Rivers

Agriculture

Recreation

Preserves

Infrastructure

CLINTON COUNTY
EATON COUNTY
INGHAM COUNTY

Biodiversity

Amphibians

Trails

Greenspace

Potential Conservation areas assessment

Parks

Beauty

Sustainability

Clean Air

Wildlife

Streams

Wild Game

Ponds

Wetlands

Flora

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Clinton, Eaton and Ingham Counties
Potential Conservation Areas Report

September 2008

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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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Clinton, Eaton, and Ingham 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 and quality of life of a community. Abundant natural resources that once attracted Native American tribes and European settlers to the region, are now small remnants scattered across the landscape. Much reduced in size, natural resource areas are becoming increasingly fragmented, degraded, and isolated due to unsustainable development patterns in the Tri-County region. These remaining sites are the foundation of Clinton, Eaton, and Ingham Counties' 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 future planning efforts. Striking a balance between economic development and natural resource conservation and preservation is critical if Clinton, Eaton, and Ingham Counties (Tri-County region) are to maintain and enhance their unique natural assets, quality of life, and economic competitiveness.

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. Changes in zoning, building codes, and technology can cause areas that were once considered "safe" from development to be exposed to sprawling development patterns and associated infrastructure. 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 an important natural area.

This report identifies and ranks Potential Conservation Areas (PCA's) remaining in Eaton, Ingham and Clinton Counties. 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) for identifying potential conservation areas, can also be used to update and track the status of these remaining sites. MNFI recommends that local municipalities in Clinton, Eaton, and Ingham Counties incorporate this information into their comprehensive land use plans and zoning ordinances. 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 in the region.

Process for delineating and ranking Potential Conservation Areas

Materials and Interpretation Methodology

Identification of potential conservation areas in the Tri-County region was conducted using the Tri-County Regional Planning Commission (TCRPC) circa 2000 MIRIS land cover, MNFI's Circa 1800 Vegetation, MNFI's database (BIOTICS), and the State of Michigan Framework stream and roads data layers. The TCRPC land cover data was derived from satellite imagery augmented by aerial photography. Attributes were manually checked for accuracy and consistency. The 1999 Land cover data were updated using 2005 aerial imagery for gross errors. All polygons were closed with no overlaps, and polygon geometry was checked. The geometry of the original landcover data was also repaired. In addition, the natural land cover classes for the PCA analysis were obtained from running a filter on the TCRPC land cover data set. The filter removed all patches less than 4 pixels in size, and replaced them with the nearest neighboring value.

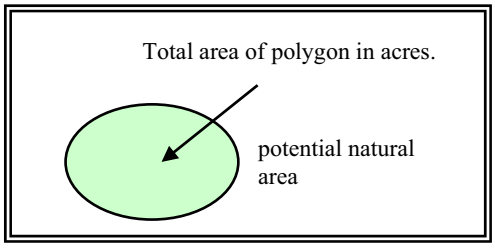
Delineation of potential conservation areas was done through analysis in a geographic information system with emphasis placed on 1) intactness, 2) wetlands and wetland complexes, 3) riparian corridors, and 4) forested tracts. PCA's were identified by focusing on wetland and forested land cover and eliminating as much development (including roads), active agriculture, and old fields as much as possible. Water was included only if it was surrounded by other PCA land cover types. All natural land cover types were combined, and major roads were buffered by 30 meters and removed. The resulting blocks of natural vegetation were then converted into a shapefile. Boundaries were defined by hard edges such as roads, parking lots, developments and railroad beds. All potential conservation areas were identified and delineated regardless of size. Municipal boundaries were not utilized to delineate site boundaries unless the boundary corresponded to a defined hard edge, such as a road. Once all sites were delineated, sites under 20 acres were removed from the shapefile. Isolated sites under 20 acres typically have little ecological value, are usually highly degraded, and have a high probability of being misclassified using satellite imagery.

Site Selection and Prioritization

Following the delineation of PCA's, a more rigorous level of examination was undertaken based upon specific spatially based criteria to prioritize sites. Spatially based criteria that were determined to be important indicators of ecological health included: 1) total size, 2) size of core area, 3) length of stream corridor, 4) landscape connectivity, 5) restorability of surrounding lands, 6) vegetation quality, 7) parcel fragmentation, and 8) bio-rarity score. Each criterion was then divided into several different categories, or levels, which were translated to a numerical score. Each site was then assessed and compared to other sites based upon the sum of the scores for each criterion. Scores for the Tri-County Region sites ranged from 1 to 31 (out of a possible 45).

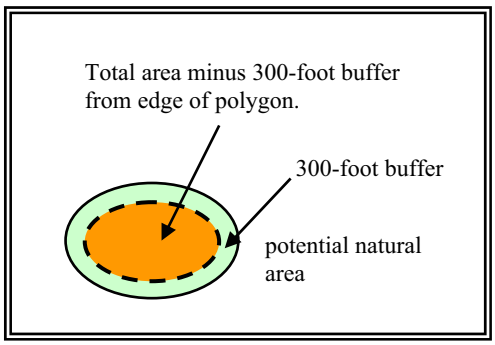
Description of Criteria

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.



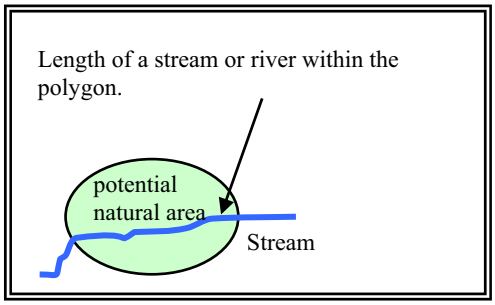
Size is defined as the total area of the resultant polygon.

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.



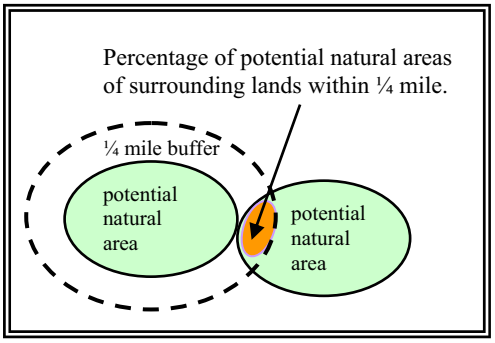
For this project, core area is defined as the total area minus a 300-foot wide buffer measured inward from the edge of the polygon. Core area is different from total area of the site because it takes into account the shape of the site. Typically, round shapes contain a larger core area relative to the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

Stream Corridor (length) - 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, particularly in fragmented landscapes.



Sites that are part of riparian corridors were given a score 0-6 points depending upon the length of stream or river that was present at the site.

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.*

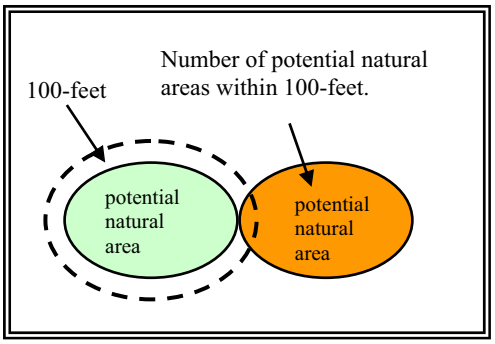


Percentage

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.

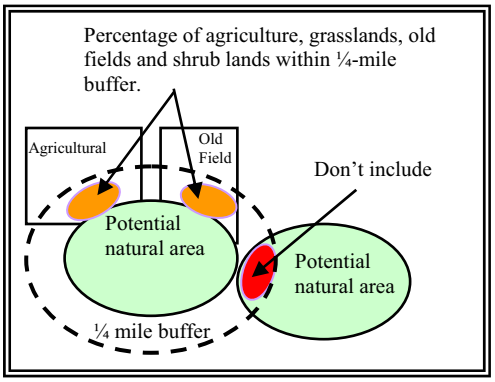
Proximity

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 power line corridors.

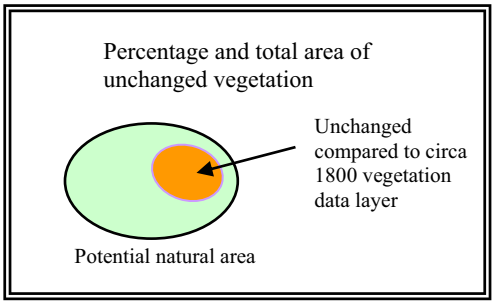


Restorability of surrounding lands - Restorability is important for increasing the size of existing natural communities, providing linkages to other habitat patches, and providing a natural buffer from development and human activities.

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, grasslands, shrub lands and old fields within the remaining buffer area was measured.



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 (cardinal direction of slope), 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 land cover data layer (appendix 2) to the MNFI circa 1800-vegetation data layer (appendix 1) was created. The resulting potential unchanged vegetation can then act as an indicator of vegetation quality.



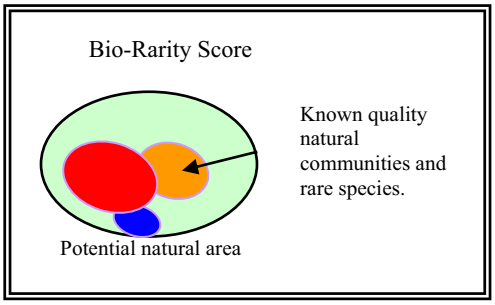
Percentage

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 a high percentage of potentially unchanged vegetation by awarding points based on actual area covered.

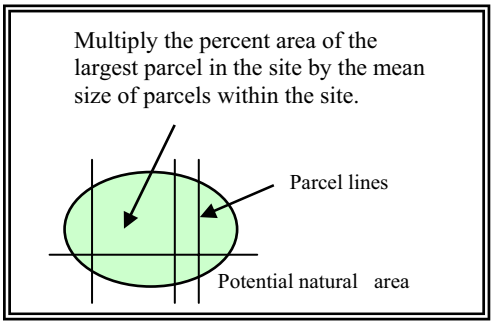
Bio-Rarity Score - The location of quality natural communities (appendix 6) and rare species tracked by MNFI are often, although not always, indicative of the quality of a site. The occurrences in and of themselves are important.



