MI/EGLE/WRD-20/007

MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY
WATER RESOURCES DIVISION
MARCH 2020

STAFF REPORT

Biological and Water Chemistry Surveys of Selected Stations in the Rouge River Watershed in Wayne, Washtenaw, and Oakland Counties, Michigan, June-September 2010 and June-September 2015

Introduction

Qualitative biological sampling of the Rouge River watershed was conducted by staff of the Michigan Department of Environment, Great Lakes, and Energy (EGLE), Surface Water Assessment Section (SWAS), from June-September 2010 and June-September 2015 as part of a five-year watershed monitoring cycle. The primary objectives of the assessments were to:

1) Assess the current status and condition of individual water bodies and determine if Michigan Water Quality Standards (WQS) are being met.
2) Address monitoring requests submitted by internal and external customers.
3) Identify nonpoint sources (NPS) of water quality impairment.
4) Collect water quality data needed for Total Maximum Daily Load (TMDL) development or delisting.
5) Evaluate biological community temporal trends.

Watershed Information

The Rouge River and its tributaries flow approximately 570 miles through Wayne, Washtenaw, and Oakland Counties and drain approximately 466 square miles of Southeast Michigan. The watershed falls almost entirely in the Southern Michigan Northern Indiana Till Plains (SMNITP) ecoregion, with the main branch flowing into the Huron/Erie Lake Plain (HELP) ecoregion downstream of the Southfield Freeway (M-39) (Omernik and Gallant, 1988). It is almost entirely a warmwater system with the exception of Johnson Creek in the Middle Branch (T2, R8E, S3) (Michigan Department of Natural Resources [MDNR], 1997), which is listed as a coldwater stream, per Rule 100 (R 323.1100[7]) of the Part 4 Rules, WQS, promulgated under Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended.

The Rouge River has four branches (Main, Upper, Middle, and Lower). The Main Branch Rouge River originates in Rochester Hills and flows in a south/southeast direction. The Upper, Middle, and Lower Rouge Rivers originate near West Bloomfield Township, the City of Wixom, and Superior Township. The Upper, Middle, and Lower Rouge River meet with the Main Branch Rouge River near Redford Township, Dearborn Heights, and Dearborn, respectively. From Dearborn, the Main Branch Rouge River flows east/southeast through a heavily industrialized area before entering the Detroit River near Delray.

Land use in the headwater reaches of the Main Branch and Upper Rouge Rivers is dominated by residential and commercial areas. Headwater reaches of the Middle and Lower

Rouge Rivers are dominated by suburban development and agriculture/open space. Land use data for the Rouge River and nearby watersheds are presented in Table 1.

Table 1. Land use summary for the Rouge River and other nearby watersheds in southeast Michigan.

Watershed	Natural Terrestrial	Wetland	Developed	Cultivated Agriculture	Hay/ Pasture	Water	Barren
Rouge R.	6.99%	2.63%	84.09%	2.61%	2.41%	0.90%	0.37%
Raisin R.	11.64%	8.20%	11.58%	48.53%	18.20%	1.54%	0.30%
Clinton R.	14.87%	7.84%	55.58%	11.26%	7.13%	2.69%	0.64%
Huron R.	21.82%	13.03%	29.73%	18.76%	12.54%	3.37%	0.74%

Historical Sampling Efforts and Information

Biological monitoring surveys were previously conducted in the Rouge River tributary watershed in 1992, 1994, 2000, and 2005. A brief historical summary is included below. Scores from earlier surveys and other descriptions of the Rouge River can be found in Oemke (1993 and 1995) and Goodwin (2002 and 2009).

Previous surveys noted that water quality impairment was present throughout the Rouge River watershed. Biological and habitat scores ranged widely with many stations rating poor to low acceptable for macroinvertebrates and fair for habitat. Stream biota were characterized by tolerant taxa. Storm water runoff, sanitary sewer discharges, channelization, flashy hydrology, and heavy siltation were impacting water quality and limiting biological communities.

In August 2007 a biota TMDL was developed and approved by the United States Environmental Protection Agency (USEPA) for the entire Rouge River watershed (Goodwin, 2007). The TMDL addresses impacted fish and macroinvertebrate communities and recognizes that watershed-wide impacts of storm water and the resultant flashy hydrology and habitat disturbance are likely major components of the cumulative stressors in the watershed.

Methods

Qualitative macroinvertebrate and habitat surveys were performed according to the SWAS Procedure 51 (Michigan Department of Environmental Quality [MDEQ], 2014) for wadable streams. If a station was at a road crossing, it was sampled upstream unless otherwise noted. Macroinvertebrate communities were assessed and scored with metrics that rate water bodies from excellent (+5 to +9) to poor (-5 to -9). Scores from +4 to -4 are rated acceptable. When assessed, fish communities are rated from excellent (+5 to +10) to poor (-5 to -10). Fish scores from -4 to +4 are rated as acceptable. Negative scores in the acceptable range are considered tending towards a poor rating, while positive scores in the acceptable range are tending towards an excellent rating. Habitat evaluations are based on 10 metrics, with a maximum total score of 200. A station habitat score of >154 is characterized as having excellent habitat, 105-154 as good, 56-104 as marginal, and <56 as poor.

Macroinvertebrate community scores are used to determine support of the Other Indigenous Aquatic Life and Wildlife designated use component of Rule 100. Habitat scores and individual metrics are used to help better understand biological community scores.

Site Selection

Stratified-random and targeted site-selection methods were used to assess the Rouge River watershed in 2010 (Table 2, Figure 1). Procedure 51 was performed at 50 randomly chosen sites to estimate statewide and watershed percent attainment as described in EGLE's "Biological Monitoring Status and Trend Procedure" (MDEQ, 2015). Seven additional targeted sites were chosen through the "Targeted Monitoring Request" process, involving stakeholder submittals from across Michigan, to address targeted questions about water chemistry in Seeley Drain and Bishop Creek. All sites sampled in 2010 are listed in Table 2 and shown in Figure 1.

In 2015, 17 status sites were randomly selected to estimate statewide and watershed percent attainment. A subset (10 sites) of the random sites from 2010 was re-selected to be resampled in 2015 because 2015 marked the second cycle of using the "Biological Monitoring Status and Trends Procedure." These 10 locations became the trend sites that will be used to evaluate both statewide and watershed water quality trends after a third cycle is complete following the 2020 biological survey in this watershed. One additional targeted site was visited to address specific questions about fish communities in Seeley Drain. All sites sampled in 2015 are listed in Table 3 and shown in Figure 2.

Please note this report does not include targeted monitoring related to the delisting of Beneficial Use Impairments within the Rouge River Area of Concern. Work related to Areas of Concern will be written in separate reports.

2010 Sampling Results

Table 2. Summary of sampling locations in the Rouge River, June-September 2010. Randomly selected aquatic habitat and macroinvertebrate community evaluations listed first. Targeted sites listed below.

Station #	Stream Name	Road Crossing	STORET #	County	Latitude	Longitude	Habitat Rating	Habitat Score[1]	Macro Rating	Macro Score[2]	S/Tar	AUID
1	Lower River Rouge	Outer Drive	820928	Wayne	42.30386	-83.26334	Marginal	81	High Acceptable	0	Status	040900040303-01
2	Lower River Rouge	Gulley Road	821459	Wayne	42.3019	-83.28588	Marginal	84	High Acceptable	0	Status	040900040303-01
3	Lower River Rouge	Venoy Road	821567	Oakland	42.28484	-83.3634	Marginal	98	High Acceptable	2	Status	040900040303-01
4	McClaughrey Drain	Annapolis Street	821557	Wayne	42.27361	-83.40084	Marginal	68	Poor	-6	Status	040900040303-01
5	McClaughrey Drain	Hannan Road	821558	Wayne	42.24834	-83.42538	Poor	48	Poor	-7	Status	040900040303-01
6	Fellows Creek	Haggerty Road	821559	Wayne	42.31282	-83.4485	Marginal	62	Poor	-6	Status	040900040301-01
7	N B Fellows Creek	Hanford Road	821458	Wayne	42.32807	-83.53207	Marginal	81	Low Acceptable	-1	Status	040900040301-01
8	Lower River Rouge	Lilley Road	820074	Wayne	42.2797	-83.45652	Marginal	95	High Acceptable	0	Status	040900040302-01
9	Lower River Rouge	Canton Center Road	821460	Wayne	42.2886	-83.48624	Good	107	Low Acceptable	-1	Status	040900040302-01
10	Lower River Rouge	Beck Road	821414	Wayne	42.28348	-83.50547	Marginal	88	High Acceptable	0	Status	040900040302-03
11	Lower River Rouge	Rockefeller Drive	821560	Wayne	42.28863	-83.50992	Marginal	69	High Acceptable	1	Status	040900040302-03
12	Fowler Creek	5th Avenue	821561	Wayne	42.28235	-83.51599	Good	109	High Acceptable	3	Status	040900040302-01
13	River Rouge	Ford Road	821562	Wayne	42.32842	-83.24129	Marginal	93	Poor	-5	Status	040900040406-01
14	Middle River Rouge	Edward N Hines	820948	Wayne	42.34109	-83.35129	Marginal	82	Low Acceptable	-3	Status	040900040204-01
15	Willow Creek	M153 (Ford Road)	821563	Wayne	42.32387	-83.41442	Poor	45	Poor	-7	Status	040900040202-02

NA = Not Applicable

[1] **Habitat Evaluation Scoring, < 56 is Poor, 56-104 Is Marginal, 105-154 is Good, >154 is Excellent**

[2] **Macroinvertebrate Community Scoring, 5 to 9 is Excellent, -4 to 4 is acceptable, -9 to -5 is poor**

Station #	Stream Name	Road Crossing	STORET #	County	Latitude	Longitude	Habitat Rating	Habitat Score[1]	Macro Rating	Macro Score[2]	S/Tar	AUID
16	Willow Creek	Haggerty Road	821564	Wayne	42.32612	-83.4491	Poor	38	Low Acceptable	-3	Status	040900040202-02
17	Tonquish Creek	Holiday Boulevard	821565	Wayne	42.33206	-83.43025	Marginal	77	High Acceptable	0	Status	040900040202-01
18	S B Tonquish Creek	Jo Ann Lane	821511	Wayne	42.36204	-83.48277	Marginal	82	High Acceptable	1	Status	040900040202-01
19	Middle River Rouge	Edward N Hines Drive	820946	Wayne	42.37024	-83.43284	Marginal	89	High Acceptable	3	Status	040900040203-01
20	Middle River Rouge	Wilcox Road	821566	Wayne	42.3831	-83.456	Good	129	High Acceptable	3	Status	040900040203-01
21	Middle River Rouge	M14	821568	Wayne	42.39082	-83.46681	Marginal	103	High Acceptable	0	Status	040900040203-01
22	Bishop Creek	Meadowbrook Road	631209	Oakland	42.47832	-83.45562	Marginal	92	High Acceptable	3	Status	040900040203-08
23	Bishop Creek	Delnol Avenue	631112	Wayne	42.48293	-83.46473	Marginal	102	Low Acceptable	-1	Status	040900040203-08
24	Walley Lake Branch	Ashbury Drive	631212	Oakland	42.44265	-83.47273	Marginal	103	Low Acceptable	-3	Status	040900040203-02
25	Walled Lake Branch	Chattham Street	631107	Oakland	42.45935	-83.45792	Good	114	Low Acceptable	-4	Status	040900040203-02
26	Walled Lake Branch	10 Mile Road	631211	Oakland	42.46693	-83.46619	Good	119	High Acceptable	1	Status	040900040203-02
27	Johnson Drain	Ridge Road	821450	Wayne	42.39611	-83.52996	Marginal	81	High Acceptable	0	Status	040900040201-03
28	Ashcroft-Sherwood Drain	Rouge Park Drive	821519	Wayne	42.36252	-83.26542	Poor	54	Poor	-6	Status	040900040406-01
29	River Rouge	Outer Drive	821569	Wayne	42.38352	-83.2591	Marginal	66	Low Acceptable	-2	Status	040900040406-01
30	River Rouge	Schoolcraft Street	821570	Wayne	42.38611	-83.26613	Marginal	68	Low Acceptable	-2	Status	040900040406-01

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Station #	Stream Name	Road Crossing	STORET #	County	Latitude	Longitude	Habitat Rating	Habitat Score[1]	Macro Rating	Macro Score[2]	S/Tar	AUID
31	Unnamed Trib	Newburgh Road	821571	Wayne	42.43859	-83.41445	Marginal	101	High Acceptable	1	Status	040900040101-01
32	Upper River Rouge	Garfield Street	821572	Wayne	42.40322	-83.28872	Marginal	72	Poor	-6	Status	040900040103-01
33	Upper River Rouge	Angling Road	821573	Wayne	42.42912	-83.32125	Marginal	68	Low Acceptable	-4	Status	040900040103-01
34	Minnow Pond Drain	Farmington Road	630989	Oakland	42.5107	-83.3788	Marginal	86	Low Acceptable	-2	Status	040900040103-03
35	Seeley Drain	Drake Road	631057	Oakland	42.48924	-83.40054	Good	112	High Acceptable	0	Status	040900040103-02
36	Seeley Drain	Halsted Road	630999	Oakland	42.48915	-83.41677	Good	120	Low Acceptable	-1	Status	040900040103-02
37	River Rouge	Ridge Road	821574	Wayne	42.41327	-83.26988	Marginal	64	Poor	-5	Status	040900040405-01
38	River Rouge	McNichols Road	821575	Wayne	42.41472	-83.26683	Marginal	70	Low Acceptable	-4	Status	040900040405-01
39	River Rouge	Bridge Street	631213	Wayne	42.44347	-83.28523	Marginal	76	Poor	-7	Status	040900040405-01
40	Pebble Creek	10 Mile Road	630990	Oakland	42.47134	-83.30394	Marginal	81	Low Acceptable	-4	Status	040900040404-02
41	Pebble Creek	11 Mile Road	630991	Oakland	42.4858	-83.30869	Marginal	101	Poor	-5	Status	040900040404-02
42	Pebble Creek	Westgate Road	631214	Oakland	42.51591	-83.34699	Good	113	Low Acceptable	-1	Status	040900040404-02
43	Franklin Branch	12 Mile Road	631210	Oakland	42.50121	-83.27859	Marginal	92	Low Acceptable	-2	Status	040900040402-01
44	Franklin Branch	14 Mile Road	630986	Oakland	42.52969	-83.3043	Good	116	High Acceptable	1	Status	040900040402-01
45	Unnamed Trib	Middlebelt Road	631215	Oakland	42.56215	-83.34119	Good	129	High Acceptable	0	Status	040900040402-01

NA = Not Applicable

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Station #	Stream Name	Road Crossing	STORET #	County	Latitude	Longitude	Habitat Rating	Habitat Score[1]	Macro Rating	Macro Score[2]	S/Tar	AUID
46	Sunken Bridge Drain	Cranbrook Court	631216	Oakland	42.56596	-83.239	Good	134	High Acceptable	1	Status	040900040401-01
47	Sunken Bridge Drain	Tamarack Way	631217	Oakland	42.57473	-83.24542	Good	121	High Acceptable	0	Status	040900040401-01
48	Unnamed Trib	Lahser Road	631049	Oakland	42.57809	-83.265	Good	128	High Acceptable	2	Status	040900040401-01
49	Unnamed Trib	Franklin Road	631218	Oakland	42.59222	-83.28696	Marginal	94	Low Acceptable	-3	Status	040900040401-01
50	River Rouge	Beach Road	631219	Oakland	42.58101	-83.19761	Good	109	Low Acceptable	-2	Status	040900040403-01
51	Bishop Creek	12 Oaks Mall	631046	Oakland	42.494962	-83.468466	NA	NA	NA	NA	Targeted. Water chemistry only.	040900040203-08
52	Bishop Creek	Delwal Avenue	631112	Macomb	42.48293	-83.46473	NA	NA	NA	NA	Targeted. Water chemistry.	040900040203-08
53	Bishop Creek	Pond Outlet	631276	Oakland	42.487565	-83.463902	NA	NA	NA	NA	Targeted. Water chemistry only.	040900040203-08
54	Bishop Creek	Upstream Pond	631105	Oakland	42.493147	-83.465928	NA	NA	NA	NA	Targeted. Water chemistry only.	040900040203-08
55	Seeley Drain	13 Mile	630996	Oakland	42.511816	-83.43395	NA	NA	NA	NA	Targeted. Water chemistry only.	040900040103-02
56	Seeley Drain	Haggerty Rd.	630998	Oakland	42.519248	-83.437158	NA	NA	NA	NA	Targeted. Water chemistry only.	040900040103-NA
57	Seeley Drain	14 Mile	630997	Oakland	42.52686	-83.450249	NA	NA	NA	NA	Targeted. Water chemistry only.	040900040103-NA

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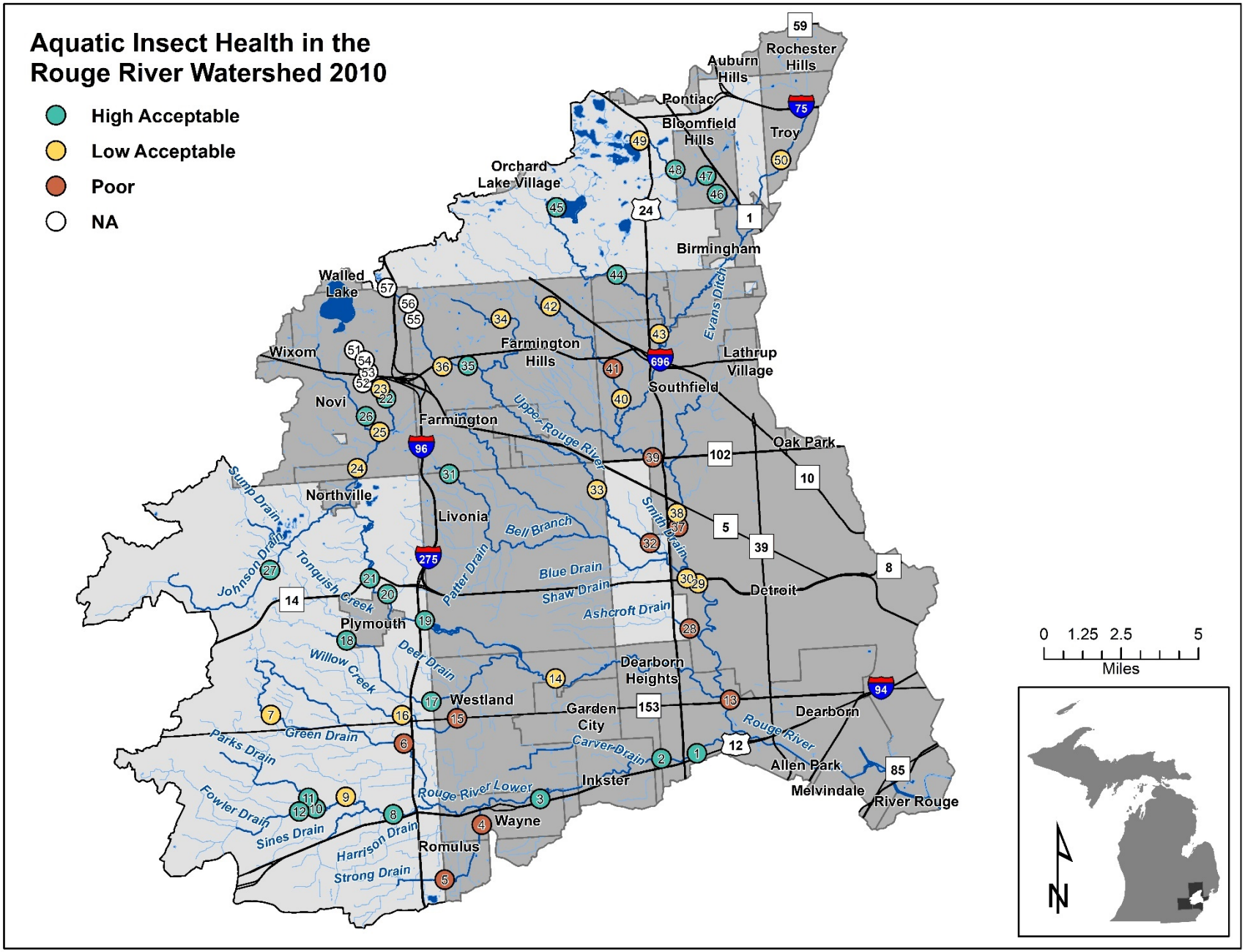

Figure 1. Rouge River sites, 2010. Colored dots represent 2010 aquatic macroinvertebrate community station ratings of high acceptable (0 to 4) and low acceptable (-4 to -1) and poor (-8 to -5). Procedure 51 was not performed at white dots (N/A).

Table 3. Summary of sampling locations in the Rouge River, June-September 2015. Randomly selected aquatic habitat and macroinvertebrate community evaluations listed first. Targeted sites listed below.

