

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER RESOURCES DIVISION
JANUARY 2015

STAFF REPORT

BIOLOGICAL SURVEY OF THE HURON RIVER AND
OTTAWA-STONY RIVER WATERSHEDS
INGHAM, LIVINGSTON, MONROE, OAKLAND, WASHTENAW, AND WAYNE COUNTIES
JUNE AND AUGUST 2012

As part of the five-year watershed monitoring cycle, staff from the Surface Water Assessment Section (SWAS) conducted biological sampling within the Huron River and Ottawa-Stony River watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw, and Wayne Counties during June and August 2012. Qualitative macroinvertebrate and habitat surveys were conducted throughout the watersheds (Figure 1, Table 1) following the SWAS Procedure 51 (Michigan Department of Environmental Quality [MDEQ], 1990) and the status and trend procedure (MDEQ, Draft).

OBJECTIVES

The biological surveys were conducted to:

- Support water quality-based effluent limit development for National Pollutant Discharge Elimination System permits.
- Identify nonpoint sources (NPS) of water quality impairment.
- Evaluate the effectiveness of specific NPS water quality improvement projects.
- Satisfy water quality monitoring requests submitted by internal and external customers.
- Support total maximum daily load (TMDL) development for surface waters of nonattainment and address nonattainment listings described in the 2012 Integrated Report (Goodwin et al., 2012).
- Assess the current status and condition of individual assessment units and determine whether water quality standards (WQS) are being met.
- Evaluate macroinvertebrate community temporal trends.
- Evaluate the effectiveness of specific contaminated site remediation projects.
- Support Area of Concern-related beneficial use delisting decisions.

WATERSHED DESCRIPTIONS

The Huron River watershed drains approximately 900 square miles of river through the southeast counties of Ingham, Livingston, Monroe, Oakland, Washtenaw, and Wayne as it flows to Lake Erie. The Huron River watershed is a warmwater system containing 24 subwatersheds and covers 910 square miles and is impounded by no fewer than 98 dams throughout its distance (City of Ann Arbor, 2012). The Huron River watershed incorporates three different ecoregions: Southern Michigan Northern Indiana Drift Plains (SMNIDP), Eastern Corn Belt Plains (ECBP), and Huron Erie Lake Plains (HELP) (Omernik and Gallant, 1988) (Figure 1). The Ottawa-Stony River watershed is a warmwater system within the ECBP and HELP ecoregions (Omernik and Gallant, 1988), which drains approximately 648 square miles

throughout the southeast counties of Monroe, Washtenaw, and Wayne and flows directly into Lake Erie.

SMNIDP is characterized by many lakes and marshes as well as an assortment of landforms, soil types, soil textures, and land uses. Broad till plains with thick and complex deposits of drift, paleobeach ridges, relict dunes, morainal hills, kames, drumlins, meltwater channels, and kettles occur. Feed grain, soybean, and livestock farming as well as woodlots, quarries, recreational development, and urban-industrial areas are common (United States Environmental Protection Agency [USEPA], 2010). HELP is a broad, fertile, nearly flat plain punctuated by relict sand dunes, beach ridges, and end moraines. Originally, soil drainage was typically poorer than in the adjacent ECBPs, and elm-ash swamp and beech forests were dominant. Oak savanna was typically restricted to sandy, well-drained dunes and beach ridges. Today, most of the area has been cleared and artificially drained and contains highly productive farms producing corn, soybeans, livestock, and vegetables; urban and industrial areas are also extensive. Stream habitat and quality have been degraded by channelization, ditching, and agricultural activities (USEPA, 2010). The ECBP is primarily a rolling plain with local end moraines; it has more natural tree cover and lighter colored soils than the Central Corn Belt Plains. The region has loamier and better drained soils than the HELP, and richer soils than the Erie/Ontario Hills and Lake Plain. The Wisconsin Glaciation deposits throughout this region are extensive. They are not as dissected nor as leached as the pre-Wisconsin till, which is restricted to the southern part of the region. Originally, beech forests were common on Wisconsin soils while beech forests and elm-ash swamp forests dominated the wetter pre-Wisconsin soils. Today, extensive corn, soybean, and livestock production occurs and has affected stream chemistry and turbidity (USEPA, 2010).

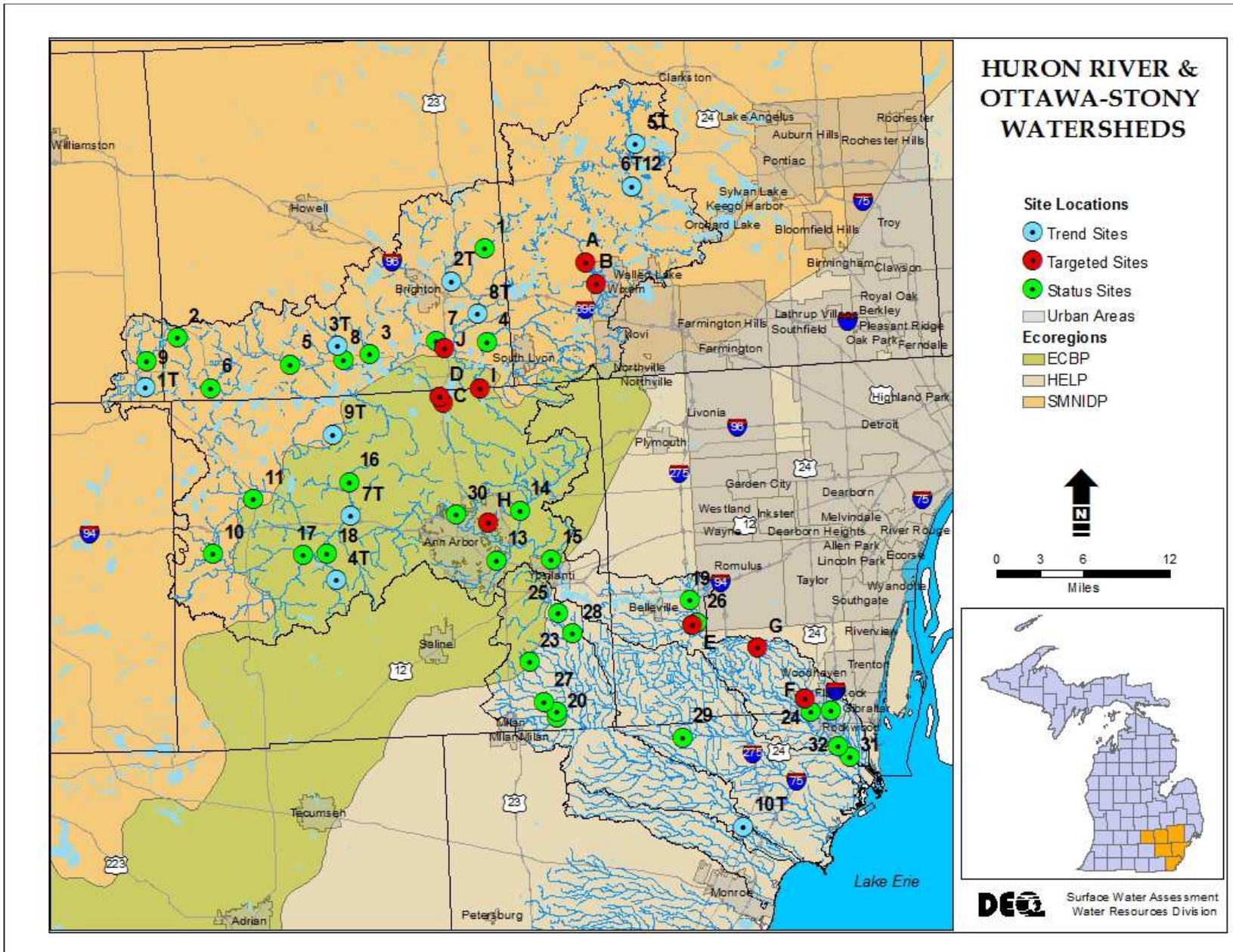


Figure 1. Huron River and Ottawa-Stony River watersheds with 2012 sampling locations within Ingham, Livingston, Monroe, Oakland, Washtenaw, and Wayne Counties.

BACKGROUND AND HISTORICAL SAMPLING EFFORTS

Huron River

In September 1988, a biological survey of the Huron River was carried out near the R&B Manufacturing Company (MI0043737) at Winans Road and downstream at US-23. No impact from the company's discharge was evident in the Huron River during the survey. The macroinvertebrate community was found to be typical of warmwater streams in this area of the state (Cornelius, 1989).

A biological survey was conducted on the Huron River in 1992 to evaluate stream quality and the ability of the stream to support aquatic life. Fifteen Huron River locations were sampled as well as 11 tributary locations for macroinvertebrate communities and habitat quality. Habitat for all sites rated excellent to poor with only the Cedar Island Road site rating poor for habitat quality while the macroinvertebrate and fish communities rated excellent to fair at all survey locations. Sediment samples were also collected upstream and downstream of the city of Ann Arbor and downstream of Belleville Lake. Sediment samples did not differ significantly in metals at all locations except lead was greater below Belleville Lake. Higher levels of copper, lead, and zinc were detected in the sediment samples also from below Belleville Lake (Kosek, 1993).

Malletts Creek, a warmwater tributary to the Huron River was surveyed in 1997, 2002, and 2003 to determine the quality of the fish and macroinvertebrate communities. In 1997, poor-rated fish and macroinvertebrate communities were found at the Chalmers Road and Packard Road locations, respectively, with habitat quality at all locations ranging from fair to good. In 2002 and 2003, all habitat and macroinvertebrate community ratings were found to be acceptable (Wuycheck, 2003).

Swift Run Creek was surveyed in 1997 and 2003 to assess the biological community within this warmwater tributary to the Huron River. Habitat quality for the August 1997 and September 2003 assessments were fair and good, respectively. Both locations resulted in flashy flow regimes and excessive deposition in the stream channel. Macroinvertebrate communities were surveyed at Hogback Road in 1997 and Shetland Road in 2003, and dominated by Diptera and air breathers. Each location rated poor with 8 and 10 total taxa identified, respectively, within the survey reach (Wuycheck, 2004).

Sixty-four sites were surveyed during the 1997 Huron River survey to evaluate the biological integrity, chemical characteristics, and physical habitat. Macroinvertebrate communities rated poor at 13 locations, the commonalities throughout these streams were low taxa richness, one or no mayfly taxa, and low densities of mayflies and nonstonefly taxa. Four of the stations that rated poor in macroinvertebrate community also had poor habitat ratings. Seven stations rated poor in habitat quality and all seven locations were found to be recently dredged. All sites on Silver, Laudenschlager, and Mouille Creeks that flowed either directly into the Detroit River or into the mouth of the Huron River were rated as poor. Fish communities were rated acceptable and excellent at two locations (Rippke, 2005b).

In 2002, 39 locations were surveyed to evaluate the biological integrity, chemical characteristics, and physical habitat of the Huron River and its tributaries. Habitat quality at all sites ranged from marginal to excellent. The three sites that rated marginal had poor riparian buffer zones, as well as unstable banks and high levels of flashiness. The macroinvertebrate community surveys for all locations indicated attainment of the aquatic life designated use. Three locations

were shown to improve macroinvertebrate ratings throughout the watershed while one location indicated a decline from excellent to acceptable since the 1997 survey. Water quality parameters all fell within the range of reference sites throughout the respective ecoregions except for Yerkies Drain, which had elevated total dissolved solids (TDS), chlorides, conductivity, phosphorus, and copper concentrations. This location was located downstream of the South Lyons Wastewater Treatment Plant (WWTP), which probably accounted for the anomalously high values (Rippke, 2005a).

Biological assessments were conducted in 2007 and 2008 within the Norton Creek watershed to determine if Norton Creek continued to exceed WQS such that a TMDL was needed for development. Macroinvertebrate communities at West Maple Road rated poor (-6) for both the 2007 and 2008 surveys while the 2008 survey upstream of that location (Durr Road) indicated an acceptable community. The 2007 and 2008 macroinvertebrate community assessment results at Buno Road indicated acceptable and poor communities based on -3 and -5 metric scores, respectively. Fish community assessments carried out in 2008 indicated an acceptable community throughout both these sections. Following the 2008 surveys a "Notice of Migration of Contamination Report" from the Ford Motor Company indicated the presence of a metals-contaminated groundwater plume, originating at the defunct Ford Wixom Assembly Plant that migrates toward, and potentially vents to, Norton Creek. The report states that the groundwater contains "...aluminum, barium, chromium, copper, iron, lead, manganese, sodium, and vanadium...." that exceed the MDEQ's generic cleanup criteria (Wuycheck, 2009a).

The Huron River was surveyed consecutively during the years 2007 and 2008. Of the 34 sites surveyed, one rated excellent, 23 rated good and 10 rated marginal for habitat. The macroinvertebrate community ratings ranged from excellent to poor with 4 sites rating excellent, 24 acceptable, and 6 poor (Wuycheck, 2009b).

Ottawa-Stony

In September 1995, a biological survey of Stony Creek and Amos Palmer Drain was carried out to assess the impacts of the effluent discharged by Londontown Aggregates (MI0051861). The survey showed that the water quality and macroinvertebrate community in Amos Palmer Drain was extremely impaired and more information was required to determine the extent of impairment in Stony Creek. Two locations were surveyed on Amos Palmer Drain in which the macroinvertebrate communities were rated as poor and acceptable. It was noted that a white powdery substance was covering the sediments and clinging to vegetation at the Amos Palmer Drain. Habitat quality was rated low acceptable for both locations. Stony Creek, upstream of Amos Palmer Drain, rated acceptable for both habitat and macroinvertebrate communities. Water quality results showed that TDS, hardness, conductivity, ammonia, total calcium, and total magnesium were elevated above background levels and TDS exceeded the Michigan WQS (Walterhouse, 1996).

North Ten-Mile Creek, a tributary to the Ottawa River, was surveyed at two locations. Habitat quality at both locations rated good with well-vegetated banks and suitable bottom substrates for colonization. Even with the suitable substrates the macroinvertebrate communities rated poor with taxa dominating the reaches indicative of low water quality (snails and isopods). Total phosphorus, ammonia, nickel, and copper concentrations were slightly elevated at one location but did not exceed the Michigan WQS (Lipsey, 2004).

Twelve sites were surveyed within the Ottawa-Stony River watershed during 2007 to evaluate attainment of WQS. Habitat quality was rated marginal to good at all locations except for

Robert Drain, which was the only location to rate poor. Four of the 12 locations rated poor for macroinvertebrate communities. These locations, Little Sandy Creek, Little Swan Creek, and two locations on Swan Creek showed impairments due to siltation, flashiness, unstable banks, and erosion (Wuycheck, 2009b).

METHODS

Water quality samples were collected at selected locations throughout the watersheds, preserved, and transported according to procedures contained in the MDEQ, Water Resources Division's Quality Assurance Manual, unless otherwise indicated. All chemical analyses were conducted at the MDEQ, Environmental Laboratory, in Lansing, Michigan. Thirty-two sites were randomly selected (Table 1) within the Huron River and Ottawa-Stony River watersheds using a stratified random site selection method to address statewide and watershed-specific water quality concerns (MDEQ, Draft). A total of 52 qualitative biological and physical habitat surveys were conducted on the Huron River and Ottawa-Stony River watersheds in 2012, which include 10 trend and 10 targeted locations (Table 1). Forty-nine of the surveys were conducted following the Procedure 51 for wadeable streams and rivers (MDEQ, 1990) and three were conducted following the Draft Qualitative Biological and Habitat Survey Protocols for Nonwadeable Rivers (MDEQ, 2013). Water samples were also taken at seven locations (Table 4), two of which were analyzed by the MDEQ, Environmental Laboratory and five which were analyzed in the field using the YSI Sonde.

Abnormally dry to moderate drought conditions were experienced in Southeast Michigan during the 2012 field season (18th driest year on record) creating low/no flow stream conditions during the survey period, forcing the use of several alternate probabilistic sites and two alternative trend sites during the summer field season (National Oceanic and Atmospheric Administration [NOAA], 2013).

The macroinvertebrate communities were scored with metrics that rate water bodies from excellent (greater than +4), acceptable (+4 to -4), and poor (less than -4). Negative ratings that are acceptable are indicative of water bodies that are strongly tending toward poor, while positive ratings that are acceptable indicate slight impairment (MDEQ, 1990). Stream habitat was qualitatively evaluated at each station using a scoring system, which ranged in value from 0 (poor) to 200 (excellent).

SUMMARY

Stations used for the biological and habitat evaluations are shown in Figure 1 and Table 1. The macroinvertebrate community and habitat assessments were performed at 32 locations and the results are presented in Tables 2a, 2b, and 3, respectively, and water chemistry monitoring data can be found in Table 4.

RANDOMLY SELECTED WADEABLE SITES

HURON RIVER WATERSHED

Mann Creek was surveyed at Kensington Road (Station 1, Figure 2) immediately below the General Motors Proving Ground Property. Habitat quality rated excellent with extensive undercut banks and moderate overhanging vegetation,



Figure 2. Mann Creek at Kensington Road.

large woody debris, aquatic macrophytes, and rootwads present in stream. Stream flashiness was rated as good with some evidence of bank scouring and few areas of sediment deposition. The stream was approximately 12 feet wide with an average stream depth of 1.5 feet. The macroinvertebrate community rated excellent with 30 taxa identified including 2 mayflies, 6 caddisflies, and 1 stonefly taxa. These taxa comprised 50 percent of the total number of individuals counted.

Unadilla-Stockbridge Drain was surveyed at Dutton Road (Station 2). Habitat quality rated good with extensive overhanging vegetation present along the entire length of the stream. Other structures were sparse with sediments dominated by a thick layer of sand/silt/clay as well as organic detritus and muck, which made wading the stream difficult. Stream banks were stable with little evidence of erosional problems, even though there was some evidence of bank scour throughout this section. Stream bank surfaces show good to excellent coverage of understory shrubs and nonwoody vegetation but the riparian width on the left side is marginal with human activities greatly impacting the section of stream. There were 22 macroinvertebrate taxa identified of which only 6 percent of the total individuals were made up of the Ephemeroptera, Plecoptera, or the Trichoptera (EPT) taxa. The site was dominated by the families Amphipoda and Chironomidae and rated acceptable.

Chilson Creek at M-36 (Station 3) runs through a heavily vegetated wetland with large trees present only in the upland areas and sediments dominated by silt and sand. Habitat quality was rated excellent even with the absence of large woody debris in the stream, there were extensive undercut banks, overhanging vegetation, aquatic macrophytes, and rootwads, which presented a significant amount of available cover for local macroinvertebrates to colonize. The macroinvertebrate communities rated acceptable with a total of 28 macroinvertebrate taxa identified within this reach of which 22 percent were composed of EPT and dominated by Chironomids and Amphipods.

Located inside a private housing community, the habitat quality at Davis Creek (Station 4) was rated good. Present throughout this reach, were moderate undercut banks, overhanging vegetation, large woody debris, and rootwads. However, aquatic vegetation was absent in sediments dominated by sand and silt. Moderate deposition was observed at constrictions and bends, and human activities have impacted the vegetative zone along the right bank, resulting in a marginal riparian width. Macroinvertebrate communities were rated acceptable with 21 total taxa, 36 percent of the total individuals were composed of EPT taxa, while this location was dominated by Amphipods and Chironomids.