The Bio Rarity Score (appendix 5) is based on the cumulative score of each element occurrence (EO) found within a site Each EO is scored based on its likelihood of being found (appendix 4), global rarity, state rarity, and condition or viability. For example, a much higher score would be awarded to a population of Mitchell's satyr, which is globally and state imperiled, and in good condition, compared to a population of box turtle, which is globally secure and rare in the state, and in fair condition.

Parcel Fragmentation – Ownership patterns can have a tremendous impact on the long-term conservation success of the project. Sites that contain numerous small parcels are typically much more difficult to manage and protect than sites with a few large parcels.

Parcel fragmentation was determined by measuring the percent area of the largest parcel within each site, and multiplying that by the mean size of parcels within the site. This index takes both the size and number of the parcels into account.



Note: The number of points assigned for each criterion is in Table 1. An element occurrence is an occurrence record of a federally and/or state listed species, state special concern species, exemplary and/or rare natural community, or another type of natural feature such as a unique geologic formation or bird colony.

Table 1. Site Criteria.

CRITERIA	*DESCRIPTION*	*DETAIL*	*PTS*
Total Size	Total size of the polygon in acres. ❑ *Size is recognized as an important factor for viability of species and ecosystems.*	20 - 40 ac.	0
		>40 - 80 ac.	1
		>80 - 240 ac.	2
		>240 ac.	4
Size of Core area	Acres of core area. - Defined as total area minus 300 ft. buffer from edge of polygon. ❑ *Greater core area limits negative impacts on "edge-sensitive" animal species.*	0 - 60ac	0
		>60 - 120 ac	2
		>120 - 230 ac	4
		>230 ac	8
Stream Corridor (length)	Length of a stream or river within the polygon. ❑ *Stream corridors provide wildlife connections between patches of habitat.*	0	0
		>0-400 m	1
		>400-800m	2
		>800-1600m	3
		>1600-3200m	4
		>3200 m	6

CRITERIA	*DESCRIPTION*	*DETAIL*	*PTS*
Landscape Connectivity 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% >11 - 22% >22 - 33% >33%	0 2 3 4
Proximity	Number of potential conservation areas within 100 ft. ❑ *Connectivity between habitat patches is considered a critical factor for wildlife health.*	0 1 2 3 4+	0 1 2 3 4
Restorability of surrounding lands	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 ❑ *Restorability is important for increasing size of existing natural communities, providing linkages to other habitat patches, and providing a natural buffer from development.*	0 - 35% >35 - 65% >65%	1 2 3
Vegetation Quality Percentage	Estimates the quality of vegetation based on circa 1800 vegetation maps and 2000 IFMAP land cover data (only done for Michigan sites). Measures the percentage of potentially unchanged vegetation within a polygon.	1 - 10% 10.1 -30% 30.1 – 65% 65.1 – 100%	0 1 2 4
Area	Measures the actual area within a polygon of potentially unchanged vegetation regardless of the size of the polygon. ❒ *The quality of vegetation is critical to determining the quality of a natural area.*	0 – 10ac 10.1 – 40ac 40.1 – 80ac 80.1 - 160 > 160ac	0 1 2 3 4
Bio Rarity Score	Known element occurrences increase the significance of a site and increase the bio rarity score. ❑ *The location of quality natural communities and rare species tracked by MNFI are often, although not always, indicative of the quality of a site.* ❑ *Values were determined using the Jenk's optimization formula.*	0 .01 – 11.5 11.51 – 24.0 24.01 - 40.5 40.51 – 60.5	0 1 2 3 4
Parcel Fragmentation	Measures the feasibility of conservation for a site by analyzing parcel numbers and size. It is calculated by multiplying the percent area of the largest parcel in the site by the mean size of parcels within the site. ❒ *The results were classified using the Jenk's optimization formula (numbers in the table are meters squared).* ❒ *The associated consequences of subdividing land can adversely affect habitat.*	0 -3.5 ac 3.6 – 7.8 ac 7.9 – 18.5 ac 18.6 – 46.4 ac > 46.4 ac	0 1 2 3 4
Total Possible Points = 45			

Priority Rankings for the Tri-County Region

Potential Conservation Areas were tallied for the Tri-County region as well as within each county. The analysis for each county includes portions of PCAs that extended into the neighboring county. As a result, the acres of several PCAs were counted in two counties. Thus, the total acres of PCA's when adding the three counties together will be greater than the acres of PCA's for the entire region.

A total of 1,984 sites, totaling 146,674 acres were identified as potential conservation areas (PCA's) in the Tri-County Region. **This represents 13% of the total land base (1,096,531 acres) in the three-county area**. Each of the 1,984 delineated sites was scored based upon the criteria described in the following table. Total scores ranged from a high of 31 points (out of a possible 45 points) to a low of 1 point. The mean score was eight.

The site that received the highest score of 31 is located in Clinton County in the northwest corner of the county. It is located along the Maple River in the Maple River State Game Area in Lebanon Township. It includes 2,274 acres in total size, with a core area of 1,555 acres. The site with the second highest score of 28 is also located in the northwest corner of Clinton County along the Maple River in the Maple River SGA in Lebanon and Essex Townships. It encompasses 882 acres in total size with a core area of 531 acres and is adjacent to the first site. Two sites tied for the third highest score of 25. The first site is located in the southeast corner of Ingham County in Ingham Township and a small portion of Bunker hill Township. This site is 1,862 acres in total size and has a core area of 1,301 acres and encompasses the majority of the Dansville State Game Area. The second site is located in the southwest corner of Eaton County. It is located just west of I-69 in Walton and Bellevue Townships along Battle Creek. It is also the top scoring unprotected site in the Tri-County area.

Once the total scores were tabulated, the next step was to determine a logical and reasonable break between high priority, medium priority, and low priority sites. Many potential natural area sites can be just one point away from being placed into another category. Natural break and equal interval classification are two legitimate methods for classifying sites. Equal interval classification, as defined for this project, is based on absolute values. It shows the value of each site relative to the highest (45) and lowest (1) possible values. Equal interval classification breaks all possible scores into equal classes regardless of actual scores. This eliminates the relative nature of scores when sites are compared only to other sites within a given area.

The natural break method is the default classification method in ArcView. 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. Based on the results of each method, MNFI recommends using the natural break method for the Tri-County Region.

As a result of applying the natural break method, 783 sites were placed in the low priority category, 805 sites were placed in the moderate category, 347 sites were placed in the high priority category, and 49 sites were placed in the highest category. Breaking it down into percentages of total sites identified, 3**9.4% were labeled low priority, 40.6% were labeled**

moderate priority, 17.5% of the sites were labeled as high priority, and 2.5% were labeled as highest priority. Breaking it down by acreage, 24.9% (36,420 acres) fell into the low priority category, 31.2% (45,813 acres) fell into the moderate category, 28.3% (41,550 acres) fell into the high priority category, and 15.6% (22,891 acres) fell into the highest priority category.

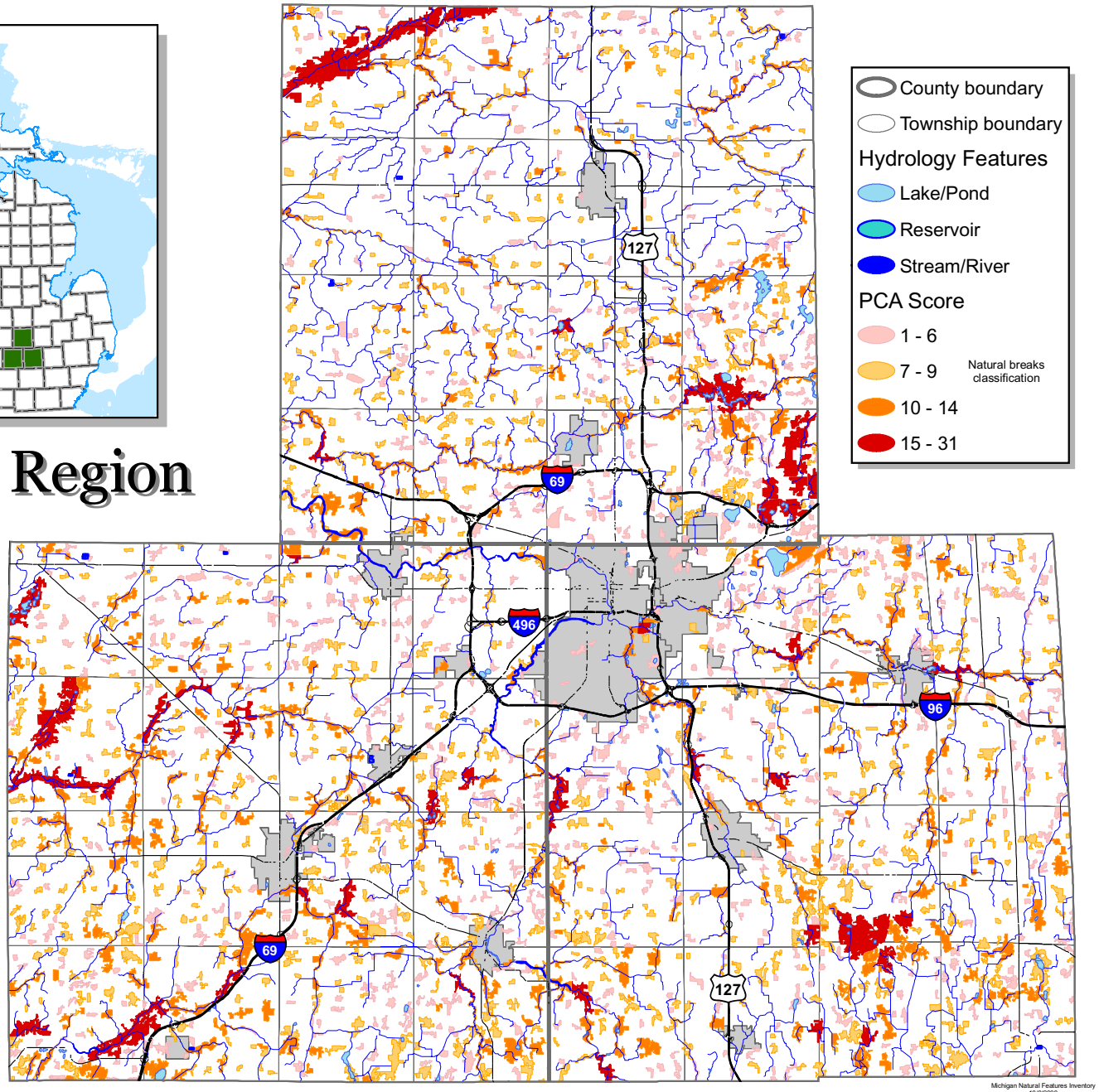
Clinton County contains the highest number of acres (9,544) of highest priority sites in the Tri-County region. These acres represent 40.6% of the total area of highest priority sites in the region.

