OAK OPENINGS INVASIVE PLANT MANAGEMENT STRATEGY

Version 1.0, September 2019

Contents

Introduction

The Green Ribbon Initiative (GRI) is a regional coalition of conservation groups partnering to conserve, enhance, and restore critical natural areas in the Oak Openings Region. GRI's comprehensive strategic plan entitled "The Blueprint for Conservation in the Oak Openings" identifies invasive species as a high-ranking threat to ecosystem targets in the Oak Openings including wet prairie, oak savanna, oak forest, flatwoods, and floodplain forest. In order to reduce the threat of invasive plant species, the blueprint calls for GRI partners to "collaboratively manage invasive plants by implementing the Oak Openings Invasive Plant Species Management Plan" (Blueprint Strategic Action 1)

This document facilitates the collaborative invasive plant management identified in Strategic Action 1 by following an integrated pest management (IPM) approach. IPM encourages a wholistic approach to pest management and consists of a series of comprehensive actions rather than treatment of individual species. This approach results in efficient and cost-effective management. Actions commonly associated with IPM include monitoring and identifying problem species, preventing new threats, and controlling species using biological, chemical, mechanical, cultural and regulatory controls.

The primary goal of the plan is to increase capacity across multiple agencies to prevent, detect, and control invasive species in the Oak Openings Region. This goal will be met by completing tasks associated with four objectives: **1. Develop and utilize a science-based methodology to assess the risk of invasive plant species, 2. Prioritize and strategically implement management across partnerships, 3. Decrease likelihood of new species establishing and spreading through vector control and early detection rapid response (EDRR), 4.Prevent the introduction and limit the spread through public outreach, staff training, and information sharing.** Application of the management plan at a regional scale will help to minimize the negative effects of invasive plants and increase the value of natural areas.

In order to ensure regional progress towards the treatment and control of invasive species, GRI partners will form a cooperative weed management area (CWMA)hat meets regularly, maintain funding for a CWMA coordinator, and work to secure resources for high-priority invasive species projects identified by tools provided in the plan.

Primary landowning partners that benefit from this document include Metroparks Toledo, Huron-Clinton Metroparks Authority, Ohio Department of Natural Resources, Michigan Department of Natural Resources, Wood County Parks, Bowling Green Parks and Recreation, The Nature Conservancy, The Olander Park System, Wayne County Parks, Southeast Michigan Land Conservancy, Oak Openings Region Conservancy, and Black Swamp Conservancy. Secondary landowning partners include private landowners on the landowner registry. Other partners are university and volunteer organizations including University of Toledo, Bowling Green State University, and WildOnes Oak Openings Chapter.

Planning Participants: This conservation plan was developed in 2019 with input from the University of Toledo, The Nature Conservancy, and Metroparks Toledo and review from the Stewardship Subcommittee. It draws from previous planning efforts involving many partners and builds upon an existing framework for coordinated actions through the GRI. The primary participants in development of the first draft include Steve Woods and Ashlee Decker from the Nature Conservancy and Dr. Jon Bossenbroek and Sarah Guiher with the University of Toledo. This plan is a living document and will be updated as new information and opportunities arise.

General Strategy

Statement of Problem

Invasive plants are ranked as a high threat in all five ecosystem targets (table 1) in the Oak Openings Region. Invasive plant species threaten ecosystems as well as human populations and require significant financial investment to treat or remove. Natural communities are degraded through changes in structure (e.g. canopy cover, altered hydrology, increased nutrient loading), disruptions to the food web, loss of native flora and fauna, and increases in disease vectors such as mice and ticks. Examples of invasives commonly encountered in the region include privet, honeysuckles, autumn olive, and spotted knapweed in Oak Savannas; common and glossy buckthorn, purple loosestrife, reed canary grass, and phragmites in wet prairies; and garlic mustard, Japanese barberry, and multiflora rose in floodplain and upland woodlands (Guiher 2018). Because invasive species are not equal in the threat they pose and not all species threaten every type of habitat, developing strategic, prioritized plans for treatment is a crucial component of effective management.

