

1. Executive Summary

A watershed is an area of land that drains surface water runoff to a particular water body such as a stream, river or lake. The boundary, or divide, of the watershed is created by the highest points of land surrounding the water body. As water travels from the watershed divide to the water body, it interacts with various natural and human-made features within the watershed. Natural features might include soils, vegetation, and streams. Examples of human-made features include building roofs, pavement and storm sewers. As the water passes through or over these various features, the quantity and quality of the water is influenced.

When trying to understand or manage the quality of a water body, it is important to understand and manage the natural and human-made features across the entire watershed. A watershed management plan (WMP) is a water-quality focused plan that addresses uses of and improvements to lands and waters within a watershed. WMP's can address an array of issues such as land use planning, zoning, development practices, vegetation management, stormwater management and cultural or historical preservation. These plans are based on goals set by a community of people who have an interest in the watershed's natural and economic resources. The plans are often initiated due to known environmental concerns or problems, but in some cases they are purely for management and prevention.

The Huron Creek watershed is located in north-central Houghton County, Michigan (see Figure 1.1). This watershed, which is 3.4 square miles in area, includes portions of the City of Houghton and Portage Township. As of 2005, land use in the watershed consisted of 33% forest, 30% commercial and residential developments, 17% agriculture and rangeland, and 20% wetlands. The watershed has been affected by human activity for decades. Mining activities, aging septic systems and closed landfills that were constructed before modern environmental requirements have contributed to water quality concerns.



Commercial development in the watershed since the mid-1970's is some of the most concentrated and rapidly growing in the western Upper Peninsula, resulting in significant areas of impervious surface in the watershed. The creek has been used for recreation activities and runs through a heavily-used public park (Kestner Waterfront Park) before emptying into the Portage Canal.

Huron Creek has been monitored by the Michigan Department of Environmental Quality, among other organizations. Concentrations of copper have been found to exceed of the state aquatic life protection values (MDEQ Water Bureau, December 2007). Huron Creek was identified as being in non-attainment of the water quality standards for aquatic life and wildlife, and was listed in the Michigan 2008 Sections

303(d), 305(b), and 314 Integrated Report (http://www.michigan.gov/documents/deq/wb-swas-ir-final-2008report_230026_7.pdf) as “Not Supporting Other Indigenous Aquatic Life and Wildlife” due to copper levels.

The history of human activities and associated water quality concerns has catalyzed the development of a watershed management plan for the Huron Creek watershed. The lead organization responsible for preparing the Huron Creek watershed management plan is the Michigan Technological University Center for Water & Society (CWS). The watershed management plan has been developed through the following steps:

- formulation of a watershed advisory committee and holding regular committee meetings,
- determining designated and desired uses of the watershed,
- developing project goals,
- completing various environmental studies and field surveys,
- identifying priority areas in the watershed,
- developing recommendations for priority areas based on goals of stakeholders,
- creating an information and education strategy, and
- completing a watershed management plan.

The watershed management plan development has been funded through a US Environmental Protection Agency Section 319 Clean Water Act grant, implemented through the Michigan Department of Environmental Quality (MDEQ) Clean Michigan Initiative (CMI) program.

1.1. Advisory Committee and Vision Statement Formation

The Huron Creek Watershed Advisory Council (WAC) was formed in spring 2006. The WAC was formed by identifying critical stakeholders such as businesses, government agencies, residents, and relevant community organizations. Approximately 20 individuals participated in the WAC. The WAC met from summer 2006 through spring 2007.