Despite the more 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.

Table 2. Results of PCA Analysis for Tri-County Area.

PCA Class	PCA Count	% of PCAs	Acres	% of PCA acreage	% of Tri-County area
Low 1-6	783	39.4%	36,420	24.9%	3.3%
Mod 7-9	805	40.6%	45,813	31.2%	4.2%
High 10-14	347	17.5%	41,550	28.3%	3.8%
Highest 15-31	49	2.5%	22,891	15.6%	2.1%
Total	1,984	100%	146,674	100%	13.4%

Tri-County Region



Potential Conservation Areas

Potential Conservation Areas (PCAs) 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. Scoring criteria used to prioritize sites included: total size, size of core area, length of stream corridor, landscape connectivity, restorability of surrounding land, parcel fragmentation, vegetation quality, and biological rarity score.

Data Sources: Tri-County Region land use/land cover, Michigan Natural Features Inventory (MNFI) Biotics Database (5/2007), Clinton, Eaton, and Ingham County parcel layer, and the National Hydrologic Database (NHD) streams (1:100,000).

MICHIGAN STATE UNIVERSITY EXTENSION

Michigan Natural Features Inventory

0 5 10 Kilometers

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Priority Rankings for Clinton County

In Clinton County, there are **578 sites**, **totaling 43,748 acres** identified as potential conservation areas. **This represents 11.9% of the total area in the county**. Each of the 578 delineated sites was given a total score based upon the criteria described in the following table. Total scores ranged from a high of 31 points (out of a possible 45 points) to a low of 1 point. The mean score was seven. **The site that received the highest score of 31 is located in the northwest corner of the county.** It is located along the Maple River in the Maple River State Game Area in Lebanon Township. It includes 2,274 acres in total size, with a core area of 1,555 acres. The site with the second highest score of 28 is also located in the northwest corner of the county, along the Maple River in the Maple River SGA in Lebanon and Essex Townships. It encompasses 882 acres in total size with a core area of 531 acres. The site with the third highest score of 242 is located in the southeast corner of the county in Bath Township along Vermilion Creek. This site is 1,235 acres in total size, has a core area of 618 acres. A small portion of this site falls within the Rose Lake Wildlife Research Area.

As a result of applying the natural break method, 224 sites were placed in the low priority category, 247 sites were placed in the moderate category, 91 sites were placed in the high priority category, and 16 sites were placed in the highest category. Breaking it down into percentages of total sites identified, 38.8% were labeled low priority, 42.7% were labeled moderate priority, 15.7% were identified as high priority, and 2.8% were labeled highest priority. Breaking it down by acreage, 23.5% (10,289 acres) fell into the low quality category, 29.6% (12,946 acres) fell into the moderate quality category, 25.1% (10,969 acres) fell into the high priority category, and 21.8% (9,544) fell into the highest priority category.

Table 3. Results of PCA Analysis for Clinton County

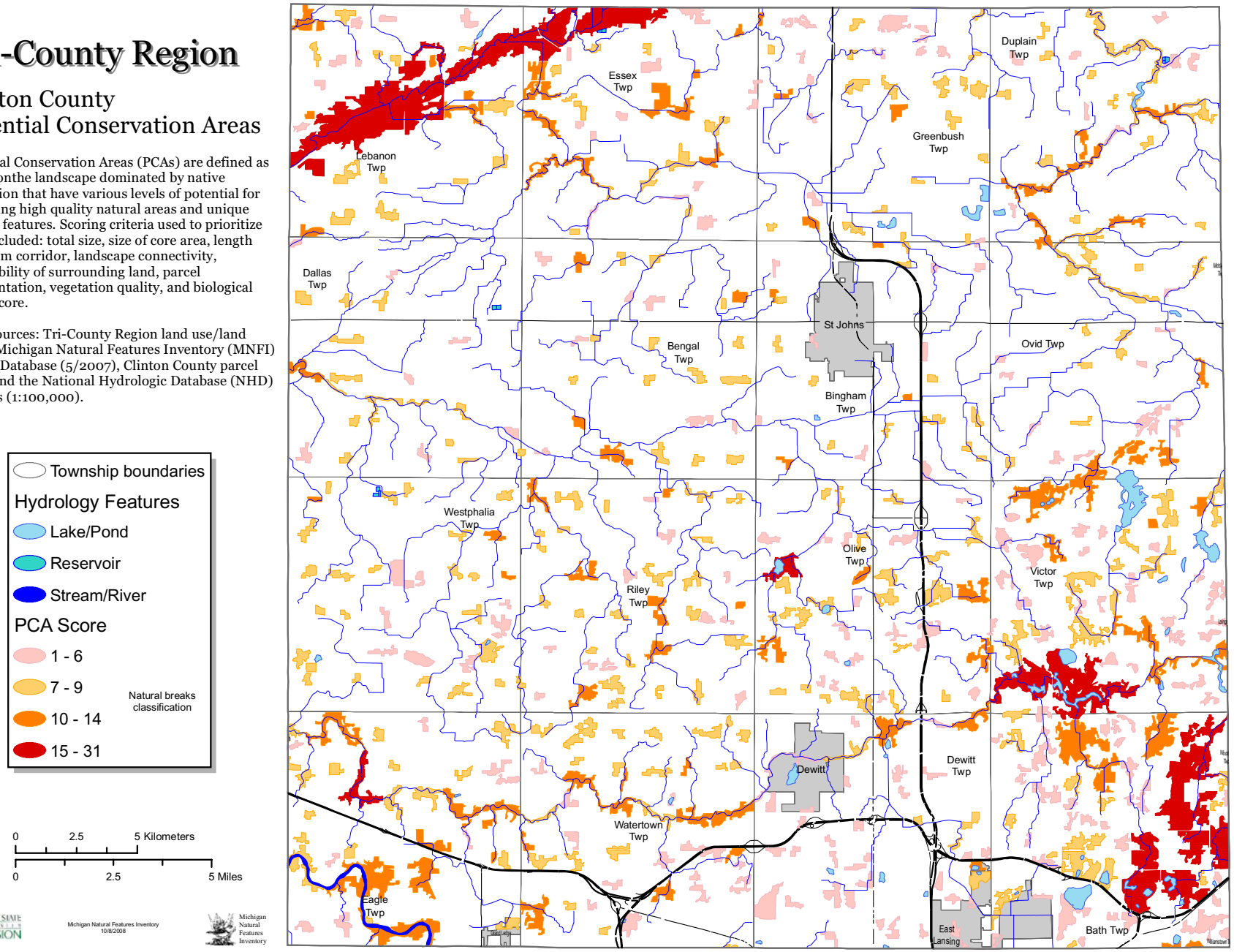
PCA Class	PCA Count	Percentage	Acres	% of PCA acreage	% County acreage
Low 1-6	224	38.8%	10,289	23.5%	2.8%
Mod 7-9	247	42.7%	12,946	29.6%	3.5%
High 10-14	91	15.7%	10,969	25.1%	3.0%
Highest 15-31	16	2.8%	9,544	21.8%	2.6%
Total	578	100%	43,748	100%	11.9%

Tri-County Region

Clinton County
Potential Conservation Areas

Potential Conservation Areas (PCAs) are defined as places onthe landscape dominated by native vegetation that have various levels of potential for harboring high quality natural areas and unique natural features. Scoring criteria used to prioritize sites included: total size, size of core area, length of stream corridor, landscape connectivity, restorability of surrounding land, parcel fragmentation, vegetation quality, and biological rarity score.

Data Sources: Tri-County Region land use/land cover, Michigan Natural Features Inventory (MNFI) Biotics Database (5/2007), Clinton County parcel layer, and the National Hydrologic Database (NHD) streams (1:100,000).



Priority Rankings for Eaton County

In Eaton County, there are **729 sites, totaling 54,507 acres** identified as potential conservation areas. **This represents 14.7% of the total area in the County**. Each of the 729 delineated sites was given a total score based upon the criteria described in table 1. Total scores ranged from a high of 25 points (out of a possible 45 points) to a low of 1 point. The mean score was eight. **The site that received the highest score of 25 is located just west of I-69 in Bellevue and Walton Townships along Battle Creek.** It is 1,076 acres in total size, with a core area of 484 acres. Two sites tied for the second highest ranking in the County with a score of 23. The first site is located in the center of Vermontville Township. It is 743 acres in total size with a core area of 387 acres. Scipio Creek flows through the site. The second site with a score of 23 is located on the western edge of Chester Township, along the Thornapple River. It encompasses 369 acres in total size with a core area of 99 acres.

As a result of applying the natural break method, 258 sites were placed in the low priority category, 302 sites were placed in the moderate category, 149 sites were placed in the high priority category, and 20 sites were placed in the highest priority category. Breaking it down into percentages of total sites identified, 35.4% were labeled low priority, 41.4% were labeled moderate priority, 20.4% of the sites were identified as high priority, and 2.7% were identified as highest priority. Breaking it down by acreage, 22% (12.001 acres) fell into the low quality category, 31.7% (17,273 acres) fell into the moderate quality category, 30.8% (16,808 acres) fell into the high priority category, and 15.5% (8,425 acres) fell into the highest priority category.

