

Chapter 3 – Prioritized Pollutants, Critical Areas, and Priority Areas

Many of the remaining natural resources and several nonpoint source pollutants have been prioritized for management based on current data. This was done to direct available resources towards preserving the remaining natural resources with the highest ecological diversity and water quality benefit in the NEW and addressing the greatest threats to water quality. The prioritization process was based on four (4) main factors:

1. Analysis of available water quality data;
2. Assessments of physical and qualitative watershed conditions based on the 2004/2005 Road/Stream Crossing Survey and the 2005/2006 Water Quality and Hydrologic Monitoring;
3. Review of master plan documents and natural features mapping; and,
4. Stakeholder input over the course of several public meetings, three (3) focus group meetings, and input from the NEW WAG over the course of two years of watershed group meetings.

“Priority Areas” are high quality and environmentally-sensitive areas that require protection and preservation. A “Critical Area” is an area that produces the highest level of pollutants in a watershed. “Critical Areas” and “Priority Areas” are delineated so that implementation efforts can be focused on the areas where the most results will be produced.

3.1 Prioritized Pollutants and Watershed Concerns

Table 3.1 outlines the natural resources, prioritized pollutants, and land use planning concerns that have been identified for the first stage of implementation of this WMP. The summary table also highlights the most probable point and nonpoint sources of the pollutants or causes of concern and the impacts to water quality, public health, aquatic life, and the economy. Upon interpretation of the point sources listed in Table 3.1, it should be clarified that point source discharges from regulated facilities such as WWTPs, sewage lagoons and package treatment plants, and industrial facilities are typically in compliance with their NPDES permits to discharge wastewater; however, there are some instances where exceedances of established permit limits may occur due to operational upsets (i.e. such as power failures that cause certain treatment operations to be bypassed).

Table 3.1 Prioritized Pollutants and Watershed Concerns in St. Clair County’s Northeastern Watersheds

Pollutant/ Concern	Point Sources	Nonpoint Sources	Impacts
Pathogens/Bacteria	<ul style="list-style-type: none"> • WWTPs* • CSOs/SSOs • Sewage lagoons/package treatment plants* • Urban Storm Water Systems 	<ul style="list-style-type: none"> • Unrestricted access of animals (domestic, wildlife, livestock) to waterways • Malfunctioning septic systems • Pastures • Land application of manure • Illicit connections/discharges 	<ul style="list-style-type: none"> • Primarily human health risks: <ul style="list-style-type: none"> ○ Risk of illness from ingestion or from contact with contaminated water through recreation • Increased cost of treatment of drinking water
Toxic Pollutants: <ul style="list-style-type: none"> • Heavy Metals • Chlorinated organic compounds • PNAs 	<ul style="list-style-type: none"> • WWTPs* • CSOs/SSOs • Industrial/manufacturing Facilities* • Urban Storm Water Systems 	<ul style="list-style-type: none"> • Landfills • Atmospheric Deposition • Spills/leaks • Improper disposal of hazardous wastes • Urban runoff from roadways and gas stations 	<ul style="list-style-type: none"> • Aquatic life impairments • Fish contamination (PCBs) • Contamination of drinking water supplies (elevated concentrations in source water)
Sediment (including Total Suspended Solids)	<ul style="list-style-type: none"> • Urban Storm Water Systems • Paper manufacturing facilities** 	<ul style="list-style-type: none"> • Agriculture (cropland and pastureland erosion) • Rangeland erosion • Excessive streambank erosion • Construction • Roadways • Urban runoff • Hydromodifications/Channelization 	<ul style="list-style-type: none"> • Reduces spawning habitat for fish • Degrades in-stream habitat • Taste/odor problems in drinking water • Recreational impacts (appearance)**
Nutrients	<ul style="list-style-type: none"> • WWTPs* • CSOs/SSOs • Sewage lagoons/package treatment plants* • Industrial/manufacturing Facilities* (i.e. discharges from paper plants) • Urban Storm Water Systems 	<ul style="list-style-type: none"> • Agriculture • Landscaped spaces in developed areas (i.e. lawns, golf courses, etc.) • Unrestricted access of animals (domestic, wildlife, livestock) to waterways • Pastures • Malfunctioning septic systems • Illicit connections/discharges 	<ul style="list-style-type: none"> • Aquatic life impairments (i.e. excessive aquatic plant growth, lowered dissolved oxygen levels) • Drinking water supply impacts (i.e. dangers from elevated nitrates) • Recreational impacts (excessive plant growth, odors, appearance, etc.)

*Point source discharges from WWTPs, Sewage Lagoons and Package Treatment Plants, and Industrial/Manufacturing Facilities are required to have NPDES permits to discharge wastewaters and must comply with established pollutant concentrations and loadings for bacteria, heavy metals, total suspended solids, and nutrients, as applicable. Typically, these facilities are not significant sources of pollutants, but could provide inputs if an operational upset of some sort were to occur.

**The point source discharges from two local paper manufacturing facilities in Port Huron have been observed to regularly contain sulfur bacteria slime which resembles paper particles. The slime sloughs off from the plants’ clarifiers and discharge pipes. The slimes have been cited as a decrease in aesthetics to the recreational uses in the St. Clair River.

