



LAKE ERIE WATERSHED COOPERATIVE WEED MANAGEMENT AREA FIVE YEAR PLAN

2021 - 2025

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Why is the targeting of invasive species important to the Lake Erie Watershed?

Invasive plants are non-native species that grow quickly and aggressively, spreading and displacing native species. Often, these species are introduced to regions far from their native range. In some cases, the species are transported or spread unknowingly by individuals within a localized area. Within these new locations, invasive species have the potential to cause harm to the ecosystem, the economy, as well as to human and animal health. By competing with and displacing native species, invasive plant infestations alter plant community structure, provide a host for disease and other troublesome species, alter nutrient cycling and hydrological processes; increase soil erosion and sedimentation; and reduce species diversity and ecosystem productivity. In their natural range, these species are limited by environmental factors such as pests and or diseases. When introduced into an area where natural controls are limited or absent, these species often become invasive, threatening fragile ecosystems.

From the dune and sand plain communities of the Lake Erie shore to the glacial wetlands farther south within tributary watersheds, the Pennsylvania Lake Erie Watershed supports some of the most ecologically rich habitats in the state. Invasive species pose a significant threat to the biological integrity of diverse ecosystems that intertwine within the region. With over 11,600 acres of publicly owned and managed lands, proactive agency staff, and engaged Non-Governmental Organizations active within the watershed, the region has a unique opportunity to work collectively to minimize the various threats posed by invasive species. The primary functions of the Lake Erie Watershed Cooperative Weed Management Area (LEW-CWMA) include the coordination of invasive species inventory, control, and education activities across the watershed. By prioritizing efforts, increasing the capacity of individual agencies and organizations, and leveraging funding for various control efforts, the formation of the LEW-CWMA has proven to be an effective method to preserve the quality and diversity of the Lake Erie Watershed's natural communities.

What is a CWMA?

Cooperative invasive species management is a topic that has grown in popularity in recent years. Collaborative efforts have been established under the titles of Cooperative Weed Management Areas, otherwise known as CWMAs, and Cooperative Invasive Species Management Areas, otherwise known as CISMAs. While CWMAs have a primary focus of combating the establishment and spread of invasive weed species, CISMAs strive to combat invasive species across various taxonomic groups. Both organizations function under the same overarching goal of bringing together landowners and land managers to coordinate action and share expertise and resources to manage invasive species. CWMAs and CISMAs are distinguished by these five characteristics:

- Defined geographical area distinguished by a common geography, invasive species concern, community, climate, political boundary, or land use.
- Involvement or representation of a diverse group of landowners and natural resource managers in the defined area.
- Led by a steering committee.
- Committed to continued cooperation.
- Function under the development of a comprehensive plan that addresses the management and prevention of one or more invasive species.

Historically, local communities have established various informal partnerships in an effort to combat invasive species. Informal partnerships have led to significant outcomes in many areas, but the commitment to continued cooperation created during the formation of a Cooperative Weed Management Area establishes a long-term relationship that will not disappear after a joint project is completed. This commitment creates a mechanism for ongoing resource-sharing and collaboration that can be a highly effective long-term strategy for dealing with a long-term problem. Locally driven CWMA's are especially effective at generating public interest in weed management and organizing community groups to support on-the-ground programs.

Mission

The Lake Erie Watershed Cooperative Weed Management Area (LEW-CWMA) provides a framework of communication, planning, and guidance to individuals, groups, organizations, and agencies engaged in the management of invasive plant species within the Lake Erie Watershed. The work of the CWMA provides educational opportunities for landowners and land managers, develops common management objectives, sets realistic management priorities, facilitates effective treatment, and coordinates efforts over geographical and municipal boundaries with similar land types, use patterns, and problem species.

Background

Pennsylvania's Lake Erie watershed is located within the northwestern corner of Pennsylvania on the southern shore of Lake Erie. The watershed is bordered by the State of Ohio to the west and the State of New York to the east. The watershed extends a minimum of 6.1 miles at its eastern border and a maximum of 25 miles near its western border south of Lake Erie. The watershed encompasses portions of Erie and Crawford counties and either portions or the full extent of 33 municipalities and townships. The over 500 square mile Lake Erie Watershed in Pennsylvania is home to the most ecologically diverse habitats in the state, harboring many rare, endangered, and threatened species and their habitats. Many of these occurrences and core habitats within the watershed have been designated as Natural Heritage Areas (NHAs) by the Pennsylvania Natural Heritage Program. Although invasive species are a concern throughout the entire region, prioritizing the use of limited resources within these sites offer the Lake Erie Watershed -

Cooperative Weed Management Area a unique, science based method to preserve, enhance, and restore areas of high ecological value within the watershed. The Lake Erie Watershed-Cooperative Weed Management Area will focus initial efforts within but not limited to the following areas:

Site	Natural Heritage Area	Description
<i>Global Significance</i>		
1	Presque Isle - Peninsula NHA	Diverse natural communities on the Peninsula include shoreline, sand dunes, sandplain and new ponds, marshes and old ponds, and several forest types. This site supports more than 70 species of conservation concern, more than any other NHA in the state.
2	Presque Isle - Bay NHA	As one of the best natural harbors along Lake Erie, Presque Isle Bay and its tributaries provide habitat for 15 species of conservation concern in PA. Two state endangered fish, Iowa darter and eastern sand darter, have refugia here.
3	Presque Isle - Gull Point NHA	This area is the only example of the Great Lakes beach-dune-sandplain complex in PA. Comprised of several dynamic lakeshore community types, the highly diverse Gull Point supports at least 53 species of conservation concern in PA.
<i>Regional Significance</i>		
1	Conneaut Creek NHA	This site supports populations of 14 species of conservation concern, including 4 mussels.
2	Erie Bluffs Coastline NHA	Centered around Erie Bluffs State Park, this site hosts the PA critically imperiled Great Lakes Bluff Seep community, only found on steep slopes adjacent to Lake Erie. There are 14 species and 2 communities of concern supported by this site.
3	Erie Bluffs East Swamp NHA	Swamps of Erie Bluffs State Park are home to the critically imperiled Great Lakes Region Lakeplain Palustrine Forest community. This habitat supports five plant species of conservation concern, including state endangered Shumard's oak and northern water-plantain.
4	Lower Elk Creek NHA	The waters, forests, and wetlands of Lower Elk Creek support 15 species of conservation concern in PA.
5	Roderick Reserve NHA	This site consists of a mix of upland forest and forested wetlands. These habitats support populations of 5 plant species of conservation concern. Included among these is PA endangered northern water-plantain.
6	West Branch Conneaut Creek NHA	Forests, forested wetlands, and aquatic habitats at this site support 11 species and two natural communities of conservation concern. Pumpkin ash, critically imperiled in PA, and Red Maple-Black-gum Palustrine Forest can be found here.
<i>State Significance</i>		
1	Asbury Woods - East NHA	Forested wetlands at this site support PA critically imperiled pumpkin ash.
2	Asbury Woods - West NHA	Forested wetlands at this site support 7 plant species of conservation concern in PA. Four of these are state endangered, including golden-fruited sedge, Bebb's sedge, slender spike-rush, and showy mountain ash.
3	Ashtabula Creek Headwaters NHA	This site supports PA critically imperiled pumpkin ash and is a candidate for classification as Elm-Ash-Maple Lakeplain Forest, a PA critically imperiled community type.