Station #	Stream Name	Road Crossing	STORET #	County	Latitude	Longitude	Habitat Rating	Habitat Score[1]	Macro Rating	Macro Score[2]	S/Tr/Tar	AUID
1	Lower River Rouge	Newburgh Rd	820073	Wayne	42.28248965	-83.4069841	Marginal	103	High Acceptable	0	Status	040900040303-01
2	Franklin Branch	10 Hill Dr	631234	Oakland	42.53536031	-83.32950765	Good	130	High Acceptable	1	Status	040900040402-01
3	Lower River Rouge	Sophia Street	821588	Wayne	42.28534974	-83.38874093	Marginal	74	Low Acceptable	-1	Status	040900040303-01
4	Lower River Rouge	Sheldon Rd	821589	Wayne	42.28641143	-83.47640029	Marginal	88	High Acceptable	0	Status	040900040302-01
5	Minnow Pond Drain	Drake Rd	631056	Oakland	42.51779392	-83.39896161	Marginal	100	High Acceptable	0	Status	040900040103-03
6	Upper River Rouge	Beech Daly Rd	821590	Wayne	42.40730315	-83.29626157	Marginal	78	Low Acceptable	-4	Status	040900040103-01
7	Seeley Drain	Halsted Rd	630999	Oakland	42.48914515	-83.41676443	Marginal	100	High Acceptable	0	Status	040900040103-02
8	Ingersol Creek (Walled Lake Branch)	off Grand River Ave	631235	Oakland	42.48544876	-83.4876051	Good	125	Low Acceptable	-2	Status	040900040203-02
9	Lower River Rouge	Canton Center Road	821460	Wayne	42.28847	-83.48675	Marginal	103	Low Acceptable	-1	Status	040900040302-01
10	River Rouge	Tireman St	821591	Wayne	42.35236324	-83.2521237	Marginal	87	Low Acceptable	-4	Status	040900040406-01
11	North Branch Fellows Creek	Hanford Rd	821592	Wayne	42.32959164	-83.49333869	Poor	46	Poor	-5	Status	040900040301-01
12	River Rouge	Wattles Rd	631020	Oakland	42.57599806	-83.20033557	Good	108	Low Acceptable	-4	Status	040900040403-01
13	Lower River Rouge	Brady Rd	821593	Wayne	42.31268676	-83.2423336	Marginal	84	Low Acceptable	-2	Status	040900040303-01
14	Franklin Branch	14 Mile Rd	630986	Oakland	42.5303018	-83.30615861	Good	120	Low Acceptable	-2	Status	040900040402-01
15	Middle River Rouge	Warren Rd	821594	Wayne	42.34171207	-83.26403659	Marginal	80	High Acceptable	0	Status	040900040204-01
16	Tonquish Creek	Ann Arbor Trail	821595	Wayne	42.35180134	-83.38618114	Marginal	63	Poor	-5	Status	040900040202-01

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Station #	Stream Name	Road Crossing	STORET #	County	Latitude	Longitude	Habitat Rating	Habitat Score[1]	Macro Rating	Macro Score[2]	S/Tr/Tar	AUID
17	Upper River Rouge	6 Mile Rd	821412	Wayne	42.41356	-83.3078	Marginal	65	Poor	-7	Status	040900040103-01
18	Bishop Creek	Meadowbrook Road	631209	Wayne	42.47832	-83.45562	Marginal	98	High Acceptable	2	Trend	040900040203-08
19	Unnamed Trib	Middlebelt Road	631215	Wayne	42.56215	-83.34119	Good	125	High Acceptable	0	Trend	040900040402-01
20	Tonquish Creek	Holiday Boulevard	821565	Wayne	42.33206	-83.43025	Marginal	70	Low Acceptable	-1	Trend	040900040202-01
21	Walled Lake Branch	Chattman Street	631107	Oakland	42.45935	-83.45792	Good	120	Poor	-5	Trend	040900040203-02
22	Pebble Creek	11 Mile Road	630991	Wayne	42.4858	-83.30869	Marginal	85	Low Acceptable	-4	Trend	040900040404-02
23	McClaughrey Drain	Hannan Road	821558	Oakland	42.24834	-83.42538	Marginal	67	Poor	-6	Trend	040900040303-01
24	Lower River Rouge	Canton Center Road	821460	Oakland	42.2886	-83.48624	Marginal	103	Low Acceptable	-1	Trend	040900040302-01
25	Middle River Rouge	Edward N Hines Drive	820946	Wayne	42.37035	-83.43864	Good	107	High Acceptable	0	Trend	040900040203-01
26	Lower River Rouge	Outer Drive	820928	Wayne	42.30386	-83.26334	Marginal	80	Low Acceptable	-3	Trend	040900040303-01
27	River Rouge	D/S Outer Drive	821569	Wayne	42.38352	-83.2591	Marginal	57	Low Acceptable	-2	Trend	040900040406-01
28	Seeley Drain	Halstead Road	630999	Oakland	42.49576	-83.47009	Status site 7 - Fish Sampling				Targeted	040900040203-08

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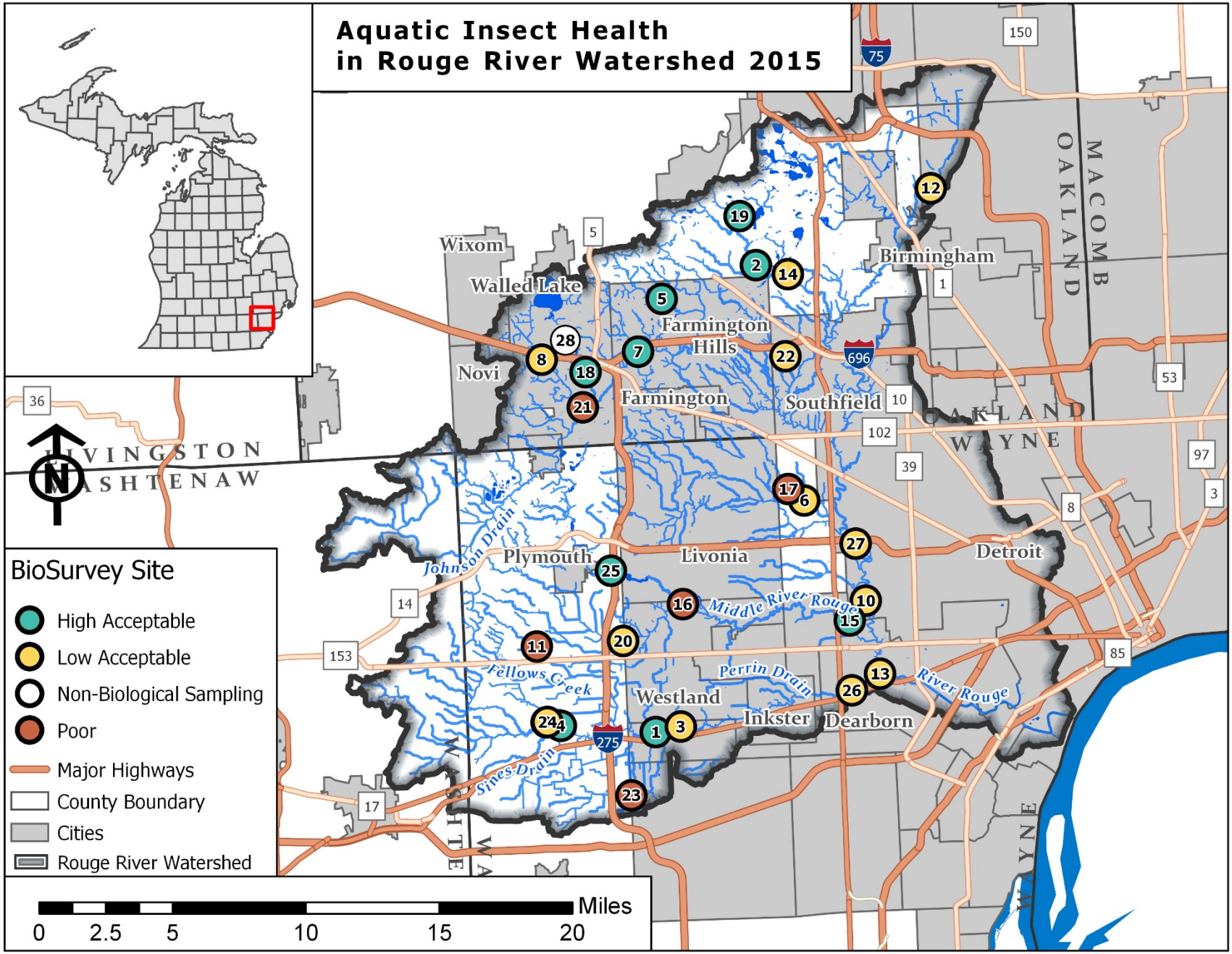

Figure 2. Rouge River sites, 2015. Colored dots represent 2010 aquatic macroinvertebrate community station ratings of high acceptable (0 to 4) and low acceptable (-4 to -1) and poor (-8 to -5). Procedure 51 was not performed at white dots (N/A).

Summary of Findings by Monitoring Objective

Objective 1: Assess the current status and condition of individual waters of the state and determine whether Michigan WQS are being met.

2010

In 2010, 50 randomly selected sites were sampled within the Rouge River. Locations of the biological sampling and habitat observations are shown in Figure 1 and Tables 2, 4, and 5. Percent attainment was calculated by dividing the number of random sites that met WQS by the total number of random locations ((40/50)100 = 80%). This value was coupled with a 95% confidence interval to provide our estimation of certainty, meaning there was 95% certainty that the true proportion of attainment in the Rouge River watershed was between 69% and 91%.

Figure 3. River Rouge at Schoolcraft (Station 30) showing erosion 3-4 feet high on both banks of the Rouge River.

Habitat scores ranged from 48 (poor) to 134 (good). Of the 50 randomly sampled sites, 4 were poor, 32 were marginal, and 14 were good. Habitats were frequently impacted by dredging, straightening, and riparian canopy removal, which is typical of urbanized stream habitat. Water temperatures were similar to air temperatures, suggesting that stream flow was dominated by surface runoff as opposed to groundwater. Habitat scores were frequently impacted by poor bank stability and closely cropped riparian vegetation. Bank scour was indicative of flashy hydrology (Figure 3). Epifaunal substrates were infrequent and, when encountered, were embedded and covered by clay and fine silts and largely unavailable to macroinvertebrate communities.

Macroinvertebrate scores ranged from -7 (poor) to +3 (high acceptable). Of the randomly sampled sites, 10 were poor and 40 were acceptable; none were excellent. Communities that scored poor (-5 to -7) were located within or downstream of urbanized areas. Acceptable sites were present in the Upper, Middle, and Lower Branches of the Rouge River. Biological communities with acceptable scores were generally located upstream of major urban areas.

However, even acceptable communities showed impacts of urban storm water runoff and exhibited a high proportional abundance of isopods, snails, and leaches and an absence or low abundance of mayflies and caddisflies. Stoneflies were not encountered.

2015

Seventeen random sites were sampled within the Rouge River watershed in 2015. The locations of the biological sampling and habitat observations are shown in Figure 2 and Tables 3, 6, and 7. Percent attainment was calculated by dividing the number of random status sites that met WQS by the total number of random locations ((14/17)100 = 82.4%). This value was coupled with a 95% confidence interval to provide our estimation of certainty, meaning there was 95% certainty that the true proportion of attainment in the Rouge River watershed was between 63% and 100%.

Ten locations were trend sites that were resampled from 2010. The locations of the biological sampling and habitat observations are shown in Figure 2 and Table 3.

Habitat scores ranged from 46 (poor) to 130 (good). Of the 27 status and trend sites, 1 was poor, 19 were marginal, and 7 were good. Habitats were frequently impacted by urbanization as described in 2010 surveys. Impervious surfaces in the watershed and riparian canopy removal have created streams with flashy hydrology, bank erosion, and poor bank stability (Figure 3). Macroinvertebrate scores ranged from -7 (poor) to +2 (high acceptable) with 5 sites scoring poor and 22 scoring acceptable. None scored excellent. Communities that scored poor (-5 to -7) were generally located within or immediately downstream of urbanized areas. Acceptable communities were present in the Upper, Middle, and Lower Branches of the Rouge River. Sites that scored acceptable were typically upstream of urban centers.

Objective 2: Satisfy monitoring requests submitted by internal and external customers.

2010

Bishop Creek

Four targeted sites on Bishop Creek were sampled for water chemistry in response to an external request (Stations 51-54). The goal of this monitoring was to assess potential impacts of parking lot runoff to this stream, including concerns over elevated total dissolved solids (TDS) concentrations. Two of the locations were also randomly selected for biological surveys (Stations 22 and 23). Water quality parameters of interest included chloride, conductivity, pH, TDS, and sulfate. Water chemistry results can be found in Table 8.

Chloride and sulfate results were compared to Michigan's aquatic life criteria developed in 2019 under Rule 57 (R 323.1057), Toxic Substances, of the Part 4 Rules. Chloride values from Bishop Creek (804 to 2510 milligrams per liter [mg/L]) were above chronic and acute ambient aquatic life criteria (150 mg/L and 320 mg/L, respectively). Sulfate values (36 to 177 mg/L) were all below developed chronic and acute ambient aquatic life water quality criteria (370 mg/L and 600 mg/L, respectively). TDS from Bishop Creek (1,500 to 4,600 mg/L) exceeded criteria from Rule 51 (R 323.1051[1]), Dissolved Solids, of the Part 4 Rules (500 mg/L monthly average/750 mg/L instantaneous values).

Chloride, sulfate, and TDS were further compared with 1998-2017 statewide median values from EGLE's Water Chemistry Monitoring Program (WCMP), excluding data from the Great Lakes and their connecting channels. Chloride, sulfate, and TDS in Bishop Creek

exceeded statewide medians (21 mg/L, 22 mg/L, and 310 mg/L, respectively). EGLE does not have a numeric criterion for conductivity. Instead, conductivity was compared to statewide median values from EGLE's WCMP data, as described above. Observed conductivity with Bishop Creek was 2,726-8,020 micromhos per centimeter (umhos/cm), which exceeds the statewide median of 446 umhos/cm. Based upon these results, designated use support for this creek should be examined more closely during the next basin cycle.

Seeley Drain

Three additional targeted sites were visited on Seeley Drain, downstream of the Commerce Township Wastewater Treatment Plant (Stations 55-57). The goal of the monitoring was to assess nutrient and flow impacts of the Wastewater Treatment Plant discharge to this stream and its wetlands. All three locations were sampled for water chemistry. Parameters of interest included ammonia, nitrate, nitrite, ortho-phosphate, total kjeldahl nitrogen, and total phosphorus. Water chemistry can be found in Table 8.

Concentrations of ammonia could not be compared with numeric criteria because it requires measurements of pH and temperature, which were not taken at the time of sampling. EGLE does not have numeric WQS for nitrogen or phosphorus. Instead, Michigan's WQS for nutrients is a narrative criterion following Rule 60 (R 323.1060), Plant Nutrients, of the Part 4 Rules. This rule states that "nutrients shall be limited to the extent necessary to prevent stimulation of growths of aquatic rooted, attached, suspended, and floating plants, fungi or bacteria, which are or may become injurious to the designated uses of the surface waters of the state." Seeley Drain was meeting state WQS based upon visual assessments.

Concentrations of nutrient water chemistry constituents were further compared to 1998-2017 statewide median values from EGLE's WCMP, excluding data from the Great Lakes and their connecting channels. Values from Seeley Drain were similar, but elevated, when compared to the statewide medians for total phosphorus (observed = 0.09-0.18 mg/L / statewide median = 0.04 mg/L), ortho-phosphate (observed = 0.04 to 0.08 mg/L / statewide median = 0.01), Kjeldahl nitrogen (observed = 1.14 to 1.42 mg/L / statewide median = 0.6 mg/L), ammonia (observed = 0.05 to 0.06 mg/L / statewide median = 0.022). Nitrate concentrations from Seeley Drain greatly exceeded the statewide median (observed = 21 to 23 mg/L / statewide median = 0.31 mg/L).

2015

The one targeted site was in response to an external request to evaluate the fish community and to search for redside dace within Seeley Drain (Station 28). Redside dace are a state-endangered species and were present in MDNR fish surveys as recently as 2005 (Blott and Muller, 2012). The fish community within Seeley Drain scored poor (-6) (Table 9). Over 90% of the individuals were tolerant taxa, and the fish community lacked piscivorous species. Habitat was negatively impacted by flashy hydrology, riparian removal, and a high prevalence of erosion on both banks. Habitat scores for this location can be found in Tables 3 and 5 (Station 7).

Objective 3: Identify NPS of water quality impairment.

There were no NPS issues investigated in either sampling year.

Objective 4: Collect water quality data needed for TMDL development or delisting.

There was no TMDL-related monitoring.

Objective 5: Evaluate biological temporal trends.

2015

Ten of the sites randomly selected in 2010 (Stations 18-27; Table 3) were designated to be long-term trend monitoring sites. These were sampled in 2015 and will be sampled again in 2020. Two of these locations rated poor and eight were acceptable. Trend information cannot be summarized until after 2020 when a sufficient amount of data will have been collected.

Conclusions and Future Monitoring Recommendations

In general, the Rouge River watershed exhibited tolerant macroinvertebrate communities with tolerant taxa. As seen in past surveys, urban storm water runoff continued to impact water quality, while channelization, flashy hydrology, and siltation also limited the potential of biological communities. Sites that scored as high acceptable were generally limited to headwaters and reaches upstream of urban centers within Upper, Middle, and Lower Branches of the Rouge River. Macroinvertebrate surveys from 2010 and 2015 (77 sites total) did not identify any reaches with excellent macroinvertebrate community scores.

Bishop Creek and Seeley Drain appeared to be negatively impacted by urban runoff. Water quality in Bishop Creek showed elevated levels of major anions and cations, with chloride and TDS exceeding water quality criteria. Seeley Drain did not demonstrate excess growth of plants or algae at the time of sampling; however, water samples contained levels of nitrate above the statewide median value observed through the WCMP. Fish community sampling identified impaired communities in Seeley Drain. Future watershed sampling should include Bishop Creek and Seeley Drain if efforts are made to improve water quality and/or habitat quality. Chemical and biological information could be used to update designated use attainment in these urban streams.

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Table 4a. Habitat evaluation for selected stations in the Rouge River watershed in Wayne, Washtenaw, and Oakland Counties, Michigan, June-September 2010.

	STATION 1	STATION 2	STATION 3	STATION 4	STATION 5
	Lower Rouge River	Lower Rouge River	Lower River Rouge	McClaughery Drain	McClaughery Drain
	Outer Drive	Gulley Road	Venoy Road	Annapolis Street	Hannan Road
	8/16/2010	8/24/2010	8/24/2010	8/18/2010	8/16/2010
	GLIDE/POOL	GLIDE/POOL	RIFFLE/RUN	RIFFLE/RUN	GLIDE/POOL
HABITAT METRIC					
Substrate and Instream Cover					
Epifaunal Substrate/ Avail Cover (20)	9	9	10	1	1
Embeddedness (20)*			6	2	
Velocity/Depth Regime (20)*			15	6	
Pool Substrate Characterization (20)**	9	9			6
Pool Variability (20)**	6	6			0
Channel Morphology					
Sediment Deposition (20)	5	5	13	7	1
Flow Status - Maint. Flow Volume (10)	9	9	9	9	5
Flow Status - Flashiness (10)	2	2	0	1	3
Channel Alteration (20)	13	13	16	15	7
Frequency of Riffles/Bends (20)*			16	2	
Channel Sinuosity (20)**	8	8			5
Riparian and Bank Structure					
Bank Stability (L) (10)	3	3	2	4	4
Bank Stability (R) (10)	3	3	1	4	2
Vegetative Protection (L) (10)	3	3	2	3	6
Vegetative Protection (R) (10)	3	3	1	3	3
Riparian Vegetation Zone Width (L) (10)	4	4	4	5	4
Riparian Vegetation Zone Width (R) (10)	4	4	3	6	1
TOTAL SCORE (200):	81	84	98	68	48
HABITAT RATING:	**Marginal**	**Marginal**	**Marginal**	**Marginal**	**Poor**
*Applies only to Riffle/Run stream Surveys **Applies only to Glide/Pool stream Surveys					
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).					

Table 4b. Habitat evaluation for selected stations in the Rouge River watershed in Wayne, Washtenaw, and Oakland Counties, Michigan, June-September 2010.

	STATION 1	STATION 2	STATION 3	STATION 4	STATION 5
	Lower Rouge River	**Lower Rouge River**	**Lower River Rouge**	**McClaughery Drain**	**McClaughery Drain**
	Outer Drive	**Gulley Road**	**Venoy Road**	**Annapolis Street**	**Hannan Road**
Date:	8/16/2010	8/24/2010	8/24/2010	8/18/2010	8/16/2010
Weather:	Sunny	Cloudy	Cloudy	Sunny	Sunny
Air Temperature: ºF	80	75	75	80	75
Water Temperature: ºF		73			66
Ave. Stream Width: Feet	36	38	25	8	7
Ave. Stream Depth: Feet	1.5	1.25	1.25	0.75	0.25
Surface Velocity: Feet/Second	1	0.6	1.25	0.4	0.2
Estimated Flow: Cubic Feet/Second	54	28.5	39.06	2.4	0.35
Stream Modifications:	None	None	None	None	Dredged
Nuisance Plants (Y/N):	N	N	N	N	N
STORET No.:	820928	821459	821567	821557	821558
County Code:	82	82	82	82	82
TRS:	02S10E21	02S10E20	02S09E27	02S09E32	03S08E12
Latitude (dd):	42.30386	42.3018	42.288296	42.27361	42.24834
Longitude (dd):	-83.26334	-83.28604	-83.359289	-83.40084	-83.42538
Ecoregion:	SMNITP	SMNITP	SMNITP	SMNITP	SMNITP
Stream Type:	Warmwater	Warmwater	Warmwater	Warmwater	Warmwater
USGS Basin Code:	4090004	4090004	4090004	4090004	4090004

Table 4a (continued). Habitat evaluation for selected stations in the Rouge River watershed in Wayne, Washtenaw, and Oakland Counties, Michigan, June-September 2010.