Table 4. Results of PCA Analysis for Eaton County.

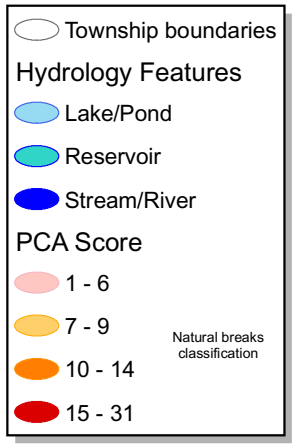
PCA Class	PCA Count	Percentage	Acres	% of PCA acreage	% County acreage
Low 1-6	258	35.4%	12,001	22.0%	3.2%
Med 7-9	302	41.4%	17,273	31.7%	4.7%
High 10-14	149	20.4%	16,808	30.8%	4.5%
Highest 15-31	20	2.7%	8,425	15.5%	2.3%
Total	729	100.0%	54,507	100.0%	14.7%

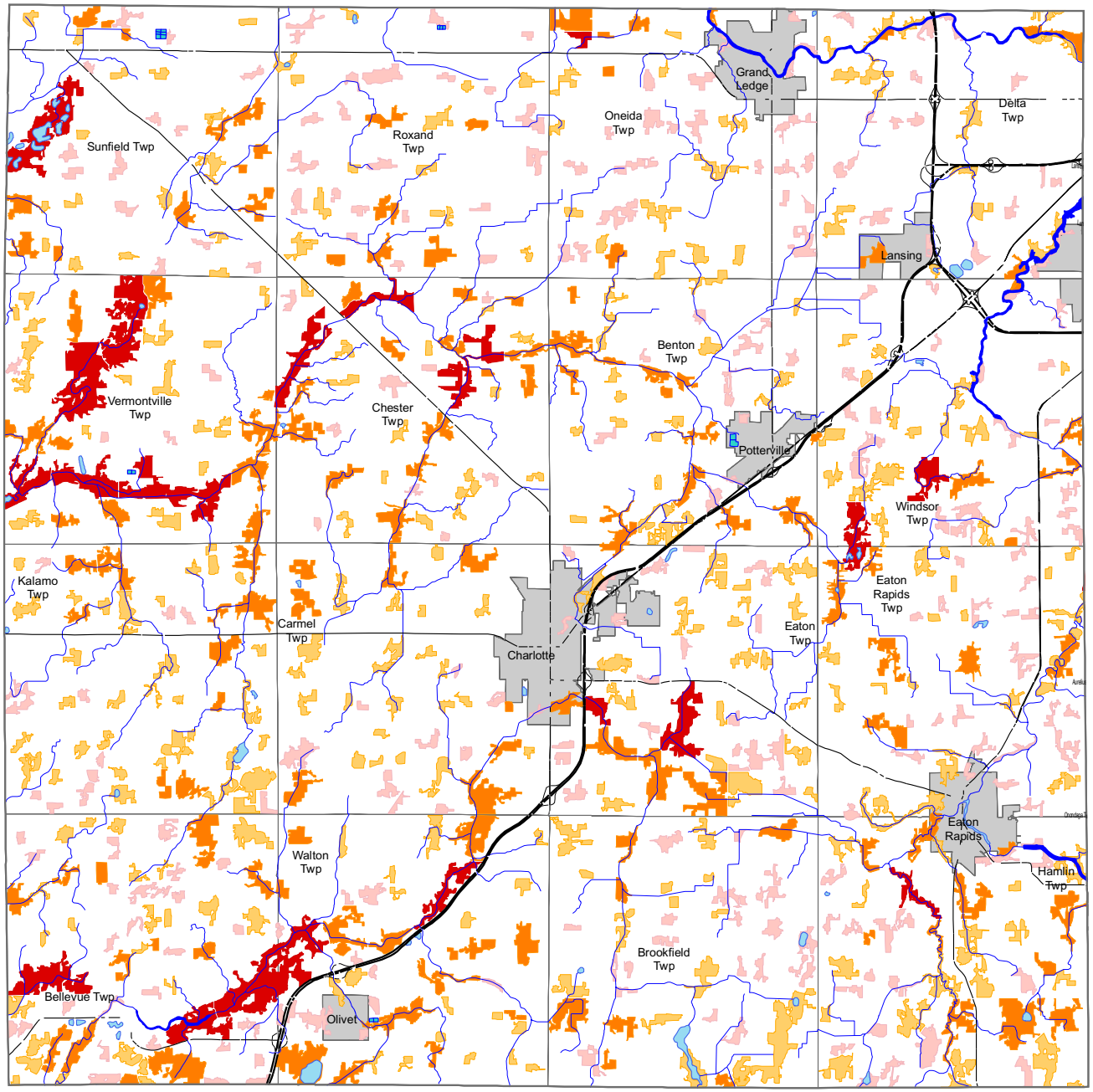
Tri-County Region

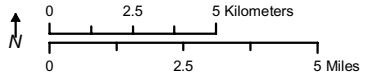
Eaton County
Potential Conservation Areas

Potential Conservation Areas (PCAs) are defined as places onthe landscape dominated by native vegetation that have various levels of potential for harboring high quality natural areas and unique natural features. Scoring criteria used to prioritize sites included: total size, size of core area, length of stream corridor, landscape connectivity, restorability of surrounding land, parcel fragmentation, vegetation quality, and biological rarity score.

Data Sources: Tri-County Region land use/land cover, Michigan Natural Features Inventory (MNFI) Biotics Database (5/2007), Eaton County parcel layer, and the National Hydrologic Database (NHD) streams (1:100,000).







MICHIGAN STATE UNIVERSITY EXTENSION

Michigan Natural Features Inventory
10/8/2008

Michigan Natural Features Inventory

Priority Rankings for Ingham County

In Ingham County there is **685 sites totaling 50,366 acres** identified as potential conservation areas. **This represents 14% of the total area of the county**. Each of the 685 delineated sites was given a total score based upon the criteria described in table 1. Total scores ranged from a high of 25 points (out of a possible 45 points) to a low of 1 point. The mean score was seven. **The site with the highest score of 25 is located in the southeast corner of Ingham County in Ingham Township and a small portion of Bunker Hill Township.** This site is 1,862 acres in total size, has a core area of 1,301 acres and encompasses the majority of the Dansville State Game Area. Two sites tied for the second highest score of 20. The first site is located along the main stem of the Grand River primarily in Delhi and Aurelius Townships. The majority of the site is located within the Burchfield Park and Nature Area. The total acreage of this area is 642 acres with a core area of 266 acres. The second site with a score of 20 is located in the northwest corner of the county, in the southeast corner of Meridian Township along the Red Cedar River. Approximately 40% of the site is found within the River Downs Natural Area. The total acreage for this site is 375 acres with a core area of 115 acres.

As a result of applying the natural break method, 303 sites were placed in the low priority category, 259 sites were placed in the medium category, 109 sites were placed in the high priority category, and 14 sites were placed in the highest priority category. Breaking it down into percentages of total sites identified, 44.2% were labeled low priority, 37.8% were labeled moderate priority, 15.9% of the sites were identified as high priority, and 2.0% of the sites were identified as highest priority. Breaking it down by acreage, 28.7% (14,455 acres) fell into the low quality category, 31.2% (15,731 acres) fell into the moderate quality category, 29.0% (14,615 acres) fell into the high priority category, and 11.0% (5,565 acres) fell into the highest priority category.

Table 5. Results of the PCA Analysis for Ingham County

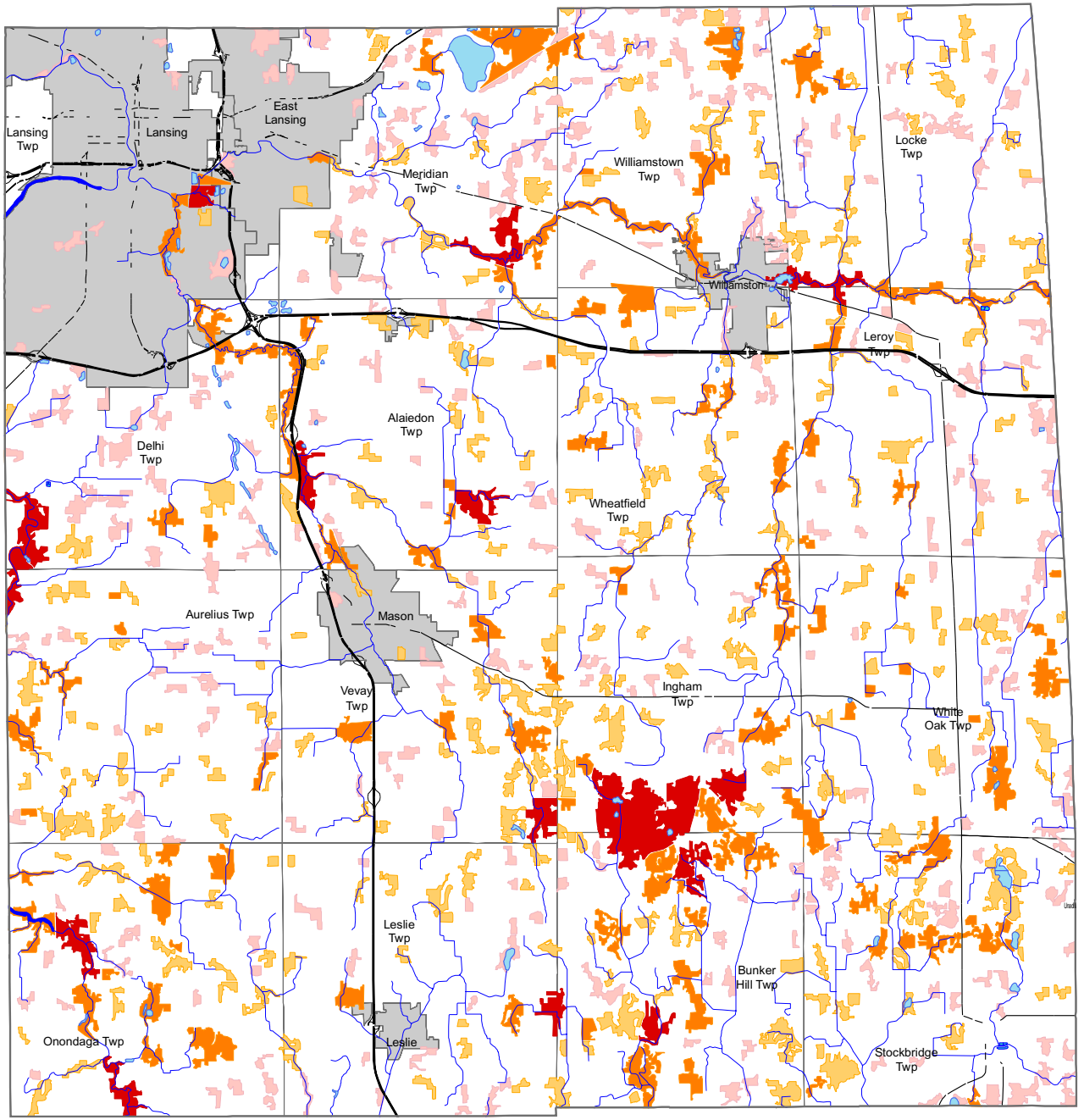
PCA Class	PCA Count	Percentage	Acres	% of PCA acreage	% County acreage
Low 1-6	303	44.2%	14,455	28.7%	4.0%
Mod 7-9	259	37.8%	15,731	31.2%	4.4%
High 10-14	109	15.9%	14,615	29.0%	4.1%
Highest 15-31	14	2.0%	5,565	11.0%	1.5%
Total	685	100.0%	50,366	100.0%	14.0%