4	Cemetery Road Bluffs NHA	The PA rare Great Lakes Bluff Seep plant community type is found at this site. Seven plant species of conservation concern are supported here.
5	Conneauttee Creek NHA	Floodplain forests along Conneauttee Creek support a population of red currant, a PA threatened plant species.
6	Crooked Creek, Erie County NHA	This site supports a sensitive species of conservation concern.
7	Devil's Backbone NHA	Centered on Little Elk Creek, Devil's Backbone is a PA critically imperiled River Bluff Seep community that supports three plant species of conservation concern.
8	East Branch Conneaut Creek NHA	Forested waterways at this site provide aquatic habitat for two sensitive species of conservation concern.
9	Elk Creek NHA	The shale bluffs above Elk Creek support a River Bluff Seep community, critically imperiled in PA, which provides habitat for four plant species of conservation concern. Among these plants is state endangered Canada buffalo-berry
10	Elk Creek - McKean NHA	Riparian habitat at this site supports a sensitive species of conservation concern.
11	Erie Bluffs Sand Dune NHA	An ancient sand dune supports a Black Oak Savanna - Midwest Sand Barren plant community, found only on dry sand ridges and relict dunes of the Lake Erie Region. Two plant species of conservation concern are also found at the site.
12	Erie Bluffs West Swamp NHA	This site supports an Elm-Ash-Maple Lakeplain Forest community which is critically imperiled in PA. Populations for three plant species of conservation concern are found here, including state endangered Shumard's oak and pumpkin ash.
13	Fairview Business Park Wet Meadow NHA	Wet meadows at this site provide breeding habitat for a sensitive species of conservation concern.
14	Fairview Hatchery Ponds NHA	Alkaline aquatic habitats at this site support two species of damselfly and one dragonfly species of conservation concern in PA.
15	Fairview Swamp NHA	This wetland is likely the critically imperiled Elm-Ash-Maple Lakeplain Forest community type and supports two plant species of conservation concern: pumpkin ash and false hop sedge.
16	Falls Run NHA	The waters of Falls Run support two fish species of conservation concern: southern redbelly dace and brook stickleback.
17	Falls Run Gorge NHA	Riparian forest habitat along the Falls Run gorge supports populations of the globally vulnerable West Virginia white butterfly, three state rare plant species, and a sensitive species of conservation concern.
18	Falls Run - Shenango Creek Headwaters NHA	Forested and open wetlands at this site provide critical habitat for the state imperiled harlequin darter and a noctuid moth.
19	Fourteen Mile Point Beach NHA	Sandy beach habitat at this site hosts two plant species of conservation concern in PA: American sea-rocket and beach peavine, state threatened.
20	Gospel Hill NHA	Forest and aquatic habitats at this site support a sensitive species of conservation concern.
21	Greenlee Road NHA	Diverse wetland types support two plant species of conservation concern at this site. These include PA threatened prairie sedge and highbush cranberry.
22	Higmeier Road Park NHA	Forested wetland at this site supports the PA critically imperiled Elm-Ash-Maple Lakeplain Forest. A wet meadow provides habitat for state endangered northern water-plantain and state threatened stalked bulrush.

23	Howard Eaton Reservoir NHA	This site provides important habitat for two insects of special concern: bronze copper (butterfly) and white-faced meadowhawk (dragonfly).
24	Lake Erie Coastline - East of Raccoon Creek NHA	This site supports two plant species of conservation concern. These are the PA endangered variegated horsetail and PA threatened small-headed rush.
25	Lake Erie Coastline - Roderick NHA	This stretch of Lake Erie shoreline supports six plant species of conservation concern in PA. Among these species is the state endangered variegated horsetail.
26	Lake Erie Community Park NHA	Lake bluff and forest ravine habitats support three plant species of conservation concern. The Great Lakes Bluff Seep plant community, critically imperiled in PA, is also found at this site.
27	Lower Walnut Creek NHA	This site supports four species of conservation concern in PA. Among these are state threatened common hop-tree and state rare longnose gar.
28	McLane Fens NHA	There are five plant species of conservation concern that are supported by forested wetlands at this site. Kames, or small gravel hills created by glaciers, filter the water feeding these wetlands and create an alkaline environment that can support these rare plants.
29	Manchester Beach NHA	This beach natural community supports populations of 6 plant species of conservation concern. Among these is the PA endangered purple sandgrass.
30	Mercyhurst Fen NHA	Comprised of a PA critically imperiled Buckthorn-Sedge-Golden Ragwort Fen community, this site supports seven plant species of conservation concern. Among these are PA endangered hooded ladies' tresses orchid and small-headed rush.
31	Northeast Lake Bluff Seeps NHA	Only found along steep lake or stream side slopes in the Great Lakes ecoregion, this Great Lakes Bluff Seep community provides refugia for four plant species of conservation concern. Among these are PA endangered variegated horsetail and Carolina grass-of-parnassus.
32	Pond Road Wetlands - North NHA	Forested wetlands north of Pond Road support a population of larger St. John's wort, a plant species listed as threatened in PA.
33	Pond Road Wetlands - South NHA	This site contains an Elm-Ash-Maple Lakeplain Forest community, critically imperiled in PA. Eleven additional species of conservation concern have populations at this site.
34	Raccoon Creek Swamp NHA	This site is comprised of the PA critically imperiled Elm-Ash-Maple Lakeplain Forest community, and it supports a population of pumpkin ash, also critically imperiled in PA.
35	Raccoon Creek Beach NHA	This site supports several plant species of conservation concern, including the PA endangered variegated horsetail.
36	Roderick Ponds NHA	This cluster of artificial pond wetlands provides habitat for the state rare bronze copper butterfly, and both the amber-winged spreadwing and azure bluet damselflies.
37	Shades Beach NHA	This site supports seven plant species of conservation concern in PA, including state endangered golden-fruited sedge, bushy cinquefoil, and Canada buffalo-berry.
38	Six Mile Creek Gorge NHA	The steep gorge walls along Six-Mile Creek support a complex of River Bluff Seep communities, critically imperiled in PA. These bluffs, along with upland forest, floodplain, and riverine habitat support 6 species of conservation concern.

