



Michigan Invasive Plant Council

Michigan Plant Invasiveness Assessment System (MPIAS June 2008)

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Background

MIPC – Invasive Plant Assessment Committee involved with the development of the 2004 version of MPIAS

Robert E. Schutzki, Chairperson. Associate Professor, Department of Horticulture, Michigan State University, East Lansing, MI

Douglas R. Pearsall, East Michigan Science and Planning Director, The Nature Conservancy, Michigan Chapter, Lansing, MI.

Alix Cleveland, Plant Ecologist, Huron-Manistee National Forests, Cadillac, MI

Jan Schultz, Forest Plant Ecologist, Hiawatha National Forest, Marquette, MI

Kim D. Herman, Wildlife Ecologist, Western Upper Peninsula Management Unit, Michigan DNR, Gladstone, MI

David MacKenzie, Hortech Nursery, Spring Lake, MI

Stephen MacDonald, Twixwood Nursery, Berrien Springs, MI

Timothy Wood, Spring Meadow Nursery, Grand Haven, MI

Ted Myers, The Cottage Gardens, Lansing, MI

2008 Revisions to MPIAS include contributions from:

Phyllis Higman, Michigan Natural Features Inventory, Lansing, MI

Chris Howe, Hortech, Inc., Spring Lake, MI

Dave MacKenzie, Hortech, Inc., Spring Lake, MI

Brian Majka, JFNEW, West Olive, MI

Doug Pearsall, The Nature Conservancy, Lansing, MI

Robert Schutzki, Michigan State University, East Lansing, MI

Acknowledgements

This assessment system is adapted from several assessment tools currently being used and/or developed for the evaluation of invasive potential and the categorization of invasive plants. We appreciate the efforts of these authors in addressing invasive plant assessment and for being able to use their models as a guide in the development of the Michigan Plant Invasiveness Assessment System.

Fox, A.M., D.R. Gordon, J.A. Dusky, L. Tyson, and R.K. Stocker. 2001. IFAS Assessment of Non-Native Plants in Florida's Natural Areas. Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Document SS-AGR-79

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Hiebert, R.D. and J. Stubbendieck. 1993. Handbook for ranking exotic plants for management and control. U.S. Department of Interior Natural Resources Report NPS/NRMWRO/NRR-93/08

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Warner, P. J., C.C. Bossard, M.L. Brooks, J.M. DiTomaso, J.A. Hall, A.M. Howard, D.W. Johnson, J.M. Randall, C.L. Roye, M.M. Ryan, and A.E. Stanton. 2003. Criteria for Categorizing Invasive Non-

native Plants that Threaten Wildlands. California Exotic Pest Plant Council and Southwest Vegetation Management Association. 24p.

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Introduction

Invasive plants threaten all of Michigan's ecosystems from natural areas, managed forests, and agricultural production fields to the built landscape. Members of the Michigan Invasive Plant Council share a concern about the effects of invasive plants in our state and as a result initiated work on an assessment system tailored to Michigan's environmental conditions and the diversity of its natural, managed, and built landscapes.

The objective of this assessment is to identify relevant biological, ecological, management, and economic information that will aid in the evaluation of the impact any given plant may have on our Michigan ecosystems and become the foundation of an accompanying Michigan Invasive Plant Council recommended plan of action.

Contents of the Assessment:

Section I – Biological Character.

Reproductive Ability and Dispersal

Reproductive ability identifies a plant's invasive tendency in **Michigan** as high (H), medium (M), low (L), insignificant (I) based on seed and vegetative reproductive characteristics.

Dispersal identifies the vectors or agents of dispersal and the likelihood of long distance dispersal. Dispersal agents are Environmental Influences (E) such as wind and water; Wildlife (W) both mammals and birds; Domestic Animals (DA) both mammals and birds; and Human activity (H). Dispersal distance refers to the potential for long distance dispersal.

Dispersal is reported as: Insignificant (I) (One or two vector categories; Little potential for long-distance dispersal); Low (L) (Three or four vector categories; Little potential for long-distance dispersal); Medium (M) (One or two vector categories; Great potential for long-distance dispersal); High (H) (Three or four vector categories; Great potential for long-distance dispersal)

Section II – Impact.

Impact identifies the plant's ecological, aesthetic, economic influence on natural areas, managed landscapes, constructed habitats and agriculture and turf production systems. Questions on impact are tailored to the individual characteristics and composition of each of the respective systems. Points are associated with each question with the total used to classified impact as high (H), medium (M), low (L), or insignificant (I).

Section III – Distribution.

Distribution identifies known occurrences of this plant. It indicates the area of origin for the plant (Original Range) and the earliest documented occurrence in North America. Then, for Michigan, identifies the extent to which the plant is reported to be a problem in each of four ecological regions (Albert 1995). The four ecological regions of Michigan have been delineated based on broad climatic, geologic, edaphic, and vegetation patterns, and provide a more meaningful framework for assessing invasiveness than geopolitical boundaries.

Michigan ecological regions are Western Upper Peninsula (WUP), Eastern Upper Peninsula (EUP), Northern Lower Peninsula (NLP), and Southern Lower Peninsula (SLP). Plant occurrence as a problem is classified as naturalized (N), widespread (W), localized (L), isolated (I), or absent (A).

Section IV – Control Methods.

Control Methods document the availability of mechanical, chemical, biological, and fire as a resource in managing or eradicating the plant in question. Control Methods are reported as available (A), not available (NA), or under development (UD).

Section V – Management Effort.

Management Effort identifies management potential (investment in human and financial resources) and management activity (programs being presently conducted). For most statements, no particular methods of control are specified however responses should relate to the methods that are most likely to be used (refer to section IV). Management potential considers feasibility, costs, and unavoidable non-target damage. Management potential is identified as high (H) or low (L) based on points associated with a series of questions.

Management activity identifies current programs being employed to eradicate or suppress this plant in the public and private arenas. Management activities being employed are labeled by: federal (F), state (S), municipal (M), non-profit organization (O), commercial (C), individual (I).

Section VI – Value within the State of Michigan.

Value within Michigan indicates economic, aesthetic, erosion control, and wildlife habitat value. Value is designated either as high (H), low (L), or none (N) in each of the respective categories.

Section VII – Invasiveness Rank, Plan of Action, and Plant Summary Report.

Section VII is for use by MIPC. The Invasive Plant Assessment Committee will use the information provided in Sections I-VI to establish an Invasiveness Rank (based on Potential Invasiveness and Impact for each system within the four ecological regions), a MIPC Plan of Action, and a Plant Summary Report.

Invasiveness Rank:

The plant's Invasiveness Rank is based on Potential Invasiveness and Impact for each system within each of the four ecological regions.

Potential Invasiveness is based on biological characteristics that may predispose a plant to invasive behavior. Reproductive Ability (Seed and Vegetative) + Dispersal = Potential Invasiveness.

Impact is the expression of potential invasiveness under a given set of environmental conditions within a system (Natural System, Forest Production, Ag/Hort/Turf Production, Constructed Habitats, and Urban and Suburban Landscapes). Impact may vary among or in some cases within ecological regions. A plant's impact may occur over a broad set of environmental conditions (temperature, light, water) or be limited by one or more factors specific to a system or ecological region.

Potential Invasiveness and Impact are coupled to identify a plant's Invasiveness Rank in each system (Natural; Managed Forests; Suburban and Urban Landscape; Ag/Hort/Turf Production) within each of Michigan's four ecological regions.

MIPC Plan of Action:

MIPC Plan of Action is based on the information obtained through the assessment. The Plan of Action is developed by the MIPC Invasive Plant Assessment Committee for review and endorsement of the MIPC Board of Directors. The Plan of Action outlines recommendation that may include one or all of the following: Education; Suppression; Restoration; and Elimination.

Education:

Educational efforts are directed at informing property owners/managers of the problems associated with the presence or use of this plant. Education will be tailored for the specific details associated with the system(s) impacted (Natural System, Forest Production, Ag/Hort/Turf Production, Constructed Habitats, and Urban and Suburban Landscapes) and the plant in question. Education can refer to other action plans such as suppression, restoration, and elimination in addition to suggestions on use and sanitation.

