Best Management Practices for Preventing the Spread of Invasive Species by Outdoor Recreation Activities in Wisconsin

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Advisory Committee Members

Dean Bowe
Lincoln County Forest

Will Christianson
Wisconsin Department of Tourism

Bill Duncanson
Wisconsin Park and Recreation Association

John Jones
Wisconsin Donkey and Mule Society

Mindy Krolick
Wisconsin State Horse Council

Tim Krueger
Wisconsin 4 Wheel Drive Association

Rob McConnell
ORV Council

George Meyer
Wisconsin Wildlife Federation

Evan Miller
Chequamegon-Nicolet National Forest

Dave Newman
Association of Wisconsin Snowmobile Clubs

Luana Schneider
Wisconsin 4-Wheel Drive Association

John Schnorr
Wisconsin Off-Highway Vehicle Association

Kevin Thusius
Ice Age Park and Trail Foundation

Rolf Utegaard
Invasive Plants Association of Wisconsin

Gary Werner
Sierra Club-Trail Chair and Ice Age Park and Trail Foundation [Dane County Chapter]

Hank Wozniel
Wisconsin ATV Association

Supplementary Advisory Committee

Wright Allen
Wisconsin Bowhunters Association

Bill Brooks
Wisconsin Society for Ornithology and Wisconsin Bird Conservation Initiative

Pat Conzemius
Wildlife Forever

Jack Hirt
Bicycle Federation of Wisconsin

Linda Lynch
Friends of Wisconsin State Parks

Scott McAuley
Wisconsin Trappers Association

Bill Menke
North County Trail Association

Dave Phillips
Governor's State Trail Council

Harold Schmidt
Wisconsin Off-Road Bicycling Association

Pamela J. Schuler
National Park Service

John Schweitzer
Jackson County Forestry and Parks

Gary Severson
Wisconsin Conservation Congress

Wisconsin DNR Staff

Thomas Boos
Wisconsin DNR Forestry

Brigit Brown
Wisconsin DNR State Parks

Kimberly Currie
Wisconsin DNR State Parks

Kelly Kearns
Wisconsin DNR Endangered Resources

Sherry Klosiewski
Wisconsin DNR State Parks

Facilitator

Kris Tiles
Basin Educator for Natural Resources
Central Wisconsin Basin
University of Wisconsin-Extension

Additional Thanks

Dave Benish
Wisconsin DNR State Parks

Fred Clark
Wisconsin Council on Forestry

Jim Gallagher
Wildlife Forever

Linda Parker
Chequamegon-Nicolet National Forest

Todd Miller
Wisconsin DNR Forestry

Bryn Scriver
Wisconsin DNR Forestry

Amy Staffen
Wisconsin DNR Forestry

Bernie Williams
Wisconsin DNR Forestry

Brett Richardson
Wildlife Forever

Darrell Zastrow
Wisconsin DNR Forestry

Wisconsin Council on Forestry
Forestry Invasives Leadership Team

Preface

In 2002, the Wisconsin Council on Forestry – comprised of representatives of private and public forestry, timber and forest product industries, conservation organizations, forestry schools, and other interested groups – was created by state statue to advise the Governor, Legislature, Department of Natural Resources, and other State agencies on issues affecting forests in the state. In 2004, the Council sponsored the Governor's Conference on Forestry. The 64 participants who attended these discussions, again representing a wide range of interested groups, concluded that "*invasive species may present the greatest threat to the long-term health and sustainability of Wisconsin's forests"* and reached "*a clear consensus on the need for voluntary invasive species best management practices and a partnership-based process for creating them."* In response, the Council created the Forest Invasives Leadership Team (FILT) to help guide these efforts and identified four areas of concern: Forestry, Recreation, Urban Forestry, and Transportation and Utility Rights-of-Way for the development of Best Management Practices.

Introduction

The Wisconsin Council on Forestry (WCOF) identified invasive species as the most critical issue facing Wisconsin's forests. Invasive species, including plants, insects, and diseases, can kill trees and impact forest regeneration and productivity.

In response, the WCOF initiated efforts to develop voluntary Best Management Practices (BMPs) for Invasive Species. Four BMP tracks, each with its own Advisory Committee, were created to address the issue of invasive species in Wisconsin's forests, including: Forestry BMPs, Recreation BMPs, Urban Forestry BMPs, and Transportation and Utility Rights-of-Way BMPs.

In the spring of 2007, more than 70 agencies, recreation organizations, and environmental groups were invited to participate in the development of the Recreation Best Management Practices. These participants were invited to collaboratively work together -- to identify their concerns and prioritize a set of voluntary Best Management Practices for a wide range of recreational activities.

By June of 2007, the Advisory Committee was comprised of 29 individuals with a variety of backgrounds and recreational interests. The Committee divided the BMPs into seven "Spokes:" Animal-based Recreation; Bicycle Recreation; Camping Recreation; Hunter, Trapper and Angler Recreation; Motorized Recreation; Pedestrian-based Recreation; and Land Management. With assistance from technical teams and DNR staff, the Advisory Committee collaboratively developed voluntary Recreation BMPs.

The final product is a set of voluntary guidelines that addresses issues universal or common to all recreational activities, along with issues unique to each type of recreation activity and issues faced by managers of recreational lands.

The Best Management Practices presented in this document are intended to help prevent the introduction and further spread of invasive plants, insects, and diseases in Wisconsin's private and public lands. In addition to the specific BMPs, the document contains information to help recreational users assess the threats posed by invasive species.

The document is structured as in the following example:

- **BMP Statement: Invasive species BMPs appear in bold and are underlined. These statements describe voluntary practices that reduce the impact of invasive species.**

  Suggestions:
  a. BMP Suggestions are listed below the BMP Statement.
  b. BMP Suggestions give more information about why the BMP is important.
  c. BMP Suggestions introduce items that could be used to address the BMP; they will not apply to every species or situation, and the user does not necessarily have to follow them to address the BMP (i.e., they are optional).
  d. BMP Suggestions may include details, examples, proposals, and issues to consider about invasive species and applying the BMP.

As you read the BMPs, keep in mind that they are intended as concepts to be tailored by individual user groups for dissemination to their members and the public. Although the specific language may change, the message should remain the same.

Best Management Practices

Universal or Common BMPs

(BMP Prefix = "U")

Best Management Practices:

BMP U-1: Learn to recognize invasive species common to the areas where you enjoy outdoor recreational activities.

Suggestions:

a. Read guides, brochures, and pamphlets produced by government agencies or other weed management groups on invasive plants and invertebrates.
b. Check out the Wisconsin DNR website for photos and instructions. http://dnr.wi.gov/invasives

BMP U-2: Wear outer layers of clothing and footwear that are not "seed-friendly."

Suggestions:

a. In appropriate areas, wear low-tread footwear that doesn't hold soils, seeds, plant parts, or invertebrates.
b. Wear disposable shoe covers over footwear in infested areas; properly dispose of them when leaving the area.
c. Consider dedicating a pair of shoes or boots for use only on infested properties.
d. Wear ankle gaiters over socks and shoe laces.
e. Avoid exposing Velcro, bulky knits (*e.g.*, wool, fleece), pants with cuffs, and other fabrics or clothing styles that can carry seeds.

BMP U-3: Inspect and clean hair, clothing, footwear, and gear for soils, seeds, plant parts, or invertebrates before and after recreating.

Suggestions:

a. Use items like a stiff brush, stick or small screwdriver to help remove soils, seeds, plant parts, or invertebrates; use boot brushes and other removal devices when provided.
b. Wear a hat to cover hair.
c. Preferred locations for cleaning are those where:
    - Invasive species are already established.
    - Gear is unloaded and loaded
    - Areas are easily monitored for new infestations due to the cleaning activity, i.e. along a road, at a trail head, or in a parking lot.

d. Do not clean clothing, footwear, or gear in or near waterways – it may promote the spread of invasive species downstream.

BMP U-4: Prior to moving equipment, vehicles, and trailers onto and off of an activity area, spray, scrape, or brush soils, seeds, plant parts, or invertebrates from exterior surfaces, to the extent practical, to minimize the risk of transporting invasive species.

Suggestions:

a. Visit a car wash or designated cleaning station; be sure to spray the undercarriage of all vehicles.
b. Preferred locations for equipment cleaning areas are those where:
    - Equipment is unloaded and loaded.
    - Invasive species are already established.
    - Areas are easily monitored for new infestations due to the cleaning activity, i.e. along a road, at a trail head, or in a parking lot.
c. Do not clean equipment, vehicles, or trailers in or near waterways – it may promote the spread of invasive species downstream.

BMP U-5: Inspect and remove soils, seeds, plant parts, or invertebrates from the coat and feet of animals and their clothing/gear before and after recreating.

Suggestions:

a. Carry a grooming brush, shedding blade, small scissors, hoof knife, etc. to help remove soil and invasive propagules from animals.
b. Preferred locations for cleaning are those where:
    - Invasive species are already established.
    - Animals are unloaded and loaded.
    - Areas are easily monitored for new infestations due to the cleaning activity, i.e. along a road, at a trail head, or in a parking lot.
    - Do not clean animals in or near waterways – it may promote the spread of invasives downstream.

BMP U-6: Properly dispose of soils, seeds, plant parts, or invertebrates, found during inspection and cleaning.

Suggestions:

a. Place materials in a bag and send to a landfill, where possible.
b. Materials may be composted but only if compost pile reaches very high temperatures and the finished compost can be monitored for invasive plant seed emergence.
c. Materials may be disposed of in piles; locate the pile in an area that facilitates easy monitoring and control if infestations spread from it.
d. Materials may be burned; locate the burn pile in an area that facilitates easy monitoring and control if infestations spread from it.

BMP U-7: Stay on designated trails, roads, and other developed areas.

Suggestions:

a. Minimize soil disturbance; it may promote invasive plant seed germination and establishment.
b. Destruction of native plants favors invasive species.
c. By venturing into uninfested areas, you may introduce invasive species by carrying propagules.
d. Avoid trails that are wet or muddy. If wet areas are encountered, go through them rather than around, if possible.

BMP U-8: When off trail, avoid areas that appear to be infested with invasive species; "when in doubt, stay out!"

Suggestions:

a. The chances of transporting soils, seeds, plant parts, or invertebrates increase in areas of heavy infestation or when seeds are present.
b. Direct contact with some invasive species can affect human and animal health, including skin and eye irritation.

BMP U-9: Report infestations of invasive species to the appropriate land manager or property owner.

Suggestions:

a. Provide as exact a location as possible; take a photo, GPS coordinates, or map the infestation.
b. Use diplomacy if contacting a private landowner.

BMP U-10: Volunteer to help control invasive species.

Suggestions:

a. Contact public and private landowners, agencies, and nonprofit organizations to find out about volunteer opportunities.
(See appendix B: Resources for information on control)

BMP U-11: Spread the word – help educate others about invasive species and their effects on our environment, economy, and recreational opportunities.

BMP U-12: Incorporate invasive species prevention into planning for special events.

Suggestions:

a. Place cleaning stations at entrance and exit points.
b. Plan travel routes to avoid areas of heavy infestation.
c. Provide participants with informational brochures and other educational materials related to invasive species prevention.
d. Identify species in the field to educate participants.
e. Consider adding a component of removal and proper disposal of invasive species as part of the event.
f. Plan events for proper times of the year to help avoid the spread of invasive species.

Best Management Practices for Animal–based Activities

(BMP Prefix = "A")

Introduction:

This section covers outdoor recreation involving animals. This includes a range of activities, including any animal used as a pack or transport animal, including but not limited to: horse, llama, alpaca, and pack goat. It includes dogs used for companions, walking, hunting (land and water), mushing, skijoring, field trials, and competition. It also includes animals taken outdoors.

Invasive species and recreational animal use:

Invasive species are having a negative effect on the quality and accessibility of recreational lands available for many recreational activities. By definition, nonnative invasive species eliminate native plant species. As a result, they change the wildlife habitat and modify both the appearance and the utility of the landscape and may pose a treat to the health of animals. Wild parsnip (*Pastinaca sativa*) may cause burns on thin haired dogs and hoary alyssum (*Berteroa incana*) can be deadly to horses. As responsible recreational users, it is important to be aware of potential ways that invasive species could be transported inadvertently when traveling to or from public lands. Left unmanaged, these threats could contribute to diminished quality and quantity of outdoor recreation within the state.

General guidance:

To minimize the introduction and spread of invasive species, recreationists with animals should focus on: 1) grooming of self and animal and cleaning of transport vehicles and trailers before and after visiting recreational lands; 2) staying on designated trails, 3) properly disposing of any debris or waste, and 4) reporting any infestations of invasive species.

Best Management Practices:

BMP A-1: Learn to recognize invasive species common to the areas where you enjoy outdoor recreational activities.

Suggestions:

a. Read guides, brochures, and pamphlets produced by government agencies or other weed management groups on invasive plants and invertebrates.
b. Pay attention to signage at infested areas and trailheads, (e.g. "*this is a picture of garlic mustard; you will see it along the west side of the trail"*).
c. Check out the Wisconsin DNR website for photos and instructions: http://dnr.wi.gov/invasives

BMP A-2: Wear outer layers of clothing and footwear that are not "seed-friendly."

Suggestions:

a. In appropriate areas, wear low-tread footwear that doesn't hold soils, seeds, plant parts, or invertebrates.
b. Wear disposable shoe covers over footwear in infested areas; properly dispose of them when leaving the area.

c. Consider dedicating a pair of shoes or boots for use only on infested properties.
d. Wear ankle gaiters over socks and shoe laces.
e. Avoid wearing Velcro, bulky knits (*e.g.*, wool, fleece), pants with cuffs, and other fabrics or clothing styles that can carry seeds.

