

# **Lake St. Clair Potential Conservation Areas Report**

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MNFI maintains a continuously updated information base, the only comprehensive, single source of data on Michigan's endangered, threatened, or special concern plant and animal species, natural communities, and other natural features. MNFI has responsibility for inventorying and tracking the State's rarest species and exceptional examples of the whole array of natural communities. MNFI also provides information to resource managers for many types of permit applications regarding these elements of diversity.

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# Lake St. Clair Potential Conservation Areas

## Introduction

Natural resource conservation is a fundamental component of a community's long-term environmental and economic health. Natural resource areas perform important natural functions such as water filtration and they provide recreational opportunities and wildlife habitat that enhance the overall vitality of a community. Abundant natural resources once surrounded population centers in the area. Now, much reduced in size, natural resource areas are becoming encircled by development. These remaining sites are the foundation of Lake St. Clair's natural heritage; they represent the last remaining remnants of the areas native ecosystems, natural plant communities and scenic qualities. Consequently, it is to a community's advantage that these sites be carefully integrated into the planning for future development. Striking a balance between development and natural resource conservation and preservation is critical if Lake St. Clair is to maintain its unique natural heritage. This approach will provide the greatest opportunity to maintain high property values and continued market demand. Part of what makes the Lake St. Clair such a unique and desirable place to work, live, and play is the combination, quality, and accessibility of its natural landscapes, lakes, rivers, and streams.

Successful land use planning requires more than simply protecting small preserves and trusting that they will remain in their current condition indefinitely. Many human activities such as road construction, chemical and fertilizer application, fire suppression, and residential development can have a detrimental impact on populations of plants, animals, and insects and the natural communities in which they live. In order to maintain the integrity of the most fragile natural areas, a more holistic approach to resource conservation must be taken, an approach that looks beyond the borders of the site itself. What happens on adjacent farmland, in a nearby town, or upstream should be considered equally as important as what happens within a preserve. By looking to the past, understanding the present, and considering the future, it becomes apparent that a balance must be struck between development and natural resource preservation.

**This report identifies and ranks Potential Conservation Areas remaining in a 10 mile buffer area around Lake St. Clair area.** Potential Conservation Areas are defined as places on the landscape dominated by native vegetation that have various levels of potential for harboring high quality natural areas and unique natural features. In addition these areas may provide critical ecological services such as maintaining water quality and quantity, soil development and stabilization, pollination of cropland, wildlife travel corridors, stopover sites for migratory birds, sources of genetic diversity, and floodwater retention. However, the actual ecological value of these areas can only be truly ascertained through on the ground biological surveys. The process established by the Michigan Natural Features Inventory (MNFI) of identifying potential conservation areas, can also be used to update and track the status of these remaining sites. The Michigan Natural Features Inventory

recommends that local municipalities in Ontario, Michigan, and Walpole Island First Nation incorporate this information into their comprehensive natural area mapping services. The site map and ranking data can be used by local municipalities, land trusts, and other agencies to prioritize conservation efforts and assist in finding opportunities to establish an open space system of linked natural areas along Lake St. Clair.

## **Process for delineating and ranking Potential Conservation Areas**

### **Materials and Interpretation Methodology**

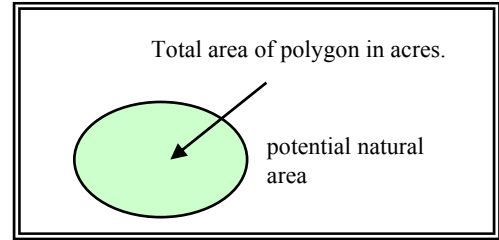
Interpretation of the 10 mile buffer area around Lake St. Clair was conducted by using C-CAP satellite imagery data set which was taken in 1999-2000 on the Michigan side, and 2002? on the Canadian side. Land coverages were divided into natural and cultural types. All natural land cover types were lumped and converted into a shapefile. The major and minor road data layers were used to split polygons into additional polygons. An additional layer, named the coastal transition zone, was created so that shoreline sites and islands were not penalized for low connectivity. Municipal boundaries were not utilized to delineate site boundaries unless the boundary corresponded to a defined hard edge, such as a road. In addition, due to the 30 x 30 meter pixel size, non-natural lands that totaled four pixels or less in size and were completely contained within the PCA, were integrated into the PCA. Once all sites were delineated, sites under 20 acres were removed from the shapefile.