Suppression:

Recommendations call for the development of management plans to suppress or eradicate the plant in problem areas. Suppression/eradication may be widespread (across multiple areas) or limited to its occurrence in specific problem areas. MIPC does not endorse any specific control method; however it encourages the property managers to develop a plan that fits within their overall management objectives and desired outcome.

Restoration:

Management efforts may require restoration of the site to minimize reoccurrence of invasion and aid in the reestablishment of desirable plants. Restoration plans should be specific to the site (natural, managed, constructed, production) and the desired outcome.

Elimination:

This recommendation calls for the plant's potential elimination from commerce. Plants may be directly (primary crop or desirable plant) or indirectly (weed seed, impurity, or by-product) introduced through commerce. Based on the assessment, the plant in question poses problems in multiple systems and has no or limited determined economic, aesthetic, or environmental value.

Plant Summary Report:

Plant Summary Report will include:

1. Plant Name (Scientific and Common).
2. MIPC Plan of Action (Education, Suppression, Restoration, Elimination). A Plant Summary Report will be published for each plant that has gone through the Michigan Plant Invasiveness Assessment System. All information used in developing the Plant Summary Report and MIPC's Plan of Action will be accessible through the Michigan Invasive Plant Council.

Michigan Plant Invasiveness Assessment System (MPIAS June 2008)

Instructions

This assessment is designed to determine whether a plant is invasive in Michigan's four ecological regions (Albert, 1995). These ecological regions have been delineated based on broad climatic, geologic, edaphic, and vegetation patterns, and provide a meaningful framework for assessing invasiveness under or as influenced by Michigan's environment. Information on plant invasiveness in areas outside of Michigan is useful and will aid the Michigan Invasive Plant Council in determining a plan of action.

Throughout this assessment, you will be asked to provide documentation for your responses. Please do your best to provide documentation as it will help the Michigan Invasive Plant Council form a plan of action and guide future revisions of the assessment system. There is no need to reproduce reports, papers, photos, or other information unless requested to do so. To assist in the evaluation of supporting information, please use the following categories (all that apply) when documenting your responses and supply appropriate citations and sources under Comments, Supportive Evidence, and Explanation of Documentation level.

<i>Reviewed scientific publication</i>	response is based on a peer-reviewed publication; please provide complete citation of all sources.
<i>Other published material</i>	response is based on non-peer-reviewed documents, reports, or other similar documents; please list the title, author, and date of publication.
<i>Observational</i>	response is supported by confirmed but not-yet-published observations by qualified biologists; please provide name(s) and contact information for source(s).
<i>Anecdotal</i>	response is supported only by unconfirmed, anecdotal information; please describe the source clearly.

Complete a new copy of the assessment for each species, cultivar, or hybrid. Plant cultivars, varieties, and hybrids are genetically different from the parent(s) species and may not exhibit the same reproductive, morphological or physiological traits. It is important when answering questions throughout this assessment that information listed is specific to the plant in question. If the information is unavailable or unknown, skip the questions and note the absence of available information under comments.

It is also important to establish that anyone whose input is sought is qualified to comment on a particular plant (i.e. they are confident with its identification, familiar with its biological characteristics, and experienced with the zones and habitat/system in which this plant is likely to occur).

If at any stage in this assessment you realize that you do not have sufficient information to make a decision that will determine where to proceed, skip the remaining questions and go to the next section. Prior to proceeding, indicate in the comments section which answer is unknown and try to recommend an individual or agency who might be able to provide the answer.

Genus, Species, Species subset

Scientific Name:			
Synonyms:			
Common Names(s):			
Plant Type:	<input type="checkbox"/> Annual	<input type="checkbox"/> Biennial	<input type="checkbox"/> Perennial

The information within this MPIAS assessment is specific to the plant listed and does not imply that cultivars, varieties, other species subsets and hybrids exhibit the same behavior or scoring.

Author Information

Author:	
Author's affiliation:	
Mailing address:	
Reviewed by:	

The information within this MPIAS assessment is specific to the plant listed and does not imply that cultivars, varieties, other species subsets and hybrids exhibit the same behavior or scoring.

Procedures for Plant Assessment through MPIAS

Information on the plants is obtained from: peer reviewed scientific journals; agencies publications, reports and other publications; fact sheets; observations from qualified biologists; unconfirmed anecdotal information; and personal communications. The searches and assemblage of information into MPIAS is reviewed for accuracy and its relevance and appropriateness for Michigan's environmental and climatic conditions by the MPIAS reviewers. The information is then used to develop the MIPC Plan of Action which is presented to the MIPC Board of Directors for approval.

Complete a new copy of the assessment for each species, cultivar, or hybrid. Information within MPIAS is specific to the plant in question. Plant cultivars, varieties, and hybrids are genetically different from the parent(s) species and others within a species and may not exhibit the same reproductive, morphological or physiological traits. Plant cultivars, varieties, and hybrids may be deemed benign where species are considered invasive, the reverse may also be true.

Automatic Exemption from the Assessment: Certain plant species are prohibited or restricted by federal and state laws. These plants are exempt from assessment with a recommendation that follows the state and federal laws. This exemption applies to all federal and Michigan prohibited and restricted plants. Current lists of these plants can be found at:

USDA/APHIS – Federal Noxious Weed List	http://www.aphis.usda.gov/ppq/permits/fnwsbycat-e.PDF
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Michigan Department of Agriculture – Noxious, Prohibited, and Restricted Plants	http://www.michigan.gov/mda/0,1607,7-125-1569_16993-11250--,00.html
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Federal and Michigan Noxious, Prohibited, or Restricted Plants

Is this species listed on the federal or Michigan noxious, prohibited, or restricted plant lists?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
If YES then do not proceed with assessment but indicate its federal and/or Michigan Department of Agriculture status on the front of the response form		
If NO then go to Section I		

Section I: Biological Character

Biological characteristics: Reproductive Ability and Dispersal. Reproductive characteristics and dispersal ability strongly relate to the potential of a plant to become invasive. The results of this section will be used by MIPC to calculate a rank of Potential Invasiveness in Section VII. *Check those that apply to this plant and note any other weedy or invasive traits this plant possesses in the space for comments below:*

I – A Reproductive Ability

Reproductive ability identifies a plant's invasive tendency in Michigan as high (H), medium (M), low (L), insignificant (I) or none (N) based on seed and vegetative reproductive characteristics.

Plant Type:	<input type="checkbox"/> Annual	<input type="checkbox"/> Biennial	<input type="checkbox"/> Perennial
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I – A1. Reproduction by Seed

If the plant is sterile or unable to complete a reproductive cycle in Michigan, skip the following questions and enter an N in the Seed Subrank at the end of this section.

<input type="checkbox"/>	Reproduces readily by seed.
<input type="checkbox"/>	When it produces seed, produces over 1,000 seeds per square meter
<input type="checkbox"/>	Reproduces at least once per year
<input type="checkbox"/>	Can germinate in a wide range of conditions
<input type="checkbox"/>	Seeds remain viable in the soil for 2 years or more.

Seed rating:	1 box marked = I 2 boxes marked = L 3 boxes marked = M 4 - 5 boxes marked = H
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Seed Subrank

Enter the Seed Subrank in the appropriate blank at the end of Section I – A.	Rank
I – A1. Reproduction by Seed:	

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

I – A2. Reproduction by Vegetative Means

If the plant does not reproduce vegetatively in Michigan, skip the following questions and enter an N in the Vegetative Subrank at the end of this section.

<input type="checkbox"/>	Reproduces readily <i>in situ</i> by vegetative means
<input type="checkbox"/>	Has spreading rhizomes that may root at nodes.
<input type="checkbox"/>	Fragments easily with fragments readily becoming re-established long distances from the parent plant by natural means (if checked, rating is automatically marked as high)
<input type="checkbox"/>	Other (*please discuss in comments and provide documentation)

Vegetative rating:	1 box marked = I 2 boxes marked = L 3 boxes marked = M 4 boxes marked = H
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Vegetative Subrank

Enter the Vegetative Subrank in the appropriate blank at the end of	Rank
Section I – A Vegetative:	

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

I-A3. Growth Habit

Growth Habit	
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I – B. Dispersal:

Dispersal identifies the vectors or agents of dispersal and the likelihood of long distance dispersal.