39	Sixteen Mile Creek Gorge NHA	Steep slopes along Sixteen Mile Creek support the Great Lakes Bluff Seep community type, critically imperiled in PA. Two plant species of conservation concern and one sensitive species of conservation concern are found at this site.
40	Springfield Township Vernal Pools NHA	This forested site contains several ephemeral pool wetlands, considered vulnerable in PA. These vernal pools vary in wetness throughout the year and provide critical springtime breeding habitat for amphibians like spotted salamander and wood frog.
41	Twenty Mile Creek NHA	This forested stretch of Twenty Mile Creek supports populations of three species of conservation concern and includes a River Bluff Seep natural community, critically imperiled in PA.
42	Twenty Mile Creek Beach NHA	Sandy beach and aquatic habitats at the mouth of Twenty Mile Creek support a state critically imperiled Great Lakes Sparsely Vegetated Shore community and nine plant species of conservation concern. Among these are PA endangered bushy cinquefoil and purple sandgrass.
43	Twenty Mile Creek Gorge NHA	Steep slopes along this forested section of Twenty Mile Creek support a River Bluff Seep community, critically imperiled in PA, and six additional species of conservation concern. Included among these are PA endangered golden-fruited sedge and capillary beaked-rush.
44	Vineyard Swamp NHA	Forested wetlands at this site support populations of two plant species of conservation concern: cyperus-like sedge and yellow water-crowfoot.
45	Walnut Creek Gorge NHA	Steep slopes support the state rare River Bluff Seeps. This site's forests and wetlands also support populations for six plant species of conservation concern. Among these are PA endangered golden-fruited sedge, variegated horsetail, and brook lobelia.
46	West Springfield - Route 20 NHA	This site supports an occurrence of racemed milkwort, critically imperiled in PA.
47	Wintergreen Gorge NHA	Steep slopes along Fourmile Creek support the PA critically imperiled River Bluff Seep community. Populations for at least four plant species of conservation concern are found here. Among these are state endangered golden-fruited sedge, and Canada buffalo-berry.

Over the last five years cooperative weed management has proven to be an effective method to address invasive species concerns throughout the region. The Lake Erie Watershed – Cooperative Weed Management Area effort has provided increased capacity to partnering organizations and allowed them to leverage their resources. The LEW-CWMA has conducted invasive plant inventories throughout the watershed, served as an effective mechanism for early detection in rapid response, undertaken treatment efforts at the regional scale, and provided educational opportunities for resource managers and private landowners alike. Multiple state agencies, non-governmental organizations, academic institutions, private landowners, and other and local community volunteers have worked together to restore and enhance several unique natural communities within the Lake Erie Watershed. Some highlights that have occurred since the group's inception include:

- 1.) Partnered with organizations such as the Pennsylvania Game Commission, Penn State University, Western Pennsylvania Conservancy, Lake Erie Region Conservancy, Audubon Society, Mercyhurst University, Erie and Crawford County Conservation Districts, Pennsylvania Department of Conservation and Natural Resources, as well as private property owners to complete treatment efforts on approximately 916 acres
- 2.) Identified the first known occurrence of hydrilla within the Pennsylvania Lake Erie watershed and led the rapid response effort to control this infestation
- 3.) Provided educational opportunities for both private landowners as well as natural resource managers at events such as Elk Creek Landowner Workshop
- 4.) Worked with regional stakeholders to form an *Ailanthus altissima*/Spotted Lanternfly working group
- 5.) Assisted in the establishment of the French Creek Watershed CWMA that is located directly to the southeast of the LEW-CWMA focal area

Target Species- The Lake Erie Watershed – Cooperative Weed Management Area has and will continue to actively manage the following species: Japanese barberry (*Berberis thunbergii*), Glossy Buckthorn (*Rhamnus frangula*), Exotic bush honeysuckle (*Lonicera spp.*), Tree of heaven (*Ailanthus altissima*), European black alder (*Alnus glutinosa*), Oriental bittersweet (*Celastrus orbiculatus*), Exotic privet (*Ligustrum Spp.*) Japanese Knotweed (*Fallopia japonica*), Multiflora rose (*Rosa multiflora*), Garlic mustard (*Alliaria petiolata*), Japanese stiltgrass (*Mircostegium vimineum*), Reed canary grass (*Phalaris arundinacea*), Myrtle (*Vinca minor*), Narrow leaf cattail (*Typha angustifolia*), Hybrid cattail (*Typha x glauca*), Common reed (*Phragmites australis*), Purple loosestrife (*Lythrum salicaria*)

Watch List Species – The Lake Erie Watershed – Cooperative Weed Management Area has and will remain vigilant in its monitoring of the following species:

Terrestrial Species: Porcelain berry (*Ampelopsis brevipedunculata*), Black swallowwort (*Cynanchum louiseae*), Pale swallowwort (*Cynanchum rossicum*), Lesser celandine (*Ranunculus ficaria*)

Aquatic Species: Brazilian waterweed (*Egeria densa*), Hydrilla (*Hydrilla verticillata*), Parrot feather watermilfoil (*Myriophyllum aquaticum*), Broadleaf watermilfoil (*Myriophyllum heterophyllum*), Yellow floatingheart (*Nymphoides peltata*), European Frogbit (*Hydrocharis morsus-ranae*), Water Chestnut (*Trapa natans*)

Goals

Globally, invasive species continue to spread and threaten quality of life. Locally, the productivity of private and public lands are at risk, and more specifically many of the ecologically rich and sensitive habitats within the Lake Erie watershed area being overwhelmed

by invasive plants. Members of the LEW-CWMA have worked collectively to establish and are committed to pursuing the following goals:

1. Prevent the introduction, reproduction, and spread of designated noxious weeds and invasive exotic plants within the Lake Erie Watershed.
2. Lead control efforts within priority areas to restore native species and habitats.
3. Increase awareness and support for the CWMA through education and outreach efforts.
4. Conduct seasonal invasive plant inventories to determine the distribution of species throughout the watershed.
5. Work collectively to increase the capacity of partnering organizations locally while also collaborating with other CWMA's and CISMAs throughout the state.