Tri-County Region

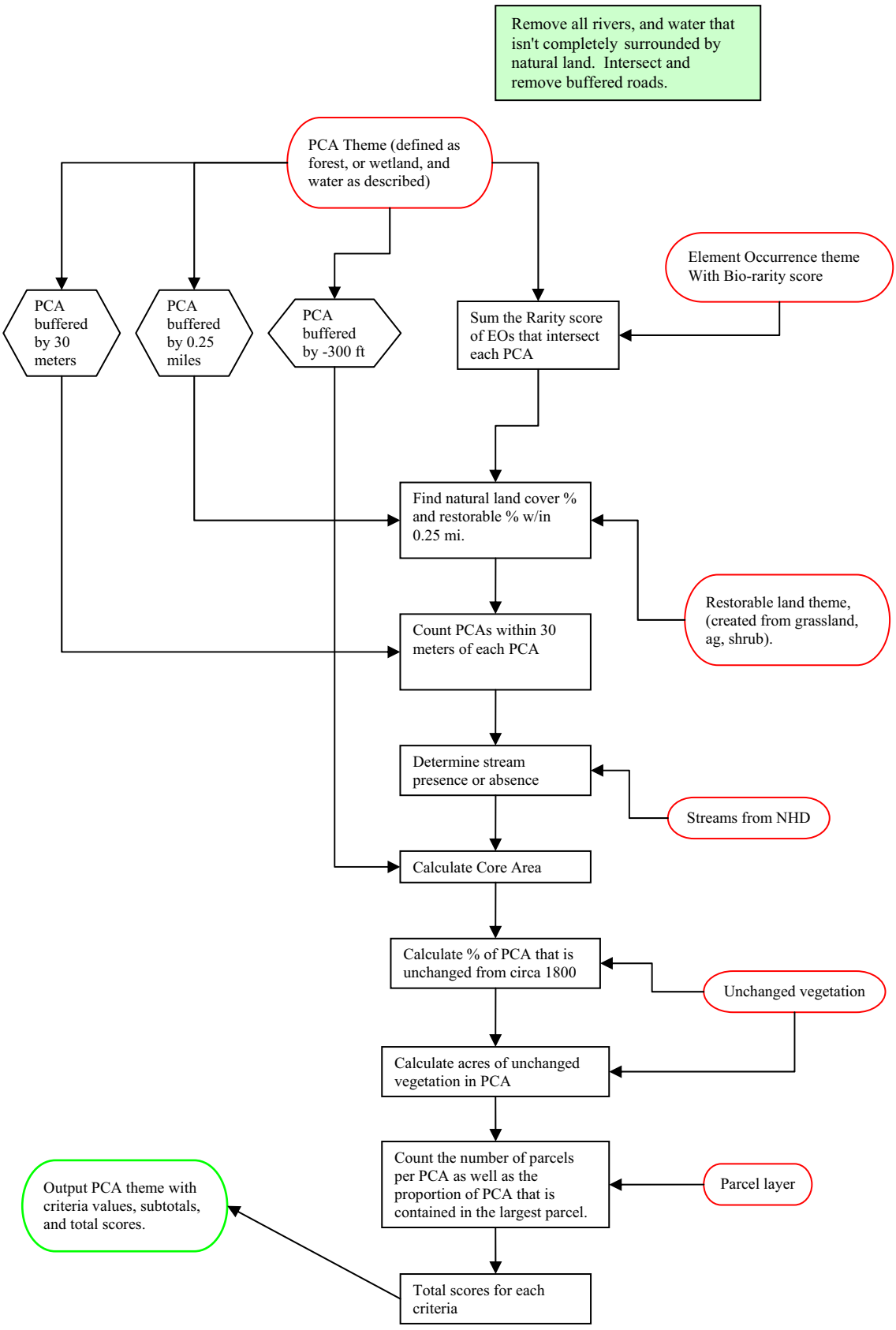
Ingham County
Potential Conservation Areas

Potential Conservation Areas (PCAs) are defined as places onthe landscape dominated by native vegetation that have various levels of potential for harboring high quality natural areas and unique natural features. Scoring criteria used to prioritize sites included: total size, size of core area, length of stream corridor, landscape connectivity, restorability of surrounding land, parcel fragmentation, vegetation quality, and biological rarity score.

Data Sources: Tri-County Region land use/land cover, Michigan Natural Features Inventory (MNFI) Biotics Database (5/2007), Ingham County parcel layer, and the National Hydrologic Database (NHD) streams (1:100,000).



Tri-County Region PCA model flow chart



Conclusion

This inventory documents that the Tri-County region has several high quality natural areas that still look and function the way they did 200 years ago. Of the remaining high quality sites, some 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 Tri-County region's diverse, natural heritage is to be conserved.

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 a publication produced by SEMCOG in 2003 entitled, "Land use Tools and Techniques." The publication includes information on tools and techniques that conserve natural resources and create open space linkages while allowing for economically viable development.

2) 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 (greenways).

3) Field inventories should be conducted in identified potential conservation areas, starting with the highest priority sites first. 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, such as the areas adjacent to the Lansing metropolitan area.

5) A direct relationship exists between natural area protection and long-term water quality. Natural area protection should be integrated into local water quality management plans especially in the Grand, Thornapple, Looking Glass, Battle Creek and Maple River systems.

6) Municipalities should work together and adopt a comprehensive green infrastructure plan, especially in the Lansing metropolitan area. The conservation of critical natural areas is most effective, and successful, in the context of a comprehensive plan that incorporates recreation, economic development, transportation, and land use.

7) Funding should be secured to update the mapping and assessment of this project's potential conservation areas approximately every three to five years depending on rate of land use

change.

8) Efforts to conserve potential conservation areas should include on-going site assessment and stewardship.

9) Local units of government in Clinton, Eaton, and Ingham Counties should undertake widespread distribution of this information in order to build awareness and encourage long-term natural 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, land ownership patterns, parcel size, accessibility, and local knowledge.

References

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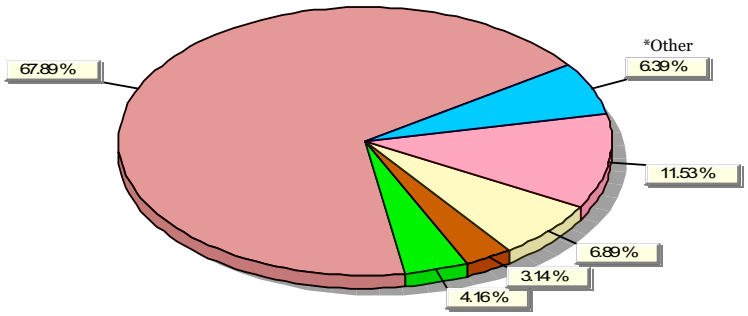
Rosenberg, K. V., R. W. Rohrbaugh, Jr., S. E. Barker, J. D. Lowe, R. S. Hames and A. A. Dhondt. 1999. A land manager's guide to improving habitat for scarlet tanagers and other forest–interior birds. The Cornell Lab of Ornithology.

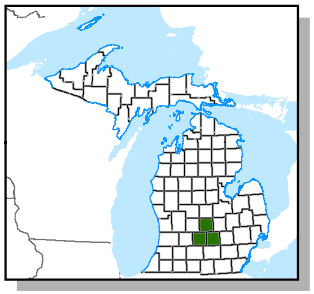
Covertype Proportions



**Other includes covertypes with < 3% total area*

Tri-County Region

Vegetation circa 1800



Data Source:
Comer, P. J., D. A. Albert, H.A. Wells, B. L. Hart, J.B. Raab, D. L. Price, D. M. Kashian, R. A. Corner, and D. W. Schuen. 1995. Vegetation circa 1800 of Michigan. Michigan's Native Landscape: As Interpreted from the General Land Office Surveys 1816-1856. Michigan Natural Features Inventory. Lansing, MI. 78 pp. + digital map.