	STATION 6	STATION 7	STATION 8	STATION 9	STATION 10
	Fellows Creek	Fellows Creek	Lower Rouge River	Lower Rouge River	Lower Rouge River
	Haggarty Road	Hanford Rd	Lilley Road	Canton Center Road	Beck Road (north)
	8/20/2010	8/20/2010	8/18/2010	8/18/2010	8/16/2010
	GLIDE/POOL	RIFFLE/RUN	RIFFLE/RUN	RIFFLE/RUN	GLIDE/POOL
HABITAT METRIC					
Substrate and Instream Cover					
Epifaunal Substrate/ Avail Cover (20)	1	5	1	9	6
Embeddedness (20)*		5	13	15	
Velocity/Depth Regime (20)*		6	10	8	
Pool Substrate Characterization (20)**	6				9
Pool Variability (20)**	3				6
Channel Morphology					
Sediment Deposition (20)	5	6	11	8	6
Flow Status - Maint. Flow Volume (10)	9	6	10	9	9
Flow Status - Flashiness (10)	3	1	1	2	1
Channel Alteration (20)	11	16	16	14	15
Frequency of Riffles/Bends (20)*		10	5	10	
Channel Sinuosity (20)**	7				11
Riparian and Bank Structure					
Bank Stability (L) (10)	1	3	4	4	2
Bank Stability (R) (10)	4	3	4	4	2
Vegetative Protection (L) (10)	1	5	5	7	6
Vegetative Protection (R) (10)	6	5	5	7	6
Riparian Vegetation Zone Width (L) (10)	1	4	4	5	5
Riparian Vegetation Zone Width (R) (10)	4	6	6	5	4
TOTAL SCORE (200):	62	81	95	107	88
HABITAT RATING:	**Marginal**	**Marginal**	**Marginal**	**Good**	**Marginal**

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

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).

Table 4b (continued). Habitat evaluation for selected stations in the Rouge River watershed in Wayne, Washtenaw, and Oakland Counties, Michigan, June-September 2010.

	STATION 6	STATION 7	STATION 8	STATION 9	STATION 10
	Fellows Creek	Fellows Creek	Lower Rouge River	Lower Rouge River	Lower Rouge River
	Haggarty Road	Hanford Rd	Lilley Road	Canton Center Road	Beck Road (north)
Date:	8/20/2010	8/20/2010	8/18/2010	8/18/2010	8/16/2010
Weather:	Sunny	Sunny	Sunny	Sunny	Sunny
Air Temperature: ºF	80		82	80	80
Water Temperature: ºF	76	70			74
Ave. Stream Width: Feet	12	9	25	23	9
Ave. Stream Depth: Feet	1	0.75	1.5	1.25	0.5
Surface Velocity: Feet/Second	0.1	0.05	1.25	1	0.3
Estimated Flow: Cubic Feet/Second	1.2	0.3375	46.875	28.75	1.35
Stream Modifications:	Canopy Removal	None	None	None	None
Nuisance Plants (Y/N):	N	N	N	N	N
STORET No.:	821559	821458	820074	821460	821414
County Code:	82	82	82	82	82
TRS:	02S08E14	02S08E07	02S08E26	02S08E28	02S08E28
Latitude (dd):	42.31282	42.32807	42.2797	42.28847	42.28344
Longitude (dd):	-83.4485	-83.53207	-83.45652	-83.48675	-83.5053
Ecoregion:	SMNITP	SMNITP	SMNITP	SMNITP	SMNITP
Stream Type:	Warmwater	Warmwater	Warmwater	Warmwater	Warmwater
USGS Basin Code:	4090004	4090004	4090004	4090004	4090004

Table 4a (continued). Habitat evaluation for selected stations in the Rouge River watershed in Wayne, Washtenaw, and Oakland Counties, Michigan, June-September 2010.

	STATION 11	STATION 12	STATION 13	STATION 14	STATION 15
	Lower Rouge River	Fowler Creek	River Rouge	Middle Rouge River	Willow Creek
	Rockefeller Drive	Fifth Avenue	Ford Road	Edward N Hines Drive	Ford Road
	8/18/2010	8/18/2010	8/18/2010	8/16/2010	8/18/2010
	GLIDE/POOL	RIFFLE/RUN	RIFFLE/RUN	GLIDE/POOL	GLIDE/POOL
HABITAT METRIC					
Substrate and Instream Cover					
Epifaunal Substrate/ Avail Cover (20)	6	8	3	8	1
Embeddedness (20)*		10			
Velocity/Depth Regime (20)*		11			
Pool Substrate Characterization (20)**	6		6	9	5
Pool Variability (20)**	4		15	7	1
Channel Morphology					
Sediment Deposition (20)	5	11	11	5	4
Flow Status - Maint. Flow Volume (10)	8	9	9	9	9
Flow Status - Flashiness (10)	2	3	0	0	1
Channel Alteration (20)	11	15	16	16	9
Frequency of Riffles/Bends (20)*		10			
Channel Sinuosity (20)**	8		13	15	5
Riparian and Bank Structure					
Bank Stability (L) (10)	3	4	3	1	1
Bank Stability (R) (10)	3	4	3	1	1
Vegetative Protection (L) (10)	4	6	2	2	3
Vegetative Protection (R) (10)	4	6	2	2	0
Riparian Vegetation Zone Width (L) (10)	2	6	4	3	4
Riparian Vegetation Zone Width (R) (10)	3	6	6	4	1
TOTAL SCORE (200):	69	109	93	82	45
HABITAT RATING:	**Marginal**	**Good**	**Marginal**	**Marginal**	**Poor**

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

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).

Table 4b (continued). Habitat evaluation for selected stations in the Rouge River watershed in Wayne, Washtenaw, and Oakland Counties, Michigan, June-September 2010.

	STATION 11	STATION 12	STATION 13	STATION 14	STATION 15
	Lower Rouge River	Fowler Creek	River Rouge	Middle Rouge River	Willow Creek
	Rockefeller Drive	Fifth Avenue	Ford Road	Edward N Hines Drive	Ford Road
Date:	8/18/2010	8/18/2010	8/24/2010	8/24/2010	8/20/2010
Weather:	Sunny	Cloudy	Partly Cloudy	Sunny	Partly Cloudy
Air Temperature: ºF	75	70	78	72	85
Water Temperature: ºF	72	74	74	73	77
Ave. Stream Width: Feet	8	9	65	27	12
Ave. Stream Depth: Feet	1	0.5	5	1.25	0.75
Surface Velocity: Feet/Second	0.25	0.3	0.1	0.6	0.1
Estimated Flow: Cubic Feet/Second	2	1.35	32.5	20.25	0.9
Stream Modifications:	None	None	None	None	Dredged
Nuisance Plants (Y/N):	N	N	N	N	N
STORET No.:	821560	821561	821562	820948	821563
County Code:	82	82	82	82	82
TRS:	02S08E29	02S08E29	02S10E15	02S09E03	02S09E18
Latitude (dd):	42.28863	42.28235	42.325101	42.34109	42.32387
Longitude (dd):	-83.50992	-83.51599	-83.242415	-83.35129	-83.41442
Ecoregion:	SMNITP	SMNITP	SMNITP	SMNITP	SMNITP
Stream Type:	Warmwater	Warmwater	Warmwater	Warmwater	Warmwater
USGS Basin Code:	4090004	4090004	4090004	4090004	4090004

Table 4a (continued). Habitat evaluation for selected stations in the Rouge River watershed in Wayne, Washtenaw, and Oakland Counties, Michigan, June-September 2010.

	STATION 16	STATION 17	STATION 18	STATION 19	STATION 20
	Willow Creek	Tonquish Creek	South Branch Tonquish Creek	Middle Rouge River	Middle River Rouge
	Haggarty Road	Holiday Boulevard	Jo-Ann Lane	Edward N Hines Drive	Hines Drive, downstream Wilcox Road
	8/20/2010	8/16/2010	8/24/2010	8/16/2010	8/11/2010
	GLIDE/POOL	RIFFLE/RUN	RIFFLE/RUN	RIFFLE/RUN	RIFFLE/RUN
HABITAT METRIC					
Substrate and Instream Cover					
Epifaunal Substrate/ Avail Cover (20)	1	3	7	8	12
Embeddedness (20)*		10	9	6	18
Velocity/Depth Regime (20)*		10	8	10	15
Pool Substrate Characterization (20)**	6				
Pool Variability (20)**	1				
Channel Morphology					
Sediment Deposition (20)	1	4	11	8	16
Flow Status - Maint. Flow Volume (10)	8	8	5	10	9
Flow Status - Flashiness (10)	0	3	1	3	2
Channel Alteration (20)	10	14	11	14	15
Frequency of Riffles/Bends (20)*		11	16	5	15
Channel Sinuosity (20)**	5				
Riparian and Bank Structure					
Bank Stability (L) (10)	1	2	3	3	3
Bank Stability (R) (10)	1	2	2	3	3
Vegetative Protection (L) (10)	1	4	3	5	6
Vegetative Protection (R) (10)	1	2	2	5	6
Riparian Vegetation Zone Width (L) (10)	1	3	2	6	6
Riparian Vegetation Zone Width (R) (10)	1	1	2	3	3
TOTAL SCORE (200):	38	77	82	89	129
HABITAT RATING:	**Poor**	**Marginal**	**Marginal**	**Marginal**	**Good**
*Applies only to Riffle/Run stream Surveys **Applies only to Glide/Pool stream Surveys					
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).					

Table 4b (continued). Habitat evaluation for selected stations in the Rouge River watershed in Wayne, Washtenaw, and Oakland Counties, Michigan, June-September 2010.

	STATION 16	STATION 17	STATION 18	STATION 19	STATION 20
	Willow Creek	**Tonquish Creek**	**South Branch Tonquish Creek**	**Middle Rouge River**	**Middle River Rouge**
	Haggarty Road	**Holiday Boulevard**	**Jo-Ann Lane**	**Edward N Hines Drive**	**Hines Drive, downstream Wilcox Road**
Date:	8/20/2010	8/16/2010	8/24/2010	8/16/2010	8/11/2010
Weather:	Partly Cloudy	Sunny	Sunny	Sunny	Cloudy
Air Temperature: ºF		82	70	80	85
Water Temperature: ºF	77	74	68	80	75
Ave. Stream Width: Feet	10	18	5	40	32
Ave. Stream Depth: Feet	0.75	0.5	0.25	1.5	1.5
Surface Velocity: Feet/Second	0.1	0.3	0.25	0.5	0.4
Estimated Flow: Cubic Feet/Second	0.75	2.7	0.3125	30	19.2
Stream Modifications:	Bank Stabilization	None	None	None	None
Nuisance Plants (Y/N):	N	N	N	N	N
STORET No.:	821564	821565	821511	820946	821566
County Code:	82	82	82	82	82
TRS:	02S08E11	02S08E12	01S08E34	01S08E25	01S08E23
Latitude (dd):	42.32612	42.33206	42.36203	42.37024	42.383096
Longitude (dd):	-83.4491	-83.43025	-83.48293	-83.43284	-83.456004
Ecoregion:	SMNITP	SMNITP	SMNITP	SMNITP	SMNITP
Stream Type:	Warmwater	Warmwater	Warmwater	Warmwater	Warmwater
USGS Basin Code:	4090004	4090004	4090004	4090004	4090004

Table 4a (continued). Habitat evaluation for selected stations in the Rouge River watershed in Wayne, Washtenaw, and Oakland Counties, Michigan, June-September 2010.

	STATION 21	STATION 22	STATION 23	STATION 24	STATION 25
	Middle River Rouge	Bishop Creek	Bishop Creek	Walled Lake Branch	Walled Lake Branch
	M14	Meadowbrook Road	Delnol Avenue	Ashbury Road	Chattman Road
	8/11/2010	8/17/2010	8/11/2010	8/17/2010	8/11/2010
	GLIDE/POOL	RIFFLE/RUN	GLIDE/POOL	GLIDE/POOL	RIFFLE/RUN
HABITAT METRIC					
Substrate and Instream Cover					
Epifaunal Substrate/ Avail Cover (20)	10	9	10	6	11
Embeddedness (20)*		13			8
Velocity/Depth Regime (20)*		10			16
Pool Substrate Characterization (20)**	15		10	8	
Pool Variability (20)**	5		6	7	
Channel Morphology					
Sediment Deposition (20)	16	15	16	16	8
Flow Status - Maint. Flow Volume (10)	9	8	10	10	8
Flow Status - Flashiness (10)	2	6	5	5	2
Channel Alteration (20)	15	5	8	10	16
Frequency of Riffles/Bends (20)*		16			16
Channel Sinuosity (20)**	6		5	5	
Riparian and Bank Structure					
Bank Stability (L) (10)	3	3	7	6	3
Bank Stability (R) (10)	2	3	7	6	3
Vegetative Protection (L) (10)	4	2	6	7	6
Vegetative Protection (R) (10)	4	2	6	7	6
Riparian Vegetation Zone Width (L) (10)	8	0	3	5	8
Riparian Vegetation Zone Width (R) (10)	4	0	3	5	3
TOTAL SCORE (200):	103	92	102	103	114
HABITAT RATING:	**Marginal**	**Marginal**	**Marginal**	**Marginal**	**Good**

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

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).

Table 4b (continued). Habitat evaluation for selected stations in the Rouge River watershed in Wayne, Washtenaw, and Oakland Counties, Michigan, June-September 2010.

	STATION 21	STATION 22	STATION 23	STATION 24	STATION 25
	Middle River Rouge	Bishop Creek	Bishop Creek	Walled Lake Branch	Walled Lake Branch
	M14	Meadowbrook Road	Delnol Avenue	Ashbury Road	Chattman Road
Date:	8/11/2010	8/17/2010	8/11/2010	8/17/2010	8/11/2010
Weather:	Partly Cloudy	Sunny	Sunny	Sunny	Partly Cloudy
Air Temperature: oF	84	80	72	72	78
Water Temperature: oF	76	72	72	70	
Ave. Stream Width: Feet	56	3	5	18	16
Ave. Stream Depth: Feet	1.5	0.75	1.25	1.5	1
Surface Velocity: Feet/Second	0.5	0.4	0.1	0.4	0.3
Estimated Flow: Cubic Feet/Second	42	0.9	0.625	10.8	4.8
Stream Modifications:	None	Dredged	Dredged	Dredged	None
Nuisance Plants (Y/N):	N	N	N	N	N
STORET No.:	821568	631209	631112	631212	631107
County Code:	82	63	63	63	63
TRS:	01S08E23	01N08E23	01N08E14	01N08E35	01N08E26
Latitude (dd):	42.388852	42.47832	42.48293	42.44265	42.45935
Longitude (dd):	-83.466837	-83.45562	-83.46473	-83.47273	-83.45798
Ecoregion:	SMNITP	SMNITP	SMNITP	SMNITP	SMNITP
Stream Type:	Warmwater	Warmwater	Warmwater	Warmwater	Warmwater
USGS Basin Code:	4090004	4090004	4090004	4090004	4090004

Table 4a (continued). Habitat evaluation for selected stations in the Rouge River watershed in Wayne, Washtenaw, and Oakland Counties, Michigan, June-September 2010.

	STATION 26	STATION 27	STATION 28	STATION 29	STATION 30
	Walled Lake Branch	Johnson Drain	Ashcroft Drain	River Rouge	Rouge River
	10 Mile Road	Ridge Road	Rouge Park Drive	Outer Drive	Schoolcraft Street
	8/11/2010	8/11/2010	8/25/2010	8/19/2010	8/12/2010
	RIFFLE/RUN	RIFFLE/RUN	RIFFLE/RUN	GLIDE/POOL	GLIDE/POOL
HABITAT METRIC					
Substrate and Instream Cover					
Epifaunal Substrate/ Avail Cover (20)	15	6	0	1	5
Embeddedness (20)*	13	10	6		
Velocity/Depth Regime (20)*	15	7	6		
Pool Substrate Characterization (20)**				6	6
Pool Variability (20)**				11	5
Channel Morphology					
Sediment Deposition (20)	5	3	2	6	2
Flow Status - Maint. Flow Volume (10)	8	8	7	9	9
Flow Status - Flashiness (10)	3	3	0	0	0
Channel Alteration (20)	16	10	15	12	15
Frequency of Riffles/Bends (20)*	18	5	0		
Channel Sinuosity (20)**				5	6
Riparian and Bank Structure					
Bank Stability (L) (10)	3	4	1	1	3
Bank Stability (R) (10)	3	4	1	3	3
Vegetative Protection (L) (10)	6	5	2	1	2
Vegetative Protection (R) (10)	6	5	2	1	2
Riparian Vegetation Zone Width (L) (10)	5	7	6	4	4
Riparian Vegetation Zone Width (R) (10)	3	4	6	6	6
Total Score (200)	119	81	54	66	68
HABITAT RATING	**Good**	**Marginal**	**Poor**	**Marginal**	**Marginal**
*Applies only to Riffle/Run stream Surveys **Applies only to Glide/Pool stream Surveys					
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).					

Table 4b (continued). Habitat evaluation for selected stations in the Rouge River watershed in Wayne, Washtenaw, and Oakland Counties, Michigan, June-September 2010.

	STATION 26	STATION 27	STATION 28	STATION 29	STATION 30
	Walled Lake Branch	Johnson Drain	Ashcroft Drain	River Rouge	Rouge River
	10 Mile Road	Ridge Road	Rouge Park Drive	Outer Drive	Schoolcraft Street
Date:	8/11/2010	8/11/2010	8/25/2010	8/19/2010	8/12/2010
Weather:	Sunny	Rainy	Cloudy	Partly Cloudy	Sunny
Air Temperature: ºF	75	82	74		85
Water Temperature: ºF	68		72	73	
Ave. Stream Width: Feet	12	12	14	25	50
Ave. Stream Depth: Feet	0.5	0.3	0.75	1.5	1
Surface Velocity: Feet/Second	0.6	0.3	0.05	0.4	0.6
Estimated Flow: Cubic Feet/Second	3.6	1.08	0.525	15	30
Stream Modifications:	None	Dredged	None	None	None
Nuisance Plants (Y/N):	N	N	N	N	N
STORET No.:	631211	821450	821519	821569	821570
County Code:	63	82	82	82	82
TRS:	01N08E23	01S08E18	01S10E33	01S10E26	01S10E21
Latitude (dd):	42.46693	42.396392	42.36126	42.38352	42.38611
Longitude (dd):	-83.46619	-83.530281	-83.2629	-83.2591	-83.26613
Ecoregion:	SMNITP	SMNITP	SMNITP	SMNITP	SMNITP
Stream Type:	Warmwater	Warmwater	Warmwater	Warmwater	Warmwater
USGS Basin Code:	4090004	4090004	4090004	4090004	4090004

Table 4a (continued). Habitat evaluation for selected stations in the Rouge River watershed in Wayne, Washtenaw, and Oakland Counties, Michigan, June-September 2010.

	STATION 31	STATION 32	STATION 33	STATION 34	STATION 35
	Unnamed Tributary to Bell Branch	Upper Rouge River	Upper Rouge River	Minnow Pond Drain	Seeley Drain
	Newburgh Road	Garfield Road	Angling Road	Farmington Road	Drake Road
	8/11/2010	8/23/2010	8/19/2010	8/23/2010	8/19/2010
	RIFFLE/RUN	GLIDE/POOL	GLIDE/POOL	RIFFLE/RUN	RIFFLE/RUN
HABITAT METRIC					
Substrate and Instream Cover					
Epifaunal Substrate/ Avail Cover (20)	10	6	1	6	11
Embeddedness (20)*	10			6	6
Velocity/Depth Regime (20)*	10			7	11
Pool Substrate Characterization (20)**		7	6		
Pool Variability (20)**		9	5		
Channel Morphology					
Sediment Deposition (20)	6	10	3	7	16
Flow Status - Maint. Flow Volume (10)	8	9	9	8	9
Flow Status - Flashiness (10)	1	3	2	6	3
Channel Alteration (20)	16	6	14	10	15
Frequency of Riffles/Bends (20)*	18			8	16
Channel Sinuosity (20)**		10	11		
Riparian and Bank Structure					
Bank Stability (L) (10)	1	3	3	6	3
Bank Stability (R) (10)	1	3	3	6	3
Vegetative Protection (L) (10)	6	2	1	6	4
Vegetative Protection (R) (10)	6	2	1	6	4
Riparian Vegetation Zone Width (L) (10)	3	1	4	2	5
Riparian Vegetation Zone Width (R) (10)	5	1	5	2	6
TOTAL SCORE (200):	101	72	68	86	112
HABITAT RATING:	**Marginal**	**Marginal**	**Marginal**	**Marginal**	**Good**

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

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).