Prevention, Early Detection, and Rapid Response

The most feasible and effective strategy in the fight against invasive species is the prevention of their spread and establishment. Preventative measures offer the most cost-effective approach to reducing future environmental and economic impacts. However, if prevention efforts fail, early detection and rapid response (EDRR) provide a second critical step to minimize the negative implications of any new infestation. When new invasive species infestations are detected, a prompt and coordinated containment and eradication response can reduce environmental and economic impacts. This coordinated action results in a lower demand of resources and is less damaging than implementing a long-term control program after the species has established. The Lake Erie Watershed – Cooperative Weed Management Area has proven its effectiveness in Early Detection and Rapid Response efforts through activities such as the development of a regional early detection species list, conducting an early detection species workshop, identifying early detection species infestations, as well as proving the group's ability to lead coordinated rapid response control efforts.

Approach

The Lake Erie Watershed Cooperative Weed Management Area's approach to prevention, early detection and rapid response provides a comprehensive framework of education, inventory, monitoring and control. The LEW-CWMA will strive to provide educational opportunities to a broad audience through focused outreach, presentations, social media, and interpretive signage placed at recreational hotspots. With the growing utilization of the iMapInvasives database and mobile app, we will continue to encourage stakeholders to document invasive species wherever they might occur. All LEW-CWMA partners will be encouraged to participate in data gathering and be provided with training as well as login information for the iMapInvasives program. Finally, the Lake Erie Watershed Cooperative Weed Management Area will continue to

encourage landowners and interested individuals to report all new invasive species populations, and to take the initiative to manage their own properties with guidance from the LEW-CWMA.

Goal: Prevent the introduction, reproduction, and spread of designated noxious weeds and invasive plants into and throughout the Lake Erie Watershed.

1. **Objective:** Build upon the existing early detection framework and promote this mechanism amongst CWMA partners.
Strategy: Encourage partners to report all invasive species distributional data via the iMapInvasives website or mobile app and utilize the website's alert system.
2. **Objective:** Develop Best Management Practices (BMP's) to prevent the spread and establishment of invasive plants in road and utility ROWs and other possible transportation corridors.
Strategy: Work with the Pennsylvania Department of Transportation, utility companies, and municipalities to share and develop BMPs for the control of invasive species currently within Right of Way's (ROWs) and prevent the initial establishment of new invasive species.
3. **Objective:** Improve communication between existing natural resource professionals and growing volunteer networks.
Strategy: Provide opportunities for natural resource managers and private land managers to gather, expand knowledge of invasive species ID and control methods, and share expertise.
4. **Objective:** Encourage use of the online mapping tool for locational data.
Strategy: Encourage the use of iMapInvasives as a centralized, online mapping system that will show exact locations of invasive infestations and allow for the input of management actions and the consolidation of information across the watershed.
5. **Objective:** Continue to evaluate species status and develop fact sheets for distribution.
Strategy: Conduct a yearly assessment of the targeted species lists as part of the CWMA agenda and add species that are considered imminent invaders of the watershed.
6. **Objective:** Encourage the expansion of CWMA's activities to neighboring watersheds and municipalities.
Strategy: Share information, attend meetings and workshops, and consider across border projects with other CWMA's and invasive species control interests in adjacent jurisdictions.

Control, Management, and Restoration

Through the identification and prioritization of invasive species that will be controlled and managed, the LEW-CWMA will continue to effectively implement invasive species management plans. When an invasive species becomes established within an ecosystem, a strategic approach for control is required to minimize the impacts and reduce spread. Effective control relies on a clear understanding of the target species biology, the ecosystem in which it has established, as well as its paths of initial introduction and potential spread. Successful control also relies on persistent monitoring of treatment efficacy and follow up control as needed.

Approach

The steering committee of Lake Erie Watershed Cooperative Weed Management Area will meet two (2) times annually, one to discuss pre-season control efforts and prioritization and one to discuss post control season summary of efforts and success. Within these meetings, the group will also discuss potential projects that have been identified for upcoming seasons, control and management experiences and difficulties, species distribution and spread, as well as opportunities for education and collaboration.

Goal: Provide control efforts within priority areas to restore native species and habitats.

- Objective:** Perform reconnaissance within high priority locations determined by steering committee.

Strategy: Map areas of infestation, develop property specific management plans, and produce schedule for follow-up monitoring.
- Objective:** Reduce the extent and density of established invasive plants to an acceptable density for that vegetative community.

Strategy: Based upon the site inventory and evaluation data, determine a desired site objective including maximum coverage of invasive plants, frequency of maintenance applications, and indicators of property succession that can be references in future evaluations. Collaborate with partners to target and share available resources in an effort to reduce the density of established invasive plant populations.
- Objective:** Work with private landowners to provide management recommendations, expertise, and sources of funding to aid invasive plant control efforts.

Strategy: Prepare materials and disseminate to partners for distribution throughout the watershed. During interactions with private landowners, evaluate their interest and possible participation in CWMA led efforts to improve the quality of their respective property and the watershed. Work with willing landowners to develop a comprehensive management plan for their property and provide them with tools and management options for each target species present.

4. **Objective:** Initiate, facilitate, and support small-scale research projects on invasive plant control and management, and share results with the public.
Strategy: Working with partners and participants in the CWMA, consider options for incorporating research questions into management activities. Look for sources of support from partners, local industries, and various programs with a stake in the control of invasive species.
5. **Objective:** Work with local governments, schools, non-profit organizations, and state natural resource professionals to create programs to manage invasive species within municipal parks and publicly owned lands.
Strategy: Use the Presque Isle Weed Warrior program as a framework for pilot programs on municipal parks and publicly owned lands.
6. **Objective:** In designated priority areas restore native vegetation and reduce or eliminate invasive species.
Strategy: Promote the re-establishment of native species through natural processes (allowing the natural regeneration of native species through seed bank) or active management processes (replanting).

