

## CHAPTER 5

# *Controlling Exotic Species*

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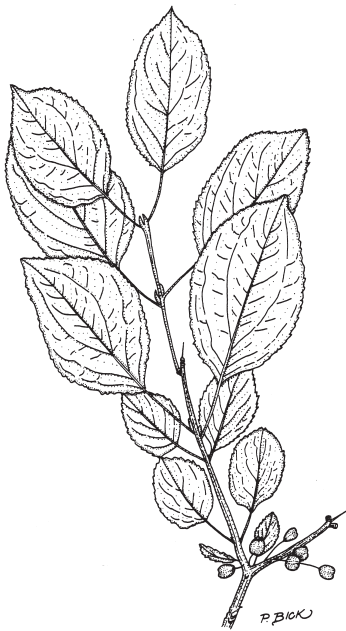
*White sweet clover*

## CHAPTER 5

# *Controlling Exotic Species*

**We are in a period of the world's history when the mingling of thousands of kinds of organisms from different parts of the world is setting up terrific dislocations in nature.**

Charles S. Elton



*Common buckthorn*

## *Reasons for Concern*

Exotic (non-native) species are foreign invasive plants and animals that are slowly infiltrating and changing our nation's ecological balance and posing increasing threats to our lakes, streams, prairies and woodlands.

Exotic species are considered to be those species that have been intentionally or accidentally introduced to North America since European settlement in Minnesota (around 1800). Human actions—either intentional or accidental—are the main source of introductions. Well-known examples of intentional introductions that were intended to be beneficial but went awry include the English sparrow, purple loosestrife and European carp.

According to a 1996 report by The Nature Conservancy, invasive species have contributed to the population decline of 42% of threatened and endangered species in the United States. Many of these invasive species also pose a threat to agricultural areas, lakes and streams, parks, trails and roadsides.

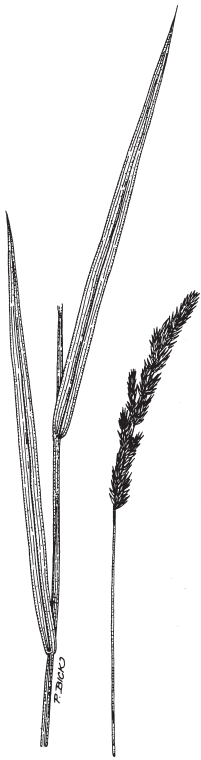
## *Pioneers and Colonizers*

Exotic invasive species are ecological pioneers and colonizers. Once introduced, they quickly establish themselves in ecologically disturbed or weakened communities.

These species typically displace native flora because they grow faster, have efficient seed dispersal methods and tolerate a wider range of conditions. Exotic species almost always lack the natural predators and diseases that control these same populations in their native environments. As the diversity and population of the native plants decrease, so does the variety of habitats for wildlife.

Opportunistic species are a second group of invasive species that are native. These species are also colonizers that can dominate certain disturbed natural communities and decrease species diversity.

**While only a small percentage of the 4,000 estimated exotic plant species cause problems, just 79 exotic plant and animal species have already cost the U.S. economy an estimated \$79 billion.**



*Reed canary grass*

Human-induced disturbances create conditions that allow pioneering species, such as exotics and certain native species, to invade an area. In a healthy ecosystem, natural disturbances, such as fire or flooding, generally keep exotic species in check, allowing disturbance-adapted native species to thrive.

### ***Ecological and Economic Impacts***

More than 4,000 exotic species exist in the United States. In Minnesota, 20% of all noncultivated plant species are exotics. While only a relatively small percentage of the 4,000 estimated exotic plant species cause problems, just 79 exotic plant and animal species have already cost the U.S. economy an estimated \$79 billion.

Invasive exotic species generate huge ecological costs by:

- Outcompeting existing native vegetation
- Diminishing biodiversity
- Threatening rare species through habitat elimination
- Reducing food and cover for native fish and wildlife
- Impoverishing native grasslands and woodlands