BMP A-3: Inspect and clean hair, clothing, footwear, and gear for soils, seeds, plant parts, or invertebrates before and after recreating.

Suggestions:

a. Use items like a stiff brush, stick or small screwdriver to help remove soils, seeds, plant parts, or invertebrates; use boot brushes and other removal devices when provided.
b. Wear a hat to cover hair.
c. Do not clean clothing, footwear, or gear in or near waterways – it may promote the spread of invasive species downstream.
d. Preferred locations for cleaning are those where:
    - Invasive species are already established.
    - Gear is unloaded and loaded.
    - Areas can be easily monitored for new infestations due to the cleaning activity, i.e. along a road, at a trail head, or in a parking lot.

BMP A-4: Prior to moving equipment, vehicles, and trailers onto and off of an activity area, spray, scrape, or brush soils, seeds, plant parts, or invertebrates from exterior surfaces, to the extent practical, to minimize the risk of transporting invasive species.

Suggestions:

a. Visit a car wash or designated cleaning station; be sure to spray the undercarriage of all vehicles.
b. Especially check bumpers, grills, and undercarriage of vehicles and trailers as these are sites for nesting insects.
c. Preferred locations for cleaning areas are those where:
    - Invasive species are already established.
    - Equipment is unloaded and loaded.
    - Areas can be easily monitored for new infestations due to the cleaning activity, i.e. along a road, at a trail head, or in a parking lot.
d. Do not clean equipment, vehicles, or trailers in or near waterways – it may promote the spread of invasive species downstream.

BMP A-5: Inspect and remove soils, seeds, plant parts, or invertebrates from the coat and feet of animals and their clothing/gear before and after recreating.

Suggestions:

a. Fully groom your animal before and after an outing in order to protect both the public land and your home.
b. Carry a grooming brush, shedding blade, small scissors, hoof knife, etc. to help remove soil and invasive propagules from animals.
c. Do not clean clothing, footwear, gear, vehicles, or animals in or near waterways – it may promote the spread of invasive species downstream.
d. Preferred locations for cleaning are those where:
    - Invasive species are already established.

- Animals are unloaded and loaded.
- Areas can be easily monitored for new infestations due to the cleaning activity, i.e. along a road, at a trail head, or in a parking lot.

BMP A-6: Properly dispose of soils, seeds, plant parts, or invertebrates.

Suggestions:

a. Place materials in a bag and send it to a landfill, where possible.
b. Materials may be composted but only if the compost pile reaches very high temperatures and the finished compost can be monitored for invasive plant seed emergence.
c. Materials may be disposed of in piles; locate the pile in an area that facilitates easy monitoring and control if infestations spread from it.
d. Materials may be burned; locate the burn pile in an area that facilitates easy monitoring and control if infestations spread from it.

BMP A-7: Stay on designated trails, roads, and other developed areas and observe animal restraint rules.

Suggestions:

a. Staying on designated trails, roads, and developed areas keeps you and your animal safe.
b. Minimize soil disturbance; it may promote invasive plant seed germination and establishment.
c. Destruction of native plants favors invasive species.
d. By venturing into uninfested areas, you may introduce invasive species by carrying propagules.
e. Avoid trails that are wet or muddy. If wet areas are encountered, go through them rather than around, if possible.

BMP A-8: When off-trail, avoid areas that appear to be infested with invasive species; "when in doubt, stay out!"

Suggestions:

a. The chances of transporting soils, seeds, plant parts, or invertebrates increase in areas of heavy infestation or when seeds are present.
b. Direct contact with some invasive species can affect human and animal health, including skin and eye irritation.

BMP A-9: Report infestations of invasive species to the appropriate land manager or property owner.

Suggestions:

a. Provide as exact a location as possible; take photos, GPS coordinates, or map the infestation.
b. Use diplomacy if contacting a private landowner.

BMP A-10: Volunteer to help control invasive species.

Suggestions:

a. Contact public and private landowners, agencies, and nonprofit organizations to find out about volunteer opportunities.
(See appendix B: Resources for information on control)

BMP A-11: Follow the property guidelines for all animal waste disposals.

Suggestions:

a. If the property does not have a proper receptacle, haul waste out and dispose of it properly.

BMP A-12: Incorporate invasive species prevention into planning for special events.

Suggestions:

a. Place cleaning stations at entrance and exit points.
b. Plan travel routes to avoid areas of heavy infestation.
c. Provide participants with informational brochures and other educational materials related to invasive species prevention.
d. Identify invasive species in the area to educate participants.
e. Consider adding a component of removal and proper disposal of invasive species as part of the event.
f. Plan events for proper times of the year to help avoid the spread of invasive species.

BMP A-13: Spread the word – help educate others about invasive species and their effects on our environment, economy, and recreational opportunities.

Best Management Practices for Bicycle Activities

(BMP Prefix = "B")

Introduction:

A bicycle is a human-powered, pedal driven vehicle. There are a wide variety of bicycling-based activities. Many, but not all, are types of recreation. These recommendations apply to both recreation (for example: mountain biking or off-road biking, bicycle touring, road biking, cyclocross (cross-country bicycle racing in open, rough terrain with riders often forced to dismount and carry their bicycle), and BMX (bicycle motorcross)) and non-recreation (for example: bicycle commuting, law enforcement patrolling, and deliveries) uses of bicycles, as well as unicycles, tricycles, and quadracycles (one, three, and four wheels, respectively), which are not strictly bicycles.

Invasive species and bicycle recreation:

Invasive species are having a negative effect on the quality and accessibility of recreational lands available for many recreation activities including bicycle recreation. Invasive species are eliminating native plant species, changing wildlife habitat, and modifying the appearance and utility of the landscape. Left unmanaged, these threats will contribute to a diminished quality and quantity of outdoor recreation within the state.

- Invasive plants out-compete the native vegetation in the landscape by replacing diverse plant communities with aggressive single (monoculture) species.

- Invasive plants directly affect human health and activities in many ways. Some produce painful skin burns; others have sharp spines, and thorns that can cause physical discomfort. Toxic berries can cause poisoning. Some allergies are caused by invasive species.

- Economic damage associated with invasive species' impacts and their management is estimated to cost the U.S. $137 billion annually. This cost includes losses in agriculture, fisheries, timber, utilities, overall land productivity, tourism, and recreation.

- Bicyclists face the possibility of losing land access due to the concern of the spreading of invasive plants.

- Invasive species take over habitat that supports native wildlife and, potentially, endangered species.

- Bicycles and their operators have the potential of unintentionally carrying invasive species from one area to another. Soils, seeds, plant parts, or invertebrates may cling to gear, bicycles, and clothing.

- Disturbed soils may create favorable conditions for the establishment and spread of invasive plants.

General guidance:

To minimize the introduction and spread of invasive species, bicyclists should focus on:

1) Inspecting and cleaning bicycles, equipment, and clothing, 2) staying on established trails and routes, and 3) "Leave No Trace": leaving as little impact on the land as possible.

Best Management Practices:

BMP B-1: Learn to recognize invasive species common to the areas where you enjoy outdoor recreational activities.

Suggestions:

a. Read guides, brochures, and pamphlets produced by government agencies or other weed management groups on invasive plants and invertebrates.
b. Pay attention to signage at infested areas and trailheads, (e.g. "*this is a picture of garlic mustard; you will see it along the west side of the trail"*).
c. Check out the Wisconsin DNR website for photos and instructions: http://dnr.wi.gov/invasives

BMP B-2: Wear outer layers of clothing and footwear that are not "seed-friendly."

Suggestions:

a. In appropriate areas, wear low-tread footwear that doesn't hold soils, seeds, plant parts, or invertebrates.
b. Wear disposable shoe covers over footwear in infested areas; properly dispose of them when leaving the area.
c. Dedicate a pair of shoes or boots for use only on infested properties.
d. Wear ankle gaiters over socks and shoe laces.
e. Avoid wearing Velcro, bulky knits (e.g., wool, fleece), pants with cuffs, and other fabrics or clothing styles that can carry seeds.

BMP B-3: Inspect and clean hair, clothing, footwear, and gear for soils, seeds, plant parts, or invertebrates before entering and upon leaving riding areas.

Suggestions:

a. Do not clean your clothing, footwear, and gear in or near waterways to prevent spreading invasive species downstream.
b. Use items like a stiff brush, stick or small screwdriver to help remove soils, seeds, plant parts, or invertebrates; use boot brushes and other removal devices when provided.
c. Periodically check for invasive species at stops (visual inspections).
d. Preferred locations for cleaning are those where:
    - Invasive species are already established.
    - Gear is unloaded and loaded
    - Areas are easily monitored for new infestations due to the cleaning activity, i.e. along a road, at a trail head, or in a parking lot.

BMP B-4: Prior to moving bicycles, equipment, vehicles, and trailers onto and off of an activity area, spray, scrape, or brush soils, seeds, plant parts, or invertebrates from

exterior surfaces, to the extent practical, to minimize the risk of transporting invasive species.

Suggestions:

a. Visit a car wash or cleaning station; be sure to check the tires and drive chain and spray the undercarriage of all vehicles. Make this all part of a regular maintenance check.
b. Preferred locations for equipment cleaning areas are those where:
    - Equipment is unloaded and loaded.
    - Invasive species are already established.
    - Areas are easily monitored for new infestations due to the cleaning activity, i.e. along a road, at a trail head, or in a parking lot.
c. Do not clean equipment, vehicles, or trailers in or near waterways – it may promote the spread of invasive species downstream.
d. Periodically check bike and gear for invasive species at stops (visual inspections).
e. Insects like the gypsy moth can be transported on bicycles, equipment, vehicles, and trailers. Check for insect egg masses, pupae, and caterpillars.

BMP B-5: Inspect and remove soils, seeds, plant parts, or invertebrates from the coat and feet of animals and their clothing/gear before and after recreating.

Suggestions:

a. Carry a grooming brush, shedding blade, small scissors, hoof knife, etc. to help remove soil and invasive propagules from animals.
b. Do not clean clothing, footwear, gear, vehicles, or animals in or near waterways – it may promote the spread of invasive species downstream.
c. Preferred locations for cleaning are those where:
    1. Invasive species are already established.
    2. Animals are unloaded and loaded
    3. Areas are easily monitored for new infestations due to the cleaning activity, i.e. along a road, at a trail head, or in a parking lot.

BMP B-6: Properly dispose of soils, seeds, plant parts, or invertebrates, found during inspection and cleaning.

Suggestions:

a. Place materials in a bag and send to a landfill, where possible.
b. Materials may be composted but only if the compost pile reaches very high temperatures and the finished compost can be monitored for invasive plant seed emergence.
c. Materials may be disposed of in piles; locate the pile in an area that facilitates easy monitoring and control if infestations spread from it.
d. Materials may be burned; locate the burn pile in an area that facilitates easy monitoring and control if infestations spread from it.

BMP B-7: Stay on established and designated trails, roads, and other developed areas.

Suggestions:

a. Minimize soil disturbance; it may promote invasive plant seed germination and establishment.
b. Destruction of native plants favors invasive species.
c. By venturing into uninfested areas, you may introduce invasive species by carrying propagules.
d. Do not create your own trails without landowner permission.
e. Avoid trails that are wet or muddy. If wet areas are encountered, go through them rather than around, if possible.

BMP B-8: When off-trail, avoid areas that appear to be infested with invasive species; "when in doubt, stay out!"

Suggestions:

a. The chances of transporting soils, seeds, plant parts, or invertebrates in areas of heavy infestation or when seeds are present.
b. Direct contact with some invasive species can affect human and animal health, including skin and eye irritation.

BMP B-9: Report infestations of invasive species to the appropriate land manager or property owner.

Suggestions:

a. Provide as exact a location as possible; take photos, GPS coordinates, or map the infestation.
b. Use diplomacy if contacting a private landowner.

BMP B-10: Volunteer to help control invasive species.

Suggestions:

a. Contact public and private landowners, agencies, and nonprofit organizations to find out about volunteer opportunities.
(See appendix B: Resources for information on control)

BMP B-11: Incorporate invasive species prevention into planning for special events.

Suggestions:

a. Place cleaning stations at entrance and exit points.
b. Plan travel routes to avoid areas of heavy infestation.
c. Provide participants with informational brochures and other educational materials related to invasive species prevention.
d. Identify invasive species in the area to educate participants.
e. Consider adding a component of removal and proper disposal of invasive species as part of the event.
f. Plan events for proper times of the year to help avoid the spread of invasive species.

<u>BMP B-12:</u> Spread the word - help educate others, about invasive species and their effects on our environment, economy, and recreational opportunities.

Best Management Practices for Camping

(BMP Prefix = "C")

Introduction:

Camping is an outdoor recreational activity in which participants can get away from civilization and enjoy nature while spending one or more nights at a campsite. Camping describes a wide range of activities. Backpack campers carry their gear on their backs, while recreational vehicle campers arrive equipped with their own electricity, heat, furniture, and bathroom facilities. Camping may be a recreational activity by itself, or it can be done in conjunction with other activities, such as hiking, boating, and fishing.

Campers span a broad range of interests and preferences, and campsites are designed accordingly. Many campgrounds have facilities like fire rings, grills, bathrooms, and utilities, though not all campsites have similar levels of development. Campsites can range from a patch of dirt with a sign marking it, to a level paved pad with water and electricity. Some RV campgrounds, for instance, offer hookups where motor homes are supplied with electricity, water, and sewer services. While in the case of "dispersed camping," backpack campers simply select a site on which to camp within a designated public land area – sites are not designated in any way.