Education and Outreach

Effective education and outreach programs increase awareness of the threat invasive plants pose to natural resources, techniques used to manage these species, and the role humans play in the dispersal and establishment of invasive weeds. Awareness also provides an important first step in the detection of new invaders. Education includes the training of CWMA participants and associated agency personnel, private landowners, and the general public in weed identification, management techniques, monitoring protocols, and other skills needed for the successful control of noxious or other invasive plants.

Approach

The Lake Erie Watershed Cooperative Weed Management Area will provide information to relevant audiences to increase the level of knowledge surrounding invasive plant identification and management through presentations, displays, publications, webinars, and social media outlets

Goal: Increase awareness, encourage personal action, and increase support for the CWMA led activities through education and outreach efforts.

1. **Objective:** Develop and distribute materials to increase awareness and encourage personal action to prevent the introduction and spread of invasive species.

- Strategy:* Develop and distribute species specific information at local events and public meetings
2. **Objective:** Involve private landowners in the LEW-CWMA efforts and look for opportunities to increase control efforts on public and private lands.
 - Strategy 1:* Develop and distribute educational materials that promote stewardship and invasive species control on privately owned lands.
 - Strategy 2:* Increase private landowner participation in control efforts.
 - Strategy 3:* Invite stewardship minded landowners to serve on the LEW-CWMA steering committee.
 3. **Objective:** Encourage the use of native and non-invasive plant materials within the watershed.
 - Strategy 1:* Develop documents that encourage landscaping with native non-invasive species; documents should include information regarding threats posed by landscaping with non-natives and a list of native alternatives.
 - Strategy 2:* Compile a list with accompanying photos of invaders that are sold or frequently promoted or sold within the CWMA region.
 - Strategy 3:* Meet with representative owners and managers of leading vendors and plant suppliers in the region to establish working relationships, promoting landscaping with native species and reducing the distribution of invasive plants.
 4. **Objective:** Develop materials articulating the process of native species regeneration.
 - Strategy:* Develop materials explaining the process of invasive species management and regeneration of native species. Materials will include strategies and photographs from the various phases of the restoration process through the differing ecological communities.
 5. **Objective:** Develop educational materials regarding BMPs for preventing the spread of invasive species through the use heavy machinery.
 - Strategy:* Collaborate with/Contact/Connect with (options) local logging and construction companies to assure they are aware of BMP's that reduce the spread of invasive species
 6. **Objective:** Educate outdoor enthusiasts on the unintentional transport of invasive plants.
 - Strategy:* Reduce the unintentional transport of invasive plants through the placement of educational signs and boot brushes at trailheads and other popular recreational areas.

7. **Objective:** Work with local schools to increase student interest in and knowledge of invasive plants.

Strategy: Work with educators to incorporate information into lessons concerning threats invasive species pose, identification, small scale control projects on school properties, and the development of a site-specific weed management plan (universities).

8. **Objective:** Increase the knowledge and expertise of key demographics in identifying invasive species.

Strategy: Host identification and control workshops that provide targeted and relevant information for regional stakeholders.

Inventory and Monitoring

Monitoring is defined as a survey repeated through time to determine changes in the status and demographics of abiotic resources, species, habitats, or ecological communities. Monitoring can play a vital role in invasive plant management and the prevention of spread. It can provide justification for evaluating management actions, adjustments in treatment methods, and aids in reaching invasive plant management objectives and sustainable land management goals more effectively and efficiently.

Approach

Initial site analysis will provide a baseline inventory for each location with detailed description of invasive plant distributions. CWMA members are encouraged to report all invasive species locations via iMapInvasives. By designating iMapInvasives as the sole reporting platform for the LEW-CWMA, distributional data will be updated and can be viewed by all members.

Distributional data obtained and recorded through iMapInvasives allows further prioritization of control, management, and restoration efforts.

Monitoring is an essential component to determine the efficiency of treatment. By recording and mapping the extent of individual invasive species infestations pre and post treatment, the LEW-CWMA will then be able to determine the efficiency of treatment, suppression, and control.

Goal: Implement a system to inventory and monitor invasive species populations throughout the watershed.

1. **Objective:** Update invasive species control plans for each site as treatment proceeds.

Strategy: Design invasive species management plans to allow updates while maintaining a history of work and progress. Utilize iMapInvasives treatment logs for recording details of treatment and outcome.

2. **Objective:** Monitor priority sites to assess potential spread of targeted invasive species.
Strategy: Based upon the succession of each site, determine optimal frequency for reassessments
3. **Objective:** Monitor infestations where eradication/control measures have been implemented to determine their effectiveness.
Strategy: After control efforts have taken place, monitor the effectiveness of each treatment and the percent reduction in invasive cover resulting from the previous application.
4. **Objective:** Identify, monitor, and document weed vectors that have the ability to increase the spread of invasive plants throughout the watershed.
Strategy: Work with partners to identify known and possible vectors leading to the introduction and spread of invasive species within the watershed.
5. **Objective:** Verify the establishment of invasive weed species.
Strategy: Soon after a new invasive species population has been documented, confirm occurrence and record baseline infestation information and potential management solutions.
6. **Objective:** Obtain and record distributional data from locations throughout the watershed.
Strategy: Record and map all existing invasive species distributional data, creating one resource for all groups to reference by location. Utilize iMapInvasives website to house all distributional data obtained through site work and reports from partners throughout the watershed.

Site Prioritization and Management Process

The Pennsylvania Natural Heritage Program (PNHP) is a partnership between Western Pennsylvania Conservancy (WPC), the Pennsylvania Department of Conservation and Natural Resources (DCNR), the Pennsylvania Game Commission (PGC), and the Pennsylvania Fish and Boat Commission (PFBC). Using a standard science-based approach, PHNP collects and stores baseline ecological information about rare plants, rare animals, unique plant communities, significant habitats, and geological features in Pennsylvania. Not only providing information regarding the location of rare species, significant habitats, and geological features, the inventory includes a system of global and state ranks used to describe the relative degree of rarity for each species and natural community.

The Erie County Natural Heritage Inventory (CNHI) report presents the known outstanding natural features in Erie County. The CNHI provides maps of the best natural communities as well as the known locations of animals and plant species of concern. Contained within the report

are written descriptions for each site that include the degrees of quality and rarity, site ranking on local, state, and globally significant scale, potential threats, and recommendations for protection.