### **Site Selection and Prioritization**

Following the delineation of potential conservation areas, a more rigorous level of examination was undertaken based upon specific scaled criteria to prioritize sites. The criteria used to first delineate the sites were translated to a numerical scale. Each site could then be assessed based upon the scaled criteria and a total calculated score, based upon the sum of the scores for each criterion.

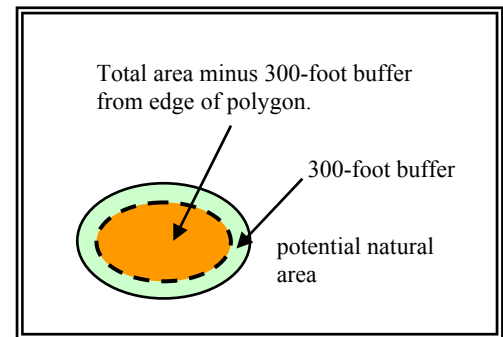
## Description of Criteria

**Total Size** - The total size of a site is recognized as an important factor for viability of species and ecosystem health. Larger sites tend to have higher species diversity, higher reproductive success, and improve the chances of plant and animal species surviving a catastrophic event such as a fire, tornado, ice storm, or flood.



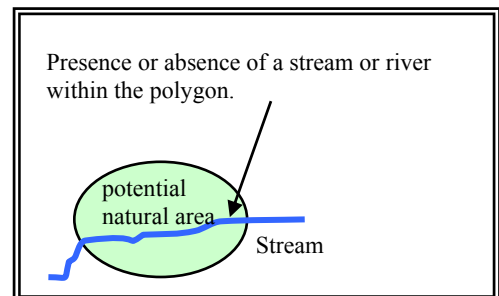
Size is defined as the total area of the polygon.

**Size of Core Area** - Many studies have shown that there are negative impacts associated with the perimeter of a site on “edge-sensitive” animal species, particularly amphibians, reptiles, and forest and grassland songbirds. Buffers vary by species, community type, and location, however most studies recommend a buffer somewhere between 200 and 600 ft. to minimize negative impacts. Three hundred feet is considered a sufficient buffer for most “edge-sensitive” species in forested landscapes.



For this project, core area is defined as “size” (see above) minus a 300-foot wide buffer measured inward from the edge of the polygon. Core area is different from total area of the site because it takes into account the shape of the site. Typically, round shapes contain a larger core area relative to the total site than long narrow shapes.

**Stream Corridor (presence/absence)** - Water is essential for life. Streams are also dynamic systems that interact with the surrounding terrestrial landscape creating new habitats. Waterways also provide the added benefit of a travel corridor for wildlife, connecting isolated patches of natural vegetation.

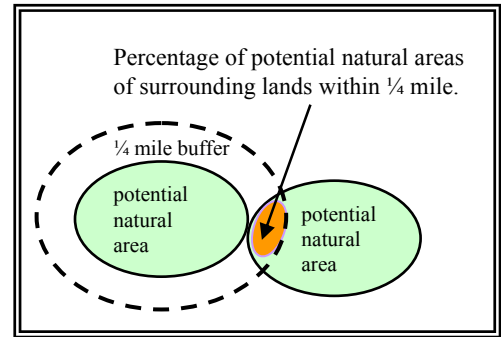


Sites that are part of riparian corridors were given a score of 2 or 0 points depending upon whether or not the site included a portion of a river or stream system.

**Landscape Connectivity** - Connectivity between habitat patches is considered a critical factor for wildlife health. High connectivity improves gene flow between populations, allows species to recolonize unoccupied habitat, improves resilience of the ecosystem, and allows ecological processes, such as flooding, fire, and pollination to occur at a more natural rate and scale. Landscape connectivity was measured in two ways, *percentage* and *proximity*.