Table 3.1 Prioritized Pollutants of Concern in St. Clair County’s Northeastern Watersheds (continued)

Pollutant/ Concern	Causes	Impacts
Extreme Flow Fluctuations (Flashy Hydrology)	<ul style="list-style-type: none"> • Hydromodifications: channel straightening, dredging, field tiling, and deforestation for: <ul style="list-style-type: none"> ○ Drain maintenance ○ Agricultural drainage • Increases in impervious surfaces 	<ul style="list-style-type: none"> • Degrades in-stream habitat • Stream warming • Accelerates streambank erosion • Unstable hydrologic flows • Reduces groundwater recharge and lowers baseflows in streams
Loss of Natural Features	<ul style="list-style-type: none"> • Clearing and snagging • Growth and development • Hydromodifications: <ul style="list-style-type: none"> ○ Loss of wetlands ○ Loss of woodlands ○ Loss of riparian buffers 	<ul style="list-style-type: none"> • Increased impervious surfaces can lead to many of the water quality impacts noted above for hydromodifications from increased runoff quantities and decreased runoff quality due to a loss in natural attenuation of storm water, natural filtration, and infiltration • Degrades in-stream habitat • Loss of aquatic and wildlife habitat
Lack of Coordinated Land Use Planning Initiatives	<ul style="list-style-type: none"> • Outdated planning documents • Lack of coordinated codes, ordinances, and design standards that promote water quality and quantity protection • Lack of cross-jurisdictional partnerships • Lack of enforcement procedures • Lack of funding 	<ul style="list-style-type: none"> • Same as loss of natural features above • Extreme flow fluctuations • Loss of riparian buffers • Loss of floodplains • Loss of prime farmland and rural character

3.2 Priority Areas or Sites and Critical Areas or Sites

Priority Areas are remaining natural resources of high quality and environmentally-sensitive areas (such as wetlands, woodlands, headwater tributaries, unique natural sites, etc.) that require protection and preservation. A high priority is the protection and preservation of the many high quality natural areas that exist throughout the NEW. Protection and proper management of water resources is much more effective, and considerably less costly, than restoration.

A Critical Area can be defined as a geographic portion of the watershed that is contributing the majority of the pollutants and is having a significant impact on particular waterbodies (such as unstable streams, construction sites, erosive soils, steep slopes, etc.). Identification of specific critical areas in a watershed saves time and money because projects can be focused on prioritized areas. In the NEW, however, many of the pollutants and concerns exist over the entire watershed which makes the identification of specific critical areas more difficult. In order to further delineate more specific geographical areas for prioritized management options, additional funding and staff will be necessary to perform the necessary assessments of the watershed.

The watershed-wide critical areas have been delineated based on the prioritized pollutants and watershed conditions of greatest concern. The prioritization process was based on available water quality and assessment data, as well as stakeholder input throughout the watershed planning process. In order to address the critical areas in the NEW, the selection of BMPs is prioritized to focus on the following elements:

Priority Sites:

1. Significant natural resources (woodlands, wetlands, glacial beach ridges and swales, fisheries, areas with threatened/endangered species, and headwater tributaries)
2. Greenway corridors
3. Preservation of prime agricultural land and rural character
4. Creation/preservation of public access to water resources

Critical Areas:

5. Sediment source areas
6. TMDL areas
7. Critical agricultural sites
8. Areas with altered watershed hydrology

3.2.1 Priority Sites

Appendix E provides maps of many of the Priority Areas throughout St. Clair County including:

- Recreation, Open Space and Environment Corridors
- Sensitive Environments
- Sand and Gravel Resource Protection Areas
- Forest Preservation Areas
- Unique Natural Features and Wildlife Habitat
- Wetlands and Water Bodies
- Flood Hazard Areas
- Prime Farmlands
- Wooded Areas
- Potential and Existing Greenway Corridors
- Trail Maps

Priority Areas will be managed and protected by County and municipal Master Planning, ordinances, development/redevelopment regulations as well as other programs such as purchasing public land or development rights, conservation easements, CREP, and CCRP.

3.2.1.1 Significant Natural Resources

As outlined in Section 1.5 of Chapter 1, there are several areas throughout the NEW that have been flagged for their significant natural resource value and conserving and protecting these features will be critical in attaining all of the goals and objectives of this WMP. All of the features outlined in the above-mentioned section of Chapter 1 requiring priority for protection/enhancement include:

- Mature and Northern Forest Conservation throughout the NEW,
- Wetlands Conservation throughout the NEW,
- Hemlock Ravine Conservation in the LBR subwatershed,
- Glacial Beach Ridges and Swales Conservation in the LHD subwatershed,
- Fisheries (primarily in the LBR, as well as Lake Huron and the St. Clair River), and
- Areas with threatened and/or endangered species throughout the NEW.

Generalized maps that preliminarily identify several of these areas have been prepared by the SCCMPC and can be utilized for planning purposes to help delineate the critical areas (see Appendix E).

In order to gain the necessary information to protect the high-quality natural features throughout the area, it is highly recommended that a site-level Michigan Natural Features Inventory (MNFI) be completed in order to ensure that the highest quality natural features are identified (BMP 37). Local communities are highly encouraged to then include the areas identified in the MNFI into their Comprehensive/Master Plan documents (BMP 38) to support future planning strategies, such as adoption and implementation of ordinances and development standards that protect these natural features (see BMPs 31-36, 39, and 40).

3.2.1.2 Greenway Corridors

Another strategy to protecting wildlife, plant species, and water resources is through greenway corridor preservation. Figure 3.1 illustrates the areas throughout the NEW that have been identified by the SCCMPC as existing, planned, and concept greenway corridor preservation areas throughout the County.

