Toward a New Conservation Vision

for the

Great Lakes Region: A Second Iteration

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In 1996, The Nature Conservancy's Great Lakes Program launched a collaborative initiative to identify high priority biodiversity conservation sites in the Great Lakes region. This initiative was precipitated by the Conservancy broadening its focus beyond just rare and endangered species and natural communities. The Conservancy recognized that to effectively protect the *full* range of biodiversity, conservation efforts must include those species and natural communities that are more common and representative as well as those that are declining or vulnerable.

Taking an Ecoregional Perspective

To address this shift in focus, the Conservancy oriented its work based on ecoregions—large areas defined by the influences of shared climate and geology, the main factors that determine the broad-scale distribution of plants and animals.[1] The Great Lakes ecoregion—which includes major portions of Canada and the United States—is one of 64 ecologically distinct regions of the continental United States. For each of these ecoregions, the Conservancy is developing a detailed plan that identifies the places that need to be protected to conserve native biodiversity for the long term. At many of these places, local communities, private landowners and an array of public and private entities are already leading important conservation efforts.

The Great Lakes ecoregional planning initiative is a systematic approach that identifies all native species, natural communities and aquatic systems characteristic of the Great Lakes region and then determines how many of and where these elements of biodiversity need to be protected over the long term. In addition, this initiative identifies broad-scale threats to Great Lakes biodiversity and begins to develop strategies to address these threats. Through ecoregional planning, we are creating a comprehensive vision for Great Lakes conservation that addresses the *full* range of biological diversity. As expected, this approach has prompted an evaluation of where the Conservancy is working on the ground in the Great Lakes region. It has also reinforced that partnerships with public and private entities will be critical to successful conservation action. Here in the Great Lakes, a new vision for conservation is emerging as a result of ecoregion-based planning—one that will determine where we focus our attention and resources in the future.

Partnerships are Critical to Success

The Great Lakes ecoregional planning initiative included many partners and experts and is only the beginning of many opportunities to share information and work together to conserve Great Lakes biodiversity. Designing a vision for Great Lakes conservation has not been accomplished by the Conservancy alone. Partnership has been, and will continue to be, vital to our collective conservation success; each of us has different strengths, and we have much to learn from each other. Clearly, strategic collaboration will lead to greater conservation success for the Great Lakes region as a whole and will enable us together to protect our shared natural heritage.

Steps Toward a New Vision for Conservation

It is important to remember that developing a conservation vision for the Great Lakes region is an *iterative* process and that this vision will be sharpened and refined as we continue to gain knowledge about the native biological diversity of our region. In February 1999, we completed a major portion of this ecoregional plan; this first iteration focused primarily on selecting sites important for target species and natural communities. Since then, we have completed a second iteration of the ecoregional plan that strengthens our conservation vision by identifying sites that

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[1] The ecoregional division of the United States is based on the work of Robert G. Bailey of the U.S. Forest Service.

are important for aquatic systems, reptiles and amphibians. In order to complete a comprehensive picture of biodiversity in the region, additional gaps in our knowledge about the region must be filled. Addressing these missing pieces will be essential to the creation of a comprehensive vision for Great Lakes conservation.

This current iteration of the Great Lakes ecoregional plan is based on what we know *now*. One of the most notable gaps in this current iteration is the absence of sites in the Canadian portion of the region. The Conservancy has been working closely with The Nature Conservancy of Canada to secure the needed funds to conduct ecoregional planning for the Ontario portion of the Great Lakes region. Also, we need to gather additional information on critical inland lake and Great Lakes nearshore habitats[2] and associated biota. The sites selected thus far include a wide range of inland lake and Great Lakes nearshore habitats, but more information is needed to determine whether these sites include examples of the *full* range of inland lake and nearshore habitats important for freshwater biodiversity in the Great Lakes region. Finally, for a relatively small subset of bird species, we will need to conduct some additional work to identify characteristics of high-quality stopover sites beyond those already identified.

The following pages introduce a collection of sites and landscapes that represent our progress toward identifying a comprehensive vision for biodiversity conservation in the Great Lakes region. This collection represents the second iteration of the Great Lakes ecoregional plan and identifies the places that need to be protected to conserve native biodiversity for the long term. The Conservancy believes that these sites contain the highest quality examples of native species, natural communities and aquatic systems remaining in the region and that, by working in partnership to conserve these sites, we together will preserve the biodiversity and ecological processes unique to the Great Lakes region. By continuing our efforts to make this vision for Great Lakes conservation as comprehensive as possible, we can help ensure that the unique natural heritage of this region will be protected for future generations to cherish and enjoy.

The Great Lakes Ecoregion and Great Lakes Watershed

At 234,000 square miles, the Great Lakes ecoregion claims many superlatives. The ecoregion has 11,000 miles of shoreline and spans eight states, one province, and two countries. Home to the largest freshwater ecosystem in the world, the ecoregion includes the five Laurentian Great Lakes: Lake Superior, Lake Michigan, Lake Huron, Lake Erie and Lake Ontario, which together hold 20% of the world's supply of surface freshwater and 95% of the U.S. supply. The open waters of the Great Lakes themselves cover an area of 94,000 square miles, while the land area covers 140,000 square miles.

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[2] The nearshore zone is defined as the shallow area of the Great Lakes between the shoreline and the 5-m depth contour.

Great Lakes Watershed
Great Lakes Ecoregion

The Great Lakes watershed includes all tributary streams and inland lakes that are hydrologically connected to the five Great Lakes. The watershed, covering over 290,000 square miles, is larger than the Great Lakes ecoregion, although there is considerable overlap between the two areas. Over 95% of the Great Lakes ecoregion falls within the Great Lakes watershed. For planning purposes, we refer to the combined area of the Great Lakes ecoregion *and* the Great Lakes watershed as the Great Lakes *region*. These two areas are inextricably connected, and we have considered both boundaries in our planning process, depending on whether we are considering individual species of plants and animals, individual natural communities, or aquatic systems.

The lakes influence climate and hydrology, creating an ecologically unique environment in which a wealth of species and communities thrive. Among the many interesting features found in the Great Lakes region are thousands of freshwater islands (including Manitoulin Island – the world's largest freshwater island); the largest freshwater river delta on earth (St. Clair River Delta); the largest collection of sand dunes of freshwater origin in the world; wild, unfragmented northern forests; and 185 globally rare plants, animals and natural communities.

The present day Great Lakes are of very recent origin, having formed 10,000 years ago. As the last glacier retreated from the Great Lakes basin, plants and animals from the west, south and east followed the ice front and dispersed across the landscape. Species settling into the region formed distinct community assemblages such as lakeplain prairies and Great Lakes marshes; other species, such as Pitcher's thistle, evolved in response to the altered landscape and warmer climate. Today we see the results of this response in the plants, animals and natural communities that are endemic (native or confined to a certain region) or largely limited to the Great Lakes ecoregion. There are numerous endemic plant communities primarily associated with the Great Lakes shoreline: coastal marshes, lakeplain prairies, beaches and dunes, wooded dune and swale systems, and rocky or cobble shores. Some species associated with Great Lakes shoreline communities include Pitcher's thistle, dwarf lake iris, Houghton's goldenrod, Lake Erie water snake, Eastern fox snake, Hines emerald dragonfly and Lake Huron locust. The limestone outcrops of the Niagara Escarpment are home to endemic species such as the lakeside daisy and a variety of land snails. The secretive locust and Kirtland's warbler are endemic species associated with various inland communities such as jack pine barrens. A wide variety of endemic alvars (relatively flat limestone bedrock areas where soils are very shallow) are found within the Great Lakes region.

The unique and diverse climate and physiography of the region also sets the stage for numerous types of aquatic systems. River systems range from small streams fed by perennial sources of groundwater to lowland rivers with water levels that rise and fall in response to storm events. Thousands of inland lakes, called pothole or kettle lakes, formed when chunks of ice buried during the last glacial recession eventually melted. Glacial debris dams formed perpendicular to rivers, creating long, narrow lakes such as the Finger Lakes of New York.

The fish fauna present in the Great Lakes watershed is primarily a result of recolonization as the glaciers receded. During the period of glacial retreat, ancient glacial lakes extended beyond their present boundaries and the ancient rivers that drained these lakes created connections to neighboring drainage basins. Fishes and other freshwater organisms used these waterways to enter the Great Lakes watershed from the upper Mississippi basin, Hudson Bay, the Ohio River valley, the St. Lawrence River and Mohawk-Hudson River valley. As a result of this mixing of species, the native fish fauna grew to include over 150 species—approximately one fifth of the total number of fish species in North America.

As the glaciers receded, aquatic macroinvertebrates (e.g. aquatic insects, freshwater mussels and snails, and planktonic animals) also colonized the Great Lakes region. Macroinvertebrates were transported by ice sheets and by other animals, including fishes, that entered the region. The southward advance of ice sheets transported arctic marine and brackish water animals with the ice front, and many of these animals adapted to freshwater conditions in the historic glacial lakes. Fish hosts transported many mussel species in their parasitic larval stage; these mussel species entered from the Mississippi basin and the Mohawk-Hudson River valley. As a result, the present day Great Lakes region contains a variety of mussels, aquatic insects and planktonic animals with freshwater and marine lineages—this has resulted in many biological assemblages unique to the Great Lakes region.

How Sites Were Identified

In partnership with numerous organizations, public agencies, academic institutions and individuals, The Nature Conservancy used a systematic, science-based approach to identify 271 sites that capture the biodiversity of the Great Lakes region. Threats to the important species, natural communities and aquatic systems at those sites, and strategies for addressing these threats and conserving biodiversity were also identified. The goal of this work is to ensure long-term survival of all viable native species, communities, and aquatic system types through the identification and conservation of a collection of sites within the region.

Great Lakes ecoregional planning has benefited from a wealth of data on species and natural communities. However, our data richness is partly the result of a relatively fragmented landscape, which has made it easier for Natural Heritage Programs [3] and partners to become very familiar with which species and natural communities are found where. In the southern portion of the region, we relied primarily on Heritage Programs' data about where examples of specific plants, animals and communities occurred, as well as additional expert input. In the northern portions of the region, we encountered more intact landscapes. Because these larger, intact areas have not been thoroughly inventoried, we conducted landscape analyses that relied on coarse-scale data, such as vegetation maps, and supplemented that information with Heritage data. Based on their knowledge of the range and habitat of these communities, and on-the-ground experience in these areas, biologists from the Conservancy, Heritage Programs and other partner organizations recorded which communities they knew to be present in these intact landscapes.

We also lacked data on aquatic species and communities. To address this data gap, the Great Lakes Program developed and applied a set of tools that can be used to identify and describe the variety of aquatic systems that occur in the Great Lakes watershed. These tools use landscape-

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[3] Natural Heritage Programs or Conservation Data Centres exist for the majority of U.S. states and Canadian provinces to inventory and monitor plants, animals and natural communities native to their state/province. Traditionally, the focus of these programs has been on rare species and communities.

and local-scale variables to describe the physical characteristics of stream, lake, and nearshore habitats. To complement this classification of aquatic systems, the Great Lakes Program gathered existing sources of fish and macroinvertebrate data. These data originated from a wide range of sources in the Great Lakes watershed, including state and federal agencies and academic institutions. These data allowed us to describe the aquatic biota associated with the variety of aquatic system types.

The process for identifying these 271 sites included the following steps:

1.   Conservation Target Identification
Conservation targets consisted of globally rare species and all natural community types found in the Great Lakes ecoregion, and all aquatic system types found in the Great Lakes watershed. We sought to identify examples of individual species of plants or animals (for example, lakeside daisy or Lake Erie water snake); individual natural communities (for example, Great Lakes coastal marsh or lakeplain prairie); and aquatic systems (for example, groundwater-fed headwater streams or large, lowland rivers on lake plain). Collectively, these targets represent the full range of biodiversity that this iteration of the ecoregional plan attempted to capture. Natural community targets and aquatic system targets were assumed to function as coarse filters, thus capturing common and representative species. In addition, special consideration was given to declining and vulnerable bird species, with special focus on their breeding areas. As we learn more about the status of biological diversity of the Great Lakes region, the target list will continue to be refined. Appendix A lists a total of 482 target species and natural communities and 231 aquatic systems for this iteration of the Great Lakes ecoregional plan.

We realized that we needed to consider conservation targets within their most appropriate ecological context. For terrestrially-based species and natural communities, we identified targets and selected sites within the boundaries of the ecoregion. The distribution of terrestrially-based species and communities is dictated by influences of shared climate and geology—the variables that define the boundaries of the ecoregion. However, for aquatic systems, we identified targets within the entire Great Lakes watershed. Distribution of aquatic biota is heavily influenced by climate and geology, but also by watershed. For this reason, we identified targets and selected sites important for aquatic biota within the context of the Great Lakes watershed.

2.   Conservation Goal Development
We worked with experts to determine how many examples of each target needed to be protected. We also asked them to look at how these examples should be distributed across the region to allow for genetic and ecological variability. These "conservation goals" guided decisions about which sites to identify as conservation priorities. It is critical that we protect those species and communities endemic to the Great Lakes ecoregion because, by definition, they are found nowhere else in the world. Therefore, the conservation goals for those species and communities whose range is largely or entirely within the Great Lakes ecoregion were more stringent. Targets whose range includes and also extends far beyond the Great Lakes ecoregion will be protected in many places, and their conservation goals reflect that. Because we defined aquatic systems based on features of the region's climate and physiography, they are inextricably connected to the Great Lakes region and therefore do not occur outside of the region. Thus, this region represents the only opportunity to capture examples of these aquatic systems; therefore we sought to include an example of *each* aquatic system that occurs in the Great Lakes watershed.

3.   Viability Assessment
Viability is the measure of a population or community's ability to persist over the long term. The Conservancy considers three criteria when assessing the viability of a population or community:

size, condition and landscape context. Based on these criteria, biologists familiar with examples of target species and communities qualitatively assessed their viability. We used a complementary process to assess the viability of aquatic systems. This process was based on expert knowledge and analysis of data on condition and landscape context. We considered information on exotic species distributions, hydrologic alterations, water quality, and land cover to help identify high quality examples of each aquatic system type. These assessments enabled us to select sites containing high quality, viable examples of our target species, communities and aquatic systems.