Table 4b (continued). Habitat evaluation for selected stations in the Rouge River watershed in Wayne, Washtenaw, and Oakland Counties, Michigan, June-September 2010.

	STATION 31	STATION 32	STATION 33	STATION 34	STATION 35
	Unnamed Tributary to Bell Branch	Upper Rouge River	Upper Rouge River	Minnow Pond Drain	Seeley Drain
	Newburgh Road	Garfield Road	Angling Road	Farmington Road	Drake Road
Date:	8/11/2010	8/23/2010	8/19/2010	8/23/2010	8/19/2010
Weather:	Partly Cloudy	Partly Cloudy	Partly Cloudy	Cloudy	Sunny
Air Temperature: ºF	82	80	84	80	85
Water Temperature: ºF	70	73	76	75	74
Ave. Stream Width: Feet	6	23	24	10	12
Ave. Stream Depth: Feet	0.5	1.5	1.25	0.75	0.75
Surface Velocity: Feet/Second	0.5	0.25	0.3	0.1	1.5
Estimated Flow: Cubic Feet/Second	1.5	8.625	9	0.75	13.5
Stream Modifications:	None	Canopy Removal	None	Dredged	Bank Stabilization
Nuisance Plants (Y/N):	N	N	N	N	N
STORET No.:	821571	821572	821573	630989	631057
County Code:	82	82	82	63	63
TRS:	01S09E05	01S10E17	01S09E01	01N08E09	01N09E17
Latitude (dd):	42.43859	42.40322	42.42912	42.48889	42.48893
Longitude (dd):	-83.41445	-83.28872	-83.32125	-83.3775	-83.40088
Ecoregion:	SMNITP	SMNITP	SMNITP	SMNITP	SMNITP
Stream Type:	Warmwater	Warmwater	Warmwater	Warmwater	Warmwater
USGS Basin Code:	4090004	4090004	4090004	4090004	4090004

Table 4a (continued). Habitat evaluation for selected stations in the Rouge River watershed in Wayne, Washtenaw, and Oakland Counties, Michigan, June-September 2010.

	STATION 36	STATION 37	STATION 38	STATION 39	STATION 40
	Seeley Drain	Rouge River	Rouge River	Rouge River	Pebble Creek
	Halsted Road	Ridge Road	McNichols Road	Bridge Street	10 Mile Road
	8/19/2010	8/12/2010	8/12/2010	8/6/2010	8/6/2010
	RIFFLE/RUN	GLIDE/POOL	GLIDE/POOL	GLIDE/POOL	RIFFLE/RUN
HABITAT METRIC					
Substrate and Instream Cover					
Epifaunal Substrate/ Avail Cover (20)	14	2	5	5	6
Embeddedness (20)*	10				6
Velocity/Depth Regime (20)*	16				13
Pool Substrate Characterization (20)**		9	10	7	
Pool Variability (20)**		5	5	10	
Channel Morphology					
Sediment Deposition (20)	6	3	2	5	3
Flow Status - Maint. Flow Volume (10)	9	9	9	9	9
Flow Status - Flashiness (10)	4	1	1	0	1
Channel Alteration (20)	18	13	15	15	16
Frequency of Riffles/Bends (20)*	16				7
Channel Sinuosity (20)**		6	6	8	
Riparian and Bank Structure					
Bank Stability (L) (10)	5	1	1	2	1
Bank Stability (R) (10)	2	3	2	1	1
Vegetative Protection (L) (10)	6	2	3	1	5
Vegetative Protection (R) (10)	5	2	3	1	5
Riparian Vegetation Zone Width (L) (10)	5	4	4	8	6
Riparian Vegetation Zone Width (R) (10)	4	4	4	4	2
TOTAL SCORE (200):	120	64	70	76	81
HABITAT RATING:	**Good**	**Marginal**	**Marginal**	**Marginal**	**Marginal**
*Applies only to Riffle/Run stream Surveys **Applies only to Glide/Pool stream Surveys					
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).					

Table 4b (continued). Habitat evaluation for selected stations in the Rouge River watershed in Wayne, Washtenaw, and Oakland Counties, Michigan, June-September 2010.

	STATION 36	STATION 37	STATION 38	STATION 39	STATION 40
	Seeley Drain	**Rouge River**	**Rouge River**	**Rouge River**	**Pebble Creek**
	Halsted Road	**Ridge Road**	**McNichols Road**	**Bridge Street**	**10 Mile Road**
Date:	8/19/2010	8/12/2010	8/12/2010	8/6/2010	8/6/2010
Weather:	Sunny	Partly Cloudy	Cloudy	Partly Cloudy	Partly Cloudy
Air Temperature: ºF	85	82	75	82	82
Water Temperature: ºF			70	72	70
Ave. Stream Width: Feet	8	36	36	45	18
Ave. Stream Depth: Feet	0.5	1.5	1.75	1.75	0.75
Surface Velocity: Feet/Second	0.75	0.4	0.25	0.3	0.2
Estimated Flow: Cubic Feet/Second	3	21.6	15.75	23.625	2.7
Stream Modifications:	None	None	None	None	None
Nuisance Plants (Y/N):	N	N	N	N	N
STORET No.:	630999	821574	821575	631213	630990
County Code:	63	82	82	63	63
TRS:	01N09E18	01S10E16	01S10E09	01N10E32	01N10E19
Latitude (dd):	42.48915	42.41327	42.41472	42.443472	42.47167
Longitude (dd):	-83.41677	-83.26988	-83.26683	-83.285231	-83.30389
Ecoregion:	SMNITP	SMNITP	SMNITP	SMNITP	SMNITP
Stream Type:	Warmwater	Warmwater	Warmwater	Warmwater	Warmwater
USGS Basin Code:	4090004	4090004	4090004	4090004	4090004

Table 4a (continued). Habitat evaluation for selected stations in the Rouge River watershed in Wayne, Washtenaw, and Oakland Counties, Michigan, June-September 2010.

	STATION 41	STATION 42	STATION 43	STATION 44	STATION 45
	Pebble Creek	Pebble Creek	Franklin Branch	Franklin Branch	Unnamed Tributary
	11 Mile Road	Westgate Road	12 Mile Road	14 Mile Road	Middlebelt Road
	8/6/2010	8/6/2010	8/19/2010	8/6/2010	8/17/2010
	RIFFLE/RUN	RIFFLE/RUN	RIFFLE/RUN	RIFFLE/RUN	RIFFLE/RUN
HABITAT METRIC					
Substrate and Instream Cover					
Epifaunal Substrate/ Avail Cover (20)	6	11	10	14	9
Embeddedness (20)*	13	16	6	7	12
Velocity/Depth Regime (20)*	15	15	11	13	10
Pool Substrate Characterization (20)**					
Pool Variability (20)**					
Channel Morphology					
Sediment Deposition (20)	9	12	6	11	11
Flow Status - Maint. Flow Volume (10)	9	9	8	9	9
Flow Status - Flashiness (10)	1	5	3	6	9
Channel Alteration (20)	15	15	16	9	15
Frequency of Riffles/Bends (20)*	13	11	8	11	15
Channel Sinuosity (20)**					
Riparian and Bank Structure					
Bank Stability (L) (10)	1	3	3	7	8
Bank Stability (R) (10)	1	6	3	7	8
Vegetative Protection (L) (10)	1	2	4	6	8
Vegetative Protection (R) (10)	1	5	4	6	8
Riparian Vegetation Zone Width (L) (10)	8	1	5	5	4
Riparian Vegetation Zone Width (R) (10)	8	2	5	5	3
TOTAL SCORE (200):	101	113	92	116	129
HABITAT RATING:	**Marginal**	**Good**	**Marginal**	**Good**	**Good**
*Applies only to Riffle/Run stream Surveys **Applies only to Glide/Pool stream Surveys					
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).					

Table 4b (continued). Habitat evaluation for selected stations in the Rouge River watershed in Wayne, Washtenaw, and Oakland Counties, Michigan, June-September 2010.

	STATION 41	STATION 42	STATION 43	STATION 44	STATION 45
	Pebble Creek	Pebble Creek	Franklin Branch	Franklin Branch	Unnamed Tributary
	11 Mile Road	Westgate Road	12 Mile Road	14 Mile Road	Middlebelt Road
Date:	8/6/2010	8/6/2010	8/19/2010	8/6/2010	8/17/2010
Weather:	Sunny	Sunny	Sunny	Sunny	Sunny
Air Temperature: ºF	80	70	70	70	80
Water Temperature: ºF	70	68	68		
Ave. Stream Width: Feet	10	5	9	19	2.5
Ave. Stream Depth: Feet	1	0.5	0.75	0.5	0.3
Surface Velocity: Feet/Second	0.2	0.3	0.6	0.3	0.75
Estimated Flow: Cubic Feet/Second	2	0.75	4.05	2.85	0.5625
Stream Modifications:	None	Bank Stabilization	None	Relocated	None
Nuisance Plants (Y/N):	N	N	N	N	N
STORET No.:	630991	631214	631210	630986	631215
County Code:	63	63	63	63	63
TRS:	01N10E18	01N09E02	01N10E09	42.53031	02N09E24
Latitude (dd):	42.4858	42.51591	42.50211	-83.30618	42.56215
Longitude (dd):	-83.30869	-83.34699	-83.277233	SMNITP	-83.34119
Ecoregion:	SMNITP	SMNITP	SMNITP	Warmwater	SMNITP
Stream Type:	Warmwater	Warmwater	Warmwater	Warmwater	Warmwater
USGS Basin Code:	4090004	4090004	4090004	4090004	4090004

Table 4a (continued). Habitat evaluation for selected stations in the Rouge River watershed in Wayne, Washtenaw, and Oakland Counties, Michigan, June-September 2010.

	STATION 46	STATION 47	STATION 48	STATION 49	STATION 50
	Sunken Bridge Drain	Sunken Bridge Drain	Cranbrook Creek	Forest Lake Outlet	Rouge River
	Cranbrook Court	Tamarack Way	Lahser Rd	Franklin Road	Beach Road
	8/5/2010	8/5/2010	8/5/2010	8/5/2010	8/5/2010
	RIFFLE/RUN	RIFFLE/RUN	RIFFLE/RUN	RIFFLE/RUN	GLIDE/POOL
HABITAT METRIC					
Substrate and Instream Cover					
Epifaunal Substrate/ Avail Cover (20)	15	11	11	6	10
Embeddedness (20)*	14	15	16	10	
Velocity/Depth Regime (20)*	15	14	11	7	
Pool Substrate Characterization (20)**					11
Pool Variability (20)**					5
Channel Morphology					
Sediment Deposition (20)	16	5	10	6	6
Flow Status - Maint. Flow Volume (10)	9	9	8	3	9
Flow Status - Flashiness (10)	6	3	5	4	6
Channel Alteration (20)	18	15	16	15	17
Frequency of Riffles/Bends (20)*	10	15	16	6	
Channel Sinuosity (20)**					11
Riparian and Bank Structure					
Bank Stability (L) (10)	8	5	8	6	6
Bank Stability (R) (10)	6	5	8	6	6
Vegetative Protection (L) (10)	8	6	6	6	6
Vegetative Protection (R) (10)	2	6	6	8	6
Riparian Vegetation Zone Width (L) (10)	5	6	3	3	4
Riparian Vegetation Zone Width (R) (10)	2	6	4	8	6
TOTAL SCORE (200):	134	121	128	94	109
HABITAT RATING:	**Good**	**Good**	**Good**	**Marginal**	**Good**
*Applies only to Riffle/Run stream Surveys **Applies only to Glide/Pool stream Surveys					
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).					

Table 4b (continued). Habitat evaluation for selected stations in the Rouge River watershed in Wayne, Washtenaw, and Oakland Counties, Michigan, June-September 2010.

	STATION 46	STATION 47	STATION 48	STATION 49	STATION 50
	Sunken Bridge Drain	Sunken Bridge Drain	Cranbrook Creek	Forest Lake Outlet	Rouge River
	Cranbrook Court	Tamarack Way	Lahser Rd	Franklin Road	Beach Road
Date:	8/5/2010	8/5/2010	8/5/2010	8/5/2010	8/5/2010
Weather:	Sunny	Sunny	Sunny	Sunny	Sunny
Air Temperature: ºF	85	88	88	75	85
Water Temperature: ºF		74	74	72	78
Ave. Stream Width: Feet	14	12	12	2	15
Ave. Stream Depth: Feet	0.75	0.5	0.5	0.2	0.5
Surface Velocity: Feet/Second	0.8	0.5	0.5	0.2	0.3
Estimated Flow: Cubic Feet/Second	8.4	3	3	0.08	2.25
Stream Modifications:	None	Bank Stabilization	Bank Stabilization	None	None
Nuisance Plants (Y/N):	N	N	N	N	N
STORET No.:	631216	631217	631049	631218	631219
County Code:	63	63	63	63	63
TRS:	02N10E23	02N10E23	02N10E16	02N10E08	02N11W18
Latitude (dd):	42.56596	42.57473	42.5782	42.59222	42.58101
Longitude (dd):	-83.239	-83.24542	-83.26529	-83.28696	-83.19761
Ecoregion:	SMNITP	SMNITP	SMNITP	SMNITP	SMNITP
Stream Type:	Warmwater	Warmwater	Warmwater	Warmwater	Warmwater
USGS Basin Code:	4090004	4090004	4090004	4090004	4090004

Table 5a. Qualitative macroinvertebrate metric evaluation of selected stations in the Rouge River watershed, 2010.

	Lower Rouge River Outer Drive	Lower Rouge River Gulley Road	Lower River Rouge Venoy Road	McClaughery Drain Annapolis Street
	8/16/2010	8/24/2010	8/24/2010	8/18/2010
TAXA	**STATION 1**	**STATION 2**	**STATION 3**	**STATION 4**
PLATYHELMINTHES (flatworms)				
Turbellaria		1		
ANNELIDA (segmented worms)				
Oligochaeta (worms)	40	32	2	2
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	1			
Decapoda (crayfish)	1	1	1	12
Isopoda (sowbugs)	2	5		2
Insecta				
Ephemeroptera (mayflies)				
Baetidae	92	40	57	
Heptageniidae			1	
Odonata				
Anisoptera (dragonflies)				
Aeshnidae			2	
Zygoptera (damselflies)				
Calopterygidae	3	90	8	3
Coenagrionidae	2	4	5	
Hemiptera (true bugs)				
Gerridae	10	3	1	2
Mesoveliidae		3		1
Nepidae		1		
Pleidae	1	1		
Trichoptera (caddisflies)				
Helicopsychidae		5		
Hydropsychidae	75	35	134	
Hydroptilidae			2	
Coleoptera (beetles)				
Elmidae			5	
Diptera (flies)				
Chironomidae	6	23	18	2
Culicidae		1		
MOLLUSCA				
Gastropoda (snails)				
Ancylidae (limpets)	1	1	2	2
Physidae			3	
Planorbidae		3		
Pelecypoda (bivalves)				
Corbiculidae			16	
Sphaeriidae (clams)	2			37
TOTAL INDIVIDUALS	236	249	257	63

Table 5b. Qualitative macroinvertebrate metric evaluation of selected stations in the Rouge River watershed, 2010.

	Lower Rouge River Outer Drive		Lower Rouge River Gulley Road		Lower River Rouge Venoy Road		McClaughery Drain Annapolis Street	
	STATION 1		**STATION 2**		**STATION 3**		**STATION 4**	
METRIC	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	13	0	17	0	15	0	9	-1
NUMBER OF MAYFLY TAXA	1	-1	1	-1	2	0	0	-1
NUMBER OF CADDISFLY TAXA	1	-1	2	0	2	0	0	-1
NUMBER OF STONEFLY TAXA	0	-1	0	-1	0	-1	0	-1
PERCENT MAYFLY COMPOSITION	38.98	1	16.06	0	22.57	1	0.00	-1
PERCENT CADDISFLY COMPOSTITION	31.78	1	16.06	0	52.92	1	0.00	-1
PERCENT DOMINANT TAXON	38.98	-1	36.14	0	52.14	-1	58.73	-1
PERCENT ISOPOD, SNAIL, LEECH	1.27	1	3.61	1	1.95	1	6.35	0
PERCENT SURFACE AIR BREATHERS	4.66	1	3.61	1	0.39	1	4.76	1
TOTAL SCORE		0		0		2		-6
MACROINVERTEBRATE COMMUNITY RATING	ACCEPTABLE		ACCEPTABLE		ACCEPTABLE		POOR	

Table 5a (continued). Qualitative macroinvertebrate metric evaluation of selected stations in the Rouge watershed, 2010.

	McClaughery Drain Hannan Road	Fellows Creek Haggarty Road	Fellows Creek Hanford Rd	Lower Rouge River Lilley Road
	8/16/2010	8/20/2010	8/20/2010	8/18/2010
TAXA	**STATION 5**	**STATION 6**	**STATION 7**	**STATION 8**
PLATYHELMINTHES (flatworms)				
Turbellaria			2	
ANNELIDA (segmented worms)				
Hirudinea (leeches)	13			
Oligochaeta (worms)	12	3	6	8
ARTHROPODA				
Crustacea				
Amphipoda (scuds)		7	2	3
Decapoda (crayfish)	1	2	1	4
Isopoda (sowbugs)	23	1		4
Arachnoidea				
Hydracarina		1		
Insecta				
Ephemeroptera (mayflies)				
Baetidae	1	2		6
Caenidae	6		5	
Heptageniidae			14	17
Odonata				
Anisoptera (dragonflies)				
Aeshnidae			3	
Libellulidae	3			
Zygoptera (damselflies)				
Calopterygidae	1	8	26	18
Coenagrionidae		5		1
Hemiptera (true bugs)				
Belostomatidae	1			
Corixidae	115	19		
Gerridae	2		3	1
Mesoveliidae		1	4	2
Nepidae		2		
Pleidae				1
Veliidae		4		
Trichoptera (caddisflies)				
Hydropsychidae	1	12	18	26
Coleoptera (beetles)				
Haliplidae (adults)	1			
Elmidae			44	21
Diptera (flies)				
Chironomidae	88	55	34	23
Culicidae			8	
Dixidae			1	
Simuliidae				2
Tabanidae			3	
Tipulidae			2	1

	McClaughery Drain Hannan Road	Fellows Creek Haggarty Road	Fellows Creek Hanford Rd	Lower Rouge River Lilley Road
	8/16/2010	8/20/2010	8/20/2010	8/18/2010
TAXA	**STATION 5**	**STATION 6**	**STATION 7**	**STATION 8**
MOLLUSCA				
Gastropoda (snails)				
Ancylidae (limpets)		22	44	4
Physidae	6			
Planorbidae	2			
Pelecypoda (bivalves)				
Sphaeriidae (clams)	7	2	30	10
TOTAL INDIVIDUALS	283	146	250	152

Table 5b (continued). Qualitative macroinvertebrate metric evaluation of selected stations in the Rouge River watershed, 2010.

	McClaughery Drain Hannan Road		Fellows Creek Haggarty Road		Fellows Creek Hanford Rd		Lower Rouge River Lilley Road	
	STATION 5		**STATION 6**		**STATION 7**		**STATION 8**	
METRIC	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	17	0	16	0	19	0	18	0
NUMBER OF MAYFLY TAXA	2	0	1	-1	2	0	2	0
NUMBER OF CADDISFLY TAXA	1	-1	1	-1	1	-1	1	-1
NUMBER OF STONEFLY TAXA	0	-1	0	-1	0	-1	0	-1
PERCENT MAYFLY COMPOSITION	2.47	-1	1.37	-1	7.60	0	15.13	0
PERCENT CADDISFLY COMPOSTITION	0.35	-1	8.22	0	7.20	0	17.11	0
PERCENT DOMINANT TAXON	40.64	-1	37.67	-1	17.60	1	17.11	1
PERCENT ISOPOD, SNAIL, LEECH	15.55	-1	15.75	-1	17.60	-1	5.26	0
PERCENT SURFACE AIR BREATHERS	42.05	-1	17.81	0	6.00	1	2.63	1
TOTAL SCORE		-7		-6		-1		0
MACROINVERTEBRATE COMMUNITY RATING	POOR		POOR		ACCEPTABLE		ACCEPTABLE	

Table 5a (continued). Qualitative macroinvertebrate metric evaluation of selected stations in the Rouge River watershed, 2010.