Those who seek a more rugged experience in the outdoors prefer to camp with only tents. Tent campers often use an automobile to carry equipment to a campground ("car camping"). Other vehicles used for camping include motorcycles, touring bicycles, boats, and canoes; using pack animals is also a popular alternative.

Invasive species and camping:

Historically the introduction and spread of invasive species can often be linked to people who unintentionally move the pests in infested plants, wood, and other materials. Often the infestations are located within campgrounds where factors like heavy public use and the presence of firewood combine to create optimal conditions for invasive species. These invasive species are a threat to the natural communities within parks, forests, campgrounds, and public and private lands throughout the state of Wisconsin. In addition, invasive species impact the recreational opportunities available to campers.

- Invasive plants may overgrow trails, making hiking and biking difficult.
- Invasive plants often out-compete native wildflowers.
- Invasive species often lower biodiversity in natural areas, disturbing ecosystems and eliminating wildlife habitat.
- Some noxious weeds adversely affect animal and human health.

Camping activities can raise the potential threat of spreading invasive species. A camper venturing into natural areas and transporting gear may unintentionally introduce invasive species.

- **Soils, seeds, plant parts, or invertebrates** may cling to gear, vehicles, or animals.

- Campers may trample native plants and disturb the soil, creating a favorable condition for the introduction of invasive species.
- Firewood is especially troublesome, as it is frequently moved long distances and harbors many invasive insects, fungi, and diseases.

General guidance:

To minimize the introduction and spread of invasive species, campers should 1) inspect and clean vehicles and gear, 2) minimize disturbance of natural environments, and 3) purchase or use local firewood, rather then transporting it. By reducing opportunities for invasive "hitchhikers" and staying on established campsites and trails, campers can do their part to keep recreational lands healthy.

Best Management Practices:

BMP C-1: Learn to recognize invasive species common to the areas where you enjoy outdoor recreational activities.

Suggestions:

a. Read guides, brochures, and pamphlets produced by government agencies or other weed management groups on invasive plants and invertebrates.
b. Pay attention to signage at infested areas and trailheads, (e.g. "this is a picture of garlic mustard; you will see it along the west side of the trail").
c. Check out the Wisconsin DNR website for photos and instructions. http://dnr.wi.gov/invasives

BMP C-2: Wear outer layers of clothing and footwear that are not "seed-friendly."

Suggestions:

a. In appropriate areas, wear low-tread footwear that doesn't hold soils, seeds, plant parts, or invertebrates.
b. Wear disposable shoe covers over footwear in infested areas; properly dispose of them when leaving the area.
c. Consider dedicating a pair of shoes or boots for use only on infested properties.
d. Wear ankle gaiters over socks and shoe laces.
e. Avoid wearing Velcro, bulky knits (*e.g.*, wool, fleece), pants with cuffs, and other fabrics or clothing styles that can carry seeds.

BMP C-3: Inspect and clean hair, clothing, footwear, and gear for soils, seeds, plant parts, or invertebrates before and after recreating.

Suggestions:

a. Use a broom or stiff brush to clean tents, tarps, shoes, and vehicles; shake out sleeping bags and clothes.
b. Use items like a stiff brush, stick or small screwdriver to help remove soils, seeds, plant parts, or invertebrates; use boot brushes and other removal devices when provided.
c. Wear a hat to cover hair.
d. Do not clean clothing, footwear, or gear in or near waterways – it may promote the spread of invasive species downstream.
e. Refrain from washing any garments within the campsite.
f. Preferred locations for cleaning are those where:

- Invasive species are already established.
- Gear is unloaded and loaded.
- Areas can be easily monitored for new infestations due to the cleaning activity, i.e. along a road, at a trail head, or in a parking lot.

BMP C-4: Prior to moving equipment, vehicles, and trailers onto and off of an activity area, spray, scrape or brush soils, seeds, plant parts, or invertebrates from exterior surfaces, to the extent practical, to minimize the risk of transporting invasive species.

Suggestions:

a. Visit a car wash or cleaning station; be sure to spray the undercarriage of all vehicles.
b. Preferred locations for equipment cleaning areas are those where:
    - Equipment is unloaded and loaded.
    - Invasive species are already established.
    - Areas can be easily monitored for new infestations due to the cleaning activity, i.e. along a road, at a trail head, or in a parking lot.
c. Do not clean vehicles or trailers in or near waterways – it may promote the spread of invasives downstream.

BMP C-5: Inspect and remove soils, seeds, plant parts, or invertebrates from the coat and feet of animals and their clothing/gear before and after recreating.

Suggestions:

a. Carry a grooming brush, shedding blade, small scissors, hoof knife, etc. to help remove soil and invasive propagules from animals.
b. Do not clean clothing, footwear, gear, vehicles, or animals in or near waterways – it may promote the spread of invasives downstream.
c. Preferred locations for cleaning are those where:
    - Invasive species are already established.
    - Animals are unloaded and loaded.
    - Areas can be easily monitored for new infestations due to the cleaning activity, i.e. along a road, at a trail head, or in a parking lot.

BMP C-6: Properly dispose of soils, seeds, plant parts, or invertebrates, found during inspection and cleaning.

Suggestions:

e. Place materials in a bag and send it to a landfill, where possible.
f. Materials may be composted but only if the compost pile reaches very high temperatures and the finished compost can be monitored for invasive plant seed emergence.
g. Materials may be disposed of in piles; locate the pile in an area that facilitates easy monitoring and control if infestations spread from it.
h. Materials may be burned; locate the burn pile in an area that facilitates easy monitoring and control if infestations spread from it.

BMP C-7: Stay on designated camping areas, tent pads, roads, and trails.

Suggestions:

a. Minimize soil disturbance; it may promote invasive plant seed germination and establishment.
b. Destruction of native plants favors invasive species.
c. By venturing into uninfested areas, you may introduce invasive species by carrying propagules.
d. Avoid trails that are wet or muddy. If wet areas are encountered, go through them.
e. Avoid poorly located campsites that encourage erosion and degrade the soil and surrounding vegetation.
f. Travel and set up camp on durable surfaces.

BMP C-8: When off-trail, avoid areas that appear to be infested with invasive species; "when in doubt, stay out!"

Suggestions:

a. The chances of transporting soils, seeds, plant parts, or invertebrates increase in areas of heavy infestation or when seeds are present.
b. Direct contact with some invasive species can affect human and animal health, including skin and eye irritation.

BMP C-9: Report infestations of invasive species to the appropriate land manager or property owner.

Suggestions:

a. Provide as exact a location as possible; take photos, GPS coordinates, or map the infestation.
b. Use diplomacy if contacting a private landowner.

BMP C-10: Volunteer to help control invasive species.

Suggestions:

a. Contact public and private landowners, agencies, and nonprofit organizations to find out about volunteer opportunities.
(See Appendix B: Resources for information on control)

BMP C-11: Incorporate invasive species prevention into planning for special events.

Suggestions:

a. Place cleaning stations at entrance and exit points.
b. Plan travel routes to avoid areas of heavy infestation.
c. Provide participants with informational brochures and other educational materials related to invasive species prevention.
d. Identify invasive species in the area to educate participants.
e. Consider adding a component of removal and proper disposal of invasive species as part of the event.
f. Plan events for proper times of the year to help avoid the spread of invasive species.

BMP C-12: Spread the word – help educate others about invasive species and their effects on our environment, economy, and recreational opportunities.

BMP C-13: Do not transport firewood.

Suggestions:

a. Follow appropriate quarantine rules. **DATCPEmeraldAshBorer@wisconsin.gov** or call **1-800-462-2803**.
b. Ideally, purchase firewood from within the campground where you are staying, as that wood is often cut on-site and sold by non-profit groups who reinvest earnings in the property.
c. Private vendors often have firewood available for sale just outside of the property as well; for firewood availability at your destination, contact the property directly.
d. When buying firewood, make sure you receive pieces that are dry and have either no bark or bark that is loose (a sign that the wood is very dry). Not only will this reduce the threat of spreading invasive species, but your fire will be easier to start.
e. Leave fallen branches and bark where they have fallen - do not transport them to your campsite.
f. Burn all firewood. Do not leave any unused wood behind, and do not take it with you to another destination.

Firewood has the potential to spread many destructive invasive species, both known and as yet, unknown. Confirmed threats include: emerald ash borer, butternut canker, white pine blister rust, and oak wilt.
Firewood is often stored unused for long periods of time and is handled by people generally not trained to notice signs of invasive pests. Once established in new areas, invasive forest pests can quickly kill trees in forests, parks, communities, and campgrounds.

BMP C-14: Unless gathering natural foods or other permitted material, don't pick plants.

Suggestions:

a. Picking plants is prohibited on many public lands.
b. While many invasive plants have attractive blooms, discarded flower or seed heads can spread invasive plant seeds.
c. When processing gathered materials, remove invasive plants and dispose of them properly.
d. Some invasive plants may cause skin and eye irritation.
e. If you are interested in controlling invasive plants, contact the property manager.

Edible fruits and nuts may be gathered in state parks for your own use. Remember though, there are many poisonous plants that can be harmful or even fatal when eaten. Be certain of your identification before you eat anything you have gathered. Remember to properly dispose of all non-desirable plant material.

Despite their appeal for ornamental purposes, avoid picking plants such as teasel and bittersweet since this provides opportunities to spread these invasive species through discarded plant parts and seeds.

BMP C-15: Follow guidelines for bringing animals into recreational areas.

Suggestions:

a. Be careful when choosing the location to tie your animal within the campsite; consider their access to vegetation and ability to cause soil disturbance, (for example, digging holes).
b. Animal owners are responsible for proper removal and disposal of their animals' waste products; dispose of animal waste in trash receptacles.
c. Camping with an animal puts it in strange surroundings; your animal will be more secure and less prone to wander if kept in the camping unit at night.

Best Management Practices for Hunters, Trappers, and Anglers

(BMP Prefix = "HTA")

Introduction:

Hunting is an outdoor recreational activity that can be described as pursuing and harvesting wild game with firearm or archery equipment. In Wisconsin, hunting opportunities are generally divided into big game (deer or bear) and small game (squirrel, rabbit, ruffed grouse, turkey, waterfowl, and some furbearers). Hunters use a variety of techniques in their pursuit of game. These techniques include but are not limited to: stand hunting, still hunting, driving of game, waiting near a bait site, calling, and the use of dogs to locate, track, or retrieve game. Hunters often travel many miles across the state or even from other states to get to their favorite hunting locations. They may also walk long distances, often through a variety of habitats, in pursuit of their intended quarry. Hunters, if they are not careful, can unintentionally spread invasive species.

Trapping is an outdoor recreational activity that can be described as placing traps with the intent of capturing a species of animal for harvest or relocation. In Wisconsin, trappers primarily target what are considered fur-bearing animals. Trapping opportunities include but are not limited to: beaver, muskrat, otter, mink, fox, coyote, or fisher. Trappers use a wide variety of traps in their pursuit of fur-bearing animals. Traps include but are not limited to: leg or foot hold traps, body grip traps, live traps, and snares. Sites where trappers place traps to capture animals are commonly known as "sets." These sets can be divided into wet and dry sets depending on what type of habitat the target species primarily uses. Wet sets are placed in water with the intention of catching a specific species that is found in or near aquatic habitats. Dry sets are placed with the intention of catching species utilizing upland habitats. Trappers often move traps from one location to another throughout the season to target different populations. By moving traps to different locations, trappers (if they are not careful) may potentially spread invasive species.

Fishing is an outdoor recreational activity that can be described as attempting to catch fish typically through the use of rod and reel (hook and line). Fishing is often done either through the use of some sort of boat, wading in shallow water, or from the shoreline or bank. Wading and shoreline or bank anglers often walk some distance on the upland areas adjacent to the water body they intend to fish in. This movement along the shoreline may unintentionally spread invasive species.

Invasive species and hunters, trappers and anglers:

Invasive species are rapidly spreading to many new areas across Wisconsin. These species can become established in parks, forests, lakes, rivers, and fields and damage the quality of the natural habitat.

- Invasive species can reduce the quality of or eliminate valuable game habitat through aggressive competition.
- Invasive species can choke lakes and waterways and make them impassable.
- Invasive species can overgrow trails making passage difficult.
- Some invasive species can adversely affect human health.
- **Soils, seeds, plant parts, or invertebrates** may cling to gear, vehicles, and clothing.

Since hunters, trappers, and anglers often take their gear with them to a variety of locations, they can unintentionally transport invasive species.

General guidance:
To reduce the possibility of spreading invasive species, hunters, trappers, and anglers should focus on:

a. Inspecting and cleaning vehicles, equipment, tools, and clothing
b. Minimizing disturbance of soil and natural environments
c. Staying on designated trails with motorized vehicles

By reducing opportunities for invasives to find their way into new areas, hunters, trappers, and anglers can do their part in keeping recreational lands healthy and productive.

Best Management Practices:

BMP HTA-1: Learn to recognize invasive species common to the areas where you enjoy outdoor recreational activities.

Suggestions:

a. Study guides, brochures, and pamphlets produced by government agencies or other weed management groups on invasive plants and invertebrates.
b. Pay attention to signage at infested areas and trailheads (e.g. "this is a picture of garlic mustard; you will see it along the west side of the trail").
c. Check out the Wisconsin DNR website for photos and instructions. http://dnr.wi.gov/invasives

BMP HTA-2: Wear outer layers of clothing and footwear that are not "seed friendly."

Suggestions:

a. In appropriate areas, wear low-tread footwear that doesn't hold soils, seeds, plant parts, or invertebrates.
b. Wear disposable shoe covers over footwear in infested areas; properly dispose of them when leaving the area.
c. Consider dedicating a pair of shoes or boots for use only on infested properties.
d. Wear ankle gaiters over socks and shoe laces.
e. Avoid wearing bulky knits (e.g., wool, fleece), pants with cuffs, and other fabrics or clothing styles that may carry seeds.