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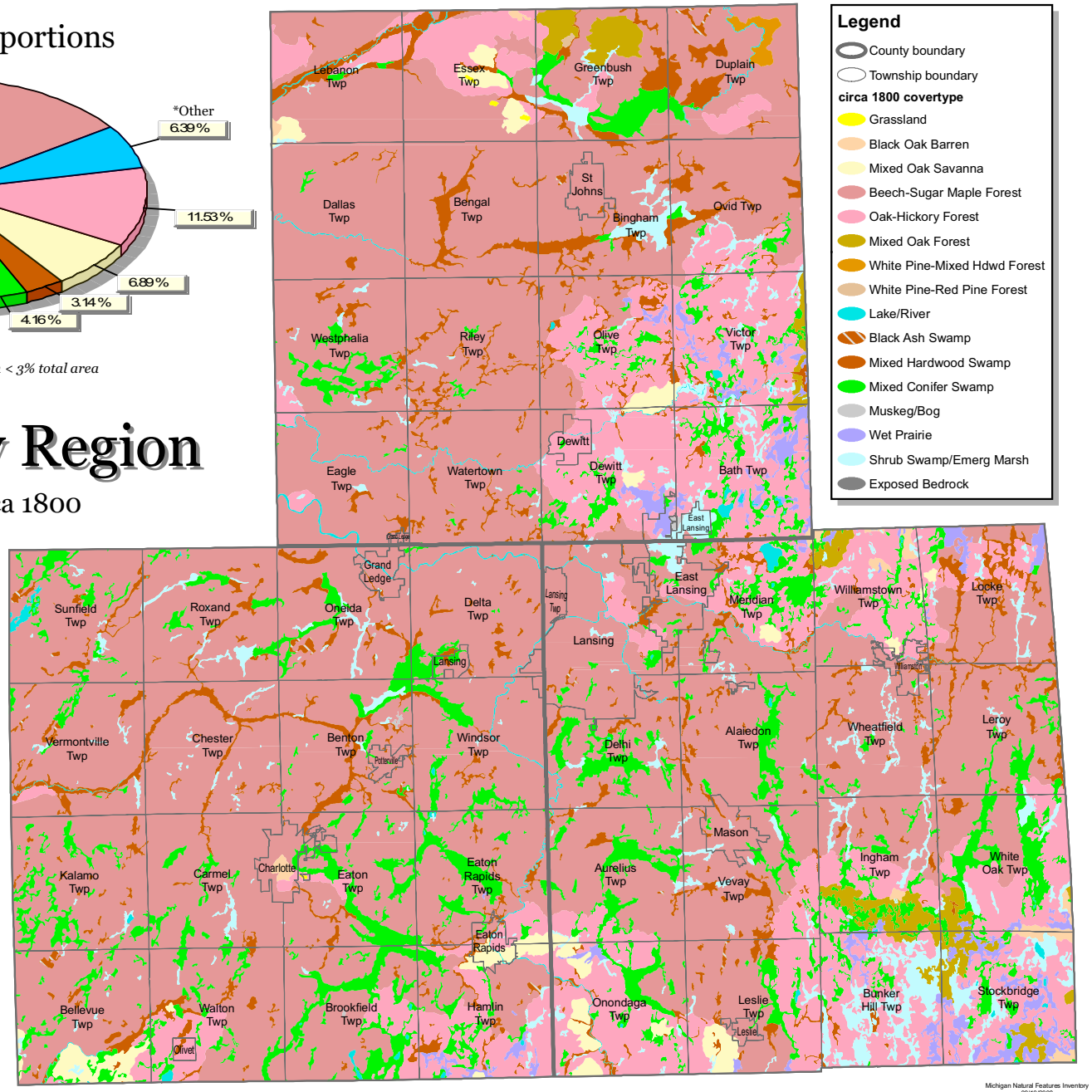
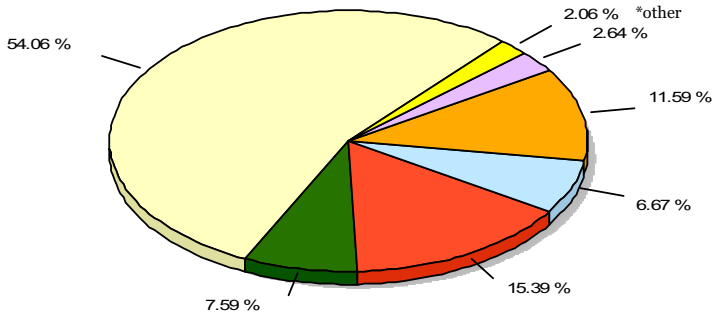
Michigan Natural Features Inventory