Table 1. Five Major Community Types in the Oak Openings

Community Type	Characteristics
Wet Prairie	Hydric soils, seasonally inundated, dominated by sedges, tree canopy primarily comprised of oak species and typically <20% cover, shrub cover low or absent
Savanna/ Upland Prairie	Sandy soils, dominated by native grasses (big bluestem, little bluestem, indiangrass) and forbs, tree canopy primarily comprised of oak species and typically 20-40% cover, shrub cover (blueberry, raspberry) averages 20%, 1-10 snags per acre
Deciduous Forest	Sandy soils, tree canopy primarily comprised of oak species and typically >80% cover, shrub cover (blueberry, witch hazel, sassafras, young oak) approximately 20%, >10 snags per acre
Floodplain Forest	Poorly to moderately drained soils, within floodplain of stream or ditch, tree canopy primarily comprised of eastern cottonwood, sycamore, and ash at >80% cover
Flatwoods Forest	Seasonally inundated hydric soils or muck overlaying sandy soils, tree canopy comprised primarily of pin oak and swamp white oak at >80% cover, herbaceaous layer may be patchily distributed where sunlight penetrates canopy

Scope of Work

Geographic: The scope of the work is limited to property within the Lake Plain Oak Openings Region. However, the threat described is consistent throughout the Upper Midwest and products of this project may have wider ranging usefulness. Within the region, work will be focused in Priority Conservation Areas identified using a GIS-based ecological model to target areas where restoration activities will have the highest likelihood of success and the greatest benefit to priority species (Figure 1).

Temporal: Implementation of strategy is likely to be ongoing, but for the purpose of this plan we present details for 2020 through 2030.

Operational: This document facilitates the efficient management of invasive plant species in the Oak Openings Region as identified in Strategic Action 1 of the GRI comprehensive strategic plan entitle "The Blueprint for Conservation in the Oak Openings". This plan guides partners in invasive plant management through prioritizing species for control, providing tools to efficiently control the highest priority invasive species on their properties, and describing future activities and needs. Actions associated with securing funding and partnership development (Blueprint SA-2) are not included in the Operational Scope of this document.

Related Plans and Strategies

Blueprint for Conservation in the Oak Openings- This document is an updated comprehensive plan for conservation in the Oak Openings. It was created by partners of GRI in 2019 after a series of planning meetings in 2017/2018. The plan identifies 4 major threats to the Oak Openings and provides strategies for mitigating those threats. Threats include invasive species,

Michigan Terrestrial Invasive Species Plan- Outlines a statewide strategy for to reduce the environmental and economic cost of invasive species on land through prevention, early detection and response, control and restoration, and collaboration. The Oak Openings Invasive Plant Management Plan is aligned with the major goals with this plan.

Ohio and Michigan Pesticide Applicators Manuals- Training manuals for each state that include current laws and safe practices for applying pesticide. The manuals are intended to prepare practitioners for state certifications, but can be used as reference guides for all field crew including seasoned practitioners.

- The Ohio pesticide manual can be obtained from: https://agri.ohio.gov/wps/portal/gov/oda/divisions/plant-health/pesticides/commercial-applicator.
- Michigan training manuals can be ordered at: https://www.canr.msu.edu/ipm/pesticide_education_safety/training_manuals/index