BMP HTA-3: Inspect and clean hair, clothing, footwear, and gear for soils, seeds, plant parts, or invertebrates, before and after recreating.

Suggestions:

a. Use items like a stiff brush, stick or small screwdriver to help remove soils, seeds, plant parts, or invertebrates; use boot brushes and other removal devices when provided.
b. Wear a hat to cover hair.
c. Do not clean clothing, footwear, or gear in or near waterways – it may promote the spread of invasive species downstream.
d. Preferred locations for cleaning are those where:
    - Invasive species are already established.

- Gear is unloaded and loaded.
- Areas can be easily monitored for new infestations due to the cleaning activity, i.e. along a road, at a trail head, or in a parking lot.

BMP HTA-4: Prior to moving equipment, vehicles or trailers onto or off of an activity area, spray, scrape, or brush soils, seeds, plant parts, or invertebrates from exterior surfaces, to the extent practical, to minimize the risk of transporting invasive species.

Suggestions:

a. Visit a car wash or cleaning station; be sure to spray the undercarriage of all vehicles.
b. Do not clean equipment, vehicles, or trailers in or near waterways – it may promote the spread of invasive species downstream. Traps should be rinsed free of mud, dirt, and debris when removing them from the location of a set.
c. Preferred locations for cleaning are those where:
    - Invasive species are already established.
    - Equipment is unloaded and loaded.
    - Areas can be easily monitored for new infestations due to the cleaning activity, i.e. along a road, at a trail head, or in a parking lot.

BMP HTA-5: Inspect and remove soils, seeds, plant parts, or invertebrates, from the coat and feet of animals (i.e. hunting dogs) before and after recreating.

Suggestions:

a. Carry a grooming brush, shedding blade, small scissors, etc. to help remove soil and invasive propagules from animals.
b. Do not clean animals in or near waterways – it may promote the spread of invasive species downstream.
c. Preferred locations for cleaning are those where:
    - Invasive species are already established.
    - Animals are unloaded and loaded.
    - Areas can be easily monitored for new infestations due to the cleaning activity, i.e. along a road, at a trail head, or in a parking lot.

BMP HTA-6: Properly dispose of soils, seeds, plant parts, or invertebrates, found during inspection and cleaning.

Suggestions:

a. Place materials in a bag and send to landfill, where possible.
b. Materials may be composted but only if the compost pile reaches very high temperatures and the finished compost can be monitored for invasive plant seed emergence.
c. Materials may be disposed of in piles; locate the pile in an area that facilitates easy monitoring and control if infestations spread from it.
d. Materials may be burned; locate the burn pile in an area that facilitates easy monitoring and control if infestations spread from it.

BMP HTA-7: Stay on designated trails, roads, and other developed areas with motorized vehicles.

Suggestions:

a. Minimize soil disturbance; it may promote invasive plant seed germination and establishment.
b. Destruction of native plants favors invasive species.
c. By venturing into uninfested areas, you may introduce invasive species by carrying propagules.
d. Avoid trails that are wet or muddy. If wet areas are encountered, go through them rather than around, if possible.

BMP HTA-8: When off trail, avoid areas that appear to be infested with invasive species; "When in doubt, stay out!"

Suggestions:

a. The chances of transporting soils, seeds, plant parts, or invertebrates increase in areas of heavy infestation or when seeds are present.
b. Direct contact with some invasive species can affect human and animal health, including skin and eye irritation.
c. Minimize soil disturbance if traveling off-trail and on stream banks; disturbed soils can create favorable conditions for the establishment and spread of invasive plants.

BMP HTA-9: Report infestations of invasive species to the appropriate land manager or property owner.

Suggestions:

a. Provide as exact a location as possible; take photos, GPS coordinates; or map the infestation.
b. Use diplomacy if contacting a private landowner.

BMP HTA-10: Volunteer to help control invasive species.

Suggestions:

a. Contact public and private landowners, agencies, and nonprofit organizations to find out about volunteer opportunities.
(See appendix B: Resources for information on control)

BMP HTA-11: Dispose of unused live bait (worms) in garbage container.

Suggestions:

a. If you use earthworms as fishing bait, throw any unused earthworms in the trash, not in the water or on the land (it is illegal to knowingly introduce any exotic species!).
b. Do not transport leaves, mulch, compost, or soil from one place to another unless you are confident that there are no earthworms or their cocoons present.

All bait worms are not native to Wisconsin and can cause serious damage to forest ecosystems.

BMP HTA-12: Incorporate invasive species prevention into planning for special events.

Suggestions:

a. Place cleaning stations at entrance and exit points.
b. Plan travel routes to avoid areas of heavy infestation.
c. Provide participants with informational brochures and other educational materials related to invasive species prevention.
d. Identify invasive species in the area to educate participants.
e. Consider adding a component of removal and proper disposal of invasive species as part of the event.
f. Plan events for proper times of the year to help avoid the spread of invasive species.

BMP HTA-13: Spread the word – help educate others about invasive species and their effects on our environment, economy, and recreational opportunities.

Best Management Practices for Motorized Activities

(BMP Prefix = "M")

Introduction:

Motorized terrestrial recreation refers to the use of snowmobiles, all-terrain vehicles, 4x4 trucks, jeeps, side-by-side utility terrain vehicles, off-highway motorcycles, amphibious machines, golf carts, dune buggies, and all other off-road motorized vehicles used in a nature-based setting. This form of recreation is broadly participated in by individuals, groups, and families. The motorized vehicle recreation sector includes a variety of users including those who are principally interested in the pleasure and thrill of operating the machines, those who use the machines as an integral part of an outdoor recreation experience such as sightseeing and wildlife viewing, and those who use the machines as transportation for their recreation activities such as hunting, camping, trapping, photography, etc. Motorized recreation can be especially beneficial for those who have physical limitations.

Invasive species and motorized recreation:

Invasive species are having a negative effect on the quality and accessibility of recreational lands available for many recreation activities including all forms of motorized terrestrial recreation. Invasive species are eliminating native plant species, changing wildlife habitat, and modifying the appearance and utility of the landscape. Left unmanaged, these threats will contribute to a diminished quality and quantity of outdoor recreation within the state.

- Invasive plants out-compete the native vegetation in the landscape by replacing diverse plant communities with aggressive single (monoculture) species.

- Invasive plants can directly affect human health and activities in many ways. Some produce painful skin burns, while others have sharp spines and thorns that can cause physical discomfort. Toxic berries can cause poisoning. Some allergies are caused by invasive species.

- Economic damage associated with invasive species' impacts and their management is estimated to cost the U.S. $137 billion annually. This cost includes losses in agriculture, fisheries, timber, utilities, overall land productivity, tourism, and recreation.

- Motorized recreationists face the possibility of losing land access due to the concern of the spreading of invasive plants.

- Invasive species take over habitat that supports native wildlife and, potentially, endangered species.

- Vehicles, operators, and passengers have the potential of unintentionally carrying invasive species from one area to another. **Soils, seeds, plant parts, or invertebrates** may cling to gear, vehicles, and clothing.

- Disturbed soils may create favorable conditions for the establishment and spread of invasive plants.

General guidance:
To minimize the introduction and spread of invasive species, motorized recreational users should focus on:

1) Inspecting and cleaning vehicles, equipment, and clothing, 2) staying on established trails and routes, and 3) treading lightly and leaving as little impact on the land as possible.

Best Management Practices:
BMP M-1: Learn to recognize invasive species common to the areas where you enjoy outdoor recreational activities.

Suggestions:

a. Read guides, brochures, and pamphlets produced by government agencies or other weed management groups on invasive plants and invertebrates.
b. Pay attention to signage at infested areas and trailheads, (e.g. "this is a picture of garlic mustard; you will see it along the west side of the trail").
c. Check out the Wisconsin DNR website for photos and instructions. http://dnr.wi.gov/invasives

BMP M-2: Wear outer layers of clothing and footwear that are not "seed-friendly."

Suggestions:

a. In appropriate areas, wear low-tread footwear that doesn't hold soils, seeds, plant parts, or invertebrates.
b. Wear disposable shoe covers over footwear in infested areas; properly dispose of them when leaving the area.
c. Consider dedicating a pair of shoes or boots for use only on infested properties.
d. Wear ankle gaiters over socks and shoe laces.
e. Avoid wearing Velcro, bulky knits (e.g., wool, fleece), pants with cuffs, and other fabrics or clothing styles that can carry seeds.

BMP M-3: Inspect and clean hair, clothing, footwear, and gear for soils, seeds, plant parts, or invertebrates; before and after recreating.

Suggestions:

a. Use items like a stiff brush, stick or small screwdriver to help remove soils, seeds, plant parts, or invertebrates; use boot brushes and other removal devices when provided.
b. Insects like the gypsy moth can move around on motorized vehicles; check for insect egg masses, pupae, and caterpillars of invasive species.
c. Do not clean clothing, footwear, or gear in or near waterways – it may promote the spread of invasive species downstream.
d. Preferred locations for cleaning are those where:
    - Invasive species are already established.
    - Gear is unloaded and loaded.
    - Areas can be easily monitored for new infestations due to the cleaning activity, i.e. along a road, at a trail head, or in a parking lot.

BMP M-4: Prior to moving equipment, vehicles, and trailers onto and off of an activity area, spray, scrape, or brush soils, seeds, plant parts, or invertebrates from exterior surfaces, to the extent practical, to minimize the risk of transporting invasive species

Suggestions:

a. Visit a car wash or cleaning station; be sure to spray the undercarriage of all vehicles.
b. Preferred locations for equipment cleaning areas are those where:
    - Invasive species are already established.
    - Equipment is unloaded and loaded.
    - Areas can be easily monitored for new infestations due to the cleaning activity, i.e. along a road, at a trail head, or in a parking lot.
c. Do not clean equipment, vehicles, or trailers in or near waterways – it may promote the spread of invasive species downstream.

BMP M-5: Inspect and remove soils, seeds, plant parts, or invertebrates, from the coat and feet of animals and their clothing/gear before and after recreating.

Suggestions:

a. Carry a grooming brush, shedding blade, small scissors, hoof knife, etc. to help remove soil and invasive propagules from animals.
b. Do not clean animals in or near waterways – it may promote the spread of invasive species downstream.
c. Preferred locations for cleaning are those where:
    - Invasive species are already established.
    - Animals are unloaded and loaded.
    - Areas can be easily monitored for new infestations due to the cleaning activity, i.e. along a road, at a trail head, or in a parking lot.

BMP M-6: Properly dispose of soils, seeds, plant parts, or invertebrates, found during inspection and cleaning.

Suggestions:

a. Place materials in a bag and send to landfill, where possible.
b. Materials may be composted but only if the compost pile reaches very high temperatures and the finished compost can be monitored for invasive plant seed emergence.
c. Materials may be disposed of in piles; locate the pile in an area that facilitates easy monitoring and control if infestations spread from it.
d. Materials may be burned; locate the burn pile in an area that facilitates easy monitoring and control if infestations spread from it.

BMP M-7: Stay on designated trails, roads, and other developed areas.

Suggestions:

a. Minimize soil disturbance; it may promote invasive plant seed germination and establishment.
b. Destruction of native plants favors invasive species.

c. By venturing into uninfested areas, you may introduce invasive species by carrying propagules.
d. Do not create your own trails on public lands.
e. If wet areas are encountered on established trails, go through them rather than around, if possible.

BMP M-8: When off-trail, avoid areas that appear to be infested with invasive species; "when in doubt, stay out!"

Suggestions:

a. The chances of transporting soils, seeds, plant parts, or invertebrates increase in areas of heavy infestation or when seeds are present.
b. Direct contact with some invasive species can affect human and animal health, including skin and eye irritation.

BMP M-9: Report infestations of invasive species to the appropriate land manager or property owner.

Suggestions:

a. Provide as exact a location as possible; take photos, GPS coordinates, or map the infestation.
b. Use diplomacy if contacting a private landowner.

BMP M-10: Volunteer to help control invasive species.

Suggestions:

a. Contact public and private landowners, agencies, and nonprofit organizations to find out about volunteer opportunities.
(See appendix B: Resources for information on control)

BMP M-11: Minimize soil displacement from the trail/roadway and soil degradation outside the traveled portion; disturbed soils may create favorable conditions for the establishment and spread of invasive plants.

Suggestions:

a. Avoid sudden stops and quick directional changes with acceleration or braking.
b. Stay on the trail/roadway to not widen it so there is little or no compaction or impact outside the trail/roadway.
c. In the winter, ride only when there is adequate snow cover and when the trail is firm or frozen.

BMP M-12: Incorporate invasive species prevention into planning for special events.

Suggestions:

a. Place cleaning stations at entrance and exit points.
b. Plan travel routes to avoid areas of heavy infestation.
c. Provide participants with informational brochures and other educational materials related to invasive species prevention.
d. Identify species in the field to educate participants.

e. Consider adding a component of removal and proper disposal of invasive species as part of the event.
f. Plan events for proper times of the year to help avoid the spread of invasive species.

<u>BMP M-13:</u> Spread the word – help educate others about invasive species and their effects on the environment, economy, and recreational opportunities.

Best Management Practices for Pedestrian-based Activities

(BMP Prefix = "P")

Introduction:

The category of "pedestrian recreation" encompasses a range of outdoor recreational activities in which participants travel on foot (or using a device to assist with foot travel) from one place to another. Travel may take place on or off trail and occurs mostly as a single-day event (i.e. would not involve camping).

