative Extension Greenshare *Sustainable Trees and Shrubs Manual* or refer to factsheet *Working for Wildlife Habitat* for a list of suggested trees, shrubs and other plants.
- Learn to identify the non-native and invasive species that may already exist in your backyard and woodlands and the possible control methods and options available. Avoid waiting until the problem appears “serious enough.” Be vigilant and monitor the problem regularly. See the Rhode Island Invasive Species Council list of invasive plants at www.riwps.org.
- Minimize land disturbances and soil exposure on your property. These

areas are often prime targets for non-native invasive plant species to move in and take over.

- When traveling—especially in foreign countries, do not bring plants, seeds, or fruit back home with you.
- Be very careful with “exotic” pets. Take extra measures to learn your pet’s behavior and how to prevent or anticipate accidental escapes. In the event that you no longer wish to have this pet, please take it and any artificial habitat features (such as an aquarium) to a proper pet store or other appropriate facility for assistance with placement. Never let an exotic pet “go free.”

THE MISSION OF THE RHODE ISLAND INVASIVE SPECIES COUNCIL, FORMED IN 1999, IS TO PROTECT NATIVE BIODIVERSITY IN RHODE ISLAND. THIS COUNCIL WILL GATHER AND CONVEY INFORMATION ON THE PRESENCE, DISTRIBUTION, ECOLOGICAL AND ECONOMIC IMPACTS, AND MANAGEMENT OF INVASIVE SPECIES; PROMOTE USES OF NATIVE SPECIES AND NON-INVASIVE ALTERNATIVES THROUGHOUT RHODE ISLAND; AND WORK COOPERATIVELY WITH RESEARCHERS, CONSERVATION ORGANIZATIONS, GOVERNMENT AGENCIES, THE GREEN INDUSTRIES, AND THE GENERAL PUBLIC TO IDENTIFY AND MANAGE INVASIVE SPECIES PRO-actively and effectively. THE COUNCIL USES A TOTAL OF 13 CRITERIA TO DETERMINE IF A SPECIES IS WIDESPREAD AND INVASIVE, RESTRICTED AND INVASIVE, OR POTENTIALLY INVASIVE.



Water Chestnut

Rock Dove



Purple Loosestrife



INVASIVE SPECIES HAVE BECOME SUCH A GREAT CONCERN THAT ON FEB. 3, 1999, PRESIDENT CLINTON SIGNED EXECUTIVE ORDER 13112, WHICH DIRECTS THE AGENCIES OF THE EXECUTIVE BRANCH OF THE FEDERAL GOVERNMENT TO WORK TO PREVENT AND CONTROL THE INTRODUCTION AND SPREAD OF INVASIVE SPECIES.

Where do I turn for more information and help?

The RI Natural History Survey

(401) 874-5800 • www.uri.edu/ce/rinhs
 • Information about invasive species, Rhode Island's ecology, biodiversity protection, and extensive links to many related organizations and publications.

The Rhode Island Wild Plant Society

(401) 783-5895 • www.riwps.org
 • List of native plants; official RI Invasive Species Council list of invasive plants; special programs, affiliations & newsletter.

URI CE GreenShare Program

(401) 874-2900
www.uri.edu/ce/ceec/greenshare.html
 • Sustainable Trees & Shrubs manual – lists over 250 disease and insect-resistant plants that thrive in Southern New England with minimal maintenance, available on-line
www.uri.edu/ce/factsheets/sheets/sustplant.html

Other Recommended On-Line Resources

Federal efforts concerning invasive species and the National Invasive Species Council:
www.invasivespecies.gov.

The Nature Conservancy's site, including information on invasive species management: <http://tncweeds.ucdavis.edu>.

URI Home*A*Syst Program, photos of some of Rhode Island's invasive species:
www.uri.edu/ce/wq/has/html/exotics.html

Connecticut Invasive Plant Working Group includes recommendations for control and management of invasive plants:
www.eeb.uconn.edu/cipwg

Other Recommended Publications

Marinelli, J. (ed.) 1996. *Invasive Plants: Weeds of the Global Garden*. Brooklyn, NY: Brooklyn Botanic Garden Handbook #149.

Shonbrun, S.B. (ed.). 1998. "Invaders." *Conservation Notes of the New England Wild Flower Society*, Vol. 2(3).

Westbrooks, R. 1998. *Invasive Plants: Changing the Landscape of America: Fact Book*. Washington D.C.: Federal Interagency Committee for the Management of Noxious and Exotic Weeds.

The journal of the Natural Areas Association (www.matareas.org) publishes many articles about the ecology and control of invasive species.

The information used to compile this factsheet was provided by Lisa Gould, Executive Director, Rhode Island Natural History Survey.

Programs and activities are available to all persons without regard to race, color, sex, disability, religion, age, sexual orientation, or national origin.

This project is a collaboration of the Southern New England Forest Consortium, Inc., and the University of Rhode Island Cooperative Extension Home*A*Syst Program. Written by Holly K. Burdett, Christopher Modisette, Alyson McCann, and Brienne Neptin. Special thanks to all publication reviewers. Funding for this project was provided by the USDA Forest Service in cooperation with the Rhode Island Department of Environmental Management Division of Forest Environment and the USDA Renewable Resources Extension Act, URI Cooperative Extension.