Dispersal agents	(E) Environmental Influences such as wind and water (W) Wildlife, both mammals and birds (DA) Domestic Animals, both mammals and birds (H).Human activity Dispersal distance refers to the potential for long distance dispersal.
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Dispersal distance refers to the potential for long distance dispersal.

I-B1. Vector categories

Identify the vector categories and individual agents involved with the dispersal of this plant. Check all that apply	
<input type="checkbox"/> Environmental Influences (E):	<input type="checkbox"/> Wind <input type="checkbox"/> Water <input type="checkbox"/> Other (name) _____
<input type="checkbox"/> Wildlife (W):	<input type="checkbox"/> Mammals <input type="checkbox"/> Birds <input type="checkbox"/> Other (name) _____
<input type="checkbox"/> Domestic Animals (DA):	<input type="checkbox"/> Mammals <input type="checkbox"/> Birds <input type="checkbox"/> Other (name) _____
<input type="checkbox"/> Human Activity (H):	<input type="checkbox"/> New development (construction equipment) <input type="checkbox"/> Maintenance equipment <input type="checkbox"/> Borrow material (topsoil, gravel, stone) <input type="checkbox"/> Recreation (ATV, boats, RV) <input type="checkbox"/> Dumping <input type="checkbox"/> Other (name) _____
<input type="checkbox"/> Other (*please discuss in comments and provide documentation)	

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

I – B2. Dispersal Distance

<input type="checkbox"/>	Little potential for long-distance dispersal (1 km in a single dispersal event)
<input type="checkbox"/>	Great potential for long-distance dispersal

Please use this scale and your answers from Section I – B above to calculate a: Dispersal Subrank

Dispersal Subrank	I One or two vector categories; Little potential for long-distance dispersal L Three or four vector categories; Little potential for long-distance dispersal M One or two vector categories; Great potential for long-distance dispersal H Three or four vector categories; Great potential for long-distance dispersal
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Dispersal Subrank

Section I B. Dispersal Subrank:	
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Biological Character Subrank

Biological Character Subrank	Rank
Section I A. Reproductive Ability: Reproduction by Seed	
Section I A. Reproductive Ability: Reproduction by Vegetative Means	
Section I B. Dispersal:	

Section II: Impact

Impact: Impact identifies the plant's ecological, aesthetic, economic influence on each of the respective natural, managed, and/or constructed system. Questions on impact are tailored to the individual characteristics and composition of the system. Impact is classified as high (H), medium (M), low (L), or insignificant (I).

II - A. Natural Systems

Impacts on native species and natural systems: Terrestrial and Aquatic. *Where possible, assess the cumulative (e.g., over a period of several decades) impact of the plant on the natural areas and other wildlands where it typically occurs. Impacts will be re-assessed as more is learned and as the plant moves into new areas.*

II - A1. Ability to invade natural systems

Choose one answer that best describes the ability of this plant to invade natural systems.	
<input type="checkbox"/>	Not known to spread into natural systems in the absence of disturbance (e.g. plant may persist from former cultivation) (0 points)
<input type="checkbox"/>	Establishes only in areas where major disturbance has occurred in the last 20 years (e.g., post-hurricane sites, highway corridors) (3 points)
<input type="checkbox"/>	Often establishes in mid-late-successional natural areas where minor disturbances may occur (e.g. tree falls, hiking trails, streambank erosion), but no major disturbance within the last 20-75 years (7 points)
<input type="checkbox"/>	Often establishes in intact or otherwise healthy natural systems with no major disturbance for at least 75 years (15 points)

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

II - A2. Impact on Ecosystem Processes

Plants that alter processes such as fire occurrence or frequency, erosion, and sedimentation rates, hydrological regimes, or nutrient regimes often have the greatest long-term impacts on ecosystems. Some invaders can completely transform natural systems so that they can no longer support native species.

Choose one answer that best describes the impact of this plant on ecological processes:	
<input type="checkbox"/>	Not known impact on ecosystem processes (0 points)
<input type="checkbox"/>	Influences ecosystem processes (e.g., has perceivable but mild influence on soil nutrient availability) (5 points)
<input type="checkbox"/>	Significant alteration in ecosystem processes (e.g., increases sedimentation rates along coastlines, reducing open water areas that are important for waterfowl) (10 points)
<input type="checkbox"/>	Major, possibly irreversible, alteration or disruption of ecosystem processes (e.g., the plant reduces water level from open water or wetland systems through rapid transpiration, making these areas more fire prone and unable to support native wetland species; or plant fixes nitrogen in the soil making soil unlikely to support certain native plants) (15 points)

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

II - A3. Impact on Natural Community Structure

Choose one answer that best describes this plant's impact on community structure:	
<input type="checkbox"/>	No impact, establishes in an existing layer without influencing its structure (0 points)
<input type="checkbox"/>	Influences structure in one layer (e.g., changes the density of a layer) (3 points)
<input type="checkbox"/>	Significant impact on at least one layer (e.g., creation of a new layer, elimination of an existing layer) (7 points)
<input type="checkbox"/>	Major alteration of structure (e.g., covers canopy, eradicating most or all layers below) (10 points)

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

II – A4. Impact on Natural Community Composition

Choose one answer that best describes this plant's impact on community composition:	
<input type="checkbox"/>	No impact, causes no known changes in native populations (0 points)
<input type="checkbox"/>	Influences community composition (e.g., reduces the number of individuals in one or more native populations by reducing recruitment) (3 points)
<input type="checkbox"/>	Significantly alters community composition (e.g., produces a significant reduction in the population size of one or more native species in the community) (7 points)
<input type="checkbox"/>	Causes major alteration in community composition (e.g., results in the extirpation of one or several native species, reducing biodiversity or changing the community composition towards species exotic to the natural community) (10 points)

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

II - A5. Conservation Significance of the Natural Systems and Native Species Threatened

Many invaders occur primarily in disturbed, low quality habitats that are dominated by other invasive plants. Invasive plants have a greater impact if they (a) directly or indirectly threaten native species or communities that are considered rare or vulnerable (e.g., Federally listed or ranked G1-G3 by The Nature Conservancy and Natural Heritage Network) or (b) threaten outstanding, high quality occurrences of common community types.

Indicate below the natural communities (Michigan Natural Features Inventory, 1986) in which the plant has become invasive, and then list any rare species that are or are likely to become threatened by this plant. (Note: * indicates a state rank of S1-S3; ** indicates global rank of G1-G3 and state rank of S1-S3)

Natural Communities Affected

Wetland		
Marsh:	<input type="checkbox"/> Submergent marsh <input type="checkbox"/> Emergent marsh <input type="checkbox"/> Great Lakes marsh* <input type="checkbox"/> Northern wet meadow <input type="checkbox"/> Southern wet meadow*	<input type="checkbox"/> Inland salt marsh ** <input type="checkbox"/> Intermittent wetland ** <input type="checkbox"/> Coastal plain marsh ** <input type="checkbox"/> Interdunal marsh **
Prairie:	<input type="checkbox"/> Lakeplain wet prairie ** <input type="checkbox"/> Lakeplain wet-mesic prairie **	<input type="checkbox"/> Wet prairie ** <input type="checkbox"/> Wet-mesic prairie **
Fen:	<input type="checkbox"/> Prairie fen ** <input type="checkbox"/> Northern fen *	<input type="checkbox"/> Patterned fen ** <input type="checkbox"/> Poor fen **
Bog:	<input type="checkbox"/> Bog	<input type="checkbox"/> Muskeg *
Forest:	<input type="checkbox"/> Poor conifer swamp <input type="checkbox"/> Rich conifer swamp * <input type="checkbox"/> Relict conifer swamp **	<input type="checkbox"/> Hardwood-conifer swamp ** <input type="checkbox"/> Southern swamp * <input type="checkbox"/> Southern floodplain forest **
Shrub:	<input type="checkbox"/> Northern shrub thicket <input type="checkbox"/> Southern shrub-carr	<input type="checkbox"/> Inundated shrub swamp *
Forest/marsh:	<input type="checkbox"/> Wooded dune and swale complex **	