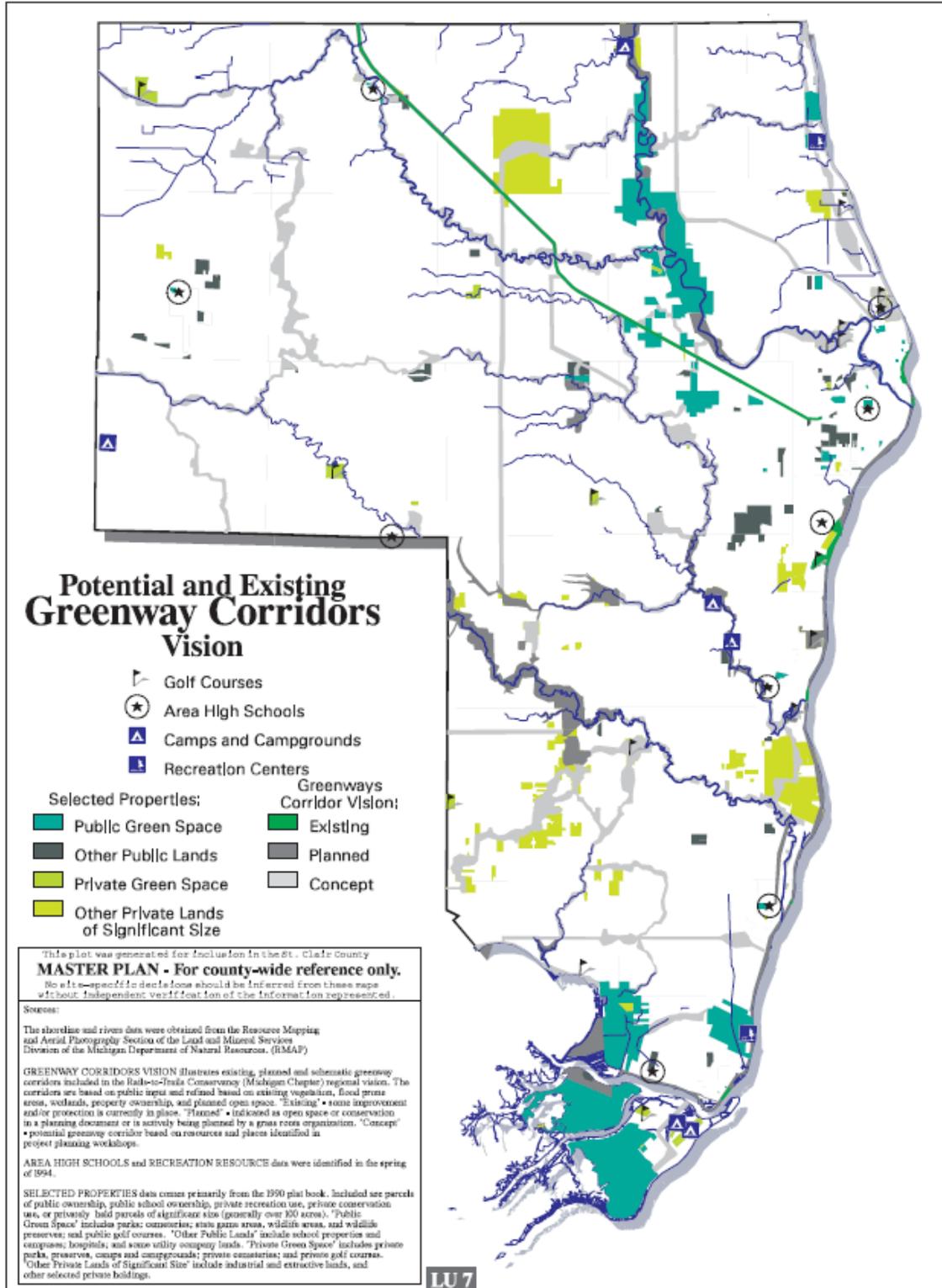


Figure 3.1 Existing, Planned, and Concept Greenway Corridors in St. Clair County (SCCMPC, 2003)

Greenway corridors are important for preservation because they allow for unfragmented, linearly connected woodlands, wetlands, and other natural features that expand habitat for wildlife. They also provide opportunities for residents and visitors to engage in recreation and opportunities to appreciate the natural resources of the area. Incorporation of hiking, biking and recreational trails along greenways and river corridors has already begun in the area, and should continue to be expanded (see BMP 44). There are currently two extensive recreational trails that fall within parts of the NEW:

1. Wadhams to Avoca Trail: Extends from I-94 in Port Huron Township to the northwest where it terminates at Avoca Road in Kenockee Township; only a small portion of this trail falls within the LBR subwatershed (see map of trail system in Appendix E), with the majority of the trail running outside of the western border of the subwatershed.
2. Bridge to Bay Trail: Will ultimately extend from the northern border of the County, under the Blue Water Bridge, through Port Huron, Marysville, St. Clair, Marine City, and Algonac. This trail follows much of the shoreline along Lake Huron and the St. Clair River in the NEW.

Figure 3.2 illustrates the areas throughout the NEW that have been identified by the SCCMPC for recreation, open space and other environmental protection uses throughout the County.