Examples of pedestrian recreation include walking, sightseeing, hiking, backpacking, and running, sometimes using assistive devices like wheelchairs, walkers, and strollers. Other activities include wildlife watching, photography, and picnicking. Pursuits like rock climbing, caving, and gathering of natural foods and other materials, as well as winter sports like cross-country skiing and snowshoeing are also pedestrian forms of recreation.

Participants in these recreational activities are as varied and diverse as their interests. Some hikers, for instance, prefer hard-surfaced trails, while others seek out more rustic and "wild" experiences. Nature photographers and wildlife watchers may travel miles from developed areas, or may find that "perfect shot" along a boardwalk or nature trail. Each recreational user has a unique comfort level and base of experience that will determine the type of opportunities sought by that individual. So, best management practices targeting these user groups must allow for flexibility and diversity of experiences.

Invasive species and pedestrian recreation:

Throughout Wisconsin, invasive species are making recreational on and off trail travel increasingly difficult:

- Invasive plants may overgrow trails and forested areas, making walking, hiking, and other travel difficult.
- Many invasive plants adversely affect human health. Some plants have prickly stems and thorns that cut exposed skin, while others produce chemicals that can cause severe skin burns and eye irritations.
- Invasive plants often out-compete native wildflowers and other plants, eliminating photographic and wildlife viewing opportunities.
- Invasive species often lower biodiversity of natural areas, resulting in less healthy ecosystems, loss of wildlife habitat, and reduced quality of recreational experiences.

By definition, people engaged in pedestrian forms of recreation are moving from one place to another, so the potential for spreading invasive species always exists. When people leave established trails and enter natural habitats, this potential increases as the resulting disturbance may favor invasive species:

- Pedestrians may damage native plants and disturb soils, creating favorable conditions for growth of invasive plants.
- **Soils, seeds, plant parts, or invertebrates** may cling to gear or clothing, especially if pedestrians travel from an infested area to a non-infested area.

General guidance:

To minimize the introduction and spread of invasive species, pedestrians should focus on: 1) inspecting and cleaning clothing, footwear, and gear, 2) minimizing disturbance of natural environments by staying on trails and in developed areas when possible, and 3) staying out of heavily infested areas. Becoming familiar with the most common invasive species is critical so that all recreational users can learn to stay out of these "hot spots."

Best Management Practices:

BMP P-1: Learn to recognize invasive species common to the areas where you enjoy outdoor recreational activities.

Suggestions:

a. Read guides, brochures, and pamphlets produced by government agencies or other weed management groups on invasive plants and invertebrates.
b. Pay attention to signage at infested areas and trailheads (e.g. "this is a picture of garlic mustard; you will see it along the west side of the trail").
c. Check out the Wisconsin DNR website for photos and instructions. http://dnr.wi.gov/invasives.

BMP P-2: Wear outer layers of clothing and footwear that are not "seed-friendly."

Suggestions:

a. In appropriate areas, wear low-tread footwear that doesn't hold soils, seeds, plant parts, or invertebrates.
b. Wear disposable shoe covers over footwear in infested areas; properly dispose of them when leaving the area.
c. Dedicate a pair of shoes or boots for use only on infested properties.
d. Wear ankle gaiters over socks and shoe laces.
e. Avoid wearing Velcro, bulky knits (*e.g.*, wool, fleece), pants with cuffs, and other fabrics or clothing styles that can carry seeds.

BMP P-3: Inspect and clean hair, clothing, footwear, and gear for soils, seeds, plant parts, or invertebrates before and after recreating.

Suggestions:

a. Use items like a stiff brush, stick or small screwdriver to help remove soils, seeds, plant parts, or invertebrates; use boot brushes and other removal devices when provided.
b. Wear a hat to cover hair.
c. Do not clean clothing, footwear, or gear in or near waterways; it may promote the spread of invasive species downstream.
d. Preferred locations for cleaning are those where:
    - Invasive species are already established.
    - Gear is unloaded and loaded.
    - Areas can be easily monitored for new infestations due to the cleaning activity, i.e. along a road, at a trail head, or in a parking lot.

BMP P-4: Prior to moving equipment such as strollers, wheelchairs, etc. onto and off of an activity areas, spray, scrape, or brush soils, seeds, plant parts, or invertebrates from

exterior surfaces, to the extent practical, to minimize the risk of transporting invasive species.

Suggestions:

a. If traveling to the site via vehicle, visit a car wash or cleaning station; be sure to spray the undercarriage.
b. Preferred locations for equipment cleaning areas are those where:
    - Equipment is unloaded and loaded.
    - Invasive species are already established.
    - Areas can be easily monitored for new infestations due to the cleaning activity, i.e. along a road, at a trail head, or in a parking lot.
c. Do not clean equipment in or near waterways; it may promote the spread of invasive species downstream.

BMP P-5: Inspect and remove soils, seeds, plant parts, or invertebrates from the coat and feet of animals and their clothing/gear before and after recreating.

Suggestions:

a. Carry a grooming brush, shedding blade, small scissors, hoof knife, etc. to help remove soil and invasive propagules from animals.
b. Do not clean clothing, footwear, gear, vehicles, or animals in or near waterways – it may promote the spread of invasive species downstream.
c. Preferred locations for cleaning are those where:
    - Invasive species are already established.
    - Animals are unloaded and loaded.
    - Areas can be easily monitored for new infestations due to the cleaning activity, i.e. along a road, at a trail head, or in a parking lot.

BMP P-6: Properly dispose of soils, seeds, plant parts, or invertebrates found during inspection and cleaning.

Suggestions:

a. Place materials in a bag and send it to a landfill, where possible.
b. Materials may be composted but only if the compost pile reaches very high temperatures and the finished compost can be monitored for invasive plant seed emergence.
c. Materials may be disposed of in piles; locate the pile in an area that facilitates easy monitoring and control if infestations spread from it.
d. Materials may be burned; locate the burn pile in an area that facilitates easy monitoring and control if infestations spread from it.

BMP P-7: Stay on designated trails, roads, and other developed areas.

Suggestions:

a. Minimize soil disturbance; it may promote invasive plant seed germination and establishment.
b. Destruction of native plants favors invasive species.
c. By venturing into uninfested areas, you may introduce invasive species by carrying propagules.

d. Avoid trails that are wet or muddy. If wet areas are encountered, go through them rather than around, if possible.

BMP P-8: When off-trail, avoid areas that appear to be infested with invasive species; "when in doubt, stay out!"

Suggestions:

a. The chances of transporting soils, seeds, plant parts, or invertebrates increase in areas of heavy infestation or when seeds are present.
b. Direct contact with some invasive species can affect human and animal health, including skin and eye irritation.

BMP P-9: Report infestations of invasive species to the appropriate land manager or property owner.

Suggestions:

a. Provide as exact a location as possible; take photos, GPS coordinates, map the infestation.
b. Use diplomacy if contacting a private landowner.

BMP P-10: Volunteer to help control invasive species.

Suggestions:

a. Contact public and private landowners, agencies, and nonprofit organizations to find out about volunteer opportunities.
(See appendix B: Resources for information on control)

BMP P-11: Unless gathering natural foods or other permitted material, don't pick plants.

Suggestions:

a. Picking plants is prohibited on many public lands.
b. While many invasive plants have attractive blooms, discarded flower or seed heads can spread invasive plant seeds.
c. When processing gathered materials, remove invasive plants and dispose of them properly.
d. Some invasive plants may cause skin and eye irritation.
e. If you are interested in controlling invasive plants, contact the property manager.

Despite their appeal for ornamental purposes, avoid picking plants such as teasel and bittersweet since this provides opportunities to spread these species through discarded plant parts and seeds.

BMP P-12: Incorporate invasive species prevention into planning for special events.

Suggestions:

a. Place cleaning stations at entrance and exit points.
b. Plan travel routes to avoid areas of heavy infestation.
c. Provide participants with informational brochures and other educational materials related to invasive species prevention.
d. Identify species in the field to educate participants.
e. Consider adding a component of removal and proper disposal of invasive species as part of the event.
f. Plan events for proper times of the year to help avoid the spread of invasive species.

BMP P-13: Spread the word – help educate others about invasive species and their effects on our environment, economy, and recreational opportunities.

Best Management Practices for Land Management

(BMP Prefix = "LM")

Introduction:

Recreational lands in Wisconsin fall under a broad spectrum of ownerships: federal, tribal, state, county, municipal, private, business/industry, and non-profits. On some sites, recreational use is subordinate to a different overall, e.g., silviculture. Land managers may include landowners, employees of the landowner, contractors, agency employees, and volunteers.

With over 85% of Wisconsin's land in private ownership, landowners and their designated land managers are the key to protecting the state's valuable natural habitats from threats like invasive species. For instance, the Wisconsin DNR estimates that approximately 90% of rare species have populations on private land. Working cooperatively and supporting private landowners' efforts to manage and restore habitats for these at-risk species is essential to protecting biodiversity in Wisconsin.

To manage the threat of invasive species, land managers may voluntarily consider a three-tiered approach: 1) planning; 2) operations and maintenance; and 3) information and education. Planning may include developing a management plan, conducting inventories, and monitoring. Operations and maintenance relates to management activities on developed and undeveloped lands. Education and information targets recreational users, staff, volunteers and local communities with messages related to invasive species identification, impacts, and spread prevention.

What are Invasive Species?

Invasive species are plants, animals and pathogens that are "out of place." A species is regarded as invasive if it has been introduced by human action to a location, area, or region where it did not previously occur naturally (i.e. is not native), becomes capable of establishing a breeding population in the new location without further intervention by humans, and spreads widely throughout the new location.

One of the reasons that invasive species are able to succeed is that they often leave their predators and competitors behind in their native ecosystems. Without these natural checks and balances, they are able to reproduce rapidly and out-compete native species.
Invasive species can alter ecological relationships among native species and can affect ecosystem function, economic value of ecosystems, and human health.
Two of the most important concepts to consider include limiting the spread and reducing impacts. Limiting the spread of invasive species means working to contain an infestation within a defined area. Preventive measures may include restricting activities and minimizing travel through infested areas, especially during certain times of year. Other voluntary practices like inspecting clothing and equipment may also limit the spread of invasives. Reducing impacts implies that if control and containment methods fail to manage an infestation, a final option may be to reduce the impact on native species and the ecosystem.

Through this method, the focus shifts from managing invasive species populations to preserving native species.

Invasive species and land management:

Land managers often find that their ability to meet site management goals and users' needs is inhibited, if not prevented, by the presence of invasive species. For example, thorny shrubs may limit access by hikers, bikers, and hunters. Invasive shrubs in the understory may inhibit forest regeneration. Furthermore, invasive species control efforts may divert resources from other property management and development activities.

Land management and invasive species control efforts can be complicated when recreational users, equipment, and property staff inadvertently spread seeds, soil, and propagules from infested sites to uninfested sites. Failure to promptly address new infestations of invasive species as soon as detected can potentially lead to a greater resource drain in the future.

A propagule *(prŏp' ə gyool) is 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 invertebrates this may be an egg, larva, pupa, or adult. In forest diseases, this may be a spore, mycelial fragment (similar to roots), or fruiting body.*

General guidance:

Land managers should attempt to voluntarily limit the introduction and spread of invasive species. They may incorporate voluntary invasive species monitoring and management into their standard operations, set specific goals and objectives for their control, and provide guidance and infrastructure necessary to limit the impact of recreational users.

The goal of the BMPs is to minimize the risk of transporting soils, seeds, plant parts, or invertebrates. To EMPHASIZE and minimize the introduction and spread of invasive species, land managers may focus on:

1. **Planning** for invasive species management.
2. Incorporating invasive species management into all **operations and maintenance** property activities.
3. **Informing and educating** users, staff, and volunteers.
4. **Monitoring** may detect new invasions of invasive species.

Best Management Practices for Recreational Land Managers

The following best management practices are intended to help land owners and land managers reduce the likelihood of invasive species introductions and control the effects of invasive species that may arrive despite their best efforts.

1. Information and Education

BMP - LM1. Provide training in identification and control of known invasive species to employees, contractors, users, and volunteers.

BMP - LM2. Inform and educate the general users in the area about common invasive species, their impacts, and ways to prevent their introduction and spread.

BMP - LM3. Post invasive species messages, posters, and prevention strategies at prominent locations on the property; provide informational materials directly to recreational users.

2. Planning

BMP - LM4. Assess the extent of invasive species on and near the property by scouting, locating, and documenting infestations.

BMP - LM5. Develop a prioritized action plan for managing invasive species on the property based on threats to the property and feasibility of control.

BMP - LM6. In planning for all activities on the property, work to limit the potential introduction and spread of invasive species.

BMP - LM7. Assess current available resources and seek new resources to control invasive species spread.

3. Operations and Maintenance Activities

BMP - LM8. Avoid using invasive plants.

BMP - LM9. Ensure that invasive species control treatments are applied safely and within the appropriate time window.

BMP - LM10. Take steps to minimize the movement of invasive species to non-infested areas during operation and management activities.

BMP - LM11. Prior to relocating equipment, vehicles and trailers be sure to spray, scrape or brush soil and debris from exterior surfaces to the extent possible.

BMP - LM12. Properly dispose of soil, seeds, plant parts or invertebrates found during inspection and cleaning.

BMP - LM13. Consider the likely response of invasive species when prescribing land management activities that result in disturbance such as soil, increased sunlight, fire, etc.

BMP - LM14. Ensure to the extent practical, that construction and maintenance materials (mulch, gravel, topsoil, etc.) are free of invasive species.

BMP - LM15. Minimize soil disturbance and quickly revegetate disturbed soils; whenever possible, promote and retain native vegetation.

4. Monitoring

BMP - LM16. Monitor each site following management activities; determine necessary treatments based on presence of invasive species.