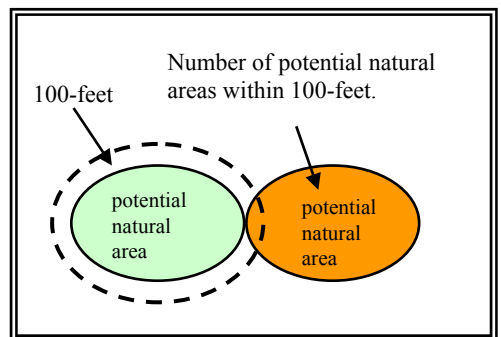
*Percentage*

Landscape connectivity was measured by building a ¼ mile buffer around each polygon and measuring the percentage of area that falls within other potential conservation areas.



*Proximity*

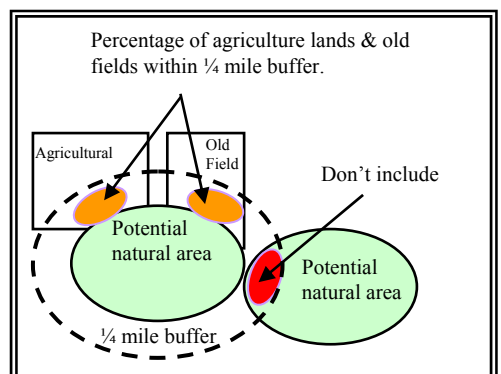
In addition to measuring the area around a polygon that is considered natural, connectivity can also be measured by the number of individual potential conservation areas in close proximity to the site. The greater the number of polygons in “close proximity,” the higher the probability for good connectivity. Close proximity was determined to be 100 feet. One hundred feet was chosen as the threshold based on digitizing error and typical width of transportation right-of-ways, pipelines, and powerline corridors.



**Restorability of surrounding lands** -

Restorability is important for increasing the size of existing natural communities, providing linkages to other habitat patches, and providing a natural buffer from development and human activities.

Restorability is measured by the potential for restoration activities in areas adjacent to the delineated site. First, a ¼ mile buffer was built around each site. Potential conservation areas as defined by MNFI, located within the buffer area were then removed, and the percentage of agricultural land and old fields within the remaining buffer area was measured. Only agricultural land and old fields were considered because they require the least amount of effort to restore back to some sort of natural condition.



**Vegetation Quality** – The quality of vegetation is

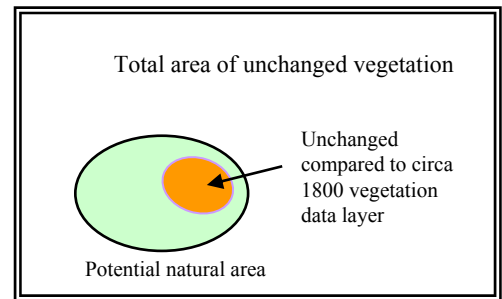
critical in determining the quality of a natural area. Vegetation can reflect past disturbance, external impacts, soil texture, moisture gradient, aspect, and geology. Vegetative quality however is very difficult to measure without recent field information. As a surrogate to field surveys, a vegetation change map comparing the 2000 IFMAP landcover data layer to the circa 1800 vegetation datalayer was created. The resulting potential unchanged vegetation can then act as an indicator of vegetation quality.

*Percentage*

Vegetation quality was measured by calculating the percentage of the site that contains potentially unchanged vegetation. This allows small sites with a high percentage of potentially unchanged vegetation to score points.

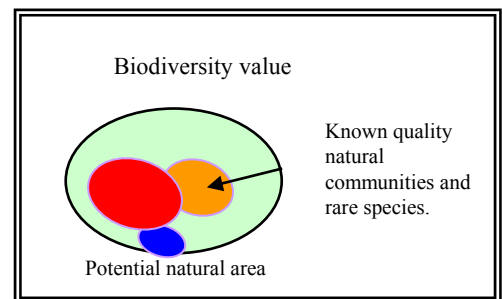
*Area*

Vegetation quality was also measured by calculating the area of potentially unchanged vegetation that falls within each site. This balances the bias of small sites with high percentage of potentially unchanged vegetation by awarding points based on actual area covered.



**Biodiversity Value** - The location of quality natural communities and rare species tracked by MNFI are often, although not always, indicative of the quality of a site. The occurrences in and of themselves are important.