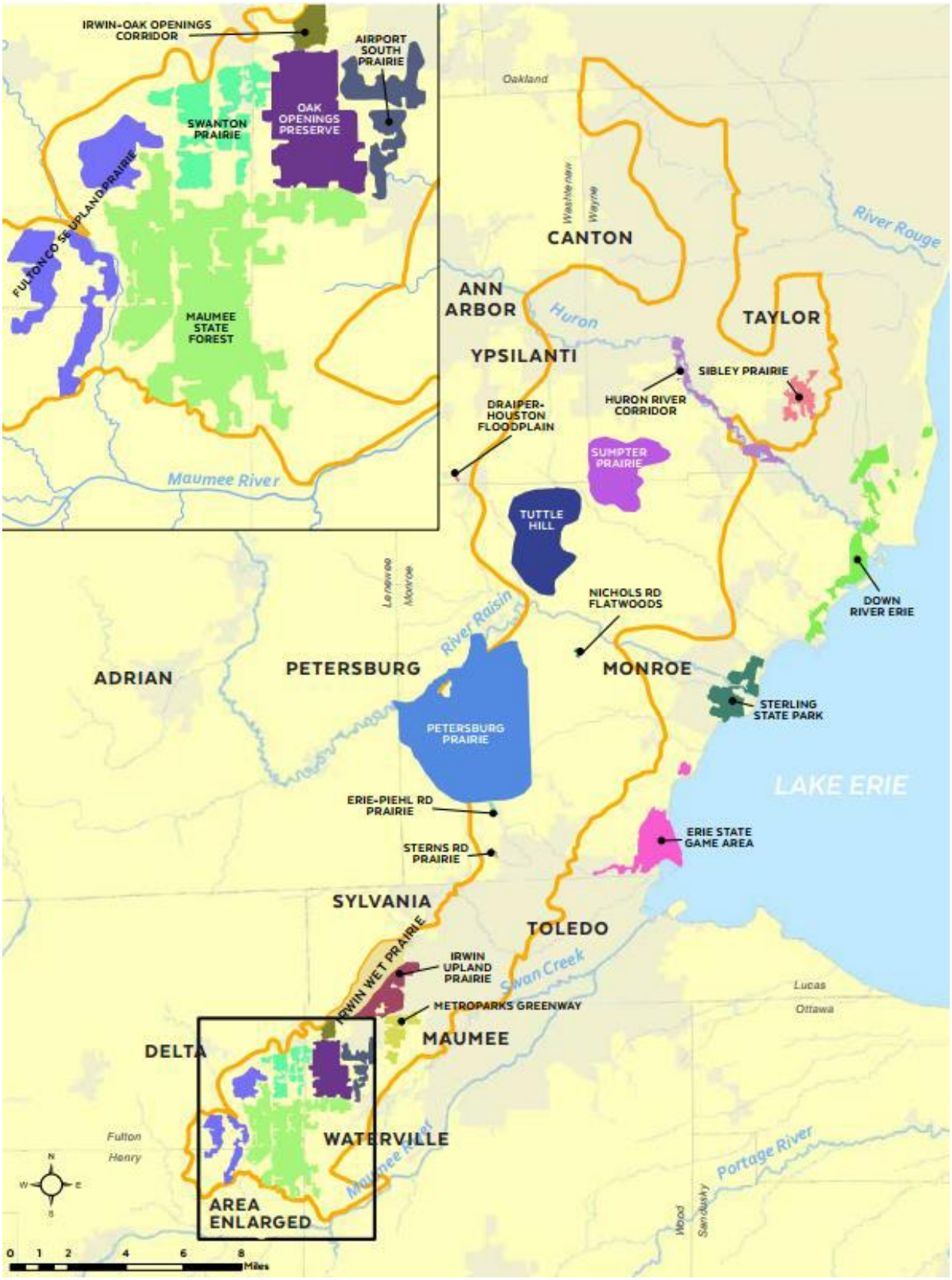

Figure 1. The Oak Openings Region and Priority Conservation Area

Goals and Objectives

The primary goal of the plan is to increase capacity across multiple agencies to prevent, detect, and control invasive species in the Oak Openings Region. This goal will be met by completing tasks associated with four objectives: **1. Develop and utilize a science-based methodology to assess the risk of invasive plant species**, 2. **Prioritize and strategically implement management across partnerships**, 3. **Decrease likelihood of new species establishing and spreading through vector control and EDRR, 4.Prevent the introduction and limit the spread through public outreach, staff training, and info sharing.** Application of the management plan at a regional scale will help to minimize the negative effects of invasive plants and increase the value of natural areas. Outlined below are brief narratives of activities associated with each objective and the current status. Tasks and timeline can be found in Section III: Operational Plan.