What is a Suggestion?

Following each BMP are voluntary suggestions that will assist property owners and land managers in implementing the best management practices for invasive species. Suggestions are intended to provide additional information and guidance on the voluntary practices of the BMPs.

1. INFORMATION AND EDUCATION

BMP LM-1: Provide training in identification and control of known invasive species to employees, contractors, users, and volunteers.

Suggestions:

a. Include training on identification, control methods, and prevention techniques.

b. Provide information about where to report sightings of invasive species and locations of new infestations.
c. Encourage prevention and control as part of land stewardship activities.
d. Present targeted messages during peak recreational use seasons.
e. Provide incentives for users, volunteers, and employees to support invasive species control and management goals; recognize those who contribute to these efforts.

BMP LM-2: Inform and educate the general users in the area about common invasive species, their impacts, and ways to prevent their introduction and spread.

Suggestions:

a. Provide information on identification of invasive species common to the property; include the potential ecological, economic, and social impacts of these species, along with concerns related to user health and safety.
b. Include links to partners like Cooperative Weed Management Areas, resource agencies, and conservation organizations.
c. **See Appendix B: for list of resources.**
d. Consider the potential of materials that are removed from the property (i.e. sand and gravel, hay, firewood, timber sales) as a source of spread and take appropriate action

BMP LM-3: Post invasive species messages, posters, and prevention strategies at prominent locations on the property; provide informational materials directly to recreational users.

Suggestions:

a. Include guidelines on the prevention of invasive species spread and information on the potential impacts within recreation permits, property maps, entrance stickers, licenses, and other materials provided directly to users.
b. Post informational signs at public areas (trailheads, campgrounds, picnic areas, boat launches, etc.) and locations where invasive species management efforts are being implemented; explain impacts, control methods, and spread prevention strategies.
c. Install prevention equipment like boot brushes and washing stations, along with informational signs, at trailheads, boat launches, and other key use areas.
d. Use plantings around public areas to demonstrate appropriate use of native plants; see **Appendix B: for additional resources and information.**

Firewood has the potential to spread many destructive invasive species, both known and as yet, unknown. Confirmed threats include: emerald ash borer, butternut canker, white pine blister rust, and oak wilt.
Firewood is often stored unused for long periods of time and is handled by people generally not trained to notice signs of invasive pests. Once established in new areas, invasive forest pests can quickly kill trees in forests, parks, communities, and campgrounds.

2. PLANNING

Since dealing with invasive species is a long term effort and can be very time-consuming and expensive, it is important that objectives are pursued to the extent practical through planned actions. Evaluating the threats posed by invasive species and determining ways to reduce their impacts are important considerations in any planning efforts. Planning includes property-based planning as well as activity based planning.

Property Planning

Property planning can be completed for any land and will provide the foundation and long-term goals for its management. Planning considers the rationale for various aspects of land management, including sustaining plant and animal communities and providing recreational opportunities. By evaluating the potential risk of invasive species, landowners and managers can more effectively protect the viability of their property.

BMP LM-4: Assess the extent of invasive species on and near the property by scouting, locating, and documenting infestations.

Suggestions:

Knowing which invasive species are present, and where, is the first piece of information needed to evaluate the risks. There are several steps to consider when scouting for invasive species:

a. Scout for invasive species at probable introduction sites such as access points, trails, campsites, and other disturbed areas.
b. Document occurrences in a manner consistent with property practices.
c. When planning for a specific management activity on the property, scout both within and around the activity area.
d. Be aware of the species that are not common and require early detection and rapid response.

Early Detection and Rapid Response

Since the chances of controlling an invasive species are greatest immediately after introduction, early detection and rapid response are an important part of managing invasive species.

Early Detection uses a comprehensive surveillance system to locate new populations of invasive species early when control is still feasible and less costly. Detection targets a) areas where introductions are likely, such as access points and travel corridors, b) areas with high ecological value, and c) vulnerable habitats or recently disturbed areas.

Rapid response is a systematic effort to contain and control invasive species while the infestation is localized. Having a prioritized management plan will provide the most effective, organized, and efficient response to a new introduction or infestation.

<u>BMP LM-5:</u> Develop a prioritized action plan for managing invasive species on the property based on threats to the property and feasibility of control.

<u>Suggestions:</u>

When developing an invasive species management plan, consider the following:

a. Which invasive species are currently present on the property? How are they impacting land management objectives? Use the Decision Guide to assess the threat and determine the steps to take.
b. What resources do you have available to control invasive species? Identify key staff and volunteers, budget, and equipment.
c. How will you prioritize your efforts? Consider the following order: 1) early detection of invasive species; 2) control of small, isolated populations; 3) protection of high-quality areas with few invasive species; 4) management of high-use areas that may be a source of further infestations.
d. What specific goals do you have for controlling invasive species present on the property? Sample goals might include:
    - Reduce abundance of host species or habitat by increasing vegetative diversity and maintaining a healthy forest understory.
    - Revegetate disturbed areas with desirable native plants
    - Use regular monitoring and early detection to identify and control small populations of invasive species.
    - Use appropriate methods to prevent the introduction of soil, seeds, pests, and propagules into uninfested areas.
e. How will you educate and inform recreational users, staff, contractors, and volunteers on invasive species including identification, impacts, and prevention?
f. **Reference the Decision Guide at the end of the Land Management BMPs.**

<u>Activity Planning</u>

Once established, invasive species may proliferate, even with targeted management activities. In many cases, skillful execution of routine management activities may help to minimize and reduce the threat of some invasive species. An "activity," for purposes of this document, may include any practice that influences vegetation, soils, or other habitat conditions.

Activity planning can occur on properties of all sizes and within all types of ownership. Planning should include scouting to identify current invasive species infestations, evaluation of risk, and modification of management activities to reduce the potential for their spread.

<u>BMP LM- 6</u>: In planning for all activities on the property, work to limit the potential introduction and spread of invasive species.

<u>Suggestions</u>:

For each specific management activity undertaken, first scout and map any invasive species present. Then conduct a risk assessment; consider threats to the property and identify options for managing invasive species.

a. What impacts do invasive species have on management objectives?
    - Some invasive species have relatively low impacts due to their low level or temporary/cyclic nature. It may be a low priority to manage these species. Other species can be extremely damaging, causing severe ecological, economic, and social impacts.

b. Select non-invasive species for seed mixes and plant materials used in land management projects.
    - Avoid purchasing or gardening with plants that are known to be invasive.
    - Plant native plants. This will support native plant populations and provide habitat for birds, beneficial insects, and other wildlife. Native plants are also easier to garden with because they require less watering, fertilization, and pest control.
    - The majority of non-native, invasive plants were introduced as garden ornamentals. As a land manager or landowner, you can help prevent the introduction of new invasive plant species and help control the spread of existing infestations.
    - Is control of invasive species feasible?
    - Controlling invasive species may be difficult, time consuming and expensive: consider control options and costs, as well as the impacts of not taking action.

c. How can you time the activity to maximize effectiveness of control efforts and minimize potential for spread?
    - Consider the need for invasive species control efforts and determine whether planned control efforts should occur before, during, or after the primary activity.
    - If pre-treatment of invasive species is necessary, postpone activity until the infestation can be treated. Effective pre-treatments sometimes need to occur one to two years prior to the activity.
    - Consider seasonal timing options to minimize the spread of invasive species, while still achieving management objectives.

d. Minimize soil disturbance.
    - Avoid disturbing natural vegetation by maintaining wide buffers around sensitive areas.
    - If possible avoid soil removal or disturbance; plan the project or activity to keep such disturbances to the absolute minimum.
    - Consider alternatives that may have fewer impacts.

Control

Early detection and rapid response may allow for the elimination of some invasive populations at the site level. However, when populations are large and resources are limited, a more realistic management goal is to control the invasive species by reducing their populations to levels that will allow native species to thrive. Control programs are usually ongoing and can include manual, mechanical, chemical, biological, and cultural components. Property owners and land managers should evaluate their site and life cycle characteristics of the invasive species to determine which control methods will be the most effective and economical while minimizing negative environmental impacts.

BMP – LM- 7: Assess current available resources and seek new resources to control invasive species spread.

Suggestions:

a. Available resources include facilities, equipment, finances, and human resources.
b. Identify local and regional partners, such as Cooperative Weed Management Areas, with whom you may collaborate and share resources.
c. Identify individuals or groups with a primary focus on invasive species; if these are volunteers, provide staff support and ways to sustain their commitment.
d. Access information on grants, funding, and organizations online.
e. See Appendix A, B, and C: for additional information

Cooperative Weed Management Areas
A Cooperative Weed Management Area (CWMA) is a partnership of government organizations, agencies, tribes, individuals, and various interest groups that manage invasive plants within a defined area.

3. OPERATIONS AND MAINTENANCE ACTIVITIES

As landowners and managers work to manage and develop their properties and the spectrum of recreational opportunities they offer, invasive species management can be integrated with daily operations.

Managers can implement the prioritized invasive species management plan, initiating control efforts and considering spread prevention and control in the property's normal management activities.

BMP LM - 8: Avoid planting invasive species.

Suggestions:

a. See lists of invasive plants in **Appendix B: Resources**
b. Whenever possible, promote and retain native vegetation.
d. Select plant materials that are site appropriate, healthy, and not prone to pests and diseases.
e. Site appropriate species are those that are suited to the climate, microclimate and soil type, texture and moisture where they are to be planted.
f. Recognize that non-native earthworms, invasive pests and invasive plant propagules may inhabit the soil associated with the planting stock.

BMP LM - 9: Ensure that invasive species control treatments are applied safely and within the appropriate time window.

Suggestions:

a. Consider life history of target invasive species in relation to timing of control methods **(See Appendix E: for a sample "Identifying Time Window for Invasive Species Management").**
b. Mow infested areas prior to seed formation to reduce further spread. **(See Appendix D: Mowing Guidance).**
c. Allow time and resources for post-treatment follow-up control measures, due to persistent seed bank and resprouting for several years.
d. For disposal in urban areas, invasive plants may be sent to a landfill if marked ***"Invasive Species, approved by WDNR for landfills"***
e. Consider the need for invasive species control efforts and determine whether planned control efforts should occur before, during, or after the primary activity.
f. If pre-treatment of invasive species is necessary, postpone activity until the infestation can be treated. Effective pre-treatments sometimes need to occur one to two years prior to the activity.
g. Consider seasonal timing options to minimize the spread of invasive species, while still achieving management objectives.

BMP LM- 10: Take steps to minimize the movement of invasive species to non-infested areas during operation and management activities.

Suggestions:

a. Mow infested areas prior to seed formation to reduce further spread. **(See Appendix D: Mowing Guidance)**
b. Consider excluding infested areas from travel corridors.
c. Carry out work under conditions that minimize the risk of spread, e.g., frozen ground, snow cover, absence of seeds/propagules, etc. **(See Appendix E: for a sample "Identifying Time Windows for Invasive Species Management" chart).**
d. Clean equipment when moving from infested to non-infested areas.
e. Avoid placing fire breaks within infestations of invasive species. If invasive species that are present are promoted by fire, exclude the area of infestation from the burn unit when feasible.
f. If the invasive species that are present are controlled by fire, incorporate the area of infestation into the burn unit when feasible.
g. Use existing natural and man-made fire breaks (lakes, streams, roads, and trails, etc.) when possible.
h. If existing roads are infested with invasives, treat before using them.
i. In areas with infestations, consider temporarily closing or rerouting roads or trails. Where appropriate, ask user groups to become actively involved and help control an infestation so the trail can be reopened.
j. For road, trail, or landing closures, erect barriers such as gates, berms, or boulders and post signs stating the length of time and reason for closure.
k. If necessary, close facilities to carry out invasive species management.
l. Consider the potential of materials that are removed from the property (i.e. sand and gravel, hay, firewood, timber sales) as a source of spread and take appropriate action

BMP LM- 11: Prior to relocating equipment, vehicles and trailers be sure to spray, scrape or brush soil and debris from exterior surfaces to the extent possible.

Suggestions:

a. Visit a car wash or cleaning station; be sure to spray the undercarriage of all vehicles.
b. Preferred locations for cleaning are those where:
    - Invasive species are already established.
    - Equipment is unloaded and loaded.
    - Areas can be easily monitored for new infestations due to the cleaning activity, i.e. along a road, at a trail head.
c. To limit the spread of invasives downstream, do not clean equipment, vehicles, or trailers in or near waterways.

BMP LM -12: Properly dispose of soil, seeds, plant parts or invertebrates found during inspection and cleaning.

Suggestions:

a. Contain whatever is being disposed; cover trailers, use heavy bags, etc.
b. Place materials in a bag and send to landfill, where possible. Contact your local solid waste authority for details.
c. Materials may be composted but only if compost pile temperature reaches very high temperatures and the finished compost can be monitored for weed emergence.
d. Materials may be disposed of in piles. Locate the pile in an area that facilitates easy monitoring and control if infestations spread from the pile.
e. Materials may be burned. Locate the burn pile in an area that facilitates easy monitoring and control if infestations spread from the pile.
f. When chipping ash logs or brush, be sure the chip size is less than ½- inch. See current state guidance: http://www.emeraldashborer.wi.gov/articleassets/MulchAndChipsEAB-CA-WI.pdf.

BMP LM-13: Consider the likely response of invasive species when prescribing land management activities that result in disturbance such as soil, increased sunlight, fire etc.