Honey Creek was surveyed at Cedar Lake Road (Station 5) and was found to have an acceptable habitat assessment. The creek, at this location, flowed through a wetland with very slow surface velocities and averaged 3 feet of depth. Overhanging vegetation was moderate throughout this location but other habitat including undercut banks, large woody debris, aquatic vegetation, and rootwads were sparse to absent. Also, overhead canopy was sparse providing very little shade throughout this section of stream. Sediments were composed of depositional sand with some gravel and silt incorporated throughout the creek. Macroinvertebrate communities rated acceptable with 27 total taxa identified, dominated by Baetids and Corixids, which made up 62 percent of the total individuals in the sample. Baetids also contributed to the 41 percent resulting from the orders EPT.

Portage Creek at Roepke Road (Station 6, Figure 3) displayed extensive aquatic macrophyte growth along with moderate availability of undercut banks, large woody debris, and rootwads. Overhanging vegetation was sparse throughout this reach but overall the habitat quality rated good.



Figure 3. Portage Creek at Roepke Road.

Sediments were dominated by sand/silt, which were moderately increasing the formation of sand bars and filling in all pools within this reach. During high water events, the bank is moderately unstable presenting areas of high erosion potential and bedload transport downstream. The macroinvertebrate community rated acceptable with the presence of 23 total taxa, dominated by Amphipods and Hydropsychids. The Orders of EPT comprised 35 percent of the total individuals identified in the sample.

habitat quality rated good. Overhanging vegetation and rootwads were found to have moderate availability throughout the reach whereas undercut banks and overhanging vegetation were sparse to absent, respectively. Depositional sediments were composed of silt/sand mix with a small amount of clay and fine organic material, which is collecting on available cover and in pools. The macroinvertebrate community was rated excellent with 28 total taxa identified, including 3 mayfly and 6 caddisfly taxa, resulting in 53 percent of the individuals identified.

Aquatic macrophytes were extensive at Huron River at Rickett Road (Station 7) where the

Hay Creek at M-36 (Station 8) was dominated by frequently disturbed, soft sediments including detrital material, fine organic muck, and sand/silt/clay, which covered more than 80 percent of the bottom. The habitat quality rated good with moderate overhanging vegetation and aquatic macrophytes present but very little other stable habitat including large woody debris, rootwads, and undercut banks, which were sparse. Macroinvertebrate communities were rated acceptable with 10 percent of the total individuals composed of EPT taxa and totaled 21 taxa. This site was dominated by Amphipods which comprised 70 percent of the total individuals identified.

Substrates were dominated by sand at the Brogan Road crossing of the Unnamed Tributary to Unadilla-Stockbridge Drain (Station 9), just downstream of Nichols Lake outlet. In spite of the similar substrates throughout this section and lack of undercut bank, overhanging vegetation, and aquatic macrophytes, the habitat quality rated good with moderate amounts of large woody debris and sparse rootwad structures. This stream also lacked sinuosity as well as a riparian zone on the left bank, which paralleled the road for approximately 400 feet before traveling through residential and agricultural property to the north. Macroinvertebrate communities were found to be comprised of Amphipods with the EPT taxa making up only 5 percent of the total individuals identified, resulting in a final rating of acceptable.

Two stations were sampled on Letts Creek during the 2012 survey, Letts Creek at Sylvan Road (Station 10) and Letts Creek at M-52 (Station 11). Letts Creek at Sylvan Road (Station 10) is immediately upstream of the Daimler Chrysler – Proving Grounds southwest of Chelsea. The stream at this location was 3-feet wide with water filling approximately 25 percent of the available channel. Surface velocities were very slow near 0.1 feet per second with substrates composed mainly of sand and silt, which looked to be disturbed frequently. Habitat within the stream was sparse with no aquatic macrophytes present in the stream, but rated good.

However, macroinvertebrate communities rated excellent. A total of 28 taxa were identified during the survey with the dominant orders comprised of the EPT orders, which made up 35 percent of the total individuals identified in the sample.

The second site located at M-52 (Station 11, Figure 4) is 6.7 miles downstream of Station 10 at Veterans Memorial Park, north of Chelsea and downstream of Jiffy Mix plant. Habitat quality at this site rated marginal due to poor vegetative bank width, lack of vegetation growth, moderate deposition of fine sediments, and little to no rootwads or in-stream vegetation. The stream has historically been channelized and has sparse habitat located throughout the section. The macroinvertebrate community rated poor with only 137 total individuals collected during the summer sampling trip, of which 42 percent were found to be Oligochetes. A total of two Heptageniids and one Hydropsychid were found at this site.



Figure 4. Letts Creek at M-52.

Habitat rated good along the Huron River at Cedar Island Road (Stations 12 and 6T), which displayed extensive overhanging vegetation and aquatic macrophytes that were growing in the depositional zone in the middle of the stream; all other habitat were sparse. The sediments were composed of waist deep silts, which were common throughout this heavy depositional zone. Macroinvertebrate communities rated acceptable with 22 percent of the total individuals composed of EPT taxa and 23 taxa identified.

Malletts Creek/Chalmers Drain at Washtenaw Avenue (Station 13, Figure 5) is located in the commercial district of Ann Arbor and is a main drainage channel for the city. The stream has been channelized and is reinforced with rip rap, which has been secured with hexagonal wire mesh to stabilize the bank, indicating a highly flashy system. In-stream habitat was rated



Figure 5. Malletts Creek/Chalmers Drain at Washtenaw Avenue.

marginal and virtually absent with undercut banks, large woody debris, and rootwads sparsely available with no overhanging or in-stream vegetation. Sediments, however, were diverse ranging from cobble to clay throughout this predominately run/pool section of drain. One large erosional problem area was noticed downstream of the rip rap reinforcement. Macroinvertebrate communities rated acceptable with 18 taxa identified, dominated by Hydropsychids and Chironomids. No Ephemeropterans or Plecopterans were found at this location.

Station 14 on Fleming Creek is located inside the University of Michigan Matthei Botanical Gardens, 0.2 miles from the Visitor Center.

Habitat quality rated excellent even without any apparent undercut banks or aquatic vegetation in-stream. However, overhanging vegetation as well as large woody debris and rootwads were moderate to sparse in association with the varied inorganic substrates composed predominately

by gravel. Macroinvertebrate communities were also rated excellent with 42 percent of the identified organisms a part of EPT orders.

The Huron River was surveyed below the Peninsular Dam above LeForge Road (Station 15) where the habitat and macroinvertebrate communities were rated excellent. Substrates within this riffle section were dominated by cobble, boulder, and gravel with other available habitat sparsely available due to the high velocities present at this location. Simuliids dominated the macroinvertebrate community composing 42 percent of the total sample. EPTs contributed 33 percent to the total individuals collected.

Mill Creek was surveyed downstream of Dexter-Pinckney Road (Station 16) where historically the Mill Creek Dam had been in place. In 2008, the dam was removed and restoration efforts have been under way ever since to enhance stream bank and in-stream habitat. Placement of large boulders as well as cobble and gravel substrates have reinforced the bank as well as increased flows throughout the section increasing available habitat. Habitat quality rated good overall but large woody debris, aquatic macrophytes, and rootwads were sparse and undercut banks and overhanging vegetation was absent throughout this riffle section. The riparian vegetation within the riparian zone was minimal for both banks which are impacted by the city park and the railroad grade. An excellent macroinvertebrate community was found at this site due to the high percentage of EPT taxa identified (69 percent) within the reach as well as the presence of the stonefly order Perlidae.

Mill Creek was also surveyed at Lima Center Road (Station 17), 7.8 miles upstream of Station 16. Habitat quality rated marginal with sparse availability of overhanging vegetation, large woody debris, and rootwads. There were no undercut banks or in-stream macrophyte growth throughout this section of stream. Sediments were dominated by heavy deposits of sand and silt along with some areas of gravel and cobble. Bank stability was moderate with a few small areas of erosion in this flashy, channelized section of stream. Stream bank surfaces show excellent coverage of understory shrubs and nonwoody debris. There were 25 macroinvertebrate taxa identified of which 37 percent of the total individuals were made up of the EPT taxa. The site was dominated by the families Brachycentrids and Chironomids and rated excellent.

The Unknown Tributary to Mill Creek was surveyed at Liberty Road (Station 18). Habitat quality rated good with sparsely available overhanging vegetation, large woody debris, aquatic macrophytes, and rootwads present in this channelized section of stream. This section was also characterized by a frequently disturbed, sand/silt depositional zone, which made the habitat availability less than desirable. Stream flashiness was rated as good with some evidence of bank scouring. The macroinvertebrate community rated acceptable with 23 taxa identified including two mayflies and 2 caddisfly taxa. These taxa comprised only 6 percent of the total number of individuals counted. The site was dominated by the Orders, Decapoda and Chironomidae.

The Huron River was surveyed at the Huron River Drive crossing (Station 19) located within the Lower Huron Metropolitan Park; is immediately downstream of the Belleville Lake Impoundment Dam. Sediments at this location were solely composed of relict zebra mussel shells (Figure 6), which were



Figure 6. Relict Zebra Mussel shells in the Huron River at the Huron River Drive crossing.

several inches thick, mixed with sand and silt that was depositing out of the water column below the dam. Habitat at this location rated marginal due to very little availability of colonizable structures in the area. Overhanging vegetation, large woody debris, and aquatic macrophytes were sparse. Undercut banks and rootwads were completely absent due, in part, to the concrete retaining wall, which is constructed along the right bank and the relic shell deposits. Macroinvertebrate communities rated on the low end of acceptable (-3) and was dominated by Chironomids, which made up 62 percent of the entire collection. EPTs comprised only 7 percent of the individuals collected at this site.

Smith Creek at Gibraltar Road (Station 22) is located in the residential/industrial area of Flat Rock. The Ford Flat Rock Assembly Plant is located immediately upstream of this location and Manheim Metro Detroit: Wholesale Auto Auction is located immediately downstream. The stream has been channelized as well as having its entire width reinforced with concrete for 100' above the Gibraltar Road crossing (Figure 7). Habitat rated marginal, undercut banks and aquatic macrophytes were absent due to the hardening of the river. The habitat that was present was sparse due to the channelized nature of the stream. Sediments were composed of fine material that have been deposited on the inside part of the hardened channel creating a false "bank" of vegetation. Macroinvertebrate communities rated poor with 19 taxa identified throughout this reach. No Mayflies, Caddisflies, or Stoneflies were found at this location and was dominated by Isopods and Amphipods.



Figure 7. Concrete-lined Smith Creek at Gibraltar Road.

Approximately 1.5 miles west of Station 22, Gibraltar Road crosses Silver Creek (Station 24), which is also approximately one mile downstream of the targeted monitoring location Site F. Habitat at this location rated marginal and displayed extensive aquatic macrophyte growth throughout the thalweg. Overhanging vegetation and large woody debris were present but only sparsely. Sediments were dominated by sand, silt, and clay, which were being deposited throughout the reach, increasing the amount of substrate that is being exposed. The macroinvertebrate community rated poor with a total of 16 taxa present. One Trichopteran was identified in this sample and was dominated by Chironomids and Isopods.

Huron River at Lower Huron Metro Parkway (Station 26) is located between the Belleville Lake Impoundment Dam and the Arsenal Dam in Flat Rock. In-stream habitat around the foot bridge area has been removed during construction and was replaced with limestone cobble and gravel. These substrates have since been colonized by zebra mussels resulting in a monocultured section of stream. Upstream from the footbridge, sediments change to a sand- and gravel-dominated area with some areas of aquatic vegetation and large woody debris. The habitat quality rated good in this section. Water levels also look to fluctuate quite frequently in this section of stream as seen by the level of exposed rock along the margins and the knowledge of being between two dams. Macroinvertebrate communities were rated acceptable with 10 percent of the total individuals composed of EPT taxa and totaled 23 taxa. However, this site was dominated by the families Dreissenidae and Corbiculidae.

OTTAWA-STONY WATERSHED

Sugar Creek was surveyed at Hitchingham Road (Station 20). Habitat quality rated good with moderately available overhanging vegetation and large woody debris as well as sparsely available rootwads and undercut banks. No aquatic vegetation was present within the channel, which was dominated by sand, silt, and organic detrital material. The stream banks were moderately stable with some evidence of scour even though the stream did not fill up its available channel, suggesting a marginally flashy system. The macroinvertebrate community rated acceptable with 21 taxa, of which, 40 percent of the total individuals were made up of the EPT taxa. The site was dominated by the families Hydropsychids and Chironomids.

Less than a half of a mile south of Station 20, Hitchingham Road crosses Buck Creek (Station 21). The stream at this location was heavily shaded by shrubs creating moderate habitat due to the overhanging vegetation but not allowing aquatic macrophytes to grow within the stream. Additional habitat was sparse throughout the reach. Sediments were a good mix of gravel/sand/silt/clay with some detrital material present within this depositional zone. The riparian vegetative zone exhibits excellent coverage of trees, understory shrubs, and other nonwoody vegetation. There were 20 macroinvertebrate taxa identified of which 9 percent of the total individuals were made up of the EPT taxa. The site was dominated by the families Chironomids and Elmids and rated acceptable.

Buck Creek at Willow Road (Station 27, Figure 8) is located one-half mile upstream of Station 21. At this location, the stream travels through agricultural fields, had historically been channelized, and has marginal aquatic habitat. Aquatic macrophytes and rootwads were found to be sparse in this section of stream and due to the frequent dredging, no undercut banks or large woody debris were found in this section of stream. Only overhanging grasses were found along the riparian corridor in this dredged area of stream providing ample habitat for the stream biota. Sediments were found to be frequently disturbed with banks that are moderately unstable and had areas of high erosion potential during high water events.

The macroinvertebrate community rated acceptable with 24 taxa identified including one mayfly and one caddisfly, these taxa comprised 4 percent of the total number of individuals counted. The site was dominated by the Orders, Chironomidae and Decapoda.

Stony Creek was surveyed at Stony Creek Road (Station 23). Habitat quality rated good. Moderate amounts of large woody debris were the main substrate for macroinvertebrate colonization, other colonization substrates were sparsely available. Stream sediments were frequently disturbed and composed mainly of sand. The macroinvertebrate community rated acceptable with 28 taxa identified including 2 mayflies, 4 caddisflies, and 1 stonefly taxa, these taxa comprised 28 percent of the total number of individuals counted. The site was dominated by the Orders, Chironomidae and Brachycentridae.

Habitat quality at Paint Creek at Textile Road (Station 25) rated good with moderate availability of rootwads present along the entire length of the stream. Other structures were sparse with



Figure 8. Buck Creek at Willow Road.

sediments dominated by gravel, sand, and silt. Stream banks were stable with little evidence of erosional problems and were well vegetated with trees, shrubs, and grasses. However, the limited riparian width, which displayed human activities close to the stream, impacted this zone a great deal. There were 15 macroinvertebrate taxa identified of which only 5 percent of the total individuals were made up of the EPT taxa. The site was dominated by the families Isopoda and Chironomidae and rated poor.

Paint Creek was surveyed at Martz Road (Station 28) and was found to have a marginal habitat assessment. The creek at this location flowed through agricultural land with slow surface velocities and averaged 1.5 feet of depth. Overhanging vegetation and large woody debris was sparse throughout this location but all other habitat structures were absent. Sediments were composed of depositional sand and silt with some gravel incorporated throughout the creek. Bank stability is moderately unstable with areas of high erosion potential during high water events. Macroinvertebrate communities rated acceptable with 17 total taxa identified, dominated by Chironomids and Hydropsychids. EPT taxa resulted in 22 percent of the total sample collected.

Swan Creek at Colf Road, East Crossing (Station 29) displayed extensive overhanging vegetation along with moderate availability of aquatic macrophytes. Large woody debris and rootwads were sparse throughout this reach but overall the habitat quality rated good. Evidence of bank scour suggests a moderately flashy system with sediments dominated by sand and silt, which is contributing to some bar formation downstream. Macroinvertebrate communities rated acceptable with 25 total taxa identified, dominated by Elmids, Chironomids, and Hydropsychids. EPT taxa resulted in 4 percent of the total sample collected.

RANDOMLY SELECTED NONWADEABLE SITES

Three sites were found that exceed the channel depth limitations for Procedure 51, Huron River at Park Road (Station 30), Huron River off Huron River Drive upstream Lebo Island (Station 31), and Huron River off Huron River Drive downstream of the railroad tracks (Station 32). All of these sites were assessed using the rapid bioassessment procedure for nonwadeable rivers (MDEQ, 2013).

The reach surveyed off of Park Road on the Huron River (Station 30) is approximately one mile downstream of Barton Pond in the city of Ann Arbor. The Huron River at this location was generally found to have stable banks with moderate riparian vegetation, due to areas of heavy human influence adjacent to the river. Nineteen taxa were identified within this predominately gravel/cobble section with the macroinvertebrate community rating marginal. This location was dominated by Amphipods and Hydracarina composing 61 percent of the total sample.

Huron River off Huron River Drive, upstream Lebo Island (Station 31), is located approximately two miles upstream of Lake Erie. Taxa richness was low with 18 taxa identified. The dominant taxa were Corixids, Hydracarina, and Amphipods, which composed 77 percent of the total taxa identified, resulting in a poor macroinvertebrate community rating in spite of the availability of colonization structures. Sediments were dominated by sand and banks were found to be moderately stable throughout this reach. This "poor" macroinvertebrate rating indicates that the Huron River may not be attaining the "other indigenous aquatic life and wildlife" designated use. However, since the river is in such close proximity to Lake Erie it is suspected that this location may be acting more like a lentic community; thus, the nonwadeable procedure used to evaluate the macroinvertebrate communities may not be an effective tool of assessment. Therefore, more data is needed to determine the final designated use of this site.

The final nonwadeable site (Station 32) was located downstream of the railroad tracks off of Huron River Drive, approximately 3.5 to 4.0 miles upstream of Lake Erie. This location was generally found to have moderately stable banks with little riparian vegetation present, due to heavy human influence adjacent to the river. Sediments were composed primarily of sand and gravel with a good variety of macroinvertebrate habitat present throughout this reach. The macroinvertebrate community rated marginal with 17 taxa identified. The dominant taxa were Coenagrionids, Corixids, and Dreissenids making up 56 percent of collected individuals.

TREND SITES

Two trend sites (Disbrow Drain at Bohn Road and Little Swan Creek at Sweitzer Road) had to be replaced during the field season due to low flow conditions. These sites were replaced from a list of previously sampled sites, which qualified as trend sites for the 2012 field season. The replacement sites were Portage Creek at Green Road and an Unnamed Tributary to Mill Creek at Waters Road. Station 6T (Huron River at Cedar Island Road) will not be discussed in this section since it has been reviewed in the Randomly Selected Wadeable Sites, Huron River Watershed Section.

HURON RIVER WATERSHED

Portage Creek was surveyed at Green Road (Station 1T) approximately one mile downstream of the city of Stockbridge WWTP. The habitat rated marginal in this channelized, depositional stream. Aside from the extensive overhanging vegetation throughout this section of stream, there was very little habitat located within the stream. The large woody debris that was present was covered in silt and was virtually unusable. Vegetation was dominated by duckweed and filamentous algae, which covered approximately 15 percent of the sand/silt dominated reach. The riparian zone was also lacking in this reach, which consisted of a few sparsely placed trees, shrubs, and grasses and bordered by a residential lawn and an agricultural field. Macroinvertebrate communities within this reach rated acceptable with 25 total taxa identified at this location and dominated by Coenagrionids, which made up 55 percent of the total organisms identified. EPT constituted only 5 percent of the total sample collected.

Woodruff Creek was surveyed at Spencer Road (Station 2T) and was found to have a good habitat assessment. The creek flows through a series of wetlands upstream from the survey location. In-stream habitat was sparse overall with the dominant aquatic vegetation comprised of *Vallisneria sp.* and *Cladophora sp.* However, these taxa were not present at nuisance levels. Sediments were composed of gravel and sand. Macroinvertebrate communities rated acceptable with 33 total taxa identified, dominated by Calopterygids and Helicopsychids, which made up 23 percent and 12 percent, respectively, of the total individuals in the sample. EPT also made up 38 percent of the total individuals collected.