	Lower Rouge River Canton Center Road	Lower Rouge River Beck Road	Lower Rouge River Rockefeller Drive	Fowler Creek Fifth Avenue
	8/18/2010	8/16/2010	8/18/2010	8/18/2010
TAXA	**STATION 9**	**STATION 10**	**STATION 11**	**STATION 12**
ANNELIDA (segmented worms)				
Hirudinea (leeches)		1		
Oligochaeta (worms)		5	26	13
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	2	7	19	1
Decapoda (crayfish)	2	3	1	11
Arachnoidea				
Hydracarina			1	1
Insecta				
Ephemeroptera (mayflies)				
Baetidae	3	17	6	2
Caenidae			12	18
Heptageniidae	2	7	4	52
Odonata				
Anisoptera (dragonflies)				
Aeshnidae				4
Libellulidae				2
Zygoptera (damselflies)				
Calopterygidae	14	7	17	29
Coenagrionidae	2	14	15	9
Hemiptera (true bugs)				
Belostomatidae			1	
Corixidae			4	
Gerridae	2	8	2	3
Mesoveliidae				3
Nepidae			1	
Pleidae			1	
Trichoptera (caddisflies)				
Hydropsychidae	170	57	4	16
Leptoceridae				5
Limnephilidae		2	1	
Coleoptera (beetles)				
Scirtidae (adults)		1		
Elmidae	30	30	33	36
Diptera (flies)				
Chironomidae	19	68	74	40
Culicidae		2	7	1
Dixidae			11	
Simuliidae	2			1
Stratiomyidae		2		
Tipulidae			1	
MOLLUSCA				

	Lower Rouge River Canton Center Road	Lower Rouge River Beck Road	Lower Rouge River Rockefeller Drive	Fowler Creek Fifth Avenue
	8/18/2010	8/16/2010	8/18/2010	8/18/2010
TAXA	**STATION 9**	**STATION 10**	**STATION 11**	**STATION 12**
Gastropoda (snails)				
Ancylidae (limpets)		19	18	3
Hydrobiidae			1	
Lymnaeidae		1		
Physidae			6	
Pelecypoda (bivalves)				
Sphaeriidae (clams)	5	9	18	4
TOTAL INDIVIDUALS	253	260	284	254

Table 5b (continued). Qualitative macroinvertebrate metric evaluation of selected stations in the Rouge River watershed, 2010.

	Lower Rouge River Canton Center Road		Lower Rouge River Beck Road		Lower Rouge River Rockefeller Drive		Fowler Creek Fifth Avenue	
	STATION 9		**STATION 10**		**STATION 11**		**STATION 12**	
METRIC	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	12	0	19	0	25	1	21	0
NUMBER OF MAYFLY TAXA	2	0	2	0	3	1	3	1
NUMBER OF CADDISFLY TAXA	1	-1	2	0	2	0	2	0
NUMBER OF STONEFLY TAXA	0	-1	0	-1	0	-1	0	-1
PERCENT MAYFLY COMPOSITION	1.98	-1	9.23	0	7.75	0	28.35	1
PERCENT CADDISFLY COMPOSTITION	67.19	1	22.69	0	1.76	-1	8.27	0
PERCENT DOMINANT TAXON	67.19	-1	26.15	0	26.06	0	20.47	0
PERCENT ISOPOD, SNAIL, LEECH	0.00	1	8.08	0	8.80	0	1.18	1
PERCENT SURFACE AIR BREATHERS	0.79	1	5.00	1	5.63	1	2.76	1
TOTAL SCORE		-1		0		1		3
MACROINVERTEBRATE COMMUNITY RATING	ACCEPTABLE		ACCEPTABLE		ACCEPTABLE		ACCEPTABLE	

Table 5a (continued). Qualitative macroinvertebrate metric evaluation of selected stations in the Rouge River watershed, 2010.

	River Rouge Ford Road	Middle Rouge River Hines Drive	Willow Creek Ford Road	Willow Creek Haggarty Road
	8/24/2010	8/24/2010	8/20/2010	8/20/2010
TAXA	**STATION 13**	**STATION 14**	**STATION 15**	**STATION 16**
PLATYHELMINTHES (flatworms)				
Turbellaria				11
ANNELIDA (segmented worms)				
Hirudinea (leeches)				4
Oligochaeta (worms)	219	13	3	8
ARTHROPODA				
Crustacea				
Amphipoda (scuds)				1
Decapoda (crayfish)	6	6	15	1
Isopoda (sowbugs)	3		2	
Arachnoidea				
Hydracarina				4
Insecta				
Ephemeroptera (mayflies)				
Baetidae		47		16
Caenidae			1	1
Heptageniidae	7			
Odonata				
Zygoptera (damselflies)				
Calopterygidae		3		2
Coenagrionidae		3		4
Hemiptera (true bugs)				
Corixidae	2			73
Gerridae	4	3	1	
Mesoveliidae				2
Veliidae		6		
Trichoptera (caddisflies)				
Hydropsychidae		45	1	2
Hydroptilidae				4
Coleoptera (beetles)				
Haliplidae (adults)				1
Elmidae	1	1		1
Diptera (flies)				
Chironomidae	7	36	6	110
Culicidae	1			
Simuliidae				2
Tipulidae				1
MOLLUSCA				
Gastropoda (snails)				
Ancylidae (limpets)	1	54	4	3
Physidae				2
Pelecypoda (bivalves)				
Corbiculidae		38		
Sphaeriidae (clams)			5	35

	River Rouge Ford Road	Middle Rouge River Hines Drive	Willow Creek Ford Road	Willow Creek Haggarty Road
	8/24/2010	8/24/2010	8/20/2010	8/20/2010
TAXA	**STATION 13**	**STATION 14**	**STATION 15**	**STATION 16**
TOTAL INDIVIDUALS	251	255	38	288

Table 5b (continued). Qualitative macroinvertebrate metric evaluation of selected stations in the Rouge River watershed, 2010.

	River Rouge Ford Road		Middle Rouge River Hines Drive		Willow Creek Ford Road		Willow Creek Haggarty Road	
	STATION 13		**STATION 14**		**STATION 15**		**STATION 16**	
METRIC	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	10	-1	12	0	9	-1	22	0
NUMBER OF MAYFLY TAXA	1	-1	1	-1	1	-1	2	0
NUMBER OF CADDISFLY TAXA	0	-1	1	-1	1	-1	2	0
NUMBER OF STONEFLY TAXA	0	-1	0	-1	0	-1	0	-1
PERCENT MAYFLY COMPOSITION	2.79	-1	18.43	0	2.63	-1	5.90	0
PERCENT CADDISFLY COMPOSTITION	0.00	-1	17.65	0	2.63	-1	2.08	-1
PERCENT DOMINANT TAXON	87.25	-1	21.18	0	39.47	-1	38.19	-1
PERCENT ISOPOD, SNAIL, LEECH	1.59	1	21.18	-1	15.79	-1	3.13	1
PERCENT SURFACE AIR BREATHERS	2.79	1	3.53	1	2.63	1	26.39	-1
TOTAL SCORE		-5		-3		-7		-3
MACROINVERTEBRATE COMMUNITY RATING	POOR		ACCEPTABLE		POOR		ACCEPTABLE	

Table 5a (continued). Qualitative macroinvertebrate metric evaluation of selected stations in the Rouge River watershed, 2010.

	Tonquish Creek Holiday Boulevard	South Branch Tonquish Creek Jo-Ann Lane	Middle Rouge River East Hines Drive	Middle River Rouge Hines Drive, downstream Wilcox Road
	8/16/2010	8/24/2010	8/16/2010	8/11/2010
TAXA	**STATION 17**	**STATION 18**	**STATION 19**	**STATION 20**
PLATYHELMINTHES (flatworms)				
Turbellaria		14	1	15
ANNELIDA (segmented worms)				
Hirudinea (leeches)		1		
Oligochaeta (worms)	6		7	3
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	23		4	7
Decapoda (crayfish)	15	1	1	
Isopoda (sowbugs)		1	1	6
Arachnoidea				
Hydracarina	1	1		
Insecta				
Ephemeroptera (mayflies)				
Baetidae	5	3	9	15
Caenidae	1			1
Heptageniidae			4	10
Odonata				
Anisoptera (dragonflies)				
Aeshnidae	4	1		
Zygoptera (damselflies)				
Calopterygidae	53	81	5	1
Coenagrionidae	7		1	2
Hemiptera (true bugs)				
Corixidae				1
Gerridae	4	2		1
Mesoveliidae			2	3
Saldidae			1	
Veliidae				1
Trichoptera (caddisflies)				
Glossosomatidae		1	60	
Hydropsychidae	10	14	24	103
Hydroptilidae			2	4
Leptoceridae			3	1
Limnephilidae				7
Philopotamidae				1
Polycentropodidae			2	
Coleoptera (beetles)				
Hydrophilidae (total)	1			
Elmidae	3	14	43	24
Diptera (flies)				
Chironomidae	43	101	66	50
Culicidae	5	2		

	Tonquish Creek Holiday Boulevard	South Branch Tonquish Creek Jo-Ann Lane	Middle Rouge River East Hines Drive	Middle River Rouge Hines Drive, downstream Wilcox Road
	8/16/2010	8/24/2010	8/16/2010	8/11/2010
TAXA	**STATION 17**	**STATION 18**	**STATION 19**	**STATION 20**
Simuliidae		23	1	
Tipulidae		1		
MOLLUSCA				
Gastropoda (snails)				
Ancylidae (limpets)	7	4	1	3
Hydrobiidae				1
Pelecypoda (bivalves)				
Sphaeriidae (clams)	1	5	66	37
TOTAL INDIVIDUALS	189	270	304	297

Table 5b (continued). Qualitative macroinvertebrate metric evaluation of selected stations in the Rouge River watershed, 2010.

	Tonquish Creek Holiday Boulevard		South Branch Tonquish Creek Jo-Ann Lane		Middle Rouge River East Hines Drive		Middle River Rouge Hines Drive, downstream Wilcox Road	
	STATION 17		**STATION 18**		**STATION 19**		**STATION 20**	
METRIC	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	17	0	18	1	21	0	23	0
NUMBER OF MAYFLY TAXA	2	0	1	0	2	0	3	0
NUMBER OF CADDISFLY TAXA	1	-1	2	0	5	1	5	1
NUMBER OF STONEFLY TAXA	0	-1	0	-1	0	-1	0	-1
PERCENT MAYFLY COMPOSITION	3.17	0	1.11	-1	4.28	0	8.75	0
PERCENT CADDISFLY COMPOSTITION	5.29	0	5.56	0	29.93	1	39.06	1
PERCENT DOMINANT TAXON	28.04	0	37.41	0	21.71	0	34.68	0
PERCENT ISOPOD, SNAIL, LEECH	3.70	1	2.22	1	0.66	1	3.37	1
PERCENT SURFACE AIR BREATHERS	5.29	1	1.48	1	0.99	1	2.02	1
TOTAL SCORE		0		1		3		3
MACROINVERTEBRATE COMMUNITY RATING	ACCEPTABLE		ACCEPTABLE		ACCEPTABLE		ACCEPTABLE	

Table 5a (continued). Qualitative macroinvertebrate metric evaluation of selected stations in the Rouge River watershed, 2010.

	Middle River Rouge M14	Bishop Creek Meadowbrook Road	Bishop Creek Delnol Avenue	Walled Lake Branch Ashbury Road
	8/11/2010	8/17/2010	8/11/2010	8/17/2010
TAXA	**STATION 21**	**STATION 22**	**STATION 23**	**STATION 24**
ANNELIDA (segmented worms)				
Hirudinea (leeches)	1		2	1
Oligochaeta (worms)	14	12	6	16
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	1			4
Decapoda (crayfish)	2			2
Isopoda (sowbugs)	1		1	23
Insecta				
Ephemeroptera (mayflies)				
Baetidae	3			24
Caenidae	1	2	4	
Heptageniidae	30			
Odonata				
Anisoptera (dragonflies)				
Aeshnidae			1	
Zygoptera (damselflies)				
Calopterygidae		6	11	1
Coenagrionidae		5	169	1
Hemiptera (true bugs)				
Belostomatidae		1		
Corixidae		1	1	
Gerridae	1		1	17
Mesoveliidae	1	3		1
Megaloptera				
Sialidae (alder flies)		1		
Trichoptera (caddisflies)				
Hydropsychidae	40	211	15	60
Leptoceridae	1	1	1	
Limnephilidae	18			
Philopotamidae		1		
Coleoptera (beetles)				
Dytiscidae (total)		1		
Hydrophilidae (total)		1		
Psephenidae (adults)	1			
Elmidae	33	1		34
Gyrinidae (larvae)			1	
Haliplidae (larvae)			1	
Diptera (flies)				
Chironomidae	53	8	34	91
Culicidae			1	
Simuliidae		24		
Tabanidae				2
Tipulidae		1		

	Middle River Rouge M14	Bishop Creek Meadowbrook Road	Bishop Creek Delnol Avenue	Walled Lake Branch Ashbury Road
	8/11/2010	8/17/2010	8/11/2010	8/17/2010
TAXA	**STATION 21**	**STATION 22**	**STATION 23**	**STATION 24**
MOLLUSCA				
Gastropoda (snails)				
Ancylidae (limpets)	11			11
Physidae	1	3	15	
Planorbidae			11	
Pelecypoda (bivalves)				
Corbiculidae	1			
Dreissenidae	24			
Sphaeriidae (clams)	10	8	4	9
TOTAL INDIVIDUALS	248	291	279	297

Table 5b (continued). Qualitative macroinvertebrate metric evaluation of selected stations in the Rouge River watershed, 2010.

	Middle River Rouge M14		Bishop Creek Meadowbrook Road		Bishop Creek Delnol Avenue		Walled Lake Branch Ashbury Road	
	STATION 21		**STATION 22**		**STATION 23**		**STATION 24**	
METRIC	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	21	0	19	1	18	1	16	0
NUMBER OF MAYFLY TAXA	3	0	1	1	1	0	1	-1
NUMBER OF CADDISFLY TAXA	3	0	3	1	2	0	1	-1
NUMBER OF STONEFLY TAXA	0	-1	0	-1	0	-1	0	-1
PERCENT MAYFLY COMPOSITION	13.71	0	0.69	-1	1.43	-1	8.08	0
PERCENT CADDISFLY COMPOSTITION	23.79	0	73.20	1	5.73	0	20.20	0
PERCENT DOMINANT TAXON	21.37	0	72.51	-1	60.57	-1	30.64	0
PERCENT ISOPOD, SNAIL, LEECH	5.65	0	1.03	1	10.39	0	11.78	-1
PERCENT SURFACE AIR BREATHERS	1.21	1	2.41	1	1.08	1	6.06	1
TOTAL SCORE		0		3		-1		-3
MACROINVERTEBRATE COMMUNITY RATING	ACCEPTABLE		ACCEPTABLE		ACCEPTABLE		ACCEPTABLE	

Table 5a (continued). Qualitative macroinvertebrate metric evaluation of selected stations in the Rouge River watershed, 2010.

	Walled Lake Branch Chattman Road	Walled Lake Branch 10 Mile Road	Johnson Drain Ridge Road	Ashcroft Drain Rouge Park Drive
	8/11/2010	8/11/2010	8/11/2010	8/25/2010
TAXA	**STATION 25**	**STATION 26**	**STATION 27**	**STATION 28**
PLATYHELMINTHES (flatworms)				
Turbellaria	1			1
ANNELIDA (segmented worms)				
Hirudinea (leeches)		1		3
Oligochaeta (worms)	3	2	58	295
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	3	2	3	
Decapoda (crayfish)	9	1	3	
Isopoda (sowbugs)	65	13		
Arachnoidea				
Hydracarina		1		
Insecta				
Ephemeroptera (mayflies)				
Baetidae	4	77	8	
Caenidae		1		
Heptageniidae			13	
Odonata				
Anisoptera (dragonflies)				
Aeshnidae	3	2	1	1
Libellulidae				16
Zygoptera (damselflies)				
Calopterygidae	37	50	17	1
Coenagrionidae	1			11
Hemiptera (true bugs)				
Belostomatidae				1
Corixidae			28	1
Gerridae			6	
Mesoveliidae		1	1	
Notonectidae				1
Veliidae	1			
Trichoptera (caddisflies)				
Hydropsychidae	44	69	17	
Hydroptilidae		4		
Limnephilidae			1	
Polycentropodidae			2	
Coleoptera (beetles)				
Dytiscidae (total)			1	3
Hydrophilidae (total)		1		
Elmidae	48	38	18	
Diptera (flies)				
Ceratopogonidae	1			1
Chironomidae	28	19	25	71
Culicidae				38

	Walled Lake Branch Chattman Road	Walled Lake Branch 10 Mile Road	Johnson Drain Ridge Road	Ashcroft Drain Rouge Park Drive
	8/11/2010	8/11/2010	8/11/2010	8/25/2010
TAXA	**STATION 25**	**STATION 26**	**STATION 27**	**STATION 28**
Simuliidae		1	1	
Stratiomyidae				2
Tabanidae	3		9	
Tipulidae		1		
MOLLUSCA				
Gastropoda (snails)				
Ancylidae (limpets)	1			
Physidae	1		2	349
Pelecypoda (bivalves)				
Sphaeriidae (clams)	13	1	16	
TOTAL INDIVIDUALS	266	285	230	795

Table 5b (continued). Qualitative macroinvertebrate metric evaluation of selected stations in the Rouge River watershed, 2010.

	Walled Lake Branch Chattman Road		Walled Lake Branch 10 Mile Road		Johnson Drain Ridge Road		Ashcroft Drain Rouge Park Drive	
	STATION 25		**STATION 26**		**STATION 27**		**STATION 28**	
METRIC	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	18	0	19	0	20	0	16	0
NUMBER OF MAYFLY TAXA	1	-1	2	0	2	0	0	-1
NUMBER OF CADDISFLY TAXA	1	-1	2	0	3	0	0	-1
NUMBER OF STONEFLY TAXA	0	-1	0	-1	0	-1	0	-1
PERCENT MAYFLY COMPOSITION	1.50	-1	27.37	1	9.13	0	0.00	-1
PERCENT CADDISFLY COMPOSTITION	16.54	0	25.61	0	8.70	0	0.00	-1
PERCENT DOMINANT TAXON	24.44	0	27.02	0	25.22	0	43.90	-1
PERCENT ISOPOD, SNAIL, LEECH	25.19	-1	4.91	0	0.87	1	44.28	-1
PERCENT SURFACE AIR BREATHERS	0.38	1	0.70	1	15.65	0	5.79	1
TOTAL SCORE		-4		1		0		-6
MACROINVERTEBRATE COMMUNITY RATING	ACCEPTABLE		ACCEPTABLE		ACCEPTABLE		POOR	

Table 5a (continued). Qualitative macroinvertebrate metric evaluation of selected stations in the Rouge River watershed, 2010.

	River Rouge Outer Drive	Rouge River Schoolcraft Street	Unnamed Tributary to Bell Branch Newburgh Road	Upper Rouge River Garfield Road
	8/19/2010	8/12/2010	8/11/2010	8/23/2010
TAXA	**STATION 29**	**STATION 30**	**STATION 31**	**STATION 32**
PLATYHELMINTHES (flatworms)				
Turbellaria			8	
ANNELIDA (segmented worms)				
Hirudinea (leeches)	3		1	
Oligochaeta (worms)	15	244	4	98
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	25	12		14
Decapoda (crayfish)	14	2	7	2
Isopoda (sowbugs)	45	4		13
Arachnoidea				
Hydracarina	1		1	
Insecta				
Ephemeroptera (mayflies)				
Baetidae	63	15	18	8
Heptageniidae		1		2
Odonata				
Anisoptera (dragonflies)				
Aeshnidae			2	
Zygoptera (damselflies)				
Calopterygidae	4		16	7
Coenagrionidae			1	2
Hemiptera (true bugs)				
Belostomatidae				2
Corixidae	1	1		1
Gerridae	2			43
Mesoveliidae		1		3
Nepidae				2
Pleidae				3
Trichoptera (caddisflies)				
Hydropsychidae	14	4	109	
Leptoceridae			2	
Coleoptera (beetles)				
Dytiscidae (total)				2
Hydrophilidae (total)			1	
Elmidae	3	2	72	8
Diptera (flies)				
Chironomidae	15	28	7	11
Culicidae				4
Simuliidae			1	
Tipulidae			1	
MOLLUSCA				
Gastropoda (snails)				

	River Rouge Outer Drive	Rouge River Schoolcraft Street	Unnamed Tributary to Bell Branch Newburgh Road	Upper Rouge River Garfield Road
	8/19/2010	8/12/2010	8/11/2010	8/23/2010
TAXA	**STATION 29**	**STATION 30**	**STATION 31**	**STATION 32**
Ancylidae (limpets)	4	3		18
Physidae				5
Pelecypoda (bivalves)				
Sphaeriidae (clams)	2	1	8	
TOTAL INDIVIDUALS	211	318	259	248

Table 5b (continued). Qualitative macroinvertebrate metric evaluation of selected stations in the Rouge River watershed, 2010.

	River Rouge Outer Drive		Rouge River Schoolcraft Street		Unnamed Tributary to Bell Branch Newburgh Road		Upper Rouge River Garfield Road	
	STATION 29		**STATION 30**		**STATION 31**		**STATION 32**	
METRIC	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	15	0	13	0	17	0	20	0
NUMBER OF MAYFLY TAXA	1	-1	2	0	1	0	2	0
NUMBER OF CADDISFLY TAXA	1	-1	1	-1	2	0	0	-1
NUMBER OF STONEFLY TAXA	0	-1	0	-1	0	-1	0	-1
PERCENT MAYFLY COMPOSITION	29.86	1	5.03	0	6.95	0	4.03	0
PERCENT CADDISFLY COMPOSTITION	6.64	0	1.26	-1	42.86	1	0.00	-1
PERCENT DOMINANT TAXON	29.86	0	76.73	-1	42.08	-1	39.52	-1
PERCENT ISOPOD, SNAIL, LEECH	24.64	-1	2.20	1	0.39	1	14.52	-1
PERCENT SURFACE AIR BREATHERS	1.42	1	0.63	1	0.39	1	24.19	-1
TOTAL SCORE		-2		-2		1		-6
MACROINVERTEBRATE COMMUNITY RATING	ACCEPTABLE		ACCEPTABLE		ACCEPTABLE		POOR	

Table 5a (continued). Qualitative macroinvertebrate metric evaluation of selected stations in the Rouge River watershed, 2010.

