



Wisconsin's Urban Forestry

# Best Management Practices for Preventing the Introduction and Spread of Invasive Species

## APPENDICES

The urban forest, Cedarburg, WI. Photo by Kevin Westphal

## Appendix A: Brief Overview of Control Methods

**Manual control** techniques include activities such as hand-pulling, digging, flooding, mulching, burning, removal of alternate hosts and manual destruction or removal of nests, egg masses or other life stages. These techniques work best on small populations or in areas where chemicals or motorized equipment cannot be used. Manual control efforts must be persistent and several treatments may be needed to reduce or eliminate the target population. If infestations are too pervasive, manual control may become very labor intensive, and thus, not economically feasible.

**Mechanical control** techniques include mowing, girdling, cutting, chopping, tilling, hoeing, , , , and constructing barriers using tools or machines. These techniques are most useful in areas with large infestations where the landscape does not create safety or equipment issues. Repeated mowing or cutting of invasive plants can weaken the population by depleting root reserves and preventing flowering; however, mechanical control is typically most effective when used in conjunction with herbicide treatments. If infestations are small, the cost of mechanical control is usually relatively low, and when combined with other treatments, it can be very effective. However, cutting large populations of woody invasive plants can become labor and resource intensive.

**Chemical control** refers to the use of pesticides, and for all practical purposes, some invasive organisms cannot be controlled without the use of pesticides. There are many kinds of herbicides, insecticides and fungicides. Not all of them will be appropriate for every situation. The choice of pesticide depends on the species, stage of growth, the presence of desirable species that may be affected, the proximity of water resources and environmental conditions. Pesticides must always be applied in accordance with the label. Property owners should possess the proper equipment and the knowledge to safely apply chemicals or hire a licensed applicator. Proper personal protection gear should be used, and materials to contain spills should be kept close by. There may be instances when chemical control is inappropriate or simply not allowed. Densely populated urban areas, adjacent property owners and local ordinances are just a few examples of things that can affect chemical control plans.

**Biological control** refers to the use of animals, fungi or diseases to control invasive populations. Control organisms usually come from the native range of the target species, and require a period of study to ensure they will remain specific to the target population and will not harm other species. Biological control typically does not eliminate the invasive species and it usually takes several years to show results. Biological control has been effective for some species such as the *Galerucella* beetle which has been used with some success to control purple loosestrife (*Lythrum salicaria*), and Btk, *Entomophaga maimaiga* and the nuclear polyhedral virus for gypsy moth control.

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**Cultural Control** is the manipulation of urban forest composition, growing conditions and tree health to control invasive species or limit their effects if invasion occurs. Trees and other vegetation that are potentially susceptible host species can be reduced as an urban forest component, thus limiting outbreaks of insects and disease-causing organisms. Alternately, species that are resistant to invasive insects and diseases may be planted instead of nonresistant species. Our urban forests include native and non-native plant species. Creating or selecting proper planting locations for them is another illustration of cultural control. For example, plants that spread aggressively by rhizomes would be best planted in a contained area. Minimizing stress to a plant through actions such as mulching, watering or fertilizing often enables it to better withstand and outcompete invasive infestations. Another example of a cultural control activity is maintaining a level of canopy closure that impedes shade intolerant invasive species. See *Appendix E: Resources* Section 13 for information about the proper management of trees shrubs and other vegetation.

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## **Appendix B: Monitoring**

The following are examples of data sheets for inventorying, monitoring, and managing invasive species. The Midwest Invasive Plant Network keeps a list of data sheet examples at <http://www.mipn.org/edrrDataForms.html>. Urban forestry practitioners need to use the data sheet that works best for their situation.

**INVASIVE SPECIES INVENTORY FIELD REPORT FORM**

Observation Date: \_\_\_\_\_  
Name: \_\_\_\_\_ Association: \_\_\_\_\_  
Address: \_\_\_\_\_ City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
Phone: \_\_\_\_\_ Email: \_\_\_\_\_

**Species Information - Name and Locations**

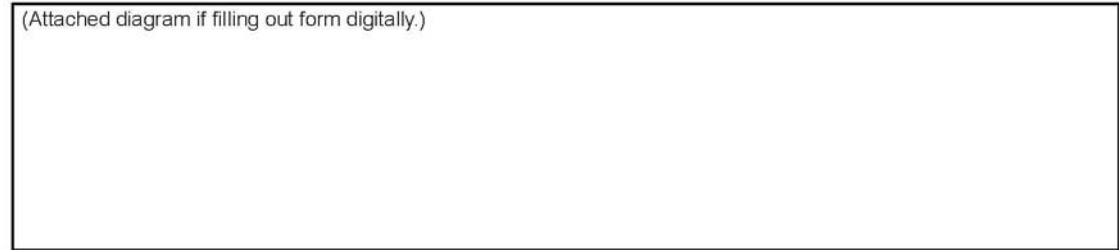
Common Name: \_\_\_\_\_ Scientific (if known): \_\_\_\_\_  
Locality Name ( lake or twnshp): \_\_\_\_\_ County: \_\_\_\_\_  
Site address (if any): \_\_\_\_\_ City: \_\_\_\_\_ Zip: \_\_\_\_\_  
Property Ownership (i.e, Private, county, state, federal, etc.): \_\_\_\_\_

**Provide one or more of the following location methods below:**

PLS: ¼ ¼ Sec \_\_\_\_\_ ¼ Sec \_\_\_\_\_ Sec \_\_\_\_\_ Twp \_\_\_\_\_ Range \_\_\_\_\_  
GPS: X Coordinate (Lat./Easting): \_\_\_\_\_  
Y Coordinate (Long./Northing): \_\_\_\_\_

**Number of individuals observed (Check one):**  < 20  20 - 99  100 - 999  < 1000  
**Distribution of infestation:**  occurs singly  scattered pockets  continuous/extensive  
**Size of infested area (acres):**  < 1  1 - 5  5 - 10  10 - 50  > 50

**Diagram:** Show roads, nearest intersections, distances, compass direction and rough outline in invasive species population.

(Attached diagram if filling out form digitally.)  


**Verbal directions (if PLS/GPS information unavailable):**



**Mail form to:** Minnesota Department of Natural Resources  
Division of Forestry  
Attn: Invasive Species Specialist  
500 Lafayette Rd  
St. Paul, MN 55155-4025

**Email to:** [susan.burks@dnr.state.mn.us](mailto:susan.burks@dnr.state.mn.us)

For more information visit:  
[http://files.dnr.state.mn.us/assistance/backyard/treecare/forest\\_health/invasivereportform.pdf](http://files.dnr.state.mn.us/assistance/backyard/treecare/forest_health/invasivereportform.pdf)

## Setting Objectives for Invasive Species\*

**Weighted Score\*\***

<b>Current Extent of the Species***</b>	
1. Species present in early stage or emerging satellite populations	5
2. Species present in large infestations and still expanding rapidly	3
3. Species present in large infestations and no longer expanding	1
Score :	

<b>Current and Potential Impacts</b>	
1. Species that alter ecosystem processes	5
2. Species that out-compete native vegetation without disturbance, but not #1	3
3. Species that only out-compete with native vegetation following disturbance	1
Score :	

<b>Value of Habitats Affected</b>	
1. Infestations occurring in high quality, high diversity or otherwise significant habitats	5
2. Infestations occurring in already de-graded, low-diversity, or less significant sites	2
Score :	

<b>Feasibility of Control and Successful Outcomes</b>	
1. Species likely to be controlled or eradicated with available methods and resources	5
2. Species difficult to control or eradicate with available resources and methods	3
3. Species unlikely to be controlled with available resources and methods	1
Score :	

Score - 15-20: Consider "Zero Tolerance" (Eradication) Objective	<b>ZT</b>	<b>Total Score :</b>
Score 9-14: Consider "Acceptable Threshold" Objective	<b>AT</b>	
Score 5-8: Consider "Slow the Spread" Objective	<b>SS</b>	

\* Adapted from "Site Weed Management Plan Template" by Mandy Tu of The Nature Conservancy's Wildland Invasive Species Program. For the complete document see: <http://tncweeds.ucdavis.edu/products/plans/WeedTemp.rtf>

\*\* Managers should select the condition that best describes their situation for each of the 4 criteria areas. The scoring ranges and associated objectives are recommended and managers may need to consider other information in setting objectives.

\*\*\* On larger properties consider creating multiple management units to reflect different conditions and levels of infestation.



## Appendix C: Terrestrial Invasive Plants in Wisconsin

There exists both formal and informal invasive plant lists for the state of Wisconsin and the surrounding region. Among these, no two lists are the same, in part because the agencies, organizations and groups who created them can have differing points of view about the invasiveness of some species. This is natural considering invasiveness varies due to location, habitat type, disturbance history, urban versus rural locations, proximity to propagules and many other factors. In short, what may be invasive in one environment may not be invasive in another.

Because no individual list will be able to meet the needs of every Urban Forestry practitioner in Wisconsin, we have put together a list of invasive plant lists pertinent to our region and have attempted to explain how they were compiled so that the user can decide for themselves which list best meets their needs.

Keep in mind that lists are continually being updated as new invasive plant species appear in Wisconsin and as additional research is being reported. It is important to remember that regardless if a particular species is included in a list, implementation of the BMPs should be effective at preventing or slowing the spread of any species.