The habitat assessment for Hay Creek at Rush Lake Road (Station 3T) was rated good even though the sediment deposition was heavy, which was composed of silt and fine particulate organic material that was very light and floccy. In addition to the light sediments, the riparian and overhanging vegetation was extensive making it very difficult to walk through the stream. Undercut banks, large woody debris, and aquatic macrophytes were moderately to sparsely available throughout the area. The macroinvertebrate community rated acceptable with the presence of 25 total taxa, dominated by Amphipods and Calopterygids. The Orders of EPT comprised only 4 percent of the total individuals identified in the sample.

Habitat for the Unnamed Tributary to Mill Creek (Station 4T) rated marginal, displaying sparse habitat structures throughout this historically dredged section. This location included a riffle section upstream of the dredged area; however, it is surrounded by a sand, silt, and clay depositional area with high composition of fine particulate organic material. The macroinvertebrate community rated acceptable but any assessment of the site for beneficial use should be dependent on future monitoring since only 85 total organisms were collected during this survey. The 2007 survey found three times the number of macroinvertebrates in this stretch and largely composed of the same taxa. Taxa missing in the 2012 survey were primarily Hemipterans and Gastropods. Further monitoring is recommended before a beneficial use can be determined.

The Huron River sampling location at Teggerdine Road (Station 5T) is upstream of Pontiac Lake approximately 0.3 miles. The stream at this location travels through a heavily vegetated wetland providing extensive overhanging vegetation serving as the primary habitat. All other habitat was sparse throughout this section of stream but habitat rated good. The stream substrate was dominated by heavy deposits of fine material including sand, silt, and coarse particulate organic material. Some areas of the stream were very soft with sediments several inches thick, making movement through the stream difficult. Twenty-five total macroinvertebrate taxa were present resulting in an acceptable rating. EPT taxa represented 7 percent of the total survey collection, which was dominated by Amphipods and Isopods.

Mill Creek at Marshall Road (Station 7T, Figure 9) is located north of I-94, between Stations 16 and 17. The habitat assessment within this reach of stream rated good with moderate amounts of large woody debris and rootwads available for colonization. Sediments were also diverse with equal proportions of cobble, gravel, sand, and silt creating occasional riffles throughout this section. Riparian width was lacking due to residential properties having manicured lawns right down to the river's edge. The macroinvertebrate community rated acceptable with the presence of 25 total taxa, dominated by Chironomids and Hydropsychids. EPT comprised 39 percent of the total individuals identified in the sample.



Figure 9. Mill Creek at Marshall Road.

The Huron River at Riverbend Road is located inside the Island Lake Recreational Area (Station 8T) and is downstream of the Kent Lake Impoundment approximately 3.0 miles. An excellent habitat rating was assessed at this location where large woody debris, aquatic macrophytes, and rootwads were all moderately available with undercut banks and aquatic vegetation sparsely available for colonization. Sediments were mainly sand and gravel with occasional riffles present throughout the section. The macroinvertebrate community was rated acceptable with EPTs comprising 27 percent of the total sample and dominated by Amphipods and Brachycentrids.

The Huron River sampling location at North Territorial Road is approximately two miles south of the Base Line Lake/Portage Lake convergence and within the Hudson Mills Metropark (Station 9T). The river at this location is roughly 150 feet wide with deep portions closest to the bridge with sediments dominated by cobble and gravel. This deep gravel section eventually transitions into a shallow, slow flowing, generally flat, sand-dominated substrate with few riffles,

which was approximately 100 feet upstream of the North Territorial Road Bridge. Habitat rated good with moderate amounts of overhanging vegetation, aquatic macrophytes, and rootwads along the margins. The macroinvertebrate community rated acceptable with 4 Mayfly taxa and 4 Caddisfly taxa, which accounted for 17 percent of the sample collected. Dominant taxa included Amphipods and Chironomids with EPT comprising less than five percent of the entire sample.

OTTAWA-STONY RIVER WATERSHED

Stony Creek at US-24 (Station 10T) is 4.5 miles upstream of the mouth where the creek empties into Lake Erie. The land use in the surrounding area is heavily impacted by agriculture and urban areas. Habitat rated good at this location with moderate amounts of large woody debris but only sparse availability of overhanging vegetation and rootwads. Sediments were dominated by cobble and hard-packed clay, which was poorly colonized by macroinvertebrates. Water levels within the river looked to be very low with a portion of the bank and channel exposed through the entire length. Occasional riffles were present at this location but the sediments seemed to be marginally available due to embeddedness with fine material. Macroinvertebrate communities rated on the lower end of acceptable (-3) with dominant organism composed of Coenagrionids and Chironomids.

(TARGETED) NPS POLLUTION SUMMARY

HURON RIVER WATERSHED

Five sites (Stations C, D, G, H, and I) were not surveyed using Procedure 51 due to low flow conditions. However, limited YSI data was collected as well as water quality data for reference. The Water Chemistry Monitoring Program's minimally impacted site (Station J) was also not sampled due to bridge construction. Four sites were successfully surveyed, Norton Creek at West Maple Road (Station A), Norton Creek at Buno Road (Station B), Woods Creek at the Lower Huron Metro Park (Station E), and Silver Creek at Vreeland Road (Station F).

Norton Creek at West Maple Road (Station A) is approximately 1.8 miles downstream of the defunct Ford Wixom Assembly Plant and one mile upstream of the Wixom WWTP. Habitat at the West Maple Road location rated good with moderately available large woody debris and overhanging vegetation and sparsely available aquatic macrophytes, undercut banks, and rootwads along the margins of the creek. Sediments were composed of cobble with equal amount of sand and silt covering all available structure throughout this reach of stream, making



Figure 10. Norton Creek at Buno Road.

it difficult for macroinvertebrates to colonize the habitat in the area. The riparian vegetative zone was nonexistent on the right bank due to a maintained yard. The left bank had a slightly better vegetative zone but was still impacted by human activities. The macroinvertebrate communities rated poor with a total of 21 taxa collected, of which Caddisflies, Mayflies, and Stoneflies were absent from the sample. Isopods and Amphipods composed 45 percent and 19 percent, respectively, of the entire sample.

Norton Creek at Buno Road (Station B, Figure 10) flows through a lowland swampy area and is

located one mile downstream of the Wixom WWTP. The sediments are composed of almost entirely organic detrital material with some sand present in the system. Wading through this section of stream is virtually impossible due to the soft sediments, which are approximately 2- to 2.5-feet deep. Available habitat at this location is less than desirable consisting of overhanging vegetation and large woody debris with sparse amounts of undercut banks and aquatic macrophytes. The macroinvertebrate community rated on the low side of acceptable (-3) with 20 taxa identified during this survey. This site was dominated by Isopods and Chironomids with only 5 percent of the sample composed of Caddisflies. No Stoneflies or Mayflies were collected at this location.

Woods Creek is located within the Lower Huron Metro Park (Station E), 0.35 miles below a 5.3-acre pond and 0.3 miles above its connection with the Huron River. The creek flows through a wooded portion of the park, which provides ample shading to the creek. However, it is only sparsely provided with large woody debris and rootwads; all other colonization structures for macroinvertebrate colonization are absent in this reach. The sediments are dominated by gravel and hard-packed clay with evidence of bank scour a few inches above the water's surface. Overall, Woods Creek habitat assessment rated good. The macroinvertebrate community survey rated acceptable, consisting of 23 taxa identified for the entire sample. Three mayfly, one stonefly, and three caddisfly taxa were also identified within this reach and resulted in 21 percent of the total individuals identified. The dominant taxa were Chironomids and Elmids.

Silver Creek at Vreeland Road (Station F) flows through a moderately residential and commercial section north of the city of Flat Rock. Habitat rated marginal at this location with sediments dominated by sand and silt and some organic detritus and fine particulate organic matter present. Moderate amounts of large woody debris for macroinvertebrate colonization were present but overhanging vegetation and rootwads were sparse and there was no aquatic vegetation present in this reach. Overall, this site had a lack of stable habitat and the habitat that was present was less than desirable with heavy deposits on nearly all material. The stream also looked to have been channelized in the past as well as having a riparian vegetative zone of around 10 feet on either side. The macroinvertebrate community rated poor with only 16 taxa identified during this survey. The site was dominated by Chironomids and Isopods; no mayflies, caddisflies, or stoneflies were present at this location.

WATER CHEMISTRY

The results of the water chemistry analysis are presented in Table 4. Water samples were collected at seven locations (Stations A, B, C, D, E, H, and I) and analyzed for general nutrients. Two locations (Stations A and B) were located on Norton Creek and also analyzed for metals.

Stations C, D, E, and I all met WQS. However, Millers Creek at Hubbard Street (Station H), a large storm water drain that runs under the Hubbard Street/Huron Parkway intersection on the University of Michigan campus, was found to exceed the acute WQS of 750 milligrams per liter (mg/l) (Table 4) for TDS.

Stations A (Buno Road) and B (West Maple Road) had lower than expected dissolved oxygen concentrations of 5.6 mg/l and 5.8 mg/l, respectively. Water samples also showed TDS concentrations exceeded the acute WQS at Station B. Elevated Nitrate levels (7.19 milligrams nitrate per liter (mgN/l)) were found at Station A (downstream), which suggests the waters may be influenced by animal/human waste via the WWTP since Station A (upstream) Nitrate levels were found to be 0.21 mgN/l. Metals were found to meet WQS at both locations.

AREAS OF FURTHER INVESTIGATION

Malletts Creek/Chalmers Drain at Washtenaw Avenue (Station 13).

- Bank Stability – large “raw” erosional area on the left bank between the bank reinforcement and the rip rap section.

Norton Creek at West Maple (Station B) and Buno (Station A) Roads.

- Sediment Deposition – heavy deposits of fine sediment at both locations, heaviest at the Buno Road location; need sediment samples to determine potential metal contamination from upstream sources (defunct Ford Wixom Assembly Plant).
- Water Quality Analysis – including heavy metals, TDS, conductivity, dissolved oxygen and biological oxygen demand to determine potential contaminated groundwater inputs from the defunct Ford Wixom Assembly Plant and Wixom WWTP discharges.
- Vegetative Protection and Riparian Vegetative Zone Width – Riparian vegetation needs help at West Maple Road. Right bank with maintained lawn and no riparian vegetation along margins of the creek.

WATERSHED ATTAINMENT

Based on the probabilistic monitoring aspect of this watershed survey, 84 +/- 13 percent of the randomly selected sites supported the other indigenous aquatic life and wildlife designated use component of R 323.1100(1)(e) of the Michigan WQS using Procedure 51. Percent attainment was calculated by dividing the number of random sites that met WQS by the total number of random locations ($27 / 32 = 0.84$). This value is coupled with a 95 percent confidence interval to provide our estimation of certainty, meaning there is 95 percent certainty that true proportion of attainment in the Huron River watershed is within +/- 13 percent of the 86 percent result.

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Table 1. Station Summary for the Huron River and Ottawa-Stony River Watersheds Located in Ingham, Livingston, Monroe, Oakland, Washtenaw, and Wayne Counties, June and August 2012.

Site ID	Water Body Name	Location	Latitude	Longitude	AUID	Macroinvertebrate	Habitat	Chem		
Status Sites										
1	Mann Creek	Kensington Road	42.56942	-83.69911	040900050107-03	Excellent	6	Excellent	165	---
2	Unadilla-Stockbridge Drain	Dutton Road	42.48764	-84.11967	040900050305-03	Acceptable	1	Good	127	---
3	Chilson Creek	M36	42.46640	-83.85810	040900050307-04	Acceptable	4	Excellent	159	---
4	Davis Creek	Pinebrook Lane	42.47619	-83.69929	040900050110-02	Acceptable	0	Good	145	---
5	Honey Creek	Cedar Lake Road	42.45849	-83.96608	040900050303-03	Acceptable	1	Excellent	161	---
6	Portage Creek	Roepke Road	42.43631	-84.07527	040900050305-02	Acceptable	0	Good	122	---
7	Huron River	Rickett Road	42.47861	-83.76720	040900050112-02	Excellent	5	Good	132	---
8	Hay Creek	M36	42.46175	-83.89469	040900050307-05	Acceptable	0	Good	123	---
9	Unnamed Trib to Unadilla-Stockbridge Dr	Brogan Road	42.46537	-84.16106	040900050304-01	Acceptable	-1	Good	130	---
10	Letts Creek	Sylvan Road	42.26978	-84.07699	040900050202-02	Excellent	6	Good	115	---
11	Letts Creek	M52 (Main St), Park	42.32369	-84.02074	040900050202-02	Poor	-5	Marginal	94	---
12	Huron River	Cedar Island Road	42.62771	-83.49605	040900050102-01	Acceptable	-1	Good	119	---
13	Malletts Creek / Chalmers Drain	Washtenaw Avenue	42.25639	-83.69354	040900050402-04	Acceptable	-1	Marginal	97	---
14	Fleming Creek	Matthei Botanical Gardens	42.30560	-83.66000	040900050401-02	Excellent	7	Excellent	160	---
15	Huron River	LeForge Road	42.25583	-83.62000	040900050403-04	Excellent	5	Excellent	155	---
16	Mill Creek	Dexter Pinckney Road (Main St)	42.33901	-83.89079	040900050204-02	Excellent	6	Good	128	---
17	Mill Creek	Lima Center Road	42.26655	-83.95580	040900050204-01	Excellent	6	Marginal	100	---
18	Unnamed Trib to Mill Creek	Liberty Road	42.26728	-83.92291	040900050204-02	Acceptable	3	Good	128	---
19	Huron River	Huron River Drive	42.21076	-83.43470	040900050405-01	Acceptable	-3	Marginal	84	---
20	Sugar Creek	Hitchingham Road	42.09669	-83.61812	041000010106-01	Acceptable	0	Good	135	---
21	Buck Creek	Hitchingham Road	42.10247	-83.61836	041000010106-01	Acceptable	-1	Good	142	---
22	Smith Creek	Gibraltar Road	42.09505	-83.24788	040900050406-04	Poor	-5	Marginal	77	---
23	Stony Creek	Stony Creek Road	42.15340	-83.65319	041000010106-01	Acceptable	4	Good	141	---
24	Silver Creek	Gibraltar Road	42.09457	-83.27510	040900050406-03	Poor	-6	Marginal	80	---
25	Paint Creek	Textile Road	42.20177	-83.61248	041000010105-01	Poor	-6	Good	132	---
26	Huron River	Lower Huron Metro Parkway	42.18750	-83.42530	040900050407-02	Acceptable	-1	Good	115	---
27	Buck Creek	Willow Road	42.11319	-83.63572	041000010106-01	Acceptable	0	Marginal	77	---
28	Paint Creek	Martz Road	42.18063	-83.59470	041000010105-01	Acceptable	-2	Marginal	100	---
29	Swan Creek	Colf Road	42.07310	-83.44967	041000010103-01	Acceptable	1	Good	123	---
30	Huron River	Park Road	42.30324	-83.74646	040900050309-02	Marginal	48	-----	---	---
31	Huron River	off Huron River Drive, u/s Lebo Island	42.04901	-83.22510	040900050407-02	Poor	14	-----	---	---
32	Huron River	off Huron River Drive, d/s RR tracks	42.05988	-83.23998	040900050407-03	Marginal	42	-----	---	---

Table 1. Station Summary for the Huron River and Ottawa-Stony River Watersheds Located in Ingham, Livingston, Monroe, Oakland, Washtenaw, and Wayne Counties, June and August 2012.

Site ID	Water Body Name	Location	Latitude	Longitude	AUID	Macroinvertebrate	Habitat	Chem		
Trend Sites										
1T	Portage Creek	Green Road	42.43920	-84.16430	040900050304-03	Acceptable	-1	Marginal	84	---
2T	Woodruff Creek	Spencer Road	42.53790	-83.74430	040900050107-01	Acceptable	2	Good	136	---
3T	Hay Creek	Rush Lake Road	42.47570	-83.90190	040900050307-01	Acceptable	0	Good	113	---
4T	Unnamed Trib to Mill Creek	Waters Road	42.24060	-83.91180	040900050204-02	Acceptable	0	Marginal	100	---
5T	Huron River	Teggerdine Road	42.66980	-83.48880	040900050101-01	Acceptable	-1	Good	119	---
6T	Huron River	Cedar Island Road	42.62770	-83.49570	040900050102-01	Acceptable	-1	Good	119	---
7T	Mill Creek	Marshall Road	42.30470	-83.88920	040900050204-02	Acceptable	3	Good	123	---
8T	Huron River	Riverbend (Island Lk S.P.)	42.50441	-83.70997	040900050112-01	Acceptable	3	Excellent	155	---
9T	Huron River	North Territorial Road (Hudson Mills Metropark)	42.38690	-83.91110	040900050309-03	Acceptable	2	Good	138	---
10T	Stony Creek	US-24	41.98170	-83.37120	041000010107-02	Acceptable	-3	Good	119	---

Site ID	Water Body Name	Location	Latitude	Longitude	AUID	Macroinvertebrate	Habitat	Chem		
Targeted Sites										
A	Norton Creek	West Maple Road (u-s Wixom WWTP)	42.53139	-83.54750	040900050103-04	Poor	-6	Good	138	W
B	Norton Creek	Buno Road (d-s Wixom WWTP)	42.55278	-83.56237	040900050103-04	Acceptable	-3	Good	153	W
C	Horseshoe Lake Drain	Main Street	42.41548	-83.76096	040900050301-05	Low Flow - No P-51 Conducted			W	
D	Horseshoe Lake Drain	Barker Road	42.42250	-83.76500	040900050301-05	Low Flow - No P-51 Conducted			W	
E	Woods Creek	Lower Huron Metro Park	42.18563	-83.43125	040900050405-01	Acceptable	4	Good	149	W
F	Silver Creek	Vreeland Road	42.10890	-83.28278	040900050406-03	Poor	-6	Marginal	80	---
G	Silver Creek	Merriman Road	42.16090	-83.34450	040900050406-03	Low Flow - No P-51 Conducted			---	
H	Millers Creek/ Unnamed Trib	Hubbard Street	42.29468	-83.70394	040900050402-03	Low Flow - No P-51 Conducted			W	
I	Green Oak/ Tobin Drain	8 Mile Road	42.42953	-83.70962	040900050110-01	Low Flow - No P-51 Conducted			W	
J	Huron River	Whitmore Lake Road (Old US-23)	42.47139	-83.75639	040900050112-02	Construction at Bridge - No P-51 Conducted			---	

Table 2A. Qualitative macroinvertebrate sampling results for selected streams in the Huron River and Ottawa-Stony River Watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne Counties, June and August 2012.