Objective 1: Develop and utilize a science-based methodology to assess the risk of invasive plant species and prioritize management activities

a. Develop protocol and assess invasive plants in the Oak Openings- The University of Toledo developed an assessment protocol to establish management priority for invasive plants within the region (Assessment Methodology and Score Sheet, Appendix A). The assessment is structured so that emerging species are considered a higher priority for management than widespread species that are difficult to manage, even if the two species have the same biological/ecological threat level. The Ohio Invasive Plant Council (OIPC) Assessment was used as the basis for the Oak Openings assessment and regional partners provided input to ensure that the end product was relevant to regional invasive plant management. The assessment consists of 25 questions within two sections: 1) Regional Ranking, and 2) Site Characteristics. As of 2018, 22 species were assessed and ranked (Appendix B). The output of the assessment is the Oak Openings Threat Matrix, which can be used as a decision support tool to inform the activities of land managers and their conservation staff. High ranking threats should be prioritized for treatment. The Threat Matrix is intended to be a living document and updated as new plant assessment are conducted. The Stewardship subcommittee has identified an additional 12 species to be assessed.

b. Map Priority Species to inform ecological models and identify priority projects. Mapping efforts should include private and public landowners adjacent to conservation lands or within Priority Conservation Areas (See Figure 1) and focus primarily on alert and target species outlined in the Threat Matrix, although any species encountered can be added. Partners are encouraged to report occurrence data to the Midwest Invasive Species Network (MISIN) so that data is shared with all partners and will help to track the introduction and spread of species. This data will also contribute to Early Detection Rapid Response (EDRR) and modeling efforts. MISIN, developed and maintained by Michigan State University, offers a website and mobile app open to professionals and the general public. Individual reports can be submitted, and MISIN also allows for bulk data submissions such as those associated with invasive plant monitoring.

c. Use Ecological Niche Modeling to guide Early Detection Rapid Response (EDDR) Management- Ecological Niche Modeling is used to predict areas likely to be invaded by invasive plants, thereby providing a framework that can be used by land management agencies to plan monitoring and management activities that focus on EDRR. GRI partner, The University of Toledo, created a model that combines species occurrence data with environmental variables to predict suitable habitat for the species of interest (Methodology in Appendix C). The model was used to examine potential distributions through two vectors of spread (roads and streams) for seven invasive plant species (*Alliaria petiolata, Berberis thunbergii, Celastrus orbiculatus, Elaeagnus umbellata, Frangula alnus, Rhamnus cathartica, and Rosa multiflora*) in the Oak Openings region of southeast Michigan and northwest Ohio. Future work should focus on expanding the database of presence points for invasive plant species in the region and running additional vector and pathway analyses. We expect increasing presence points to increase the accuracy of model outputs for each species.

Objective 2: Strategically implement management across partnership

a. Treat Invasive Species using Best Management Practices- Best Management Practices have been developed that outline pertinent information and a systematic control approach specific to the Oak Openings for priority species so that land managers can efficiently apply the most effective treatments at the right time of year. These are available to practitioners at www.oakopenings.org or in Appendix D. Land managers are encouraged to print and collate the BMP's in a binder for staff to have readily available in the field.

b. Communicate and Coordinate the timely treatment of priority species – Using the threat matrix and mapped locations of priority species, the CWMA coordinator will provide reminders, maps, and necessary BMP's to GRI partners and landowners throughout the year as a particular species is ready to be treated so that invasive species are being addressed in a strategic fashion throughout the region.

c. Train staff and volunteers in proper treatment techniques- The Green Ribbon Initiative has developed training modules to assist land managers in training staff and volunteers. These modules include PowerPoint presentations and lesson plans for herbaceous invasive species control, woody invasive species control, and restoration tools. The CWMA coordinator will hold two yearly trainings (one/state). Lesson Plans included in Appendix E. The coordinator will also hold trainings as needed for permanent staff on using the threat matrix and ecological model for identifying priority management units.

d. Evaluate treatments and actions- The Oak Openings Rapid Assessment Method (OORAM) was developed by the GRI Science Subcommittee to provide consistent means of assessing changes in quality on the landscape scale and across ownerships and of measuring site-level changes resulting from restoration activities. Evaluation of the size and extent of invasive species populations are a component of this method. Photographs should be taken before and after treatments. Protocol in Appendix F.