Upland:		
Forest:	<input type="checkbox"/> Mesic southern forest (southern hardwood) ** <input type="checkbox"/> Dry-mesic northern forest (pine-hardwood)* <input type="checkbox"/> Dry-mesic southern forest (oak-hardwood) * <input type="checkbox"/> Dry northern forest (pine) *	<input type="checkbox"/> Dry southern forest (oak forest) * <input type="checkbox"/> Boreal forest * <input type="checkbox"/> Mesic northern forest (northern hardwood and hemlock-hardwood) *
Savanna:	<input type="checkbox"/> Lakeplain oak openings ** <input type="checkbox"/> Bur oak plains ** <input type="checkbox"/> Oak openings ** <input type="checkbox"/> Oak barrens **	<input type="checkbox"/> Pine barrens ** <input type="checkbox"/> Great lakes barrens ** <input type="checkbox"/> Northern bald (krummholz ridgetop) **
Prairie:	<input type="checkbox"/> Mesic prairie ** <input type="checkbox"/> Hillside prairie ** <input type="checkbox"/> Mesic sand prairie **	<input type="checkbox"/> Woodland prairie ** <input type="checkbox"/> Dry sand prairie **
Primary:	<input type="checkbox"/> Open dunes ** <input type="checkbox"/> Sand gravel beach ** <input type="checkbox"/> Cobble beach * <input type="checkbox"/> Bedrock beach * <input type="checkbox"/> Alvar ** <input type="checkbox"/> Bedrock glade **	<input type="checkbox"/> Dry non-acid cliff * <input type="checkbox"/> Moist non-acid cliff * <input type="checkbox"/> Dry acid cliff * <input type="checkbox"/> Moist acid cliff * <input type="checkbox"/> Sinkhole **

Native Species affected:	
Global Heritage Status Rank:	
National Heritage Status Rank (U.S.):	
National Heritage Status Rank (Canada):	
Michigan Rank:	
Michigan wetland category:	
Physiognomy:	
Wetness coefficient:	
Other information:	

Conservation Significance

Based on this information, choose one answer that best describes the overall conservation significance of native species or communities affected by this plant:	
<input type="checkbox"/>	Found only in human-disturbed habitats and not known to impact any vulnerable or high quality native species or communities (0 points)
<input type="checkbox"/>	Usually inhabits common, unthreatened habitats and rarely impacts vulnerable or high quality species or communities (3 points)
<input type="checkbox"/>	Known to occasionally threaten vulnerable or high quality species or communities (7 points)
<input type="checkbox"/>	Known to often inhabit one or more vulnerable or high quality communities and/or often threatens rare native species (15 points)

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

Impact Subrank: Section II: Natural Systems

Total Points from questions II – A1 to II – A5	
Natural Systems Impact Subrank:	
Determine a Subrank using this scale: 0 – 12 points = I; 13 – 28 = L; 29 – 45 = M; 46 – 65 = H	

II - B. Production/Managed Forests, Christmas Tree Plantations

Definition: Forests managed for wood and fiber production and/or wildlife or other values such as pine plantations, aspen, northern hardwoods, and Christmas tree plantations.

Desirable or Weed Plant

Is the plant in question:		
An intended crop or desirable plant	<input type="checkbox"/> YES	<input type="checkbox"/> NO
Considered a weed plant	<input type="checkbox"/> YES	<input type="checkbox"/> NO
If the answer is yes to crop/desirable plant than proceed to section II-C. If the plant is identified as a weed plant continue		

Extensiveness

How extensive is this plant?	
<input type="checkbox"/>	It is not known to occur (0 points)
<input type="checkbox"/>	Scattered individuals or present in small isolated patches (3 points)
<input type="checkbox"/>	Establishes along forest edges or in areas disturbed by forest management activities- i.e. roads, landings, clearing or skid trails (7 points)
<input type="checkbox"/>	Ubiquitous throughout, spreading or dominant in the understory (15 points)

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

Production Impact

Is it impacting production?	
<input type="checkbox"/>	No impact to tree regeneration (0 points)
<input type="checkbox"/>	Regeneration somewhat impacted (5 points)
<input type="checkbox"/>	Regeneration moderately impacted (7 points)
<input type="checkbox"/>	Tree regeneration is not occurring because of this plant. (15 points)

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

Production/Management Stages

At what production/management stages does this plant have a negative impact? Check all that apply:			
<input type="checkbox"/>	None (0 points)	<input type="checkbox"/>	Sapling stage (10 points)
<input type="checkbox"/>	Planting (5 points)	<input type="checkbox"/>	Pole stage or mature stand (15 points)
<input type="checkbox"/>	Seedling establishment (5 points)		

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

The following information will not be scored in the assessment however it is useful in determining MIPC Plan of Action.

Silvicultural Treatments

What silvicultural treatments associated with the crop species may influence the presence of this plant. Check all that apply:	
<input type="checkbox"/>	Natural regeneration
<input type="checkbox"/>	Site prep
<input type="checkbox"/>	Planting
<input type="checkbox"/>	Selection cut
<input type="checkbox"/>	Thinning
<input type="checkbox"/>	Clear cut
<input type="checkbox"/>	Whole tree
<input type="checkbox"/>	Shortwood

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

Introduction sources

Introduction sources. Check all that apply:	
<input type="checkbox"/>	Corridors (roads, utility, trails, streams, and rivers)
<input type="checkbox"/>	Seed mixes-re-vegetation practices
<input type="checkbox"/>	Seed bank
<input type="checkbox"/>	Equipment- logging, recreational, road building (skidders, harvesters, ATV's, road graders)
<input type="checkbox"/>	Borrow material (gravel, sand, topsoil)
<input type="checkbox"/>	Wildlife (mammals, birds)
<input type="checkbox"/>	People (recreational user, cars, boats)
<input type="checkbox"/>	Unauthorized dumping
<input type="checkbox"/>	Plants on adjacent sites

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

Impact Subrank: Section II-B. Production/Managed Forests, Christmas Tree Plantations

Add total points		
Rating:	≤ 5 = Insignificant (I) $>5 \leq 13$ = Low (L) $>13 \leq 34$ = Medium (M) >34 = High (H)	
Production/Managed Forests, Christmas Tree Plantations Subrank:		

II-C. Impacts on Managed Landscapes within Suburban and Urban Ecosystems

Definition: Public and private areas within suburban and urban communities managed for green belts, linear parks, parks, and other recreational uses as well as urban forests and open space integrated throughout residential and commercial centers. Commercial centers include retail centers, corporate campuses and industrial areas. These areas are typically managed with various degrees of input by individual property owners, public agencies and/or commercial contractors and include unmanaged peripheral areas.

Desirable or weed plant

Is the plant in question:	
An intended or desirable plant:	<input type="checkbox"/> YES <input type="checkbox"/> NO
Considered a weed plant:	<input type="checkbox"/> YES <input type="checkbox"/> NO
If the answer is yes to desirable plant than proceed to section II-D. If the plant is identified as a weed plant continue	

Extensiveness

How extensive is this plant in suburban and urban ecosystems?	
<input type="checkbox"/>	Not present (0 points)
<input type="checkbox"/>	Present in scattered areas and isolated patches (3 points)
<input type="checkbox"/>	Present in areas not receiving routine or regular management practices (5 points)
<input type="checkbox"/>	Persistent throughout suburban and urban ecosystems. (15 points)

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

Impact on visual appeal

Impact on visual appeal of landscape compositions:	
<input type="checkbox"/>	Does not alter visual appeal (0 points)
<input type="checkbox"/>	Visual appeal compromised during limited periods or season (3 points)
<input type="checkbox"/>	Requires periodic attention to maintain visual appeal (7 points)
<input type="checkbox"/>	Requires regular attention to maintain visual appeal (15 points)

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

Impact on Desirable Plant Composition

Impact on Desirable Plant Composition:	
<input type="checkbox"/>	No impact on surrounding desirable plants (0 points)
<input type="checkbox"/>	Minor competition for light, water and nutrients without a direct influence on desirable plant quality (3 points)
<input type="checkbox"/>	Competes and causes minor impacts on desirable plants' quality (7 points)
<input type="checkbox"/>	Major influences on desirable plant quality caused by competition and changes in environmental conditions. (15 points)

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

The following information will not be scored in the assessment however it is useful in determining MIPC Plan of Action .