TAXA	Mann Creek Kensington Road 6/14/2012 STATION 1	Unadilla-Stockbridge Drain Dutton Road 6/13/2012 STATION 2	Chilson Creek M-36 6/13/2012 STATION 3	Davis Creek Pinebrook Lane 6/13/2012 STATION 4
ANNELIDA (segmented worms)				
Oligochaeta (worms)	2		4	1
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	5	164	51	59
Decapoda (crayfish)	11	2	1	6
Isopoda (sowbugs)			5	11
Arachnoidea				
Hydracarina			2	
Insecta				
Ephemeroptera (mayflies)				
Baetidae	11	1	34	5
Caenidae	2	3	2	
Ephemeridae			1	
Odonata				
Anisoptera (dragonflies)				
Aeshnidae	9	3	2	3
Cordulegastridae		1	2	
Gomphidae	2	1	1	2
Zygoptera (damselflies)				
Calopterygidae	10	5	2	11
Coenagrionidae		2	5	
Plecoptera (stoneflies)				
Perlidae	4		1	1
Hemiptera (true bugs)				
Belostomatidae			1	
Corixidae	5			
Gerridae	1	1		
Pleidae	1		1	
Veliidae	2			
Megaloptera				
Sialidae (alder flies)		5		
Trichoptera (caddisflies)				
Brachycentridae	75		13	38
Helicopsychidae	2			
Hydropsychidae	59	2		25
Leptoceridae	10	1	18	2
Limnephilidae	2	11		3
Molannidae	1		1	
Coleoptera (beetles)				
Dytiscidae (total)			1	
Haliplidae (adults)	1			
Hydrophilidae (total)	1	1		
Elmidae	15	3	27	10
Noteridae (larvae)	1			
Scirtidae (larvae)	1			
Diptera (flies)				
Athericidae				1
Ceratopogonidae		1	2	
Chironomidae	46	34	59	44
Culicidae	1	1	3	
Simuliidae	48		1	18
Tabanidae		1		4
MOLLUSCA				
Gastropoda (snails)				
Ancylidae (limpets)	1			
Physidae	3	3	41	29
Planorbidae			1	1
Pelecypoda (bivalves)				
Sphaeriidae (clams)	1	38	30	9
TOTAL INDIVIDUALS	333	284	312	283

Table 2B. Macroinvertebrate metric evaluation of selected streams in the Huron River and Ottawa-Stony River watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne counties, June and August 2012.

METRIC	Mann Creek Kensington Road 6/14/2012 STATION 1		Unadilla-Stockbridge Drain Dutton Road 6/13/2012 STATION 2		Chilson Creek M-36 6/13/2012 STATION 3		Davis Creek Pinebrook Lane 6/13/2012 STATION 4	
	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	30	1	22	1	28	1	21	0
NUMBER OF MAYFLY TAXA	2	0	2	1	3	1	1	0
NUMBER OF CADDISFLY TAXA	6	1	3	0	3	0	4	0
NUMBER OF STONEFLY TAXA	1	1	0	-1	1	1	1	1
PERCENT MAYFLY COMP.	3.90	0	1.41	-1	11.86	0	1.77	-1
PERCENT CADDISFLY COMP.	44.74	1	4.93	0	10.26	0	24.03	0
PERCENT DOMINANT TAXON	22.52	0	57.75	-1	18.91	1	20.85	0
PERCENT ISOPOD, SNAIL, LEECH	1.20	1	1.06	1	15.06	-1	14.49	-1
PERCENT SURF. AIR BREATHERS	3.60	1	1.06	1	1.92	1	0.00	1
TOTAL SCORE		6		1		4		0
MACROINV. COMMUNITY RATING		EXCELLENT		ACCEPT.		ACCEPT.		ACCEPT.

Table 2A. Qualitative macroinvertebrate sampling results for selected streams in the Huron River and Ottawa-Stony River Watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne Counties, June and August 2012.

TAXA	Honey Creek Cedar Lake Road 6/13/2012 STATION 5	Portage Creek Roepke Road 6/13/2012 STATION 6	Huron River Rickett Road 6/25/2012 STATION 7	Hay Creek M36 6/28/2012 STATION 8
ANNELIDA (segmented worms)				
Oligochaeta (worms)		7	9	1
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	4	137	55	233
Decapoda (crayfish)	11	1	3	11
Isopoda (sowbugs)			10	
Arachnoidea				
Hydracarina	3	1	3	1
Insecta				
Ephemeroptera (mayflies)				
Baetidae	98		57	4
Caenidae	2		3	
Heptageniidae	1		19	1
Tricorythidae				2
Odonata				
Anisoptera (dragonflies)				
Aeshnidae	1		4	3
Gomphidae			5	
Libellulidae		1		
Zygoptera (damselflies)				
Calopterygidae	3	1	4	9
Coenagrionidae		10	3	
Hemiptera (true bugs)				
Corixidae	84		3	
Gerridae		1	1	
Pleidae	12			
Veliidae	3			2
Megaloptera				
Sialidae (alder flies)	1	1		1
Trichoptera (caddisflies)				
Brachycentridae	1		37	10
Hydropsychidae	6	127	14	13
Lepidostomatidae			1	
Leptoceridae		2	8	1
Limnephilidae	12		8	
Molannidae		1		
Phryganeidae				1
Polycentropodidae		1	32	
Coleoptera (beetles)				
Dytiscidae (total)	1	2		
Hydrophilidae (total)			1	
Elmidae	2	24	31	18
Gyrinidae (larvae)	1	1		
Diptera (flies)				
Ceratopogonidae	1			
Chironomidae	21	13	6	11
Culicidae	2			
Simuliidae	9	40		4
Tabanidae	1			
Tipulidae		1		
MOLLUSCA				
Gastropoda (snails)				
Ancylidae (limpets)	2			
Lymnaeidae				1
Physidae	4	3	2	3
Planorbidae	1	1		
Pleuroceridae			4	1
Pelecypoda (bivalves)				
Corbiculidae			1	
Dreissenidae		1	10	
Sphaeriidae (clams)	6		2	
Unionidae (mussels)		1		
TOTAL INDIVIDUALS	293	378	336	331

Table 2B. Macroinvertebrate metric evaluation of selected streams in the Huron River and Ottawa-Stony River watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne counties, June and August 2012.

METRIC	Honey Creek Cedar Lake Road 6/13/2012 STATION 5		Portage Creek Roepke Road 6/13/2012 STATION 6		Huron River Rickett Road 6/25/2012 STATION 7		Hay Creek M36 6/28/2012 STATION 8	
	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	27	1	23	0	28	1	21	0
NUMBER OF MAYFLY TAXA	3	0	0	-1	3	0	3	1
NUMBER OF CADDISFLY TAXA	3	0	4	0	6	1	4	0
NUMBER OF STONEFLY TAXA	0	-1	0	-1	0	-1	0	-1
PERCENT MAYFLY COMP.	34.47	1	0.00	-1	23.51	1	2.11	-1
PERCENT CADDISFLY COMP.	6.48	0	34.66	1	29.76	1	7.55	0
PERCENT DOMINANT TAXON	33.45	0	36.24	0	16.96	1	70.39	-1
PERCENT ISOPOD, SNAIL, LEECH	2.39	1	1.06	1	4.76	0	1.51	1
PERCENT SURF. AIR BREATHERS	34.81	-1	0.79	1	1.49	1	0.60	1
TOTAL SCORE		1		0		5		0
MACROINV. COMMUNITY RATING		ACCEPT.		ACCEPT.		EXCELLENT		ACCEPT.

Table 2A. Qualitative macroinvertebrate sampling results for selected streams in the Huron River and Ottawa-Stony River Watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne Counties, June and August 2012.

TAXA	Unnamed Trib to Unadilla Stockbridge Dr Brogan Road 6/28/2012 STATION 9	Letts Creek Sylvan Road 6/27/2012 STATION 10	Letts Creek M-52 Pk 6/28/2012 STATION 11	Huron River Cedar Island Road 8/22/2012 STATION 12
ANNELIDA (segmented worms)				
Hirudinea (leeches)		1	7	
Oligochaeta (worms)		8	58	2
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	260	5	11	19
Decapoda (crayfish)	2	7	2	
Arachnoidea				
Hydracarina		2		9
Insecta				
Ephemeroptera (mayflies)				
Baetidae	6			20
Caenidae		4		27
Heptageniidae		3	2	2
Isonychiidae		1		
Odonata				
Anisoptera (dragonflies)				
Aeshnidae	6	18	2	1
Libellulidae		1		2
Zygoptera (damselflies)				
Calopterygidae	14	1		
Coenagrionidae				87
Plecoptera (stoneflies)				
Perlidae		2		
Hemiptera (true bugs)				
Gerridae	4	2	7	2
Veliidae	1	1		
Megaloptera				
Sialidae (alder flies)		4	1	
Trichoptera (caddisflies)				
Hydropsychidae	9	58	1	
Hydroptilidae				7
Lepidostomatidae		10		
Leptoceridae				7
Limnephilidae	1	5		1
Molannidae		11		
Coleoptera (beetles)				
Dytiscidae (total)	1			
Haliplidae (adults)			1	
Elmidae	2	35	14	12
Diptera (flies)				
Ceratopogonidae	1		12	1
Chironomidae	26	74	17	44
Culicidae		1	1	
Ptychopteridae		1		
Simuliidae	15			
Tabanidae	1	3		1
Tipulidae	2	2		
MOLLUSCA				
Gastropoda (snails)				
Ancylidae (limpets)		4	1	
Hydrobiidae				26
Lymnaeidae		1		
Physidae	1			6
Planorbidae				12
Pelecypoda (bivalves)				
Corbiculidae				1
Dreissenidae				3
Sphaeriidae (clams)	1	7		5
TOTAL INDIVIDUALS	353	272	137	297

Table 2B. Macroinvertebrate metric evaluation of selected streams in the Huron River and Ottawa-Stony River watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne counties, June and August 2012.

METRIC	Unnamed Trib to Unadilla Stockbridge Dr Brogan Road 6/28/2012 STATION 9		Letts Creek Sylvan Road 6/27/2012 STATION 10		Letts Creek M-52 Pk 6/28/2012 STATION 11		Huron River Cedar Island Road 8/22/2012 STATION 12	
	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	18	1	28	1	15	0	23	0
NUMBER OF MAYFLY TAXA	1	0	3	1	1	-1	3	0
NUMBER OF CADDISFLY TAXA	2	0	4	1	1	-1	3	0
NUMBER OF STONEFLY TAXA	0	-1	1	1	0	-1	0	-1
PERCENT MAYFLY COMP.	1.70	-1	2.94	-1	1.46	-1	16.50	0
PERCENT CADDISFLY COMP.	2.83	-1	30.88	1	0.73	-1	5.05	0
PERCENT DOMINANT TAXON	73.65	-1	27.21	0	42.34	-1	29.29	0
PERCENT ISOPOD, SNAIL, LEECH	0.28	1	2.21	1	5.84	0	14.81	-1
PERCENT SURF. AIR BREATHERS	1.70	1	1.84	1	6.57	1	0.67	1
TOTAL SCORE		-1		6		-5		-1
MACROINV. COMMUNITY RATING		ACCEPT.		EXCELLENT		POOR		ACCEPT.

Table 2A. Qualitative macroinvertebrate sampling results for selected streams in the Huron River and Ottawa-Stony River Watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne Counties, June and August 2012.

TAXA	Malletts Creek Washtenaw Ave 6/27/2012 STATION 13	Fleming Creek Matthei Botanical Gardens 6/14/2012 STATION 14	Huron River LeForge Road 6/15/2012 STATION 15	Mill Creek d-s Dexter-Pinckney Road 6/14/2012 STATION 16
PLATYHELMINTHES (flatworms)				
Turbellaria	11			
ANNELIDA (segmented worms)				
Hirudinea (leeches)	1		1	
Oligochaeta (worms)	8	7	1	15
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	10		9	3
Decapoda (crayfish)	45	5	6	16
Isopoda (sowbugs)	7		5	3
Arachnoidea				
Hydracarina		2		3
Insecta				
Ephemeroptera (mayflies)				
Baetidae		4	5	15
Caenidae			1	
Heptageniidae		3	7	3
Tricorythidae				3
Odonata				
Anisoptera (dragonflies)				
Aeshnidae		5		1
Gomphidae		1		
Zygoptera (damselflies)				
Calopterygidae		1	1	1
Coenagrionidae			6	
Plecoptera (stoneflies)				
Perlidae		3	1	12
Hemiptera (true bugs)				
Corixidae	1	8		
Gerridae				1
Pleidae				1
Veliidae	1	2	1	
Trichoptera (caddisflies)				
Brachycentridae				23
Glossosomatidae		9		
Hydropsychidae	72	89	87	161
Leptoceridae			1	4
Limnephilidae		8	1	1
Philopotamidae		23	5	1
Phryganeidae				1
Polycentropodidae			1	
Coleoptera (beetles)				
Dytiscidae (total)	1			
Gyrinidae (adults)				1
Haliplidae (adults)	1			
Hydrophilidae (total)	1			
Elmidae	9	59	11	8
Gyrinidae (larvae)				1
Psephenidae (larvae)			16	
Diptera (flies)				
Ceratopogonidae		1	1	
Chironomidae	52	72	2	41
Culicidae	1			
Psychodidae				1
Simuliidae	2	2	136	1
Tipulidae		3		
MOLLUSCA				
Gastropoda (snails)				
Ancylidae (limpets)	1		4	1
Lymnaeidae		1	2	1
Physidae				1
Viviparidae			1	
Pelecypoda (bivalves)				
Corbiculidae			3	
Dreissenidae			11	
Sphaeriidae (clams)	4	19	1	1
TOTAL INDIVIDUALS	228	327	327	325

Table 2B. Macroinvertebrate metric evaluation of selected streams in the Huron River and Ottawa-Stony River watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne counties, June and August 2012.

METRIC	Chalmers Drain Washtenaw Avenue 6/27/2012 STATION 13		Fleming Creek Matthei Botanical Gardens 6/14/2012 STATION 14		Huron River LeForge Road 6/15/2012 STATION 15		Mill Creek downstream Dexter-Pinckney Road 6/14/2012 STATION 16	
	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	18	0	22	1	28	1	28	1
NUMBER OF MAYFLY TAXA	0	-1	2	0	3	0	3	0
NUMBER OF CADDISFLY TAXA	1	-1	4	1	5	1	6	1
NUMBER OF STONEFLY TAXA	0	-1	1	1	1	1	1	1
PERCENT MAYFLY COMP.	0.00	-1	2.14	0	3.98	0	6.46	0
PERCENT CADDISFLY COMP.	31.58	1	39.45	1	29.05	1	58.77	1
PERCENT DOMINANT TAXON	31.58	1	27.22	1	41.59	0	49.54	0
PERCENT ISOPOD, SNAIL, LEECH	3.95	0	0.31	1	3.98	0	1.85	1
PERCENT SURF. AIR BREATHERS	2.63	1	3.06	1	0.31	1	0.92	1
TOTAL SCORE		-1		7		5		6
MACROINV. COMMUNITY RATING		ACCEPT.		EXCELLENT		EXCELLENT		EXCELLEN

Table 2A. Qualitative macroinvertebrate sampling results for selected streams in the Huron River and Ottawa-Stony River Watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne Counties, June and August 2012.

TAXA	Mill Creek	Unnamed Trib to Mill Creek
	Lima Center Road 6/14/2012 STATION 17	Liberty Road 6/14/2012 STATION 18
ANNELIDA (segmented worms)		
Oligochaeta (worms)	12	23
ARTHROPODA		
Crustacea		
Amphipoda (scuds)	1	13
Decapoda (crayfish)	9	108
Isopoda (sowbugs)	1	
Insecta		
Ephemeroptera (mayflies)		
Baetidae	1	
Caenidae		8
Heptageniidae	5	3
Odonata		
Anisoptera (dragonflies)		
Aeshnidae	7	1
Gomphidae	2	1
Zygoptera (damselflies)		
Calopterygidae	9	1
Plecoptera (stoneflies)		
Perlidae	4	
Hemiptera (true bugs)		
Corixidae	4	14
Gerridae	1	4
Mesoveliidae	1	
Nepidae	1	2
Veliidae		1
Trichoptera (caddisflies)		
Brachycentridae	59	
Hydropsychidae	21	5
Limnephilidae	7	3
Coleoptera (beetles)		
Dytiscidae (total)	1	
Gyrinidae (adults)		2
Elmidae	50	1
Gyrinidae (larvae)		1
Diptera (flies)		
Athericidae		1
Ceratopogonidae	1	1
Chironomidae	39	76
Culicidae	1	
Simuliidae	26	22
Tabanidae	1	
MOLLUSCA		
Gastropoda (snails)		
Lymnaeidae		1
Physidae		2
Pelecypoda (bivalves)		
Sphaeriidae (clams)	1	6
TOTAL INDIVIDUALS	265	300

Table 2B. Macroinvertebrate metric evaluation of selected streams in the Huron River and Ottawa-Stony River watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne counties, June and August 2012.

METRIC	Mill Creek Lima Center Road 6/14/2012 STATION 17		Unnamed Trib to Mill Creek Liberty Road 6/14/2012 STATION 18	
	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	25	1	23	1
NUMBER OF MAYFLY TAXA	2	0	2	0
NUMBER OF CADDISFLY TAXA	3	0	2	0
NUMBER OF STONEFLY TAXA	1	1	0	-1
PERCENT MAYFLY COMP.	2.26	0	3.67	0
PERCENT CADDISFLY COMP.	32.83	1	2.67	0
PERCENT DOMINANT TAXON	22.26	1	36.00	1
PERCENT ISOPOD, SNAIL, LEECH	0.38	1	1.00	1
PERCENT SURF. AIR BREATHERS	3.40	1	7.67	1
TOTAL SCORE		6		3
MACROINV. COMMUNITY RATING		EXCELLENT		ACCEPT.
			ACCEPT.	ACCEPT.

Table 2A. Qualitative macroinvertebrate sampling results for selected streams in the Huron River and Ottawa-Stony River Watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne Counties, June and August 2012.

TAXA	Huron River Huron River Road 8/21/2012 STATION 19	Sugar Creek Hitchingham Road 6/25/2012 STATION 20	Buck Creek Hitchingham Road 6/26/2012 STATION 21	Smith Creek Gibraltar Road 6/25/2012 STATION 22
PLATYHELMINTHES (flatworms)				
Turbellaria	18			
ANNELIDA (segmented worms)				
Hirudinea (leeches)	3			7
Oligochaeta (worms)	8	1	5	4
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	6			82
Decapoda (crayfish)		26	4	21
Isopoda (sowbugs)	1			138
Arachnoidea				
Hydracarina		2	2	1
Insecta				
Ephemeroptera (mayflies)				
Baetidae	1	4	1	
Heptageniidae		1	2	
Odonata				
Anisoptera (dragonflies)				
Aeshnidae		5	9	3
Zygoptera (damselflies)				
Calopterygidae		16	3	3
Coenagrionidae	1		1	2
Hemiptera (true bugs)				
Corixidae		2	5	
Gerridae		6	1	2
Notonectidae			1	1
Pleidae		1		
Veliidae	2	7	1	2
Trichoptera (caddisflies)				
Hydropsychidae	7	106	13	
Hydroptilidae	7			
Polycentropodidae	1			
Coleoptera (beetles)				
Dytiscidae (total)		1		1
Haliplidae (adults)	5			1
Hydrophilidae (total)			2	1
Elmidae		43	32	46
Gyrinidae (larvae)	1			
Diptera (flies)				
Ceratopogonidae	8	4	1	
Chironomidae	149	30	66	50
Culicidae				1
Simuliidae		1	5	
Tabanidae		1		
Tipulidae		1	3	
MOLLUSCA				
Gastropoda (snails)				
Hydrobiidae	1			
Lymnaeidae	12			
Physidae	5	8	14	
Planorbidae	2			
Pelecypoda (bivalves)				
Corbiculidae	1			
Dreissenidae	3			
Sphaeriidae (clams)		12		6
TOTAL INDIVIDUALS	242	278	171	372

Table 2B. Macroinvertebrate metric evaluation of selected streams in the Huron River and Ottawa-Stony River watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne counties, June and August 2012.