Suggestions:

a. Ground disturbance may uproot existing vegetation and expose soil, creating a seedbed for invasive plants that can overwhelm native vegetation.
b. Soil disturbance, when combined with aggressive follow-up control measures, may be used to control invasive species within infested areas by depleting the seed bank.
c. After a soil disturbance, encourage prompt regeneration of desirable vegetation to limit introduction of invasive plants.
d. After a soil disturbance, monitor the area and treat new invasive plant infestations.
e. Following a prescribed burn, restore or rehabilitate disturbed areas.

BMP LM-14: Ensure, to the extent practical, that construction and maintenance materials (mulch, gravel, topsoil, etc.) are free of invasive species.

Suggestions:

a. Use on-site materials when possible.
b. Keep stockpiled material free of invasive species.
c. Cover exposed piles of soil or construction materials with plastic sheeting.
d. Mechanically disturb piles to prevent growth of invasives.
e. Use soil and aggregate sources from areas that are free of invasive species.
f. Avoid infested source material or treat it to remove invasive species prior to use.
g. If using half- or full-logs from on-site, remove bark when possible.
h. Use weed-free oat or wheat straw or hay for mulch where available; "marsh hay" may contain reed canary grass. For more information on certified weed-free materials visit: http://hayandforage.com/links/hay/weed-seed-free-programs/.

BMP LM-15: Minimize soil disturbance and quickly revegetate disturbed soils; whenever possible, promote and retain native vegetation.

Suggestions:

a. Avoid planting invasive species.
b. In areas where invasive species are known to be in the seed bank, treat invasives before revegetating.
c. A non-persistent cover crop like annual rye or oats can be used to temporarily stabilize the soil, discouraging the establishment of invasive species and allowing native species to re-colonize.
d. Revegetate or restore depending on site conditions.
e. Use weed-free, locally appropriate seed mixes where available.
f. Stockpile displaced topsoil and native plants for future use on the same site.
g. If conditions permit, allow native plants to recolonize disturbed sites.

Monitoring

Monitoring sites after activities may detect new invasions early and evaluate the success of invasive species control efforts. Monitoring inspections can be integrated with other activities like forestry surveys and should be kept as simple as possible to meet invasive species management objectives. While monitoring sites for known invasive species, landowners and managers should be alert for emerging invasive threats like the emerald ash borer, gypsy moth, and other species that may move into the area.

BMP LM-16: Monitor each site following management activities; determine necessary treatments based on presence of invasive species.

Suggestions:

a. Conduct periodic inspections of each site following a management activity. Anticipate response of invasive species to activities and check for new infestations or the spread of existing populations.
b. Determine appropriate control measures to respond to new infestations or spreading populations; continue monitoring.

c. The area where the activity occurred should be monitored on a regular basis several times a year. Consider assigning monitoring for invasives to one staff person or volunteer.
d. Encourage land managers to increase monitoring by involving volunteer groups.
e. See Appendix B: Resources.

Beyond Invasive Species Control: Ecological Restoration

Invasive species removal and control is only a small part of overall invasive species management. Restoring a healthy ecosystem is the ultimate goal of invasive species programs. Returning native communities to a site that has been cleared of invasives reduces the risk of future invasions and, in the long run, the need for active control.

There are several steps in planning and carrying out a successful restoration:
- determine what type of native community is appropriate
- determine goals for the project and measures of success
- determine whether site conditions will need to be changed and how the site will be prepared and planted
- set a timeline, project budget, and a list of materials and contractors
- develop a plan for monitoring the site and conducting follow-up management activities.

Invasive Earthworms

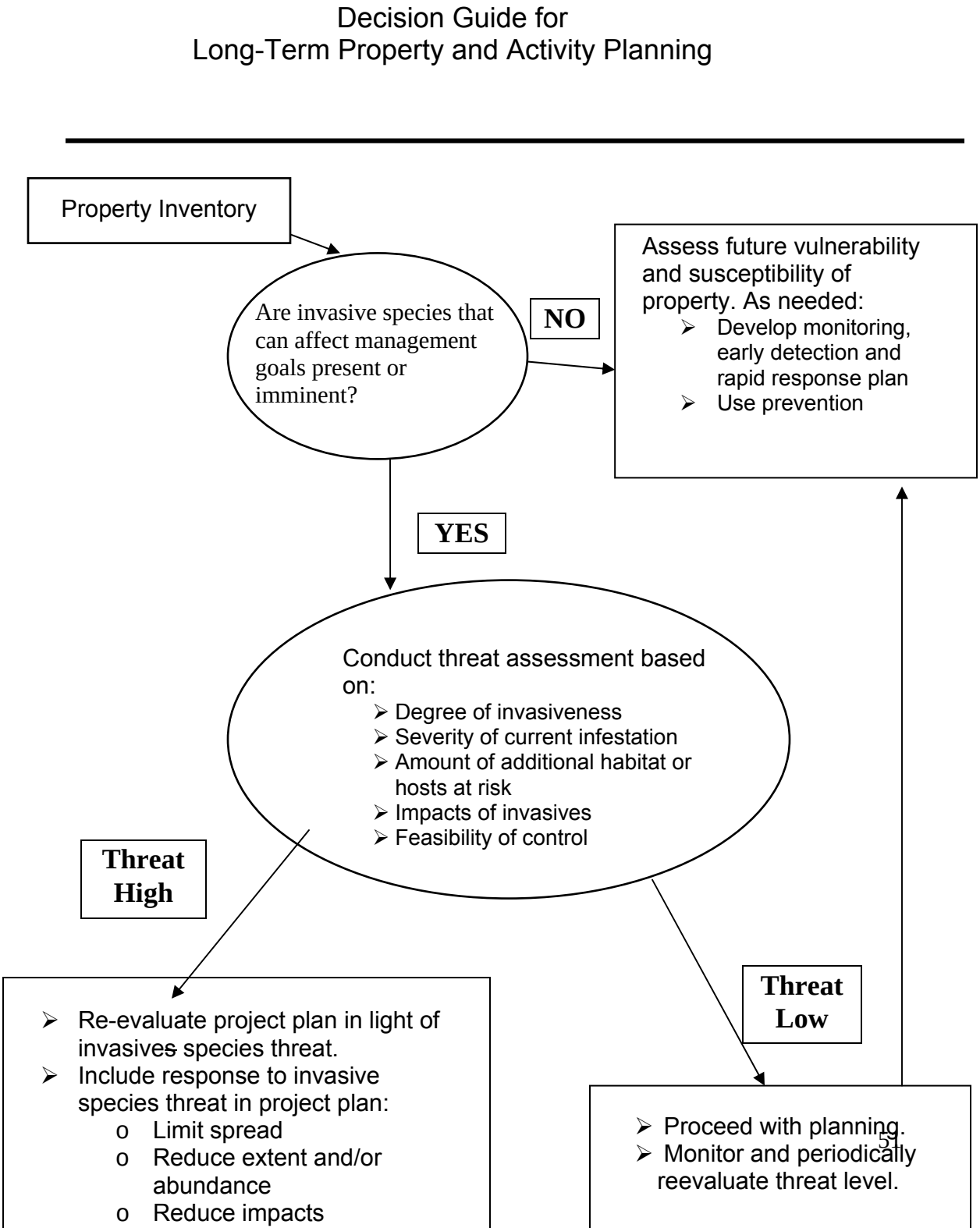
Earthworms are not native to the Great Lakes Region. There were no native earthworms in the area after the last glaciation. The current population, brought here by early Europeans and being spread in bait, soil, gravel, and mulch, is slowly changing the face of our native forests and recreational lands.

To be sure, it's a slow-motion invasion: Many worms spread just half a mile every century. But they are now so numerous and widespread that they are dramatically changing the forest ecosystem, devouring a layer of the forest floor that native wildflowers, beetles, and other species need to survive.

Consider postings signs:
DO NOT DUMP BAITWORMS IN THE WATER OR ON THE GROUND. PUT THEM IN THE TRASH OR HOME COMPOST.

Learn more by exploring these links:
http://www.wormpost.com/worms/biology.html
http://cfhe.cfans.umn.edu/projects/leadingedge.html

(See Appendix E: for a sample "Identifying Time Windows for Invasive Species Management" chart).



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 labor intensive and thus not economically feasible.

Mechanical control techniques include hoeing, cutting, girdling, tilling, mowing, chopping and constructing barriers using tools or machines. These techniques are most useful in areas with large infestations where terrain 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, and not all of them will be appropriate for every situation. The choice of pesticide depends on the target population, stage of growth, the presence of desirable species that may be affected, the proximity of water resources and environmental conditions. Additionally, there may be some areas where chemical control is inappropriate, for example if rare species are present. Pesticides must always be applied in accordance with the label. Landowners 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. Major invasive plant infestations may require complete stand removal, using herbicides to remove the invasives after harvest, and establishing a plantation of native tree species.

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 that they will remain specific to the target population, and will not harm native species, crops, or other ornamental species. Biological control typically does not eliminate the invasive species, and usually takes several years to show results. However, biological control has been effective for some species. Examples include the *Galerucella* beetle which has been used with some success to control the European perennial purple loosestrife (*Lythrum salicaria*), and two species of parasitic wasp (*Agathis pumila* and *Chrysocharis laricinellae*) which were introduced to control larch casebearer (*Coleophora laricella*) infestations in tamarack.

Cultural Control is the manipulation of forest structure and composition to control invasive species or the alteration of the stand so that effects will be limited if invasion occurs. Trees that are potentially susceptible host species can be reduced as a component of the stand, thus limiting population outbreaks of insects and disease-causing organisms. Alternately, species that are resistant to invasive insects and diseases may be planted instead of nonresistant species. Other examples of cultural control activities include maintaining a level of canopy closure that impedes shade intolerant invasive species, or developing advanced regeneration that can compete with invasive plants before removing the overstory. For drastically disturbed sites, cultural control may include the replacement or restoration of the plant community through cultivation—cutting, tilling, re-seeding, fertilizing, and irrigating—to reduce the weed seed bank prior to planting desirable species and prevent or reduce future weed infestations.

APPENDIX B: RESOURCES

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.

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.

Invasive Insects and Diseases

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.

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/ 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/ 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://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.

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 Initiative. http://tncweeds.ucdavis.edu This web site 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, and 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.

General Sites of Interest

University of Wisconsin Extension. http://www.uwex.edu/locations/ The 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.

Wisconsin Department of Natural Resources (WDNR). List of Native Plant Nurseries and Restoration Consultants in Wisconsin.
http://dnr.wi.gov/org/land/er/plants/nurseries.htm#Booming The list includes nurseries within 100 miles of Wisconsin that may be able to provide native seed and/or plants for your projects. Consultants provide services such as design, landscape installation, and maintenance services including prescribed burning.

Wisconsin Department of Natural Resources (WDNR). State Nursery Program.
http://dnr.wi.gov/forestry/nursery/ The DNR operates three forest tree nurseries: the Wilson State Nursery in Boscobel; the Griffith State Nursery in Wisconsin Rapids; and the Hayward State Nursery in Hayward. Trees are sold for reforestation, wildlife habitat, and erosion control purposes.

Wisconsin Family Forests (WFF). http://www.wisconsinfamilyforests.org/
This organization is a non-profit that works with professional wildlife managers, foresters and experienced woodland owners who act as advisors to other forest owners.

Wisconsin Forest Management Guidelines (PUB-FR-226 2003).
http://www.dnr.state.wi.us/forestry/publications/Guidelines/toc.htm
The Guidelines serve as a practical reference guide to responsible resource management.

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.

Wisconsin Woodland Owners Association (WWOA). http://wisconsinwoodlands.org
This organization is a nonprofit educational organization established to advance the interests of woodland owners and the cause of forestry, develop public appreciation for the value of Wisconsin's woodlands and their importance in the economy and overall welfare of the state, foster and encourage wise use and management of Wisconsin's woodlands for timber production, wildlife habitat and recreation, and educate those interested in managing Wisconsin's woodlands.

General Invasive Plant Management (Control Methods)

Center for Invasive Plant Management (CIPM)—Weed Control Methods.
http://www.weedcenter.org/management/control.htm
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.
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 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. Available for purchase at www.ipaw.org.

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.

The Nature Conservancy (TNC)—Weed Control Methods Handbook: Tools and Techniques for Use in Natural Areas. http://tncweeds.usdavis.edu/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/
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

Wisconsin Department of Natural Resources (WDNR). Wisconsin Manual of Control Recommendations: Ecologically Invasive Plants.
http://www.dnr.state.wi.us/invasives/pubs/intro.htm

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.

Grazing:

University of Idaho Rangeland Ecology and Management. Targeted Grazing: A Natural Approach to Vegetation Management and Landscape Enhancement.
http://www.cnr.uidaho.edu/rx-grazing/Handbook.htm The handbook outlines the basics of applying targeted grazing for vegetation management. This handbook includes 18 chapters and represents a compilation of the latest research on harnessing livestock to graze targeted vegetation in ways that improve the function and appearance of a wide variety of landscapes.

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 Plant 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/management/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/databas/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.

Appendix C – Financial assistance for controlling invasive species

Invasive Plants

Wisconsin Landowner Grant Program (WFLGP)
WFLGP is a state program administered by the WDNR Division of Forestry. It provides $1,250,000 annually for stewardship practices on private lands. A wide array of practices are eligible for cost sharing including management plan development, wetland restoration, tree planting, forest improvement, and prairie restoration. Up to 50% of the eligible costs can be refunded to the landowner upon completion of the work. The maximum cost share amount is currently set at $10,000 per year. Landowner Grant applications are accepted continuously but processed only four times a year - February 1, May 1, August 1 and November 1. Applications are funded on the basis of priority. Plan development, afforestation, reforestation and timber stand improvement are top priorities while the remaining practices are secondary. For more information, go to:
http://dnr.wi.gov/forestry/private/financial/#costshare.