MICHIGAN STATE UNIVERSITY EXTENSION



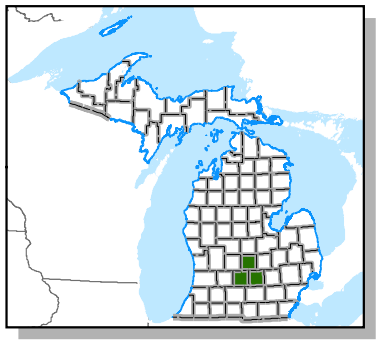
Class Proportions

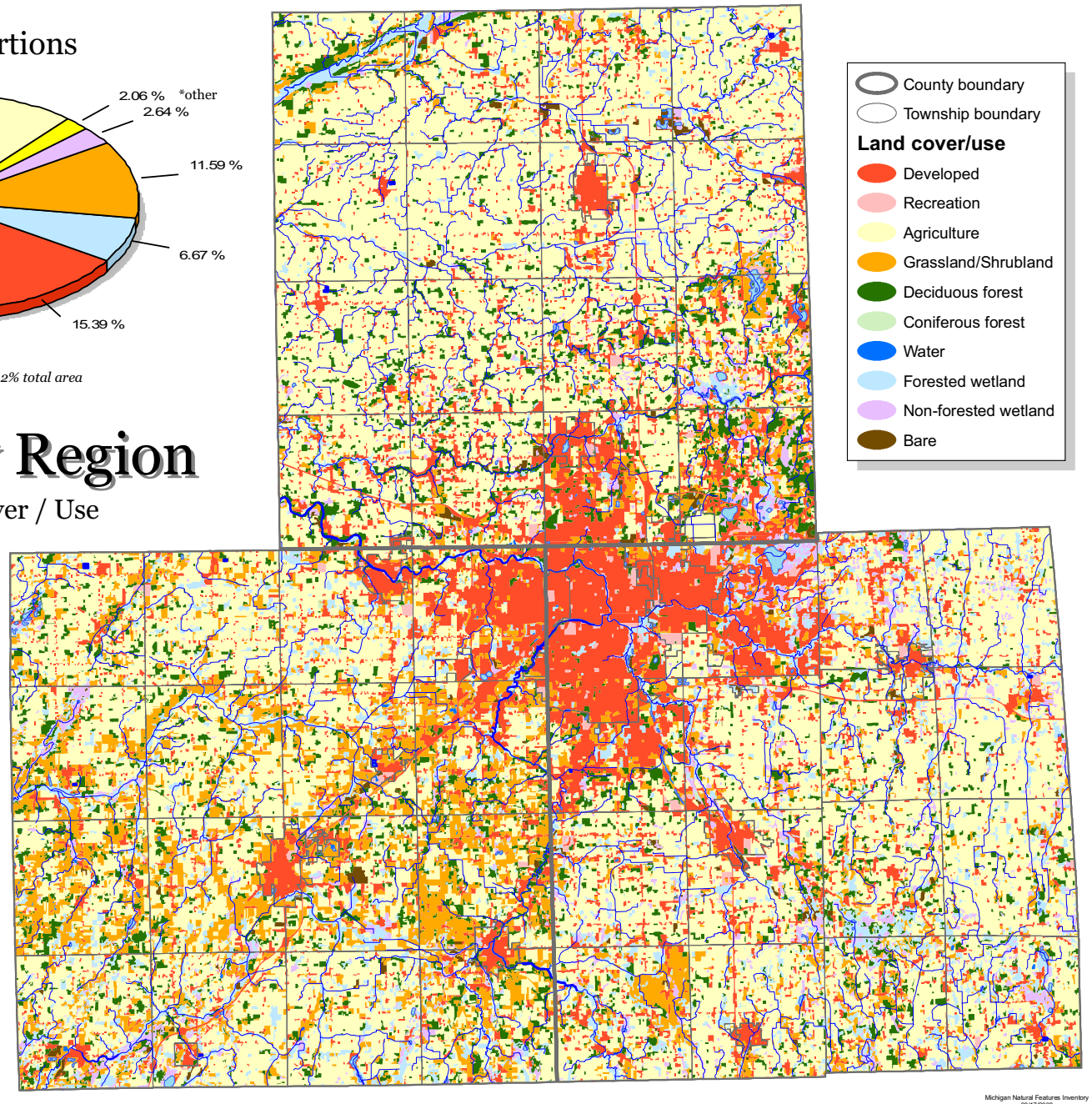


**Other includes classes with < 2% total area*

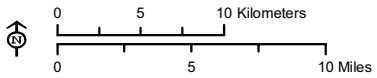
Tri-County Region

Updated Land Cover / Use



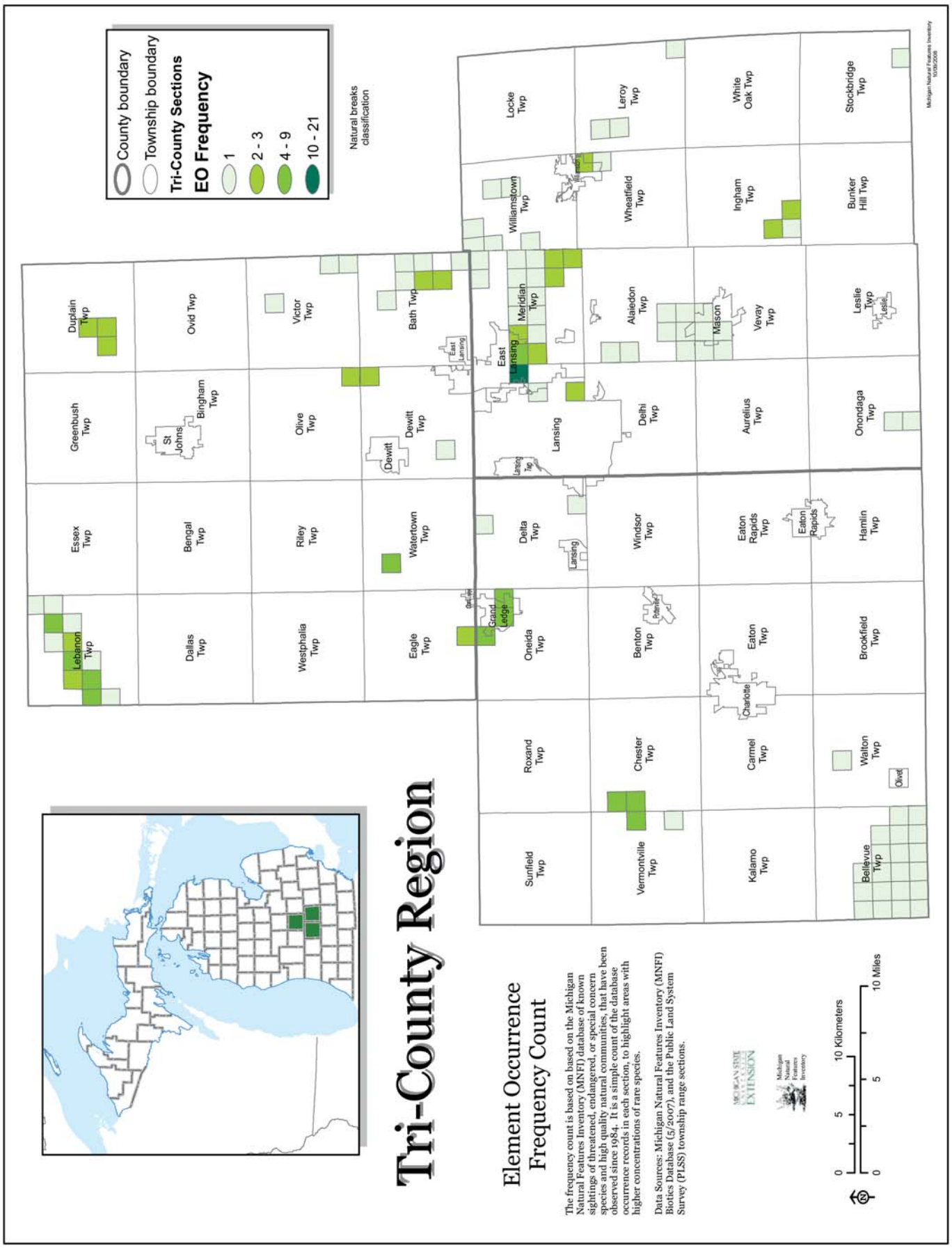


Data Source: Tri-County Region. 1999 Land use / cover. Updates to selected classes by H. Enander, MNFI, using 2005 aerial photography. Legend classified in a modified Anderson Level II format.



MICHIGAN STATE UNIVERSITY EXTENSION

Michigan Natural Features Inventory


County boundary
Township boundary
Tri-County Sections
EO Frequency
1
2 - 3
4 - 9
10 - 21
Natural breaks classification
Tri-County Region
Element Occurrence Frequency Count
The frequency count is based on the Michigan Natural Features Inventory (MNFI) database of known sightings of threatened, endangered, or special concern species and high quality natural communities, that have been observed since 1984. It is a simple count of the database occurrence records in each section, to highlight areas with higher concentrations of rare species.
Data Sources: Michigan Natural Features Inventory (MNFI) Biotics Database (5/2007), and the Public Land System Survey (PLSS) township range sections.
MICHIGAN STATE UNIVERSITY EXTENSION
Michigan Natural Features Inventory
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Michigan Natural Features Inventory 10/29/2008
Locke Twp
Leroy Twp
White Oak Twp
Stockbridge Twp
Williamstown Twp
Wheatfield Twp
Ingham Twp
Bunker Hill Twp
Duplain Twp
Ovid Twp
Victor Twp
Bath Twp
Meridian Twp
Alaiedon Twp
Mason
Vevay Twp
Leslie Twp
Greenbush Twp
St Johns
Bingham Twp
Olive Twp
Dewitt
Dewitt Twp
East Lansing
Lansing
Delhi Twp
Aurelius Twp
Onondaga Twp
Essex Twp
Bengal Twp
Riley Twp
Watertown Twp
Delta Twp
Windsor Twp
Eaton Rapids Twp
Hamlin Twp
Lebanon Twp
Dallas Twp
Westphalia Twp
Eagle Twp
Grand Ledge
Oneida Twp
Benton Twp
Potterville
Charlotte
Eaton Twp
Brookfield Twp
Roxand Twp
Chester Twp
Carmel Twp
Walton Twp
Olivet
Sunfield Twp
Vermontville Twp
Kalamo Twp
Bellevue Twp

Tri-County Region

Element Occurrence Likelihood Value

The likelihood model is based on the Michigan Natural Features Inventory (MNFI) database of known sightings of threatened, endangered, or special concern species and high quality natural communities, that have been observed since 1984. It is designed to highlight those areas with known occurrences and is classified on the age of the occurrence database record and the presence of suitable habitat.

Data Sources: Michigan Natural Features Inventory (MNFI) Biotics Database (5/2007), and the Public Land System Survey (PLSS) township range sections.

MICHIGAN STATE UNIVERSITY EXTENSION

Michigan Natural Features Inventory

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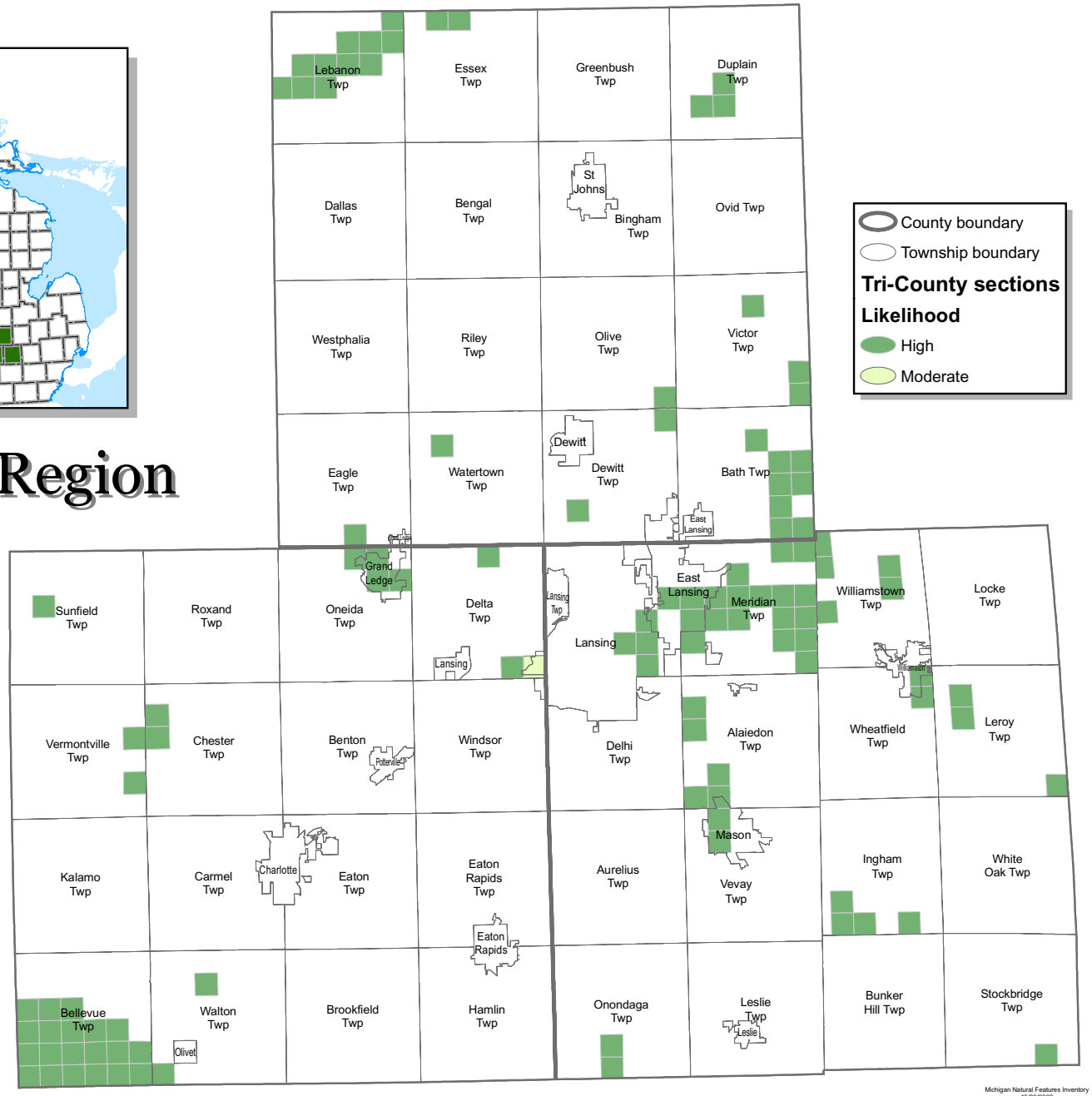

Tri-County Region

Biological Rarity

The biological rarity value is based on based on the Michigan Natural Features Inventory (MNFI) database of known sightings of threatened, endangered, or special concern species and high quality natural communities, that have been observed since 1984, and the presence of suitable habitat. It prioritizes areas for conservation by quality, rarity, status, and confidence.

Data Sources: Michigan Natural Features Inventory (MNFI) Biotics Database (5/2007), and the Public Land System Survey (PLSS) township range sections.