METRIC	Huron River Huron River Road 8/21/2012 STATION 19		Sugar Creek Hitchingham Road 6/25/2012 STATION 20		Buck Creek Hitchingham Road 6/26/2012 STATION 21		Smith Creek Gibraltar Road 6/25/2012 STATION 22	
	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	21	0	21	0	20	1	19	1
NUMBER OF MAYFLY TAXA	1	-1	2	1	2	1	0	-1
NUMBER OF CADDISFLY TAXA	3	0	1	-1	1	-1	0	-1
NUMBER OF STONEFLY TAXA	0	-1	0	-1	0	-1	0	-1
PERCENT MAYFLY COMP.	0.41	-1	1.80	-1	1.75	-1	0.00	-1
PERCENT CADDISFLY COMP.	6.20	0	38.13	1	7.60	0	0.00	-1
PERCENT DOMINANT TAXON	61.57	-1	38.13	-1	38.60	-1	37.10	-1
PERCENT ISOPOD, SNAIL, LEECH	9.92	0	2.88	1	8.19	0	38.98	-1
PERCENT SURF. AIR BREATHERS	2.89	1	6.12	1	5.85	1	2.42	1
TOTAL SCORE		-3		0		-1		-5
MACROINV. COMMUNITY RATING		ACCEPT.		ACCEPT.		ACCEPT.		POOR

Table 2A. Qualitative macroinvertebrate sampling results for selected streams in the Huron River and Ottawa-Stony River Watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne Counties, June and August 2012.

TAXA	Stony Creek Stony Creek Road 6/15/2012 STATION 23	Silver Creek Gibraltar Road 6/26/2012 STATION 24	Paint Creek Textile Road 6/12/2012 STATION 25	Huron River Lower Huron Metro Park 6/12/2012 STATION 26
PORIFERA (sponges)				1
PLATYHELMINTHES (flatworms)				
Turbellaria		5		
ANNELIDA (segmented worms)				
Hirudinea (leeches)		48		
Oligochaeta (worms)	3	24	16	2
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	1	37	1	13
Decapoda (crayfish)	10	7	31	1
Isopoda (sowbugs)		91	86	
Arachnoidea				
Hydracarina			1	1
Insecta				
Ephemeroptera (mayflies)				
Baetidae	21		2	
Caenidae				1
Ephemeridae				1
Heptageniidae	1			
Potamanthidae				2
Odonata				
Anisoptera (dragonflies)				
Aeshnidae	3			
Zygoptera (damselflies)				
Calopterygidae	5		4	
Coenagrionidae		2		2
Plecoptera (stoneflies)				
Perlidae	2			
Hemiptera (true bugs)				
Corixidae	1	4		
Gerridae	11			1
Notonectidae		1		
Pleidae	1			
Veliidae	3			3
Trichoptera (caddisflies)				
Brachycentridae	38			
Hydropsychidae	17	1	12	20
Leptoceridae	2			1
Limnephilidae	2			6
Polycentropodidae				1
Coleoptera (beetles)				
Dytiscidae (total)	1			2
Haliplidae (adults)	1	1	2	
Hydrophilidae (total)			1	3
Elmidae	2		1	9
Haliplidae (larvae)		1		
Diptera (flies)				
Athericidae	24			
Ceratopogonidae		1	3	
Chironomidae	108	117	71	39
Culicidae	2		2	
Dixidae	1			
Simuliidae	31		45	13
Stratiomyidae	1			
Syrphidae	1			
Tabanidae	1			
MOLLUSCA				
Gastropoda (snails)				
Ancylidae (limpets)				39
Physidae	2	20		
Pelecypoda (bivalves)				
Corbiculidae		2		53
Dreissenidae				93
Sphaeriidae (clams)		19		
TOTAL INDIVIDUALS	296	381	278	307

Table 2B. Macroinvertebrate metric evaluation of selected streams in the Huron River and Ottawa-Stony River watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne counties, June and August 2012.

METRIC	Stony Creek Stony Creek Road 6/15/2012 STATION 23		Silver Creek Gibraltar Road 6/26/2012 STATION 24		Paint Creek Textile Road 6/12/2012 STATION 25		Huron River Lower Huron Metro Park 6/12/2012 STATION 26	
	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	28	1	16	0	15	-1	23	0
NUMBER OF MAYFLY TAXA	2	1	0	-1	1	-1	3	0
NUMBER OF CADDISFLY TAXA	4	1	1	-1	1	-1	4	1
NUMBER OF STONEFLY TAXA	1	1	0	-1	0	-1	0	-1
PERCENT MAYFLY COMP.	7.43	-1	0.00	-1	0.72	-1	1.30	-1
PERCENT CADDISFLY COMP.	19.93	0	0.26	-1	4.32	0	9.12	0
PERCENT DOMINANT TAXON	36.49	-1	30.71	-1	30.94	-1	30.29	-1
PERCENT ISOPOD, SNAIL, LEECH	0.68	1	41.73	-1	30.94	-1	12.70	0
PERCENT SURF. AIR BREATHERS	7.43	1	1.57	1	1.80	1	2.93	1
TOTAL SCORE		4		-6		-6		-1
MACROINV. COMMUNITY RATING		ACCEPT.		POOR		POOR		ACCEPT.

Table 2A. Qualitative macroinvertebrate sampling results for selected streams in the Huron River and Ottawa-Stony River Watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne Counties, June and August 2012.

TAXA	Buck Creek Willow Road 6/15/2012 STATION 27	Paint Creek Martz Road 6/15/2012 STATION 28	Swan Creek Colf Road (east) 6/25/2012 STATION 29
ANNELIDA (segmented worms)			
Oligochaeta (worms)	11	11	6
ARTHROPODA			
Crustacea			
Amphipoda (scuds)			3
Decapoda (crayfish)	15	7	3
Isopoda (sowbugs)		1	
Arachnoidea			
Hydracarina	2		3
Insecta			
Ephemeroptera (mayflies)			
Baetidae			9
Caenidae	1		1
Odonata			
Anisoptera (dragonflies)			
Aeshnidae			2
Zygoptera (damselflies)			
Calopterygidae	13	10	15
Coenagrionidae			1
Hemiptera (true bugs)			
Belostomatidae	1		
Corixidae	4		1
Gerridae		1	2
Notonectidae			2
Veliidae	1		7
Trichoptera (caddisflies)			
Hydropsychidae	4	58	51
Hydroptilidae			7
Leptoceridae			3
Limnephilidae		1	2
Philopotamidae		2	
Phryganeidae			7
Coleoptera (beetles)			
Dytiscidae (total)	1		
Gyrinidae (adults)	1		
Hydrophilidae (total)	1		
Elmidae	1	16	82
Diptera (flies)			
Athericidae	3	7	
Ceratopogonidae	2	1	
Chironomidae	38	147	57
Culicidae	2		6
Dixidae	2		
Simuliidae	4	5	
Stratiomyidae	1	2	
Syrphidae	2		
Tabanidae	1	1	
Tipulidae		1	14
MOLLUSCA			
Gastropoda (snails)			
Physidae	1		32
Viviparidae			1
Pelecypoda (bivalves)			
Corbiculidae		7	
Sphaeriidae (clams)	1		2
TOTAL INDIVIDUALS	113	278	319

Table 2B. Macroinvertebrate metric evaluation of selected streams in the Huron River and Ottawa-Stony River watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne counties, June and August 2012.

METRIC	Buck Creek Willow Road 6/15/2012 STATION 27		Paint Creek Martz Road 6/15/2012 STATION 28		Swan Creek Colf Road (east) 6/25/2012 STATION 29	
	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	24	1	17	0	25	1
NUMBER OF MAYFLY TAXA	1	1	0	-1	2	1
NUMBER OF CADDISFLY TAXA	1	0	3	0	5	1
NUMBER OF STONEFLY TAXA	0	-1	0	-1	0	-1
PERCENT MAYFLY COMP.	0.88	-1	0.00	-1	3.13	-1
PERCENT CADDISFLY COMP.	3.54	0	21.94	0	21.94	0
PERCENT DOMINANT TAXON	33.63	-1	52.88	-1	25.71	-1
PERCENT ISOPOD, SNAIL, LEECH	0.88	1	0.36	1	10.34	0
PERCENT SURF. AIR BREATHERS	12.39	0	1.08	1	5.64	1
TOTAL SCORE		0		-2		1
MACROINV. COMMUNITY RATING		ACCEPT.		ACCEPT.		ACCEPT.

Table 2A. Qualitative macroinvertebrate sampling results for selected streams in the Huron River and Ottawa-Stony River Watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne Counties, June and August 2012.

TAXA	Huron R 8/2/12 U/S Lebo Isl. STATION 31	Huron R 8/2/12 Off Huron Dr. STATION 32	Huron R 8/3/12 Park Rd. STATION 30 STATION 30
PLATYHELMINTHES (flatworms)			
Turbellaria			1
ANNELIDA (segmented worms)			
Hirudinea (leeches)	1		
Oligochaeta (worms)	8	12	
ARTHROPODA			
Crustacea			
Amphipoda (scuds)	27	30	146
Decapoda (crayfish)	1		
Isopoda (sowbugs)	1		5
Arachnoidea			
Hydracarina	31	24	141
Insecta			
Ephemeroptera (mayflies)			
Baetidae	2	55	2
Caenidae	7	33	31
Heptageniidae			1
Odonata			
Anisoptera (dragonflies)			
Corduliidae		3	5
Zygoptera (damselflies)			
Coenagrionidae	27	106	29
Hemiptera (true bugs)			
Corixidae	204	104	
Gerridae		1	
Mesoveliidae			35
Nepidae	2		
Pleidae	1		
Megaloptera			
Sialidae (alder flies)		1	
Trichoptera (caddisflies)			
Leptoceridae	2		3
Coleoptera (beetles)			
Haliplidae (adults)	4	19	
Hydrophilidae (total)		1	
Elmidae (total)	1	2	5
Diptera (flies)			
Ceratopogonidae	7	7	4
Chironomidae	14	40	21
Culicidae			1
MOLLUSCA			
Gastropoda (snails)			
Hydrobiidae			15
Physidae	2	9	3
Planorbidae			3
Pelecypoda (bivalves)			
Dreissenidae (zebra)		89	23
	342	536	474

Table 2B. Macroinvertebrate metric evaluation of selected streams in the Huron River and Ottawa-Stony River Watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne Counties, June and August 2012.

ATTRIBUTE	U/S Lebo Isl.	Off Huron Dr.	Park Rd.
	Station 31	Station 32	Station 30
TOTAL ABUNDANCE	342	536	474
TOTAL RICHNESS	18	17	19
NUMBER OF EPHEMEROPTERA FAMILIES	2	2	3
NUMBER OF PLECOPTERA FAMILIES	0	0	0
NUMBER OF TRICHOPTERA FAMILIES	1	0	1
NUMBER OF DIPTERA TAXA	2	2	3
TRICHOPTERA ABUNDANCE	2	0	3
ABUNDANCE OF DOMINANT TAXON	204	106	146
SHREDDER ABUNDANCE	34	49	154
SCRAPER ABUNDANCE	2	9	22
COLL-FILTERER ABUNDANCE	0	89	24
COLL-GATH ABUNDANCE	237	246	60
PREDATOR ABUNDANCE	69	143	214

METRIC	Metric Score	Metric Score	Metric Score
FFG Diversity (25)	8	25	25
Habitat Stability FFG Surrogate (25)	0	8	8
% Trichoptera (20)	0	0	0
EPT Richness (8)	0	0	3
Total Richness (7)	2	2	5
Diptera Richness (5)	2	2	2
Plecoptera Richness (5)	0	0	0
% Dominance (5)	2	5	5

Total Score (100)	14	42	48
MACROINVERTEBRATE COMMUNITY RATING	POOR	MARGINAL	MARGINAL

Table 2A. Qualitative macroinvertebrate sampling results for selected streams in the Huron River and Ottawa-Stony River Watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne Counties, June and August 2012.

TAXA	Norton Creek West Maple Road 6/11/2012 STATION A	Norton Creek Buno Road 6/11/2012 STATION B
PLATYHELMINTHES (flatworms)		
Turbellaria	21	1
ANNELIDA (segmented worms)		
Hirudinea (leeches)	1	
Oligochaeta (worms)	41	5
ARTHROPODA		
Crustacea		
Amphipoda (scuds)	67	45
Isopoda (sowbugs)	162	83
Arachnoidea		
Hydracarina	1	1
Insecta		
Odonata		
Anisoptera (dragonflies)		
Aeshnidae	1	
Zygoptera (damselflies)		
Calopterygidae	7	6
Coenagrionidae		4
Hemiptera (true bugs)		
Corixidae	2	3
Gerridae	2	2
Pleidae	1	1
Trichoptera (caddisflies)		
Hydropsychidae		1
Hydroptilidae		13
Coleoptera (beetles)		
Dytiscidae (total)	1	1
Haliplidae (adults)	1	
Hydrophilidae (total)	1	
Dryopidae		2
Elmidae	1	19
Haliplidae (larvae)	1	
Diptera (flies)		
Ceratopogonidae	1	
Chironomidae	24	64
Culicidae	1	1
Tipulidae	1	
MOLLUSCA		
Gastropoda (snails)		
Bithyniidae		2
Physidae	1	9
Planorbidae		2
Pelecypoda (bivalves)		
Sphaeriidae (clams)	21	
TOTAL INDIVIDUALS	360	265

Table 2B. Macroinvertebrate metric evaluation of selected streams in the Huron River and Ottawa-Stony River watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne counties, June and August 2012.

This METRIC	Norton Creek West Maple Road 6/11/2012 STATION A		Norton Creek Buno Road 6/11/2012 STATION B	
	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	21	0	20	0
NUMBER OF MAYFLY TAXA	0	-1	0	-1
NUMBER OF CADDISFLY TAXA	0	-1	2	0
NUMBER OF STONEFLY TAXA	0	-1	0	-1
PERCENT MAYFLY COMP.	0.00	-1	0.00	-1
PERCENT CADDISFLY COMP.	0.00	-1	5.28	0
PERCENT DOMINANT TAXON	45.00	-1	31.32	0
PERCENT ISOPOD, SNAIL, LEECH	45.56	-1	36.23	-1
PERCENT SURF. AIR BREATHERS	2.50	1	3.02	1
TOTAL SCORE		-6		-3
MACROINV. COMMUNITY RATING		POOR		ACCEPT.

Table 2A. Qualitative macroinvertebrate sampling results for selected streams in the Huron River and Ottawa-Stony River Watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne Counties, June and August 2012.

TAXA	Woods Creek Lower Huron Metro Parkway 6/12/2012 STATION E	Silver Creek Vreeland Road 6/25/2012 STATION F
PLATYHELMINTHES (flatworms)		
Turbellaria		4
ANNELIDA (segmented worms)		
Hirudinea (leeches)		1
Oligochaeta (worms)	15	13
ARTHROPODA		
Crustacea		
Amphipoda (scuds)	33	2
Decapoda (crayfish)	28	1
Isopoda (sowbugs)	1	140
Arachnoidea		
Hydracarina	1	2
Insecta		
Ephemeroptera (mayflies)		
Baetidae	1	
Caenidae	12	
Heptageniidae	1	
Odonata		
Anisoptera (dragonflies)		
Aeshnidae	2	
Gomphidae		1
Zygotera (damselflies)		
Calopterygidae	2	2
Coenagrionidae		4
Plecoptera (stoneflies)		
Perlidae	1	
Hemiptera (true bugs)		
Gerridae		2
Veliidae		4
Trichoptera (caddisflies)		
Hydropsychidae	44	
Leptoceridae	2	
Philopotamidae	4	
Coleoptera (beetles)		
Hydrophilidae (total)	2	
Elmidae	68	
Diptera (flies)		
Ceratopogonidae		2
Chironomidae	81	198
Simuliidae	2	
Tabanidae	2	
Tipulidae	1	
MOLLUSCA		
Gastropoda (snails)		
Physidae	1	1
Viviparidae	1	
Pelecypoda (bivalves)		
Corbiculidae	8	
Sphaeriidae (clams)		1
TOTAL INDIVIDUALS	313	378

Table 2B. Macroinvertebrate metric evaluation of selected streams in the Huron River and Ottawa-Stony River watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne counties, June and August 2012.

METRIC	Woods Creek Lower Huron Metro Parkway 6/12/2012 STATION E		Silver Creek Vreeland Road 6/25/2012 STATION F	
	Value	Score	Value	Score
	TOTAL NUMBER OF TAXA	23	1	16
NUMBER OF MAYFLY TAXA	3	1	0	-1
NUMBER OF CADDISFLY TAXA	3	1	0	-1
NUMBER OF STONEFLY TAXA	1	1	0	-1
PERCENT MAYFLY COMP.	4.47	-1	0.00	-1
PERCENT CADDISFLY COMP.	15.97	0	0.00	-1
PERCENT DOMINANT TAXON	25.88	-1	52.38	-1
PERCENT ISOPOD, SNAIL, LEECH	0.96	1	37.57	-1
PERCENT SURF. AIR BREATHERS	0.64	1	1.59	1
TOTAL SCORE		4		-6
MACROINV. COMMUNITY RATING		ACCEPT.		POOR

Table 2A. Qualitative macroinvertebrate sampling results for selected streams in the Huron River and Ottawa-Stony River Watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne Counties, June and August 2012.

TAXA	Portage Creek Green Road 8/23/2012 STATION 1T	Woodruff Creek Spencer Road 8/22/2012 STATION 2T	Hay Creek Rush Lake Road 8/23/2012 STATION 3T	Unnamed Trib to Mill Creek Waters Road 8/23/2012 STATION 4T
ANNELIDA (segmented worms)				
Hirudinea (leeches)	1		1	
Oligochaeta (worms)	5	1	2	2
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	5	1	134	
Decapoda (crayfish)		3		1
Isopoda (sowbugs)		9		
Arachnoidea				
Hydracarina	2	1		
Insecta				
Ephemeroptera (mayflies)				
Baetidae	10	22	2	
Caenidae	1			
Heptageniidae	2	10		
Leptophlebiidae				1
Odonata				
Anisoptera (dragonflies)				
Aeshnidae	2	1	1	2
Gomphidae			1	
Libellulidae	32	1		
Zygoptera (damselflies)				
Calopterygidae	1	67	37	1
Coenagrionidae	167	2	1	1
Hemiptera (true bugs)				
Belostomatidae	1		1	
Corixidae	9			
Gerridae			1	
Mesoveliidae	5			
Notonectidae	3		1	
Pleidae	1		1	
Veliidae		4	1	1
Megaloptera				
Sialidae (alder flies)	2		2	10
Trichoptera (caddisflies)				
Helicopsychidae		34		
Hydropsychidae		23		9
Hydroptilidae	2	2		
Leptoceridae		13	4	
Limnephilidae		2		1
Molannidae			1	4
Philopotamidae			1	
Phryganeidae		4	1	
Coleoptera (beetles)				
Dytiscidae (total)			1	
Gyrinidae (adults)		1		
Haliplidae (adults)	1			
Hydrophilidae (total)	1			
Elmidae	13	20	16	6
Psephenidae (larvae)		11		
Diptera (flies)				
Ceratopogonidae			1	1
Chironomidae	25	15	26	26
Dixidae			3	
Tabanidae	3	5		1
Tipulidae		2		13
MOLLUSCA				
Gastropoda (snails)				
Ancylidae (limpets)	9	3	4	
Physidae		3		1
Planorbidae	2	1		
Pleuroceridae		2		
Viviparidae		9		
Pelecypoda (bivalves)				
Corbiculidae		1		
Dreissenidae		3		
Sphaeriidae (clams)		14	1	4
Unionidae (mussels)		1		
TOTAL INDIVIDUALS	305	291	245	85

Table 2B. Macroinvertebrate metric evaluation of selected streams in the Huron River and Ottawa-Stony River watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne counties, June and August 2012.