### **Lists:**

*Wisconsin Department of Natural Resources (WDNR)—Invasive Plant Species Proposed to be Regulated Under NR 40 and Plant Species Not Regulated by NR 40*  
<http://dnr.wi.gov/invasives/classification/>

The species lists, developed as part of the Wisconsin DNR's Proposed Invasive Species Identification, Classification and Control Rule – NR 40, were created with input from the DNR, the Wisconsin Council on Invasive Species and Species Assessment Groups (SAGs) comprised of experts in their respective fields and stake-holder groups. The SAGs reviewed literature summaries and made recommendations to the Council. The rule identifies invasive species in each specific category based on criteria and will place restrictions on those species that are classified as prohibited or restricted. Once formally adopted by the Wisconsin State Legislature, this will be the only invasive plant list that is regulated. This list is not definitive. Additional species are or will be under review, and the list will be periodically updated.

*Wisconsin Department of Natural Resources (WDNR)—Invasive Species Plants.*  
<http://dnr.wi.gov/invasives/plants.asp>

This is an informal list first created in 1992 by Wisconsin Department of Natural Resource staff with a great deal of input from land managers throughout the state. Species have been and continue to be added as they are brought to the attention of DNR staff. The list consists of species that appear to be anecdotally invasive, are widespread or are known to be significantly invasive outside of Wisconsin and have the potential to naturalize in our state. The list also includes native species with invasive tendencies.

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*Invasive Plants Association of Wisconsin—IPAW Working List of the Invasive Plants of Wisconsin.* <http://www.ipaw.org/list/index.htm>

The mission of IPAW, a private, nonprofit org is to advance understanding of invasive plants and encourage their control to promote stewardship of the natural resources of Wisconsin. In order to carry out their mission, members of IPAW created a working list of plants that are invasive in the natural plant communities and wild areas of Wisconsin. The list was created by a formal process that involved the collection of a wide variety of personal observations and experience of natural area and plant experts by survey. The survey was conducted in 2002 and the list was published in March 2003. It has not been updated since. The IPAW list does not include agricultural weeds; it focuses on plants that invade natural plant communities. It does not include plants that are native to Wisconsin. Non-native species that are not known to be currently invasive in Wisconsin, but are invasive in similar ecoregions and may have the potential to become invasive in our state, are presented separately in the "IPAW Working List of the Potentially Invasive Plants for Wisconsin". The IPAW list also does not take into consideration cultivar and varietal differences in potential invasiveness.

## **Appendix D: Short List of Invasive Insects and Diseases for Wisconsin**

The lists below are provided for educational purposes for use in conjunction with the BMPs. The lists represent insects and diseases, native or non-native, that are the most destructive or threatening to Wisconsin's urban forests. Species are listed in alphabetical order; they are not listed in order of priority. These species may already be present in our state or they have the potential to be here in the near future. The lists may be updated as new invasive species appear in or threaten Wisconsin.

Those species assessed by Species Assessment Groups are **in bold**. Species Assessment Groups, comprised of experts in their respective fields and stake-holder groups, were asked to review literature summaries and to make recommendations to the Wisconsin Council on Invasive Species as how to categorize species for WDNR's proposed Invasive Species Identification, Classification, and Control Rule (NR 40).

The lists are not comprehensive. See *Appendix E: Resources* Sections 3 and 4 for links to more information about the species listed and other invasive insect and disease species.

<b>Invasive Insects</b>		
<b>Common Name</b>	<b>Scientific Name</b>	<b>Preferred Host Species</b>
<b>European gypsy moth</b>	<b><i>Lymantria dispar</i> (European race)</b>	<i>hardwoods; oaks preferred</i>
Japanese beetle	<i>Popillia japonica</i>	<i>many hosts</i>
<b>Emerald ash borer</b>	<b><i>Agrilis planipennis</i></b>	<i>all species of ash (<u>Fraxinus spp.</u>)</i>
<b>Asian longhorned beetle</b>	<b><i>Anopliophora glabripennis</i></b>	<i>hardwoods; maples preferred</i>
<b>Sirex woodwasp</b>	<b><i>Sirex noctilio</i></b>	<i>pinus</i>
<b>Hemlock wooly adelgid</b>	<b><i>Adelges tsugae</i></b>	<i>Eastern and Carolina hemlock</i>
<b>Asian gypsy moth</b>	<b><i>Lymantria dispar</i> (Asian race)</b>	<i>hardwoods &amp; conifers</i>
<b>Invasive Diseases</b>		
<b>Disease Name</b>	<b>Scientific Name of Pathogen</b>	<b>Preferred Host Species</b>
Diplodia shoot blight	<i>Diplodia pinea</i>	<i>pinus; red, scots, jack &amp; Austrian preferred</i>
Cytospora canker	<i>Cytospora kunzei</i> var. <i>piceae</i>	<i>Norway &amp; Colorado blue spruce preferred</i>
Oak wilt	<i>Ceratocystis fagacearum</i>	<i>oaks; red/black family preferred</i>
<b>White pine blister rust</b>	<b><i>Cronartium ribicola</i></b>	<i>5-needled pines</i>
Dutch elm disease	<i>Ophiostoma ulmi</i> , <i>O. novo-ulmi</i>	<i>American elm most susceptible</i>
Fireblight	<i>Erwinia amylovora</i>	<i>rose, apple, pear, and other rosaceous plants</i>
<b>Sudden oak death</b>	<b><i>Phytophthora ramorum</i></b>	<i>many hosts</i>
<b>Butternut canker</b>	<b><i>Sirococcus clavigignenti-juglandacearum</i></b>	<i>butternut</i>
<p><b>Species in bold</b> were assessed by Species Assessment Groups comprised of experts in their respective fields and stake-holder groups. The Species Assessment Groups were asked to review literature summaries and to make recommendations to the Wisconsin Council on Invasive Species as how to categorize species for the proposed Invasive Species Identification, Classification and Control Rule (NR 40).  <a href="http://dnr.wi.gov/invasives/classification/">http://dnr.wi.gov/invasives/classification/</a></p>		

Note: The term "**invasive disease**" is used throughout this document. Although diseases themselves are not technically invasive, the pathogens that cause plant diseases (including but not limited to fungi, bacteria, viruses and phytoplasmas) can be invasive when they infect a susceptible host and conditions are favorable for disease to develop.

## Appendix E: Resources

1. Invasive Plants
2. Plants to Use as an Alternative to Invasives
3. Invasive Insects and Diseases
4. Invasive Insects and Diseases Lists
5. All Invasives
6. General Invasive Plant Management
7. Cooperative Weed Management Areas (CWMAs)
8. Biocontrol
9. Herbicide
10. Prescribed fire
11. Early Detection and Rapid Response
12. Prioritizing Management
13. General Sites of Interest
14. Educational Opportunities and Events

### 1. Invasive Plants (See also *All Invasives*):

*Center for Invasive Plant Management (CIPM)*. <http://www.weedcenter.org>

This web site provides information on invasive plant identification, biology, and impacts of invasive species. It also includes links to a resource guide, weed control methods, and invasive plant management online textbook.

*Great Lakes Indian Fish and Wildlife Commission (GLIFWC)—Exotic Plant Information Center*. <http://www.glifwc.org/invasives/> This site features a searchable database of invasive species accounts. It also provides distribution maps, educational materials, and a slide library.

*Invasive Plants Association of Wisconsin (IPAW)*. <http://www.ipaw.org>

The mission of IPAW is to promote better stewardship of the natural resources of Wisconsin by advancing the understanding of invasive plants and encouraging the control of their spread. Their web site offers a photo gallery, invasive species list, educational resources, news and events, and more.

*Midwest Invasive Plant Network (MIPN)*. <http://www.mipn.org/>

This organization's mission is to reduce the impact of invasive plant species in the Midwest. The web site provides information on prevention, early detection and rapid response, control and management, education, research, and more.

*Plant Conservation Alliance (PCA), Weeds Gone Wild, Alien Plant Invaders of Natural Areas*. <http://www.nps.gov/plants/alien/> This web site provides a list of invasive plants in the US, background information on the threats and impacts of invasive species, fact sheets, and relevant links.

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*The Nature Conservancy (TNC), Invasive Species Plant Summaries.*

<http://www.imapinvasives.org/GIST/ESA/index.html> Elemental Stewardship Abstracts are no longer maintained by the Nature Conservancy but still provide good information on invasive plants.

*University of Wisconsin Extension—Weed Identification and Management.*

<http://weedid.wisc.edu> This site houses an interactive weed identification database of 280 of the most common weeds/invasive plants in Wisconsin.

*University of Wisconsin-Green Bay Herbarium—Invasive Plants of Wisconsin.*

[http://www.uwgb.edu/biodiversity/herbarium/invasive\\_species/invasive\\_plants01.htm](http://www.uwgb.edu/biodiversity/herbarium/invasive_species/invasive_plants01.htm) This site includes photos, description and distribution maps of invasive plants.

*University of Wisconsin Herbarium.* <http://www.botany.wisc.edu/wisflora>

The Herbarium's web site is fully searchable for Wisconsin's vascular plant species. It includes photos, habitat information, distribution maps, and herbarium specimen data.

*University of Wisconsin-Steven Point Freckmann Herbarium.*

<http://wisplants.uwsp.edu/VascularPlants.html> This web site is searchable for Wisconsin's vascular plants species. It includes photos, habitat information, and distribution maps.