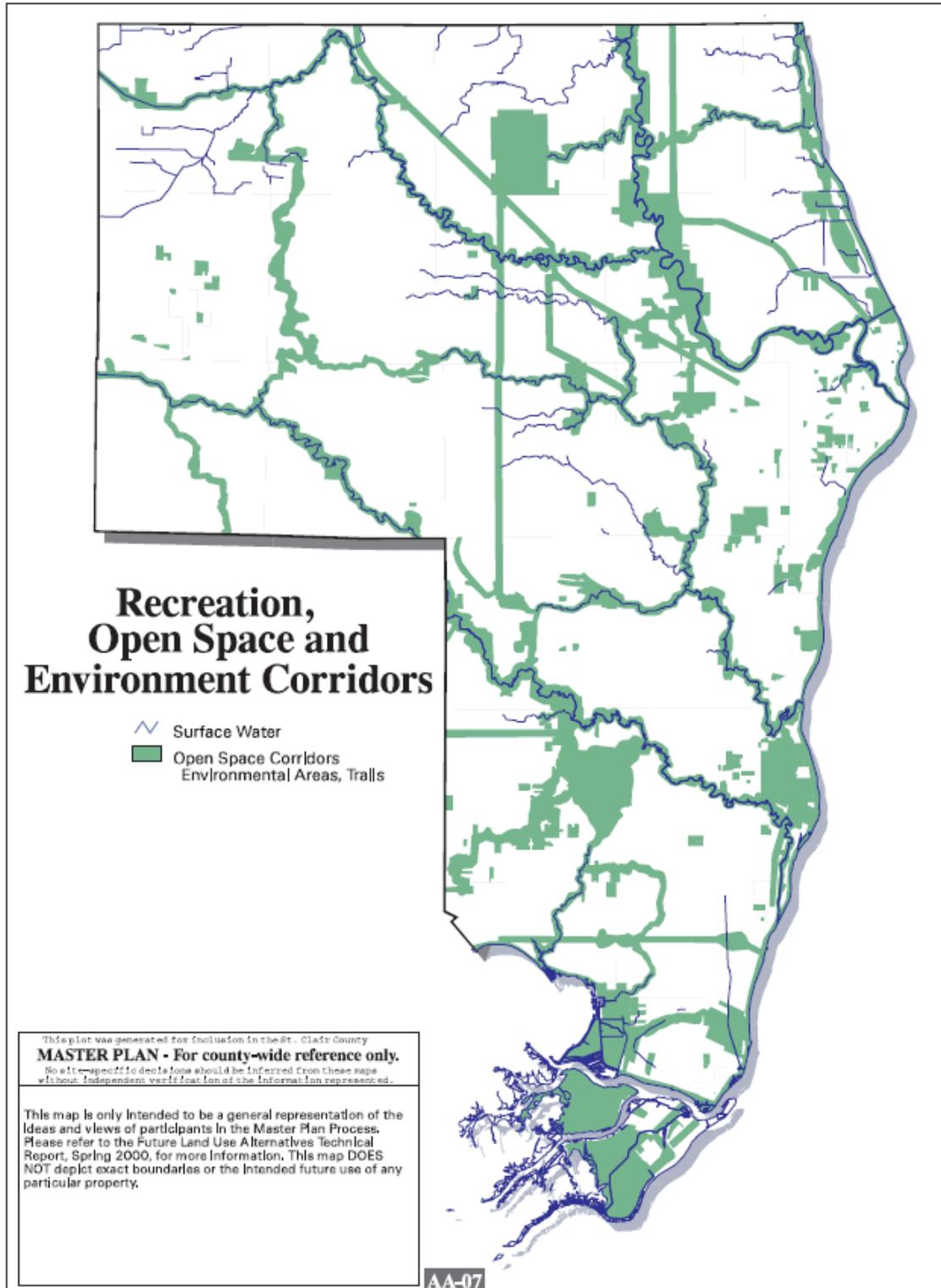


Figure 3.2 Recreation, Open Space, and Environment Corridors throughout St. Clair County (SCCMPC, 2003)

3.2.1.3 Preservation of Prime Agricultural Land and Rural Character

As outlined in Section 1.6 of Chapter 1, the most productive agricultural lands in the NEW occur along the glacial ridge separating the LBR and LHD subwatersheds. Farmlands in these areas have been identified by the NRCS as those best suited for food production. This means that they require minimal soil enhancement measures such as irrigation and fertilizer, and crops grown on these soils will produce the highest yields with the smallest input of energy and economic resources. As such, these areas should be prioritized for purchase of development rights (BMP 47) in conjunction with the Farmland Preservation Program (P.A. 116 Program) (BMP 48), and rural Townships should consider adopting an agricultural buffer zoning ordinance (BMP 50). However, these soils are also highly susceptible to erosion (Figure 3.8). Stream buffers and agricultural BMPs are necessary for sustainable agriculture and water quality protection.

3.2.1.4 Creation/Preservation of Public Access to Water Resources

Many people choose to live in northeastern St. Clair County because of the recreation opportunities provided by the Black and St. Clair Rivers, and Lake Huron. Lake Huron and the St. Clair River are commonly used for a variety of boating, swimming, diving and fishing activities, while the Black River is commonly used for boating and fishing access. Preserving recreational access to these waterways is important for the NEW as it provides a means for the public to value these waterways that they ultimately depend on for more than just recreation. Activities such as swimming, fishing, boating, or simply riding a bike or walking along the water may not seem like water quality protection activities, but it is generally accepted that those who use water recreationally are more likely to value and protect it.

There is significant interest to acquire additional areas for public access to the water resources throughout the NEW. Currently, the County's Parks and Recreation Commission (PARC) has an updated Master Plan which is current through 2006 and outlines the priority recreational facilities that the commission will pursue until the next update (for 2007-2011). Each community in the NEW should also create, or update, recreation plans in order to be eligible for various funding sources to help acquire additional parks and recreational space.

A summary of the existing public facilities (beaches and boardwalk parks) that provide, fishing, swimming, and/or diving access to the Black River, St. Clair River and Lake Huron are provided in Table 3.2 below, as well as a summary of the public boat launches that provide access to the St. Clair River and Black River.