METRIC	Portage Creek Green Road 8/23/2012 STATION 1T		Woodruff Creek Spencer Road 8/22/2012 STATION 2T		Hay Creek Rush Lake Road 8/23/2012 STATION 3T		Unnamed Trib to Mill Creek Waters Road 8/23/2012 STATION 4T	
	Value	Score	Value	Score	Value	Score	Value	Score
	TOTAL NUMBER OF TAXA	25	1	33	1	25	1	18
NUMBER OF MAYFLY TAXA	3	0	2	0	1	0	1	0
NUMBER OF CADDISFLY TAXA	1	-1	6	1	4	1	3	0
NUMBER OF STONEFLY TAXA	0	-1	0	-1	0	-1	0	-1
PERCENT MAYFLY COMP.	4.26	0	11.00	0	0.82	-1	1.18	-1
PERCENT CADDISFLY COMP.	0.66	-1	26.80	0	2.86	-1	16.47	0
PERCENT DOMINANT TAXON	54.75	-1	23.02	0	54.69	-1	30.59	0
PERCENT ISOPOD, SNAIL, LEECH	3.93	1	9.28	0	2.04	1	1.18	1
PERCENT SURF. AIR BREATHERS	6.89	1	1.72	1	2.45	1	1.18	1
TOTAL SCORE		-1		2		0		0
MACROINV. COMMUNITY RATING		ACCEPT.		ACCEPT.		ACCEPT.		ACCEPT.

Table 2A. Qualitative macroinvertebrate sampling results for selected streams in the Huron River and Ottawa-Stony River Watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne Counties, June and August 2012.

TAXA	Huron River Teggerdine Road 8/22/2012 STATION 5T	Huron River Cedar Island Road 8/22/2012 STATION 6T	Mill Creek Marshall Rd 8/21/2012 STATION 7T	Huron River Riverbend 8/22/2012 STATION 8T
ANNELIDA (segmented worms)				
Hirudinea (leeches)				1
Oligochaeta (worms)	2	2	10	1
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	67	19	5	109
Decapoda (crayfish)	1		2	
Isopoda (sowbugs)	53			11
Arachnoidea				
Hydracarina	2	9		
Insecta				
Ephemeroptera (mayflies)				
Baetidae	3	20	15	11
Caenidae		27		2
Heptageniidae	2	2	39	6
Isonychiidae			5	
Tricorythidae				5
Odonata				
Anisoptera (dragonflies)				
Aeshnidae	2	1		
Gomphidae			1	1
Libellulidae		2		
Zygoptera (damselflies)				
Calopterygidae	21		9	8
Coenagrionidae	9	87	8	18
Hemiptera (true bugs)				
Corixidae			6	3
Gerridae	1	2		1
Veliidae	3		11	
Megaloptera				
Corydalidae (dobson flies)				
Sialidae (alder flies)	2		2	1
Trichoptera (caddisflies)				
Brachycentridae				3
Hydropsychidae			50	43
Hydroptilidae	7	7		6
Lepidostomatidae	6			2
Leptoceridae	3	7		1
Limnephilidae		1		1
Molannidae	2			
Philopotamidae			2	1
Coleoptera (beetles)				
Haliplidae (adults)				
Elmidae	39	12	26	14
Gyrinidae (larvae)				1
Psephenidae (larvae)				2
Diptera (flies)				
Athericidae				
Ceratopogonidae	2	1	3	
Chironomidae	45	44	75	15
Culicidae	1		1	
Simuliidae				1
Syrphidae				1
Tabanidae		1	5	1
MOLLUSCA				
Gastropoda (snails)				
Ancylidae (limpets)				
Bithyniidae	35		6	1
Hydrobiidae	2	26	1	1
Physidae	2	6	2	
Planorbidae		12		
Pleuroceridae				8
Pelecypoda (bivalves)				
Corbiculidae				
Dreissenidae		1	1	14
Sphaeriidae (clams)	4	3		8
TOTAL INDIVIDUALS	316	297	287	302

Table 2B. Macroinvertebrate metric evaluation of selected streams in the Huron River and Ottawa-Stony River watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne counties, June and August 2012.

METRIC	Huron River Teggerdine Road 8/22/2012 STATION 5T		Huron River Cedar Island Road 8/22/2012 STATION 6T		Mill Creek Marshall Rd 8/21/2012 STATION 7T		Huron River Riverbend 8/22/2012 STATION 8T	
	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	25	1	23	0	25	1	33	1
NUMBER OF MAYFLY TAXA	2	0	3	0	3	0	4	1
NUMBER OF CADDISFLY TAXA	4	0	3	0	2	0	7	1
NUMBER OF STONEFLY TAXA	0	-1	0	-1	0	-1	0	-1
PERCENT MAYFLY COMP.	1.58	-1	16.50	0	20.56	1	7.95	0
PERCENT CADDISFLY COMP.	5.70	0	5.05	0	18.12	0	18.87	0
PERCENT DOMINANT TAXON	21.20	0	29.29	0	26.13	0	36.09	0
PERCENT ISOPOD, SNAIL, LEECH	29.11	-1	14.81	-1	3.14	1	7.28	0
PERCENT SURF. AIR BREATHERS	1.58	1	0.67	1	6.62	1	1.66	1
TOTAL SCORE		-1		-1		3		3
MACROINV. COMMUNITY RATING		ACCEPT.		ACCEPT.		ACCEPT.		ACCEPT.

Table 2A. Qualitative macroinvertebrate sampling results for selected streams in the Huron River and Ottawa-Stony River Watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne Counties, June and August 2012.

Huron River
u-s Territorial Road (Hudson Mills Metropark)
8/21/2012
STATION 9T

TAXA	
<hr/>	
ANNELIDA (segmented worms)	
Hirudinea (leeches)	2
Oligochaeta (worms)	5
ARTHROPODA	
Crustacea	
Amphipoda (scuds)	62
Decapoda (crayfish)	1
Isopoda (sowbugs)	19
Arachnoidea	
Hydracarina	1
Insecta	
Ephemeroptera (mayflies)	
Baetidae	1
Caenidae	21
Ephemerellidae	4
Tricorythidae	5
Odonata	
Anisoptera (dragonflies)	
Aeshnidae	1
Gomphidae	4
Libellulidae	5
Zygoptera (damselflies)	
Coenagrionidae	42
Hemiptera (true bugs)	
Pleidae	2
Veliidae	1
Megaloptera	
Corydalidae (dobson flies)	1
Trichoptera (caddisflies)	
Hydroptilidae	9
Leptoceridae	3
Limnephilidae	4
Polycentropodidae	1
Lepidoptera (moths)	
Pyalidae	1
Coleoptera (beetles)	
Haliplidae (adults)	1
Elmidae	14
Psephenidae (larvae)	2
Diptera (flies)	
Ceratopogonidae	1
Chironomidae	47
MOLLUSCA	
Gastropoda (snails)	
Bithyniidae	2
Physidae	2
Pelecypoda (bivalves)	
Corbiculidae	5
Dreissenidae	1
Sphaeriidae (clams)	5
<hr/>	
TOTAL INDIVIDUALS	275

Table 2B. Macroinvertebrate metric evaluation of selected streams in the Huron River and Ottawa-Stony River watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne counties, June and August 2012.

Huron River u-s Territorial Road (Hudson Mills Metropark) 8/21/2012 STATION 9T		
METRIC	Value	Score
TOTAL NUMBER OF TAXA	32	1
NUMBER OF MAYFLY TAXA	4	1
NUMBER OF CADDISFLY TAXA	4	0
NUMBER OF STONEFLY TAXA	0	-1
PERCENT MAYFLY COMP.	11.27	0
PERCENT CADDISFLY COMP.	6.18	0
PERCENT DOMINANT TAXON	22.55	0
PERCENT ISOPOD, SNAIL, LEECH	9.09	0
PERCENT SURF. AIR BREATHERS	1.45	1
TOTAL SCORE		2
MACROINV. COMMUNITY RATING		ACCEPT.

Table 2A. Qualitative macroinvertebrate sampling results for selected streams in the Huron River and Ottawa-Stony River Watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne Counties, June and August 2012.

TAXA	Stony Creek US 24 8/21/2012 STATION 10T
ANNELIDA (segmented worms)	
Hirudinea (leeches)	1
Oligochaeta (worms)	9
ARTHROPODA	
Crustacea	
Decapoda (crayfish)	8
Isopoda (sowbugs)	20
Arachnoidea	
Hydracarina	1
Insecta	
Ephemeroptera (mayflies)	
Baetidae	5
Caenidae	4
Heptageniidae	4
Odonata	
Anisoptera (dragonflies)	
Aeshnidae	1
Zygoptera (damselflies)	
Calopterygidae	24
Coenagrionidae	100
Hemiptera (true bugs)	
Belostomatidae	1
Gerridae	2
Nepidae	8
Veliidae	5
Trichoptera (caddisflies)	
Hydropsychidae	1
Limnephilidae	1
Coleoptera (beetles)	
Dytiscidae (total)	1
Elmidae	4
Diptera (flies)	
Chironomidae	77
Culicidae	2
Tabanidae	1
Tipulidae	1
MOLLUSCA	
Gastropoda (snails)	
Bithyniidae	8
Physidae	1
Pelecypoda (bivalves)	
Corbiculidae	22
Sphaeriidae (clams)	1
TOTAL INDIVIDUALS	313

Table 2B. Macroinvertebrate metric evaluation of selected streams in the Huron River and Ottawa-Stony River watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne counties, June and August 2012.

Stony Creek US 24 8/21/2012 STATION 10T		
METRIC	Value	Score
TOTAL NUMBER OF TAXA	27	0
NUMBER OF MAYFLY TAXA	3	0
NUMBER OF CADDISFLY TAXA	2	0
NUMBER OF STONEFLY TAXA	0	-1
PERCENT MAYFLY COMP.	4.15	-1
PERCENT CADDISFLY COMP.	0.64	-1
PERCENT DOMINANT TAXON	31.95	-1
PERCENT ISOPOD, SNAIL, LEECH	9.58	0
PERCENT SURF. AIR BREATHERS	6.07	1
TOTAL SCORE		-3
MACROINV. COMMUNITY RATING		ACCEPT.

Table 3. Habitat evaluation for selected streams in the Huron River and Ottawa-Stony River Watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne Counties, June and August 2012.

	Mann Creek Kensington Road GLIDE/POOL STATION 1	Unadilla Stockbridge Drain Dutton Road GLIDE/POOL STATION 2	Chilson Creek M-36 GLIDE/POOL STATION 3	Davis Creek Pinebrook Lane GLIDE/POOL STATION 4	Honey Creek Cedar Lake Road GLIDE/POOL STATION 5
HABITAT METRIC					
Substrate and Instream Cover					
Epifaunal Substrate/ Avail Cover (20)	13	8	13	11	11
Embeddedness (20)*					
Velocity/Depth Regime (20)*					
Pool Substrate Characterization (20)**	15	9	14	11	16
Pool Variability (20)**	16	6	11	13	15
Channel Morphology					
Sediment Deposition (20)	16	8	16	10	10
Flow Status - Maint. Flow Volume (10)	10	10	10	10	10
Flow Status - Flashiness (10)	8	7	9	7	9
Channel Alteration (20)	13	15	15	20	19
Frequency of Riffles/Bends (20)*					
Channel Sinuosity (20)**	18	13	11	13	13
Riparian and Bank Structure					
Bank Stability (L) (10)	10	10	10	9	10
Bank Stability (R) (10)	10	10	10	9	10
Vegetative Protection (L) (10)	9	8	10	9	9
Vegetative Protection (R) (10)	9	9	10	9	9
Riparian Veg. Zone Width (L) (10)	9	4	10	10	10
Riparian Veg. Zone Width (R) (10)	9	10	10	4	10
TOTAL SCORE (200):	165	127	159	145	161
HABITAT RATING:	EXCELLENT (NON- IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	EXCELLENT (NON- IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	EXCELLENT (NON- IMPAIRED)
Note: Individual metrics may better describe conditions directly affecting the biological community while the Habitat Rating describes the general riverine environment at the site(s).					
Date:	6/14/2012	6/13/2012	6/13/2012	6/13/2012	6/13/2012
Weather:	Sunny	Sunny	Sunny	Sunny	Sunny
Air Temperature:	65 Deg. F.	65 Deg. F.	75 Deg. F.	75 Deg. F.	75 Deg. F.
Water Temperature:	54 Deg. F.	52 Deg. F.	70 Deg. F.	68 Deg. F.	59 Deg. F.
Ave. Stream Width:	12 Feet	5 Feet	7 Feet	8 Feet	15 Feet
Ave. Stream Depth:	1.5 Feet	0.3 Feet	2 Feet	1 Feet	3 Feet
Surface Velocity:	0.7 Ft./Sec.	0.5 Ft./Sec.	0.8 Ft./Sec.	0.7 Ft./Sec.	0.25 Ft./Sec.
Estimated Flow:	12.6 CFS	0.75 CFS	11.2 CFS	5.6 CFS	11.25 CFS
Stream Modifications:	Relocated	Dredged	None	None	None
Nuisance Plants (Y/N):	N	N	N	N	N
Report Number:					
STORET No.:	470652	470653	470543	470654	470515
Stream Name:	Mann Creek	Unadilla Stockbridge Drain	Chilson Creek	Davis Creek	Honey Creek
Road Crossing/Location:	Kensington Road	Dutton Road	M-36	Pinebrook Lane	Cedar Lake Road
County Code:	47	47	47	47	47
TRS:	02N06E14	01N03E08	01N05E21	01N06E14	01N04E22
Latitude (dd):	42.56942	42.48764	42.4664	42.47619	42.4583
Longitude (dd):	-83.69911	-84.11967	-83.8581	-83.69929	-83.9661
Ecoregion:	SMNITP	SMNITP	SMNITP	SMNITP	SMNITP
Stream Type:	Warmwater	Warmwater	Warmwater	Warmwater	Warmwater
USGS Basin Code:	4090005	4090005	4090005	4090005	4090005

* Applies only to Riffle/Run stream Surveys

** Applies only to Glide/Pool stream Surveys

COMMENTS:

Table 3. Habitat evaluation for selected streams in the Huron River and Ottawa-Stony River Watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne Counties, June and August 2012.

	Portage Creek Roepke Road GLIDE/POOL STATION 6	Huron River Rickett Road GLIDE/POOL STATION 7	Hay Creek M36 GLIDE/POOL STATION 8	Unnamed Trib to Unadilla ! Brogan Road GLIDE/POOL STATION 9	Letts Creek Sylvan Road GLIDE/POOL STATION 10
HABITAT METRIC					
Substrate and Instream Cover					
Epifaunal Substrate/ Avail Cover (20)	10	14	6	14	9
Embeddedness (20)*					
Velocity/Depth Regime (20)*					
Pool Substrate Characterization (20)**	15	15	11	8	8
Pool Variability (20)**	8	13	11	8	8
Channel Morphology					
Sediment Deposition (20)	10	8	3	13	8
Flow Status - Maint. Flow Volume (10)	9	9	8	9	3
Flow Status - Flashiness (10)	3	4	6	9	6
Channel Alteration (20)	15	19	18	15	16
Frequency of Riffles/Bends (20)*					
Channel Sinuosity (20)**	8	8	13	8	8
Riparian and Bank Structure					
Bank Stability (L) (10)	8	7	8	9	7
Bank Stability (R) (10)	8	8	8	9	8
Vegetative Protection (L) (10)	7	9	7	9	9
Vegetative Protection (R) (10)	7	6	7	9	9
Riparian Veg. Zone Width (L) (10)	10	9	9	1	9
Riparian Veg. Zone Width (R) (10)	4	3	8	9	7
TOTAL SCORE (200):	122	132	123	130	115

HABITAT RATING:	GOOD (SLIGHTLY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)
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Note: Individual metrics may better describe conditions directly affecting the biological community while the Habitat Rating describes the general riverine environment at the site(s).

	6/13/2012	6/25/2012	6/28/2012	6/28/2012	6/27/2012
Date:	6/13/2012	6/25/2012	6/28/2012	6/28/2012	6/27/2012
Weather:	Sunny	Sunny	Sunny	Sunny	Sunny
Air Temperature:	62 Deg. F.	70 Deg. F.	80 Deg. F.	75 Deg. F.	80 Deg. F.
Water Temperature:	64 Deg. F.	70 Deg. F.	68 Deg. F.	62 Deg. F.	72 Deg. F.
Ave. Stream Width:	30 Feet	60 Feet	8 Feet	5 Feet	3 Feet
Ave. Stream Depth:	1 Feet	2 Feet	1 Feet	0.25 Feet	0.2 Feet
Surface Velocity:	0.5 Ft./Sec.	0.75 Ft./Sec.	0.9 Ft./Sec.	1 Ft./Sec.	0.1 Ft./Sec.
Estimated Flow:	15 CFS	90 CFS	7.2 CFS	1.25 CFS	0.06 CFS
Stream Modifications:	Dredged	Bank Stabilization	None	Dredged	None
Nuisance Plants (Y/N):	N	N	N	N	N
Report Number:					
STORET No.:	470655	470493	470656	330457	810587
Stream Name:	Portage Creek	Huron River	Hay Creek Jnadilla Stockbridge Drain		Letts Creek
Road Crossing/Location:	Roepke Road	Rickett Road	M36	Brogan Road	Sylvan Road
County Code:	47	47	47	33	81
TRS:	01N03E34	01N06E17	01N05E19	xxxxxxx	02S03E28
Latitude (dd):	42.43631	42.47861	42.46175	42.46537	42.26978
Longitude (dd):	-84.07527	-83.7672	-83.89469	-84.16106	-84.07699
Ecoregion:	SMNITP	SMNITP	SMNITP	SMNITP	SMNITP
Stream Type:	Warmwater	Warmwater	Warmwater	Warmwater	Warmwater
USGS Basin Code:	4090005	4090005	4090005	4090005	4090005

* Applies only to Riffle/Run stream Surveys

** Applies only to Glide/Pool stream Surveys

COMMENTS:

Table 3. Habitat evaluation for selected streams in the Huron River and Ottawa-Stony River Watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne Counties, June and August 2012.

	Letts Creek M-52 Pk GLIDE/POOL STATION 11	Huron River Cedar Island Road GLIDE/POOL STATION 12			
HABITAT METRIC					
Substrate and Instream Cover					
Epifaunal Substrate/ Avail Cover (20)	8	12			
Embeddedness (20)*					
Velocity/Depth Regime (20)*					
Pool Substrate Characterization (20)**	6	11			
Pool Variability (20)**	8	3			
Channel Morphology					
Sediment Deposition (20)	6	3			
Flow Status - Maint. Flow Volume (10)	9	9			
Flow Status - Flashiness (10)	7	9			
Channel Alteration (20)	13	15			
Frequency of Riffles/Bends (20)*					
Channel Sinuosity (20)**	8	13			
Riparian and Bank Structure					
Bank Stability (L) (10)	8	7			
Bank Stability (R) (10)	8	7			
Vegetative Protection (L) (10)	2	7			
Vegetative Protection (R) (10)	7	9			
Riparian Veg. Zone Width (L) (10)	1	6			
Riparian Veg. Zone Width (R) (10)	3	8			
TOTAL SCORE (200):	94	119	0	0	0

HABITAT RATING:	MARGINAL (MODERATELY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	POOR (SEVERELY IMPAIRED)	POOR (SEVERELY IMPAIRED)	POOR (SEVERELY IMPAIRED)
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Note: Individual metrics may better describe conditions directly affecting the biological community while the Habitat Rating describes the general riverine environment at the site(s).