## **2. Plants to Use as an Alternative to Invasives:**

*Alternative to Ash Trees: Commercially Available Species and Cultivars.*

<http://www.uwex.edu/ces/wihort/landscape/AshAlternatives.doc> By Dr. Laura G. Jull, Dept. of Horticulture, University of Wisconsin-Madison

*Alternative to Ash Trees: Short List.*

<http://www.entomology.wisc.edu/emeraldashborer/Alternatives%20to%20Ash%20for%20Homeowners.pdf> By Dr. Laura G. Jull, Dept. of Horticulture, University of Wisconsin-Madison

*Meijer & The Nature Conservancy's Recommended Non-Invasives List.*

[http://www.nature.org/wherewework/northamerica/states/michigan/files/meijer\\_plant\\_list.pdf](http://www.nature.org/wherewework/northamerica/states/michigan/files/meijer_plant_list.pdf)

*Landscape Alternatives for Invasive Plants of the Midwest.*

<http://mipn.org/MIPN%20redraft2.pdf> Lists the invasive and its alternatives

## **3. Invasive Insects and Diseases (See also *All Invasives*):**

*Department of Agriculture Trade and Consumer Protection (DATCP).*

<http://www.datcp.state.wi.us/core/insectspesticides/insectspesticides.jsp>

DATCP is responsible for the prevention, introduction and spread of plant pests. This webpage provides information on specific pests, rules, firewood restrictions, and firewood dealer certification.

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*Department of Agriculture Trade and Consumer Protection (DACTP)—Wisconsin Pest Bulletin.* <http://pestbulletin.wi.gov/index.jsp> The most relevant links are: *Nursery and Forest, Exotic Pest of the Week, and DATCP Contacts.*

*Emerald Ash Borer: What you need to know.* <http://www.emeraldashborer.info/> This web site is part of a multi-state effort to provide the latest information about EAB to the public.

*National Agricultural Pest Information System (NAPIS)—Pest Tracker.* <http://ceris.purdue.edu/napis/> This web site has links to state information, pest information, survey maps and publications. Information presented here is derived, in part, from the National Agricultural Pest Information System (NAPIS), an agricultural pest tracking and database sponsored by the US Department of Agriculture Animal and Plant Health Inspection Service (APHIS) and Plant Protection and Quarantine (PPQ) Cooperative Agricultural Pest Survey, (CAPS).

*The Exotic Forest Pest Information System for North America.* <http://spfnic.fs.fed.us/exfor/index.cfm> This web site contains a database of invasive insects, mites, and diseases with background information for each pest.

*U S Department of Agriculture (USDA) Animal Plant Health Inspection Service (APHIS).* [http://www.aphis.usda.gov/plant\\_health/](http://www.aphis.usda.gov/plant_health/) APHIS safeguards agriculture and natural resources from the risks associated with the entry, establishment, or spread of animal and plant pests. The site has links to information on specific plant pests, pest detection and identification information, and plant protection and quarantine manuals.

*US Department of Agriculture (USDA) Forest Service—North Central Research Station: Emerging Forest Insect Pests.* [http://www.ncrs.fs.fed.us/4501/focus/emerging\\_pests/](http://www.ncrs.fs.fed.us/4501/focus/emerging_pests/) The North Central Research Station web site provides information on exotic forest insects, describes current research, and features publications and maps for a 20-state region spanning the Midwest and Northeast.

*Wisconsin Gypsy Moth.* <http://www.gypsymoth.wi.gov/> The Wisconsin Gypsy Moth site has information on predicting defoliation, management options, identification, and life cycle and includes the phone number for the Gypsy Moth Information Line.

*Wisconsin's Emerald Ash Borer Resource.* <http://emeraldashborer.wi.gov/> This site includes information on surveys, detection, and management, and includes an email address and phone number to report suspected infestations.

#### **4. Invasive Insects and Diseases Lists:**

*Wisconsin DNR Forest Health Protection Unit's Annual Report: Forest Health Conditions in Wisconsin, 2007.* <http://dnr.wi.gov/forestry/Fh/pdf/AnnualReport2007.pdf>

*USDA Forest Service Invasive Species Program Web pages.*

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<http://www.fs.fed.us/invasivespecies/speciesprofiles/index.shtml>

*USDA Forest Service North Central Research Station.*

[http://www.ncrs.fs.fed.us/4501/focus/emerging\\_pests/](http://www.ncrs.fs.fed.us/4501/focus/emerging_pests/)

*The Nature Conservancy's Invasive Species Initiative Regional List of Pests, 2004 (scroll down to Midwest region, but note that this covers from MI to ND, south to TX).* <http://www.invasive.org/gist/products/gallery/regionlist.html>

## **5. All Invasives:**

*National Invasive Species Council's Definition of Invasive Species.*

<http://www.invasivespeciesinfo.gov/docs/council/isacdef.pdf>

*National Invasive Species Management Plan.*

<http://www.invasivespeciesinfo.gov/council/nmp.shtml>

*The Nature Conservancy (TNC), Global Invasive Species Team.* <http://tncinvasives.ucdavis.edu>

This web site is no longer maintained by the Nature Conservancy but it is archived on various other web sites. It provides many resources designed to help conservationists deal most effectively with invasive species. It provides links to an introduction on invasive species management, planning and strategy, control methods, photo archive and more.

*USDA Forest Service Invasive Species Program.* <http://www.fs.fed.us/invasivespecies> This web site serves as a portal to Forest Service invasive species information and related management and research activities across the agency and with partners. The program's goal is to reduce, minimize, or eliminate the potential for introduction, establishment, spread, and impact of invasive species across all landscapes and ownerships.

*Wisconsin Council on Invasive Species.* <http://dnr.wi.gov/invasives/iscouncil.htm>

This site includes a link to the comprehensive state management plan.

*Wisconsin Department of Natural Resources (WDNR).* <http://dnr.wi.gov/invasives>

The Invasive Species webpage provides links to invasive species information including a photo gallery, complete plant and animal invasive species lists, and information on managing invasive species populations.

## **6. General Invasive Plant Management:**

*Center for Invasive Plant Management (CIPM)—Weed Control Methods.*

<http://www.weedcenter.org/management/control.html>

The Weed Control Methods web page offers information and links on the following control techniques: biocontrol, grazing, herbicides, mechanical and prescribed burning.

*Department of Conservation and Natural Resources Invasive Exotic Plant Tutorial for Natural Land Managers. Invasive Exotic Plants in Pennsylvania List.*

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<http://www.dcnr.state.pa.us/forestry/invasivetutorial/List.htm>

Although this site is for Pennsylvania most of the species featured are also invasive in Wisconsin. The site provides links to fact sheets and management and control recommendations.

*Garlic mustard (Alliaria petiolata)—Guide for identifying and controlling.*

<http://www.for-wild.org/download/garlicmustard.pdf>

*Illinois Nature Preserve Management Guidelines.*

[http://dnr.state.il.us/INPC/Management\\_guidelines.htm](http://dnr.state.il.us/INPC/Management_guidelines.htm) The information presented gives guidance to landowners, managers, custodians and stewards of sites in the Illinois Nature Preserve Programs on control methods for common invasives.

*Invasive Plants of the Upper Midwest* by Elizabeth J. Czarapata. This book is a comprehensive, fully-illustrated guide to the identification and control of invasive plant species.

*Plant Conservation Alliance—Alien Plant Invaders of Natural Areas.*

<http://www.nps.gov/plants/alien/factmain.htm> This web site features illustrated, easy-to-read fact sheets on select invasive plants with native ranges; plant descriptions; ecological threats; US distributions and habitats; background of introductions; plant reproduction and dispersal; management approaches; alternative native plants; and other useful information.

*Shaw Nature Reserve Native Landscaping Manual—Chapter Three-Control and Identification of Invasive Species: A Management Guide for Missouri.*

<http://www.shawnature.org/nativeland/NativeLandscapingManual/ChapterThree.aspx> This manual describes mechanical and chemical control methods and revegetation. It provides good illustrations of management.

*The Nature Conservancy (TNC)—Weed Control Methods Handbook: Tools and Techniques for Use in Natural Areas.* <http://www.invasive.org/gist/handbook.html> The handbook provides detailed information on the use of manual and mechanical techniques, grazing, prescribed fire, biocontrol, and herbicides for use in controlling invasive species in natural areas.

*USDA Forest Service Invasive Species Program—Control and Management.*

<http://www.fs.fed.us/invasivespecies/controlmgmt/index.shtml> This page provides links for more information on research, management planning, forest service activities, and pest-specific control and management.

*US Forest Service—Dangerous Travelers: Controlling Invasive Plants along America's*

*Roadsides (Video).* <http://www.fs.fed.us/invasivespecies/prevention/dangeroustravelers.shtml>

The video outlines the best management practices that road crews should be following in their day-to-day operations. This is the first in a series on “Best Management Practices for Invasive Species Prevention.” The video can also be ordered on DVD by contacting: USDA Forest Service; San Dimas Technology and Development Center; 444 East Bonita Avenue; San Dimas, CA 91773; (909) 599-1267

## **7. Cooperative Weed Management Areas (CWMAs):**

A cooperative Weed Management Area is a partnership of federal, state and local government agencies; tribes; individuals; and other interested groups that manage invasive plants in a defined geographic area. CWMA's are local organizations that provide a mechanism for sharing invasive plant management resources across jurisdictional boundaries in order to achieve widespread invasive plant prevention and control. CWMA's operate under a formal agreement to ensure long-term, on-going resource-sharing and collaboration.

- *Midwest Invasive Plant Network* <http://mipn.org/cwma.html>  
A local Midwest resource for starting a CWMA.
- *Invasive Plant Association of Wisconsin* [www.ipaw.org](http://www.ipaw.org)  
The most up-to-date list of CWMA's in Wisconsin.
- *Center for Invasive Plant Management* [www.weedcenter.org](http://www.weedcenter.org)  
Information and resources on how to start a CWMA.