The information presented in the Erie County Natural Heritage Inventory, last updated in 2012, will be used to guide and focus efforts of the Lake Erie Watershed - Cooperative Weed Management Area. By identifying the unique and rare habitats within the watershed, the CHNI has provided an extremely valuable tool enabling the LEW-CWMA to prioritize and direct limited resources to preserving, enhancing, and restoring the ecological integrity of these sites.

Determining Sites

Initial site evaluations documented in the Inventory and Monitoring section of this plan are essential to determining the highest priority invasive species management locations within the Lake Erie watershed. Prioritization of these sites will be based upon the pool of existing data as well as data collected each season regarding invasive plant communities present and the ecological sensitivity of each site. While taking into account existing information such as the size and severity of the infestation, site accessibility, ownership, and available resources, the steering committee will be responsible for choosing a minimum of five sites for inventory each season and a minimum of three target locations for management. An additional factor for site selection is the locations proximity to other treatment areas. There is an increased benefit in building upon successful control areas and expanding invasive treatments outward from the initial control site.

When sites have been chosen for inventory, the LEW-CWMA coordinator or other CWMA member will be responsible for contacting the property owners and natural resource managers, providing relevant background information regarding the negative impacts of invasive species as well as the groups mission. The primary goal of working with these landowners and land managers is to establish working relationships and promote stewardship long into the future., Members of the CWMA will work to conduct a property-wide invasive plant inventory, draft a management plan, and work directly with the landowner or natural resource manager to implement the plan as resources are available.

After property inventories are complete and management plans have been developed, the steering committee will meet to discuss the findings and determine which sites are the best candidates for management and restoration efforts. Site specific plans will outline the management timeline and goals for each site, target species, known locations and approximate size of each infestation, as well as the dates and level of success for each treatment.

Understanding that invasive species will be present to some degree in all locations, this review of available information will allow partners to determine where the limited resources that are available will have the greatest impact. When possible, restoration efforts that include the eradication of early detection and rapid response species should be given high priority.

Understanding that management efforts in most locations will require multiple treatments over an extended period of time, the LEW-CWMA will consider all factors including existing funding

sources and available resources such as manpower, equipment, and other assets held by involved groups.

Throughout the management process, photographs of the site will be taken to document the vegetative changes and succession of the natural communities. At the end of each season, information regarding the successes as well as challenges all restoration efforts will be presented to members of the LEW-CWMA. Successes will be categorized by the reduction in patch size or when feasible, total eradication. The reduction in patch size can be assessed through the collection and comparison of GPS data on an annual basis. Also, comparisons can be derived the analyzation of aerial imagery. Although aerial imagery can often be difficult to obtain on an annual basis, the growing popularity and usage of unmanned aerial vehicles (UAV), otherwise known as drones, provides an opportunity to collect localized aerial imagery as well as other data when needed.

Adapting and Updating the Plan

This plan is to be used as a guiding document for the Lake Erie Watershed - Cooperative Weed Management Area through the year 2025. This plan will remain in effect for five years from the date it has been agreed upon by all parties. This plan will be adapted and modified as the Steering Committee sees fit within this five-year period. At the end of this five year period, the Lake Erie Watershed - Cooperative Weed Management Area will re-assess the content within this document and modify it as needed to address new threats and develop new strategies to protect the biological integrity of the Lake Erie Watershed into the future.

Funding

Over the course of the last Five-Year Plan, members of the LEW-CWMA have been successful in pursuing its implementation by securing and distributing funds from the following sources:

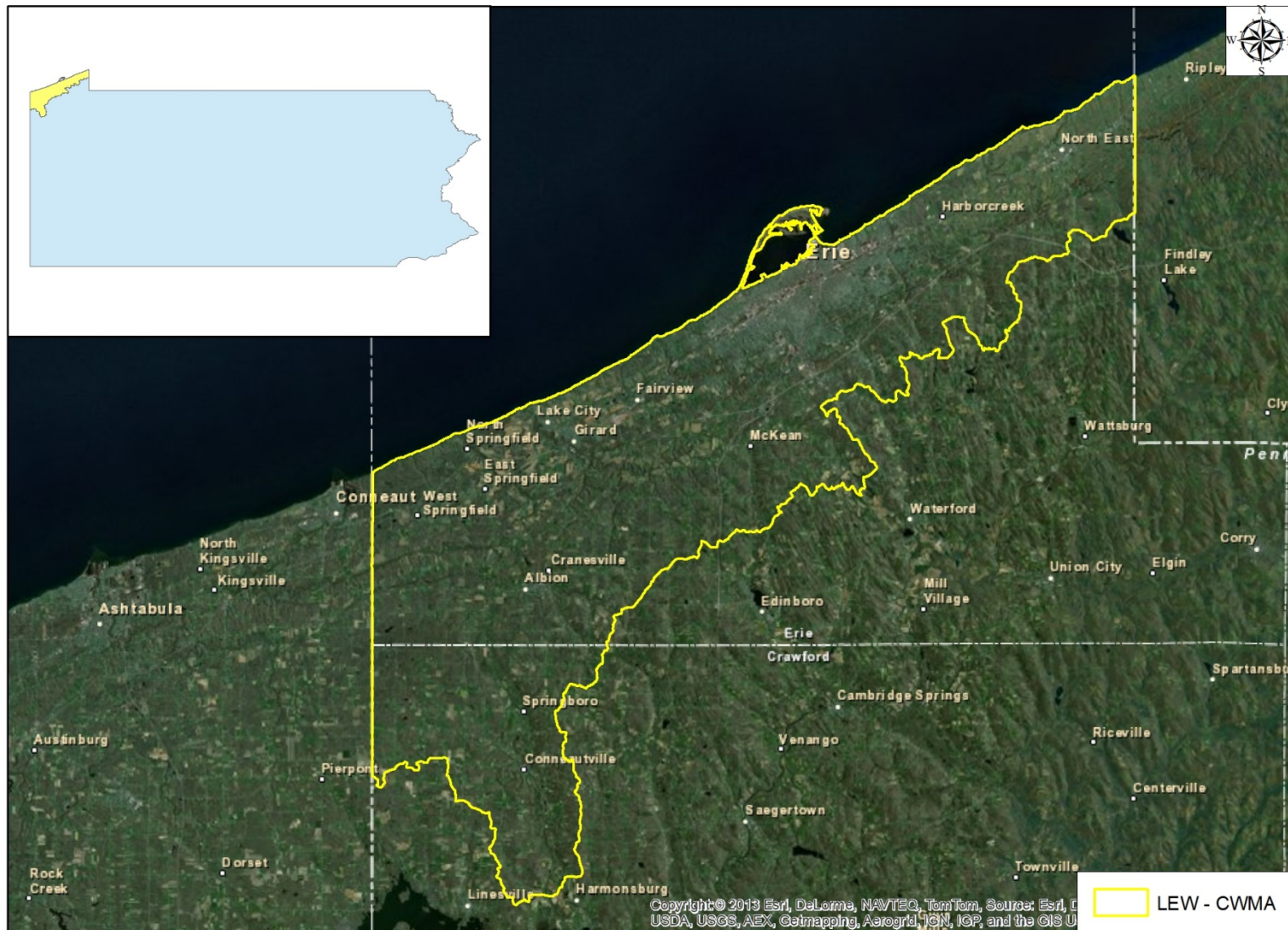
- US Forest Service Cooperative Forestry Assistance Program
- Great Lakes Restoration Initiative
- Pennsylvania Department of Community and Economic Development
- Voluntary Public Access and Habitat Incentive Program (VPA-HIP)
- PA Watersheds Foundation