The Biodiversity value is based on the cumulative score of each element occurrence (EO) found within a site. Each EO is scored based on its probability of being found, global rarity, state rarity, and condition or viability.



**Note:** The number of points assigned for each

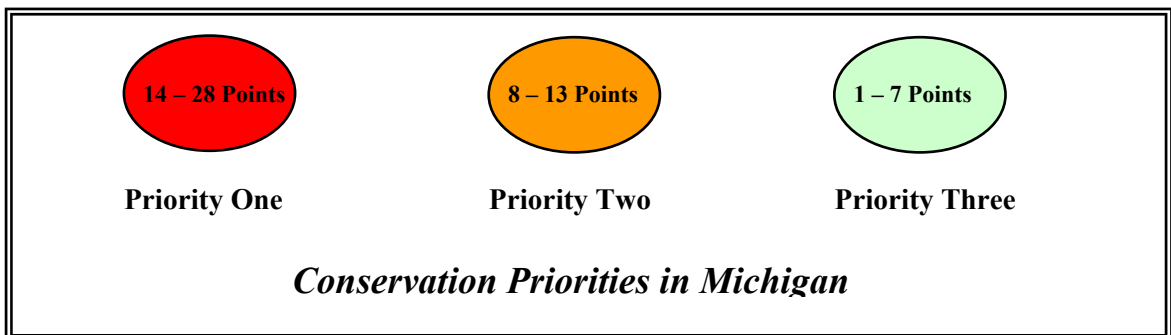
In total, there were 386 potential conservation areas identified on the Michigan side of the study area. Total scores ranged from 28 points (out of a possible 37) to a low of 1 point. The average score was 9. Once the total scores were tabulated, the next step was to determine a logical and reasonable break between priority one, priority two, and priority three sites. Many potential conservation area sites can be just one point away from being placed into another category.

To determine where the breaks between categories should occur, the natural break classification (or Jenk's optimization), which is the default classification method in ArcView, was used. This method identifies breakpoints between classes using a statistical formula called Jenk's optimization. The Jenk's method finds groupings and patterns inherent in the data by minimizing the sum of the variance within each of the classes.

Despite this objective methodical approach to classification, it still could be argued that sites scoring one point below should be included in the higher category or that sites scoring right at the low end of a category should be placed in the next lowest category. To help alleviate anxieties about which category a particular site is placed, actual numeric total scores can be displayed in the middle of each polygon. This would allow the viewer to see how a site compares directly to another site without artificially categorizing it within a group.

Using the natural break classification, a total of 145 sites were placed in the priority three category, 197 sites were placed in the priority two category, and 44 sites were placed in the priority one category (see map on page 10). Breaking it down into percentages of total sites identified, 37.6 % were labeled priority three, 51.1% were labeled priority two, and 11.3 % of the sites were identified as priority one. It is important to note that although only 11.3 % of the sites were identified as priority one, these 44 sites total 18,720 acres. This corresponds to 42 % of the total acreage of all delineated sites (44,143 acres).

The three sites with the highest scores were St. John's marsh, Algonac State Park and Dickinson Island. Only one site, St. John's marsh, received the highest score of 28. The largest site on the Michigan side is Dickinson Island at 2,698 acres.



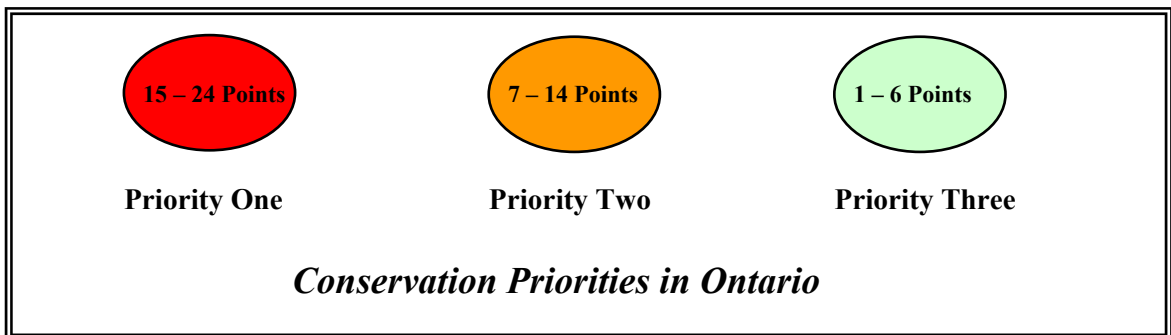
In total, there were 161 potential conservation areas identified on the Ontario side of the study area. Total scores ranged from 24 points (out of a possible 29) to a low of 1 point. The average score was 7. Once the total scores were tabulated, the next step was to determine a logical and reasonable break between priority one, priority two, and priority three sites. Many potential conservation area sites can be just one point away from being placed into another category.