Conservation Reserve Program (CRP)
CRP is a federal program administered by the Farm Service Agency (FSA) with NRCS and DNR providing technical advice. It is an annual payment program based on bids submitted by the landowner, offering a 50% cost-share for establishing ground cover and agreeing not

to farm the land. Cost sharing is available for plan preparation, tree planting, wildlife planting, grass establishment, erosion control structures, and stream buffers. For more information, go to: http://www.wi.nrcs.usda.gov/programs/crp.html.

Cooperative Forest Health Management Program
This is a US Department of Agriculture grant and partnership program to fund weed management activities on state and private forest lands. Eligible entities include Cooperative Weed Management Areas, states, and non-profit organizations. This program requires a 50% match. For more information contact Rob Mangold at (703) 605-5340 or rmangold@fs.fed.us.

Environmental Quality Incentives Program (EQIP)
EQIP is a federal program administered by the NRCS, with DNR Forestry providing technical advice for forested lands. This program provides up to a 75% cost share, with 65% of funds allocated to priority areas and the remainder available statewide. Contracts are for five or ten years. Maximum cost shares set by the program are currently $10,000 annually and $50,000 per contract. Cost sharing is available for tree planting, ecosystem management including prescribed burning and brush management, erosion control, agricultural waste management, and stream buffers. For more information, go to: http://www.wi.nrcs.usda.gov/programs/eqip.html.

Wildlife Habitat Incentives Program (WHIP)
WHIP is a federal program administered by the NRCS, with NRCS and DNR Fisheries and Wildlife providing technical advice. WHIP provides 75% cost share for items proposed in a five or ten year contract. The maximum cost share per year is $10,000. Cost sharing is available for wildlife planting, grass establishment, fencing, prescribed burning, farmstead shelterbelts, and wildlife practices that include nesting habitat, vegetation management, tree and shrub planting, creation of openings, and wildlife corridors. For more information, go to: http://www.wi.nrcs.usda.gov/programs/whip.html.

Forest Land Enhancement Program (FLEP)
FLEP was authorized by the 2002 Farm Bill, but was not re-funded in 2004, so funding under this program is not currently available. It replaced the Stewardship Incentives Program (SIP) and the Forestry Incentives Program (FIP). FLEP provided technical, educational, and cost share assistance to non-industrial private forest landowners. There is a possibility that it may be reauthorized in future Farm Bills.

Landowner Incentive Program (LIP)
LIP is funded by the U.S. Fish and Wildlife Service and administered by the DNR Bureau of Endangered Resources. The program helps private landowners by providing financial and technical assistance to manage and restore habitat for at-risk species on their land. At-risk species include rare and declining plants and animals in Wisconsin such as those that are listed as endangered or threatened, special concern or species of greatest conservation need. LIP provides up to 75% of the project cost for eligible projects. The maximum cost share is $25,000. Potential projects include conducting prescribed burns, planting native vegetation, and controlling invasive and woody species. For more information, go to: http://dnr.wi.gov/org/land/er/wlip/.

Plant Materials Program

State Wildlife Grant
The State Wildlife Grants program is designed to assist states by providing federal funds for developing and implementing programs that benefit wildlife (including fish and invertebrates) and their habitats. This funding is intended to supplement, not duplicate existing fish and wildlife programs. Funding in the program is provided for species with the greatest conservation need, species indicative of the diversity and health of the state's wildlife, and low and declining populations as deemed appropriate by the state's fish and wildlife agencies. For more information, go to: http://dnr.wi.gov/org/land/er/swg/.

Partners for Fish and Wildlife (U.S. Fish & Wildlife Service)
The Partners for Fish and Wildlife (PFW) program provides technical and financial assistance to private landowners who voluntarily restore wetlands and other fish and wildlife habitats on their lands. A dollar-for-dollar cost-share, although not a program requirement, is sought on a project-by-project basis. Up to 100-percent funding for habitat restoration projects is available through the Service and its partners. Landowners agree to maintain the restored habitats for no less than 10 years, but otherwise retain full control of their lands. For more information, go to http://www.fws.gov/partners.

National Fish & Wildlife Foundation Pulling Together Initiative (PTI)
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, for-profit businesses, and USDA staff are not directly eligible to receive PTI grants, but are encouraged to work with eligible applicants to develop and submit applications to PTI. Proposals may be submitted that describe initiatives to prevent, manage, or eradicate invasive and noxious plants through a coordinated program of public/private partnerships; and that increase public awareness of the adverse impacts of invasive and noxious plants. For more information, see: http://www.nfwf.org.

National Fish & Wildlife Foundation Upper Mississippi River Watershed Fund (UMRWF)
UMRWF is a partnership between the USDA Forest Service and the National Fish and Wildlife Foundation that provides grants for forest stewardship and watershed restoration in the Upper Mississippi River drainage. Eligible applicants include non-profit 501 (c) organizations, local, and state units of government. In particular the UMRWF will support projects that address: conservation of priority forest areas, loss of migratory bird habitat, regeneration of bottom land hardwoods, enhancement of water quality and aquatic habitat, and outreach and education. For more information, see: http://www.nfwf.org.

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
- All federal grants - http://www.grants.gov/

Insects and Diseases

Gypsy Moth Suppression Program

The DNR facilitates an aerial spray program to suppress gypsy moth outbreaks which is offered to landowners in WI 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

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. EAB).
http://www.na.fs.fed.us/werc/grants.shtm

Appendix D: Mowing Guidance

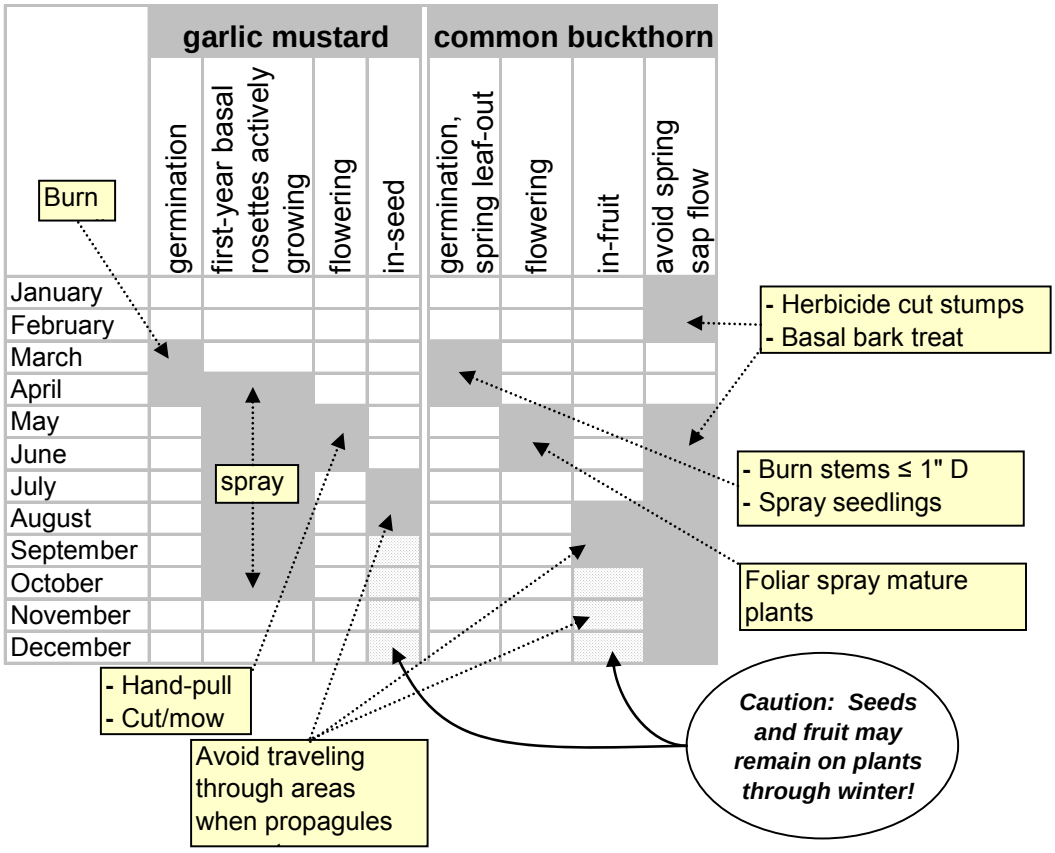
The following suggestions shall be evaluated when developing mowing recommendations

- Mowing may be a good choice in places where gully formation is a potential problem for other required management options.
- Use discretion if soil conditions are wet to avoid compaction and damage to sod.
- Always control noxious weeds by spot spraying or spot clipping. This will reduce the potential for unintentional establishment of these species.
- Clean mowing equipment prior to moving out of fields with known noxious weeds or invasive plant species to avoid spreading seed.

It is highly recommended, but is not required, that mowing be delayed until after September 1, reducing the chance of harming fledgling birds and other young wildlife. Mowing shall not be delayed where necessary to control weed or invasive plant species.

- Verify that weeds or invasive plant species are not present in levels exceeding required treatment thresholds. If treatment is needed, the mowing and/or herbicide application schedule in the weed/invasive plant species control plan shall be followed.
- Verify that mowing will enhance existing cover.

Appendix E: *Example* Identifying Time Windows for Invasive Species Management



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http://tncweeds.ucdavis.edu/esadocs.html (last updated 10/07)

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WDNR-Division of Forestry. 2003. Wisconsin Forest Management Guidelines Pub-Fr-226 2003. http://www.dnr.state.wi.us/forestry/publications/Guidelines/toc.htm (last updated 7/30/07)

Appendix: G Glossary

4WD	Four-wheel drive
4x4	Four-wheel drive vehicle
Angler	A person who fishes
Aquatic invasives	Invasive species that is found in water.
ATB	All-terrain bicycle. See 'Mountain Bicycle.'
ATV	All-terrain vehicle
Best Management Practices (BMPs)	Practical and economically achievable (do we really want to say this?) practices for preventing or reducing the introduction and spread of invasive species.
Biological Control	Management of an invasive species population of one organism by the use of another.
Control	Containment or eradication of an invasive species population.
Eradication	Elimination of an invasive species from a specific country? or area.
Established	An introduced invasive species, present in a country or area, multiplying or expected to continue to occupy the area. (Isn't time a factor here?)
Exotic	From another country; not native to the place where found.
Firebreak	Naturally occurring or human-made barrier to the spread of fire.
Geocaching	An outdoor treasure-hunting game in which the participants use a Global Positioning System (GPS) receiver or other navigational techniques to hide and seek containers anywhere in the world.
Indigenous	Native to a particular area, not introduced. (see 'native')
Infestation	An established population of invasive species that is reproducing and spreading.
Introduction	Entry and establishment of a pest.
Invasive species	A non-indigenous species whose introduction does or is likely to cause economic or environmental harm or harm to human health.
Management	The utilization of any procedure or combination of procedures designed to suppress or contain invasive species populations at a level to protect natural resources.
Mountain Bicycle	A mountain bike or mountain bicycle [abbreviated MTB or ATB (All Terrain Bicycle)] is a bicycle designed for off-road biking, either on dirt trails or other unpaved environments.
MTB	See 'Mountain Bicycle.'
Mulch	A natural or artificial layer of plant residue or other materials covering the land surface that conserves moisture, holds soil in place, aids in establishing plant cover, and minimizes temperature fluctuations.
Mushing	The use of one or more dogs to pull a sled on snow.
Native	Present in a certain area from other than human causes or influences. (see indigenous)
OHV	Off-highway vehicle
Pathway	Any means that allows the entry or spread of an invasive species.
Personal watercraft	A motorized water vessel less than 15 feet in length designed to be operated by a person sitting, standing, or kneeling on it rather than within the confines of a hull.

Pest	Any living stage of an insect, mite, nematode, slug, snail, or other invertebrate animal injurious to plants, plant products, animals, and humans; any bacteria, fungi, other parasitic plants, or reproductive parts thereof, viruses, phytoplasmas, protozoans, or infectious substances which cause disease in or damage to plants or plant products; any host upon which a plant pest is dependent for the completion of all or a portion of its lifecycle.
Prescribed burning	Skillful application of fire to natural fuels that allows confinement of the fire to a predetermined area and at the same time produces certain planned benefits.
Propagule	Any reproductive structure or part of an invasive species 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 forest pests, this may be an egg, larva, pupa, or adult. In forest pathogens, this may be a spore, mycelial fragment (similar to root), or a fruiting body.
Recreationists	Individuals who take part in outdoor recreational activities.
Road bicycle	A bicycle designed for use primarily on paved roads.
RV	Recreational vehicle
Segway™	A self-balancing personal transportation device with two wheels; can operate in any level pedestrian environment.
Skijor	A winter sport where a person wearing skis is pulled over the snow by a dog or dogs.
Survey	A methodical procedure, conducted over a defined period of time, to determine the characteristics of an invasive species population, or to determine which species occur in an area.
Terrestrial invasives	Invasive species that is found on land.
Touring bicycle	A bicycle designed to handle touring, distinctive in its sturdier wheels, wider tires, and in its ability to carry gear on racks.
Trailhead	The point at which a path starts. Recreational trail users typically begin excursions at trailheads and may review kiosks with maps and other information on display, if available.
Treatment	Officially authorized procedure for killing or removing plant pests or rendering them infertile.
UTV	Utility terrain vehicle.
Vehicle access	An entry point to a recreational trail or area for motorized vehicles.
Wildlife food plot	A planted area set aside to act as a food source for wildlife. Food plots generally consist of but are not limited to legumes or forage grasses.
Wildlife opening	An opening in a forest that provides wildlife with a variety of food and cover sources that are close together and easily available. May be food plots, natural herbaceous or brushy cover, fire breaks, roads, or utility rights-of-way.