4. Site Selection

To achieve the conservation goals for a given species, community, or aquatic system target, preliminary sites were identified that supported the most viable examples of that target. In instances where there were more viable examples than were needed to meet conservation goals, participants considered the number, type and viability of additional targets present at those sites as well as the quality of the original occurrence. For each preliminary site, we then considered additional information that might impact our or our partners' ability to successfully protect biodiversity targets at the site. By analyzing the threats to conservation targets and the current situation at a site, participants determined the probability of conservation success at a site and the urgency of conservation action that was necessary. The goal of this analysis was to confirm that a given site should be selected, and to gather site-specific data that would enable us to identify conservation strategies that will impact numerous high-priority sites across the region.

5. Data Gap Identification

Specific gaps in information were identified and prioritized so that further work can be directed toward filling the most important data gaps and refining the collection of conservation sites. With a more thorough understanding of these data gaps, we will be better able to focus future research initiatives on practical conservation needs. One example of a gap that was identified during ecoregional planning was the lack of information on important sites for conservation of reptile and amphibian species. We have already begun to address this gap in the second iteration of the Great Lakes ecoregional plan. In spring 2000, we convened a series of workshops attended by experts knowledgable about reptile and amphibian species in the Great Lakes region. At each workshop, experts discussed aspects of biology that make amphibians and reptiles especially vulnerable to population declines and the most pervasive environmental threats to them. Experts then identified and prioritized important sites for reptile and amphibian conservation on the basis of species richness, robust or large populations of at-risk species, and potential for restoration of reptile and amphibian populations at the site. The Great Lakes Program summarized these results in a report, and data gathered through this process have been integrated with other ecoregional data.

Over 220 experts and partners have been actively involved in the Great Lakes ecoregional planning initiative: 47 Conservancy staff, 25 staff from Natural Heritage Programs and over 145 partners from other agencies and organizations. These partners include biologists, ecologists and conservation specialists representing local governments, landowners, the U.S. Forest Service, U.S. Fish and Wildlife Service, National Park Service, state forests, state parks, state wildlife management organizations, county forest preserve districts, land trusts, academic institutions, non-profit conservation organizations, and other agencies and organizations. A list of the organizations and agencies that participated in the Great Lakes ecoregional planning initiative can be found in Appendix B. Their primary role has been to review conservation goals, assess viability, select sites, and evaluate threats. Some of these experts drafted regional conservation goals, and many were involved in reviewing and revising the goals. Often, we found that experts had current information on the viability of documented occurrences that was not otherwise

available, and experts were able to provide locations and viability assessments of previously undocumented occurrences of species, natural communities, and aquatic systems.

To give special consideration to reptile and amphibian species and declining and vulnerable birds, we convened an additional nine specialized workshops. Four workshops focused on identifying conservation sites for reptile and amphibian species; over 80 experts participated in this process, either by attending one of the workshops, recommending sites, or reviewing preliminary results. We held five workshops focused on declining and vulnerable birds, and over 125 experts participated in the process to identify important conservation sites for this group of species. The results of these two complementary efforts are integrated into the current version of the Great Lakes ecoregional plan.

The Great Lakes Vision for Conservation

Two hundred seventy-one sites were chosen during the current iteration of the Great Lakes ecoregional plan through the process previously described. Map 1 illustrates the approximate location and distribution of these sites. Many of these 271 sites are important for more than one type of conservation target. For example, many sites contain important aquatic systems *and* forest communities and other sites are home to rare plant species *and* serve as high quality breeding sites for declining and vulnerable birds. Of the 271 sites, 140 sites contain important aquatic systems, 114 sites are important for declining and vulnerable birds and 54 sites contain important reptile and amphibian species. Site boundaries were roughly approximated during this process and will be further refined as specific conservation strategies are identified and implemented for these sites. However, an <u>estimate</u> of the size of selected sites ranges from 60 to 1.5 million acres, and 75% percent of the sites are less than 20,000 acres.

This collection of Great Lakes sites represents the tremendous biological diversity of the region. These sites include marshes and wet meadows, bogs and fens, upland forests, prairies and grasslands, sandy and rocky shorelines, barrens and savannas, shrublands, bluffs, cliffs, talus slopes, and rocky flats. As shown on Map 1, many of the sites are along Great Lakes shorelines because of the high level of endemism and rarity in those areas. Many of the 271 sites are forested, reflecting the significant contribution of forests to the region's biological diversity. Because the northern reaches of the Great Lakes region include less fragmented landscapes, sites in the northern part of the region tended to be larger. Conversely, due to the near-complete conversion of prairies and grasslands to agricultural and urban lands, sites in the southern parts of the region were frequently much smaller. A number of the smaller sites were chosen because they contained the only, or one of the few remaining, viable examples of a particular species or community in the ecoregion.

The 271 sites are distributed across the U.S. portion of the Great Lakes region. As noted in Table 1, the proportion of sites within a given state roughly corresponds to the proportion of the Great Lakes region that falls within that state. One hundred sixty-six sites, over sixty percent of the sites, are irreplaceable—meaning that these places represent the *only* opportunity to protect certain species, natural communities, aquatic systems, or assemblages of these targets, in the Great Lakes region. These irreplaceable sites are concentrated in Michigan, New York, and Wisconsin, the states with the greatest proportion of sites and the greatest proportion of the region. The high number of irreplaceable sites in the region affirms the importance of the role of landowners and managers in implementing management strategies that improve or maintain the viability of species, natural communities and aquatic systems at these sites.

Table 1. Regional Features Summarized by State

State/Province	% of U.S. portion of region within state[4]	# of selected sites within state [5]	% of all selected sites	# of irreplaceable sites within state[6]	% of all irreplaceable sites within state
Michigan	50	135	50	71	43
New York	15	56	21	37	22
Wisconsin	15	27	10	24	14
Ohio	10	27	10	17	10
Minnesota	5	21	8	12	7
Illinois	2	10	4	9	5
Indiana	3	9	3	6	4
Pennsylvania	<1	2	<1	*Unknown*	*Unknown*
Ontario	*N/A*	*In progress*	*In progress*	*In progress*	*In progress*

Meeting Conservation Goals: It is important to note that identifying a site as an important place for Great Lakes biodiversity does not mean that it is protected; in fact, 95% of the selected sites are *not* fully protected for biodiversity conservation. Based on our *current* knowledge, the collection of Great Lakes sites, *if protected*, would fully meet conservation goals for only 20% of our target species and communities. This means that for 80% of our target species and communities, this collection of sites falls short of what is necessary to sustain biodiversity over the long term. In the majority of cases where goals are not met, it is because there are either no confirmed viable or no known examples of the target in the ecoregion; additional inventory and/or restoration will be necessary to meet goals for these target species and communities. Future iterations of this plan will need to further explore opportunities for restoration as a strategy to meet conservation goals for target species and communities.

We met conservation goals for approximately 80% of our target aquatic systems. This means that, based on our *current* knowledge, only 20% of the aquatic systems found in the Great Lakes watershed are not represented in our set of conservation sites. In many of the cases where goals are not met, either all examples of the target aquatic system have been degraded to the point that there are no longer any viable examples in the watershed, or we need additional information to determine where the best remaining example is located. As we learn more, new information will change these statistics, additional sites will be identified that help capture missing examples of biological diversity, and our overall vision for Great Lakes biodiversity conservation will be enhanced.

Urgency of Conservation Needed: Currently, only five percent of the sites are fully protected for biodiversity conservation. To better focus our future conservation efforts over the next ten years, we determined how urgently conservation attention is needed for sites without adequate

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[4] Again, the *region* is the combined area of the Great Lakes ecoregion *and* the Great Lakes watershed.

[5] A total of 271 sites have been identified thus far in the Great Lakes ecoregional planning process. Because fifteen of these sites straddle two state boundaries and one site straddles three state boundaries, this table indicates a total of 287 sites so that each state will have a complete record of sites selected within its jurisdiction.

[6] A total of 166 irreplaceable sites have been identified. As noted in the previous footnote, some sites cross into more than one state. This table indicates a total of 176 irreplaceable sites to provide a complete record for each state.

protection. A full 79% of the Great Lakes sites identified thus far require conservation attention within the next 10 years, or we may forever lose an opportunity to protect our region's distinctive biological diversity. At more than one third of the sites, action must be taken *immediately* in order to protect conservation targets. Over two-thirds of the sites are in need of conservation attention within the next five years. Conservation at 13% of the sites is currently stable; however, changes in ownership, land use, or management could dramatically increase the urgency for action at any of these sites. Conservation action needed ranges from specific land protection measures (such as conservation easements, changes in ownership, or special designations), to changes in policies affecting land use or biodiversity conservation, to modifications in management practices so that biodiversity targets are adequately protected.

Priority Conservation Areas for The Nature Conservancy: Every site chosen as a result of the Great Lakes ecoregional planning initiative is important to protect in order to capture the full range of this region's biological diversity. However, limited resources necessitate that we determine which places we must focus on first. In keeping with the Conservancy's national commitment to conserve at least 20% of each region's collection of sites over the next ten years, 72 priority conservation areas (27% of the 271 sites) were identified where the Conservancy will focus first (Map 2). Criteria used to select priority conservation areas included biological contribution, irreplaceability, level of threat to conservation targets, urgency of conservation action needed, probability of conservation success, and future role of the Conservancy. In collaboration with partners, the Conservancy will identify and implement appropriate conservation strategies for these places.

Threats: We gathered information about threats to species, natural community and aquatic system targets at selected conservation sites. Information included the type of threat; the scope, severity, immediacy, and reversibility of that threat; and potential strategies to address each threat. Based on the 224 sites for which we were able to gather these data, four top threats emerged from the analysis: development, exotic and invasive species, hydrologic alterations, and recreation. Development is the top threat to important biodiversity sites; urban, residential, second home, or road development pressures threaten approximately two-thirds of the sites with loss, fragmentation, or degradation of critical habitat. The second most critical threat, exotic and invasive species, affects the integrity of more than half of the sites.   This category includes potential impacts due to the presence of exotic species such as purple loosestrife, reed canary grass, garlic mustard, buckthorn, zebra mussels, and exotic fishes as well as threats due to invasive native woody plants and high-impact species such as deer.   The third most common threat to native biological diversity was hydrologic alteration. Hydrologic alteration affects almost half of the sites and includes threats due to dams, diversions, dikes, groundwater withdrawals, and other changes to the natural flow regime. Finally, recreation (boating, recreational vehicle use and general-purpose uses such as hiking, camping, biking, etc.) affects over 40% of the sites.

Although development, exotic and invasive species, hydrologic alteration, and recreation are the most prevalent threats across the region as a whole, this is not true for individual Great Lakes states. Table 2 below shows the top four threats to biodiversity for the Great Lakes region as a whole and for each state's portion of the region. Other critical threats to native species, natural communities, and aquatic systems included improper forestry practices, resource extraction, agriculture, incompatible management practices, and fire suppression.

Table 2: Top Threats to Biodiversity for the Region and for Each State's Portion of the Region

Region				
Region	Development	Exotic/Invasive Species	Hydrologic alteration	Recreation
Minnesota	Development	Exotic/Invasive Species	Improper Forestry Practices	Recreation
Wisconsin	Development	Hydrologic Alterations	Resource Extraction	Exotic/Invasive Species
Illinois	Exotic/Invasive Species	Management	Hydrologic Alterations	Fire Suppression
Indiana	Development	Hydrologic Alterations	Recreation	Fire Suppression
Michigan	Development	Recreation	Exotic/Invasive Species	Hydrologic Alterations
Ohio	Hydrologic Alterations	Exotic/Invasive Species	Development	Agriculture
New York	Development	Exotic/Invasive Species	Hydrologic Alterations	Recreation

Data Gaps: An important outcome of the planning process was the identification of critical data gaps that will drive future research, inventory, and monitoring efforts. For example, priority sites in Canada have not yet been identified. In addition, some sites in the U.S. portion of the region were identified as potential sites, but more data are needed to determine whether they should be selected or not. Furthermore, additional inventory work is needed in many areas in order to assess more fully the locations, distribution, and viability of target species and communities, especially those that are more common in the region. In particular, more information is needed to fully describe the aquatic biota associated with aquatic systems selected. Finally, although identification of migratory stopover sites and breeding sites for declining and vulnerable species of birds is partly complete, additional information will be needed to complete the assessment for poorly inventoried species and to be better able to predict where high quality stopover sites occur.

Site-Specific Conservation Action Plans: The Great Lakes ecoregional planning initiative has been instrumental in identifying a collection of priority conservation sites. A critical next step is to develop site-specific conservation action plans that will guide on-the-ground activities to abate threats and protect biodiversity. This ecoregional planning effort is just the beginning of conservation action. For priority conservation sites, thoughtful scientifically-based conservation strategies that compatibly integrate the economic, social and ecological goals of local communities must now be developed and implemented. At many places, local communities, private landowners and an array of public and private entities are already leading important conservation efforts. At other places, it may be appropriate for the Conservancy to work with local communities to help move conservation forward. In any scenario, it will be essential to have dynamic and adaptive implementation plans that guide our collaborative on-the-ground conservation work.

Future Partnerships

The Great Lakes ecoregional plan represents an ambitious vision for conservation—one that was created using the knowledge and expertise of many partners, and one that will be realized only

through collaborative action. The results of this ecoregional effort have identified a suite of important sites where the need for action is pressing. More than three-quarters of the 271 sites identified thus far will need our conservation attention within the next 10 years, and over two-thirds of the sites need more immediate action. Without the Great Lakes conservation community's help, we all are confronted with the stark risk of forever losing the opportunity to protect our shared natural heritage for future generations to cherish and enjoy.

Taking action to protect the full range of native biological diversity represented by these sites will require active participation by many in the Great Lakes conservation community. As sites were selected, we identified the organizations, agencies, or individuals whose leadership or partnership will be critical in order to implement conservation strategies that protect the target species, natural communities, and aquatic systems at a site or several sites. As expected, key partners varied depending on the situation at any given site being considered. However, many of these partners are involved at several sites. For the region as a whole, it was clear that local communities and landowners are consistently key leaders or partners in conservation. State government agencies are frequently key partners, especially at sites that include important aquatic systems, since state agencies frequently have jurisdiction over the use and quality standards of aquatic habitats. In addition, other partners often play or can play an important role in conservation action. These partners included local non-governmental organizations; local government entities (e.g. county planning agencies and governments, municipal governments, and parks); state non-governmental organizations; state government agencies (departments of natural resources, environment, and transportation); federal government agencies; and tribal government agencies.

Some important steps are already underway, and there are countless opportunities to achieve additional conservation success. Every site identified through this initiative is unique, and our overall approach to conservation must take this into account. Local conservation efforts that are rooted in thoughtful consideration of a community's needs have always been, and will continue to be, critical to the Conservancy's approach to conservation. Conservancy state chapters are committed to working in partnership with communities to identify locally-based conservation strategies that integrate economic, social and conservation priorities. Lessons learned through these locally-based conservation efforts will in turn guide the development of partnerships at many levels and broader-based strategies that complement and reinforce them.