Objective 3: Decrease likelihood of new species establishing and spreading through vector control and EDRR.

a. Control or address pathways of introduction or spread- Partners and the CWMA coordinator will work collaboratively with industry to address pathways of introduction. Initial modeling indicates three modes of introduction/spread that stand out as potential opportunities: transportation corridors, the horticultural industry, and outdoor recreation. Next steps in this activity should include creating contact lists in industry and developing ways to address the issue. Reports of new species— All partners are encouraged to report alert and priority species to MISIN. Partners may share new alert species with the coordinator for faster repsonse. Some partners with minimal staff resources may not use MISIN, in this case the coordinator will serve as the hub for information intake and output. The CWMA coordinator will use the alert feature through MISIN for priority species and will email partners when a notice is recieved.

Objective 4: Prevent the introduction and limit the spread through public outreach and information sharing

a. Conduct outreach campaigns and workshops for target audiences. Audience appropriate subject matter should be selected on an annual basis and may include education on regulations or decontamination techniques. Audiences to consider include landowners, local government officials, and partner staff.

b. Expand and improve existing information-gathering. Engage and train partners and public in ID of high threat and reporting to MISIN.

c. Engage in proactive communication with and through existing partnerships- The CWMA coordinator should maintain communication with regional invasive species networks. This is an important form of cultural control and an essential part of EDRR.

d. Assess changes in attitude- through surveys of target audiences

e. Maintain a web presence- The Green Ribbon Initiative operates the website www.oakopenings.org. Included on this site will be a page for the Oak Openings CWMA with information for partners and landowners regarding the management of invasive species.

Measures of Project Success

Restoration Volume and Quality- One representative from each GRI agency will report annual treatment acres on properties within the Oak Openings Region and OORAM scores to the CWMA Coordinator.

Trainings Conducted- One representative from each GRI agency will report the number of invasive species trainings conducted, to whom, location, number of participants.

Partnership Tools and Resources

CWMA Coordinator- Currently a part-time position employed by The Nature Conservancy. This position is funded until 2021 with a grant from the US Forest Service. GRI partners will continue to seek funding for this position. The Coordinator is a resource for all CWMA partners.

Interagency Restoration Team- A team of grant-funded Oak Openings restoration experts employed through the Nature Conservancy. This team has the knowledge and tools to efficiently remove invasive species in the Oak Openings and work on high-priority projects identified by partners. The team is also available for contract when grant funding is not available. Contact Ashlee Decker for more information: ashlee.decker@tnc.org.

Plant Assessment Protocol and Threat Matrix- A decision-support tool for land managers and should be used to guide invasive species management. Developed using an invasive species assessments. (Appendix A and B)

Ecological Niche Model Methodology - Uses species occurrence data and environmental variables to predict suitable habitat for invasive plant species with Maxent. Outputs can be used to plan monitoring and management activities that focus on EDRR by predicting areas likely to be invaded by individual invasive plants. Appendix C.

Best Management Practices- Provide detailed information on invasive species management in the Oak Openings, including guidelines for mechanical, chemical, and biological treatments, prevention of spread by equipment, and specific methods for individual species. Appendix D.

Train-the Trainer Workshops- To be used by land managers and volunteers to train field staff and crews. Addressees management and monitoring efforts in the region while having a consistent message. Includes PowerPoint presentations and lesson plans for herbaceous invasive species control, woody invasive species control, monitoring for management, native seed collection and propagation and restoration tools. Lesson Plans in Appendix E.

Oak Openings Rapid Assessment Method Protocol- A method to quickly assess habitat quality and track improvements at both site and landscape scales. Protocol and Datasheets Appendix F.

Adopt-A-Natural Area- A program which provides opportunities for individuals, community groups, schools, corporations, or any community group to take an active part in the stewardship of local natural areas. Enrolled volunteers are provided with background information and training by the Green Ribbon Initiative. http://www.oakopenings.org/resources/volunteers/adopt-a-natural-area-program/. Contact ashlee.decker@tnc.org to connect a group with a property.