## **8. Biocontrol:**

*Invasive Plants of the Eastern U S—Biological Control of Invasive Plants in the Eastern United States.* (USDA Forest Service Publication FHTET-2002-04, 413 p.)

<http://www.invasive.org/eastern/biocontrol> This web site serves as a reference guide for field workers and land managers concerning the historical and current status of the biological control of select invasive plants in the eastern United States.

*Cornell University. Biological Control: A Guide to Natural Enemies in North America.*

<http://www.nysaes.cornell.edu/ent/biocontrol/> This web site provides photographs and descriptions of biocontrol agents of insect, disease and weed pests in North America.

## **9. Herbicide:**

*Department of Agriculture Trade and Consumer Protection (DATCP)—Pesticide Database Searches.* <http://www.kellysolutions.com/wi/> Use this site to search for registered pesticide products, the companies that sell and use pesticides, and the people that apply them.

*Herbicide safety information—Material Data Safety (MDS) sheets and product labels.*

<http://www.cdms.net/LabelsMsds/LMDefault.aspx?t=>.

*The Nature Conservancy (TNC)—Safe Herbicide Handling in Natural Areas: A Guide for Land Stewards and Volunteer Stewards.* <http://www.invasive.org/gist/products/library/herbsafe.pdf>

*The Nature Conservancy (TNC)—Upkeep and Maintenance of Herbicide Equipment: A guide for natural area stewards.* <http://www.invasive.org/gist/products/library/herbupkeep.pdf>

## **10. Prescribed fire:**

*California Invasive Plant Council—The Use of Fire as a Tool for Controlling Invasive Plants.* <http://www.cal-ipc.org/ip/management/Useoffire.pdf>

This document contains information on the following: planning and implementing prescribed burns, control of invasive plants with prescribed fire, using prescribed burning in integrated strategies, effects of fire on plant communities, effects of fire on chemical, physical, and biotic properties of soil.

*Center for Invasive Plant Management (CIPM)—Fire As a Tool For Controlling Nonnative Invasive Plants.* [http://www.weedcenter.org/store/docs/burning\\_weeds.pdf](http://www.weedcenter.org/store/docs/burning_weeds.pdf) This review focuses on the intentional use of fire, alone or integrated with other methods, to control exotic plants in North America.

*The Nature Conservancy (TNC)—Fire Management Manual.* <http://www.tncfiremanual.org/index.htm> The manual serves as the Conservancy's guiding document on all aspects of wildland fire management.

*USDA Forest Service—Fire Effects Information System (FEIS).* <http://www.fs.fed.us/database/feis/> FEIS features a searchable database that summarizes and synthesizes research about living organisms in the United States—their biology, ecology, and relationship to fire.

*Wisconsin Prescribed Fire Council.* <http://www.prescribedfire.org/index.html> The Wisconsin Prescribed Fire Council strives to make the use of prescribed fire in Wisconsin safer and more accepted for all practitioners. The site provides information and links on government relations, liability, training, weather, and fire implementation.

## **11. Early Detection and Rapid Response:**

*iMapInvasives: Geotracking invasive exotic species.* <http://imapinvasives.org/index.html>  
A consortium developed an on-line GIS-based invasive species mapping tool designed to aid in Early Detection and Rapid Response efforts. The site allows one to display maps and query by invasive species or contributing organization. Currently the site has only sample plant data for the state of New York. Long-term goals for the site include seeking participation of additional states and/or provinces.

*Midwest Invasive Plant Network (MIPN)—Early Detection and Rapid Response.* <http://www.mipn.org/detectionresponse.html>

*National Biological Information Infrastructure (NBII). National Framework for Early Detection, Rapid Assessment, and Rapid Response to Invasive Species.* [http://invasivespecies.nbii.gov/portal/community/Communities/Ecological\\_Topics/Invasive\\_Species/Early\\_Detection,\\_Rapid\\_Response\\_\(EDRR\)/](http://invasivespecies.nbii.gov/portal/community/Communities/Ecological_Topics/Invasive_Species/Early_Detection,_Rapid_Response_(EDRR)/) This framework includes seven main components: 1) identification and validation, 2) reporting, 3) expert verification, 4) occurrence databases, 5) rapid assessment, 6) planning, 7) rapid response.

*The North American Weed Management Association.* <http://www.nawma.org/> The North American Weed Association has developed a data collection standard for invasive plant monitoring in the western United States and it has been adopted by several federal agencies,

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including US Forest Service and the National Park Service. At the home page, scroll down to “Mapping Standards” link.

*USDA Forest Service. The Early Warning System for Forest Health Threats in the United States.* [http://www.fs.fed.us/foresthealth/publications/EWS\\_final\\_draft.pdf](http://www.fs.fed.us/foresthealth/publications/EWS_final_draft.pdf)

This is a monitoring framework for early detection and response to environmental threats (e.g. insects, diseases, invasive species, and fire) to forest lands. The framework is based on the following steps: 1) identify potential threats, 2) detect actual threats, 3) assess impacts, and 4) respond.

*Wisconsin Department of Natural Resources/ University of Wisconsin-Madison Herbarium—Invasive Plants of the Future.* <http://dnr.wi.gov/invasives/futureplants/>

This monitoring and early reporting project has three main goals: 1) identify and report populations of high-risk early-stage target weed species in Wisconsin; 2) eliminate or contain those populations before they spread; and 3) coordinate long-term monitoring of occurrence sites. All land managers are encouraged to participate in this program.

## **12. Prioritizing Management:**

*NatureServe—An Invasive Species Assessment Protocol: Evaluating Non-Native Plants for Their Impacts on Biodiversity.*

<http://www.natureserve.org/library/invasiveSpeciesAssessmentProtocol.pdf>

The Invasive Species Assessment Protocol was developed as a tool for assessing, categorizing, and listing non-native invasive vascular plants according to their impact on biodiversity in a large area such as a nation, state or province, or ecological region. This protocol is designed to make the process of assessing and listing invasive plants objective and systematic.

*Animal and Plant Health Inspection Service (APHIS)—Weed-Initiated Pest Risk Guidelines for Qualitative Assessments.*

[http://www.aphis.usda.gov/plant\\_health/plant\\_pest\\_info/weeds/downloads/wra.pdf](http://www.aphis.usda.gov/plant_health/plant_pest_info/weeds/downloads/wra.pdf)

This document provides a template for conducting pest risk analysis: initiating the process by identifying a pest that may qualify as a quarantined pest, and/or pathways that may allow introduction or spread of a quarantine pest; and assessing pest risk (determining which pests are quarantine pests, characterized in terms of likelihood of entry, establishment, spread, and economic importance.)

## **13. General Sites of Interest:**

*American Nursery and Landscape Association.* <http://www.anla.org/> This website provides education, research, public relations, and representation services to members of the nursery and landscape industry.

*International Society of Arboriculture* <http://www.isa-arbor.com/home.aspx> This is a worldwide professional organization dedicated to fostering a greater appreciation for trees and to promoting research, technology, and the professional practice of arboriculture.

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*Invaders of the Forest.* <http://dnr.wi.gov/org/caer/ce/eeek/teacher/invasiveplantguide.htm> This is an educators' guide to invasive plants of Wisconsin forests. The guide provides classroom and field activities for formal and non-formal educators working with kindergarten through adult audiences. Lessons are correlated to Wisconsin's academic standards.

*Trees are Good. International Society of Arboriculture.* <http://www.treesaregood.com/> This site helps to educate the general public about the importance and value of proper tree care.

*University of Wisconsin Extension.* <http://www.uwex.edu/locations/> The site has links to the Master Gardener program, the Plant Disease Diagnostic Clinic, and urban horticulture topics. Extension has offices in every county in Wisconsin.

*University of Wisconsin Forestry Extension.* <http://www.forest.wisc.edu/extension/index.html> This site has publications, internet resources, and other materials related to forests, their management, and the wood products industry in Wisconsin. It includes a link to the popular *Forestry Facts* series.

*University of Wisconsin Urban Horticulture.* <http://wihort.uwex.edu/> This site houses the Wisconsin Garden Facts (X-file series), phenological information, Wisconsin horticultural updates and pest information including invasive plant publications.

*Wisconsin Arborist Association.* <http://www.waa-isa.org/> This is a large organization of commercial, municipal, utility and academic arborists whose members serve Wisconsin by providing private and public arboriculture services and research. The WAA is a chapter of the International Society of Arboriculture which has representation in over 30 countries.

*Wisconsin Department of Natural Resources (WDNR). Urban Forestry Consultants and Certified Arborists.*

<http://www.dnr.state.wi.us/forestry/UF/resources/consulth.htm> This site links to lists of urban forestry consultants working in Wisconsin and also to the International Society of Arboriculture's (ISA's) certified arborist database and directory of certified arborists for hire in Wisconsin.

*Wisconsin Department of Natural Resources (WDNR). Urban and Community Forestry.* <http://www.dnr.state.wi.us/forestry/uf/> The website includes information on the program, grants, news and events, the Wisconsin Urban Forestry Council, awareness and recognition programs, and additional resources.