MICHIGAN STATE UNIVERSITY EXTENSION

Michigan Natural Features Inventory

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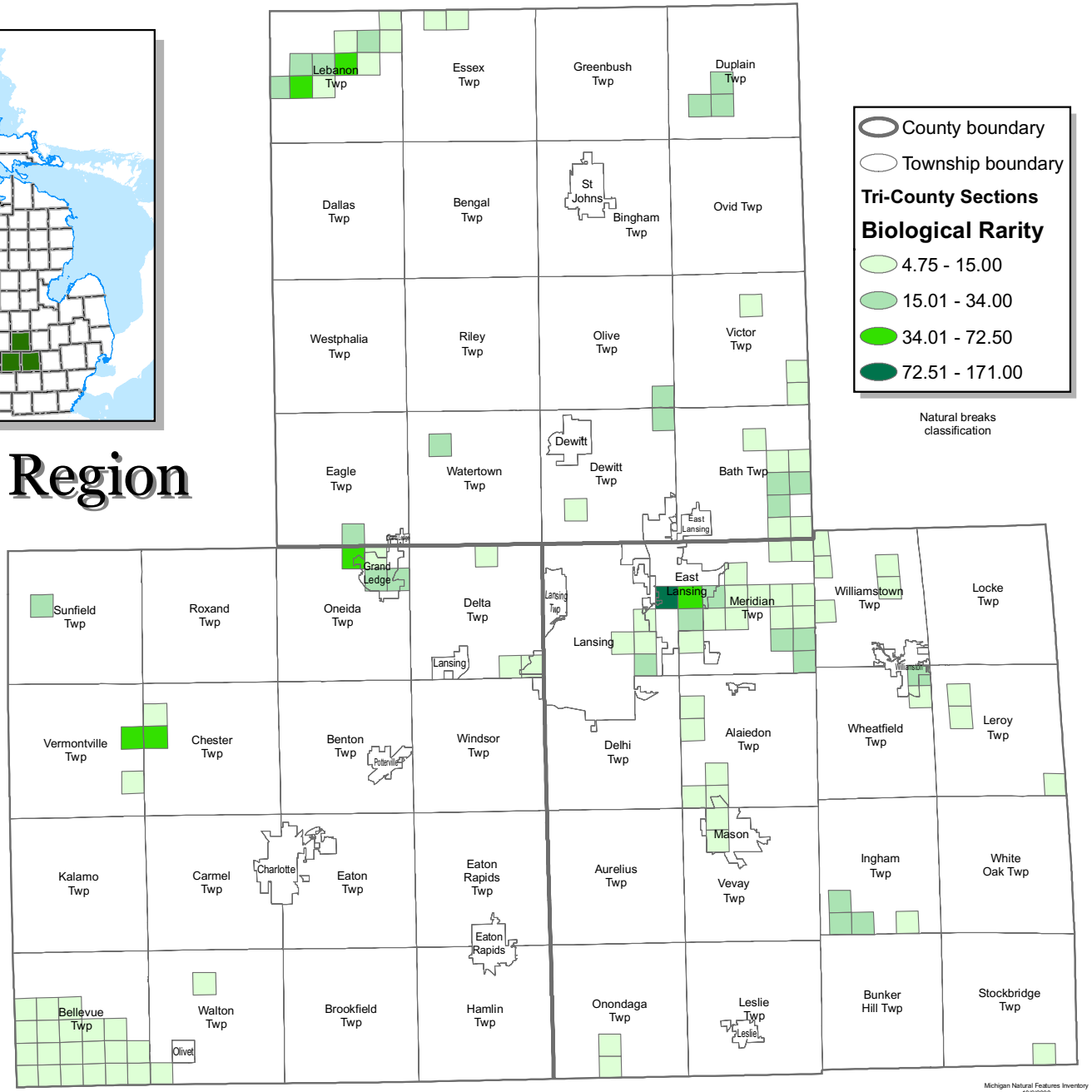
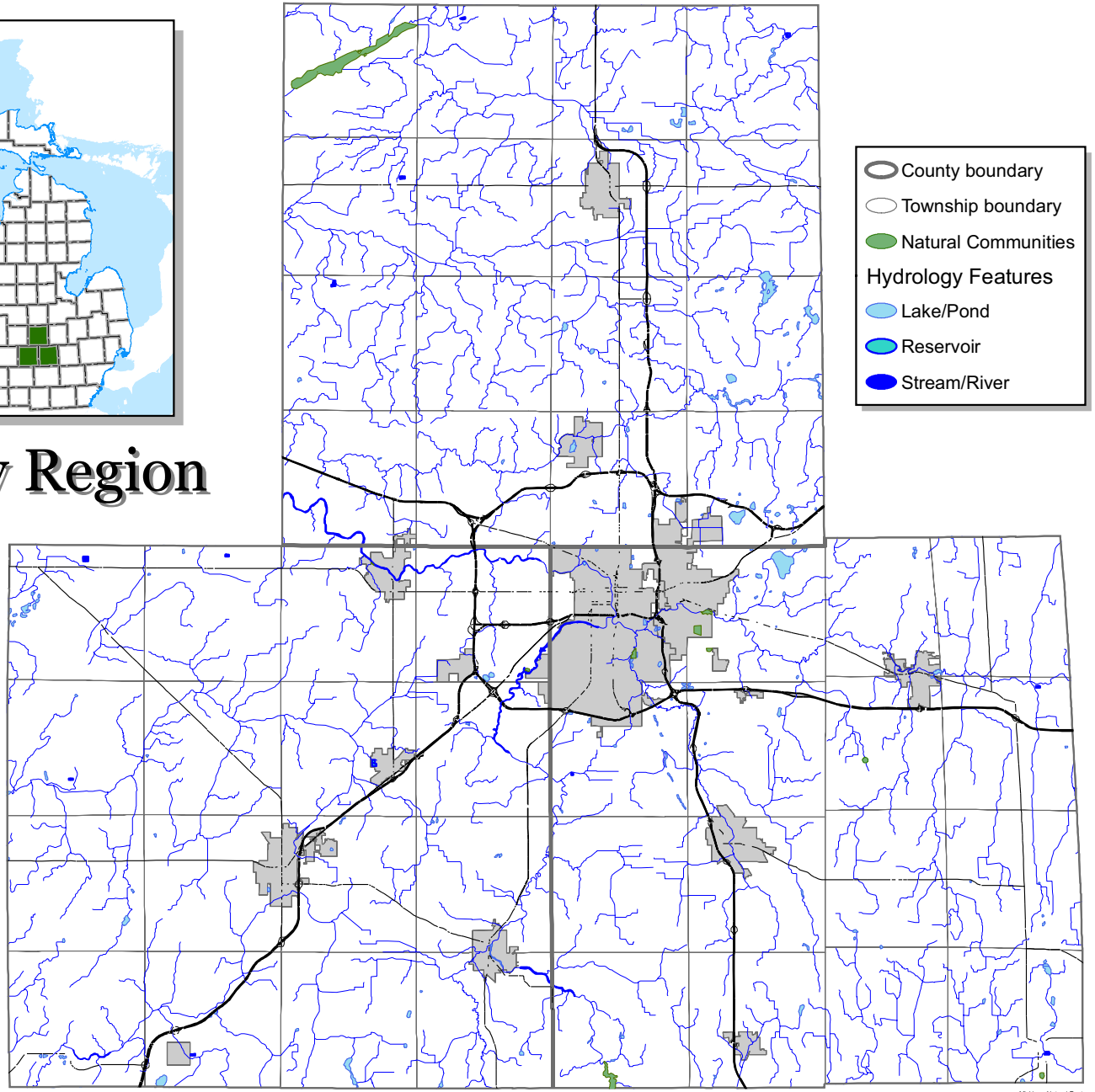


Tri-County Region



Natural Community Occurrences

Michigan Natural Features Biotics database, accessed 10/8/2008.

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Michigan Natural Features Inventory

MICHIGAN STATE UNIVERSITY EXTENSION

~ NOTES ~

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Greening MID-MICHIGAN

PARTNERS

Tri-County Regional Planning Commission

Eaton Conservation District

MTGA Michigan Trails & Greenways Alliance

Greater Lansing Regional Committee for Stormwater Management

Clinton County

Tri-County Regional Growth

Eaton County Parks — A MEMORABLE OUTDOOR EXPERIENCE

LeapInc

GM

DEQ

Potential Conservation Areas Assessment

COMPONENTS
- Identify natural resources
- Ranking & prioritizing of areas
- Creation of Tri-County conservation map

OUTCOMES
- Regional mapping tool for guidance on land use and conservation planning
- Creation of a potential conservation area report for public

Comprehensive Natural Resource Identification

COMPONENTS
- Regional detailed analysis of:
  - Flora/Fauna
  - High quality natural communities
  - Water resources & integrity
  - Land cover change

OUTCOMES
- Comprehensive report and mapping for public & private stakeholders
- Tool to identify natural features of concern
- Identifying information gaps

Green Infrastructure Mapping and Public Engagement

COMPONENTS
- Supplement and map MNFI data w/additional land use information
- Local government stakeholders interviews
- Public engagement
- Creation of a regional green infrastructure vision

OUTCOMES
- Local entities aligning planning priorities to incorporate scientific data
- Regional participation & cooperation is enhanced
- Increase public awareness and stewardship of the environment

FINAL PRODUCT

Creation of a regional green infrastructure vision including policy tools for natural resources management and land use planning

Please visit our website : www.greenmidmichigan.org





Prepared by:

Michigan Natural Features Inventory

Submitted September 2008

Prepared for:

Tri-County Regional Planning Commission

With Thanks to Our Project Partners:

Eaton Conservation District - Michigan Trails and Greenways Alliance

Eaton County Community Development Department - Eaton County Parks

Greater Lansing Regional Committee for Stormwater Management

Clinton County Green Space Commission - Clinton County Agricultural Preservation Board

Clinton Conservation District - Ingham County Agricultural Preservation Board

Ingham County Parks - Lansing Economic Area Partnership, Inc.

General Motors – Michigan Department of Environmental Quality

Natural Resources Conservation Service - The Land Use and Health Resource Team

(a member of the Power of We Consortium)

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