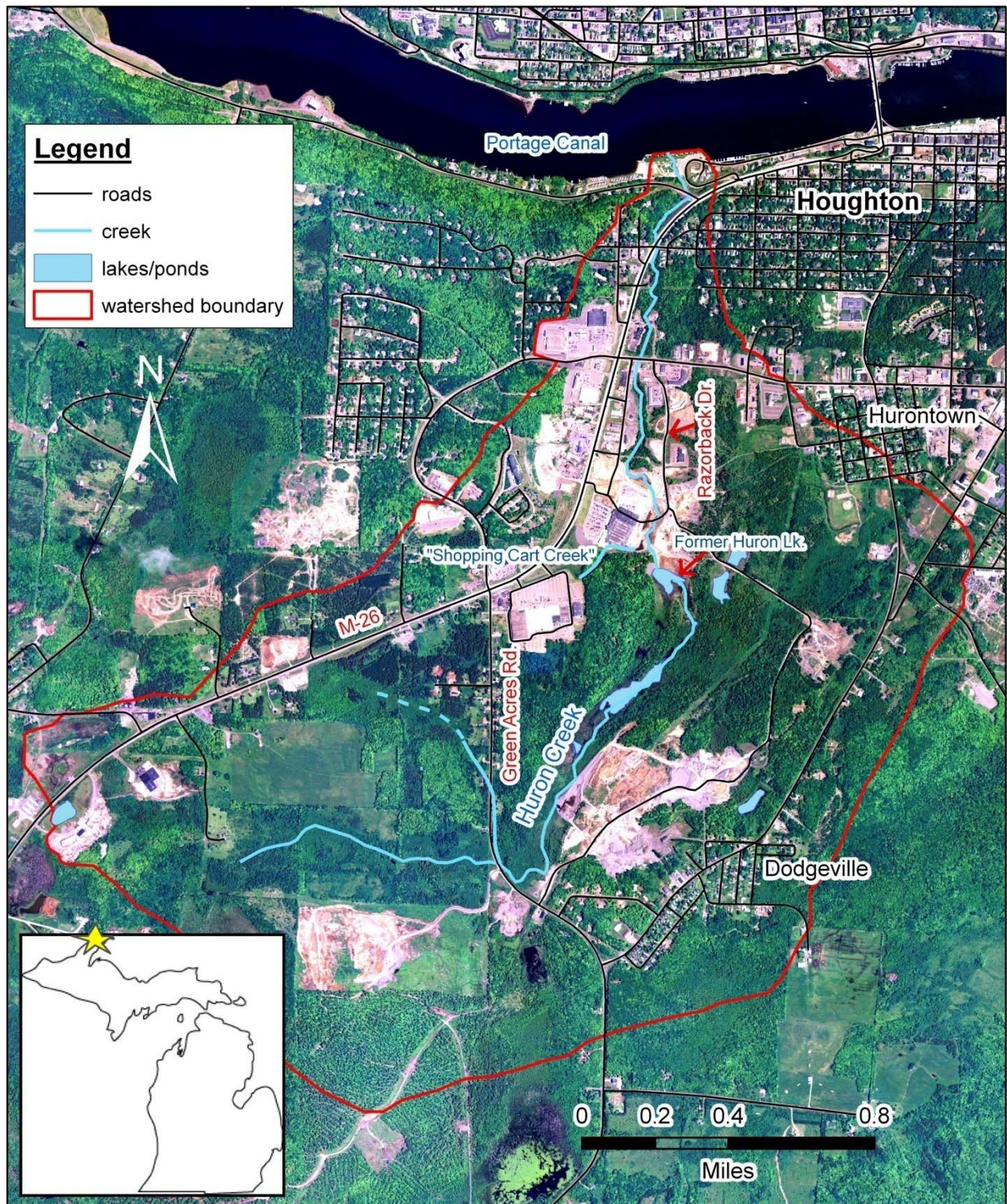


Figure 1.1. Huron Creek watershed. Created by: Linda Kersten, 12/20/06. Map projection: NAD 1927 UTM Zone 16N. Data source: 2005 NAIP 1-meter digital orthophoto.

The WAC's accomplishments included analyzing existing information on the creek and identifying the most critical problems and areas facing the watershed. The WAC created a vision statement to provide a framework upon which to build the watershed management plan:

"We see Huron Creek and its watershed as valuable to the residents of Houghton County in maintaining a sense of place compatible with the area's character. In particular, we desire a watershed and stream that:

- 1. Is visually attractive and includes a stream-side vegetation buffer that is visible on the landscape;*
- 2. Provides habitat for a healthy ecosystem within an urban setting;*
- 3. Provides opportunities for human interactions with the stream ecosystem, with the Houghton Waterfront park and the former Huron Lake being prime sites for interaction;*
- 4. Has water quality that is consistent with the previous three goals;*
- 5. Provides opportunities for community education (including schools, business owners, and the public in general) on the importance of healthy watersheds and in the historical uses of this particular watershed, with interpretive signs at sites of interaction being one possible form of education."*



1.2. Identification of Designated Uses and Pollutants

A "designated use" is one of eight recognized uses of water established by the state of Michigan and federal water quality programs. Examples of designated uses are coldwater fishery, public water supply, aquatic life and wildlife habitat and partial body contact. In case of Huron Creek, three designated uses were identified, as shown in Table 1.1.