	Upper Rouge River Angling Road	Minnow Pond Drain Farmington Road	Seeley Drain Drake Road	Seeley Drain Halsted Road
	8/19/2010	8/23/2010	8/19/2010	8/19/2010
TAXA	**STATION 33**	**STATION 34**	**STATION 35**	**STATION 36**
PLATYHELMINTHES (flatworms)				
Turbellaria	1		2	
ANNELIDA (segmented worms)				
Hirudinea (leeches)	1	1		
Oligochaeta (worms)	48	5	1	1
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	3	29		
Decapoda (crayfish)	10	4	1	1
Isopoda (sowbugs)	23			
Insecta				
Ephemeroptera (mayflies)				
Baetidae			12	4
Caenidae		2		
Odonata				
Anisoptera (dragonflies)				
Aeshnidae	6	2	3	1
Gomphidae				1
Libellulidae		1		
Zygoptera (damselflies)				
Calopterygidae	24	69	5	57
Coenagrionidae	3	7		1
Hemiptera (true bugs)				
Gerridae		9		
Mesoveliidae	1		1	
Nepidae		1		
Notonectidae		1		
Pleidae		1		
Veliidae	2		1	1
Trichoptera (caddisflies)				
Hydropsychidae	6	13	149	25
Leptoceridae			1	
Limnephilidae		1		
Philopotamidae			63	
Coleoptera (beetles)				
Dytiscidae (total)		1		
Haliplidae (adults)		1		
Elmidae	4	5	37	55
Diptera (flies)				
Chironomidae	13	49	20	15
Culicidae		4		
Ephydridae			3	
Simuliidae	1		9	1
Stratiomyidae		1		
Tabanidae		2		
Tipulidae			5	1

	Upper Rouge River Angling Road	Minnow Pond Drain Farmington Road	Seeley Drain Drake Road	Seeley Drain Halsted Road
	8/19/2010	8/23/2010	8/19/2010	8/19/2010
TAXA	**STATION 33**	**STATION 34**	**STATION 35**	**STATION 36**
MOLLUSCA				
Gastropoda (snails)				
Ancylidae (limpets)	1	29	10	2
Physidae		14		
Planorbidae		8		
Viviparidae		1		
Pelecypoda (bivalves)				
Sphaeriidae (clams)		10	1	6
TOTAL INDIVIDUALS	147	271	324	172

Table 5b (continued). Qualitative macroinvertebrate metric evaluation of selected stations in the Rouge River watershed, 2010.

	Upper Rouge River Angling Road		Minnow Pond Drain Farmington Road		Seeley Drain Drake Road		Seeley Drain Halsted Road	
	STATION 33		**STATION 34**		**STATION 35**		**STATION 36**	
METRIC	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	16	0	27	1	18	0	15	0
NUMBER OF MAYFLY TAXA	0	-1	1	0	1	-1	1	0
NUMBER OF CADDISFLY TAXA	1	-1	2	0	3	0	1	-1
NUMBER OF STONEFLY TAXA	0	-1	0	-1	0	-1	0	-1
PERCENT MAYFLY COMPOSITION	0.00	-1	0.74	-1	3.70	0	2.33	-1
PERCENT CADDISFLY COMPOSTITION	4.08	0	5.17	0	65.74	1	14.53	0
PERCENT DOMINANT TAXON	32.65	0	25.46	0	45.99	-1	33.14	0
PERCENT ISOPOD, SNAIL, LEECH	17.01	-1	19.56	-1	3.09	1	1.16	1
PERCENT SURFACE AIR BREATHERS	2.04	1	7.01	0	0.62	1	0.58	1
TOTAL SCORE		-4		-2		0		-1
MACROINVERTEBRATE COMMUNITY RATING	ACCEPTABLE		ACCEPTABLE		ACCEPTABLE		ACCEPTABLE	

Table 5a (continued). Qualitative macroinvertebrate metric evaluation of selected stations in the Rouge River watershed, 2010.

	Rouge River Ridge Road	Rouge River McNichols Road	Rouge River Bridge Street	Pebble Creek 10 Mile Road
	8/12/2010	8/12/2010	8/6/2010	8/6/2010
TAXA	**STATION 37**	**STATION 38**	**STATION 39**	**STATION 40**
ANNELIDA (segmented worms)				
Hirudinea (leeches)			2	
Oligochaeta (worms)	68	141	123	2
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	32	15	8	1
Decapoda (crayfish)	10	6	6	6
Isopoda (sowbugs)	3	14	33	28
Insecta				
Ephemeroptera (mayflies)				
Baetidae	1	10		3
Heptageniidae			2	
Odonata				
Anisoptera (dragonflies)				
Aeshnidae			1	1
Zygoptera (damselflies)				
Calopterygidae	1	9	4	39
Coenagrionidae			3	1
Hemiptera (true bugs)				
Corixidae	7	1	13	
Gerridae	1	1	2	5
Mesoveliidae			1	3
Veliidae		1	4	
Megaloptera				
Corydalidae (dobson flies)			1	
Trichoptera (caddisflies)				
Hydropsychidae	3	7	4	14
Coleoptera (beetles)				
Elmidae	3	8	3	1
Diptera (flies)				
Chironomidae	19	12	58	20
Simuliidae				1
Tabanidae				2
Tipulidae			4	
MOLLUSCA				
Gastropoda (snails)				
Ancylidae (limpets)	6	6	1	
Pelecypoda (bivalves)				
Sphaeriidae (clams)	2	2	4	2
TOTAL INDIVIDUALS	156	233	277	129

Table 5b (continued). Qualitative macroinvertebrate metric evaluation of selected stations in the Rouge River watershed, 2010.

	Rouge River Ridge Road		Rouge River McNichols Road		Rouge River Bridge Street		Pebble Creek 10 Mile Road	
	STATION 37		**STATION 38**		**STATION 39**		**STATION 40**	
METRIC	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	13	0	14	0	20	0	16	0
NUMBER OF MAYFLY TAXA	1	-1	1	-1	1	-1	1	-1
NUMBER OF CADDISFLY TAXA	1	-1	1	-1	1	-1	1	-1
NUMBER OF STONEFLY TAXA	0	-1	0	-1	0	-1	0	-1
PERCENT MAYFLY COMPOSITION	0.64	-1	4.29	0	0.72	-1	2.33	-1
PERCENT CADDISFLY COMPOSTITION	1.92	-1	3.00	-1	1.44	-1	10.85	0
PERCENT DOMINANT TAXON	43.59	-1	60.52	-1	44.40	-1	30.23	0
PERCENT ISOPOD, SNAIL, LEECH	5.77	0	8.58	0	13.00	-1	21.71	-1
PERCENT SURFACE AIR BREATHERS	5.13	1	1.29	1	7.22	0	6.20	1
TOTAL SCORE		-5		-4		-7		-4
MACROINVERTEBRATE COMMUNITY RATING	POOR		ACCEPTABLE		POOR		ACCEPTABLE	

Table 5a (continued). Qualitative macroinvertebrate metric evaluation of selected stations in the Rouge River watershed, 2010.

	Pebble Creek 11 Mile Road	Pebble Creek Westgate Road	Franklin Branch 12 Mile Road	Franklin Branch 14 Mile Road
	8/6/2010	8/6/2010	8/19/2010	8/6/2010
TAXA	**STATION 41**	**STATION 42**	**STATION 43**	**STATION 44**
PLATYHELMINTHES (flatworms)				
Turbellaria		12		
ANNELIDA (segmented worms)				
Oligochaeta (worms)	1	4	5	2
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	6	29		
Decapoda (crayfish)	13	2	20	1
Isopoda (sowbugs)	63	22	32	2
Arachnoidea				
Hydracarina		6	1	6
Insecta				
Ephemeroptera (mayflies)				
Baetidae		2	5	62
Odonata				
Anisoptera (dragonflies)				
Aeshnidae	2	1	10	1
Zygoptera (damselflies)				
Calopterygidae	70	142	59	16
Coenagrionidae	1	7		1
Lestidae		1		
Hemiptera (true bugs)				
Gerridae	1	1		1
Mesoveliidae		1		
Pleidae				1
Veliidae			1	
Trichoptera (caddisflies)				
Glossosomatidae				1
Hydropsychidae	7	66	28	78
Hydroptilidae				33
Limnephilidae		1		
Psychomyiidae			1	
Uenoidae		3		
Coleoptera (beetles)				
Hydrophilidae (total)				1
Elmidae	69	11	21	2
Diptera (flies)				
Chironomidae	10	36	14	80
Culicidae				1
Simuliidae				6
Stratiomyidae				1
Tipulidae	1	1		
MOLLUSCA				
Gastropoda (snails)				
Ancylidae (limpets)		2		1
Lymnaeidae				1

	Pebble Creek 11 Mile Road	Pebble Creek Westgate Road	Franklin Branch 12 Mile Road	Franklin Branch 14 Mile Road
	8/6/2010	8/6/2010	8/19/2010	8/6/2010
TAXA	**STATION 41**	**STATION 42**	**STATION 43**	**STATION 44**
Physidae	1	1	3	10
Planorbidae		1		
Pelecypoda (bivalves)				
Sphaeriidae (clams)	2	1		7
TOTAL INDIVIDUALS	247	353	200	315

Table 5b (continued). Qualitative macroinvertebrate metric evaluation of selected stations in the Rouge River watershed, 2010.

	Pebble Creek 11 Mile Road		Pebble Creek Westgate Road		Franklin Branch 12 Mile Road		Franklin Branch 14 Mile Road	
	STATION 41		**STATION 42**		**STATION 43**		**STATION 44**	
METRIC	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	14	0	23	1	13	0	23	0
NUMBER OF MAYFLY TAXA	0	-1	1	0	1	0	1	-1
NUMBER OF CADDISFLY TAXA	1	-1	3	0	2	0	3	0
NUMBER OF STONEFLY TAXA	0	-1	0	-1	0	-1	0	-1
PERCENT MAYFLY COMPOSITION	0.00	-1	0.57	-1	2.50	-1	19.68	1
PERCENT CADDISFLY COMPOSTITION	2.83	-1	19.83	0	14.50	0	35.56	1
PERCENT DOMINANT TAXON	28.34	0	40.23	-1	29.50	0	25.40	0
PERCENT ISOPOD, SNAIL, LEECH	25.91	-1	7.37	0	17.50	-1	4.44	0
PERCENT SURFACE AIR BREATHERS	0.40	1	0.57	1	0.50	1	1.59	1
TOTAL SCORE		-5		-1		-2		1
MACROINVERTEBRATE COMMUNITY RATING	POOR		ACCEPTABLE		ACCEPTABLE		ACCEPTABLE	

Table 5a (continued). Qualitative macroinvertebrate metric evaluation of selected stations in the Rouge River watershed, 2010.

	Unnamed Tributary Middlebelt Road	Sunken Bridge Drain Cranbrook Court	Sunken Bridge Drain Tamarack Way	Cranbrook Creek Lahser Rd
	8/17/2010	8/5/2010	8/5/2010	8/5/2010
TAXA	**STATION 45**	**STATION 46**	**STATION 47**	**STATION 48**
PORIFERA (sponges)		1		
PLATYHELMINTHES (flatworms)				
Turbellaria	1	5	1	15
ANNELIDA (segmented worms)				
Hirudinea (leeches)			1	1
Oligochaeta (worms)	21	1	6	4
ARTHROPODA				
Crustacea				
Amphipoda (scuds)		25	27	
Decapoda (crayfish)	5		3	1
Isopoda (sowbugs)		9	24	8
Arachnoidea				
Hydracarina	1	1	1	
Insecta				
Ephemeroptera (mayflies)				
Baetidae	1	4	22	15
Caenidae	4			
Heptageniidae		17	1	
Odonata				
Anisoptera (dragonflies)				
Aeshnidae	1	1	1	1
Zygoptera (damselflies)				
Calopterygidae	15	1	23	98
Coenagrionidae	2	3	1	2
Hemiptera (true bugs)				
Gerridae	2	1	1	2
Mesoveliidae		1	6	1
Veliidae				1
Megaloptera				
Sialidae (alder flies)	3			
Trichoptera (caddisflies)				
Brachycentridae		1		
Hydropsychidae	27	105	64	24
Leptoceridae	19			
Limnephilidae		1		
Philopotamidae			1	1
Coleoptera (beetles)				
Hydrophilidae (total)	1		1	
Elmidae	87	27	23	26
Diptera (flies)				
Ceratopogonidae	1			
Chironomidae	30	45	31	38
Culicidae	2			
Simuliidae		1	8	6
Tipulidae	1	1		1

	Unnamed Tributary Middlebelt Road	Sunken Bridge Drain Cranbrook Court	Sunken Bridge Drain Tamarack Way	Cranbrook Creek Lahser Rd
	8/17/2010	8/5/2010	8/5/2010	8/5/2010
TAXA	**STATION 45**	**STATION 46**	**STATION 47**	**STATION 48**
MOLLUSCA				
Gastropoda (snails)				
Ancylidae (limpets)		1	1	
Physidae	2			
Planorbidae	2			
Viviparidae	1			
Pelecypoda (bivalves)				
Dreissenidae	24			
Sphaeriidae (clams)	28	6	4	17
TOTAL INDIVIDUALS	281	258	251	262

Table 5b (continued). Qualitative macroinvertebrate metric evaluation of selected stations in the Rouge River watershed, 2010.

	Unnamed Tributary Middlebelt Road		Sunken Bridge Drain Cranbrook Court		Sunken Bridge Drain Tamarack Way		Cranbrook Creek Lahser Rd	
	STATION 45		**STATION 46**		**STATION 47**		**STATION 48**	
METRIC	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	24	0	22	0	22	0	19	1
NUMBER OF MAYFLY TAXA	2	0	2	0	2	0	1	0
NUMBER OF CADDISFLY TAXA	2	0	3	0	2	0	2	0
NUMBER OF STONEFLY TAXA	0	-1	0	-1	0	-1	0	-1
PERCENT MAYFLY COMPOSITION	1.78	-1	8.14	0	9.16	0	5.73	0
PERCENT CADDISFLY COMPOSTITION	16.37	0	41.47	1	25.90	0	9.54	0
PERCENT DOMINANT TAXON	30.96	0	40.70	-1	25.50	0	37.40	0
PERCENT ISOPOD, SNAIL, LEECH	1.78	1	3.88	1	10.36	0	3.44	1
PERCENT SURFACE AIR BREATHERS	1.78	1	0.78	1	3.19	1	1.53	1
TOTAL SCORE		0		1		0		2
MACROINVERTEBRATE COMMUNITY RATING	ACCEPTABLE		ACCEPTABLE		ACCEPTABLE		ACCEPTABLE	

Table 5a (continued). Qualitative macroinvertebrate metric evaluation of selected stations in the Rouge River watershed, 2010.

	Forest Lake Outlet Franklin Road	Rouge River Beach Road
	8/5/2010	8/5/2010
TAXA	**STATION 49**	**STATION 50**
PORIFERA (sponges)	1	
PLATYHELMINTHES (flatworms)		
Turbellaria	715	1
ANNELIDA (segmented worms)		
Hirudinea (leeches)	5	1
Oligochaeta (worms)	8	5
ARTHROPODA		
Crustacea		
Amphipoda (scuds)	7	1
Decapoda (crayfish)		1
Isopoda (sowbugs)	261	3
Arachnoidea		
Hydracarina	1	2
Insecta		
Ephemeroptera (mayflies)		
Caenidae	2	5
Odonata		
Anisoptera (dragonflies)		
Libellulidae		1
Zygoptera (damselflies)		
Calopterygidae	1	9
Coenagrionidae	2	26
Hemiptera (true bugs)		
Corixidae		4
Gerridae		10
Mesoveliidae	1	2
Notonectidae	1	
Pleidae		1
Trichoptera (caddisflies)		
Hydropsychidae		20
Hydroptilidae		6
Coleoptera (beetles)		
Dytiscidae (total)	1	
Gyrinidae (adults)	1	
Haliplidae (adults)	4	
Hydrophilidae (total)		1
Elmidae	1	10
Diptera (flies)		
Ceratopogonidae		1
Chironomidae	12	153
Culicidae		1
Ephydridae	1	
Simuliidae		1
Tipulidae		1
MOLLUSCA		
Gastropoda (snails)		

	Forest Lake Outlet Franklin Road	Rouge River Beach Road
	8/5/2010	8/5/2010
TAXA	**STATION 49**	**STATION 50**
Ancylidae (limpets)		5
Hydrobiidae	1	
Lymnaeidae		1
Physidae		3
Valvatidae	8	
Pelecypoda (bivalves)		
Sphaeriidae (clams)	21	3
Unionidae (mussels)		1
TOTAL INDIVIDUALS	1055	279

Table 5b (continued). Qualitative macroinvertebrate metric evaluation of selected stations in the Rouge River watershed, 2010.

	Forest Lake Outlet Franklin Road		Rouge River Beach Road	
	STATION 49		**STATION 50**	
METRIC	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	21	1	29	1
NUMBER OF MAYFLY TAXA	1	1	1	-1
NUMBER OF CADDISFLY TAXA	0	-1	2	0
NUMBER OF STONEFLY TAXA	0	-1	0	-1
PERCENT MAYFLY COMPOSITION	0.19	-1	1.79	-1
PERCENT CADDISFLY COMPOSTITION	0.00	-1	9.32	0
PERCENT DOMINANT TAXON	67.77	-1	54.84	-1
PERCENT ISOPOD, SNAIL, LEECH	26.07	-1	4.66	0
PERCENT SURFACE AIR BREATHERS	0.76	1	6.81	1
TOTAL SCORE		-3		-2
MACROINVERTEBRATE COMMUNITY RATING	ACCEPTABLE		ACCEPTABLE	

Table 6a. Habitat evaluation for selected stations in the Rouge River watershed in Wayne, Washtenaw, and Oakland Counties, Michigan, June-September 2015.

	STATION 1	STATION 2	STATION 3	STATION 4	STATION 5
	Lower River Rouge	**Franklin Branch**	**Lower River Rouge**	**Lower River Rouge**	**Minnow Pond Drain**
	Newburgh Road	**10 Hill Drive**	**Sophia Street**	**Sheldon Road**	**Drake Rd**
	8/24/2015	**8/5/2015**	**8/24/2015**	**8/24/2015**	**8/26/2015**
	RIFFLE/RUN	**RIFFLE/RUN**	**RIFFLE/RUN**	**GLIDE/POOL**	**GLIDE/POOL**
HABITAT METRIC					
Substrate and Instream Cover					
Epifaunal Substrate/ Avail Cover (20)	5	12	3	8	6
Embeddedness (20)*	15	11	12		
Velocity/Depth Regime (20)*	13	11	10		
Pool Substrate Characterization (20)**				8	6
Pool Variability (20)**				2	0
Channel Morphology					
Sediment Deposition (20)	7	12	6	7	15
Flow Status - Maint. Flow Volume (10)	9	10	9	9	5
Flow Status - Flashiness (10)	1	5	0	2	5
Channel Alteration (20)	15	18	15	17	10
Frequency of Riffles/Bends (20)*	10	15	4		
Channel Sinuosity (20)**				13	11
Riparian and Bank Structure					
Bank Stability (L) (10)	3	6	2	3	8
Bank Stability (R) (10)	3	6	2	3	8
Vegetative Protection (L) (10)	5	7	3	3	6
Vegetative Protection (R) (10)	5	7	1	3	6
Riparian Vegetation Zone Width (L) (10)	6	4	5	5	6
Riparian Vegetation Zone Width (R) (10)	6	6	2	5	8
TOTAL SCORE (200):	103	130	74	88	100
HABITAT RATING:	**Marginal**	**Good**	**Marginal**	**Marginal**	**Marginal**
*Applies only to Riffle/Run stream Surveys **Applies only to Glide/Pool stream Surveys					
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).					

Table 6b. Habitat evaluation for selected stations in the Rouge River watershed in Wayne, Washtenaw, and Oakland Counties, Michigan, June-September 2015.