Date:	6/28/2012	8/22/2012			
Weather:	Sunny	Sunny			
Air Temperature:	95 Deg. F.	80 Deg. F.	Deg. F.	Deg. F.	Deg. F.
Water Temperature:	72 Deg. F.	71 Deg. F.	Deg. F.	Deg. F.	Deg. F.
Ave. Stream Width:	20 Feet	25 Feet	Feet	Feet	Feet
Ave. Stream Depth:	1 Feet	1 Feet	Feet	Feet	Feet
Surface Velocity:	0.1 Ft./Sec.	0.25 Ft./Sec.	Ft./Sec.	Ft./Sec.	Ft./Sec.
Estimated Flow:	2 CFS	6.25 CFS	CFS	CFS	CFS
Stream Modifications:	None	None			
Nuisance Plants (Y/N):	N	N			
Report Number:					
STORET No.:	810502	631035			
Stream Name:	Letts Creek	Huron River			
Road Crossing/Location:	M-52 Pk	Cedar Island Road			
County Code:	81	63			
TRS:	02S03E12	03N08E27			
Latitude (dd):	42.32417	42.6275			
Longitude (dd):	-84.02139	-83.4956			
Ecoregion:	SMNITP	SMNITP			
Stream Type:	Warmwater	Warmwater			
USGS Basin Code:	4090005	4090005			

* Applies only to Riffle/Run stream Surveys

** Applies only to Glide/Pool stream Surveys

COMMENTS:

Table 3. Habitat evaluation for selected streams in the Huron River and Ottawa-Stony River Watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne Counties, June and August 2012.

	Malletts Creek Washtenaw Avenue RIFFLE/RUN STATION 13	Fleming Creek Matthei Botanical Gardens RIFFLE/RUN STATION 14	Huron River LeForge Road RIFFLE/RUN STATION 15	Mill Creek downstream Dexter-Pinckr RIFFLE/RUN STATION 16	Mill Creek Lima Center Road GLIDE/POOL STATION 17
HABITAT METRIC					
Substrate and Instream Cover					
Epifaunal Substrate/ Avail Cover (20)	13	15	15	13	6
Embeddedness (20)*	16	16	18	16	
Velocity/Depth Regime (20)*	16	13	19	16	
Pool Substrate Characterization (20)**					6
Pool Variability (20)**					10
Channel Morphology					
Sediment Deposition (20)	13	13	18	13	3
Flow Status - Maint. Flow Volume (10)	8	9	9	9	9
Flow Status - Flashiness (10)	1	8	9	3	1
Channel Alteration (20)	1	16	18	13	13
Frequency of Riffles/Bends (20)*	8	16	13	16	
Channel Sinuosity (20)**					5
Riparian and Bank Structure					
Bank Stability (L) (10)	7	9	9	9	7
Bank Stability (R) (10)	4	9	9	9	7
Vegetative Protection (L) (10)	3	9	6	5	9
Vegetative Protection (R) (10)	1	9	6	2	9
Riparian Veg. Zone Width (L) (10)	3	9	3	3	9
Riparian Veg. Zone Width (R) (10)	3	9	3	1	6
TOTAL SCORE (200):	97	160	155	128	100
HABITAT RATING:	MARGINAL (MODERATELY IMPAIRED)	EXCELLENT (NON- IMPAIRED)	EXCELLENT (NON- IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	MARGINAL (MODERATELY IMPAIRED)
Note: Individual metrics may better describe conditions directly affecting the biological community while the Habitat Rating describes the general riverine environment at the site(s).					
Date:	6/27/2012	6/14/2012	6/15/2012	6/14/2012	6/14/2012
Weather:	Sunny	Sunny	Sunny	Sunny	Sunny
Air Temperature:	80 Deg. F.	65 Deg. F.	70 Deg. F.	75 Deg. F.	80 Deg. F.
Water Temperature:	66 Deg. F.	70 Deg. F.	72 Deg. F.	64 Deg. F.	64 Deg. F.
Ave. Stream Width:	25 Feet	15 Feet	150 Feet	25 Feet	20 Feet
Ave. Stream Depth:	0.5 Feet	0.6 Feet	2 Feet	1.5 Feet	1.5 Feet
Surface Velocity:	1 Ft./Sec.	0.5 Ft./Sec.	2 Ft./Sec.	1 Ft./Sec.	0.3 Ft./Sec.
Estimated Flow:	12.5 CFS	4.5 CFS	600 CFS	37.5 CFS	9 CFS
Stream Modifications:	Dredged	None	Bank Stabilization	Canopy Removal	Dredged
Nuisance Plants (Y/N):	N	N	N	N	N
Report Number:					
STORET No.:	810584	810461	810232	810537	810582
Stream Name:	Chalmers Drain	Fleming Creek	Huron River	Mill Creek	Mill Creek
Road Crossing/Location:	Washtenaw Avenue	Matthei Botanical Gardens	LeForge Road	downstream Dexter-Pinckr	Lima Center Road
County Code:	81	81	81	81	81
TRS:	03S06E02	02S07E19	03S07E05	01S05E31	02S04E34
Latitude (dd):	42.25639	42.30064	42.25583	42.3394	42.26655
Longitude (dd):	-83.69354	-83.65988	-83.62	-83.89056	-83.9558
Ecoregion:	ECBP	ECBP	ECBP	ECBP	ECBP
Stream Type:	Warmwater	Warmwater	Warmwater	Warmwater	Warmwater
USGS Basin Code:	4090005	4090005	4090005	4090005	4090005

* Applies only to Riffle/Run stream Surveys

** Applies only to Glide/Pool stream Surveys

COMMENTS:

Table 3. Habitat evaluation for selected streams in the Huron River and Ottawa-Stony River Watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne Counties, June and August 2012.

Unnamed Tributary to Mill Creek
 Liberty Road
 GLIDE/POOL
 STATION 18

HABITAT METRIC

Substrate and Instream Cover					
Epifaunal Substrate/ Avail Cover (20)	8				
Embeddedness (20)*					
Velocity/Depth Regime (20)*					
Pool Substrate Characterization (20)**	13				
Pool Variability (20)**	15				
Channel Morphology					
Sediment Deposition (20)	6				
Flow Status - Maint. Flow Volume (10)	9				
Flow Status - Flashiness (10)	7				
Channel Alteration (20)	13				
Frequency of Riffles/Bends (20)*					
Channel Sinuosity (20)**	5				
Riparian and Bank Structure					
Bank Stability (L) (10)	8				
Bank Stability (R) (10)	8				
Vegetative Protection (L) (10)	8				
Vegetative Protection (R) (10)	8				
Riparian Veg. Zone Width (L) (10)	10				
Riparian Veg. Zone Width (R) (10)	10				
TOTAL SCORE (200):	128	0	0	0	0

HABITAT RATING:	GOOD (SLIGHTLY IMPAIRED)	POOR (SEVERELY IMPAIRED)	POOR (SEVERELY IMPAIRED)	POOR (SEVERELY IMPAIRED)	POOR (SEVERELY IMPAIRED)
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Note: Individual metrics may better describe conditions directly affecting the biological community while the Habitat Rating describes the general riverine environment at the site(s).

Date:	6/14/2012				
Weather:	Sunny				
Air Temperature:	80 Deg. F.	Deg. F.	Deg. F.	Deg. F.	Deg. F.
Water Temperature:	68 Deg. F.	Deg. F.	Deg. F.	Deg. F.	Deg. F.
Ave. Stream Width:	10 Feet	Feet	Feet	Feet	Feet
Ave. Stream Depth:	1 Feet	Feet	Feet	Feet	Feet
Surface Velocity:	0.1 Ft./Sec.	Ft./Sec.	Ft./Sec.	Ft./Sec.	Ft./Sec.
Estimated Flow:	1 CFS	CFS	CFS	CFS	CFS
Stream Modifications:	Dredged				
Nuisance Plants (Y/N):	N				
Report Number:					

STORET No.:	810580
Stream Name:	ary to Mill Creek
Road Crossing/Location:	Liberty Road
County Code:	81
TRS:	02S04E35
Latitude (dd):	42.26728
Longitude (dd):	-83.92291
Ecoregion:	ECBP
Stream Type:	Warmwater
USGS Basin Code:	4090005

* Applies only to Riffle/Run stream Surveys
 ** Applies only to Glide/Pool stream Surveys

COMMENTS:

Table 3. Habitat evaluation for selected streams in the Huron River and Ottawa-Stony River Watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne Counties, June and August 2012.

	Huron River Huron River Road GLIDE/POOL STATION 19	Sugar Creek Hitchingham Road GLIDE/POOL STATION 20	Buck Creek Hitchingham Road GLIDE/POOL STATION 21	Smith Creek Gibralter Road GLIDE/POOL STATION 22	Stony Creek Stony Creek Road GLIDE/POOL STATION 23
HABITAT METRIC					
Substrate and Instream Cover					
Epifaunal Substrate/ Avail Cover (20)	2	12	15	6	10
Embeddedness (20)*					
Velocity/Depth Regime (20)*					
Pool Substrate Characterization (20)**	6	12	13	6	11
Pool Variability (20)**	2	9	10	3	10
Channel Morphology					
Sediment Deposition (20)	3	15	8	3	15
Flow Status - Maint. Flow Volume (10)	9	7	9	5	9
Flow Status - Flashiness (10)	6	4	4	1	8
Channel Alteration (20)	13	14	18	13	18
Frequency of Riffles/Bends (20)*					
Channel Sinuosity (20)**	11	8	13	6	13
Riparian and Bank Structure					
Bank Stability (L) (10)	7	8	7	7	9
Bank Stability (R) (10)	7	8	7	7	9
Vegetative Protection (L) (10)	5	9	9	7	8
Vegetative Protection (R) (10)	1	9	9	7	8
Riparian Veg. Zone Width (L) (10)	7	10	10	3	9
Riparian Veg. Zone Width (R) (10)	5	10	10	3	4
TOTAL SCORE (200):	84	135	142	77	141
HABITAT RATING:	MARGINAL (MODERATELY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	MARGINAL (MODERATELY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)

Note: Individual metrics may better describe conditions directly affecting the biological community while the Habitat Rating describes the general riverine environment at the site(s).

	8/21/2012	6/25/2012	6/26/2012	6/25/2012	6/15/2012
Date:	8/21/2012	6/25/2012	6/26/2012	6/25/2012	6/15/2012
Weather:	Partly Cloudy	Sunny	Sunny	Sunny	Sunny
Air Temperature:	70 Deg. F.	75 Deg. F.	70 Deg. F.	75 Deg. F.	80 Deg. F.
Water Temperature:	74 Deg. F.	68 Deg. F.	58 Deg. F.	62 Deg. F.	57 Deg. F.
Ave. Stream Width:	80 Feet	10 Feet	8 Feet	8 Feet	6 Feet
Ave. Stream Depth:	2.5 Feet	0.25 Feet	0.3 Feet	0.8 Feet	0.25 Feet
Surface Velocity:	1 Ft./Sec.	0.1 Ft./Sec.	1 Ft./Sec.	0.1 Ft./Sec.	0.75 Ft./Sec.
Estimated Flow:	200 CFS	0.25 CFS	2.4 CFS	0.64 CFS	1.125 CFS
Stream Modifications:	ank Stabilization	None	None	Dredged	None
Nuisance Plants (Y/N):	N	N	N	N	N
Report Number:					
STORET No.:	821410	810586	810585	821581	810583
Stream Name:	Huron River	Sugar Creek	Buck Creek	Smith Creek	Stony Creek
Road Crossing/Location:	Huron River Road	Hitchingham Road	Hitchingham Road	Gibralter Road	Stony Creek Road
County Code:	82	81	81	82	81
TRS:	03S08E24	04S07E32	04S07E29	04S10E33	04S07E07
Latitude (dd):	42.21076	42.09669	42.10247	42.09505	42.1534
Longitude (dd):	-83.4347	-83.61812	-83.61836	-83.24788	-83.65319
Ecoregion:	HELP	HELP	HELP	HELP	HELP
Stream Type:	Warmwater	Warmwater	Warmwater	Warmwater	Warmwater
USGS Basin Code:	4090005	4100001	4100001	4090005	4100001

* Applies only to Riffle/Run stream Surveys

** Applies only to Glide/Pool stream Surveys

COMMENTS:

Table 3. Habitat evaluation for selected streams in the Huron River and Ottawa-Stony River Watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne Counties, June and August 2012.

	Silver Creek Gibraltar Road GLIDE/POOL STATION 24	Paint Creek Textile Road GLIDE/POOL STATION 25	Huron River Lower Huron Metro Pk Ri GLIDE/POOL STATION 26	Buck Creek Willow Road GLIDE/POOL STATION 27	Paint Creek Martz Road GLIDE/POOL STATION 28
HABITAT METRIC					
Substrate and Instream Cover					
Epifaunal Substrate/ Avail Cover (20)	6	10	10	6	6
Embeddedness (20)*					
Velocity/Depth Regime (20)*					
Pool Substrate Characterization (20)**	8	15	13	11	11
Pool Variability (20)**	3	16	8	13	13
Channel Morphology					
Sediment Deposition (20)	2	13	15	8	11
Flow Status - Maint. Flow Volume (10)	7	9	8	9	9
Flow Status - Flashiness (10)	7	7	1	1	4
Channel Alteration (20)	13	13	19	6	13
Frequency of Riffles/Bends (20)*					
Channel Sinuosity (20)**	8	11	13	5	8
Riparian and Bank Structure					
Bank Stability (L) (10)	9	8	8	4	4
Bank Stability (R) (10)	9	8	8	4	4
Vegetative Protection (L) (10)	3	8	4	4	4
Vegetative Protection (R) (10)	3	8	4	4	4
Riparian Veg. Zone Width (L) (10)	1	3	1	1	3
Riparian Veg. Zone Width (R) (10)	1	3	3	1	6
TOTAL SCORE (200):	80	132	115	77	100
HABITAT RATING:	MARGINAL (MODERATELY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	MARGINAL (MODERATELY IMPAIRED)	MARGINAL (MODERATELY IMPAIRED)
Note: Individual metrics may better describe conditions directly affecting the biological community while the Habitat Rating describes the general riverine environment at the site(s).					
Date:	6/26/2012	6/12/2012	6/12/2012	6/15/2012	6/15/2012
Weather:	Sunny	Sunny	Sunny	Sunny	Sunny
Air Temperature:	65 Deg. F.	Deg. F.	75 Deg. F.	85 Deg. F.	80 Deg. F.
Water Temperature:	64 Deg. F.	63 Deg. F.	76 Deg. F.	61 Deg. F.	59 Deg. F.
Ave. Stream Width:	12 Feet	15 Feet	50 Feet	5 Feet	13 Feet
Ave. Stream Depth:	0.25 Feet	2 Feet	1.5 Feet	2 Feet	1.5 Feet
Surface Velocity:	0.1 Ft./Sec.	0.6 Ft./Sec.	0.5 Ft./Sec.	0.3 Ft./Sec.	0.5 Ft./Sec.
Estimated Flow:	0.3 CFS	18 CFS	37.5 CFS	3 CFS	9.75 CFS
Stream Modifications:	Dredged	None	Bank Stabilization	Dredged	Dredged
Nuisance Plants (Y/N):	Y	N	N	N	N
Report Number:					
STORET No.:	821580	810581	821114	810579	810578
Stream Name:	Silver Creek	Paint Creek	Huron River	Buck Creek	Paint Creek
Road Crossing/Location:	Gibraltar Road	Textile Road	Lower Huron Metro Pk Ri	Willow Road	Martz Road
County Code:	82	81	82	81	81
TRS:	04S10E32	03S07E21	03S08E36	04S07E20	03S07E34
Latitude (dd):	42.09457	42.20177	42.1875	42.11319	42.18063
Longitude (dd):	-83.2751	-83.61248	-83.4253	-83.63572	-83.5947
Ecoregion:	HELP	HELP	HELP	HELP	HELP
Stream Type:	Warmwater	Coldwater	Warmwater	Warmwater	Coldwater
USGS Basin Code:	4090005	4100001	4090005	4100001	4100001

* Applies only to Riffle/Run stream Surveys
 ** Applies only to Glide/Pool stream Surveys

COMMENTS:

Table 3. Habitat evaluation for selected streams in the Huron River and Ottawa-Stony River Watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne Counties, June and August 2012.

Swan Creek
Colf Road (east)
GLIDE/POOL
STATION 29

HABITAT METRIC

HABITAT METRIC					
Substrate and Instream Cover					
Epifaunal Substrate/ Avail Cover (20)	11				
Embeddedness (20)*					
Velocity/Depth Regime (20)*					
Pool Substrate Characterization (20)**	6				
Pool Variability (20)**	8				
Channel Morphology					
Sediment Deposition (20)	15				
Flow Status - Maint. Flow Volume (10)	8				
Flow Status - Flashiness (10)	3				
Channel Alteration (20)	13				
Frequency of Riffles/Bends (20)*					
Channel Sinuosity (20)**	15				
Riparian and Bank Structure					
Bank Stability (L) (10)	7				
Bank Stability (R) (10)	7				
Vegetative Protection (L) (10)	9				
Vegetative Protection (R) (10)	9				
Riparian Veg. Zone Width (L) (10)	9				
Riparian Veg. Zone Width (R) (10)	3				
TOTAL SCORE (200):	123	0	0	0	0

HABITAT RATING:	GOOD (SLIGHTLY IMPAIRED)	POOR (SEVERELY IMPAIRED)	POOR (SEVERELY IMPAIRED)	POOR (SEVERELY IMPAIRED)	POOR (SEVERELY IMPAIRED)
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Note: Individual metrics may better describe conditions directly affecting the biological community while the Habitat Rating describes the general riverine environment at the site(s).

Date:	6/25/2012				
Weather:	Sunny				
Air Temperature:	80 Deg. F.	Deg. F.	Deg. F.	Deg. F.	Deg. F.
Water Temperature:	70 Deg. F.	Deg. F.	Deg. F.	Deg. F.	Deg. F.
Ave. Stream Width:	10 Feet	Feet	Feet	Feet	Feet
Ave. Stream Depth:	0.5 Feet	Feet	Feet	Feet	Feet
Surface Velocity:	0.75 Ft./Sec.	Ft./Sec.	Ft./Sec.	Ft./Sec.	Ft./Sec.
Estimated Flow:	3.75 CFS	CFS	CFS	CFS	CFS
Stream Modifications:	None				
Nuisance Plants (Y/N):	N				
Report Number:					

STORET No.:	580590
Stream Name:	Swan Creek
Road Crossing/Location:	Colf Road (east)
County Code:	58
TRS:	05S08E2

Latitude (dd):	42.0731
Longitude (dd):	-83.44967
Ecoregion:	HELP
Stream Type:	Warmwater

USGS Basin Code:	4100001
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* Applies only to Riffle/Run stream Surveys
** Applies only to Glide/Pool stream Surveys

COMMENTS:

Table 3. Habitat evaluation for selected streams in the Huron River and Ottawa-Stony River Watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne Counties, June and August 2012.