We are at a critical juncture for the conservation of Great Lakes biodiversity. Although the vision for Great Lakes biodiversity conservation is not yet complete, the collection of sites identified thus far will begin to guide conservation efforts by The Nature Conservancy and other organizations who share a commitment to protecting the wealth of natural features in the Great Lakes region. This blueprint for conservation will help all of us determine how we can best work together to conserve the full range of Great Lakes biological diversity effectively and efficiently over the long term. We invite you, our partners, to be actively involved in and to take the lead in the implementation of this vision. At many sites, leadership from local communities, private landowners, and an array of public and private entities will be critical in the implementation of conservation actions and strategies. It is only through the collaborative action of many players that we will be able to successfully conserve the diversity of life in one of the most biologically rich and globally significant ecosystems on earth—the Great Lakes.

Additional Information

For additional information about the Great Lakes ecoregional planning process and results, please feel free to contact any of the Conservancy's offices listed below.

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Appendix A-1. Species Targets

Global Name	Common Name	Global Rank*	Distribution**
Succinea bakeri	A snail	[G1?]	Endemic
Vertigo nylanderi	Deep-throat vertigo (land snail)	G?	Endemic
Dendroica kirtlandii	Kirtland's warbler	G1	Endemic
Botrychium acuminatum	Moonwort	G1	Endemic
Brychius hungerfordi	Hungerford's crawling water beetle	G1	Endemic
Succinea chittenangoensis	Appalachian ambersnail	G1	Endemic
Botrychium pseudopinnatum	A moonwort	G1	Endemic
Hemileuca sp 1	Bog buckmoth	G1Q	Endemic
Hymenoxys herbacea	Lakeside daisy	G2	Endemic
Vallonia gracilicosta albula	Multi-rib vallonia (land snail)	G2	Endemic
Lycopodiella subappressa	Northern appressed clubmoss	G2	Endemic
Somatochlora hineana	Hines emerald dragonfly	G2	Endemic
Appalachia arcana	Secretive locust	G2G3	Endemic
Trimerotropis huroniana	Lake Huron locust	G2G3	Endemic
Catinella exile	Pleistocene catinella (land snail)	G3	Endemic
Iris lacustris	Dwarf lake iris	G3	Endemic
Cirsium pitcheri	Pitcher's thistle	G3	Endemic
Solidago houghtonii	Houghton's goldenrod	G3	Endemic
Coregonus hoyi	Bloater (salmonid)	G3	Endemic
Fontigens nickliniana	A snail	G3G4	Endemic
Mimulus glabratus var michiganensis	Michigan monkey-flower	G5T1	Endemic
Nerodia sipedon insularum	Lake Erie water snake	G5T2	Endemic
Elaphe vulpina gloydi	Eastern fox snake	G5T3	Endemic
Potamogeton ogdenii	Ogden's pondweed	G1	Limited
Papaipema eryngii	Rattlesnake-master borer moth	G1	Limited
Vertigo morsei	Six-whorl vertigo (land snail)	G1G2	Limited
Stenelmis douglasensis	A riffle beetle	G1G3	Limited
Catinella gelida	A land snail	G2	Limited
Platanthera leucophaea	Prairie white-fringed orchid	G2	Limited
Vertigo hubrichti	Hubricht's vertigo (land snail)	G2	Limited

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**Distribution relative to the Great Lakes ecoregion

Global Name	Common Name	Global Rank*	Distribution**
Carex juniperorum	Juniper sedge	G2	Limited
Vertigo hubrichti hubrichti	A land snail	G2T2	Limited
Vertigo hubrichti variabilis	A land snail	G2T2	Limited
Neonympha mitchellii mitchellii	Mitchell's satyr	G2T2	Limited
Potamogeton hillii	Hill's pondweed	G3	Limited
Vertigo elatior	Tapered vertigo (land snail)	G3	Limited
Listera auriculata	Auricled twayblade	G3	Limited
Botrychium campestre	Prairie moonwort, prairie dunewort	G3	Limited
Vertigo iowaensis	A land snail	G3	Limited
Moxostoma valenciennesi	Greater redhorse	G3	Limited
Cypripedium arietinum	Ram's head lady's slipper	G3	Limited
Sistrurus catenatus catenatus	Eastern massasauga	G3G4T3	Limited
Asplenium scolopendrium var americanum	Hart's tongue-fern	G4T3	Limited
Sedum integrifolium ssp leedyi	Leedy's roseroot	G5T1	Limited
Lycaeides melissa samuelis	Karner blue butterfly	G5T2	Limited
Sarracenia purpurea ssp heterophylla	Yellow pitcher plant	G5T2	Limited
Myotis sodalis	Indiana bat	G2	Widespread
Scirpus hallii	Hall's bulrush	G2	Widespread
Pyrgus wyandot	Southern grizzled skipper	G2	Widespread
Villosa fabalis	Rayed bean (mussel)	G2	Widespread
Clonophis kirtlandii	Kirtland's snake	G2	Widespread
Cystopteris laurentiana	Laurentian bladder fern	G2G4	Widespread
Epioblasma torulosa rangiana	Northern riffleshell (mussel)	G2T2	Widespread
Obovaria subrotunda	Round hickorynut	G3	Widespread
Epioblasma triquetra	Snuffbox (mussel)	G3	Widespread
Carex wiegandii	Weigand's sedge	G3	Widespread
Acipenser fulvescens	Lake sturgeon	G3	Widespread
Notropis anogenus	Pugnose shiner	G3	Widespread
Stylurus scudderi	Zebra clubtail	G3	Widespread
Etheostoma pellucidum	A sand darter	G3	Widespread

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**Distribution relative to the Great Lakes ecoregion

Global Name	Common Name	Global Rank*	Distribution**
Merolonche dolli	Doll's merolonche (a noctuid moth)	G3	Widespread
Clemmys muhlenbergii	Bog turtle	G3	Widespread
Euphyes dukesi	Duke's skipper	G3	Widespread
Somatochlora incurvata	Incurvate emerald dragonfly	G3	Widespread
Botrychium rugulosum	American ternate grapefern	G3	Widespread
Botrychium mormo	Little goblin moonwort	G3	Widespread
Gomphus viridifrons	Green-faced clubtail	G3	Widespread
Myotis leibii	Eastern small-footed bat	G3	Widespread
Stylurus amnicola	Riverine clubtail	G3	Widespread
Cirsium hillii	Hill's thistle	G3	Widespread
Charadrius melodus	Piping plover	G3	Widespread
Poa paludigena	Bog bluegrass	G3	Widespread
Carex schweinitzii	Schweinitz's sedge	G3	Widespread
Menegazzia terebrata	Port-hole lichen	G3	Widespread
Agalinis skinneriana	Pale false foxglove	G3	Widespread
Hesperia ottoe	Ottoe's skipper	G3?	Widespread
Botrychium oneidense	Blunt-lobed grapefern	G3G4	Widespread
Lepyronia gibbosa	Hill-prairie spittlebug	G3G4	Widespread
Prenanthes crepidinea	Nodding rattlesnake root	G3G4	Widespread
Astragalus neglectus	Cooper's milk vetch	G3G4	Widespread
Pachypolia atricornis	Three-horned moth	G3G4	Widespread
Vertigo cristata	A land snail	G3G4	Widespread
Spiranthes magnicamporum	Great Plains ladies' tresses	G3G4	Widespread
Lobaria scrobiculata	A lichen	G3G4	Widespread
Botrychium spathulatum	Spoon-leaf moonwort	G3G4	Widespread
Potamogeton confervoides	Algae-like pondweed	G3G4	Widespread
Venustaconcha ellipsiformis ellipsiformis	Ellipse (mussel)	G3G4	Widespread
Incisalia irus	Frosted elfin	G3G4	Widespread
Ammodramus henslowii	Henslow's sparrow	G3G4	Widespread
Arabis missouriensis var deamii	Deam's rockcress	G3G4T3	Widespread
Lanius ludovicianus migrans	Migrant loggerhead shrike	G5T3Q	Widespread

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**Distribution relative to the Great Lakes ecoregion

Global Name	Common Name	Global Rank*	Distribution**
Pleurobema clava	Clubshell	G1	Peripheral
Toxolasma lividus	Purple lilliput	G1G2	Peripheral
Macromia wabashensis	A riverine dragonfly	G1G3Q	Peripheral
Siphlonisca aerodromia	Tomah mayfly	G2	Peripheral
Lespedeza leptostachya	Prairie bush clover	G2	Peripheral
Sida hermaphrodita	Virginia mallow	G2	Peripheral
Simpsonaias ambigua	Salamander mussel	G2	Peripheral
Isotria medeoloides	Small whorled pogonia	G2G3	Peripheral
Cicindela marginipennis	Cobblestone tiger beetle	G2G3	Peripheral
Synosma suaveolens	Sweet-scented Indian plantain	G3	Peripheral
Cicindela ancocisconensis	A tiger beetle	G3	Peripheral
Polemonium vanbruntiae	Jacob's ladder	G3	Peripheral
Plantago cordata	Heart-leaved plantain	G3	Peripheral
Papaipema beeriana	Blazing star stem borer moth	G3	Peripheral
Speyeria idalia	Regal fritillary	G3	Peripheral
Agalinis auriculata	Earleaf foxglove	G3	Peripheral
Ophiogomphus howei	Pygmy snaketail	G3	Peripheral
Vertigo paradoxa	Mystery vertigo (land snail)	G3	Peripheral
Talinum rugospermum	Prairie fame-flower	G3G4	Peripheral
Carex lupuliformis	False hop sedge	G3G4	Peripheral
Etheostoma clarum	A sand darter	G3G4	Peripheral
Papaipema silphii	Silphium borer moth	G3G4	Peripheral
Williamsonia fletcheri	Ebony boghunter (dragonfly)	G3G4	Peripheral
Aeshna mutata	Spatterdock darner	G3G4	Peripheral
Gomphus quadricolor	Rapids clubtail	G3G4	Peripheral
Aster furcatus	Forked aster	G3G4	Peripheral
Pygarctia spraguei	Sprague's pygarctic	G3G4	Peripheral
Phyciodes batesii	Tawny crescent	G3G4	Peripheral
Problema byssus	Byssus skipper	G3G4	Peripheral
Leptochloa fascicularis var maritima	Salt-meadow grass; long-awned sprangletop	G5T3T4	Peripheral
Dalea foliosa	Leafy prairie clover	G2	Disjunct

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**Distribution relative to the Great Lakes ecoregion

Global Name	Common Name	Global Rank*	Distribution**
Botrychium hesperium	Western grapefern, western moonwort	G3	Disjunct
Scleria reticularis	Reticulated or netted nutrush	G3G4	Disjunct
Ophiogomphus anomalus	Extra-striped snaketail	G3	Unknown
Gomphurus ventricosus	Skillet clubtail	G3	Unknown
Eleocharis nitida	Slender spike-rush	G3G4	Unknown
Pleurobema sintoxia	Round pigtoe (a mussel)	G3G4	Unknown

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**Distribution relative to the Great Lakes ecoregion

Appendix A-2. Community Targets

Global Name	Common Name	Global Rank*	Distribution**
Great Lakes Granite (Metamorphic) Bedrock Lakeshore Sparse Vegetation	Great Lakes Granite (Metamorphic) Rocky Shore		Endemic
Granite/Metamorphic Great Lakes Cliff Sparse Vegetation	Great Lakes Granite/Metamorphic Cliff		Endemic
Great Lakes Basalt (Conglomerate) Bedrock Lakeshore Sparse Vegetation	Great Lakes Basalt (Conglomerate) Bedrock Lakeshore		Endemic
Picea glauca - Abies balsamea Basalt Wooded Herbaceous Vegetation	Spruce - Fir Basalt Bedrock Glade		Endemic
Scirpus spp. - Juncus spp. - Eleocharis elliptica Great Lakes Herbaceous Vegetation	Great Lakes Shallow Marsh		Endemic
Potamogeton spp. - Ceratophyllum spp. Great Lakes Shoreline Herbaceous Vegetation	Great Lakes Pondweed Submerged Aquatic Wetland	G?	Endemic
Quercus bicolor / Vaccinium corymbosum / Carex stipata Forest	Swamp White Oak Swamp	G?	Endemic
Quercus macrocarpa - Quercus palustris - Quercus bicolor / Calamagrostis canadensis Wooded Herbaceous Vegetation	Lakeplain Wet-Mesic Oak Openings	G1	Endemic
Quercus muehlenbergii / Andropogon gerardii - Anemone cylindrica Woodland	Oak Openings	G1	Endemic
Great Lakes Coastal Marsh Complex (5 subtypes)	Great Lakes Coastal Marsh Complex	G1G3	Endemic
Pinus banksiana - (Pinus resinosa) - Pinus strobus / Juniperus horizontalis Wooded Herbaceous Vegetation	Great Lakes Pine Barrens	G2	Endemic
Andropogon gerardii - Calamagrostis canadensis - Pycnanthemum virginianum - Solidago ohioensis Herbaceous Vegetation	Lakeplain Wet-Mesic Prairie	G2	Endemic
Cornus racemosa / Carex (sterilis, hystricina, flava) Shrub Herbaceous Vegetation		G2G3	Endemic
Spartina pectinata - Carex spp. - Calamagrostis canadensis Lakeplain Herbaceous Vegetation	Lakeplain Wet Prairie	G2G3	Endemic
Cladium mariscoides - (Carex lasiocarpa, Hypericum kalmianum, Solidago riddellii, Eleocharis elliptica) Herbaceous Vegetation	Twigrush Wet Prairie	G2G3	Endemic
Prunus pumila - (Ptelea trifoliata) Dune Shrubland	Sand Cherry Dune Shrubland	G2Q	Endemic
Wooded Dune and Swale Complex	Wooded Dune and Swale Complex	G3	Endemic
Juniperus communis - Rhus aromatica - Viburnum rafinesquianum / Solidago ptarmicoides Shrubland	Common Juniper - Mixed Deciduous Dry Alvar Shrubland	G3	Endemic
Potentilla fructicosa / Calamintha arkansana - Potentilla anserina - Primula mistassinica Sparse Vegetation	Great Lakes Limestone Bedrock Lakeshore	G3	Endemic
Pentaphylloides floribunda / Cladium mariscoides - Juncus balticus - (Rhynchospora capillacea) Herbaceous Vegetation	Interdunal Wetland	G3?	Endemic