Looking Forward

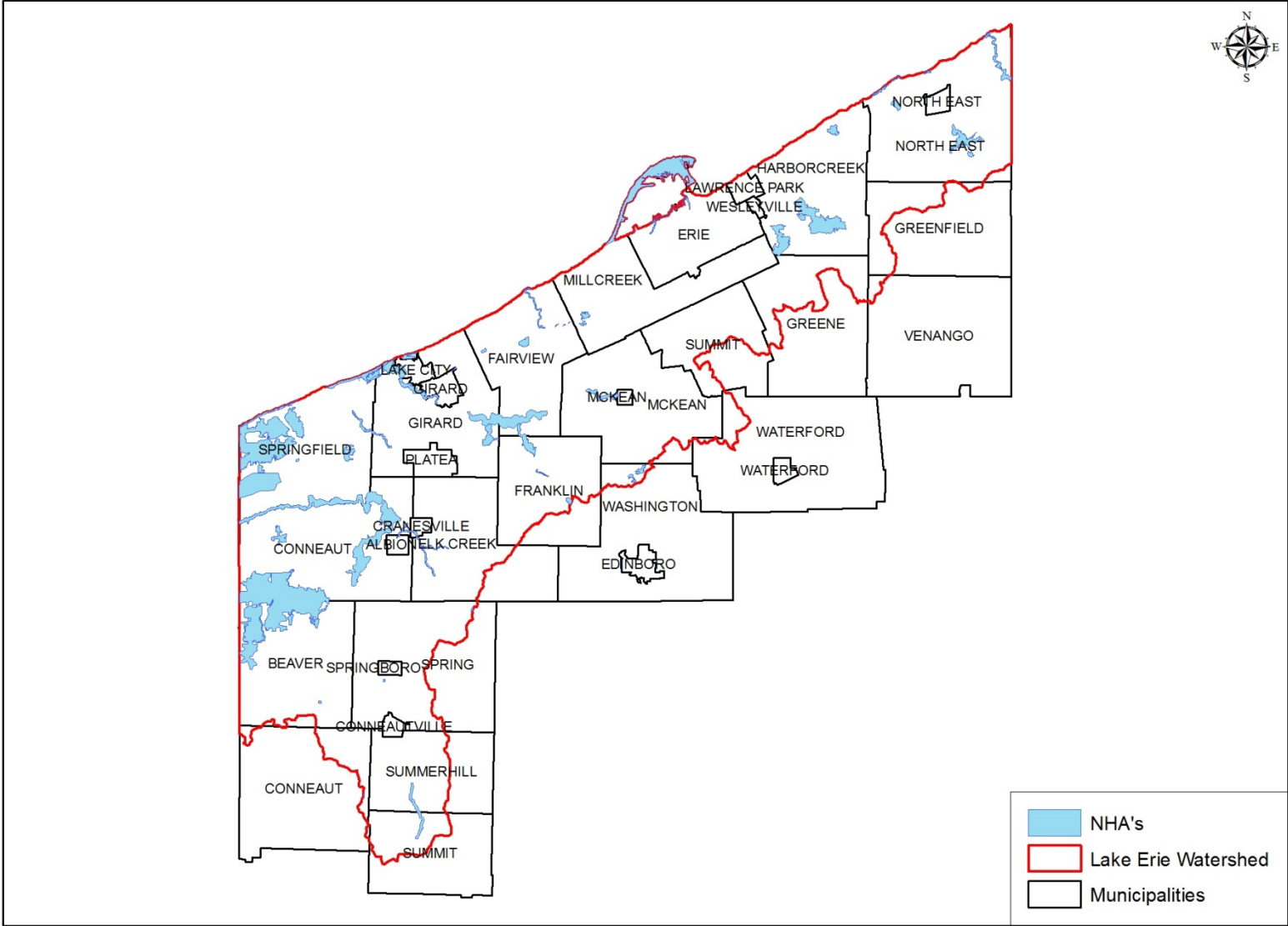
In years to come, the Lake Erie watershed will inevitably continue to face issues related to invasive species. As we work together to curb their negative effect on our native ecological communities, we also must take into consideration factors such as climate change and native and exotic pest introductions that have the potential to expand distribution and increase hardiness of invasive species. Controlling existing populations of invasive species and keeping a watchful eye

for the occurrence of currently undocumented invasive species into the watershed are key priorities for the LEW-CWMA. By working collectively with many partners and cooperators throughout the watershed, we hope to be a catalyst for the advancement of invasive species management while also striving to protect and enhance some of the watershed's most significant ecological resources.