	Norton Creek West Maple Road GLIDE/POOL STATION A	Norton Creek Buno Road GLIDE/POOL STATION B			
HABITAT METRIC					
Substrate and Instream Cover					
Epifaunal Substrate/ Avail Cover (20)	14	10			
Embeddedness (20)*					
Velocity/Depth Regime (20)*					
Pool Substrate Characterization (20)**	16	12			
Pool Variability (20)**	13	13			
Channel Morphology					
Sediment Deposition (20)	15	11			
Flow Status - Maint. Flow Volume (10)	10	9			
Flow Status - Flashiness (10)	7	7			
Channel Alteration (20)	15	18			
Frequency of Riffles/Bends (20)*					
Channel Sinuosity (20)**	13	13			
Riparian and Bank Structure					
Bank Stability (L) (10)	10	10			
Bank Stability (R) (10)	7	10			
Vegetative Protection (L) (10)	10	10			
Vegetative Protection (R) (10)	1	10			
Riparian Veg. Zone Width (L) (10)	6	10			
Riparian Veg. Zone Width (R) (10)	1	10			
TOTAL SCORE (200):	138	153	0	0	0

HABITAT RATING:	GOOD (SLIGHTLY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	POOR (SEVERELY IMPAIRED)	POOR (SEVERELY IMPAIRED)	POOR (SEVERELY IMPAIRED)
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Note: Individual metrics may better describe conditions directly affecting the biological community while the Habitat Rating describes the general riverine environment at the site(s).

Date:	6/11/2012	6/11/2012			
Weather:	Cloudy	Cloudy			
Air Temperature:	70 Deg. F.	70 Deg. F.	Deg. F.	Deg. F.	Deg. F.
Water Temperature:	60 Deg. F.	64 Deg. F.	Deg. F.	Deg. F.	Deg. F.
Ave. Stream Width:	12 Feet	20 Feet	Feet	Feet	Feet
Ave. Stream Depth:	1 Feet	2.5 Feet	Feet	Feet	Feet
Surface Velocity:	0.75 Ft./Sec.	0.5 Ft./Sec.	Ft./Sec.	Ft./Sec.	Ft./Sec.
Estimated Flow:	9 CFS	25 CFS	CFS	CFS	CFS
Stream Modifications:	Dredged	None			
Nuisance Plants (Y/N):	N	N			
Report Number:					
STORET No.:	630721	630251			
Stream Name:	Norton Creek	Norton Creek			
Road Crossing/Location:	West Maple Road	Buno Road			
County Code:	63	63			
TRS:	02N08ES31	02N07ES24			
Latitude (dd):	42.5313	42.552781			
Longitude (dd):	-83.54756	-83.562366			
Ecoregion:	SMNITP	SMNITP			
Stream Type:	Warmwater	Warmwater			
USGS Basin Code:	4090005	4090005			

* Applies only to Riffle/Run stream Surveys

** Applies only to Glide/Pool stream Surveys

COMMENTS:

Table 3. Habitat evaluation for selected streams in the Huron River and Ottawa-Stony River Watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne Counties, June and August 2012.

	Woods Creek Lower Huron Metro Parkw RIFFLE/RUN STATION E	Silver Creek Vreeland Road GLIDE/POOL STATION F			
HABITAT METRIC					
Substrate and Instream Cover					
Epifaunal Substrate/ Avail Cover (20)	15	6			
Embeddedness (20)*	15				
Velocity/Depth Regime (20)*	16				
Pool Substrate Characterization (20)**		8			
Pool Variability (20)**		3			
Channel Morphology					
Sediment Deposition (20)	11	3			
Flow Status - Maint. Flow Volume (10)	8	9			
Flow Status - Flashiness (10)	4	4			
Channel Alteration (20)	18	11			
Frequency of Riffles/Bends (20)*	18				
Channel Sinuosity (20)**		6			
Riparian and Bank Structure					
Bank Stability (L) (10)	7	6			
Bank Stability (R) (10)	7	6			
Vegetative Protection (L) (10)	9	6			
Vegetative Protection (R) (10)	9	6			
Riparian Veg. Zone Width (L) (10)	6	3			
Riparian Veg. Zone Width (R) (10)	6	3			
TOTAL SCORE (200):	149	80	0	0	0

HABITAT RATING:	GOOD (SLIGHTLY IMPAIRED)	MARGINAL (MODERATELY IMPAIRED)	POOR (SEVERELY IMPAIRED)	POOR (SEVERELY IMPAIRED)	POOR (SEVERELY IMPAIRED)
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Note: Individual metrics may better describe conditions directly affecting the biological community while the Habitat Rating describes the general riverine environment at the site(s).

Date:	6/12/2012	6/25/2012			
Weather:	Sunny	Sunny			
Air Temperature:	75 Deg. F.	70 Deg. F.	Deg. F.	Deg. F.	Deg. F.
Water Temperature:	70 Deg. F.	68 Deg. F.	Deg. F.	Deg. F.	Deg. F.
Ave. Stream Width:	8 Feet	8 Feet	Feet	Feet	Feet
Ave. Stream Depth:	0.3 Feet	0.4 Feet	Feet	Feet	Feet
Surface Velocity:	0.8 Ft./Sec.	0.25 Ft./Sec.	Ft./Sec.	Ft./Sec.	Ft./Sec.
Estimated Flow:	1.92 CFS	0.8 CFS	CFS	CFS	CFS
Stream Modifications:	None	Bank Stabilization			
Nuisance Plants (Y/N):	N	N			
Report Number:					
STORET No.:	821582	821470			
Stream Name:	Woods Creek	Silver Creek			
Road Crossing/Location:	Lower Huron Metro Parkw	Vreeland Road			
County Code:	82	82			
TRS:	03S08E36	04S10E32			
Latitude (dd):	42.18563	42.1089			
Longitude (dd):	-83.43125	-83.28278			
Ecoregion:	HELP	HELP			
Stream Type:	Warmwater	Warmwater			
USGS Basin Code:	4090005	4090005			

* Applies only to Riffle/Run stream Surveys

** Applies only to Glide/Pool stream Surveys

Table 3. Habitat evaluation for selected streams in the Huron River and Ottawa-Stony River Watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne Counties, June and August 2012.

	Portage Creek Green Road GLIDE/POOL STATION 1T	Woodruff Creek Spencer Road RIFFLE/RUN STATION 2T	Hay Creek Rush Lake Road GLIDE/POOL STATION 3T	Unnamed Tributary to Mill Waters Road RIFFLE/RUN STATION 4T	Huron River Teggerdine Road GLIDE/POOL STATION 5T
HABITAT METRIC					
Substrate and Instream Cover					
Epifaunal Substrate/ Avail Cover (20)	6	12	6	8	8
Embeddedness (20)*		15		8	
Velocity/Depth Regime (20)*		10		8	
Pool Substrate Characterization (20)**	7		6		10
Pool Variability (20)**	2		1		1
Channel Morphology					
Sediment Deposition (20)	3	11	1	1	3
Flow Status - Maint. Flow Volume (10)	10	9	9	8	9
Flow Status - Flashiness (10)	4	7	8	4	9
Channel Alteration (20)	8	18	15	15	16
Frequency of Riffles/Bends (20)*		11		8	
Channel Sinuosity (20)**	6		15		13
Riparian and Bank Structure					
Bank Stability (L) (10)	9	7	9	9	9
Bank Stability (R) (10)	9	5	9	9	9
Vegetative Protection (L) (10)	6	6	8	9	7
Vegetative Protection (R) (10)	7	7	8	9	7
Riparian Veg. Zone Width (L) (10)	3	9	9	2	9
Riparian Veg. Zone Width (R) (10)	4	9	9	2	9
TOTAL SCORE (200):	84	136	113	100	119
HABITAT RATING:	MARGINAL (MODERATELY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	MARGINAL (MODERATELY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)
Note: Individual metrics may better describe conditions directly affecting the biological community while the Habitat Rating describes the general riverine environment at the site(s).					
Date:	8/23/2012	8/22/2012	8/23/2012	8/23/2012	8/22/2012
Weather:	Sunny	Sunny	Sunny	Sunny	Sunny
Air Temperature:	85 Deg. F.	80 Deg. F.	80 Deg. F.	85 Deg. F.	70 Deg. F.
Water Temperature:	71 Deg. F.	70 Deg. F.	58 Deg. F.	60 Deg. F.	58 Deg. F.
Ave. Stream Width:	18 Feet	10 Feet	5 Feet	7 Feet	10 Feet
Ave. Stream Depth:	1 Feet	0.5 Feet	1 Feet	0.3 Feet	2 Feet
Surface Velocity:	1 Ft./Sec.	0.5 Ft./Sec.	0.5 Ft./Sec.	0.1 Ft./Sec.	0.3 Ft./Sec.
Estimated Flow:	18 CFS	2.5 CFS	2.5 CFS	0.21 CFS	6 CFS
Stream Modifications:	Dredged	None	None	None	None
Nuisance Plants (Y/N):	N	N	N	N	N
Report Number:					
STORET No.:	330374	470599	470598	810554	631010
Stream Name:	Portage Creek	Woodruff Creek	Hay Creek	Unnamed Tributary to Mill Creek	Huron River
Road Crossing/Location:	Green Road	Spencer Road	Rush Lake Road	Waters Road	Teggerdine Road
County Code:	33	47	47	81	63
TRS:	01N02ES35	02N06E28	01N05E18	03S04ES12	03N08E15
Latitude (dd):	42.4392	42.5379	42.4757	42.2406	42.670004
Longitude (dd):	-84.1643	-83.7443	-83.9019	-83.9118	-83.488893
Ecoregion:	SMNITP	SMNITP	SMNITP	SMNITP	SMNITP
Stream Type:	Coldwater	Coldwater	Coldwater	Coldwater	Warmwater
USGS Basin Code:	4090005	4090005	4090005	4090005	4090005

* Applies only to Riffle/Run stream Surveys

** Applies only to Glide/Pool stream Surveys

COMMENTS:

Table 3. Habitat evaluation for selected streams in the Huron River and Ottawa-Stony River Watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne Counties, June and August 2012.

	Huron River Cedar Island Road GLIDE/POOL STATION 6T	Mill Creek Marshall Rd RIFFLE/RUN STATION 7T	Huron River Riverbend, Island Lake Re RIFFLE/RUN STATION 8T	Huron River downstre Territorial Road (Hudson Mills Metropark) RIFFLE/RUN STATION 9T	
HABITAT METRIC					
Substrate and Instream Cover					
Epifaunal Substrate/ Avail Cover (20)	12	13	18	11	
Embeddedness (20)*		15	15	13	
Velocity/Depth Regime (20)*		11	16	3	
Pool Substrate Characterization (20)**	11				
Pool Variability (20)**	3				
Channel Morphology					
Sediment Deposition (20)	3	11	13	18	
Flow Status - Maint. Flow Volume (10)	9	9	9	9	
Flow Status - Flashiness (10)	9	8	8	9	
Channel Alteration (20)	15	16	18	18	
Frequency of Riffles/Bends (20)*		6	8	3	
Channel Sinuosity (20)**	13				
Riparian and Bank Structure					
Bank Stability (L) (10)	7	7	8	9	
Bank Stability (R) (10)	7	6	6	9	
Vegetative Protection (L) (10)	7	6	9	9	
Vegetative Protection (R) (10)	9	8	9	9	
Riparian Veg. Zone Width (L) (10)	6	2	9	9	
Riparian Veg. Zone Width (R) (10)	8	5	9	9	
TOTAL SCORE (200):	119	123	155	138	0

HABITAT RATING:	GOOD (SLIGHTLY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	EXCELLENT (NON- IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	POOR (SEVERELY IMPAIRED)
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Note: Individual metrics may better describe conditions directly affecting the biological community while the Habitat Rating describes the general riverine environment at the site(s).

	8/22/2012	8/21/2012	8/22/2012	8/21/2012	
Date:	8/22/2012	8/21/2012	8/22/2012	8/21/2012	
Weather:	Sunny	Partly Cloudy	Sunny	Sunny	
Air Temperature:	80 Deg. F.	70 Deg. F.	80 Deg. F.	70 Deg. F.	Deg. F.
Water Temperature:	71 Deg. F.	64 Deg. F.	72 Deg. F.	74 Deg. F.	Deg. F.
Ave. Stream Width:	25 Feet	35 Feet	65 Feet	150 Feet	Feet
Ave. Stream Depth:	1 Feet	0.8 Feet	0.5 Feet	2.5 Feet	Feet
Surface Velocity:	0.25 Ft./Sec.	0.8 Ft./Sec.	1 Ft./Sec.	0.8 Ft./Sec.	Ft./Sec.
Estimated Flow:	6.25 CFS	22.4 CFS	32.5 CFS	300 CFS	CFS
Stream Modifications:	None	None	None	None	
Nuisance Plants (Y/N):	N	N	N	N	
Report Number:					
STORET No.:	631035	810521	470124	810557	
Stream Name:	Huron River	Mill Creek	Huron River	Huron River	
Road Crossing/Location:	Cedar Island Road	Marshall Rd	Riverbend, Island Lake Re	downstre Territorial Road (Hudson Mills Metropark)	
County Code:	63	81	47	81	
TRS:	03N08E27	02S05E18	01N06E03	01S04ES13	
Latitude (dd):	42.6275	42.3046	42.50441	42.38582	
Longitude (dd):	-83.4956	-83.8896	-83.70997	-83.91209	
Ecoregion:	SMNITP	SMNITP	SMNITP	SMNITP	
Stream Type:	Warmwater	Warmwater	Warmwater	Warmwater	
USGS Basin Code:	4090005	4090005	4090005	4090005	

* Applies only to Riffle/Run stream Surveys

** Applies only to Glide/Pool stream Surveys

COMMENTS:

Table 3. Habitat evaluation for selected streams in the Huron River and Ottawa-Stony River Watersheds located in Ingham, Livingston, Monroe, Oakland, Washtenaw and Wayne Counties, June and August 2012.

Stony Creek
US 24
RIFFLE/RUN
STATION 10T

HABITAT METRIC

Substrate and Instream Cover	
Epifaunal Substrate/ Avail Cover (20)	11
Embeddedness (20)*	8
Velocity/Depth Regime (20)*	7
Pool Substrate Characterization (20)**	
Pool Variability (20)**	
Channel Morphology	
Sediment Deposition (20)	16
Flow Status - Maint. Flow Volume (10)	7
Flow Status - Flashiness (10)	5
Channel Alteration (20)	18
Frequency of Riffles/Bends (20)*	8
Channel Sinuosity (20)**	
Riparian and Bank Structure	
Bank Stability (L) (10)	7
Bank Stability (R) (10)	7
Vegetative Protection (L) (10)	7
Vegetative Protection (R) (10)	7
Riparian Veg. Zone Width (L) (10)	7
Riparian Veg. Zone Width (R) (10)	4
TOTAL SCORE (200):	119

HABITAT RATING:	GOOD (SLIGHTLY IMPAIRED)	POOR (SEVERELY IMPAIRED)	POOR (SEVERELY IMPAIRED)	POOR (SEVERELY IMPAIRED)	POOR (SEVERELY IMPAIRED)
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Note: Individual metrics may better describe conditions directly affecting the biological community while the Habitat Rating describes the general riverine environment at the site(s).

Date:	8/21/2012					
Weather:	Sunny					
Air Temperature:	70	Deg. F.	Deg. F.	Deg. F.	Deg. F.	Deg. F.
Water Temperature:	63	Deg. F.	Deg. F.	Deg. F.	Deg. F.	Deg. F.
Ave. Stream Width:	28	Feet	Feet	Feet	Feet	Feet
Ave. Stream Depth:	0.8	Feet	Feet	Feet	Feet	Feet
Surface Velocity:	0.5	Ft./Sec.	Ft./Sec.	Ft./Sec.	Ft./Sec.	Ft./Sec.
Estimated Flow:	11.2	CFS	CFS	CFS	CFS	CFS
Stream Modifications:	None					
Nuisance Plants (Y/N):	N					
Report Number:						

STORET No.:	580564
Stream Name:	Stony Creek
Road Crossing/Location:	US 24
County Code:	58
TRS:	06S09ES09

Latitude (dd):	41.9817
Longitude (dd):	-83.3712
Ecoregion:	HELP
Stream Type:	Warmwater

USGS Basin Code:	4100001
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* Applies only to Riffle/Run stream Surveys
** Applies only to Glide/Pool stream Surveys

COMMENTS:

Table 4. Water Quality Summary for the Huron River and Ottawa-Stony River Watersheds Located in Ingham, Livingston, Monroe, Oakland, Washtenaw, and Wayne Counties, June and August 2012.

		NORTON CR @ W. MAPLE u/s Wixom WWTP	NORTON CR @ BUNO d/s Wixom WWTP	HORSESHOE CR @ MAIN	HORSESHOE CR @ BARKER	WOODS CR @ LHMP	MILLERS CR @ HUBBARD	TOBIN CR @ 8 MILE
Parameters	Label	6/11/2012	6/11/2012	6/12/2012	6/12/2012	6/12/2012	6/12/2012	6/11/2012
YSI - Field	Station	A	B	C	D	E	H	I
Temperature	°F	61.3	64.2	--	--	--	--	--
Conductivity	µS/cm	1307	1072	--	--	--	--	--
Dissolved Oxygen	mg/l	5.8	5.6	--	--	--	--	--
Dissolved Oxygen	%	62.8	59.7	--	--	--	--	--
pH	pH	7.26	7.42					
Water Samples - Lab								
Alkalinity - Bicarbonate	mg/L	280	220	--	--	--	--	--
Alkalinity - Carbonate	mg/L	ND	ND	--	--	--	--	--
Alkalinity (as CaCO3)	mg/L	280	220	--	--	--	--	--
Ammonia	mg N/L	0.004	0.044	0.462	0.171	0.077	0.103	0.062
Arsenic - Total	µg/L	ND	1.5	--	--	--	--	--
Barium - Total	µg/L	200	120	--	--	--	--	--
Cadmium - Total	µg/L	ND	ND	--	--	--	--	--
Chloride	mg/L	290	190	--	--	--	--	--
Chromium - Total	µg/L	ND	ND	--	--	--	--	--
COD	mg/L	14	15	26	9.3	14	48	33
Conductance	µmhos/cm	1549	1260	--	--	--	--	--
Copper - Total	µg/L	1.4	2.1	--	--	--	--	--
Hexavalent Chromium	µg/L	ND	ND	--	--	--	--	--
Lead - Total	µg/L	ND	ND	--	--	--	--	--
Mercury - Total	µg/L	ND	ND	--	--	--	--	--
Nitrate - Calculated	mg N/L	0.21	7.19	0.069	0.146	0.33	0.82	0.27
Nitrate + Nitrite	mg N/L	0.215	7.23	0.106	0.196	0.398	0.901	0.459
Nitrite	mg N/L	0.01	0.036	0.037	0.05	0.07	0.077	0.191
Ortho-phosphate	mg P/L	0.016	0.041	0.094	0.02	0.03	0.077	0.069
pH	pH	7.650	7.73	--	--	--	--	--
Selenium - Total	µg/L	ND	ND	--	--	--	--	--
Silver -Total	µg/L	ND	ND	--	--	--	--	--
Solids - Suspended	mg/L	ND	13	ND	ND	12	5	9
Solids - Total	mg/L	890	650	660	590	360	1200	580
Dissolved								
Sulfate	mg/L	53	76	--	--	--	--	--
TOC	mg/L	4.9	4.6	11	4.6	6.2	15.4	12
Total Kjeldahl Nitrogen	mg N/L	0.52	0.93	1.89	0.79	0.76	1.49	1.28
Total Phosphorus	mg P/L	0.04	0.136	0.136	0.039	0.067	0.244	0.137
Turbidity	NTU	3.5	6.48	3.58	5.47	6.45	4.78	9.06
Zinc - Total	µg/L	ND	15	--	--	--	--	--