Table 3.2 Existing Public Recreational Access Facilities throughout the NEW

Community	Facility Name	Access Type	Access To:
Lakeport	Jeddo Road Beach	~ 66' of public beach	Lake Huron
	Washington Street Park	~ 66 feet of public beach	Lake Huron
Burtchville Township	Lakeport State Campground Beach	~ 1.5 miles of public beach and campsites	Lake Huron
	Lakeport State Park	Day use area	Lake Huron
	Burtchville Township Park Beach	Public Beach	Lake Huron
	Metcalf Road Beach	Public Beach (no parking)	Lake Huron
Fort Gratiot Township	Keewahdin Road Beach	~ 82' of public beach	Lake Huron
	Fort Gratiot County Park*	~ 850' of public beach	Lake Huron
	Fort Gratiot Bike Trail and Nature Preserve	2.5 miles of biking and walking trails adjacent to wetlands and county drain	Black River
Grant Township	Port Huron State Game Area	~ 15 miles of access (both sides of river) for hiking and hunting	Black River (fishing, no swimming)
Port Huron Township	Bakers Field	~0.5 mile shoreline for fishing access, walking and park activities.	Black River
	W.P. Thompson Pond	65-acre pond with fishing access	-
City of Port Huron	Ballentine Street Beach	66' of public beach	Lake Huron
	Lakeside Park Beach	1031' of public beach	Lake Huron
	Krafft Road Beach	66' of public beach	Lake Huron
	Conger Beach/Lighthouse Park	934' of public beach	Lake Huron
	Holland Avenue Beach	60' of public beach	Lake Huron
	Thomas Edison Parkway	Part of the Bridge to Bay Trail: ~ 24 miles of walking and biking trails, family parks, swimming, scuba diving and fishing access	St. Clair R.
	Pine Grove Park		
	Municipal Office Center		
	Water Reclamation Facility		
	Lincoln Park		
	Desmond Landing	Under construction	St. Clair R.
	River Street Dock**	95 boat slips, boat launch	Black River
	Quay Street Dock**	15 boat slips	Black River
	Southside Dock**	16 boat slips	Black River
	Fort Street Dock**	20 boat slips	Black River
Water Street Marina	234 boat slips, boat launch	Black River	
City of Marysville	Chrysler Beach	300' of public beach, walking/biking trails	St. Clair R.
	Marysville City Park		
	Riverwalk		
Marine City	Marine City Beach	75' of public beach, walking, biking, fishing	St. Clair R.
	Marine City Diving Area	Diving access	St. Clair R.
	Nautical Mile Park	-	St. Clair R.
	Public Boat Launch	Boating access for City residents only	St. Clair R.
City of St. Clair	Boardwalk Park	~ 1,705' of boardwalk, walking/biking trails, and fishing access	St. Clair R.
	Boat Harbor	Boat slips and boat launch	St. Clair R.
East China Township	St. Clair Shores Park (north side of town)	Fishing access/viewing	St. Clair R.
	River Park (south side of town)	Fishing access/viewing	St. Clair R.

*Not yet open to the public; facilities for beach access, restrooms, a splash pad, playground, picnic shelters, and walking trails to begin being built in early 2006 when Phase I of the development is completed.

**All of these locations are part of the Marina Division and have a public walkway that extends from Military Street to 10th Avenue along the Black River in the City of Port Huron.

There are several strategies that can be implemented to acquire additional parks and recreational space throughout the NEW. Partnerships between local governments and the County’s Parks and Recreation Commission to share funding options is an existing option, and there are several other funding options available for the acquisition of land for recreational uses as discussed in Chapter 6. The SCC Parks and Recreation Commission is currently working with local municipalities and the Road Commission to develop small boat access along river courses at road ends or road crossings. It should be noted that as shore land stabilization projects are implemented, their design should strive to include a public access component to increase recreational opportunities along the St. Clair River (see BMPs 42, 43, and 61).

3.2.2 Critical Areas

Some maps showing Critical Areas and areas with opportunities to implement BMPs are provided in Appendix E entitled:

- Urbanized Land
- Future Land Use
- Redevelopment and Renewal Areas
- Commercial Growth Areas
- Change in Population Density

General critical areas are generally described in the categories of TMDLs,

3.2.2.1 TMDL Areas

As discussed in Section 2.3.1 of Chapter 2, there are several river reaches and public beaches in the NEW that have been scheduled for the development of a Total Maximum Daily Load (TMDL) which outlines the allowable loading of a pollutant in a waterbody to assure that state water quality standards are met. Table 3.3 provides a summary of those areas and appropriate measures should be taken to achieve the pollutant loadings outlined in the TMDL once the TMDL has been approved. Although there are TMDLs scheduled for PCBs and mercury, they are not an issue related to storm water management, and therefore, have not been included in the TMDL areas of critical concern.

Table 3.3 Summary of 303(d) Listed Waterbodies in NEW (MDEQ, 2006)

Pollutant/ Impairment	Waterbody	Miles Impaired	Reach Impaired	Sources	TMDL Year
Pathogens/ Bacteria (<i>E. coli</i>)	Black River	1.5	St. Clair River confluence upstream to I-94 in the vicinity of Port Huron	<ul style="list-style-type: none"> • CSOs/SSOs • Urban runoff/storm sewers • Illicit connections 	2009
	Lake Huron	0.12	Krafft Road Beach in the vicinity of Port Huron		2015
	St. Clair River	27	Vicinity of Algonac, Lake St. Clair inlet upstream to Lake Huron outlet at Port Huron		2009
	St. Clair River	0.5	Chrysler Beach in Marysville		2016

As noted in Section 2.3.6.1, the predominant sources of bacteria in the NEW originate from both point and nonpoint sources. Programs are already in place to reduce and eliminate these sources primarily through CSO/SSO elimination projects, implementation of local and county IDEP programs, and public education to reduce the amount of domestic and animal wastes that can get

into surface water runoff. Also, the county’s monitoring strategy to track the reduction in bacteria levels throughout the NEW will be maintained (see Figure 2.12 for monitoring locations) and results analyzed to help measure progress in attaining the goals of this WMP.