#### **14. Educational Opportunities and Events:**

*International Society of Arboriculture*  
<http://www.isa-arbor.com/home.aspx>

*Invasive Plant Association of Wisconsin*  
<http://www.ipaw.org/events.htm>

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*University of Wisconsin Extension*  
<http://www.uwex.edu/>

*Wisconsin Arborist Association*  
[http://www.waa-isa.org/calendar\\_of\\_events.asp](http://www.waa-isa.org/calendar_of_events.asp)

*Wisconsin Council on Invasive Species*  
<http://invasivespecies.wi.gov/awareness/section.asp?linkid=1558&locid=63>

*Wisconsin Department of Natural Resources - Urban Forestry*  
<http://www.dnr.state.wi.us/forestry/uf/news/>

*Wisconsin Green Industry Federation*  
<http://www.wislf.org/>

## **Appendix F: Financial Assistance for Managing Invasives**

### *Gypsy Moth Suppression Program*

The DNR facilitates an aerial spray program to suppress gypsy moth outbreaks which is offered to landowners in Wisconsin through counties. Because this is a state organized program, the DNR can apply for federal cost sharing available for management of outbreaks of this invasive pest. Depending on availability of federal funds, the reimbursement may be up to 50% of the cost of the spray and its associated administrative work. The DNR passes through the federal cost share to the counties to offset their costs and for distribution to the communities and/or individuals who paid for the treatment. <http://dnr.wi.gov/org/caer/cfa/lr/gypsy/moth.html>

### *Pulling Together Initiative*

The Pulling Together Initiative seeks proposals that will help control invasive plant species, mostly through the work of public/private partnerships such as Cooperative Weed Management Areas. PTI applications are accepted from private non-profit (501)(c) organizations, local, county, and state government agencies, and from field staff of federal government agencies. Individuals and for-profit businesses are not eligible to receive PTI grants, but are encouraged to work with eligible applicants to develop and submit applications to PTI. Application deadline: June 30, 2009 For more information, please visit [www.nfwf.org/pti](http://www.nfwf.org/pti)

### *United States Department of Administration Forest Service Wood Education and Resource Center (WERC)*

The Wood Education and Resource Center (WERC) funds projects that create opportunities for sustained forest products production for primary and secondary hardwood industries located in the eastern hardwood forest region. Examples of proposals that would be given priority include: Develop technology and markets to address emergency issues including: 1) Phytosanitation of wood packaging materials, firewood and similar products to eliminate these pathways for the transport of insect and disease pests, and 2) development of markets for and utilization of unpredicted increases in volume of urban and rural wood due to incidents like new pest introductions (e.g. Emerald Ash Borer). <http://www.na.fs.fed.us/werc/grants.shtm>

### *Urban Forestry Grant Program*

This is a state program administered by the WDNR Division of Forestry - Urban Forestry. It is a 50-50 cost-share program providing grants that range from \$1,000 to \$25,000. Grant recipients are reimbursed upon project completion. Eligible applicants may be a city, village, town, county, tribal government, or a 501(c)(3) nonprofit organization. Projects may include, but are not limited to, development of: urban forestry plans, tree inventories, vegetation ordinances, tree boards, staff training and public awareness programs. Funds may be available for tree planting, maintenance, or removal. However, priority is given to projects focusing on long term urban forestry management. The application deadline varies each year but is generally around the beginning of October. Projects begin at the start of the calendar year and must be completed by the end of that year. For more information go to: <http://www.dnr.state.wi.us/forestry/UF/grants/>

## **Other Invasives Funding:**

### *For Urban Natural Areas*

There are additional grant opportunities that may be applicable for certain large urban natural areas and other similar environments. See the Forestry Track's Financial Assistance Appendix to view these grants. <http://council.wisconsinforestry.org/invasives/forestry.php>

### *More information*

Grants are sometimes available for special purposes or community projects. See the following websites for current announcements or opportunities.

- Midwest Invasive Plants Association - <http://www.mipn.org/grants.html>
- Invasive Plants Association of Wisconsin - <http://www.ipaw.org/funding/index.htm>
- National Urban and Community Forestry Advisory Council - <http://www.treelink.org/nucfac/>
- Wisconsin's Certified Community Foundations - <http://www.wisconsin Gives.org/>
- USDA grant and partnership programs that could be used to fund invasive species related projects - <http://www.invasivespeciesinfo.gov/docs/toolkit/usdagrants2009.pdf>
- Grants Information Collection - UW Madison - <http://grants.library.wisc.edu>
- Wisconsin Dept. of Commerce - <http://www.commerce.state.wi.us/>
- All federal grants - <http://www.grants.gov/>

## Appendix G: Federal and Wisconsin State Statutes and Administrative Rules Applicable to Invasive Plants and Pests

The links and statutes listed below are for the federal and statewide level. Local municipal and county ordinances should also be checked for laws applicable to invasive plants, pests and control treatments. Reference the Wisconsin State Law Library for access to many of these county and municipal ordinances <http://wilawlibrary.gov/ordinances.html>.

### Municipal Government Authority:

#### *Wisconsin Statutes*

The Updated Wisconsin Statutes and Annotations: <http://www.legis.state.wi.us/rsb/stats.html>  
See left navigation bar to search for a specific Statute in the Infobase. Or go to a Statute Chapter: <http://www.legis.state.wi.us/rsb/Statutes.html>

#### **27.09 – City forester, duties; tree planting**

**History:** 1991 a. 316.

#### **27.13 – Town and village parks**

**History:** Not listed. <http://www.legis.state.wi.us/statutes/Stat0027.pdf>

#### **66.0517 – Weed commissioner**

**History:** 1999 a. 150; 2003 a. 33.

#### **823.01 – Jurisdiction over nuisances**

**History:** 1973 c. 189; Sup. Ct. Order, 67 Wis. 2d 585, 762 (1975); Stats. 1975 s. 823.01.

#### *Wisconsin Constitution*

<http://www.legis.state.wi.us/rsb/2wiscon.html>

#### **Article XI, §3 Municipal home rule; debt limit; tax to pay debt. Section 3.**

**History:** Nov. 1874, Nov. 1912, Nov. 1924, Nov. 1932, April 1951, April 1955, Nov. 1960, April 1961, April 1963, April 1966 and April 1981.

### Invasive Plants:

#### *Wisconsin Statutes*

The Updated Wisconsin Statutes and Annotations: <http://www.legis.state.wi.us/rsb/stats.html>  
See left navigation bar to search for a specific Statute in the Infobase. Or go to a Statute Chapter: <http://www.legis.state.wi.us/rsb/Statutes.html>

#### **15.34 Department of natural resources; creation.**

#### **15.347 Same; councils.**

#### **(18) INVASIVE SPECIES COUNCIL**

**History:** 1973 c.74; 1991 a.316; 2001 a.16.

#### **23.22 Invasive species.**

**Cross Reference:** See also ch. NR 198, Wis. adm. code.

**History:** 2001 a. 109 ss. 72t, 72xd; 2003 a. 33.

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**23.235 Nuisance weeds.**

**History:** 1987 a. 41; 1999 a. 150 s. 616; Stats. 1999 s. 23.235; 2001 a. 16; 2001 109 ss. 72td to 72wj.

**26.02 Council on forestry.**

**History:** 2001 a. 109.

**28.04 Management of state forests.**

**History:** 1995 a. 257.

**Cross Reference:** See also ch. NR 44 and s. NR 1.24, Wis. adm. code.

**66.0407 Noxious weeds.**

**History:** 1975 c. 394 s. 12; 1975 c. 421; Stats. 1975 s. 66.96; 1983 a. 112, 189; 1989 a. 56 s. 258; 1991 a. 39, 316; 1997 a. 287; 1999 a. 150 ss. 617 to 619; Stats. 1999 s. 66.0407.

**94.38 Agricultural and vegetable seeds; definitions.**

**History:** 1975 c. 39, 308; 1983 a. 189; 1985 a. 138; 1993 a. 112.

**94.39 Seed labeling requirements.**

**History:** 1975 c. 39, 308; 1985 a. 138.

**94.41 Prohibitions.**

**History:** 1973 c. 194, 195; 1985 a. 138; 1993 a. 492.

**94.45 Powers and authority of the department [Department of Agriculture].**

**History:** 1975 c. 39, 308; 1983 a. 189 s. 329 (20).

**Cross Reference:** See also ch. ATCP 20, Wis. adm. code.

**94.46 Stop sale, penalties, enforcement**

**History:** 1985 a. 138.

*Administrative Code*

The Wisconsin Administrative Code and Register: <http://www.legis.state.wi.us/rsb/code.htm>  
See left navigation bar to search for a specific Statute in the Infobase. Or go to a Code Chapter (look under “NR Natural Resources”.) <http://www.legis.state.wi.us/rsb/code/codtoc.html>

**NR 150.025 Policy.**

**History:** Register, February, 1981, No. 302, eff. 3-1-81; renum. (2) (g) and (h) to be (2) (h) and (i), cr. (2) (g), Register, February, 1984, No. 338, eff. 3-1-84; am. (2) (e), Register, January, 1987, No. 373, eff. 2-1-87.

**NR 1.211 Cooperative forestry policy.**

**History:** Cr. Register, July, 1989, No. 403, eff. 8-1-89.

**NR 44.04 Master plan development, adoption and public involvement.**

**History:** Cr. Register, August, 1996, No. 488, eff. 9-1-96.

**Insects and Diseases:**

*Wisconsin Statutes*

The Updated Wisconsin Statutes and Annotations: <http://www.legis.state.wi.us/rsb/stats.html>

See left navigation bar to search for a specific Statute in the Infobase.