Introduction Sources

Introduction Sources. Check all that apply:			
<input type="checkbox"/>	Seed bank	<input type="checkbox"/>	Equipment
<input type="checkbox"/>	Off site plants	<input type="checkbox"/>	Topsoil/mulch/compost materials
<input type="checkbox"/>	On site plant	<input type="checkbox"/>	Unauthorized dumping
<input type="checkbox"/>	Seed mixes	<input type="checkbox"/>	Wildlife

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

Where found

Where is it found in the landscape?			
<input type="checkbox"/>	Ornamental beds	<input type="checkbox"/>	Open space
<input type="checkbox"/>	Boulevards and common areas	<input type="checkbox"/>	Corridors
<input type="checkbox"/>	Edges of landscaped areas	<input type="checkbox"/>	Vacant land
<input type="checkbox"/>	Woodlots		

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

Impact Subrank: Section II-C. Managed Landscapes

Add total points		
Rating:	≤ 6 = Insignificant (I) $>6 \leq 9$ = Low (L) $>9 \leq 36$ = Medium (M) >36 = High (H)	
Managed Landscapes within Suburban and Urban Ecosystems Subrank:		

II - D. Impact on Agricultural, Horticultural and Turf Production Systems

Definition: Production areas for agronomic, horticultural, and other commodity crops. These include fields, orchards, and plantations.

Desirable or Weed

Is the plant in question:		
An intended crop:	<input type="checkbox"/> YES	<input type="checkbox"/> NO
Considered a weed plant:	<input type="checkbox"/> YES	<input type="checkbox"/> NO
If the answer is yes to crop than proceed to section III. If the plant is identified as a weed plant continue		

Ability to invade

Ability to invade agricultural, horticultural, and turf production systems:	
<input type="checkbox"/>	Not known to be present (0 points)
<input type="checkbox"/>	Present in scattered areas and isolated patches (3 points)
<input type="checkbox"/>	Occurs on a regular basis in production systems (7 points)
<input type="checkbox"/>	Spreads throughout production systems and beyond into adjacent areas (15 points)

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

Impact on production

Is it impacting plant/crop production?	
<input type="checkbox"/>	No impact to production (0 points)
<input type="checkbox"/>	Somewhat impacted (5 points)
<input type="checkbox"/>	Moderately impacted (7 points)
<input type="checkbox"/>	Severely impacted (15 points)

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

Impact throughout production cycle

Does the plant have a negative impact throughout production cycle? Check all that apply:	
<input type="checkbox"/>	Planting (5 points)
<input type="checkbox"/>	Seedling/plant establishment (5 points)
<input type="checkbox"/>	Crop maturation (7 points)
<input type="checkbox"/>	Harvest (7 points)
<input type="checkbox"/>	Processing (10 points)
<input type="checkbox"/>	Fallow fields (3 points)

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

The following information will not be scored in the assessment however it is useful in determining MIPC Plan of Action .

Introduction sources

Introduction sources. Check all that apply:	
<input type="checkbox"/>	Seed bank
<input type="checkbox"/>	Off site plants
<input type="checkbox"/>	On site plant
<input type="checkbox"/>	Seed mixes
<input type="checkbox"/>	Equipment
<input type="checkbox"/>	Topsoil/mulch/compost materials
<input type="checkbox"/>	Unauthorized dumping
<input type="checkbox"/>	Domestic animals
<input type="checkbox"/>	Wildlife

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

Impact Subrank: Section II-D. Agricultural, Horticultural, and Turf Production Systems

Add total points		
Rating:	≤ 5 = Insignificant (I) $>5 \leq 10$ = Low (L) $>10 \leq 36$ = Medium (M) >36 = High (H)	
Agricultural, Horticultural and Turf Production Systems Subrank:		

II – E. Impact on Constructed Habitat Systems

Definition: Constructed Habitat in disturbed areas. These include woodland, prairie, and wetland construction and/or restoration.

Desired or Weed

Is the plant in question:		
A desired plant:	<input type="checkbox"/> YES	<input type="checkbox"/> NO
Considered a weed plant:	<input type="checkbox"/> YES	<input type="checkbox"/> NO
If the answer is yes to desired plant than proceed to section III. If the plant is identified as a weed plant continue		

Ability to invade

Ability to invade constructed habitats:	
<input type="checkbox"/>	Not known to be present (0 points)
<input type="checkbox"/>	Present in scattered areas and isolated patches (3 points)
<input type="checkbox"/>	Occurs on a regular basis in habitat systems (7 points)
<input type="checkbox"/>	Spreads throughout the habitat and beyond into adjacent areas (15 points)

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

Impact on Habitat

Impact on Habitat Composition:	
<input type="checkbox"/>	No impact on habitat plant composition (0 points)
<input type="checkbox"/>	Minor competition for light, water, and nutrients without a direct influence on desirable plant compositions (3 points)
<input type="checkbox"/>	Competes and causes minor impacts on desirable plant compositions (7 points)
<input type="checkbox"/>	Major influences on habitat composition caused by competition and changes in environmental conditions. (15 points)

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

Impact throughout habitat

Does the plant have a negative impact throughout the habitat? Check all that apply:	
<input type="checkbox"/>	Planting (3 points)
<input type="checkbox"/>	Seedling/plant establishment (5 points)
<input type="checkbox"/>	Habitat maturation (10 points)

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

The following information will not be scored in the assessment however it is useful in determining MIPC Plan of Action .

Introduction sources

Introduction sources. Check all that apply:	
<input type="checkbox"/>	Seed bank
<input type="checkbox"/>	Off site plants
<input type="checkbox"/>	On site plant
<input type="checkbox"/>	Seed mixes
<input type="checkbox"/>	Equipment
<input type="checkbox"/>	Topsoil/mulch/compost materials
<input type="checkbox"/>	Domestic animals
<input type="checkbox"/>	Wildlife

Impact Subrank:: Section II-E. Constructed Habitat

Add total points		
Rating:	≤ 3 = Insignificant (I) $>3 \leq 10$ = Low (L) $> 10 \leq 31$ = Medium (M) >32 = High (H)	
Constructed Habitat Subrank:		

Section III. Distribution In Michigan And The United States

Document the known distribution of this plant. Indicate the area of origin for the species (Original Range) and the earliest documented occurrence in North America. Then, for Michigan, identify the extent of its occurrence in each of four ecological regions (Albert 1995). The four ecological regions of Michigan, as pictured below, have been delineated based on broad climatic, geologic, edaphic, and vegetation patterns, and provide a more meaningful framework for assessing invasiveness than geopolitical boundaries.