Operational Plan

Management and Organization

The Green Ribbon Initiative (GRI) is a group of more than 20 partners that have committed to the preservation and restoration of natural areas within the Oak Openings. Partners organize themselves into subcommittees and working groups. The Oak Openings Cooperative Weed Management Area (CWMA) is housed in the GRI Stewardship Subcommittee, creating a collaborative forum among land managers. The subcommittee meets at least twice per year and participating partners are encouraged to attend. A CWMA Coordinator will support implementation of invasive species projects on behalf of the GRI Stewardship Subcommittee to ensure that all activities are completed across ownerships in a cohesive fashion. Because the CWMA spans two states, the OO CWMA should strive to work collaboratively with the Michigan delineated Western Lake Erie CISMA where appropriate. Proactive communication should also be maintained with regional invasive species programs including: the Ohio Invasive Plant Council (OIPC), Midwest Invasive Species Network (MISIN), The Stewardship Network, Midwest Invasive Plant Network (MIPN), and other regional CWMA/CISMAs.

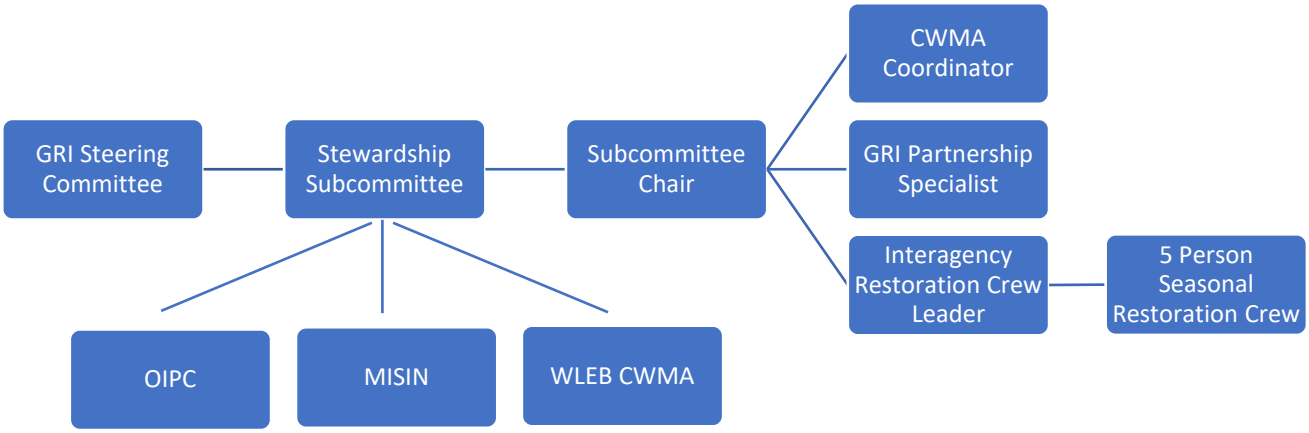

Figure 2. GRI and Oak Openings CWMA Organizational Structure

Job Descriptions

The following job descriptions can be found in Appendix G.

a. Subcommittee Chair

b. CWMA Coordinator

c. Interagency Restoration Team Crew members

Work Plan

The following tables outline actions and intermediate outcomes associated with each of the four objectives (Table 2) and the contact person currently involved in stewardship activities within the Oak Openings Region.