Or go to a Statute Chapter: <http://www.legis.state.wi.us/rsb/Statutes.html>

*Wisconsin Statutes that apply to the Department of Natural Resources (WDNR):*

**26.30 Forest insects and diseases; department jurisdiction; procedure.**

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**History:** 1977 c. 29 s. 1650m (1); 1979 c. 32 s. 92 (9); 1979 c. 110 s. 60 (11); 1983 a. 189; 1985 a. 13; 1991 a. 316; 2003 a. 33, 57.

**Cross Reference:** See also s. NR 47.910, Wis. adm. code.

**45.04(1)(g) – Firewood restrictions on state property**

**History:** Cr. Register, December, 1983, No. 336, eff. 1-1-84; am. (2) (a) (intro.) and (c), cr. (3) (k), Register, December, 1987, No. 384, eff. 1-1-88; emerg. cr. (3) (l), eff. 4-1-88; emerg. cr. (3) (l), eff. 4-1-89; emerg. am. (3) (l), eff. 5-2-89; renum. (3) (h) to be (3) (h) 1. and cr. (3) (h) 2., Register, March, 1990, No. 411, eff. 4-1-90; am. (1) (c) and (2) (c), cr. (3) (l), Register, March, 1992, No. 435, eff. 4-1-92; r. and recr. (1) (a), (2) (a) and (3) (d), am. (1) (c), (3) (b) and (e), cr. (3) (m), Register, December, 1993, No. 456, eff. 1-1-94; cr. (1) (d), (2) (a) 3. and (b) 4., r. and recr. (2) (b) 3. and (3) (b), Register, November, 1995, No. 479, eff. 12-1-95; renum. (3) (k), (L) and (m) to be (3) (j), (k) and (L), Register, December, 1997, No. 504, eff. 1-1-98; am. (3) (g), cr. (3) (m), (n) and (o), Register, December, 1999, No. 528, eff. 1-1-00; CR 01-011: cr. (1) (e), (3) (p), (r) and (s) Register April 2002 No. 556, eff. 5-1-02; CR 03-035: cr. (1), (f), am. (2) (c), (3) (n) and (p), r. and recr. (3) (f) Register December 2003 No. 576, eff. 1-1-04; CR 04-092: am. (1) (c), cr. (3) (t) Register April 2005 No. 592, eff. 5-1-05; emerg. cr. (1) (g), eff. 4-1-06; CR 06-065: cr. (1) (g) Register November 2006 No. 611, eff. 12-1-06; CR 07-026: cr. (2) (a) 4., r. (3) (h) Register December 2007 No. 624, eff. 1-1-08; **CR 08-011: cr. (3) (u) Register September 2008 No. 633, eff. 2-1-09.**

*Wisconsin Statutes that apply to the Department of Agriculture, Trade and Consumer Protection (WDATCP):*

**21.17 – Emerald ash borer; import controls and quarantine**

**History:** CR 06-008: cr. Register October 2006 No. 610, eff. 11-1-06.

**94.01 Plant inspection and pest control authority.**

**History:** 1975 c. 394 s. 18; Stats. 1975 s. 94.01.

**Cross Reference:** See also ch. ATCP 21, Wis. adm. code.

**94.02 Abatement of pests.**

**History:** 1975 c. 394ss. 5, 19; 1975 c. 421; Stats. 1975 s. 94.02; 1977 c. 418; 1981 c.20.

**94.03 Shipment of pests and biological control agents; permits.**

**History:** 1975 c. 394 ss. 6, 17; 1983 a. 189 s. 329 (20).

**94.10 Nursery stock; inspection and licensing.**

**History:** 1975 c. 394 ss. 20, 22; 1975 c. 421; Stats. 1975 s. 94.10; 1983 a. 189; 1989 a. 31; 1993 a. 16; 1995 a. 27; 1999 a.9.

**94.685 Pesticides; licensing of dealers and distributors of restricted-use pesticides.**

**History:** 1987 a. 27; 1991 a. 269; 1993 a. 16, 490; 1997 a. 27.

**Cross Reference:** See also chs. ATCP29, 30, and 31 and ss. ATCP 160.19 and 160.21, Wis. adm. code.

**94.69 Pesticides; rules.**

**History:** 1975 c. 94s. 91 (10); 1977 c. 106; 1983 a. 410; 1997 a. 27, 237.

**Cross-reference:** See s. 94.709 for prohibition of use of DDT and exceptions to the prohibition.

**Cross Reference:** See also chs. ATCP 29, 30, and 31 and ss. ATCP 160.19 and 160.21, Wis. adm. code.

*Wisconsin Statutes that apply to both the Department of Agriculture, Trade and Consumer Protection (WDATCP) and the Department of Natural Resources (WDNR):*

**146.60 Notice of release of genetically engineered organisms into the environment.**

**History:** 1989 a. 15; 1993 a. 213; 1995 a. 27 s. 9126 (19); 1997 a. 283; 2001 a. 109.

Administrative Code

The Wisconsin Administrative Code and Register: <http://www.legis.state.wi.us/rsb/code.htm>

See left navigation bar to search for a specific Statute in the Infobase. Or go to a Code Chapter (look under “NR Natural Resources”) <http://www.legis.state.wi.us/rsb/code/codtoc.html>

**NR45.04(1)(g) – Firewood restrictions on state property**

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**History:** Cr. Register, December, 1983, No. 336, eff. 1-1-84; am. (2) (a) (intro.) and (c), cr. (3) (k), Register, December, 1987, No. 384, eff. 1-1-88; emerg. cr. (3) (l), eff. 4-1-88; emerg. cr. (3) (l), eff. 4-1-89; emerg. am. (3) (l), eff. 5-2-89; renum. (3) (h) to be (3) (h) 1. and cr. (3) (h) 2., Register, March, 1990, No. 411, eff. 4-1-90; am. (1) (c) and (2) (c), cr. (3) (l), Register, March, 1992, No. 435, eff. 4-1-92; r. and recr. (1) (a), (2) (a) and (3) (d), am. (1) (c), (3) (b) and (e), cr. (3) (m), Register, December, 1993, No. 456, eff. 1-1-94; cr. (1) (d), (2) (a) 3. and (b) 4., r. and recr. (2) (b) 3. and (3) (b), Register, November, 1995, No. 479, eff. 12-1-95; renum. (3) (k), (L) and (m) to be (3) (j), (k) and (L), Register, December, 1997, No. 504, eff. 1-1-98; am. (3) (g), cr. (3) (m), (n) and (o), Register, December, 1999, No. 528, eff. 1-1-00; CR 01-011: cr. (1) (e), (3) (p), (r) and (s) Register April 2002 No. 556, eff. 5-1-02; CR 03-035: cr. (1), (f), am. (2) (c), (3) (n) and (p), r. and recr. (3) (f) Register December 2003 No. 576, eff. 1-1-04; CR 04-092: am. (1) (c), cr. (3) (t) Register April 2005 No. 592, eff. 5-1-05; emerg. cr. (1) (g), eff. 4-1-06; CR 06-065: cr. (1) (g) Register November 2006 No. 611, eff. 12-1-06; CR 07-026: cr. (2) (a) 4., r. (3) (h) Register December 2007 No. 624, eff. 1-1-08; **CR 08-011: cr. (3) (u) Register September 2008 No. 633, eff. 2-1-09.**

## **Federal Laws and Regulations:**

### **PUBLIC LAW 106-224 114 STAT. 438-455 TITLE IV - Plant Protection Act**

[http://www.aphis.usda.gov/plant\\_health/plant\\_pest\\_info/weeds/downloads/PPAText.pdf](http://www.aphis.usda.gov/plant_health/plant_pest_info/weeds/downloads/PPAText.pdf)

### **7CFR 301.53 – 301.53-9 – EAB Regulations**

[http://www.access.gpo.gov/nara/cfr/waisidx\\_05/7cfr301\\_05.html](http://www.access.gpo.gov/nara/cfr/waisidx_05/7cfr301_05.html)

### **7CFR 319.40 – Logs, Lumber, and Other Unmanufactured Wood Articles Regulations**

[http://www.access.gpo.gov/nara/cfr/waisidx\\_01/7cfr319\\_01.html](http://www.access.gpo.gov/nara/cfr/waisidx_01/7cfr319_01.html)

## Appendix H: References

Allison, R.B. 1989. Tree Diseases in Wisconsin's Urban Forests. *Wisconsin Academy Review* (36)1.

*Best Management Practices for Land Managers*. Long Island Weed Management Area.  
<http://www.invasive.org/gist/products/wma/li-managers.pdf>

Chornesky, E.A., A.M. Bartuska, G.H. Aplet, K.O. Britton, J. Cummings-Carlson, F.W. Davis, J. Eskow, D.R. Gordon, K.W. Gottschalk, R.A. Haack, A.J. Hansen, R.N. Mack, F.J. Rahel, M.A. Shannon, L.A. Wainger and T.B. Wigley. 2005. Science priorities for reducing the threat of invasive species to sustainable forestry. *BioScience* 55(4): 335-348.

Colorado Natural Areas Program. 2000. Creating an Integrated Weed Management Plan: A Handbook for Owners and Managers of Lands with Natural Values. In *Caring for the Land Series*, Volume IV.

Czarapata, E.J. 2005. *Invasive Plants of the Upper Midwest: An Illustrated Guide to Their Identification and Control*. University of Wisconsin Press. Madison, WI.

Duryea, M.L., Binelli, E. K. and Korhnak, L. V. 2000. *Restoring the Urban Forest Ecosystem*. CD-ROM. School of Forest Resources and Conservation, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida.