If a designated use is not being met according to the State of Michigan's water quality standards, that use is impaired. If it is thought that a designated use may be threatened by certain watershed conditions, it is referred to as threatened. A series of



chemical, physical and biological surveys were conducted by the MTU Center for Water and Society from fall 2006 through spring 2008. The surveys included:

- water quality monitoring
- land use study
- hydrologic modeling
- storm drain, ditch and road crossing surveys
- geomorphology surveys¹
- vegetation surveys
- wetland analysis

Table 1.1 Designated Uses

Designated Use	Status of Designated Use	Pollutants or Problems Associated with Designated Use
Aquatic Life and Wildlife Habitat	Impaired	Metals (Copper, Iron), Nutrients (Nitrogen, Phosphorus, Ammonia), Sediment, "Flashy Flow," and Invasive Plant Species
Partial Body Contact Recreation	Threatened	Bacteria
Total Body Contact Recreation	Threatened	Bacteria

These surveys indicated that the designated uses were either impaired or threatened, as indicated in Table 1.1. The pollutants or problems that have lead to the threatened or impaired status are also indicated in Table 1.1.

1.3. Critical Areas and Recommended Actions

The chemical, physical and biological surveys also were used to identify "Critical Areas," or locations to be the focus of management recommendations. The Critical Areas and the concerns corresponding to each area are listed in Table 1.2. Recommended actions for improving and protecting the Huron Creek watershed have been formulated to address the problems identified in the Critical Areas, in concert with the vision statement formulated by the WAC.



Table 1.3 lists the recommended actions for physical improvements, monitoring plans, and ordinances, including tasks required to complete the actions, the time frame proposed to complete the tasks, and estimates of the associated costs. The recommended actions for physical improvements are listed in a proposed order of priority based on several factors including the (a) the priority of the related pollutant or characteristic (see Section 6.1), (b) potential availability of funding for the action, (c) anticipated

¹ Geomorphology survey refers to a field analysis of the factors affecting the erosion, transport and deposition of sediment in a stream. For more detail, see Appendix J.

interest in the action by the local community. More detailed information on the physical improvements, monitoring plan, and ordinance can be found in Sections 7.3, 0, and 7.5, along with suggested partners for implementing the actions and potential sources for funding the actions.

Best Management Practices (BMPs) are identified in Section 7.6 to be implemented as part of, or in combination with several of the recommended actions. BMPs are structural, vegetative or managerial practices used to treat, prevent or reduce water pollution. Suggestions for potential project partners have been identified for each recommended action, along with an estimated implementation schedule, suggested milestones for measuring progress, estimated costs and possible funding sources.

Table 1.2 Critical Areas and Concerns

Critical Area	Related Concerns
Ray Kestner Waterfront Park	Streambank erosion and general aesthetic concerns
Former Houghton Landfill Area	Landfill leachate, erosion, stamp sands
"Shopping Cart Creek" (Man-made Tributary to Huron Creek)	Erosion
Wetland Mitigation and Creek Re-route Areas	Habitat, invasive species, stamp sands
Dakota Heights Neighborhood of Portage Township	Septic systems
Assorted Small-Scale Erosion Locations	Erosion
Watershed-wide Locations	Wetland health, general water quality, erosion, invasive vegetative species
City of Houghton, Portage Township	"Flashy" Flows, stormwater treatment, preservation of buffers

1.4. Information and Education Strategy

An Information and Education (I/E) Strategy was developed to ensure continued community involvement and stakeholder participation. Several I/E activities have occurred during the development of the watershed management plan, including:

- construction of a watershed plan development website
- public education day at the Kestner Waterfront Park ("Huron Creek Day")
- litter clean-up days