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Using the natural break classification, a total of 84 sites were placed in the priority three category, 58 sites were placed in the priority two category, and 19 sites were placed in the priority one category (see map on page 10). Breaking it down into percentages of total sites identified, 52.2 % were labeled priority three, 36 % were labeled priority two, and 11.8 % of the sites were identified as priority one. It is important to note that although only 11.8 % of the sites were identified as priority one, these 19 sites total 27,522 acres. This corresponds to 78 % of the total acreage of all delineated sites (35,257 acres).

Three sites received the highest score of 24 points. Two of these sites are located in the middle of Walpole Island and one is located in a coastal marsh just north of the Thames River. An additional three sites on Walpole Island received the second highest score of 23 points. The largest site on the Ontario side (as well as the entire study area) is the Great Lakes marsh complex located in the southern portion of the Walpole Island. It totals 11,366 acres in size or approximately 17.75 square miles.





## Priority One, Priority Two & Priority Three Ranking

**Site Criteria Table**

<i><b>CRITERIA</b></i>	<i><b>DESCRIPTION</b></i>	<i><b>DETAIL</b></i>	<i><b>PTS</b></i>
<b>Total Size</b>	Total size of the polygon in acres.  <input type="checkbox"/> <i>Size is recognized as an important factor for viability of species and ecosystems.</i>	20 - 40 ac.	0
		>40 - 80 ac.	1
		>80 - 240 ac.	2
		>240 ac.	4
<b>Size of Core area</b>	Acres of core area. - Defined as total area minus 300 ft. buffer from edge of polygon.  <input type="checkbox"/> <i>Greater core area limits negative impacts on "edge-sensitive" animal species.</i>	0 - 60ac	0
		>60 - 120 ac	2
		>120 - 230 ac	4
		>230 ac	8
<b>Stream Corridor (presence/absence)</b>	Presence/absence of a stream or river within the polygon.  <input type="checkbox"/> <i>Stream corridors provide wildlife connections between patches of habitat.</i>	none	0
		present	2
<b>Landscape Connectivity</b>  Percentage	Percentage of potential conservation areas within 1/4 mile. - build 1/4 mile buffer - measure % of buffer that is a potential conservation area	0 - 11%	0
		>11 - 22%	2
		>22 - 33%	3
		>33%	4
<b>Proximity</b>	Number of potential conservation areas within 100 ft..  <input type="checkbox"/> <i>Connectivity between habitat patches is considered a critical factor for wildlife health.</i>	0	0
		1	1
		2	2
		3	3
		4+	4
<b>Restorability of surrounding lands</b>	Restorability of surrounding lands within 1/4 mi. - build 1/4 mile buffer - subtract potential conservation areas from buffer - measure % agricultural lands and old fields  <input type="checkbox"/> <i>Restorability is important for increasing size of existing natural communities, providing linkages to other habitat patches, and providing a natural buffer from development.</i>	0 - 35%	1
		>35 - 65%	2
		>65%	3