Known distribution

Original Range (world wide)	
Earliest possible documentation in North America	

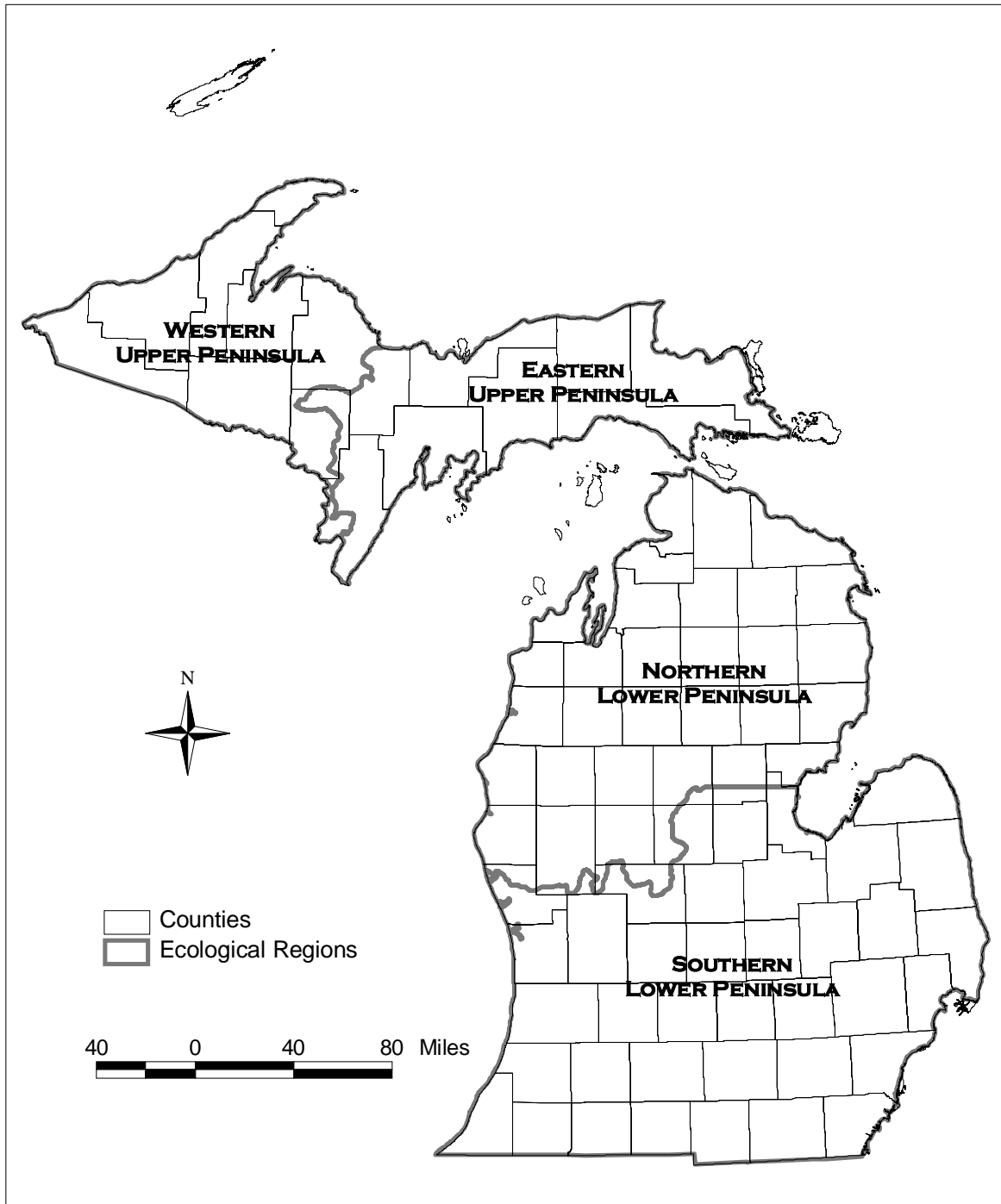
Regional Importance in Michigan

For each of the four ecological regions within Michigan, indicate the extent to which this plant has been identified as a problem.

<p>Within each region identify whether the plant is:</p> <p>(see glossary for definitions).</p>	<p>N (naturalized) W (widespread) L (localized) I (isolated occurrences) A (absent)</p>
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For ratings of N or W, please enter the date of earliest reported occurrence in that region. Transfer the rating for each ecological region to the Distribution Subrank at the end of this section. If the date identified as a problem is unknown place (Unk) in the appropriate place.

Ecological Regions	Rating	Date
Western Upper Peninsula (WUP)		
Eastern Upper Peninsula (EUP)		
Northern Lower Peninsula (NLP)		
Southern Lower Peninsula (SLP)		



List the Michigan counties with known infestations (if there are many counties covering large areas, those areas may be identified. For example, “all counties in the Lower Peninsula” is acceptable in lieu of listing out all those counties):

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

The following information is not scored in the assessment system however it is used to aid in determining the presence of this plant in surrounding states or provinces.

Problem in nearby states

Has this plant has been identified by land managers within Indiana, Illinois, Wisconsin, Ohio, and Ontario as a problem.

Please check the states/provinces and provide the appropriate documentation	
<input type="checkbox"/>	Indiana
<input type="checkbox"/>	Illinois
<input type="checkbox"/>	Wisconsin
<input type="checkbox"/>	Ohio
<input type="checkbox"/>	Ontario

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

Identify other areas in the U.S. in which it has been identified as a problem by land managers.

Some plants are not invasive everywhere they occur in the U.S., but only in certain regions or habitats. For instance, Tamarisks are severe riparian and wetland pests from California to Texas and north at least to Kansas, but while they escape occasionally in the eastern U.S., they have not been reported as a problem.

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

Current trends in total range within the United States.

Choose one answer that best describes the current trend:	
<input type="checkbox"/>	Declining or Historical
<input type="checkbox"/>	Stable
<input type="checkbox"/>	Increasing
<input type="checkbox"/>	Unknown

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

Michigan Distribution Subrank: Section III Distribution In Michigan

Western Upper Peninsula (WUP)	
Eastern Upper Peninsula (EUP)	
Northern Lower Peninsula (NLP)	
Southern Lower Peninsula (SLP)	

Section IV. Control Methods

Control Methods document the availability of mechanical, chemical, biological, and fire as a resource in managing or eradicating the plant in question. Control Methods are reported as available (A), not available (NA), or under development (UD).

Control methods available

IV-A. Are Control Methods currently available for this plant?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
If yes proceed to IV –B, No = NA (non available) in all the control categories.		

IV- B. Control Methods Currently Available

Mechanical: (Check all that apply)			
<input type="checkbox"/>	Hand pulling	<input type="checkbox"/>	Pulling using tools
<input type="checkbox"/>	Mowing/Cutting	<input type="checkbox"/>	Stabbing
<input type="checkbox"/>	Girdling	<input type="checkbox"/>	Tilling
<input type="checkbox"/>	Soil Solarization	<input type="checkbox"/>	Flooding
<input type="checkbox"/>	Grazing	<input type="checkbox"/>	Other
None marked = NA in the Control Method Subrank ≥ 1 marked = A in the Control Method Subrank If you did not mark any methods and are aware of methods under development please include the information in the comments section below and mark UD in the Control Method Subrank			

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

Biological Control Agents:

	Control Method Subrank
Released/available biological control agents	A
Biological control agent currently being researched Please include information in the comments section below	UD
No known biological control agents available	NA

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

The following information will not be scored in the assessment however it is useful in determining MIPC Plan of Action.

Biological Control testing

Identify the crops/plants that the biological control agents have been tested on.	
Is the biological control agent known to have a negative impact on non-target species?	<input type="checkbox"/> YES <input type="checkbox"/> NO
If yes, identify the impacts species:	

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

Chemical herbicides

Chemical Herbicides: (Check all that apply)			
<input type="checkbox"/>	Pre-emergence herbicides available	<input type="checkbox"/>	Contact herbicides
<input type="checkbox"/>	Post emergence herbicides available		
None marked = NA in the Control Method Subrank ≥ 1 marked = A in the Control Method Subrank			

If you did not mark any methods and are aware of methods under development please include the information in the comments section below and mark UD in the Control Method Subrank

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

Fire

Fire can control the spread of invasive species into or within natural areas.

Response to fire.			
<input type="checkbox"/>	Prescribed burns*	<input type="checkbox"/>	Spot burning*
None marked = NA in the Control Method Subrank ≥ 1 marked = A in the Control Method Subrank			

If you did not mark any methods and are aware of methods under development please include the information in the comments section below and mark UD in the Control Method Subrank

*Refer to IV-C to determine whether a plant's response to fire requires consideration in planning for or using this method.

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

The following information will not be scored in the assessment however it is useful in determining MIPC Plan of Action .

Response to fire

Many invasive species have the potential to invade burned areas. Since plants respond differently to varying levels of fire intensity, it is important from a managerial standpoint to determine which plants will survive and/or invade burned areas as well as determining which invasive plants are controlled by fire.