3.2.2.2 Critical Agricultural Sites

Agricultural land use is the most significant source of upland sediment in the LHD and LBR subwatersheds. In general, more riparian buffers, runoff treatment, cattle exclusion, and agricultural BMPs are necessary throughout the NEW. This is especially evident in the spring when owners of untilled fields construct mid-field ditches to drain their land allowing excessive sediment to fill road drains. Because this problem is so widespread, it is difficult to pinpoint specific locations for corrective actions. Although sediment is equally if not more detrimental to water resource health as pathogens and bacteria, it has been determined through WAG priorities and consultations with the Conservation Service and Natural Resources Conservation District that agricultural sites with unrestricted cattle access will be addressed first. The critical agricultural sites identified in the Road/Stream Crossing Survey as having unrestricted cattle access (Figure 2.38) include:

Site ID	Location
Fue1	Fueslin Drain tributary to the Black River at 8695 Cribbins Rd.
N/A	5909 Burtch in Grant Twp., first tributary south of Burtch in the LHD subwatershed on the east side of Wildcat
N/A	Section 31 of Port Huron Twp, north of Range Road and Atkins

3.2.2.3 Areas with Altered Watershed Hydrology

The hydrologic cycle has changed significantly in the NEW over the past two centuries (Section 1.2). During the development of land for agricultural use, deforestation, wetland filling and drainage improvements were extensive. This increased the runoff volumes and rates and decreased base flows. In more recent decades, the runoff in more urbanized areas has increased which has resulted in flooding and channel erosion.

Most tributaries throughout the NEW have been physically modified over the past century by dredging, channel straightening, and other maintenance activities to improve conveyance of these increased flows. Some headwater tributaries and ditches continue to be maintained in ways that are not sustainable and main tributaries have not recovered from historic impacts. Therefore, there is an opportunity to restore the hydrology in headwater areas and restore and enhance the unstable stream channels.



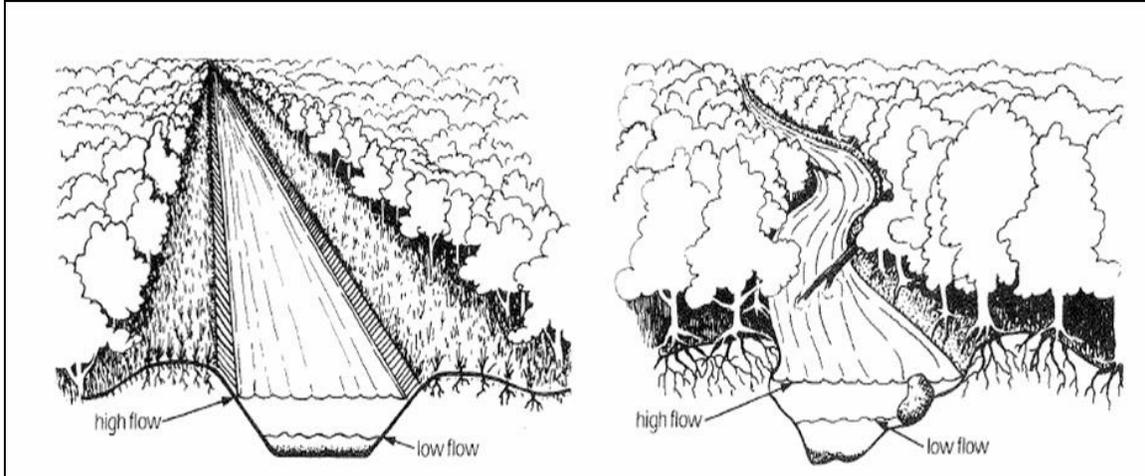
Figure 3.3 Un-vegetated Drainage Ditch

The changes to watershed hydrology and channel hydraulics have degraded water quality and habitat. The science of stream restoration has grown significantly in recent decades throughout the U.S. and there are many opportunities for improvement in the NEW. However, a watershed-based approach that considers restoring watershed hydrology and reducing significant sediment sources is critical to sustainable restoration efforts. Therefore, the critical areas in the NEW with the greatest opportunity for restoring the effects of altered watershed hydrology (and hydraulics) include:

- Restoring headwater tributaries,
- Constructing two-stage ditches that require less maintenance and increase time of concentration (i.e., time for water to travel from point ‘A’ to point ‘B’),
- Daylighting storm sewers,
- Retrofitting off-line extended detention basins within the middle third of a watershed (MDEQ, 1999),
- Re-forestation and small-scale tree planting,
- Wetland creation,
- Floodplain restoration,
- Urban storm water BMPs (both regional detention and source controls),
- Removing deteriorated unnecessary dams, weirs, and hydraulic structures, and
- Re-constructing road crossings with under-sized or perched culverts.

Although channelization may be necessary in a few cases (such as the mouth of the Black River), it is an expensive and least-preferred approach. Methods that allow the drainage course to maintain a natural meandering pattern while conveying the sediment and water produced by its watershed require considerably less maintenance. Natural stream channels maintain floodplain connectivity, vegetative buffers, and in-stream habitat (Figure 3.4). The restoration of rural and urban streams provides an opportunity to achieve sustainable flood control benefits while improving water quality, habitat, aesthetics, and property values.

The St. Clair County Drain Commissioner’s Office, the primary entity that performs drain maintenance on county drains, has been taking measures for several years now to achieve and maintain a more naturalized state of the drainage courses in their jurisdiction. The Drain Commissioner’s Office is moving towards a “stream restoration” approach as opposed to channelization.



Source: International Association of Fish and Wildlife Agencies, U.S. Fish and Wildlife Service, and U.S. Forest Service, 1983

Figure 3.4 Schematic of Channelized and Meandering Drainage Courses

The Drain Commissioner is committed to preserving as much of the natural drainage features as possible and limiting maintenance activities to those absolutely necessary to maintain adequate drainage. The Drain Commissioner also updated their Drainage Standards in 2004 which are designed to:

- Expedite construction plan reviews with simple and clarified requirements for storm water management facilities;
- Increase the drain commissioner’s jurisdiction by covering all developments within county drainage districts;
- Improve flood protection due to the fact that there have been four “100-year floods” in St. Clair County since 1996;
- Provide better protection from drainage problems for future homeowners;
- Provide better protection of floodplains and wetlands; and,
- Require new water quality measures, such as first flush detention and oil skimmers, in the design of storm water management facilities.