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**Distribution relative to the Great Lakes ecoregion

Global Name	Common Name	Global Rank*	Distribution**
Cakile edentula Great Lakes Shore Sparse Vegetation	Great Lakes Beach	G3?	Endemic
Alkaline Cobble - Gravel Great Lakes Shore Sparse Vegetation	Great Lakes Alkaline Cobble/Gravel Shore	G3G4	Endemic
Non-alkaline Cobble - Gravel Great Lakes Shore Sparse Vegetation	Great Lakes Non-Alkaline Cobble/Gravel Shore	G3G4	Endemic
Non-alkaline Bedrock Great Lakes Shore Herbaceous Vegetation	Great Lakes Non-Alkaline Rocky Shore	G3G4	Endemic
Ammophila breviligulata - (Schizachyrium scoparium) Herbaceous Vegetation	Great Lakes Beachgrass Dune	G3G5	Endemic
Pinus banksiana - Pinus resinosa - Pinus strobus Dune Forest	Great Lakes Dune Pine Forest	G3Q	Endemic
Typha spp. - Scirpus spp. - Mixed Herbs Great Lakes Shore Herbaceous Vegetation	Great Lakes Shoreline Cattail - Bulrush Marsh	G4?	Endemic
Typha spp. Great Lakes Shore Herbaceous Vegetation	Great Lakes Shoreline Cattail Marsh	G4?	Endemic
Open Bluff - Cliff Great Lakes Alkaline Sparse Vegetation	Great Lakes Alkaline Open Bluff - Cliff	G4G5	Endemic
Open Bluff - Cliff Great Lakes Non-alkaline Sparse Vegetation	Great Lakes Non-Alkaline Open Bluff - Cliff	G4G5	Endemic
Juniperus communis - (J. virginiana) - Rhus aromatica - Viburnum rafinesquianum / Solidago ptarmicoides Shrubland	Juniper Alvar Shrubland		Limited
Thuja occidentalis / Carex eburnea Forest	Northern White-Cedar/Ebony Sedge Forest	G?	Limited
Igneous Dripping Bluff - Cliff Sparse Vegetation	Igneous Dripping Bluff/Cliff	G?	Limited
Bedrock River Shore Sparse Vegetation	River Bedrock Shore	G?	Limited
Danthonia spicata - Poa compressa - (Schizachyrium scoparium) Herbaceous	Poverty Grass Dry Alvar Grassland	G?	Limited
Chamaedaphne calyculata - Myrica gale / Carex lasiocarpa Dwarf-Shrubland	Leatherleaf-Sweetgale Shore Fen	G?	Limited
Spartina pectinata Great Lakes-North Atlantic Coast Herbaceous Vegetation		G?	Limited
Spartina pectinata - Muhlenbergia richardsonis - Sporobolus heterolepis - Solidago ptarmicoides-Euthamia graminifolia Herbaceous Vegetation	River Ledge Alvar Grassland	G1	Limited
Scirpus maritimus - Atriplex patula - Eleocharis parvula Herbaceous Vegetation	Inland Saline Marsh	G1	Limited
Quercus muhlenbergii / Poa spp. - Allium cernuum - Eleocharis compressa / Aulacomnium palustre Woodland	Chinquapin Oak / Nodding Onion Alvar Woodland	G1?	Limited
Corylus americana Shrubland	Hazelnut Barrens	G1?	Limited
THUJA OCCIDENTALIS ALVAR WOODED HERBACEOUS VEGETATION	White Cedar Alvar Savanna	G1G2	Limited
Deschampsia cespitosa - Spartina pectinata - Schizachyrium scoparium - Solidago ohioensis Herbaceous Vegetation	Midwest Wet-Mesic Dolomite Prairie	G1G2	Limited
Populus deltoides - (Juniperus virginiana) Dune Woodland	Cottonwood Dune	G1G2	Limited

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**Distribution relative to the Great Lakes ecoregion

Global Name	Common Name	Global Rank*	Distribution**
Picea glauca - Thuja occidentalis - Juniperus communis / Iris lacustris - Carex eburnea Shrubland	Spruce-Cedar Wet Alvar Woodland	G1G2	Limited
Pinus banksiana - (Quercus ellipsoidalis) / Schizachyrium scoparium - Prairie Forbs Wooded Herbaceous Vegetation	Jack Pine / Prairie Forbs Barrens	G2	Limited
Schizachyrium scoparium - Sorghastrum nutans - Bouteloua curtipendula Dry - Mesic Gravel Herbaceous Vegetation	Midwest Dry-Mesic Gravel Prairie	G2	Limited
Sporobolus heterolepis - Schizachyrium scoparium (Carex scirpoidea / Juniperus horizontalis) herbaceous vegetation	Little Bluestem Alvar Grassland	G2	Limited
Deschampsia cespitosa - (Sporobolus heterolepis - Schizachyrium scoparium) - Carex crawei - Senecio pauperculus Herbaceous Vegetation:Tufted Hairgrass - (Northern Dropseed - Little Bluestem) - Sedge sp. - Ragwort Sp. Herbaceous Vegetation	Tufted Hairgrass Wet Alvar Grassland	G2	Limited
Tortella tortuosa - Cladonia pocillum - Placynthium spp. Sparse Vegetation	Alvar Nonvascular Pavement	G2	Limited
Andropogon gerardii - Sorghastrum nutans - Schizachyrium scoparium - Aletris farinosa Herbaceous Vegetation	Mesic Sand Tallgrass Prairie	G2	Limited
Juniperus horizontalis - Pentaphylloides floribunda / Schizachyrium scoparium - Carex richardsonii dwarf-shrubland	Creeping Juniper - Shrubby Cinquefoil Alvar Pavement	G2	Limited
Sporobolus neglectus - S. vaginiflorus - Trichostema brachiatum - Panicum philadelphicum - (Poa compressa) herbaceous vegetation	Annual Alvar Pavement-Grassland	G2	Limited
Quercus alba - Quercus velutina - Quercus palustris / Carex pensylvanica Woodland	Lakeplain Mesic Oak Woodland	G2	Limited
Rhynchospora capitellata - Rhexia virginica - Rhynchospora scirpoides - Scirpus hallii Herbaceous Vegetation	Inland Coastal Plain Marsh	G2?	Limited
Pinus banksiana - Thuja occidentalis - Picea glauca / Juniperus communis Woodland	Mixed Conifer / Common Juniper Alvar Woodland	G2?	Limited
Pinus strobus - Quercus alba - (Quercus ellipsoidalis) / Carex pensylvanica Wooded Herbaceous Vegetation	White Pine - White Oak Barrens	G2?	Limited
Fagus grandifolia - Acer saccharum - Quercus bicolor - Acer rubrum Flatwoods Forest	Beech - Hardwoods Till Plain Flatwoods	G2G3	Limited
Quercus palustris - Quercus bicolor - Acer rubrum Flatwoods Forest	Northern (Great Lakes) Flatwoods	G2G3	Limited
Carex lasiocarpa - Scirpus cespitosus - Rhynchospora capillacea / Andromeda glaucophylla Herbaceous Vegetation	Boreal Calcareous Seepage Fen	G2Q	Limited
Thuja occidentalis Limestone Bedrock Woodland	White Cedar Limestone Bedrock Woodland	G3	Limited
Acer saccharum - Ostrya virginiana - Carya ovata - Quercus rubra Limestone Woodland	Sugar Maple-Oak-Hickory Limestone Woodland	G3	Limited
Tofieldia glutinosa - Parnassia glauca Herbaceous Vegetation		G3?	Limited

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**Distribution relative to the Great Lakes ecoregion

Global Name	Common Name	Global Rank*	Distribution**
JUNIPERUS VIRGINIANA ALVAR WOODED HERBACEOUS VEGETATION	Red Cedar Alvar Savanna	G3?	Limited
(Quercus rubra) - Juniperus communis / Juniperus horizontalis - Arctostaphylos uva-ursi Shrubland	Common Juniper Rocky Krummholz	G3G4	Limited
Thuja occidentalis Limestone Talus Woodland	White Cedar Limestone Talus Woodland	G3G4	Limited
Pentaphylloides floribunda / Carex interior - Carex flava - Sarracenia purpurea Shrub Herbaceous Vegetation	Northeastern Cinquefoil - Sedge Fen	G3G4	Limited
Acer rubrum - Larix laricina / Pentaphylloides floribunda Woodland		G3G5	Limited
Cladium mariscoides - Carex cryptolepis - Rhynchospora alba - Juncus canadensis Herbaceous Vegetation	Twigrush Wet Meadow	G3G5	Limited
Tilia americana - Fraxinus americana - (Acer saccharum) / Geranium robertianum Woodland	Basswood - Ash - Maple Woodland	G3G5	Limited
Chamaedaphne calyculata / Carex lasiocarpa - Utricularia spp. Shrub Herbaceous Vegetation		G4G5	Limited
Tsuga canadensis - Fagus grandifolia - (Acer saccharum) Great Lakes Forest	Great Lakes Hemlock - Beech - Hardwood Forest	G4G5	Limited
Picea mariana / Chamaedaphne calyculata / Sphagnum spp Dwarf-Shrubland	Black Spruce/Leatherleaf Semi-Treed Bog		Widespread
Salix exigua - Salix lutea Sandbar Shrubland	Midwest Willow Sandbar Shrubland	G?	Widespread
Quercus rubra - Acer rubrum / Erythronium americanum Forest	Red Oak Forest	G?	Widespread
Platanus occidentalis - Fraxinus pennsylvanica Forest		G?	Widespread
Pinus strobus / Alnus spp. / Osmunda regalis Forest	White Pine / Alder Swamp Forest	G?	Widespread
Acer saccharinum - Ulmus americana / Onoclea sensibilis Forest		G?	Widespread
Corylus cornuta - Amelanchier spp. - Prunus virginiana Rocky Shrubland	Boreal Hazelnut - Serviceberry Rocky Shrubland	G?	Widespread
Pinus resinosa - Populus tremuloides / Diervilla lonicera - Vaccinium spp. Forest	Red Pine-Aspen-Birch Forest	G?	Widespread
Pinus strobus - Pinus resinosa - Quercus (ellipsoidalis, rubra) / Juniperus communis Rocky Woodland	Mixed Pine - Hardwood Rocky Woodland	G?	Widespread
Acer saccharum - Pinus strobus / Acer pensylvanicum Forest	Sugar Maple - White Pine Forest	G?	Widespread
Eroding Clay Bank Sparse Vegetation	Eroding Clay Bank	G?	Widespread
Quercus rubra - Acer saccharum Forest	Red Oak - Sugar Maple Forest	G?	Widespread
Thuja occidentalis - Acer rubrum / Cornus stolonifera Forest		G?	Widespread
Quercus alba - Quercus rubra - Quercus velutina / Thalictrum dioicum Forest	White Oak - Red Oak / Early Meadow-Rue Forest	G?	Widespread

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**Distribution relative to the Great Lakes ecoregion

Global Name	Common Name	Global Rank*	Distribution**
Fraxinus nigra - Acer rubrum - (Larix laricina) / Rhamnus alnifolia Forest		G?	Widespread
Populus tremuloides - Quercus (ellipsoidalis, macrocarpa) / Andropogon gerardii Shrubland	Aspen - Oak Scrub Barrens	G?	Widespread
Thuja occidentalis / Hylocomium splendens Forest		G?	Widespread
Lacustrine Sand Flats - Bars Sparse Vegetation	Lacustrine Sand Flats - Bars	G?	Widespread
Populus tremuloides - (Populus grandidentata) Rocky Woodland	Mixed Aspen Rocky Woodland	G?	Widespread
Thuja occidentalis - Fraxinus nigra Forest	White Cedar - Black Ash Swamp	G?	Widespread
Clay Seeps Sparse Vegetation	Clay Seeps	G?	Widespread
Thuja occidentalis - Tsuga canadensis Saturated Forest	White Cedar - Hemlock Swamp	G?	Widespread
Danthonia spicata - Poa compressa Granite Herbaceous Vegetation	Poverty Grass Granite Barrens	G?	Widespread
Pteridium aquilinum - Bromus kalmii Herbaceous Vegetation	Bracken Grassland	G?	Widespread
Myrica gale Fen Shrubland	Sweet Gale Shrub Fen	G?	Widespread
Betula papyrifera Boreal Woodland [Provisional]	Paper Birch Boreal Woodland	G?	Widespread
Vallisneria americana Herbaceous Vegetation	Tape Grass Riverine Submerged Aquatic Wetland	G?	Widespread
Picea glauca - (Betula papyrifera) / Danthonia spicata Woodland	White Spruce Rocky Woodland	G?	Widespread
Lake Mud Flats Sparse Vegetation	Lake Mud Flats	G?	Widespread
River Mud Flats Sparse Vegetation	River Mud Flats	G?	Widespread
Eroding Cliffs Sparse Vegetation	Small Eroding Cliffs	G?	Widespread
Quercus velutina - (Quercus ellipsoidalis) - Quercus alba / Deschampsia flexuosa Woodland	Black Oak - Northern Pin Oak / Common Hairgrass Woodland	G?	Widespread
Acer saccharum - Fraxinus americana - Tilia americana - Magnolia acuminata / Cimicifuga racemosa Forest		G?	Widespread
Zizania (aquatica, palustris) Herbaceous Vegetation [Provisional]	Wild Rice Marsh	G?	Widespread
Carex lasiocarpa - Carex aquatilis - Calamagrostis canadensis - Decodon verticillatus Herbaceous Vegetation	Midwest Calcareous Floating Mat	G?	Widespread
Northern Igneous Dry Bluff - Cliff Sparse Vegetation	Northern Igneous Dry Bluff - Cliff	G?	Widespread
Calamagrostis canadensis Eastern Herbaceous Vegetation [Provisional]	Bluejoint Eastern Marsh	G?	Widespread