Response to fire: (Check all that apply)			
<input type="checkbox"/>	well adapted to fire	<input type="checkbox"/>	numbers decline after fire
<input type="checkbox"/>	top killed	<input type="checkbox"/>	numbers increase after fire
<input type="checkbox"/>	sprouts readily from rhizomes	<input type="checkbox"/>	seeds survive in seed bed
<input type="checkbox"/>	killed by high intensity fires	<input type="checkbox"/>	seeds are dispersed easily in a burned area
<input type="checkbox"/>	killed by low intensity fires	<input type="checkbox"/>	seed dormancy broken by fire
<input type="checkbox"/>	the presence of this plant can contribute to increased fire potential and/or intensity		

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

Control Method Subrank: Section IV: Control Method Subrank

Method	Score	Method	Score
Mechanical		Chemical	
Biological		Fire	

Section V. Management Effort

Management effort identifies management potential (investment in human and financial resources) and management activity (programs being presently conducted). For most statements, no particular control methods are specified but responses should relate to the methods that are most likely to be used (refer to section IV). Management potential considers feasibility, costs, and unavoidable non-target damage. Management activity identifies current programs being employed to suppress or eradicate this plant in public and private arenas.

V-A Management Potential

Documentation must be provided. Add all points from statements which are true for this plant and record the point at the bottom of this section.

Statement	Options	Points
Despite investigation, no legally permissible and effective herbicide treatments are available and cutting or mowing alone are not sufficient to eliminate this plant.	<input type="checkbox"/> YES 15 points	
This plant is difficult to control without significant damage to native species because: it is widely dispersed throughout the sites (i.e., does not occur within discrete clumps nor monocultures); it is attached to native species (e.g., vine, epiphytes or parasite); or there is a native plant which is easily mistaken for this invader.	<input type="checkbox"/> YES 10 points	
Total contractual costs of known control method per acre in first year, including access, personnel, equipment, and materials (any needed re-vegetation is not included) exceeds \$2,000/acre (2002 estimated control costs are for acres with a 50% infestation).	<input type="checkbox"/> YES 5 points	
Further site restoration is necessary following plant control to reverse ecosystem impacts and to restore the original habitat-type or to prevent immediate re-colonization of the invader.	<input type="checkbox"/> YES 5 points	
Following the first year of control of this species, it would be expected that individual sites would require re-survey or re-treatment, due to recruitment from persistent seeds, spores, or vegetative structures, or by dispersal from outside the site: (choose one)	<input type="checkbox"/> multiple times per year (15 points) <input type="checkbox"/> once a year for the next 5 years; (10 points) <input type="checkbox"/> one to 4 times over the next 5 years; (6 points) <input type="checkbox"/> regrowth not known. (2 points)	
Total Points		

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

Management Potential Subrank: Section V-A Management Potential

Add the total points:	Value
< 15 = High potential for control >=15 = Low potential for control	
Transfer information to the Management Effort Subrank	

V-B MANAGEMENT ACTIVITY

Given the current state of knowledge regarding control methods, are activities being employed to suppress or eradicate this plant in Michigan. <input type="checkbox"/> YES <input type="checkbox"/> NO			
If yes please provide documentation on management efforts being used: method(s); agency(ies); location(s).			
Public Lands		Private Lands	
<input type="checkbox"/>	Federal (F):	<input type="checkbox"/>	Non-profit organizations (O):
<input type="checkbox"/>	State (S):	<input type="checkbox"/>	Commercial (C):
<input type="checkbox"/>	Municipal (M):	<input type="checkbox"/>	Individual (I)

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

Management Activity Subrank: Section V-B Management Activity

Indicate whether management activities are being employed by a letter indicating the sector involved: federal (F), state (S), municipal (M), non-profit organization (O), commercial (C), individual (I).	Value
Transfer information to the Management Effort Subrank	

Section V. Management Effort Subrank

	Value
Management Potential	
Management Activity	

Section VI. Value within Michigan

Value within Michigan indicates economic, aesthetic, erosion control, and wildlife habitat value. Value is designated either as high (H), low (L), or none (N) in each of the respective categories.

Does this plant have any value?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
If response is NO then VI = N in the value subrank table If response is YES then go to Section VI-B		

VI-A. Factors that Indicate a Economic, Aesthetic, Erosion Control or Wildlife Habitat

Add the points from statements that are true for this plant. Please provide documentation on the size, scope, and extent of the use of the designated plant. Please provide state and federal statistics where applicable. Record the score in the table following this section.

Agriculture: Crops and Forage		
This plant constituents more than 10% of the crop on commercial farms producing and/or using this plant within the State.	<input type="checkbox"/> YES 5 points	<input type="checkbox"/> NO 0 points
This plant has provided a crop, forage, or seed source (e.g., forage, nectar) that has been or resulted in a source of commercial income within the state.	<input type="checkbox"/> YES 5 points	<input type="checkbox"/> NO 0 points
This plant has provided a crop, forage, or seed source (e.g., forage, nectar) that is used by the general public within the state	<input type="checkbox"/> YES 3 points	<input type="checkbox"/> NO 0 points

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

Horticulture (Fruit, Vegetable, Herbs, and Ornamentals)		
This plant constitutes more than 10% of the crop produced or sold by commercial growers within the State	<input type="checkbox"/> YES 5 points	<input type="checkbox"/> NO 0 points
This plant has provided a crop, forage, and/or seed source that has been or resulted in a source of commercial income within the state	<input type="checkbox"/> YES 5 points	<input type="checkbox"/> NO 0 points
This plant has provided a crop, forage, or seed source (e.g., forage, nectar) that is used by the general public within the state	<input type="checkbox"/> YES 3 points	<input type="checkbox"/> NO 0 points

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

Turf (Sod, Golf Course, Commercial Turf (sport fields, schools, etc)		
This plant constituents more than 10% of the crop produced or sold by commercial growers within the state	<input type="checkbox"/> YES 5 points	<input type="checkbox"/> NO 0 points
This plant has provided turf, forage, and/or seed source that has been, or resulted in a source of commercial income within the state	<input type="checkbox"/> YES 5 points	<input type="checkbox"/> NO 0 points
This plant contribute significantly to recreation and leisure activities	<input type="checkbox"/> YES 3 points	<input type="checkbox"/> NO 0 points
This plant is used in land development (public and private property)	<input type="checkbox"/> YES 3 points	<input type="checkbox"/> NO 0 points

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

Forestry (Wood, Pulp, Christmas Trees)		
This plant constitutes more than 10% of the crop produced, managed, or sold by commercial forest/Christmas tree operations within the state	<input type="checkbox"/> YES 5 points	<input type="checkbox"/> NO 0 points
This plant has provided timber, pulp, plantations, seedlings/transplants, and/or seed orchards that has been or resulted in a source of commercial income for public and private forestry	<input type="checkbox"/> YES 5 points	<input type="checkbox"/> NO 0 points
This plant has value added wildlife and environmental benefits during production cycles within forest operations	<input type="checkbox"/> YES 5 points	<input type="checkbox"/> NO 0 points
This plant has provided timber, plantations, seed orchard, or recreational uses by non-commercial property owners within the state	<input type="checkbox"/> YES 3 points	<input type="checkbox"/> NO 0 points

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

Landscape (Public and Private)		
This plant is currently sold in national or regional retail stores, Michigan garden centers, horticultural distribution centers or by landscape contractors	<input type="checkbox"/> YES 5 points	<input type="checkbox"/> NO 0 points
This plant is used in residential and commercial landscapes	<input type="checkbox"/> YES 5 points	<input type="checkbox"/> NO 0 points
This plant is use in public landscapes	<input type="checkbox"/> YES 5 points	<input type="checkbox"/> NO 0 points

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

Erosion: Soil and Water Erosion

This plant has been and/or is currently used in erosion control practices such as soil erosion, storm water management, phyto-remediation, bank stabilization, etc.