<b>CRITERIA</b>	<b>DESCRIPTION</b>	<b>DETAIL</b>	<b>PTS</b>
<b>Vegetation Quality (Michigan only)</b>	Estimates the quality of vegetation based on circa 1800 vegetation maps and 2000 IFMAP landcover data (only done for Michigan sites).  Measures the percentage of potentially unchanged vegetation within a polygon.	1 - 10%	0
		10.1 -30%	1
		30.1 – 65%	2
		65.1 – 100%	4
<b>Area</b>	Measures the actual area within a polygon of potentially unchanged vegetation regardless of the size of the polygon.  <i>The quality of vegetation is critical to determining the quality of a natural area.</i>	0 – 10ac	0
		10.1 – 40ac	1
		40.1 – 80ac	2
		80.1 - 160	3
		> 160ac	4
<b>Biodiversity Value (Michigan)</b>	Known element occurrences increase the significance of a site.  <input type="checkbox"/> <i>The location of quality natural communities and rare species tracked by MNFI are often, although not always, indicative of the quality of a site.</i>  <input type="checkbox"/> <i>Values were determined using the Jenk's optimization formula. Michigan and Ontario had different ranges.</i>	0 – 6.99	0
		7 – 23.12	1
		23.13 -52.37	2
		52.38 -96.99	3
		≥ 97	4
<b>Biodiversity Value (Ontario)</b>	Known element occurrences increase the significance of a site.  <input type="checkbox"/> <i>The location of quality natural communities and rare species tracked by MNFI are often, although not always, indicative of the quality of a site.</i>  <input type="checkbox"/> <i>Values were determined using the Jenk's optimization formula. Michigan and Ontario had different ranges.</i>	0 – 13.99	0
		14 - 44.24	1
		44.25-69.99	2
		70-103.24	3
		≥ 103.25	4
<b>Note</b> Total possible points = 37 for Michigan Total possible points = 29 for Ontario			

## Conclusion

This inventory documents that the area immediately surrounding Lake St. Clair still contains high quality natural resource areas that still look and function the way they did 200 years ago. This is particularly true around the St. Clair flats area at the mouth of the St. Clair River. Not surprisingly, the three highest scoring sites in Michigan are Algonac State Park, St. John's marsh, and Dickinson Island, while five of the six highest scoring sites in Ontario are located on Walpole Island. A total of 547 PCAs were identified and ranked in the study area (386 in Michigan and 161 in Ontario). These sites represent what appear to be the least disturbed natural areas remaining within the 10 mile buffer surrounding Lake St. Clair. Together, these 547 PCAs total 79,436 acres, representing approximately x % of the total study area (terrestrial).

Some of these sites have the potential of harboring endangered, threatened, or special concern animal and plant species. With the high rate of development and its associated stresses on the natural environment, conservation of these remaining areas and their native plant and animal populations are vital if the diverse natural heritage around Lake St. Clair is to be maintained.

When using this information it is important to keep in mind that site boundaries and rankings are a starting point and tend to be somewhat general in nature. Consequently, each community, group or individual using this information should determine what additional expertise is needed in order to establish more exact boundaries and the most appropriate conservation efforts.

## Comments/Recommendations

- 1) Local units of government, individuals and interest groups using this information should consult ..... The study includes information on tools and techniques that conserve natural resources and create open space linkages while allowing for economically viable development.
- 2) Local municipalities should identify opportunities to link other possible natural resource sites not mapped during this survey. This would include small patches of land, tree and fence row plantings, agriculture land, and open fields.
- 3) Field inventories should be conducted on identified potential conservation areas. This fieldwork would provide much needed additional site-specific data that should be considered when developing in and around such areas.
- 4) All identified sites, regardless of their priority, have significance to their local setting. This is especially true in areas that have experienced a high degree of development and landscape fragmentation.
- 5) A direct relationship exists between natural area protection and long-term water quality. With Lake St. Clair as the focal area of this project and the potential impact on the economy associated with degradation of this resource, natural area protection should be integrated into local water quality management plans.
- 6) Municipalities should adopt a comprehensive conservation/greenway plan. The

conservation of potential conservation areas is most effective, and successful, in the context of an overall conservation/greenway plan.

- 7) Funding should be secured to update the mapping and assessment of this project's potential conservation areas.
- 8) Efforts to conserve potential conservation areas should include on-going site assessment and stewardship.
- 9) Local units of government in Ontario, Michigan, and Walpole First Nation should undertake widespread distribution of this information in order to build awareness and encourage long-term resource planning and stewardship. Knowledge of potential conservation areas is meaningless unless action is taken to ensure that they will remain part of this area's natural heritage.
- 10) When establishing sites for possible field inventory, each community, group or individual should consider all available criteria in conjunction with their unique local conditions. Site selection may well be influenced by local growth pressure and ownership of the land.

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