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Quercus rubra - Acer saccharum - Quercus alba - Ulmus americana / Prunus virginiana Forest	Red Oak-Sugar Maple-Elm Forest	G?Q	Widespread
Carex oligosperma - Rhynchospora alba - Scheuchzeria palustris Herbaceous	Open Schlenke Bog	G?Q	Widespread
Sandstone Dry Bluff - Cliff Sparse Vegetation	Sandstone Dry Bluff - Cliff	G?Q	Widespread
Polygonum spp. - Mixed Forbs Herbaceous Vegetation [Provisional]	Temporary Herbaceous Pond	G?Q	Widespread
Pinus banksiana - (Picea mariana) - Mixed Hardwoods / Sphagnum spp. Forest	Jack Pine Swamp	G?Q	Widespread
Sedimentary Dripping Bluff - Cliff Sparse Vegetation	Sedimentary Dripping Bluff/Cliff	G?Q	Widespread
Quercus palustris - Quercus bicolor - Nyssa sylvatica - Acer rubrum Sand Flatwoods Forest	Pin Oak - Swamp White Oak Sand Flatwoods	G2?	Widespread
Potamogeton pectinatus - Ruppia maritima Herbaceous Vegetation	Sago Pondweed Submerged Wetland	G2?	Widespread
Fagus grandifolia - Quercus spp. - Acer rubrum - Juglans nigra Forest	Beech - Mixed Hardwood Floodplain Forest	G2G3	Widespread
Schizachyrium scoparium - Sorghastrum nutans - Bouteloua curtipendula Dry - Mesic Herbaceous Vegetation	Midwest Dry-Mesic Prairie	G2G3	Widespread
Myrica gale - Pentaphylloides floribunda / Carex lasiocarpa - Cladium mariscoides Shrub Herbaceous Vegetation		G2G3	Widespread
Schizachyrium scoparium - Danthonia spicata - Carex pensylvanica - (Viola pedata) Herbaceous Vegetation	Midwest Dry Sand Prairie	G2G3	Widespread
Carex crinita - Osmunda spp. / Sphagnum spp. Herbaceous Vegetation	Midwest Acid Seep	G2Q	Widespread
Thuja occidentalis - Betula alleghaniensis Forest	Eastern White Cedar - Yellow Birch Forest	G2Q	Widespread
Carex spp. - Cladium mariscoides - Rhynchospora capillacea - Tofieldia glutinosa Herbaceous Vegetation	Midwest Calcareous Seep	G2Q	Widespread
Thuja occidentalis Bluff Woodland	White Cedar Bluff Woodland	G2Q	Widespread
Cornus sericea - Cornus amomum - Aronia melanocarpa - Viburnum lentago Fen Shrubland	Willow - Mixed Rich Shrub Fen	G2Q	Widespread
Vaccinium corymbosum - Gaylussacia baccata - Aronia melanocarpa / Calla palustris Shrubland	Highbush Blueberry Bog	G2Q	Widespread
Pinus strobus - Quercus alba - Mixed Hardwoods Forest	White Pine - White Oak Forest	G3	Widespread
Quercus velutina - (Quercus alba) - Quercus ellipsoidalis / Schizachyrium scoparium - Lupinus perennis Wooded Herbaceous Vegetation	Black Oak / Lupine Barrens	G3	Widespread

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Schizachyrium scoparium - Sorghastrum nutans - Andropogon gerardii - Lespedeza capitata Sand Herbaceous Vegetation	Midwest Dry-Mesic Sand Prairie	G3	Widespread
Pinus strobus - (Pinus resinosa) - Quercus rubra Forest	White Pine - Red Oak Forest	G3	Widespread
Tsuga canadensis - Betula alleghaniensis Saturated Forest	Hemlock - Yellow Birch Wet-Mesic Forest	G3	Widespread
Pinus resinosa / Vaccinium spp. Forest	Red Pine / Blueberry Dry Forest	G3	Widespread
Pinus strobus - Tsuga canadensis Great Lakes Forest	Great Lakes White Pine - Hemlock Forest	G3?	Widespread
Pinus strobus - Pinus resinosa / Vaccinium spp. / Arctostaphylos uva-ursi Forest	White Pine Inland Dune Ridge Forest	G3?	Widespread
Thuja occidentalis - (Betula alleghaniensis - Tsuga canadensis) Forest	White Cedar - (Hemlock) Mesic Forest	G3?	Widespread
Cobble - Gravel River Shore Sparse Vegetation	River Cobble-Gravel Shore	G3?	Widespread
Carex oligosperma - Carex lasiocarpa / Sphagnum spp. - Polytrichum spp. Herbaceous Vegetation	Northern Poor Fen	G3G4	Widespread
Pinus strobus - (Acer rubrum) / Osmunda spp. Forest	White Pine - Red Maple Swamp	G3G4	Widespread
Pinus strobus / Acer spicatum - Corylus cornuta Forest	White Pine / Mountain Maple Mesic Forest	G3G4	Widespread
Acer saccharum - Betula alleghaniensis - (Tilia americana) Forest	Maple - Yellow Birch Northern Hardwoods Forest	G3G4	Widespread
Pinus banksiana - Pinus resinosa / Quercus ellipsoidalis Woodland	Jack Pine - Red Pine / Scrub Oak Woodland	G3G4	Widespread
Thuja occidentalis - (Larix laricina) Seepage Forest	White Cedar Seepage Swamp	G3G4	Widespread
Pinus strobus / Vaccinium spp. Forest	White Pine / Blueberry Dry-Mesic Forest	G3G4	Widespread
Tsuga canadensis - (Betula alleghaniensis) Mesic Forest	Hemlock Mesic Forest	G3G4	Widespread
Chamaedaphne calyculata Relict Bog Dwarf-shrubland	Leatherleaf Kettle Bog	G3G4	Widespread
Pinus banksiana - Pinus resinosa / Carex pensylvanica Wooded Herbaceous Vegetation	Jack Pine - Red Pine Barrens	G3G4	Widespread
Fagus grandifolia - Acer saccharum Glaciated Midwest Forest	Beech - Maple Glaciated Forest	G3G4	Widespread
Fraxinus pennsylvanica - Ulmus americana - (Celtis occidentalis, Tilia americana) Northern Forest	Northern Ash - Elm - Hackberry Floodplain Forest	G3G4Q	Widespread
Picea mariana / Sphagnum spp. (Lower New England / Northern Piedmont, North Atlantic Coast) Woodland		G3G5	Widespread
Pinus banksiana - Mixed Conifer / Cladonia spp. Nonvascular Vegetation	Jack Pine/Lichen Rocky Barrens	G3G5	Widespread
Acer saccharum - Betula alleghaniensis - Fagus grandifolia / Viburnum lantanoides Forest	Northern Hardwood Forest	G3G5	Widespread

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Vaccinium corymbosum / Sphagnum spp. Shrubland		G3G5	Widespread
Pinus strobus - Quercus rubra / Danthonia spicata Acid Bedrock Wooded Herbaceous Vegetation	White Pine - Oak Acid Bedrock Glade	G3Q	Widespread
Chamaedaphne calyculata / Carex oligosperma / Sphagnum spp. Dwarf-shrubland	Great Lakes Leatherleaf Intermittent Wetland	G3Q	Widespread
Pinus strobus - Pinus resinosa - Quercus alba Morainal Ridge Forest	White Pine - Oak Morainal Ridge Forest	G3Q	Widespread
Fraxinus nigra - Mixed Hardwoods-Conifers / Cornus sericea / Carex spp. Forest	Black Ash - Mixed Hardwood Swamp	G4	Widespread
Thuja occidentalis / Abies balsamea - Acer spicatum Forest	White Cedar - Boreal Conifer Mesic Forest	G4	Widespread
Betula pumila - (Chamaedaphne calyculata, Andromeda glaucophylla) / Carex oligosperma Patterned Herbaceous Vegetation	Northern Poor Patterned Fen	G4	Widespread
Cephalanthus occidentalis / Carex spp. Northern Shrubland	Northern Buttonbush Swamp	G4	Widespread
Acer rubrum - Fraxinus spp. - Betula papyrifera / Cornus canadensis Forest	Red Maple - Ash - Birch Swamp Forest	G4	Widespread
Larix laricina / Alnus incana Forest	Northern Tamarack Rich Swamp	G4	Widespread
Thuja occidentalis - (Picea mariana - Abies balsamea) / Alnus incana Forest	White Cedar - (Mixed Conifer) / Alder Swamp	G4	Widespread
Cornus spp. - Salix spp. - Vaccinium corymbosum - Rhamnus alnifolia - Toxicodendron vernix Shrubland	Dogwood - Willow - Blueberry Swamp	G4?	Widespread
Acer saccharinum - Ulmus americana - (Populus deltoides) Forest	Silver Maple - Elm - (Cottonwood) Forest	G4?	Widespread
Betula papyrifera / Diervilla lonicera - (Abies balsamea) Forest	Paper Birch / Fir Forest	G4?	Widespread
Larix laricina / Aronia melanocarpa / Sphagnum spp. Forest	Central Tamarack Poor Swamp	G4?	Widespread
Pinus banksiana / (Quercus rubra, Quercus ellipsoidalis) Forest	Jack Pine / Scrub Oak Forest	G4?	Widespread
Betula papyrifera / Acer saccharum - Mixed Hardwoods Forest	Paper Birch / Sugar Maple - Mixed Hardwoods Forest	G4?	Widespread
Symplocarpus foetidus Herbaceous Vegetation	Skunk Cabbage Seepage Meadow	G4?	Widespread
Acer saccharum - Tilia americana / Ostrya virginiana - Carpinus caroliniana Forest	North-Central Maple - Basswood Forest	G4?	Widespread
Quercus alba - Quercus rubra - Carya ovata Forest	White Oak - Red Oak Dry-Mesic Forest	G4?	Widespread
Quercus velutina - Quercus alba - Carya (glabra, ovata) Forest	Black Oak - White Oak - Hickory Forest	G4?	Widespread
Cobble - Gravel Lake Shore Sparse Vegetation	Inland Lake Cobble-Gravel Shore	G4?	Widespread
Bedrock Lake Shore Sparse Vegetation	Inland Lake Bedrock Shore	G4?	Widespread
Quercus velutina / Carex pensylvanica Forest	Black Oak Forest	G4?	Widespread
Pinus banksiana - (Pinus resinosa) / Corylus cornuta Forest	Jack Pine / Hazel Forest	G4?	Widespread

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Acer (rubrum, saccharinum) - Fraxinus spp. - Ulmus americana Forest	Maple-Ash-Elm Swamp Forest	G4?	Widespread
Quercus velutina - Quercus alba / Vaccinium (angustifolium, pallidum) / Carex pensylvanica Forest	Black Oak - White Oak / Blueberry Forest	G4?	Widespread
Thuja occidentalis - Mixed Hardwoods Saturated Forest	White Cedar - Mixed Hardwood Swamp	G4?	Widespread
Pinus banksiana - Picea mariana / Vaccinium spp. / Lichen Rocky Woodland	Jack Pine - Black Spruce Rocky Woodland	G4?	Widespread
Tsuga canadensis - Acer saccharum - Betula alleghaniensis Forest	North Central Hemlock - Hardwood Forest	G4?	Widespread
Tsuga canadensis - Betula alleghaniensis Lower New England , Northern Piedmont Forest	Hemlock - Northern Hardwood Forest	G4?	Widespread
Pinus strobus - Populus tremuloides / Corylus cornuta Forest	White Pine-Aspen-Birch Forest	G4?	Widespread
Carex aquatilis - Carex spp. Herbaceous Vegetation	Water Sedge Wet Meadow	G4?	Widespread
Carex stricta - Carex spp. Herbaceous Vegetation	Tussock Sedge Wet Meadow	G4?	Widespread
Riverine Sand Flats - Bars Sparse Vegetation	Riverine Sand Flats	G4G5	Widespread
Pinus banksiana - (Pinus resinosa) - Quercus ellipsoidalis / Carex pensylvanica Forest	Jack Pine - Northern Pin Oak Forest	G4G5	Widespread
Betula pumila - Salix spp. Rich Boreal Fen Shrubland	Bog Birch - Willow Rich Boreal Fen	G4G5	Widespread
Pinus banksiana / Vaccinium spp. / Pleurozium schreberi Forest	Jack Pine / Blueberry / Feathermoss Forest	G4G5	Widespread
Carex lasiocarpa - Carex buxbaumii - Scirpus cespitosus Boreal Herbaceous Vegetation	Boreal Sedge Rich Fen	G4G5	Widespread
Acer saccharum - Fagus grandifolia - Betula spp. / Maianthemum canadense Forest	Beech - Maple - Northern Hardwoods Forest	G4G5	Widespread
Nuphar lutea ssp. advena - Nymphaea odorata Herbaceous Vegetation	Central Water Lily Aquatic Wetland	G4G5	Widespread
Picea mariana - Populus tremuloides / Mixed Herbs Forest	Black Spruce - Aspen Rich Forest	G4G5	Widespread
Picea glauca - Abies balsamea / Acer spicatum / Rubus pubescens Forest	Spruce - Fir / Mountain Maple Forest	G4G5	Widespread
Betula pumila / Chamaedaphne calyculata / Carex lasiocarpa Shrubland	Bog Birch-Leatherleaf Poor Fen	G4G5	Widespread
Pinus banksiana - Populus tremuloides / Diervilla lonicera Forest	Jack Pine-Aspen/Bush Honeysuckle Forest	G4G5	Widespread
Inland Freshwater Strand Beach Sparse Vegetation	Inland Freshwater Strand Beach	G4G5	Widespread
Igneous Talus Northern Sparse Vegetation	Northern Igneous Talus	G4G5	Widespread
Scirpus tabernaemontani - Typha spp. - (Sparganium spp., Juncus spp.) Herbaceous Vegetation [Provisional]	Bulrush - Cattail - Burreed Shallow Marsh	G4G5	Widespread
Sandstone Moist Bluff - Cliff Sparse Vegetation	Sandstone Moist Bluff - Cliff	G4G5	Widespread
Carex lacustris Herbaceous Vegetation	Lake Sedge Wet Meadow	G4G5	Widespread