Table 1.3 Recommended Actions

Recommended Action	Task	Estimated Cost
Physical Improvements		
Reduce Metals and Ammonia Loads to Huron Creek	1. Mitigate stamp sand area next to Huron Creek in vicinity of Ridge Road Landfill	\$800 to \$1,200
	2. Mitigate stamp sand in wetlands mitigation area	\$1,000 to \$3,800
	3. Evaluate performance of landfill leachate collection system	\$500 to 1,000/yr
Further Study of Stormwater Management Issues	Conduct survey of stormwater systems and stormwater modeling; assess best management alternatives for reducing the flashy flows	\$50,000
Improve Huron Creek in Kestner Waterfront Park	Stabilize banks and establish vegetative buffer	\$70,000 to \$85,000
Septic System and Sanitary Sewer Improvements	Connect Dakota Heights to sanitary sewer	Approximately \$1 million, with USDA grant covering \$724,000
Improve "Shopping Cart Creek" Area	1. Install stormwater detention pond at the source of Shopping Cart Creek.	\$200,000
	2. Stabilize erosion areas	\$10,000 to \$36,000
	3. Establish baseline data for headcut and continue to monitor.	\$0 to \$1,900/yr
Improve Wetland Mitigation and Creek Re-route Areas	1. Remove invasive species and establish native plant species	\$22,500 to \$45,000
	2. Physical Improvements	\$2,000 to \$3,000
Mitigate Erosion Areas	1. Improve Ridge Road Landfill Area	\$13,000 to \$18,000
	2. Mitigate critical erosion locations	\$100 to \$3,000 for each location
Wetland Restoration	Plan and implement wetland restoration	\$3,500- \$140,000
Monitoring Plans		
Water Quality Monitoring	Evaluate changes and/or trends in water quality	\$1,200 to \$1,400/yr
Erosion and Geomorphologic Monitoring	Evaluate changes and/or trends erosion & sediment	\$0 to \$100/yr
Invasive Vegetative Species Monitoring	Create watershed-wide invasive species management plan and monitor invasive species	\$0 to \$100/yr
Ordinance		
Develop and Implement Stormwater Management Ordinance	Create and implement stormwater ordinance	Dependent on time required by government officials to pass and enforce

- storm drain stenciling event
- placement of an educational sign in the Kestner Waterfront Park
- publications in local media about the watershed and the management plan
- local school activities and community workshops at various locations along the creek

Proposed future I/E activities are described in Table 1.4, including the target audience for the activity and the estimated costs. More details on the proposed I/E activities can be found in Section 8.

Table 1.4 Proposed Information and Education Activities

Activity	Target Audiences	Estimated Cost/year
Develop and distribute information on important functions of wetlands; construct Wetland Education Station (see Section 8.2.1)	General public, K-12, tourists	Cost of information development, printing, and mailing; Education Station (deck), path, interpretive sign = \$4,000 to \$5,000
Develop and distribute information about the location of scenic vistas, historical sites; install educational and historical signage (see Section 8.2.2)	General public, K-12, tourists	Cost of information development, printing, and mailing; \$200 to \$350 per sign
Conduct training and implement volunteer water quality (see Section 8.2.3) and invasive species monitoring programs	Riparian landowners, general public, K-12, local governments	Cost of packet development and reproduction, workshops
Inform public of Implementation of recommended actions (see section 8.2.4)	General public	Minimal
Hold watershed tours to promote protection and improvement of water quality	General public, K-12, local governments	Cost of transportation
Educate about proper construction techniques and stabilization practices to minimize erosion	Developers, landowners, local governments	Cost of information development, printing, and mailing, workshops
Develop and distribute information on limiting nutrient loadings to surface water through limited use of fertilizers or low phosphorus fertilizers	Landowners, businesses, general public, local governments	Cost of information development, printing, and mailing, workshops
Educate about low impact development techniques for managing stormwater runoff	Landowners, businesses, general public, local governments	Cost of information development, printing, and mailing, workshops

1.5. Evaluation Plan

An evaluation plan was formulated to measure progress towards the watershed management plan goals and objectives and to identify any needed changes in the plan. The evaluation plan focuses on assessing progress towards completion of recommended actions, achieving water quality goals, and involvement of the public in the implementation of the plan. The evaluation plan is described in detail in Section 9.

1.6. Conclusion

The development of the Huron Creek watershed management plan has involved public input through a watershed advisory committee, technical surveys of the state of the watershed, prioritization of critical areas of needing improvement, and development of recommended actions to achieve these improvements. Implementation of the plan's recommended actions are expected to achieve the goal of improving water quality while creating a creek that the public can enjoy and sustaining a viable aquatic ecosystem.