Table 2. 10-year work plan

OBJECTIVES	ACTIONS	INTERMEDIATE OUTCOMES	COMPLETION DATE	RESPONSIBLE PARTY
1. Develop and utilize a science-based methodology to assess the risk of invasive plant species	a. Oak Openings Invasive Plant Assessments	Assessment protocol developed and vetted with partners. 22 plant assessments completed.	completed 2018	UT/TNC
		10 additional species identified for assessment	2021	CWMA Coordinator
	b. Map Priority Species	enter priority species observed into MISIN from 2,000 acres of OORAM monitoring efforts	2021	CWMA Coordinator
	c. Ecological Niche Modeling	Model developed and tested on 7 species	2018	UT
		Continue collecting data points for improved output-- see 1b for intermediate outcome		All Partners
2. Prioritize and strategically implement management across partnerships	a. Treat Invasive Species using Best Management Practices	Best management practices developed for 20 species	2018	UT/TNC/Partners
		Develop 10 additional BMPs	2021	CWMA Coordinator/partners
		Treat 1,000 acres per year of invasive species across the Oak Openings Region in priority landscapes.	yearly	All Partners
	b. Evaluate treatments and actions	Develop protocol for monitoring at a landscape scale	Completed 2016	UT
		Digitize new assessment units for baseline monitoring (4,000 acres)	2020	CWMA Coordinator
		Conduct baseline surveys on 2,000 acres	2021	CWMA Coordinator
	c. Communicate and Coordinate	CWMA coordinator will attend at least one meeting with another regional CWMA	yearly	CWMA Coordinator
		CWMA Coordinator will proactively communicate with other regional invasive plant organizations	Ongroing	CWMA Coordinator
	d. Train conservation staff	Hold two trainings per year (1/state) for seasonal staff and volunteers	ongoing	CWMA Coordinator/ GRI Specialist

3. Decrease likelihood of new species establishing and spreading through vector control and EDRR.	a. Control or address pathways of introduction or spread	Identify major vectors of spread	completed 2018	UT
		Engage with at least 6 entities from the transportation and/or horicultural industry to co-host educational seminars OR discuss practices to minimize spread of invasive species	2025	CWMA Coordinator/Stewardship Subcommittee members
		Develop and disseminate signage and pamphlets for parks to educate guests on spread of invasive species during recreational activities	2025	Stewardship Subcommittee/ Education and Outreach Subcommittee
	b. Respond to reports of new species	CWMA Coordinator request information from conservation partners, submit information to MISIN as needed, and share alert messages from MISIN	ongoing	CWMA Coordinator
Prevent the introduction and limit the spread through public outreach, staff training, and info sharing.	a. Outreach campaigns, workshops	Host 2 educational workshop for an identified target audience.	yearly	CWMA Coordinator
	b. Expand and improve existing information-gathering-	Attend at least one meeting with another CISMA or regional CISMA gatherings	yearly	CWMA Coordinator
	c. Assess changes in attitude	Explore collaboration with university or partners to conduct a study for target audiences	ongoing	Stewardship Subcommittee
	d. Web presence	Create and maintain a webpage on www.oakopenings.org for invasive species information	2021	GRI Specialist

Table 3. Current Agency Representation

Agency	Name	Title	Phone	Email
Black Swamp Conservancy	Melanie Coulter	Conservation Manager	419-833-1025	mcoulter@blackswamp.org
Bowling Green Parks and Recreation	Cinda Stutzman	Natural Resources Specialist	419-353-0301	cstutzman@bgohio.org
Crosswinds Marsh	Jennifer Panek	Park Manager	734-654-1220	jpanek@waynecounty.com
Huron-Clinton Metroparks	Tyler Mitchell	Natural Resources Coordinator	810-494-6019	tyler.mitchell@metroparks.com
Metroparks Toledo	LaRae Sprow	Natural Resources Supervisor	419-779-6047	larae.sprow@metroparkstoledo.com
Michigan Department of Natural Resources	Zach Cooley	Wildlife Biologist	734-379-9692	cooleyz@michigan.gov
Ohio Department of Natural Resources	Ryan Schroeder	NW Region Preserve Manager	419-445-1775	ryan.schroeder@dnr.state.oh.us
River Raisin Institute	Brittany Leick	Program Coordinator	734-240-9682 ext.	bleick@rriearth.org
Southeast Michigan Land Conservancy	Julie McLaughlin	Stewardship and Outreach Specialist	734-484-6565	jmclaughlin@smlcland.org
The Nature Conservancy	Ashlee Decker	GRI Partnership Specialist	419-455-4192	ashlee.decker@tnc.org
The Nature Conservancy	Chris May	Director of Protecting Land &	517-316-0300	cmay@tnc.org
The Nature Conservancy	Brian Yahn	CWMA Coordinator	419-867-1521 ext.	brian.yahn@tnc.org
Wood County Parks	Adrian Lowien	Woodland Specialist	419-661-5113	alowien@wcparks.org