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Carex (rostrata, utriculata) - Carex lacustris - (Carex vesicaria) Herbaceous Vegetation	Northern Sedge Wet Meadow	G4G5Q	Widespread
Canadian Shield Rock Outcrop Sparse Vegetation	Canadian Shield Rock Outcrop	G5	Widespread
Picea glauca - Abies balsamea - Populus tremuloides / Mixed Herbs Forest	Spruce - Fir - Aspen Forest	G5	Widespread
Nymphaea odorata - Nuphar lutea (ssp. pumila, variegata) Herbaceous Vegetation	Northern Water Lily Aquatic Wetland	G5	Widespread
Pinus strobus - Quercus (rubra, velutina) - Fagus grandfolia Forest	Pine - Oak Forest	G5	Widespread
Abies balsamea - Betula papyrifera / Diervilla lonicera Forest	Balsam Fir - Paper Birch Forest	G5	Widespread
Typha spp. - Scirpus acutus - Mixed Herbs Midwest Herbaceous Vegetation	Midwest Mixed Emergent Deep Marsh	G5	Widespread
Limestone - Dolomite Talus Sparse Vegetation	Limestone - Dolomite Talus	G5	Widespread
Populus tremuloides - Betula papyrifera / Acer saccharum - Mixed Hardwoods Forest	Aspen - Birch / Sugar Maple - Mixed Hardwoods Forest	G5	Widespread
Populus tremuloides - Betula papyrifera - (Acer rubrum, Populus grandidentata) Forest	Aspen - Birch - Red Maple Forest	G5	Widespread
Larix laricina / Sphagnum spp. Forest	Northern Tamarack Poor Swamp	G5	Widespread
Populus tremuloides - Betula papyrifera / (Abies balsamea, Picea glauca) Forest	Aspen-Birch/Boreal Conifer Forest	G5	Widespread
Picea mariana / Ledum groenlandicum / Carex trisperma / Sphagnum spp. Woodland	Black Spruce Bog	G5	Widespread
Picea mariana / Pleurozium schreberi Forest	Black Spruce / Feathermoss Forest	G5	Widespread
Populus tremuloides - Populus balsamifera - Mixed Hardwoods Lowland Forest	Aspen - Balsam Poplar Lowland Forest	G5	Widespread
Chamaedaphne calyculata - Decodon verticillatus / Woodwardia virginica Dwarf-shrubland		G5	Widespread
Picea mariana / Kalmia angustifolia / Sphagnum spp. Forest		G5	Widespread
Pinus banksiana / Abies balsamea Forest	Jack Pine / Balsam Fir Forest	G5	Widespread
Picea mariana / Ledum groenlandicum / Sphagnum spp. Forest	Black Spruce / Labrador Tea Poor Swamp	G5	Widespread
Picea mariana / Alnus incana / Sphagnum spp. Forest	Black Spruce / Alder Rich Swamp	G5	Widespread
(Chamaedaphne calyculata) - Ledum groenlandicum - Kalmia polifolia Bog Dwarf-shrubland	Leatherleaf Bog	G5	Widespread
Alkaline Moist Bluff - Cliff Sparse Vegetation	Alkaline Moist Bluff - Cliff	G5	Widespread
Cornus spp. - Salix discolor - (Rosa palustris) Shrubland	Dogwood - Pussy Willow Swamp	G5	Widespread
Typha spp. Midwest Herbaceous Vegetation	Midwest Cattail Deep Marsh	G5	Widespread
Pinus banksiana - Picea mariana / Vaccinium spp. / Pleurozium schreberi Forest	Jack Pine - Black Spruce / Feathermoss Forest	G5	Widespread

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Alkaline Dry Bluff - Cliff Sparse Vegetation	Alkaline Dry Bluff - Cliff	G5	Widespread
Alnus incana Swamp Shrubland [Provisional]	Speckled Alder Swamp	G5?	Widespread
Nuphar lutea ssp. advena Herbaceous Vegetation	Cowlily Aquatic Bed	G5?	Widespread
Potamogeton spp. - Ceratophyllum spp. Midwest Herbaceous Vegetation	Midwest Pondweed Submerged Aquatic Wetland	G5Q	Widespread
Phalaris arundinacea Eastern Herbaceous Vegetation	Reed Canary Grass Eastern Marsh (Provisional)	G?	Peripheral
Scirpus fluviatilis - Scirpus spp. Herbaceous Vegetation	River Bulrush Marsh	G?	Peripheral
Acer saccharum - Fraxinus spp. - Tilia americana / Osmorhiza claytonii - Caulophyllum thalictroides Forest	Sugar Maple - Ash - Basswood Rich Mesic Forest	G?	Peripheral
Quercus muehlenbergii - Fraxinus (americana, quadrangulata) Alkaline Forest	Chinquapin Oak - Ash Alkaline Forest	G?	Peripheral
Quercus alba - Carya (glabra, ovata) / Desmodium glutinosum Forest		G?	Peripheral
Acer saccharum - Quercus muehlenbergii Forest [Provisional]	Sugar Maple - Chinquapin Oak Forest	G?	Peripheral
Quercus macrocarpa - (Quercus alba - Quercus velutina) / Andropogon gerardii Wooded Herbaceous Vegetation	North-Central Bur Oak Openings	G1	Peripheral
Quercus bicolor - (Quercus macrocarpa) Woodland	Swamp White Oak Woodland	G1	Peripheral
Quercus alba - Quercus macrocarpa / Andropogon gerardii Wooded Herbaceous Vegetation	White Oak - Bur Oak Openings	G1G3	Peripheral
Pinus strobus - Quercus alba Sand Woodland	White Pine - White Oak Sand Woodland	G1Q	Peripheral
Malus ioensis - Crataegus spp. Prairie Shrubland	Prairie Apple Shrubland	G1Q	Peripheral
Spiraea tomentosa / Andropogon gerardii Shrubland	Hardhack Shrub Prairie	G1Q	Peripheral
Schizachyrium scoparium - Sorghastrum nutans - Calamintha arkansana Alkaline Herbaceous Vegetation	Midwest Dry-Mesic Limestone - Dolomite Prairie	G2	Peripheral
Andropogon gerardii - Sorghastrum nutans - (Sporobolus heterolepis) - Liatris spp. - Ratibida pinnata Herbaceous Vegetation	Central Mesic Tallgrass Prairie	G2	Peripheral
Cornus amomum - Salix spp. - Rhus vernix - Rhamnus lanceolata Fen Shrubland	Dogwood - Willow - Poison Sumac Shrub Fen	G2G3	Peripheral
Andropogon gerardii - Calamagrostis canadensis Sand Herbaceous Vegetation	Central Wet-Mesic Sand Tallgrass Prairie	G2G3	Peripheral
Schizachyrium scoparium - Bouteloua curtipendula - Bouteloua hirsuta Sand Hill Herbaceous Vegetation	Little Bluestem - Grama Sand Hill Prairie	G2G3	Peripheral
Quercus macrocarpa - Quercus bicolor - Carya laciniosa / Leersia spp. - Cinna spp. Forest	Bur Oak - Swamp White Oak Mixed Bottomland Forest	G2G3	Peripheral

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Andropogon gerardii - Calamagrostis canadensis - Helianthus grosseserratus Herbaceous Vegetation	Central Wet-Mesic Tallgrass Prairie	G2G3	Peripheral
Schizachyrium scoparium - Carex rugosperma - Carex muhlenbergii - Lithospermum carolinense - Opuntia humifusa Herbaceous Vegetation	Midwest Sand Barrens	G2G3	Peripheral
Schizachyrium scoparium - Sorghastrum nutans - Bouteloua curtipendula Glacial Drift Herbaceous Vegetation	Midwest Glacial Drift Hill Prairie	G2Q	Peripheral
Schizachyrium scoparium - Sorghastrum nutans - Bouteloua curtipendula Dry Gravel Herbaceous Vegetation	Midwest Dry Gravel Prairie	G3	Peripheral
Spartina pectinata - Carex spp. - Calamagrostis canadensis Sand Herbaceous Vegetation	Central Cordgrass Wet Sand Prairie	G3?	Peripheral
Pinus rigida / Vaccinium myrtilloides / Sphagnum spp. Woodland		G3?	Peripheral
Acer saccharum - Tilia americana / Ostrya virginiana Northern Forest	Northern Maple - Basswood Forest	G3?	Peripheral
Spartina pectinata - Carex spp. - Calamagrostis canadensis - Lythrum alatum - (Oxypolis rigidior) Herbaceous Vegetation	Central Cordgrass Wet Prairie	G3?	Peripheral
Pentaphylloides floribunda / Carex sterilis - Andropogon gerardii - Cacalia plantaginea Shrub Herbaceous Vegetation	Cinquefoil - Sedge Prairie Fen	G3G4	Peripheral
Pentaphylloides floribunda - Betula pumila / Carex lasiocarpa Patterned Herbaceous Vegetation	Patterned Rich Fen	G3G4	Peripheral
Nelumbo lutea Herbaceous Vegetation	American Lotus Aquatic Wetland	G3G4	Peripheral
Quercus alba - Quercus macrocarpa - Quercus rubra / Corylus americana Woodland	Northern Dry-Mesic Oak Woodland	G3G4	Peripheral
Quercus palustris - Quercus bicolor - (Liquidambar styraciflua) Mixed Hardwood Forest	Pin Oak Mixed Hardwood Forest	G3G5	Peripheral
Pinus rigida / Vaccinium spp. - Gaylussacia baccata Woodland	Pitch Pine / Blueberry Spp. - Huckleberry Woodland	G3G5	Peripheral
Fraxinus pennsylvanica - Ulmus spp. - Celtis occidentalis Forest	Central Green Ash - Elm - Hackberry Forest	G3G5	Peripheral
Quercus ellipsoidalis Forest	Northern Pin Oak Forest	G4?	Peripheral
Justicia americana Herbaceous Vegetation	Water-Willow Wetland	G4G5	Peripheral
Nymphaea tetragona - Nuphar lutea (ssp. pumila, variegata) Herbaceous Vegetation	Boreal Water Lily Aquatic Wetland	G4G5	Peripheral
Quercus ellipsoidalis - Quercus macrocarpa Bedrock Woodland	Northern Pin Oak - Bur Oak Bedrock Woodland	G4Q	Peripheral
Betula nigra - Platanus occidentalis Forest	River Birch - Sycamore Forest	G5	Peripheral
Quercus macrocarpa - (Quercus alba - Quercus stellata) / Andropogon gerardii Wooded Herbaceous Vegetation	Central Bur Oak Openings	G1G2	Disjunct

*Rank of rarity across entire range of a species or community: G1 = "critically imperilled" (~5 or fewer examples) ; G2 = "imperilled" (~6-20 examples); G3 = "vulnerable" (~21-100 examples) G4 = "apparently secure" (>100 examples); G5 = "secure" (common). Subrank T indicates rank applies to a subspecies or variety. Qualifiers to ranks: ? = "inexact numeric rank"; Q = "questionable taxonomy".

**Distribution relative to the Great Lakes ecoregion

Global Name	Common Name	Global Rank*	Distribution**
Spartina pectinata - Muhlenbergia richardsonis - Sporobolus heterolepis - Solidago ptarmicoides - Euthamia graminifolia herbaceous vegetation	River Ledge Limestone Pavement	G1	Unknown
Quercus macrocarpa / Danthonia spicata - (Geum triflorum) limestone wooded herbaceous vegetation	Bur Oak Limestone Savanna	G1?	Unknown
Pinus banksiana / Aronia melanocarpa / Xanthoparmelia spp. Woodland	Jack Pine Pavement Barrens	G4G5	Unknown
Populus tremuloides / Corylus americana Forest	Aspen / American Hazel Forest	G5	Unknown
Tsuga canadensis / Sphagnum spp. Forest		G5	Unknown

*Rank of rarity across entire range of a species or community: G1 = "critically imperilled" (~5 or fewer examples) ; G2 = "imperilled" (~6-20 examples); G3 = "vulnerable" (~21-100 examples) G4 = "apparently secure" (>100 examples); G5 = "secure" (common). Subrank T indicates rank applies to a subspecies or variety. Qualifiers to ranks: ? = "inexact numeric rank"; Q = "questionable taxonomy".

**Distribution relative to the Great Lakes ecoregion

Appendix A-3. Bird Targets

Common Name	Global Rank*
American White Pelican	G3
American Bittern	G4
Trumpeter Swan	G4
Bald Eagle	G4
Peregrine Falcon	G4
Greater Prairie Chicken	G4
Sharp-tailed Grouse	G4
Yellow Rail	G4
Piping Plover	G3
Black Tern	G4
Red-headed Woodpecker	G5
Sedge Wren	G5
Wood Thrush	G5
Bell's Vireo	G5
Blue-winged Warbler	G5
Golden-winged Warbler	G4
Black-throated Blue Warbler	G5
Kirtland's Warbler	G1
Prairie Warbler	G5
Cerulean Warbler	G4
Black-and-white Warbler	G5
Prothonotary Warbler	G5
Worm-eating Warbler	G5
Connecticut Warbler	G4
Canada Warbler	G5
Dickcissel	G4
Grasshopper Sparrow	G5
Henslow's Sparrow	G4
LeConte's Sparrow	G4
Nelson's Sharp-tailed Sparrow	G5
Wood Duck	G5
American Black Duck	G5
Hooded Merganser	G5
Redhead	G5
Ring-necked Duck	G5
Northern Harrier	G5
Ruffed Grouse	G5
Wild Turkey	G5
N. Bobwhite	G5
Sandhill Crane	G5
Upland Sandpiper	G5
American Woodcock	G5
Wilson's Phalarope	G5
Forster's Tern	G5
Black-billed Cuckoo	G5
Yellow-billed Cuckoo	G5
Short-eared Owl	G5

Common Name	Global Rank*
Whip-poor-will	G5
Chuck-wills-widow	G5
Chimney Swift	G5
Black-backed Woodpecker	G5
Olive-sided Flycatcher	G5
Eastern Wood-Pewee	G5
Yellow-bellied Flycatcher	G5
Least Flycatcher	G5
Willow Flycatcher	G5
Acadian Flycatcher	G5
Marsh Wren	G5
Veery	G5
Brown Thrasher	G5
Loggerhead Shrike	G5
Yellow-throated Vireo	G5
Warbling Vireo	G5
Philadephia Vireo	G5
Nashville Warbler	G5
Chestnut-sided Warbler	G5
Cape May Warbler	G5
Black-throated Green Warbler	G5
Blackburnian Warbler	G5
Yellow-throated Warbler	G5
Mourning Warbler	G5
Louisiana Waterthrush	G5
Kentucky Warbler	G5
Hooded Warbler	G5
Rose-breasted Grosbeak	G5
Clay-colored Sparrow	G5
Field Sparrow	G5
Bobolink	G5
Baltimore Oriole	G5
Purple Finch	G5

Appendix A-4. Aquatic System Targets[7]

North Shore of Lake Superior

Stream targets	*Lake targets*	*Nearshore targets*
Knife River system (large river with long Lake Superior-connected lower reach)	in-line wetland lakes	bedrock (resistant) with bedrock (resistant) nearshore
Pigeon River and estuary	large (partially bedrock-confined) headwater lakes	
Reservation River system	large, flow-through lakes	
runoff-dominated streams fed by headwater lakes	small, bedrock-confined headwater lakes	
runoff-dominated streams fed by wetlands and local inputs of groundwater		
runoff-dominated streams originating in large lakes and draining to a large river		
small, high gradient, runoff-dominated coastal streams		
Swamp River		