Elzinga, C.L., D.W. Salzer, and J.W. Willoughby. 1998. *Measuring and Monitoring Plant Populations*. Technical Reference 1730-1. Bureau of Land Management, National Business Center, Denver Co.

Environmental Protection Agency. Code of Federal regulations, Title 40, Protection of the Environment, Criteria for Classification of Solid Waste Disposal Facilities and Practices. 40 CFR Part 257 Appendix II, Section B. <http://www.epa.gov/epawaste/wycd/tribal/pdftxt/40cfr257.pdf> pg 23

*Executive Summary of the National Invasive Species Plan*.  
<http://www.invasivespeciesinfo.gov/council/nmp.shtml>

Frappier, B., R.T. Eckert, and T.D. Lee. 2003. Potential impacts of the invasive exotic shrub *Rhamnus frangula* L. (glossy buckthorn) on forests of southern New Hampshire. *Northeastern Naturalist*. 10(3):277-296.

Frappier, B., R.T. Eckert, and T.D. Lee. 2004. Experimental removal of the non-indigenous shrub *Rhamnus frangula* L. (glossy buckthorn): effects on native herbs and woody seedlings. *Northeastern Naturalist*. 11(3):333-342.

8/11/009

Global Invasive Species Programme. <http://www.gisp.org/ecology/strategies.asp>

Hafstad, G.E., J. Libby, and G.L. Worf. 1965. *Dutch elm disease manual for Wisconsin*. Univ. of Wis. Ext. and Wis. Dep. Agric, Madison. 92 p.

Harrington, R.A. and R.R. Kujawski. 2003. Invasive plants and the green industry. *Journal of Arboriculture* 29(1): 42-48.

Harris, R.W. et al. *Arboriculture: Integrated Management of Landscape Trees, Shrubs, and Vines*. 3<sup>rd</sup> edition, Prentice-Hall, Inc. 1999.

Heneghan, L., C. Rauschenberg, F. Fatemi, and M. Workman. 2004. European buckthorn (*Rhamnus cathartica*) and its effects on some ecosystem properties in an urban woodland. *Ecological Restoration*. 22(4):275-280.

Heneghan, L., F. Fatemi, L. Umek, K. Grady, K. Fagen and M. Workman. 2006. The invasive shrub European buckthorn (*Rhamnus cathartica*, L.) alters soil properties in Midwestern U.S. woodlands. *Applied Soil Ecology*. 32:142-148.

Hodkinson, D.J. and K. Thompson. 1997. Plant dispersal: the role of man. *Journal of Applied Ecology* 34: 1484-1496.

Hulme, P.E.. 2006. Beyond control: wider implications for the management of biological invasions. *Journal of Applied Ecology* 43: 835-847.

Humble, L.M. and E.A. Allen. 2004. *Alien Invaders: Non-indigenous species in urban forests*. 6<sup>th</sup> Canadian Urban Forest Conference, Kelowna, B.C.

Kolar, C.S. and D.M. Lodge. 2001. Progress in invasion biology: predicting invaders. *Trends in Ecology & Evolution* 16(4): 199-204.

Kostichka, C.J. and W.N. Cannon, Jr. 1984. Costs of Dutch elm disease management in Wisconsin communities. *Journal of Arboriculture* 10(9).

LaGro Jr. J.A. 2001. *Site Analysis: Linking program and concept in land planning and design*. John Wiley and Sons, Inc. New York

Leung, B., D.M. Lodge, D. Finnoff, J.F. Shogren, M.A. Lewis and G. Lamberti. 2002. An ounce of prevention or a pound of cure: bioeconomic risk analysis of invasive species. *Proceedings of the Royal Society – Biological Sciences* 269: 2407-2413.

Lodge, D.M., S. Williams, H.J. MacIsaac, K.R. Hayes, B. Leung, S. Reichard, R.N. Mack, P.B. Moyle, M. Smith, D.A. Andow, J.T. Carlton and A. McMichael. 2006. Biological invasions: Recommendations for U.S. Policy and Management. *Ecological Applications* 16(6): 2035-2054.

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Mack, R.N., D. Simberloff, W.M. Lonsdale, H. Evans, M. Clout, and F.A. Bazzaz. 2000. Biotic invasions: causes, epidemiology, global consequences, and control. *Ecological Applications* 10(3): 689-710.

Miller, R.W. 1997. *Urban Forestry: Planning and managing urban green spaces*. 2<sup>nd</sup> Edition. Prentice Hall, New Jersey. 210 pp.

National Invasive Species Council. 2001. *Meeting the Invasive Species Challenge: National Invasive Species Management Plan*. 80 pp.

<http://invasivespeciesinfo.gov/docs/council/mpfinal.pdf>

National Invasive Species Council. 2008. *2008-2012 National Invasive Species Management Plan*. 35 pp. <http://www.invasivespeciesinfo.gov/council/mp2008.pdf>

*National Strategy and Implementation Plan for Invasive Species Management*. 2004. United States Department of Agriculture: Forest Service.

Perron, C. 2008. *Best Management Practices for Roadside Invasive Plants*. New Hampshire Department of Transportation. Revised by WI DNR.

Pimentel, D.S. McNair, J. Janecka, J. Wightman, C. Simmonds, C. O'Connell, E. Wong, L. Russel, J. Zern, T. Aquino and T. Tsomondo. 2001. Economic and environmental threats of alien plant, animal, and microbe invasions. *Agriculture, Ecosystems & Environment* (84) 1: 1-20.

Reichard, S.H. and C.W. Hamilton. 1997. Predicting invasions of woody plants introduced into North America. *Conservation Biology*. 11: 193-203.

Simberloff, D., I.M. Parker and P.N. Windle. 2005. Introduced species policy, management, and future research needs. *Frontiers in Ecology and the Environment* 3(1): 12-20.

Smith, Lisa L. 2005. *Invasive Exotic Plant Management Tutorial for Natural Lands Managers*. Mid-Atlantic Exotic Pest Plant Council, Inc.

Snow, K. 2002. Working with the horticultural industry to limit invasive species introductions. *Conservation in Practice*. 3(1): 33-36.

Society for Ecological Restoration International Science & Policy Working Group. 2004. *The SER International Primer on Ecological Restoration*. www.ser.org & Tucson: Society for Ecological Restoration International.

Spear, Robert J. *The Great Gypsy moth War*. Amherst & Boston: University of Massachusetts Press, 2005.

Stinson K.A., Campbell S.A., Powell J.R., Wolfe B.E., Callaway R.M., et al. 2006. Invasive plant suppresses the growth of native tree seedlings by disrupting belowground mutualisms. *PLoS Biology*. 4(5):e140.

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*The Dictionary of Forestry*. 1998. Helms, J. A. (ed.). Society of American Foresters, Bethesda, Maryland. 210 p.

Ticehurst, M. and S. Finley. 1988. An urban forest integrated pest management program for gypsy moth: an example. *Journal of Arboriculture*. 14(7): 172-175.

Urban Forestry Services. *Forestry Facts #3: Controlling Invasive Plants*. Toronto Parks and Recreation. <http://www.toronto.ca/trees>.

Voluntary codes of conduct for nursery professionals.

<http://www.centerforplantconservation.org/invasives/>

Wilcove, D. S., D. Rothstein, J. Dubow, A. Phillips, and E. Loso. 1998. Quantifying threats to imperiled species in the United States. *Bioscience*. 48: 607-615.

Wisconsin Department of Natural Resources. Wisconsin Administrative Code, Chapter NR 502, Solid Waste Storage, Transportation, Transfer, Incineration, Air Curtain Destructors, Processing, Wood Burning, Composting and Municipal Solid Waste Combustors. Chapter NR 502.12(10)(h). <http://www.legis.state.wi.us/rsb/code/nr/nr502.pdf> pg 16.

Worall, J. 2002. *Review of Systems for Early Detection and Rapid Response*. USDA Forest Service: Forest Health Protection.

## Appendix I: Glossary

**Control:** To reduce the impact of a pest to a level necessary to meet site management goals.

**Cooperative Weed Management Area (CWMA):** A formal partnership of federal, state and local government agencies; tribes; individuals; and other interested groups that share resources to manage invasive plants in a defined geographic area.

**Cultivar:** A cultivated variety of a plant. Cannot be reproduced without human assistance. Usually propagated asexually (cloned). Compare to variety....

**Early Detection:** An integrated system of active or passive surveillance to find new populations of invasive species, as early as possible while their population is low, when eradication and control are still feasible and less costly. It may be targeted at: a) areas where introductions are likely, such as access points and travel corridors, b) areas with high ecological value where impacts are likely to be significant, and c) vulnerable habitats or recently disturbed areas.

**Ecosystem:** The complex of a community of organisms and its environment.

**Invasive Disease:** Although diseases themselves are not technically invasive, the pathogens that cause plant diseases (including but not limited to fungi, bacteria, viruses and phytoplasmas) can be invasive when they infect a susceptible host and conditions are favorable for disease to develop.

**Invasive Species:** A species that is not native to the ecosystem under consideration whose introduction causes or is likely to cause economic or environmental harm or harm to human health.

**Integrated Pest Management:** To reduce the impact of destructive agents by the planned use of a variety of preventive, suppressive or regulatory tactics and strategies that are ecologically and economically efficient and socially acceptable.

**Introduction:** The intentional or unintentional escape, release, dissemination or placement of a species into an ecosystem as a result of human activity.

**Inventory:** The collection of data about the number, condition and distribution of trees and other vegetation in order to manage the resource.