☐ **YES**
5 points

☐ **NO**
0 points

This plant is specified and used by federal and state agencies in erosion control practices

☐ **YES**
5 points

☐ **NO**
0 points

This plant is specified and used by private contractors in erosion control and/or habitat restoration

☐ **YES**
5 points

☐ **NO**
0 points

This plant provides value added benefits in wildlife conservation

☐ **YES**
3 points

☐ **NO**
0 points

Level of Documentation

Place a check next to the most accurate category and briefly explain

☐

Reviewed scientific publication

☐

Observational

☐

Other published material

☐

Anecdotal

Comments, supportive evidence, and explanation of documentation level:

Wildlife: Food and Shelter

This plant is currently used in wildlife management	<input type="checkbox"/> YES 5 points	<input type="checkbox"/> NO 0 points
This plant is specified or used by wildlife organizations in habitat restoration or feed plot establishment	<input type="checkbox"/> YES 5 points	<input type="checkbox"/> NO 0 points
This plant is specified and used by federal and state agencies in providing shelter and/or feed sources on public lands	<input type="checkbox"/> YES 5 points	<input type="checkbox"/> NO 0 points
This plant provides value added benefits in soil and water conservation	<input type="checkbox"/> YES 3 points	<input type="checkbox"/> NO 0 points

Level of Documentation

Place a check next to the most accurate category and briefly explain			
<input type="checkbox"/>	Reviewed scientific publication	<input type="checkbox"/>	Observational
<input type="checkbox"/>	Other published material	<input type="checkbox"/>	Anecdotal
Comments, supportive evidence, and explanation of documentation level:			

Value Within Michigan Subrank: Section VI: Value within Michigan

Please total the points for each area and place them in the appropriate column.

Subrank	Agriculture	Horticulture	Turf	Forestry	Landscape	Erosion Control	Wildlife Habitat
	Crop and Forage	Fruit, Vegetable, Ornamentals	Sod, Golf Course, Commercial Turf	Wood, Pulp, Christmas Trees	Public and Private	Soil and Water	Food and Shelter
Points							
Rating	0=N <5= L >8 =H	0=N <5= L >8 =H	0=N <5= L >10 =H	0=N <5= L >8 =H	0=N <5= L >10 =H	0=N <5= L >8 =H	0=N <5= L >8 =H

Section VII. Invasiveness Rank, MIPC Plan of Action, and Plant Summary Report

Section VII is for use by MIPC. The Invasive Plant Assessment Committee will use the information provided in Sections I-VI to establish an Invasiveness Rank (based on Potential Invasiveness and Impact for each systems within the four ecological regions), a MIPC Plan of Action, and a Plant Summary Report.

Potential Invasiveness

Potential Invasiveness is a based on biological characteristics that may predispose a plant to invasive behavior. Reproductive Ability (Seed and Vegetative) + Dispersal = Potential Invasiveness.

Determine a Reproductive Ability value for this plant using the table below and the scores from the Seed and Vegetative reproduction sections on Biological Character

Reproductive Ability

Table of Reproductive Ability Values

		Vegetative Reproduction			
		H	M	L	I
Seed Reproduction	H	H	H	H	H
	M	H	M	M	L
	L	H	M	L	L
	I	H	I	I	I

	Value
Enter the Reproductive Ability Value for this plant:	

Use the Reproductive Ability Value and the Dispersal rating from Section 1. to determine the Potential Invasiveness Value for this plant from the table below.

Potential Invasiveness

Table of Potential Invasiveness Values

		Dispersal			
		H	M	L	I
Reproductive Ability	H	H	H	M	M
	M	H	M	M	L
	L	M	M	L	L
	I	I	I	I	I

	Value
Enter the Potential Invasiveness Value for this plant:	

Invasiveness Rank is a function of Potential Invasiveness and Impact. Impact is the expression of potential invasiveness under a given set of environmental conditions within a system (Natural System, Forest Production, Constructed Habitats, Ag/Hort/Turf Production, and Urban and Suburban Landscapes). Impact may vary among or within ecological regions. A plant's impact may occur over a broad set of environmental conditions (temperature, light, water) or be limited by one or more factors specific to a system or ecological region.

Table of Invasiveness Rank

		Impact			
		H	M	L	I
Potential Invasiveness	H	H	H	M	M
	M	H	M	M	L
	L	M	M	L	L
	I	I	I	I	I

Invasiveness Rank

Determine the Invasiveness rank for each system:	Value
Natural System	
Forest Production	
Ag/Hort/Turf Production	
Constructed Habitats	
Urban and Suburban Landscapes	

Regional Importance

Distribution establishes the regional importance of a plant's impact on Michigan's natural, production, managed, and constructed systems. Use Invasiveness rank for each system and the Regional Impact rating for each ecological region from Section III. to determine regional importance. Regional importance is recorded as: high (H); medium (M); and low (L); and Insignificant (I)

Conversion table for determining Regional Importance

		Regional Impact			
		N	W	L	I
Invasiveness Rank	H	H	H	M	I
	M	H	M	M	I
	L	M	M	L	I
	I	I	I	I	I

Regional Importance

Regional Importance in five system types in each of four ecological regions.

Record the Invasiveness Rank for each system within each ecological region below.		System Type				
		Natural	Constructed Habitats	Managed Forests	Suburban/Urban	Ag/Hort/Turf
Ecological Region	WUP					
	EUP					
	NLP					
	SLP					

This information will aid in assessing and determining the overall MIPC Plan of Action.

MIPC Plan of Action

MIPC Plan of Action is based on the information obtained through this assessment. The Plan of Action is develop by the MIPC Invasive Plant Assessment Committee for review and endorsement of the MIPC Board of Directors. The Plan of Action outlines recommendation that may include one or all of the following: Education; Suppression; Restoration; and Elimination.

References

References	
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Glossary

Absent	Not present in the ecological region
Anthropogenic disturbance	Human-induced disturbance (e.g., mowing) or human-induced changes in natural disturbance regime (e.g., changing the frequency, extent, or severity of fires).
Coverage	Visual or quantitative estimate of the relative amount of area in a stratum where the canopy of the non-native species intercepts the light that would otherwise be available for other species in or below that stratum. Estimated cover may be dispersed or continuous in a site. Cover is usually measured when foliage is fully expanded. In the case of species that form a dense, continuous mat of rhizomes or stolons, the percent of the soil surface or upper level occupied by that root mat can be estimated as soil, rather than canopy, cover.
Disturbance	Mechanisms that limit biomass by causing its partial or total destruction.
Discrete sites.	Disjunct habitat-types or fragments of habitats at least 1 mile apart that support invasive plant populations that likely arose by separate long-distance dispersal mechanisms.
Documentation of evidence	One publication including relevant, original research will suffice if data are specific to the taxon and zone(s) under evaluation. If such documentation is not available or needs to be up-dated, at least three individuals who have the expertise on the particular species and zone in question must be identified.
Formal Risk Benefit Analysis	Detailed economic studies of impact and management costs and commercial value for present and future infestations.
Invasive	Invasive species means an alien species whose introduction does or is likely to cause economic or environmental harm, or harm to human health (Executive Order 13112, February 1999). Furthermore, to be considered invasive, the negative impacts caused by a non-native species will be deemed to outweigh the beneficial effects it provides (ISAC White Paper, Invasive Species Definition Clarification and Guidance White Paper, 2006).
Isolated	Present in small disjointed patches within an ecological region.
Localize	Found to be prevalent in a localized area within an ecological region.
Long-term alterations in ecosystem processes	Examples of ecosystem processes that could be altered: erosion and sedimentation rates; land elevation; water channels; water-holding capacity; water-table depth; surface flow patterns; rates of nutrient mineralization or immobilization; soil or water chemistry; and type, frequency, intensity, or duration of disturbance. For further explanation see Gordon (1998).
Native	Species within its natural range or natural zone of dispersal (i.e., within the range it could have, or would have, occupied without direct or indirect introduction and/or care by humans. Excludes species descended from domesticated ancestors) (Vitousek <i>et al.</i> 1995).
Natural areas	Natural areas: Areas with native plant communities supporting native plant and animal species, with long undisturbed soil systems, and hydrological regimes relatively intact or under restoration. Edges of historically or currently disturbed

	areas (roadsides, trails, adjacent to historically disturbed locations, etc.) should not be included in the assessment of invasion into natural areas. That invasion may have been facilitated by the edges, but has to have extended into the native communities for inclusion in this category.
<i>Naturalized</i>	Of foreign origin but established and reproducing itself as though a native and abundant throughout the ecological region across multiple systems.
<i>Pollen or genetic invasion</i>	When a native species is displaced by a non-native species through hybridization.
<i>Stratum</i>	A distinct layer in the architecture of vegetation (e.g., tree canopy or understory shrubs).
<i>Widespread</i>	Found throughout the ecological region within a limited systems.

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