St. Louis River Drainage

Stream targets	*Lake targets*	*Nearshore targets*
lower St. Louis River and estuary	in-line wetland lakes	barrier beach with clay nearshore
Sand Lake-Seven Beaver Lake complex	large, wetland-fed headwater lakes	semi-protected wetlands with clay nearshore
wetland-dominated streams in drumlin fields		

Bayfield Peninsula and Uplands

Stream targets	*Lake targets*	*Nearshore targets*
headwater streams in Bayfield sand plains	backwater sloughs	baymouth/barrier beaches and semi-protected wetlands
headwater streams in Mille Lacs uplands	coastal marsh with lagoon	

[7] Aquatic system targets are organized by Ecological Drainage Unit (EDU). EDUs are groups of watersheds that share ecological and biological characteristics; There are 18 EDUs in the Great Lakes region. EDUs were the unit of assessment for the aquatic portion of the ecoregional plan. In this appendix, the EDU name is listed in boldface type and the target aquatic systems that occur within that EDU are listed beneath each heading.

high gradient river on conglomerate bedrock; includes waterfalls

large, low gradient river on Lake Superior lake plain

lower Bad/Kakagon River

medium sized rivers with headwaters in Winegar moraines and crossing through the Iron Range

moderate groundwater mainstems on Lake Superior lake plain; headwaters in Mille Lakes uplands

small coastal streams on lake plain

headwater and unconnected lakes in ice contact

oxbow lakes

peat lakes

small, spring-fed lakes

soft, shallow drainage lakes in end moraine

bedrock (composite) with bedrock nearshore

bedrock (resistant) with bedrock (resistant) nearshore

bedrock and coarse beaches with bedrock nearshore

riverine coastal marsh

shoreline bluffs with beach with sand

East Central Wisconsin

Stream targets

cool/coldwater rivers crossing end moraines

Fox River upstram of Lake Winnebago

Fox tributary rivers--north

Fox tributary rivers--south

large rivers on till plain and lake plain; cool/cold headwaters

large tributaries to lower Wolf River; cool headwaters

large, cool/coldwater rivers in outwash, end moraine, and ice contact

low gradient tributary streams on west Green Bay till plain

lower Wolf River

rapids reach of mainstem Wolf River

west Green Bay coastal streams on till and lake plain

Lake targets

Bass Lake Chain and adjacent spring-fed lakes

lake plain wetland lakes

large, headwater lakes in ground moraine, outwash, and ice contact

oxbow lakes

seepage ponds (Central Wisconsin Moraines)

small, deep, unconnected lakes in outwash plain

Spread Eagle Chain

spring-fed headwater lakes

Wolf Lake Chain

Nearshore targets

riverine coastal marsh

Western Lake Michigan and Door Peninsula

Stream targets	*Lake targets*	*Nearshore targets*
groundwater/wetland fed headwater streams in ice contact and end moraine	kettle moraine lakes	baymouth/barrier beaches with bedrock nearshore
low groundwater headwater streams on till	large, spring-fed lakes	baymouth/barrier beaches with sand
low groundwater mainstems on till and lake plain	marl lakes	bedrock shoreline with semi-protected and open wetlands with sand nearshore
medium-sized, low groundwater streams on Manitowoc till plain	shallow dune lakes	
moderate groundwater mainstems on till/lake plain; headwaters in ice contact/end moraine		
small coastal streams on thin till over bedrock and lacustrine sand		

Western Upper Peninsula and Keweenaw Peninsula

Stream targets	*Lake targets*	*Nearshore targets*
clay plain coastal streams on western Keweenaw Peninsula	kettle moraine lakes	baymouth/barrier beaches with bedrock nearshore
coastal reaches of western Upper Peninsula rivers	large (partially bedrock-confined) headwater lakes	bedrock (resistant) with bedrock (resistant) nearshore
Copper Country coastal streams on bedrock/thin till--most with falls near mouth	large lake complexes with high shoreline development	coarse beaches with bedrock (resistant) nearshore
lower Ontonagon River		sandy beach/dunes with bedrock (resistant) nearshore
midreaches of Ontonagon river on dissected lake plain		sandy beach/dunes with sand nearshore
Winegar moraine headwater streams		semi-protected wetlands with bedrock (resistant) nearshore

Central Upper Peninsula

Stream targets	*Lake targets*	*Nearshore targets*
large coastal streams on till plain entering western Green Bay--extensive wetlands	fault lakes	bedrock (resistant) with bedrock (resistant) nearshore

large, moderate groundwater small to medium-sized streams on outwash and coarse ground/end moraine

lower Menomonee River

lower Sturgeon River

medium-sized coastal streams on till and lake plain

medium-sized till plain streams--extensive wetlands

Michigamme highland-Huron Mountain coastal rivers

Michigamme highland-Huron Mountain inland rivers

moderate groundwater small to medium-sized streams on outwash and coarse ground/end moraine (drumlins common)

moderate to high gradient coastal streams entering Keweenaw or Huron Bay

small to medium sized tributaries to the lower Sturgeon River

kettle moraine lakes

large (partially bedrock-confined) headwater lakes

peat lakes

small, bedrock-confined headwater lakes

small, headwater lakes on outwash plain

coarse beaches with sand nearshore

low bluff (<15 m) with sand nearshore

open shoreline wetlands with sand nearshore

sandy beach/dunes with bedrock (resistant) nearshore

sandy beach/dunes with sand nearshore

semi-protected wetlands with bedrock (resistant) nearshore

Eastern Upper Peninsula

Stream targets

Bay de Noc tributaries on outwash and lake plain

central Upper Peninsula coastal streams--Lake Superior drainage

lower reaches of Taquamenon and Manistique Rivers

medium-sized coastal stream on Cheboygan lake plain

Seney sand lake plain streams

small to medium sizes streams on peat and lake

Lake targets

lake plain wetland lakes

large lakes with coastal connections

peat lakes

shallow dune lakes

small, headwater lakes on outwash plain

Nearshore targets

baymouth/barrier beaches with bedrock nearshore

baymouth/barrier beaches with sand

bedrock (resistant) with bedrock (resistant) nearshore

coarse beaches with bedrock (resistant) nearshore

open shoreline wetlands with bedrock nearshore

sandy beach/dunes with bedrock (resistant)

plain

St.Ignace-Rudyard clay lake plain coastal
streams--extensive wetlands

St.Ignace-Rudyard clay lake plain coastal
streams--few wetlands

nearshore

sandy beach/dunes with sand nearshore

semi-protected wetlands with bedrock
(resistant) nearshore

Northern Lake Michigan, Lake Huron, and Straits of Mackinac

Stream targets	*Lake targets*	*Nearshore targets*
branches of Thunder Bay river--lower reaches	bog ponds	baymouth/barrier beaches with bedrock nearshore
cold, groundwater-fed stream on sandy lake plain	drowned river mouth lakes	baymouth/barrier beaches with sand and gravel lag over clay nearshore
high groundwater, headwater streams in outwash and ice contact	headwater and unconnected lakes in ice contact	baymouth/barrier beaches with sand
lower Cheboygan/Black River	kettle moraine lakes	bedrock (resistant) with bedrock (resistant) nearshore
lower reaches of Au Sable, Manistee, Muskegon Rivers	lake plain wetland lakes	coarse beaches with bedrock (resistant) nearshore
mainstems of Au Sable, Manistee, and Muskegon rivers	pinched off bays of Great Lakes	high bluff with beach with sand and gravel lag over clay nearshore
medium-sized streams in Harrisville Moraines--karst terrain	sink hole lakes	open shoreline wetlands with sand nearshore
medium-sized, moderate to high groundwater streams entering Lake Charlevoix, Grand Traverse Bay/Chain of Lakes, and/or Little Traverse Bay	small, headwater lakes on outwash plain	sandy beach/dunes with bedrock (resistant) nearshore
	very large, deep, inland lakes	
	very large, wetland-connected inland lakes	sandy beach/dunes with sand and gravel lag over clay nearshore
moderate groundwater coastal streams (NW Lake Michigan) with drowned river mouth		sandy beach/dunes with sand nearshore
small to medium-sized rivers in outwash and coarse ground moraine		semi-protected wetlands with bedrock (resistant) nearshore
Thunder Bay River headwaters		
wetland-connected headwater streams on outwash plain, ice contact and end moraine		

Saginaw Bay

Stream targets	*Lake targets*	*Nearshore targets*
Huron clay lake plain coastal streams	kettle moraine lakes	baymouth/barrier beaches with bedrock nearshore
interlobate headwater streams (Saginaw Bay drainage)		baymouth/barrier beaches with sand
lower Tittabawassee River		bedrock (composite) with bedrock nearshore
lowland, lake plain river (fed by interlobate headwaters)		bedrock (resistant) with bedrock (resistant) nearshore
medium- to large-sized lake plain coastal rivers--fed by headwaters originating on lake plain		coarse beaches with bedrock (resistant) nearshore
Saginaw River		open shoreline wetlands with sand and gravel lag over clay nearshore
small lake plain tributaries to Shiawassee River		open shoreline wetlands with sand nearshore
Tawas lake plain coastal streams		sandy beach/dunes with bedrock (resistant) nearshore
Tittabawassee River tributaries		sandy beach/dunes with sand nearshore

Southeast Lake Michigan

Stream targets	*Lake targets*	*Nearshore targets*
interlobate headwater streams (Lake Michigan drainage)	cisco lakes	baymouth/barrier beaches with sand and gravel lag over clay nearshore
large rivers in southwest Michigan till plains	kettle moraine lakes	baymouth/barrier beaches with sand nearshore
large to very large rivers in southwest Michigan till plains--coastal reach	large, deep, stream-connected lakes	sandy beach/dunes with sand/gravel nearshore
medium-sized, lowland rivers with extensive riparian wetlands	oxbow lakes	
sandy coastal dune streams		
small to medium-sized tributary streams in end moraine and outwash		
small to medium-sized tributary streams in outwash and ice contact		

southern tributaries to St. Joseph River (Lake Michigan drainage)

tributary streams in medium textured moraines (southern Iona moraines)

Southeast Michigan Interlobate and Lake Plain

Stream targets

interlobate headwater streams (Lake Erie drainage)

lake plain tributaries connecting to a medium-sized stream

medium- to large-sized lake plain coastal rivers--fed (at least in part) by interlobate headwater streams

medium- to large-sized lake plain coastal rivers--fed by headwaters originating on lake plain

Lake targets

cisco lakes

inland whitefish lakes

kettle moraine lakes

marl lakes

Nearshore targets

open shoreline wetlands with sand and gravel lag over clay nearshore

Western Lake Erie

Stream targets

eastern Maumee lake plain coastal mainstems

headwater tributaries to Maumee River

interlobate headwater streams (Maumee River drainage)

large, bedrock-confined coastal streams

lower Maumee River

medium-sized till plain mainstems--local groundwater inputs present

medium/large-sized lake plain tributaries to Maumee River

Sandusky River headwater streams

Nearshore targets

baymouth/barrier beaches with bedrock nearshore

baymouth/barrier beaches with clay/sand nearshore

bedrock (non-resistant) with bedrock

shoreline bluffs with bedrock nearshore

shoreline bluffs with clay/sand nearshore

small lake plain coastal streams

small, coastal streams on Maumee lake plain

small, very low gradient tributaries to lower Maumee River

St. Joseph River mainstem (Maumee drainage)

Southern Lake Erie

Stream targets

Cuyahoga River headwaters

eastern Maumee lake plain coastal mainstems

Grand River lowland headwaters and

large, coastal rivers (NE Ohio/Allegheny Plateau)

medium-sized coastal streams on bedrock (predominantly shale)

medium-sized till plain mainstems--local groundwater inputs absent

medium-sized till plain mainstems--local groundwater inputs present

small coastal streams on bedrock (predominantly shale)

Nearshore targets

baymouth/barrier beaches with bedrock nearshore

baymouth/barrier beaches with clay/sand nearshore

bedrock (non-resistant) with bedrock

bedrock (non-resistant) with clay/sand nearshore

open shoreline wetlands with clay/sand nearshore

semi-protected wetlands with clay/sand nearshore

shoreline bluffs with clay/sand nearshore

Eastern Lake Erie

Stream targets

Allegheny plateau headwaters

bedrock coastal streams

confined mainstems

Lake Erie coastal plain streams

lake plain mainstems

Nearshore targets

bedrock (non-resistant) with bedrock

coarse beaches with bedrock nearshore

Lake Erie shoal

sandy/silty banks with bedrock nearshore

lower Niagara River

medium-sized coastal streams on bedrock (predominantly shale)

upper Niagara River

Southern Lake Ontario and Finger Lakes

Stream targets	*Lake targets*	*Nearshore targets*
confined mainstems	lake plain coastal ponds--not Great Lakes connected	baymouth/barrier beaches and shoreline bluffs with bedrock nearshore
Finger Lake connecting channels		
Finger Lake inlets	large, elongate, highly-confined lakes	baymouth/barrier beaches and shoreline bluffs with sand nearshore
Finger Lake tributaries	marsh ponds	sandy beach/dunes with bedrock (resistant) nearshore
Genesee River gorge reach	oxbow lakes	
groundwater-fed till plain streams		shoreline bluffs and beach with bedrock nearshore
lake outlets		
lake plain wetland-fed streams		
lower Genesee River		
marsh tributaries to Seneca River		
southwest Lake Ontario lake plain coastal streams		
tributaries to southern Lake Ontario bays		

Eastern Lake Ontario

Stream targets	*Lake targets*	*Nearshore targets*
Black River headwaters	coastal ponds--Great Lakes connected	bedrock (resistant) with bedrock (resistant) nearshore
Black River mainstem	large, flow-through lakes	sandy beach/dunes with sand nearshore
Eastern Lake Ontario coastal streams	small, bedrock-confined headwater lakes	spawning reef
eastern tributaries to Black River		
headwaters of southern tributaries to Oneida Lake		

lower Black River

lower Salmon River

midreaches of southern tributaries to Oneida Lake

northern Jefferson county coastal streams

southern Tug Hill transition streams

Tug Hill headwater streams

western Tug Hill transition streams

St. Lawrence

Stream targets	*Lake targets*	*Nearshore targets*
Adirondack highland streams	backwater sloughs	bedrock (resistant) with bedrock (resistant) nearshore
glacial marine plain tributaries	bog ponds	clay banks with clay nearshore
large St. Lawrence tributaries	large lake plain lakes	open shoreline wetlands with bedrock nearshore
midreaches of St. Lawrence tributaries	large, flow-through lakes	
small marine plain coastal streams	oxbow lakes	open shoreline wetlands with clay nearshore
St. Lawrence lake plain mainstems	small, bedrock-confined headwater lakes	sandy beach/dunes with sand nearshore
St. Lawrence lake plain tributaries		
till plain tributaries		