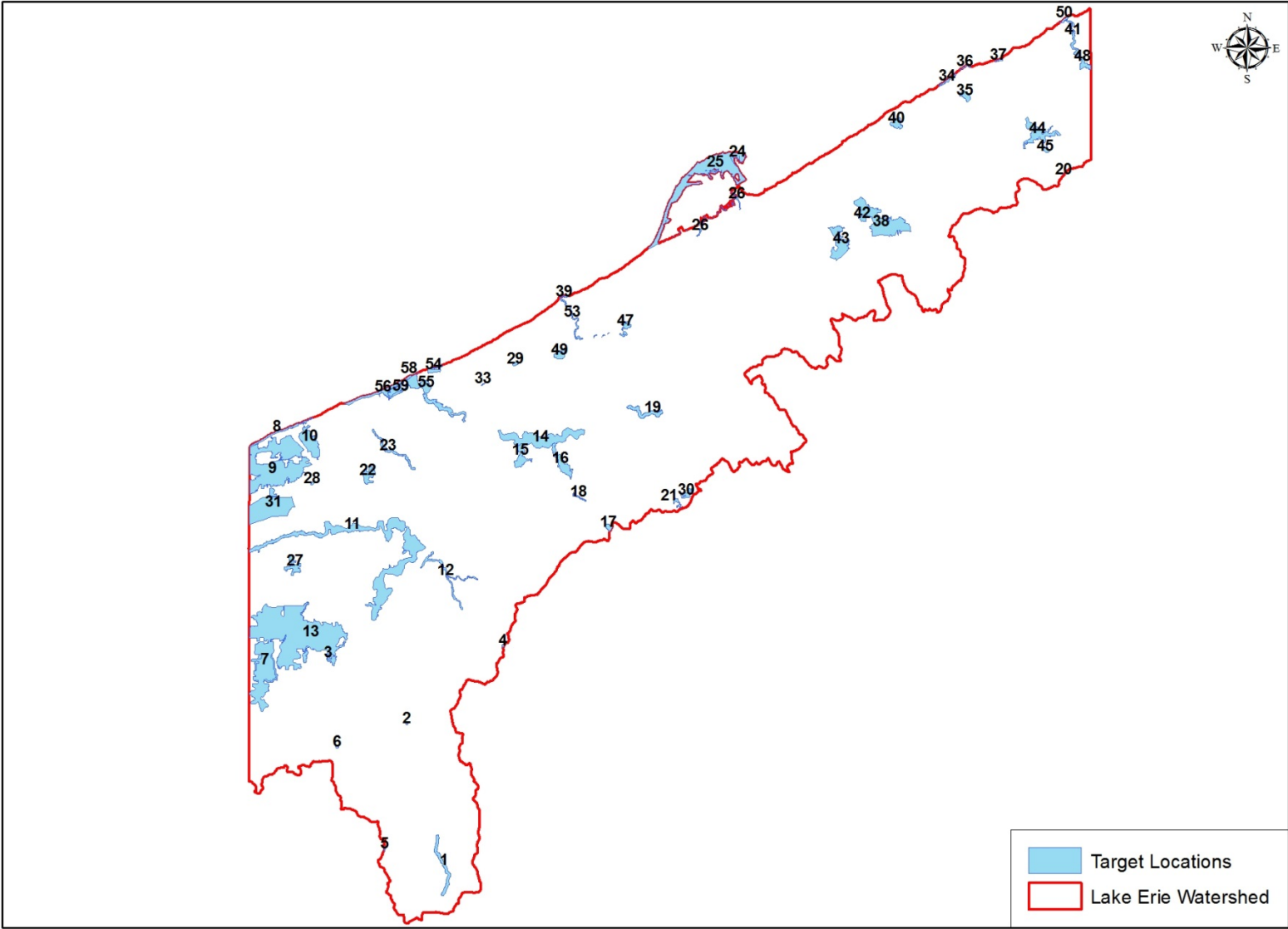
Lake Erie Watershed - Cooperative Weed Management Area



Lake Erie Watershed : Municipalities



LEW - CWMA : Target Locations



Site information Table

ID # :	Site Name	County
1	Conneaut Creek at Dicksonburg	Crawford
2	Conneaut Creek Slope - Springsboro South	Crawford
3	Mud Run Wetland	Crawford
4	Pont Road Wetlands	Crawford
5	Linesville Creek Headwaters Wetland	Crawford
6	East Branch Conneaut Creek Headwaters Wetland	Crawford
7	West Branch Conneaut Creek	Crawford, Erie
8	Lake Erie Coastline - Roderick	Erie
9	Roderick Reserve	Erie
10	Raccoon Creek Swamp	Erie
11	Conneaut Creek	Erie
12	East Branch Conneaut Creek	Erie
13	West Branch Conneaut Creek	Erie, Crawford
14	Elk Creek	Erie
15	Devil's Backbone	Erie
16	Falls Run	Erie
17	Falls Run - Shenango Creek Headwaters	Erie
18	Falls Run	Erie
19	Elk Creek - McKean	Erie
20	Howard Eaton Reservoir	Erie
21	McLane Fens	Erie
22	Springfield Township Vernal Pools	Erie
23	Crooked Creek	Erie
24	Presque Isle - Gull Point	Erie
25	Presque Isle - Peninsula	Erie
26	Presque Isle - Bay	Erie
27	Ashtabula Creek Headwaters	Erie
28	West Springfield - Route 20	Erie
29	Trout Run Pond	Erie
30	McLane Fens - East	Erie
31	Pond Road Wetlands - South	Erie
32	Pond Road Wetlands - North	Erie
33	Mercyhurst Fen	Erie
34	Cemetery Road Bluffs	Erie
35	Vineyard Swamp	Erie
36	[needs a name]	Erie
37	Northeast Lake Bluff Seeps	Erie
38	Six Mile Creek Gorge	Erie
39	Manchester Beach	Erie
40	Highmeyer Road Park	Erie

41	Twenty Mile Creek	Erie
42	Gospel Hill	Erie
43	Wintergreen Gorge	Erie
44	Sixteen Mile Creek Gorge	Erie
45	German Road Ponds	Erie
46	Asbury Woods	Erie
47	Asbury Woods	Erie
48	Twenty Mile Creek Gorge	Erie
49	Fairview Swamp	Erie
50	Twenty Mile Creek Beach	Erie
51	Twenty Mile Creek Beach	Erie
52	Twenty Mile Creek Beach	Erie
53	Walnut Creek	Erie
54	Lake Erie Community Park	Erie
55	Elk Creek - Mouth	Erie
56	Erie Bluffs - Shoreline	Erie
57	Erie Bluffs - Sand Dune	Erie
58	Elk Creek - Mouth	Erie
59	Erie Bluffs - Swamp	Erie