	STATION 1	STATION 2	STATION 3	STATION 4	STATION 5
	Lower River Rouge	**Franklin Branch**	**Lower River Rouge**	**Lower River Rouge**	**Minnow Pond Drain**
	Newburgh Road	**10 Hill Drive**	**Sophia Street**	**Sheldon Road**	**Drake Rd**
Date:	8/24/2015	8/5/2015	8/24/2015	8/24/2015	8/26/2015
Weather:	Sunny	Sunny	Partly Cloudy	Sunny	Cloudy
Air Temperature: ºF	74	75	73	72	68
Water Temperature: ºF		64	72	69	
Ave. Stream Width: Feet	27	12	40	26	4
Ave. Stream Depth: Feet	2	0.5	2	1.5	0.25
Surface Velocity: Feet/Second	1	1	2	1	0
Estimated Flow: Cubic Feet/Second	84	4	154	44	0
Stream Modifications:	None	None	Bank Stabilization	None	None
Nuisance Plants (Y/N):	N	N	N	N	N
STORET No.:	820073	631234	821588	821589	631056
County Code:	82	63	82	82	63
TRS:	02S09E30	02N09E36	02S09E29	02S08E27	01N09E05
Latitude (dd):	42.28249	42.53536	42.28449	42.28641	42.51795
Longitude (dd):	-83.40698	-83.32951	-83.38995	-83.4764	-83.39911
Ecoregion:	SMNITP	SMNITP	SMNITP	SMNITP	SMNITP
Stream Type:	Warmwater	Warmwater	Warmwater	Warmwater	Warmwater
USGS Basin Code:	4090004	4090004	4090004	4090004	4090004

Table 6a (continued). Habitat evaluation for selected stations in the Rouge River watershed in Wayne, Washtenaw, and Oakland Counties, Michigan, June-September 2015.

	STATION 6	STATION 7	STATION 8	STATION 9	STATION 10
	Upper River Rouge	**Seeley Drain**	**Ingersol Creek (Walled Lake Branch)**	**Lower River Rouge**	**River Rouge**
	Beech Daly Road	**Halsted Road**	**Access Road off Grand River**	**Canton Center Road**	**Tireman Street**
	9/29/2015	**8/26/2015**	**8/12/2015**	**8/10/2015**	**9/29/2015**
	GLIDE/POOL	**RIFFLE/RUN**	**GLIDE/POOL**	**GLIDE/POOL**	**GLIDE/POOL**
HABITAT METRIC					
Substrate and Instream Cover					
Epifaunal Substrate/ Avail Cover (20)	6	10	11	8	2
Embeddedness (20)*		6			
Velocity/Depth Regime (20)*		15			
Pool Substrate Characterization (20)**	7		11	10	6
Pool Variability (20)**	5		5	8	4
Channel Morphology					
Sediment Deposition (20)	4	7	6	11	8
Flow Status - Maint. Flow Volume (10)	7	8	10	9	10
Flow Status - Flashiness (10)	1	2	6	3	0
Channel Alteration (20)	15	16	15	15	14
Frequency of Riffles/Bends (20)*		16			
Channel Sinuosity (20)**	14		15	10	9
Riparian and Bank Structure					
Bank Stability (L) (10)	2	3	9	2	6
Bank Stability (R) (10)	2	2	9	2	6
Vegetative Protection (L) (10)	5	3	8	5	5
Vegetative Protection (R) (10)	5	3	8	7	5
Riparian Vegetation Zone Width (L) (10)	2	5	6	6	6
Riparian Vegetation Zone Width (R) (10)	3	4	6	7	6
TOTAL SCORE (200):	78	100	125	103	87
HABITAT RATING:	**Marginal**	**Marginal**	**Good**	**Marginal**	**Marginal**
*Applies only to Riffle/Run stream Surveys **Applies only to Glide/Pool stream Surveys					
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).					

Table 6b (continued). Habitat evaluation for selected stations in the Rouge River watershed in Wayne, Washtenaw, and Oakland Counties, Michigan, June-September 2015.

	STATION 6	STATION 7	STATION 8	STATION 9	STATION 10
	Upper River Rouge	Seeley Drain	Ingersol Creek (Walled Lake Branch)	Lower River Rouge	River Rouge
	Beech Daly Road	Halsted Road	Access Road off Grand River	Canton Center Road	Tireman Street
Date:	9/29/2015	8/26/2015	8/12/2015	8/10/2015	9/29/2015
Weather:	Partly Cloudy	Partly Cloudy	Sunny	Cloudy	Cloudy
Air Temperature: ºF	68	68	77	75	70
Water Temperature: ºF	66	62	70	68	68
Ave. Stream Width: Feet	28	9	10	30	56
Ave. Stream Depth: Feet	1	0.7	1.5	2	3
Surface Velocity: Feet/Second	1	1	1	1	0
Estimated Flow: Cubic Feet/Second	8	6	15	61	71
Stream Modifications:	None	None	Habitat Improvement	None	None
Nuisance Plants (Y/N):	N	N	N	N	N
STORET No.:	821590	630999	631235	821460	821591
County Code:	82	63	63	82	82
TRS:	01S10E18	01N09E18	01N08E15	02S08E28	02S10E03
Latitude (dd):	42.4073	42.48915	42.48545	42.28847	42.35236
Longitude (dd):	-83.29626	-83.41677	-83.48761	-83.48675	-83.25212
Ecoregion:	SMNITP	SMNITP	SMNITP	SMNITP	SMNITP
Stream Type:	Warmwater	Warmwater	Warmwater	Warmwater	Warmwater
USGS Basin Code:	4090004	4090004	4090004	4090004	4090004

Table 6a (continued). Habitat evaluation for selected stations in the Rouge River watershed in Wayne, Washtenaw, and Oakland Counties, Michigan, June-September 2015.

	STATION 1	STATION 12	STATION 13	STATION 14	STATION 15
	North Branch Fellows Creek	River Rouge	Lower River Rouge	Franklin Branch	Middle River Rouge
	Hanford Road	Wattles Rd	Brady Road, downstream	14 Mile Road	Hines Drive, downstream Warren Road
	8/11/2015	8/15/2015	9/29/2015	8/5/2015	8/25/2015
	GLIDE/POOL	GLIDE/POOL	GLIDE/POOL	RIFFLE/RUN	GLIDE/POOL
HABITAT METRIC					
Substrate and Instream Cover					
Epifaunal Substrate/ Avail Cover (20)	0	7	6	11	3
Embeddedness (20)*				8	
Velocity/Depth Regime (20)*				10	
Pool Substrate Characterization (20)**	6	10	8		8
Pool Variability (20)**	0	11	5		1
Channel Morphology					
Sediment Deposition (20)	0	11	8	7	9
Flow Status - Maint. Flow Volume (10)	6	9	9	9	10
Flow Status - Flashiness (10)	6	4	1	2	0
Channel Alteration (20)	6	15	11	16	16
Frequency of Riffles/Bends (20)*				15	
Channel Sinuosity (20)**	6	13	10		9
Riparian and Bank Structure					
Bank Stability (L) (10)	6	5	4	6	3
Bank Stability (R) (10)	6	6	4	6	3
Vegetative Protection (L) (10)	1	3	5	8	4
Vegetative Protection (R) (10)	1	7	5	8	4
Riparian Vegetation Zone Width (L) (10)	1	2	4	7	2
Riparian Vegetation Zone Width (R) (10)	1	5	4	7	8
TOTAL SCORE (200):	46	108	84	120	80
HABITAT RATING:	**Poor**	**Good**	**Marginal**	**Good**	**Marginal**
*Applies only to Riffle/Run stream Surveys **Applies only to Glide/Pool stream Surveys					
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).					

Table 6b (continued). Habitat evaluation for selected stations in the Rouge River watershed in Wayne, Washtenaw, and Oakland Counties, Michigan, June-September 2015.

	STATION 1	STATION 12	STATION 13	STATION 14	STATION 15
	North Branch Fellows Creek	River Rouge	Lower River Rouge	Franklin Branch	Middle River Rouge
	Hanford Road	Wattles Rd	Brady Road, downstream	14 Mile Road	Hines Drive, downstream Warren Road
Date:	8/11/2015	8/15/2015	9/29/2015	8/5/2015	8/25/2015
Weather:	Sunny	Sunny	Rainy	Sunny	Cloudy
Air Temperature: ºF	75	70	68	75	69
Water Temperature: ºF	76	57	67		68
Ave. Stream Width: Feet	6	20	45	15	42
Ave. Stream Depth: Feet	0.25	1.5	2.5	0.75	1.5
Surface Velocity: Feet/Second	1	0	2	1	1
Estimated Flow: Cubic Feet/Second	1	6	124	18	62
Stream Modifications:	Canopy Removal	None	Bank Stabilization	None	None
Nuisance Plants (Y/N):	N	N	N	N	N
STORET No.:	821592	631020	821593	630986	821594
County Code:	82	63	82	63	82
TRS:	02S08E09	02N11E18		02N10E31	02S10E09
Latitude (dd):	42.32959	42.575837	42.31269	42.53031	42.33937
Longitude (dd):	-83.49334	-83.200282	-83.24233	-83.30618	-83.26404
Ecoregion:	SMNITP	SMNITP	SMNITP	SMNITP	SMNITP
Stream Type:	Warmwater	Warmwater	Warmwater	Warmwater	Warmwater
USGS Basin Code:	4090004	4090004	4090004	4090004	4090004

Table6 (continued). Habitat evaluation for selected stations in the Rouge River watershed in Wayne, Washtenaw, and Oakland Counties, Michigan, June-September 2015.

	STATION 16	STATION 17	STATION 18	STATION 19	STATION 20
	Tonquish Creek	Upper River Rouge	Bishop Creek	Unnamed Tributary	Tonquish Creek
	Ann Arbor Trail, adjacent	6 Mile Road	Meadowbrook Road	Middlebelt Road	Holiday Boulevard
	8/11/2015	8/26/2015	8/10/2015	8/5/2015	8/11/2015
	GLIDE/POOL	GLIDE/POOL	RIFFLE/RUN	RIFFLE/RUN	RIFFLE/RUN
HABITAT METRIC					
Substrate and Instream Cover					
Epifaunal Substrate/ Avail Cover (20)	2	1	10	10	3
Embeddedness (20)*			16	11	10
Velocity/Depth Regime (20)*			10	10	8
Pool Substrate Characterization (20)**	8	7			
Pool Variability (20)**	3	5			
Channel Morphology					
Sediment Deposition (20)	1	2	14	16	4
Flow Status - Maint. Flow Volume (10)	9	9	10	10	9
Flow Status - Flashiness (10)	0	0	4	9	1
Channel Alteration (20)	16	15	10	15	11
Frequency of Riffles/Bends (20)*			16	6	6
Channel Sinuosity (20)**	5	10			
Riparian and Bank Structure					
Bank Stability (L) (10)	1	2	2	9	2
Bank Stability (R) (10)	1	2	2	9	2
Vegetative Protection (L) (10)	2	3	1	6	4
Vegetative Protection (R) (10)	2	3	1	6	4
Riparian Vegetation Zone Width (L) (10)	6	3	1	5	4
Riparian Vegetation Zone Width (R) (10)	7	3	1	3	2
TOTAL SCORE (200):	63	65	98	125	70
HABITAT RATING:	**Marginal**	**Marginal**	**Marginal**	**Good**	**Marginal**
*Applies only to Riffle/Run stream Surveys **Applies only to Glide/Pool stream Surveys					
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).					

Table 6b (continued). Habitat evaluation for selected stations in the Rouge River watershed in Wayne, Washtenaw, and Oakland Counties, Michigan, June-September 2015.

	STATION 16	STATION 17	STATION 18	STATION 19	STATION 20
	Tonquish Creek	Upper River Rouge	Bishop Creek	Unnamed Tributary	Tonquish Creek
	Ann Arbor Trail, adjacent	6 Mile Road	Meadowbrook Road	Middlebelt Road	Holiday Boulevard
Date:	8/11/2015	8/26/2015	8/10/2015	8/5/2015	8/11/2015
Weather:	Sunny	Cloudy	Partly Cloudy	Sunny	Sunny
Air Temperature: ºF	77	68	73	75	72
Water Temperature: ºF	70		70	21.5	69
Ave. Stream Width: Feet	24	24	4	6	30
Ave. Stream Depth: Feet	1	2	0.3	1	1
Surface Velocity: Feet/Second	1	0	1	1	0
Estimated Flow: Cubic Feet/Second	19	11	2	4	8
Stream Modifications:	None	Bank Stabilization	Canopy Removal	None	None
Nuisance Plants (Y/N):	N	N	N	N	N
STORET No.:	821595	821412	631209	631215	821565
County Code:	82	82	63	63	82
TRS:	02S09E04	01S10E04	01N08E23	02N09E24	02S08E12
Latitude (dd):	42.35171	42.41356	42.47832	42.56215	42.33206
Longitude (dd):	-83.37508	-83.30781	-83.45562	-83.34119	-83.43025
Ecoregion:	SMNITP	SMNITP	SMNITP	SMNITP	SMNITP
Stream Type:	Warmwater	Warmwater	Warmwater	Warmwater	Warmwater
USGS Basin Code:	4090004	4090004	4090004	4090004	4090004

Table 6a (continued). Habitat evaluation for selected stations in the Rouge River watershed in Wayne, Washtenaw, and Oakland Counties, Michigan, June-September 2015.

	STATION 21	STATION 22	STATION 23	STATION 24	STATION 25
	Walled Lake Branch	Pebble Creek	McClaughery Drain	Lower River Rouge	Middle River Rouge
	Chattman Road	11 Mile Road	Hannan Road	Canton Center Road	East Hines Drive
	8/10/2015	8/11/2015	8/10/2015	8/10/2015	8/12/2015
	RIFFLE/RUN	RIFFLE/RUN	GLIDE/POOL	GLIDE/POOL	RIFFLE/RUN
HABITAT METRIC					
Substrate and Instream Cover					
Epifaunal Substrate/ Avail Cover (20)	13	5	1	8	9
Embeddedness (20)*	10	8			9
Velocity/Depth Regime (20)*	15	16			13
Pool Substrate Characterization (20)**			6	10	
Pool Variability (20)**			2	8	
Channel Morphology					
Sediment Deposition (20)	10	4	5	11	12
Flow Status - Maint. Flow Volume (10)	8	10	10	9	9
Flow Status - Flashiness (10)	3	0	4	3	2
Channel Alteration (20)	16	14	8	15	15
Frequency of Riffles/Bends (20)*	16	10			9
Channel Sinuosity (20)**			4	10	
Riparian and Bank Structure					
Bank Stability (L) (10)	5	1	7	2	5
Bank Stability (R) (10)	6	1	7	2	4
Vegetative Protection (L) (10)	6	2	4	5	6
Vegetative Protection (R) (10)	6	2	5	7	4
Riparian Vegetation Zone Width (L) (10)	3	6	3	6	8
Riparian Vegetation Zone Width (R) (10)	3	6	1	7	2
TOTAL SCORE (200):	120	85	67	103	107
HABITAT RATING:	**Good**	**Marginal**	**Marginal**	**Marginal**	**Good**
*Applies only to Riffle/Run stream Surveys **Applies only to Glide/Pool stream Surveys					
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).					

Table 6b (continued). Habitat evaluation for selected stations in the Rouge River watershed in Wayne, Washtenaw, and Oakland Counties, Michigan, June-September 2015.

	STATION 21	STATION 22	STATION 23	STATION 24	STATION 25
	Walled Lake Branch	Pebble Creek	McClaughery Drain	Lower River Rouge	Middle River Rouge
	Chattman Road	11 Mile Road	Hannan Road	Canton Center Road	East Hines Drive
Date:	8/10/2015	8/11/2015	8/10/2015	8/10/2015	8/12/2015
Weather:	Cloudy	Partly Cloudy	Rainy	Cloudy	Sunny
Air Temperature: ºF	75	68	75	75	62
Water Temperature: ºF	68	66	72	68	70
Ave. Stream Width: Feet	14	9	16	30	40
Ave. Stream Depth: Feet	1.5	0.75	0.75	2	1.5
Surface Velocity: Feet/Second	1		0	1	1
Estimated Flow: Cubic Feet/Second	7		4	61	54
Stream Modifications:	None	None	Dredged	None	None
Nuisance Plants (Y/N):	N	N	N	N	N
STORET No.:	631107	630991	821558	821460	820946
County Code:	63	63	82	82	82
TRS:	01N08E26	01N10E18	03S08E12	02S08E28	01S08E25
Latitude (dd):	42.45935	42.4858	42.24834	42.28847	42.37024
Longitude (dd):	-83.45798	-83.30869	-83.42538	-83.48675	-83.43284
Ecoregion:	SMNITP	SMNITP	SMNITP	SMNITP	SMNITP
Stream Type:	Warmwater	Warmwater	Warmwater	Warmwater	Warmwater
USGS Basin Code:	4090004	4090004	4090004	4090004	4090004

Table 6a (continued). Habitat evaluation for selected stations in the Rouge River watershed in Wayne, Washtenaw, and Oakland Counties, Michigan, June-September 2015.

	STATION 26	STATION 27
	Lower River Rouge	River Rouge
	Outer Drive	downstream Outer Drive
	8/12/2015	8/12/2015
	GLIDE/POOL	GLIDE/POOL
HABITAT METRIC		
Substrate and Instream Cover		
Epifaunal Substrate/ Avail Cover (20)	8	1
Embeddedness (20)*		
Velocity/Depth Regime (20)*		
Pool Substrate Characterization (20)**	10	6
Pool Variability (20)**	6	1
Channel Morphology		
Sediment Deposition (20)	5	1
Flow Status - Maint. Flow Volume (10)	10	9
Flow Status - Flashiness (10)	1	1
Channel Alteration (20)	15	15
Frequency of Riffles/Bends (20)*		
Channel Sinuosity (20)**	6	6
Riparian and Bank Structure		
Bank Stability (L) (10)	2	1
Bank Stability (R) (10)	2	2
Vegetative Protection (L) (10)	3	2
Vegetative Protection (R) (10)	3	3
Riparian Vegetation Zone Width (L) (10)	5	4
Riparian Vegetation Zone Width (R) (10)	4	5
TOTAL SCORE (200):	80	57
HABITAT RATING:	**MARGINAL**	**MARGINAL**
*Applies only to Riffle/Run stream Surveys **Applies only to Glide/Pool stream Surveys		
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).		

Table 6b (continued). Habitat evaluation for selected stations in the Rouge River watershed in Wayne, Washtenaw, and Oakland Counties, Michigan, June-September 2015.

	STATION 26	STATION 27
	Lower River Rouge	River Rouge
	Outer Drive	downstream Outer Drive
Date:	8/12/2015	8/12/2015
Weather:	Sunny	Partly Cloudy
Air Temperature: ºF		75
Water Temperature: ºF	68	69
Ave. Stream Width: Feet	45	55
Ave. Stream Depth: Feet	1.5	2.5
Surface Velocity: Feet/Second	1	1
Estimated Flow: Cubic Feet/Second	89	167
Stream Modifications:	None	None
Nuisance Plants (Y/N):	N	N
STORET No.:	820928	821569
County Code:	82	82
TRS:	02S10E21	01S10E26
Latitude (dd):	42.30386	42.38352
Longitude (dd):	-83.26334	-83.2591
Ecoregion:	SMNITP	SMNITP
Stream Type:	Warmwater	Warmwater
USGS Basin Code:	4090004	4090004

Table 7a. Qualitative macroinvertebrate metric evaluation of selected stations in the Rouge River watershed, 2015.

	Lower River Rouge Newburgh Road	Franklin Branch 10 Hill Drive	Lower River Rouge Sophia Street	Lower River Rouge Sheldon Road
	8/24/2015	8/5/2015	8/24/2015	8/24/2015
TAXA	**STATION 1**	**STATION 2**	**STATION 3**	**STATION 4**
PLATYHELMINTHES (flatworms)				
Turbellaria	2			3
ANNELIDA (segmented worms)				
Hirudinea (leeches)			1	
Oligochaeta (worms)	3	9	10	10
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	1	1	1	3
Decapoda (crayfish)		4	1	1
Isopoda (sowbugs)			3	1
Arachnoidea				
Hydracarina		1		
Insecta				
Ephemeroptera (mayflies)				
Baetidae	26	3	3	44
Heptageniidae		13	1	
Odonata				
Anisoptera (dragonflies)				
Aeshnidae	2	7	1	1
Zygoptera (damselflies)				
Calopterygidae	34	6	21	2
Coenagrionidae			1	
Hemiptera (true bugs)				
Mesoveliidae	2	1		
Megaloptera				
Sialidae (alder flies)		1		
Trichoptera (caddisflies)				
Hydropsychidae	65	75	18	96
Leptoceridae		2		
Limnephilidae		3		
Phryganeidae		7		
Coleoptera (beetles)				
Dytiscidae (total)	1			
Haliplidae (adults)	3			
Hydrophilidae (total)	4			
Elmidae	20	112	9	20
Diptera (flies)				
Chironomidae	50	31	5	47
Culicidae	1			
Ephydridae		2		
Simuliidae		11		8
Tabanidae		1		
Tipulidae	1	2		1
MOLLUSCA				
Gastropoda (snails)				
Ancylidae (limpets)	3	2		1
Lymnaeidae				2

	Lower River Rouge Newburgh Road	Franklin Branch 10 Hill Drive	Lower River Rouge Sophia Street	Lower River Rouge Sheldon Road
	8/24/2015	8/5/2015	8/24/2015	8/24/2015
TAXA	**STATION 1**	**STATION 2**	**STATION 3**	**STATION 4**
Physidae	1	1		
Pelecypoda (bivalves)				
Corbiculidae	3		2	2
Dreissenidae		1		
Sphaeriidae (clams)		4	3	
TOTAL INDIVIDUALS	226	300	80	242

Table 7b. Qualitative macroinvertebrate metric evaluation of selected stations in the Rouge River watershed, 2015.