Appendix B. Great Lakes Ecoregional Planning Participants

ILLINOIS

Illinois Nature Preserves Commission
University of Illinois - Chicago
Morton Arboretum
US Fish & Wildlife Service

McHenry County Conservation District
The Nature Conservancy - Illinois Field Office
The Nature Conservancy - Peoria Office
The Nature Conservancy - Great Lakes Program

INDIANA

Indiana Dunes National Lakeshore
Lake County Parks
Indiana Natural Heritage Data Center

The Nature Conservancy - Indiana Field Office
The Nature Conservancy - Southern Lake Michigan Project
USGS – Biological Resource Division

MICHIGAN

Michigan Natural Features Inventory
Saginaw Basin Land Conservancy
Hiawatha National Forest
Northern Michigan University
Tip of the Mitt Watershed Council
Michigan Department of Environmental Quality
Ottawa National Forest
Huron-Manistee National Forest
Mead Paper
US Fish & Wildlife Service
Seney National Wildlife Refuge
Porcupine Mountains Wilderness State Park
US Geological Survey—National Water-Quality Assessment Program
University of Michigan School of Natural Resources and Environment

The Nature Conservancy - Michigan Field Office
Michigan DNR - Forest Management Division
Michigan DNR - Wildlife Management Division
Michigan DNR - Parks & Recreation Division
Michigan DNR – Fisheries Division
Shelter Bay Forests
Grand Traverse Regional Land Conservancy
Allegan State Game Area
Lake St. Clair Great Lakes Fisheries Station
Keweenaw Land Trust
Blue Water Land Conservancy
Tahquemenon Falls State Park

MINNESOTA

Arrowhead Regional Development Commission
Minnesota DNR - Minnesota County Biological Survey
Minnesota DNR - Parks
Minnesota DNR – Ecological Services
Minnesota DNR – Fisheries
University of Minnesota - Duluth
Minnesota Parks and Trails Council
Lake County Courthouse

The Nature Conservancy - Minnesota Field Office
The Nature Conservancy - Northeast Minnesota Office
The Nature Conservancy - Midwest Resource Office
Minnesota Pollution Control Agency
US EPA – Mid-Continent Ecology Division – Duluth
Potlach - Minnesota Wood Products Division
Wolf Ridge Environmental Learning Center
US Forest Service - Tofte Ranger Station

NEW YORK

Northern New York Community Foundation
Thousand Islands Land Trust
New York Natural Heritage Program
New York Dept. of Environmental Conservation
US Fish and Wildlife Service
State University of NY – College at Oswego
State University of NY – Buffalo
State University of NY – College of Environmental Science and Forestry

The Nature Conservancy - New York Regional Office
The Nature Conservancy - Adirondack Office
The Nature Conservancy - Central & Western NY Chapter
The Nature Conservancy - Eastern Lake Ontario Project
The Nature Conservancy – Neversink River Project Office
Cornell University
State University of NY – Oneonta Biological Field Station

OHIO

Toledo Metro Parks
Ohio Natural Heritage Program
ODNR – Division of Geological Survey
Ohio EPA – Ecological Assessment Section

The Nature Conservancy - Ohio Field Office
The Nature Conservancy - Oak Openings Project
Office/Kitty Todd Preserve

ONTARIO

Natural Heritage Information Centre

WISCONSIN

Bad River Natural Resources Department
US Fish & Wildlife Service - Green Bay
University of Wisconsin - Green Bay
Wisconsin DNR
Northeast Wisconsin Land Trust
Wisconsin Natural Heritage Program
Apostle Islands National Lakeshore

The Nature Conservancy - Wisconsin Field Office
The Nature Conservancy - Door County Office
The Nature Conservancy - Kakagon Sloughs Project
The Nature Conservancy - Door Peninsula Project
Chequamegon-Nicolet National Forest
Door County Land Trust
Northland College - Ashland

Map 1: Conservation Areas in the Great Lakes Region

Produced by The Nature Conservancy Great Lakes Program
September 2000

Ontario *

Quebec

Lake Superior

MN

WI

Lake Huron

Lake Ontario

MI

NY

Lake Michigan

Lake Erie

PA

IL

IN

OH

The Nature Conservancy®
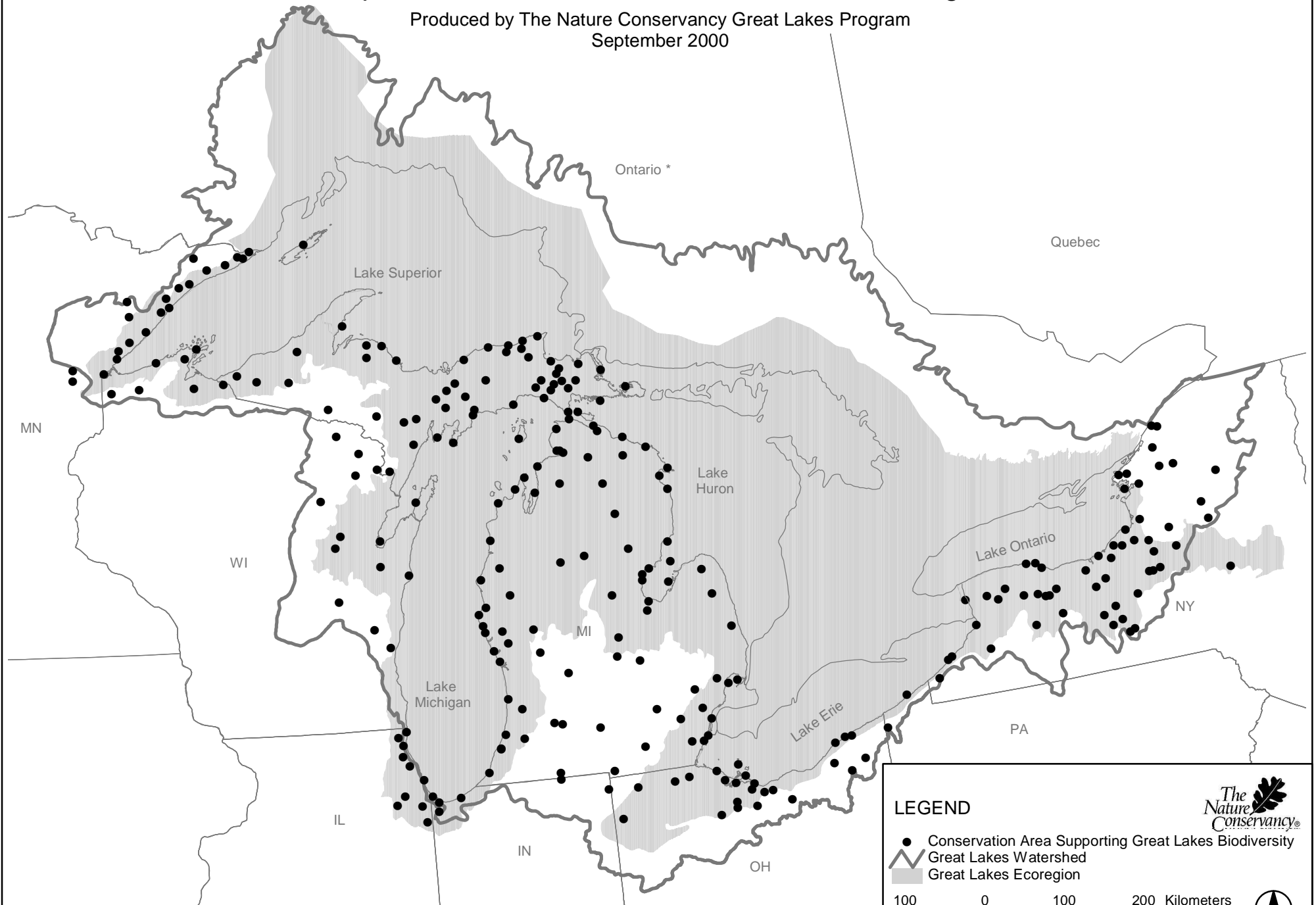
LEGEND

- Conservation Area Supporting Great Lakes Biodiversity
- Great Lakes Watershed
- Great Lakes Ecoregion

100   0   100   200   Kilometers

*Site selection is underway in Ontario.

Map 2: The Nature Conservancy's Priority Conservation Areas in the Great Lakes Region

Produced by The Nature Conservancy Great Lakes Program
September 2000

Keweenaw Peninsula
Swamp River
Pigeon River and estuary
Yellow Dog Plains-Craig Lake State Park
Brule River
Reservation River
Little Presque Isle-Middle Bay
Cascade River-Mississippi Creek
Sturgeon River-Bay de Noc-Ogontz Bay
Temperance
Seney Fens and East Branch Fox River
Manitou
Two Hearted River
Carp River
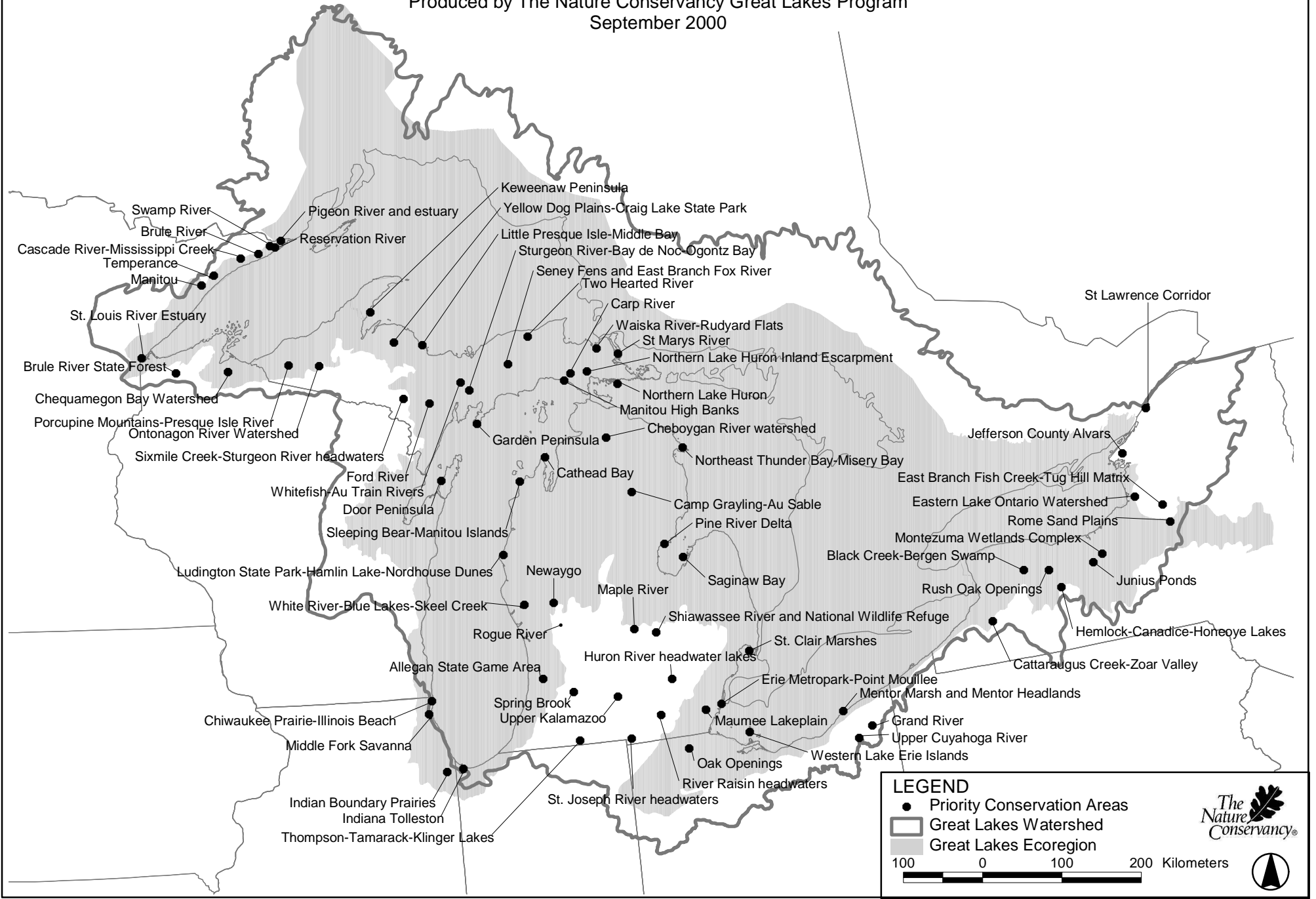St. Louis River Estuary
Waiska River-Rudyard Flats
St Marys River
St Lawrence Corridor
Brule River State Forest
Northern Lake Huron Inland Escarpment
Chequamegon Bay Watershed
Northern Lake Huron
Manitou High Banks
Porcupine Mountains-Presque Isle River
Cheboygan River watershed
Ontonagon River Watershed
Jefferson County Alvars
Sixmile Creek-Sturgeon River headwaters
Garden Peninsula
Northeast Thunder Bay-Misery Bay
Ford River
Cathead Bay
East Branch Fish Creek-Tug Hill Matrix
Whitefish-Au Train Rivers
Eastern Lake Ontario Watershed
Door Peninsula
Camp Grayling-Au Sable
Rome Sand Plains
Pine River Delta
Montezuma Wetlands Complex
Sleeping Bear-Manitou Islands
Black Creek-Bergen Swamp
Ludington State Park-Hamlin Lake-Nordhouse Dunes
Junius Ponds
Newaygo
Saginaw Bay
Rush Oak Openings
Maple River
White River-Blue Lakes-Skeel Creek
Shiawassee River and National Wildlife Refuge
Hemlock-Canadice-Honeoye Lakes
Rogue River
St. Clair Marshes
Huron River headwater lakes
Cattaraugus Creek-Zoar Valley
Allegan State Game Area
Erie Metropark-Point Mouillee
Mentor Marsh and Mentor Headlands
Spring Brook
Chiwaukee Prairie-Illinois Beach
Maumee Lakeplain
Grand River
Upper Kalamazoo
Upper Cuyahoga River
Middle Fork Savanna
Oak Openings
Western Lake Erie Islands
Indian Boundary Prairies
River Raisin headwaters
Indiana Tolleston
St. Joseph River headwaters
Thompson-Tamarack-Klinger Lakes

LEGEND
• Priority Conservation Areas
☐ Great Lakes Watershed
▨ Great Lakes Ecoregion

100   0   100   200   Kilometers

The Nature Conservancy®