### ***Guiding Principle***

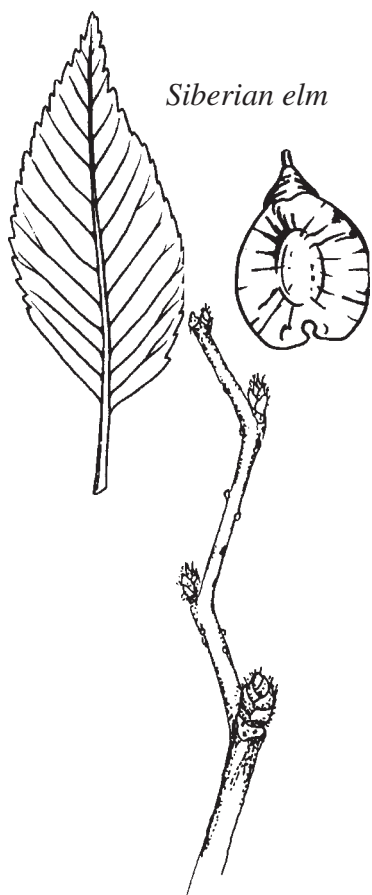
To make control of exotic species a management priority, with the long-term goal of restoring ecological balance to natural plant communities along state trails, canoeing and boating routes, and water access sites, thereby increasing the quality of the recreational experience and fostering user awareness and appreciation.

This principle can be achieved by:

- Understanding the origin and biological behavior** of exotic plants.
- Identifying and ranking the extent of exotic plant invasion.**
- Focusing control efforts** on those plant communities that still have high ecological diversity to encourage natural regeneration of native plants.
- Monitoring treated sites** regularly and thoroughly to keep exotic species under control.

## Guidelines for Controlling Exotic Species

The Minnesota Interagency Exotic Species Task Force prepared a report and recommendation for the Minnesota Legislature in 1991. The report identified those species that are potentially harmful to the integrity of Minnesota's remaining natural areas. The report also recommended a set of statewide policies to control these invasive species.



*Siberian elm*

The Task Force limited its review and discussion of exotic species to plants and animals, including birds, mammals, fish, reptiles, amphibians, insects, mollusks and crustaceans. Genetically engineered native organisms were also considered exotic species. (Bacteria, fungi and other microorganisms were not covered by this report.)

Of the exotic species that already exist in Minnesota, the Task Force identified 38 species as posing a severe threat; 42 species as posing a moderate threat; and 33 species as posing a minimal threat at the time of the report. An additional 40 species have been identified as potentially harmful if introduced in Minnesota.

### Listing of Harmful Exotic Plants

Table 1 and Table 2 on pages 4 and 5 list exotic plants that are identified as presenting a moderate to severe threat to natural plant communities:

- Table 1 lists harmful exotic woody plants (page 4).
- Table 2 lists harmful exotic perennial and annual herbaceous plants and grasses (pages 4-5).



*Exotic honeysuckle*

**Table 1: Harmful exotic woody plants**

<i>Common name</i>	<i>Scientific name (alphabetical)</i>	<i>Environmental impact</i>	<i>Current degree of threat</i>
Amur maple	<i>Acer ginnala</i>	Shades out herbaceous plants in savannas and open woods and stump sprouts.	Moderate
Norway maple	<i>Acer platanoides</i>	Invades native forests, out-competes sugar maple and shades out ground layer plants.	Moderate
Japanese barberry	<i>Berberis thunbergii</i>	Out-competes native shrubs in woodlands and oak savannas.	Moderate
Russian olive	<i>Eleagnus angustifolia</i>	Displaces native vegetation; grows on most soils in full sun.	Moderate
Exotic honeysuckles	<i>Lonicera tartarica</i> <i>Lonicera morrowii</i> <i>Lonicera x bella</i>	Displaces native species in woodlands and forest edges; can dominate the understory of oak woods.	Severe
European buckthorn Alder buckthorn	<i>Rhamnus cathartica</i> <i>Rhamnus frangula</i>	Displaces native understory shrubs, primarily in southern oak, maple-basswood, and riparian woodlands; also invades prairies and wetlands. <b>Restricted noxious weed.</b>	Severe
Black locust	<i>Robinia pseudoacacia</i>	Outcompetes native species; is persistent and monotypic; prefers upland woods and grasslands.	Moderate
Siberian elm	<i>Ulmus pumila</i>	Invades dry and mesic grassland; is very hardy.	Moderate