A comprehensive list of BMPs recommended for achieving improved water quality and habitat function along drainage courses can be found in Section 6.2.5.1 through 6.2.6 of Chapter 6 (see BMPs 30-36, 41, 56, 61, 63-65, 67, and 68).

3.3 Sources of Critical Pollutants throughout the Watershed

It has been determined that bacteria, sediment, and nutrients are the priority nonpoint source pollutants impacting the NEW. Each of these critical areas is further discussed in Sections 3.3.1 to 3.3.3 of this chapter.

3.3.1 Bacteria

The issue of pathogens and bacteria was discussed in detail in Section 2.3.6.1 of Chapter 2. The available data shows that bacteria levels are regularly exceeded at several area beaches along the Lake Huron and St. Clair River shorelines. This indicates that there are likely sources of bacteria coming from upstream tributaries, or sources near the shorelines. In addition to beaches, several waterways are monitored to determine possible sources of *E. coli*. Almost all of the tributaries in

the NEW that regularly exceed the partial body contact criteria are in the LHD subwatershed. From 1999 to 2004, the following weekly monitoring sites frequently exceeded 1,000 CFU/mL:

- Brandymore Drain at Krafft Road
- Burtch Creek at M-25
- Lake Street Creek at Burtchville Twp. Park
- Milwaukee Creek at M-25
- Norman Road Drain at M-25
- Metcalf Drainage Ditch at Metcalf Road Beach
- Doe Creek at M-25
- Carrigan Drain at Lakeshore
- Marysville wastewater treatment plant

Actions are already being taken to find and eliminate sources of contamination from bacteria and these actions will continue to be implemented throughout the watershed. Those actions include:

- Implementation of Illicit Discharge Elimination Programs (including detection and elimination of sewer cross connections and failing OSDS),
- Upgrades to sanitary sewer infrastructure and treatment systems in Port Huron and Marysville, and
- Ongoing public education efforts to encourage the reduction of bacteria into surface waters from pets, livestock, waterfowl, failing OSDS, and others.

Livestock access to streams has also been observed in agricultural areas of the LBR and LHD subwatersheds. Follow-up actions for these sites will be performed by the SCCHD in 2007.

3.3.2 Sediment

As discussed in Section 2.3.6.2 of Chapter 2, soil erosion and sedimentation is a major issue throughout the NEW. Excessive loadings of fine sediments (silts and clays) can significantly impact water quality and aesthetics. A significant increase in sediment load or a shift to a larger size of sediment will cause an increase in deposition, the formation of mid-channel bars, and extensive system-wide channel instability (as opposed to localized bank erosion) may then be triggered. The sources and causes of excess sediment to the tributaries of the NEW are highly variable, but can generally be classified as a combination of in-stream and upland sources.

The in-stream source areas (i.e., from stream bed and bank erosion) are not well defined in the NEW. The most unstable reaches tend to be in the LHD and LBR subwatersheds based on the Road/Stream Crossing Survey (Table 3.4); however, some of these sites should be re-surveyed due to seasonal changes in site conditions. Several tributaries in the NEW are very unstable and produce high sediment loadings during moderate to large storm events due to ongoing channel adjustments. For example, approximately one third of the headwater tributaries in the Burtch Creek catchment in the LHD subwatershed were contributing excessive sediment loads due to inappropriate management practices (see Figures 3.5 – 3.7).



Figure 3.5 Farmed, Unstable Headwater Tributary of Burtch Creek – Sediment Source



Figure 3.6 Sedimentation at Outlet of Tributary to Main Branch of Burtch Creek



Figure 3.7 Evidence of Streambank Erosion along Main Branch of Burtch Creek

Based on the STEPL model and preliminary field observations, there are several source areas that generally provide most of the upland sediment loadings to waterways in the NEW:

- Erosion at road/stream crossings (including unvegetated ditches, unstabilized outfalls, perched culverts)
- Agricultural runoff
- New development/re-development (construction sites)
- Roadways (dirt/gravel)
- Steep slopes and erosive soils

Table 3.4 Road/Stream Crossing Survey Areas with High Evidence of Bank Erosion

County	Waterbody	Station	Location
St. Clair	fueslein1	fue1	Cribbins between Jeddo and Fisher
Sanilac	muley drain trib to jackson	jcmuld-01	Fargo Rd. between Galbraith Line & Wellman Line Rd.
St. Clair	bunce creek	sc-bunce-02	Mobile home park off of Ravenswood
St. Clair	plumb creek	pc-02	Cribbins between Holly and Hewitt
St. Clair	unknown	sc-mary-02	Smithcreek and Pickford
St. Clair	unknown	sc-m-unk-02	Cuttle between Range & M-29
St. Clair	cuttle creek	sc-cut-05	18th between Range & Michigan
St. Clair	unkown trib to burtch	bch-8	Babcock Rd. S. of Jeddo Rd.
Sanilac	jackson creek drain	jc-02	Kilgore between Galbraith Line & Wellman Line
Sanilac	lavell drain trib to black crk	lvld-01	Bricker Rd. between Galbraith & Wellman

Based on soil type, texture, erosivity factor, and land slope, areas of moderate to severe erosion potential are defined in Figure 3.8 for the NEW. The areas with the most erosion potential are concentrated along the moraine bordering the east side of the Black River and the headwaters of the LHD. Other isolated areas of erosive soils are mostly scattered in the LBR and LHD. This is generally reflected in the summary of upland sediment loadings in Chapter 2.