**Microclimate:** The climate of small spaces, such as an inner city, a residential area or a mountain valley. Microclimate includes: sun/shade, wind, temperature and precipitation.

**Monitoring:** The periodic inspection of post-activity sites to detect new invasions and evaluate the success of invasive species management plans and control measures.

**Native species:** With respect to a particular ecosystem, a species that, other than as a result of an introduction, historically occurred or currently occurs in that ecosystem.

**Pathogen:** An agent that causes disease, especially a living microorganism such as a bacterium or fungus.

**Prevention:** The prescriptions or strategies used to discourage the presence or spread of pests.

**Propagule:** Any reproductive structure or part of an organism that can grow independently of its parent source. In plants, this may be a fruit, seed, bud, tuber, root, stem with rooting structures or shoot. In insects, this may be an egg, larva, pupa or adult. In diseases, this may be a spore, mycelial fragment (similar to roots) or a fruiting body.

**Provenance:** The geographic seed source (i.e. where the seed or seedling originated). Assures that the seed or seedling will be adaptable to the general climatic conditions of that geographic area.

**Rapid Response:** A systematic effort to contain, control or eradicate invasive species while the infestation is still localized. It may be implemented in response to new introductions or to isolated infestations of a previously established species. Preliminary assessment and subsequent monitoring may be part of the response. It is most effective when based on a plan organized in advance so that the response is rapid and efficient.

**Reforestation:** The reestablishment of forest cover either naturally (e.g. natural seeding, coppice, root suckers) or artificially (e.g. planting or direct seeding).

**Restoration:** The process of assisting the recovery of an ecosystem that has been degraded, damaged or destroyed.

**Revegetation:** The reestablishment and development of vegetation.

**Soil seedbank:** The collective name for the store of unsprouted seeds in the soil. For example, although most seeds sprout in the first few years after they fall onto the soil, spotted knapweed seeds can last 10 years in the soil before they sprout.

**Species:** A group of organisms, all of which have a high degree of physical and genetic similarity, generally interbreed only among themselves and show persistent differences from members of allied groups of organisms.

**Urban Forest:** All the trees, shrubs, groundcovers and associated vegetation in and around a city, village or town in association with the buildings, infrastructure, soil, water, air, topography, animals and people.

**Urban Forestry:** The art, science and technology of managing the urban forest landscape for the environmental, ecological, physiological, sociological, economic and aesthetic benefits trees, shrubs, groundcovers, and associated vegetation provide.

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**Variety:** A naturally occurring subdivision of a species having a distinct difference and breeding true to that difference. Compare to cultivar....

**Weed Commissioner:** A position which a municipality or county may appoint as having responsibility over noxious weeds and other duties as assigned by the entity.

## Appendix J: List of BMPs

### Chapter 3 Planning:

#### Land Use Planning

**BMP 3.1:** Know which invasive species affect or could affect your region and property.

**BMP 3.2:** Assess the extent of invasive species on and near the property by scouting and documenting infestations.

**BMP 3.3:** Assess current available resources and explore additional resources to prevent the introduction and manage the spread of invasive species.

**BMP 3.4:** Develop a plan for managing invasive species.

**BMP 3.5:** Provide training on identification, management, and prevention techniques of known invasive species to employees, contractors, volunteers, elected officials, owners, users, and the public.

#### Activity Planning

**BMP 3.6:** When planning for a specific management/maintenance activity, scout for invasive species both within and around the activity area.

**BMP 3.7:** Plan urban forest management/maintenance activities to limit the introduction and spread of invasive species.

**BMP 3.8:** Plan to monitor each site following management and maintenance activities; determine necessary treatments based on presence of invasive species.

**BMP 3.9:** As opportunities arise, interact with and engage researchers to further our understanding of invasives.

### Chapter 4 Design:

**BMP 4.1:** Conduct a site assessment prior to site design.

**BMP 4.2:** Conduct an inventory for invasive species as part of a site assessment.

**BMP 4.3:** Do not include invasive species in planting designs.

**BMP 4.4:** Design using plant materials that are site appropriate and less susceptible to highly damaging/detrimental pests and diseases.

**BMP 4.5:** Design planting conditions that foster the establishment and health of plants.

**BMP 4.6:** Diversify the planting material within the context of your design.

**BMP 4.7:** Design with long-term management/maintenance in mind.

### Chapter 5 Sales:

**BMP 5.1:** Do not purchase, sell or propagate known invasive plant species or their propagules.

**BMP 5.2:** Do not purchase or sell plant or landscape material you suspect may be infested or infected with invasive pests.

**BMP 5.3:** When available and appropriate, purchase, sell and propagate species, cultivars and varieties known to be less susceptible to invasive pests as alternatives to more susceptible ones.

**BMP 5.4:** Plant propagators, wholesalers and retailers should educate themselves and their customers about invasive plants and potential invasive insect and disease issues associated with host plant materials.

## **Chapter 6 Planting and Installation:**

**BMP 6.1:** Limit the introduction and spread of invasives during site preparation activities.

**BMP 6.2:** Do not plant invasive species.

**BMP 6.3:** Do not plant material that you suspect may be infested or infected with invasive pests.

**BMP 6.4:** Select plant materials that are site appropriate, healthy and less susceptible to highly damaging/detrimental pests and diseases.

**BMP 6.5:** Diversify the planting material within the context of your planting project.

**BMP 6.6:** Prepare site and plant trees according to current arboriculture industry standards for optimum tree health.

**BMP 6.7:** Reduce the introduction of pathogens and insects by avoiding unnecessary wounding of trees and other vegetation.

**BMP 6.8:** Avoid unnecessary soil disturbance.

**BMP 6.9:** Stabilize disturbed soils in a timely manner to prevent the establishment of invasive species.

**BMP 6.10:** Use landscape materials that are free of invasive species and their propagules.

**BMP 6.11:** Monitor sites following planting and installation activities; determine necessary treatments based on presence of invasive species.

**BMP 6.12:** Prior to relocating equipment, vehicles and trailers, remove soil and debris from exterior surfaces by scraping, brushing, washing or using other methods to minimize the risk of transporting propagules.

**BMP 6.13:** Remove soil, seeds, vegetative matter and other debris from shoes, clothing and tools prior to leaving an area.

## **Chapter 7 Management/Maintenance:**

**BMP 7.1:** Plan management/maintenance activities to limit the introduction and spread of invasive species.

**BMP 7.2:** When working in an area infested or previously infested with invasives, utilize monitoring surveys and control records for the property prior to the current work being conducted.

**BMP 7.3:** Minimize the movement of invasive species to non-infested areas during management/maintenance activities.

**BMP 7.4:** Reduce the introduction of pathogens and insects by avoiding unnecessary wounding of trees and other vegetation.

**BMP 7.5:** Perform activities in a way that promotes healthy plants.

**BMP 7.6:** Use landscape materials that are free of invasive species and their propagules.

**BMP 7.7:** Avoid unnecessary soil disturbance.

**BMP 7.8:** Stabilize disturbed soils in a timely manner to prevent the establishment of invasive species.

**BMP 7.9:** Keep records of activities that could affect invasives.

**BMP 7.10:** If possible, monitor recent work sites for invasive species.

**BMP 7.11:** Prior to relocating equipment, vehicles and trailers, remove soil and debris from exterior surfaces by scraping, brushing, washing or using other methods to minimize the risk of transporting propagules.

**BMP 7.12:** Remove soil, seeds, vegetative matter and other debris from shoes, clothing and tools prior to leaving an area.

**BMP 7.13:** Properly treat or dispose of invasive species or materials that may harbor invasive propagules, insects or diseases.

**BMP 7.14:** If pre- or post-activity invasive species control treatments are planned, ensure they are applied within the appropriate time window and environmental conditions.

### **Chapter 8 Sanitation and Debris Disposal:**

**BMP 8.1:** Prior to relocating equipment, vehicles and trailers, remove soil and debris from exterior surfaces by scraping, brushing, washing or using other methods to minimize the risk of transporting propagules.

**BMP 8.2:** Remove soil, seeds, vegetative matter and other debris from shoes, clothing and tools prior to leaving an area.

**BMP 8.3:** Minimize the offsite transport of invasives and materials that may contain invasives.

**BMP 8.4:** When necessary to transport invasives and materials that may contain invasives off site, cover or otherwise contain those materials.

**BMP 8.5:** Properly treat or dispose of invasive species or materials that may harbor invasive propagules, insects or diseases.

**BMP 8.6:** Allow compost piles to heat to appropriate temperatures and times and with proper procedures to reduce the viability of invasives contained within.

**BMP 8.7:** Avoid the use of wood chips and compost that may contain invasive propagules.

### **Chapter 9 Monitoring and Research:**

**BMP 9.1:** Create an invasive species monitoring plan for properties under your management.

**BMP 9.2:** Assess the extent of invasive species on and near the property by scouting, locating and documenting infestations.

**BMP 9.3:** Monitor sites under your management following management/maintenance activities; determine necessary follow-up based on presence of invasive species.

**BMP 9.4:** Keep records when scouting and monitoring.

**BMP 9.5:** Report new infestations of known invasive species to the appropriate authority.

**BMP 9.6:** As opportunities arise, interact with and engage researchers to further our understanding of invasives.

### **Chapter 10 Education:**

**BMP 10.1:** Educate yourself about invasive species.

**BMP 10.2:** Educate employees and volunteers about invasive species.

**BMP 10.3:** Educate clients, customers and users about invasive species.

**BMP 10.4:** Educate public officials and other decision makers about invasive species.