**Table 2. Harmful exotic perennial and annual herbaceous plants and grasses**

<i>Common name</i>	<i>Scientific name (alphabetical)</i>	<i>Environmental impact</i>	<i>Current degree of threat</i>
Quackgrass	<i>Agropyron repens</i>	Rapidly invades native prairie; extremely hard to eradicate.	Severe
Garlic mustard	<i>Alliaria petiolata</i>	Invades rich moist upland forests and wooded streambanks; displaces native ground layer. See Fact Sheet Series. <b>Prohibited noxious weed.</b>	Severe
Hoary alyssum	<i>Berteroa incana</i>	Displaces native species, particularly in dry prairies and sand blowouts.	Moderate
Smooth brome grass	<i>Bromus inermis</i>	Cool-season exotic; can successfully invade native prairie.	Severe
Flowering rush	<i>Butomus umbellatus</i>	Competes with native shoreline vegetation, can out-compete willows and cattails. <b>Prohibited noxious weed.</b>	Severe
Plumeless thistle	<i>Carduus acanthoides</i>	Aggressive biennial; dominates within three years; difficult to control.	Moderate
Musk thistle	<i>Carduus nutans</i>	Invades disturbed areas, especially grazed prairie. <b>Prohibited noxious weed.</b>	Moderate

**Table 2. Harmful exotic perennial and annual herbaceous plants and grasses (continued)**

<i>Common name</i>	<i>Scientific name (alphabetical)</i>	<i>Environmental impact</i>	<i>Current degree of threat</i>
Spotted knapweed	<i>Centaurea maculosa</i>	Aggressive allelopathic species; difficult to control; displaces natives in dry grasslands.	Severe
Ox-eye daisy	<i>Chrysanthemum leucanthemum</i>	May displace native species; difficult to control.	Severe
Canada thistle	<i>Cirsium arvense</i>	Invades native prairie and woodlands. Difficult to control. <b>Prohibited noxious weed.</b>	Moderate
Bull thistle	<i>Cirsium vulgare</i>	Invades native prairie and woodlands. Difficult to control. <b>Prohibited noxious weed.</b>	Moderate
Crown vetch	<i>Coronilla varia</i>	Beginning to spread from the roadsides where it was planted; will outcompete most native plants.	Severe
Queen Anne's lace	<i>Daucus carota</i>	Can become a dense roadside forb; invades low quality or disturbed prairies and old pastures.	Moderate
Grecian foxglove	<i>Digitalis lanata</i>	Occurs primarily in Washington County. Forms single species stands, toxic.	Moderate
Leafy spurge	<i>Euphorbia esula</i>	Aggressively displaces native species; very difficult to control. <b>Prohibited exotic species.</b>	Moderate
Creeping Charlie	<i>Glechoma hederacea</i>	Chokes out forbs and grasses. Not a threat to healthy native communities.	Moderate
Orange hawkweed	<i>Hieracium aurantiacum</i>	Invades northern pastures and forest edges, roadsides, colonizes.	Moderate
Yellow iris	<i>Iris pseudacorus</i>	Competes with native shoreline vegetation.	Moderate
Butter and eggs	<i>Linaria vulgaris</i>	Colonizes abandoned pastures, croplands and along roadsides.	Moderate
Bird's foot trefoil	<i>Lotus corniculatus</i>	Aggressive; monotypic; forms a dense mat; crowding out native plants.	Moderate
Purple loosestrife	<i>Lythrum salicaria</i>	Aggressively crowds out emergent wetland vegetation; invades wet prairies. <b>Prohibited exotic species.</b>	Severe
White sweet clover	<i>Melilotus alba</i>	Aggressive biennial; invades native grasslands.	Moderate
Yellow sweet clover	<i>Melilotus officinalis</i>	Aggressive biennial; invades native grasslands. See Fact Sheet Series.	Moderate
Amur silver grass	<i>Miscanthus sacchariflorus</i>	Invades disturbed sunny to semi-shaded environments, aggressive colonizer.	Moderate
Wild parsnip	<i>Pastinaca sativa</i>	Invades in most moisture regimes; dry to wet-mesic; spreads rapidly; causes phytophoto-dermatitis to human skin.	Severe in southeast Minnesota
Reed canary grass	<i>Phalaris arundinacea</i>	Very aggressive; forms monotypic stands; prefers fertile organic soils but also grows on uplands and spoil piles; difficult to eradicate.	Severe
Kentucky bluegrass	<i>Poa pratensis</i>	Displaces native warm-season species.	Severe
Japanese knotweed	<i>Polygonum cuspidatum</i>	Spreads vegetatively forming dense thickets especially along disturbed stream banks and lakes.	Moderate
Perennial sow thistle	<i>Sonchus arvensis</i>	Colonizes disturbed sites. <b>Prohibited noxious weed.</b>	Moderate
Common tansy	<i>Tanacetum vulgare</i>	Widespread in northern Minnesota. Competes with native prairies, savannas.	Moderate
Hairy vetch	<i>Vicia villosa</i>	Aggressive climber crowds out native species in sandy soils.	Moderate