3.3.3 Nutrients

The specific sources of nutrients throughout the NEW cannot be determined without an extensive, long-term water quality monitoring program. Implementing measures to address suspected and known sources of nutrients should be a priority in the NEW. However, some level of nutrient monitoring should be initiated (see Chapter 9).

Based on the STEPL model, the most significant land use areas contributing phosphorus and nitrogen are agricultural and urban land uses. Unlike the LHD and LBR subwatersheds, urban land use is a greater source of these pollutants in the SRD subwatershed. As listed in Table 2.5, the sources of phosphorus and nitrogen in the NEW are:

- Onsite Sewage Disposal Systems (OSDS), Sewage Lagoons, Package Treatment Plants
- Lawn and garden activities (excess fertilizers), commercial composting sites
- Agricultural runoff
- Land application septage
- Livestock, pet, and wildlife waste
- Sanitary sewer systems (SSOs/CSOs)
- New development, re-development

The primary means of reducing nutrient loading to the NEW will be through public education efforts and the encouragement of the use of appropriate BMPs to reduce nutrient loading, such as installation of riparian buffers. Nutrients are discussed in detail in Section 2.3.6.3 of Chapter 2.

3.4 Implementation Strategy

The implementation of the recommended BMPs that target the prioritized pollutants and watershed/natural resource concerns should be scheduled for implementation within the short-term, or within the first permit cycle (by 2008), and into the early stages of the second permit cycle (between 2009 and 2011). The BMPs for addressing the critical areas and protecting the priority areas are discussed in Chapter 6. As implementation of the NEW WMP continues, the critical areas may change over time. As protection/enhancement projects are completed, additional challenges to the watershed arise, and as more information on the characteristics of the watershed is obtained, additional critical areas may be delineated. These changes will be reflected in future modifications to this WMP.

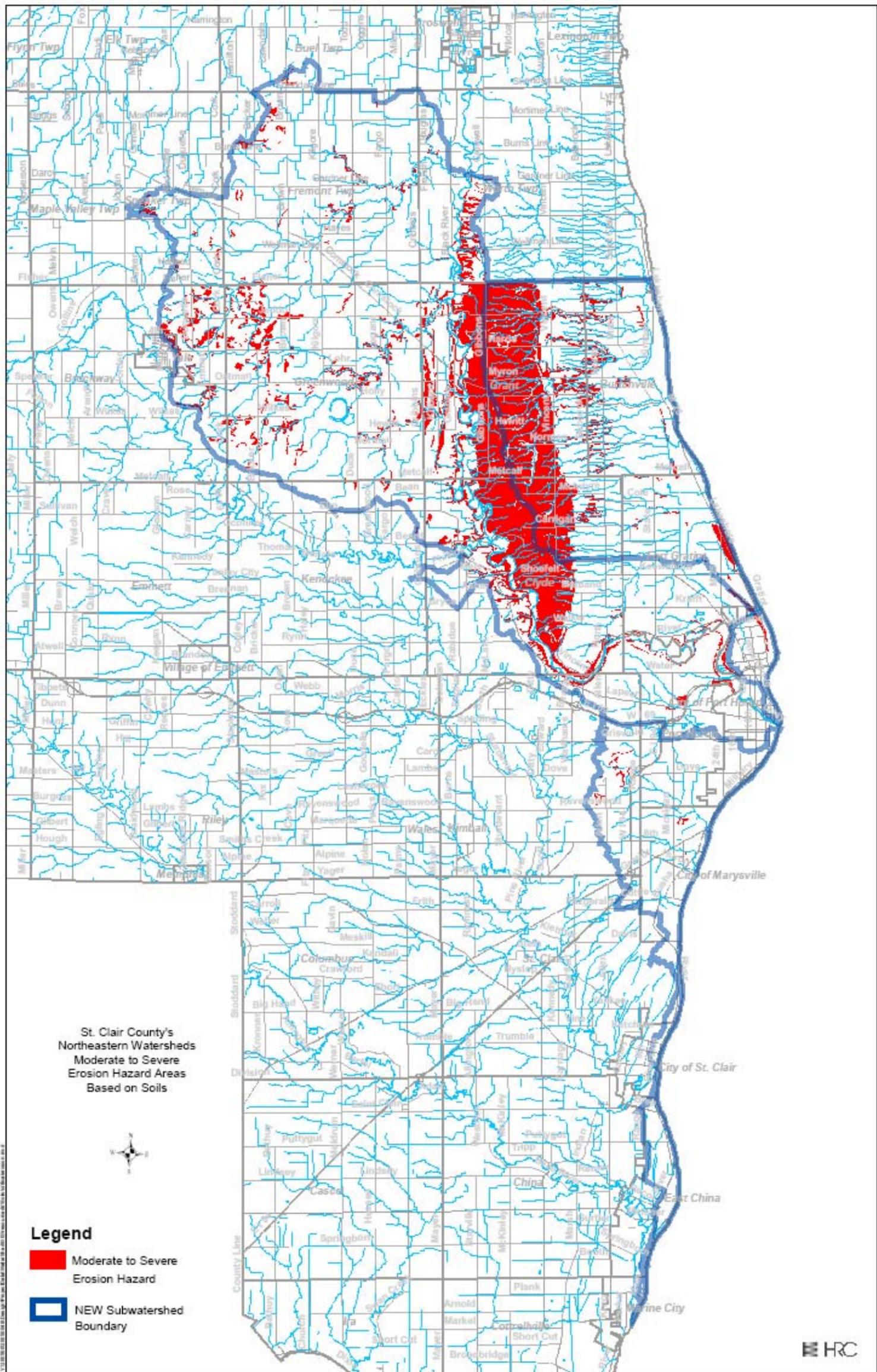


Figure 3.8 Moderate to Severe Erosion Hazard Areas in the NEW Based on Soils (and Slopes)