## Control Methods

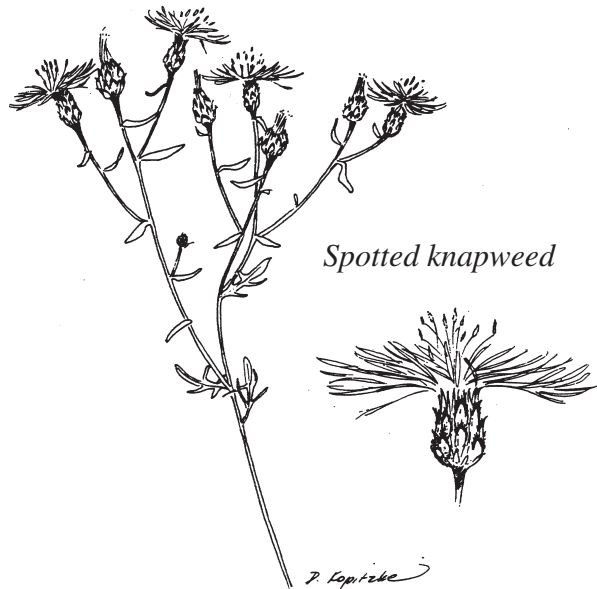
Methods for control of exotic species fall into four categories: mechanical removal, prescribed burning, use of herbicides, and biological control.

**Mechanical removal:** Pull and remove plants from the site before they go to seed; girdle trees.

**Prescribed burning:** Apply a burning regime that weakens exotic plants and gives native plants a chance to compete.

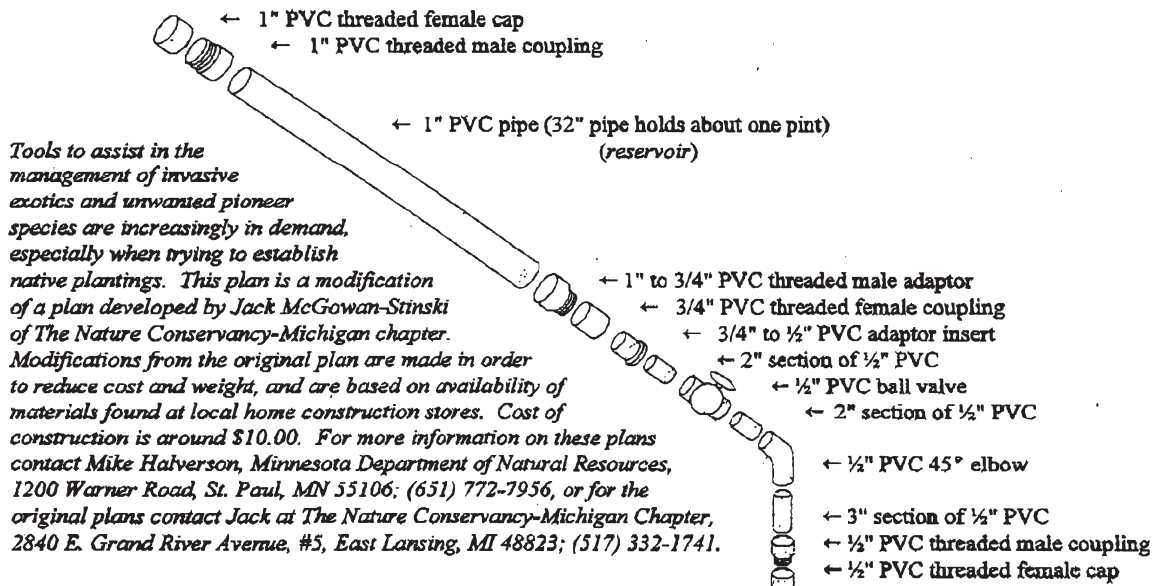
**Use of herbicides:** Apply foliar sprays to small plants; cut and treat stumps to discourage resprouting on large woody plants (see Figure 1, page 7). Follow Operational Order #59: Use of Pesticides in DNR Natural Resource Management Activities, 1977; revised 2004.

**Biological control:** The U.S. Department of Agriculture (USDA) is conducting a major biological control program that involves importing, propagating and distributing the natural enemies of exotic plants. Extensive and careful research precedes the introduction of biological control agents. The USDA is the permitting agency. Biological control is used in Minnesota for the following plants: purple loosestrife, leafy spurge and spotted knapweed.



# Cut Stump or Small Plant Herbicide Applicator

## Components and instructions for assembly and use



Tools to assist in the management of invasive exotics and unwanted pioneer species are increasingly in demand, especially when trying to establish native plantings. This plan is a modification of a plan developed by Jack McGowan-Stinski of The Nature Conservancy-Michigan chapter. Modifications from the original plan are made in order to reduce cost and weight, and are based on availability of materials found at local home construction stores. Cost of construction is around \$10.00. For more information on these plans contact Mike Halverson, Minnesota Department of Natural Resources, 1200 Warner Road, St. Paul, MN 55106; (651) 772-7956, or for the original plans contact Jack at The Nature Conservancy-Michigan Chapter, 2840 E. Grand River Avenue, #5, East Lansing, MI 48823; (517) 332-1741.

**Assembly Instructions:** Cement all non-threaded parts together using PVC pipe cement. To prevent leakage, be sure to use Teflon plumbing tape on all of the threaded parts. Before attaching the 1/2" PVC threaded female cap, drill two 1/16" drip holes near the center of the cap. More holes can be added later if you feel additional flow is needed.

A variety of sponge materials can be used at the end, but remember that larger sponges will require more herbicide before becoming saturated. I found that a small (approximately 4" by 4") terry covered sponge (staining pad) works well. When centered on the drip cap it can be wrapped across the tip and tied above the cap. A terry cloth protected sponge is more durable than sponge alone. In order to suit your specific needs, you can experiment with different kinds of applicator ends and sponges.

**To use:** With the ball valve in the "OFF" or "CLOSED" position, pour herbicide mix in reservoir and close with threaded female cap (at top of applicator). Open ball valve to allow herbicide to reach sponge (you may have to loosen cap at top of applicator to allow air to enter reservoir). When the sponge

begins to saturate, close ball valve and re-tighten reservoir cap. Once the sponge is saturated only a light touch on target plant or stump is needed. Open ball valve when more herbicide is needed.

### Helpful Hints:

- In order to make cleaning easier, there are three places where threaded parts are used.
- Always clear drip holes of residue before re-using applicator (a paper clip works well).
- A plastic bag should be secured around the sponge tip when moving from one location to another (do not store this way for a long period of time).
- Do not allow left-over herbicide mix to remain in reservoir during freezing or very hot conditions.
- Be sure to correctly identify plants before you treat them.
- Always follow herbicide label directions.
- Be sure to check whether state or local permits are needed before you apply herbicides, especially near water.

Figure 1: Cut stump or small plant herbicide applicator



## For Further Information

*Biology and Management of Noxious Rangeland Weeds* edited by Roger L. Sheley & Janet K. Petroff, Oregon State University Press, Corvallis, 1999.

*Invasive Weeds of Wisconsin*, a video produced by the Park People, P.O. Box 17513, Milwaukee, Wisconsin 53217. Phone: 414-273-7257. [www.theparkpeople-milwaukee.org](http://www.theparkpeople-milwaukee.org)

*Minnesota invasive non-native terrestrial plants*, an identification guide for resource managers. Minnesota Department of Natural Resources, Trails and Waterways Division, 2003 edition.

This publication is available at Minnesota's Bookstore, order online at [www.minnesotasbookstore.com](http://www.minnesotasbookstore.com) or call 1.800.657.3757.

Also available at:

<http://www.dnr.state.mn.us/terrestrialplants/index.html>

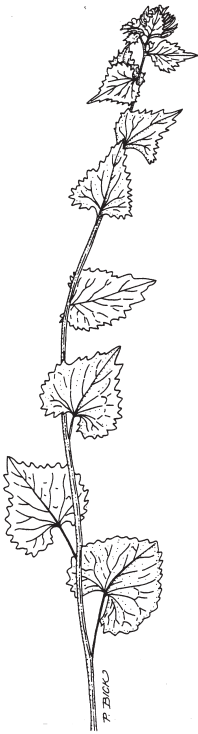
*Report and Recommendations of the Minnesota Interagency Exotic Species Task Force*, July 1991. Minnesota Department of Natural Resources, St. Paul, Minnesota.

*The Tallgrass Restoration Handbook*, Stephen Packard and Cornelia F. Mutel. Island Press, Washington, D.C., 1997.

*Wisconsin Manual of Control Recommendations for Ecologically Invasive Plants*. Bureau of Endangered Resources, Wisconsin Department of Natural Resources, Madison, Wisconsin, May 1997.

### **Businesses Providing Exotic Species Control and Management Services**

Go to: <http://www.dnr.state.mn.us/gardens/nativeplants/suppliers.html>



*Garlic mustard*