	Lower River Rouge Newburgh Road		Franklin Branch 10 Hill Drive		Lower River Rouge Sophia Street		Lower River Rouge Sheldon Road	
	STATION 1		**STATION 2**		**STATION 3**		**STATION 4**	
METRIC	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	19	0	24	0	15	0	16	0
NUMBER OF MAYFLY TAXA	1	-1	2	0	2	0	1	-1
NUMBER OF CADDISFLY TAXA	1	-1	4	0	1	-1	1	-1
NUMBER OF STONEFLY TAXA	0	-1	0	-1	0	-1	0	-1
PERCENT MAYFLY COMPOSITION	11.50	0	5.33	0	5.00	0	18.18	1
PERCENT CADDISFLY COMPOSTITION	28.76	1	29.00	1	22.50	0	39.67	1
PERCENT DOMINANT TAXON	28.76	0	37.33	-1	26.25	0	39.67	-1
PERCENT ISOPOD, SNAIL, LEECH	1.77	1	1.00	1	5.00	0	1.65	1
PERCENT SURFACE AIR BREATHERS	6.19	1	0.33	1	0.00	1	0.00	1
TOTAL SCORE		0		1		-1		0
MACROINVERTEBRATE COMMUNITY RATING	ACCEPTABLE		ACCEPTABLE		ACCEPTABLE		ACCEPTABLE	

Table 7a (continued). Qualitative macroinvertebrate metric evaluation of selected stations in the Rouge River watershed, 2015.

	Minnow Pond Drain Drake Rd	Upper River Rouge Beech Daly Road	Seeley Drain Halsted Road	Ingersol Creek (Walled L. Branch) Access Road off Grand River
	8/26/2015	9/29/2015	8/26/2015	8/12/2015
TAXA	**STATION 5**	**STATION 6**	**STATION 7**	**STATION 8**
PLATYHELMINTHES (flatworms)				
Turbellaria	1	1	4	
ANNELIDA (segmented worms)				
Oligochaeta (worms)	5	8	17	4
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	45	55		46
Decapoda (crayfish)	1	20	2	22
Isopoda (sowbugs)	2	116		11
Arachnoidea				
Hydracarina	2			
Insecta				
Ephemeroptera (mayflies)				
Baetidae	1	24	7	2
Heptageniidae		2		
Odonata				
Anisoptera (dragonflies)				
Aeshnidae	2	1	2	10
Zygoptera (damselflies)				
Calopterygidae	63	2	113	18
Coenagrionidae	1	2	1	4
Hemiptera (true bugs)				
Belostomatidae	1			
Corixidae	16			
Gerridae		3	1	2
Mesoveliidae		1	3	1
Nepidae	3			
Notonectidae	1			
Pleidae	1			1
Veliidae	1			
Trichoptera (caddisflies)				
Hydropsychidae	30		99	1
Leptoceridae				2
Limnephilidae	1			
Phryganeidae			1	
Coleoptera (beetles)				
Haliplidae (adults)			1	1
Hydrophilidae (total)	1			
Elmidae	17	6	15	48
Diptera (flies)				
Ceratopogonidae				1
Chironomidae	44	3	20	43
Culicidae	3			

	Minnow Pond Drain Drake Rd	Upper River Rouge Beech Daly Road	Seeley Drain Halsted Road	Ingersol Creek (Walled L. Branch) Access Road off Grand River
	8/26/2015	9/29/2015	8/26/2015	8/12/2015
TAXA	**STATION 5**	**STATION 6**	**STATION 7**	**STATION 8**
Dixidae	2			
Simuliidae			10	
Tipulidae			1	
MOLLUSCA				
Gastropoda (snails)				
Ancylidae (limpets)		5		
Lymnaeidae	2			1
Physidae	3			
Pelecypoda (bivalves)				
Sphaeriidae (clams)			3	3
TOTAL INDIVIDUALS	250	249	300	221

Table 7b (continued). Qualitative macroinvertebrate metric evaluation of selected stations in the Rouge River watershed, 2015.

	Minnow Pond Drain Drake Rd		Upper River Rouge Beech Daly Road		Seeley Drain Halsted Road		Ingersol Creek (Walled L. Branch) Access Road off Grand River	
	STATION 5		**STATION 6**		**STATION 7**		**STATION 8**	
METRIC	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	26	1	15	0	17	0	19	0
NUMBER OF MAYFLY TAXA	1	0	2	0	1	0	1	0
NUMBER OF CADDISFLY TAXA	2	0	0	-1	2	0	2	0
NUMBER OF STONEFLY TAXA	0	-1	0	-1	0	-1	0	-1
PERCENT MAYFLY COMPOSITION	0.40	-1	10.44	0	2.33	-1	0.90	-1
PERCENT CADDISFLY COMPOSTITION	12.40	0	0.00	-1	33.33	1	1.36	-1
PERCENT DOMINANT TAXON	25.20	0	46.59	-1	37.67	-1	21.72	0
PERCENT ISOPOD, SNAIL, LEECH	2.80	1	48.59	-1	0.00	1	5.43	0
PERCENT SURFACE AIR BREATHERS	10.80	0	1.61	1	2.00	1	2.71	1
TOTAL SCORE		0		-4		0		-2
MACROINVERTEBRATE COMMUNITY RATING	ACCEPTABLE		ACCEPTABLE		ACCEPTABLE		ACCEPTABLE	

Table 7a (continued). Qualitative macroinvertebrate metric evaluation of selected stations in the Rouge River watershed, 2015.

	Lower River Rouge Canton Center Road	River Rouge Tireman Street	North Branch Fellows Creek Hanford Road	River Rouge Wattles Rd
	8/10/2015	9/29/2015	8/11/2015	8/15/2015
TAXA	**STATION 9**	**STATON 10**	**STATION 11**	**STATION 12**
PLATYHELMINTHES (flatworms)				
Turbellaria			1	2
ANNELIDA (segmented worms)				
Hirudinea (leeches)			22	
Oligochaeta (worms)	3	153	72	12
ARTHROPODA				
Crustacea				
Amphipoda (scuds)		33		6
Decapoda (crayfish)	1	4		1
Isopoda (sowbugs)		37		15
Arachnoidea				
Hydracarina				2
Insecta				
Ephemeroptera (mayflies)				
Baetidae	4	5		3
Caenidae				7
Heptageniidae		32		5
Odonata				
Anisoptera (dragonflies)				
Aeshnidae				1
Libellulidae			1	
Zygoptera (damselflies)				
Calopterygidae		1		2
Coenagrionidae		1		11
Hemiptera (true bugs)				
Corixidae	1	7	18	68
Gerridae	1			5
Mesoveliidae				1
Veliidae	1			
Trichoptera (caddisflies)				
Hydropsychidae	47			8
Coleoptera (beetles)				
Haliplidae (adults)			1	
Elmidae	14	1		41
Scirtidae (larvae)				1
Diptera (flies)				
Ceratopogonidae			1	
Chironomidae	23	1	136	86
Simuliidae	4			
Stratiomyidae			1	
Tipulidae	2			
MOLLUSCA				
Gastropoda (snails)				
Hydrobiidae				1

	Lower River Rouge Canton Center Road	River Rouge Tireman Street	North Branch Fellows Creek Hanford Road	River Rouge Wattles Rd
	8/10/2015	9/29/2015	8/11/2015	8/15/2015
TAXA	**STATION 9**	**STATON 10**	**STATION 11**	**STATION 12**
Lymnaeidae			5	
Physidae				4
Planorbidae	1			1
Pelecypoda (bivalves)				
Corbiculidae	3			
Sphaeriidae (clams)		1	82	4
TOTAL INDIVIDUALS	105	276	340	287

Table7b (continued). Qualitative macroinvertebrate metric evaluation of selected stations in the Rouge River watershed, 2015.

	Lower River Rouge Canton Center Road		River Rouge Tireman Street		North Branch Fellows Creek Hanford Road		River Rouge Wattles Rd	
	STATION 9		**STATION 10**		**STATION 11**		**STATION 12**	
METRIC	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	13	0	12	0	11	0	23	0
NUMBER OF MAYFLY TAXA	1	-1	2	0	0	-1	3	0
NUMBER OF CADDISFLY TAXA	1	-1	0	-1	0	-1	1	-1
NUMBER OF STONEFLY TAXA	0	-1	0	-1	0	-1	0	-1
PERCENT MAYFLY COMPOSITION	3.81	0	13.41	0	0.00	-1	5.23	0
PERCENT CADDISFLY COMPOSTITION	44.76	1	0.00	-1	0.00	-1	2.79	-1
PERCENT DOMINANT TAXON	44.76	-1	55.43	-1	40.00	-1	29.97	0
PERCENT ISOPOD, SNAIL, LEECH	0.95	1	13.41	-1	7.94	0	7.32	0
PERCENT SURFACE AIR BREATHERS	2.86	1	2.54	1	6.18	1	25.78	-1
TOTAL SCORE		-1		-4		-5		-4
MACROINVERTEBRATE COMMUNITY RATING	ACCEPTABLE		ACCEPTABLE		POOR		ACCEPTABLE	

Table 7a (continued). Qualitative macroinvertebrate metric evaluation of selected stations in the Rouge River watershed, 2015.

	Lower River Rouge Brady Road, downstream	Franklin Branch 14 Mile Road	Middle River Rouge Hines Drive, downstream Warren Road	Tonquish Creek Ann Arbor Trail, adjacent
	9/29/2015	8/5/2015	8/25/2015	8/11/2015
TAXA	**STATION 13**	**STATION 14**	**STATION 15**	**STATION 16**
PLATYHELMINTHES (flatworms)				
Turbellaria	6	4		
ANNELIDA (segmented worms)				
Hirudinea (leeches)	3		1	
Oligochaeta (worms)	35	7	105	60
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	3		2	1
Decapoda (crayfish)		1	18	10
Isopoda (sowbugs)	1	7		1
Arachnoidea				
Hydracarina		36		
Insecta				
Ephemeroptera (mayflies)				
Baetidae	22	35	39	6
Heptageniidae		1	28	
Odonata				
Anisoptera (dragonflies)				
Aeshnidae	1	1		
Zygoptera (damselflies)				
Calopterygidae	9	8	2	12
Coenagrionidae		1	3	
Hemiptera (true bugs)				
Corixidae				1
Gerridae	1	1	1	5
Mesoveliidae	2	1		2
Notonectidae			1	1
Pleidae				1
Trichoptera (caddisflies)				
Hydropsychidae	114	25	22	2
Coleoptera (beetles)				
Hydrophilidae (total)		1		
Elmidae		12	3	
Diptera (flies)				
Chironomidae	14	111	14	29
Culicidae				3
Empididae		1		
Simuliidae		3		
Tipulidae		1		1
MOLLUSCA				
Gastropoda (snails)				
Ancylidae (limpets)	8	2	2	2
Physidae		1		5

	Lower River Rouge Brady Road, downstream	Franklin Branch 14 Mile Road	Middle River Rouge Hines Drive, downstream Warren Road	Tonquish Creek Ann Arbor Trail, adjacent
	9/29/2015	8/5/2015	8/25/2015	8/11/2015
TAXA	**STATION 13**	**STATION 14**	**STATION 15**	**STATION 16**
Planorbidae		1		
Pelecypoda (bivalves)				
Corbiculidae	3		4	
Sphaeriidae (clams)	42	1	8	6
TOTAL INDIVIDUALS	264	263	253	148

Table 7b (continued). Qualitative macroinvertebrate metric evaluation of selected stations in the Rouge River watershed, 2015.

	Lower River Rouge Brady Road, downstream		Franklin Branch 14 Mile Road		Middle River Rouge Hines Drive, downstream Warren Road		Tonquish Creek Ann Arbor Trail, adjacent	
	STATION 13		**STATION 14**		**STATION 15**		**STATION 16**	
METRIC	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	15	0	24	0	16	0	18	0
NUMBER OF MAYFLY TAXA	1	-1	2	0	2	0	1	-1
NUMBER OF CADDISFLY TAXA	1	-1	1	-1	1	-1	1	-1
NUMBER OF STONEFLY TAXA	0	-1	0	-1	0	-1	0	-1
PERCENT MAYFLY COMPOSITION	8.33	0	13.69	0	26.48	1	4.05	0
PERCENT CADDISFLY COMPOSTITION	43.18	1	9.51	0	8.70	0	1.35	-1
PERCENT DOMINANT TAXON	43.18	-1	42.21	-1	41.50	-1	40.54	-1
PERCENT ISOPOD, SNAIL, LEECH	4.55	0	4.18	0	1.19	1	5.41	0
PERCENT SURFACE AIR BREATHERS	1.14	1	1.14	1	0.79	1	8.78	0
TOTAL SCORE		-2		-2		0		-5
MACROINVERTEBRATE COMMUNITY RATING	ACCEPTABLE		ACCEPTABLE		ACCEPTABLE		POOR	

Table 7a (continued). Qualitative macroinvertebrate metric evaluation of selected stations in the Rouge River watershed, 2015.

	Upper River Rouge 6 Mile Road	Bishop Creek Meadowbrook Road	Unnamed Tributary Middlebelt Road	Tonquish Creek Holiday Boulevard
	8/26/2015	8/10/2015	8/5/2015	8/11/2015
TAXA	**STATION 17**	**STATION 18**	**STATION 19**	**STATION 20**
PORIFERA (sponges)	1			
PLATYHELMINTHES (flatworms)				
Turbellaria			1	
ANNELIDA (segmented worms)				
Hirudinea (leeches)	1			
Oligochaeta (worms)	59	4	12	35
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	9	35	51	2
Decapoda (crayfish)	23	5	3	35
Isopoda (sowbugs)	24			1
Arachnoidea				
Hydracarina		1	1	
Insecta				
Ephemeroptera (mayflies)				
Baetidae		5	1	14
Caenidae			1	
Odonata				
Anisoptera (dragonflies)				
Aeshnidae		2		2
Zygoptera (damselflies)				
Calopterygidae	14	7	6	19
Coenagrionidae		14		1
Hemiptera (true bugs)				
Corixidae		1		
Gerridae		1		5
Mesoveliidae			1	3
Nepidae				1
Notonectidae				1
Veliidae		1		
Megaloptera				
Sialidae (alder flies)		1	3	
Trichoptera (caddisflies)				
Hydropsychidae		126	59	59
Hydroptilidae		2		
Leptoceridae		3		
Uenoidae		1		
Coleoptera (beetles)				
Dytiscidae (total)		1		
Haliplidae (adults)		1		
Hydrophilidae (total)		1		
Elmidae	9	5	13	2
Diptera (flies)				
Athericidae			2	

	Upper River Rouge 6 Mile Road	Bishop Creek Meadowbrook Road	Unnamed Tributary Middlebelt Road	Tonquish Creek Holiday Boulevard
	8/26/2015	8/10/2015	8/5/2015	8/11/2015
TAXA	**STATION 17**	**STATION 18**	**STATION 19**	**STATION 20**
Chironomidae	4	73	9	29
Culicidae				3
Simuliidae		6	1	
Stratiomyidae		1		
MOLLUSCA				
Gastropoda (snails)				
Ancylidae (limpets)	2	3		1
Viviparidae			1	
Pelecypoda (bivalves)				
Dreissenidae			95	
Sphaeriidae (clams)	1	2	6	1
TOTAL INDIVIDUALS	147	303	266	214

Table 7b (continued). Qualitative macroinvertebrate metric evaluation of selected stations in the Rouge River watershed, 2015.

	Upper River Rouge 6 Mile Road		Bishop Creek Meadowbrook Road		Unnamed Tributary Middlebelt Road		Tonquish Creek Holiday Boulevard	
	STATION 17		**STATION 18**		**STATION 19**		**STATION 20**	
METRIC	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	11	-1	26	1	18	0	18	0
NUMBER OF MAYFLY TAXA	0	-1	1	0	2	1	1	-1
NUMBER OF CADDISFLY TAXA	0	-1	4	1	1	-1	1	-1
NUMBER OF STONEFLY TAXA	0	-1	0	-1	0	-1	0	-1
PERCENT MAYFLY COMPOSITION	0.00	-1	1.65	-1	0.75	-1	6.54	0
PERCENT CADDISFLY COMPOSTITION	0.00	-1	43.56	1	22.18	0	27.57	0
PERCENT DOMINANT TAXON	40.14	-1	41.58	-1	35.71	0	27.57	0
PERCENT ISOPOD, SNAIL, LEECH	18.37	-1	0.99	1	0.38	1	0.93	1
PERCENT SURFACE AIR BREATHERS	0.00	1	2.64	1	0.38	1	6.07	1
TOTAL SCORE		-7		2		0		-1
MACROINVERTEBRATE COMMUNITY RATING	POOR		ACCEPTABLE		ACCEPTABLE		ACCEPTABLE	

Table 7a (continued). Qualitative macroinvertebrate metric evaluation of selected stations in the Rouge River watershed, 2015.

	Walled Lake Branch Chattman Road	Pebble Creek 11 Mile Road	McClaughery Drain Hannan Road	Lower River Rouge Canton Center Road
	8/10/2015	8/11/2015	8/10/2015	8/10/2015
TAXA	**STATION 21**	**STATION 22**	**STATION 23**	**STATION 24**
PLATYHELMINTHES (flatworms)				
Turbellaria	1	1		
ANNELIDA (segmented worms)				
Hirudinea (leeches)		1	10	
Oligochaeta (worms)	11	9	4	3
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	31	5	23	
Decapoda (crayfish)	3	6	1	1
Isopoda (sowbugs)	50	33	83	
Arachnoidea				
Hydracarina		1	1	
Insecta				
Ephemeroptera (mayflies)				
Baetidae	1	2	3	4
Caenidae			2	
Odonata				
Anisoptera (dragonflies)				
Aeshnidae	6	2	1	
Libellulidae			1	
Zygoptera (damselflies)				
Calopterygidae	47	52		
Coenagrionidae	2		25	
Hemiptera (true bugs)				
Corixidae			67	1
Gerridae		1	3	1
Mesoveliidae	1	1		
Pleidae	1			
Veliidae				1
Trichoptera (caddisflies)				
Hydropsychidae	7	19		47
Coleoptera (beetles)				
Haliplidae (adults)			7	
Elmidae	81	99	1	14
Haliplidae (larvae)			1	
Diptera (flies)				
Ceratopogonidae			3	
Chironomidae	12	19	122	23
Ephydridae	1			
Simuliidae	1	1		4
Stratiomyidae			1	
Tabanidae	1			
Tipulidae	1	1		2
MOLLUSCA				

	Walled Lake Branch Chattman Road	Pebble Creek 11 Mile Road	McClaughery Drain Hannan Road	Lower River Rouge Canton Center Road
	8/10/2015	8/11/2015	8/10/2015	8/10/2015
TAXA	**STATION 21**	**STATION 22**	**STATION 23**	**STATION 24**
Gastropoda (snails)				
Ancylidae (limpets)		3		
Physidae			13	
Planorbidae		1		1
Pelecypoda (bivalves)				
Corbiculidae				3
Sphaeriidae (clams)	2		22	
TOTAL INDIVIDUALS	260	257	394	105

Table 7b (continued). Qualitative macroinvertebrate metric evaluation of selected stations in the Rouge River watershed, 2015.

	Walled Lake Branch Chattman Road		Pebble Creek 11 Mile Road		McClaughery Drain Hannan Road		Lower River Rouge Canton Center Road	
	STATION 21		**STATION 22**		**STATION 23**		**STATION 24**	
METRIC	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	19	0	19	0	21	0	13	0
NUMBER OF MAYFLY TAXA	1	-1	1	0	2	0	1	-1
NUMBER OF CADDISFLY TAXA	1	-1	1	-1	0	-1	1	-1
NUMBER OF STONEFLY TAXA	0	-1	0	-1	0	-1	0	-1
PERCENT MAYFLY COMPOSITION	0.38	-1	0.78	-1	1.27	-1	3.81	0
PERCENT CADDISFLY COMPOSTITION	2.69	-1	7.39	0	0.00	-1	44.76	1
PERCENT DOMINANT TAXON	31.15	0	38.52	-1	30.96	0	44.76	-1
PERCENT ISOPOD, SNAIL, LEECH	19.23	-1	14.79	-1	26.90	-1	0.95	1
PERCENT SURFACE AIR BREATHERS	0.77	1	0.78	1	21.57	-1	2.86	1
TOTAL SCORE		-5		-4		-6		-1
MACROINVERTEBRATE COMMUNITY RATING	POOR		ACCEPTABLE		POOR		ACCEPTABLE	

Table 7a (continued). Qualitative macroinvertebrate metric evaluation of selected stations in the Rouge River watershed, 2015.

	Middle River Rouge East Hines Drive	Lower River Rouge Outer Drive	River Rouge downstream Outer Drive
	8/12/2015	8/12/2015	8/12/2015
TAXA	**STATION 25**	**STATION 26**	**STATION 27**
PLATYHELMINTHES (flatworms)			
Turbellaria	9	19	
ANNELIDA (segmented worms)			
Hirudinea (leeches)	1	8	3
Oligochaeta (worms)	5	151	32
ARTHROPODA			
Crustacea			
Amphipoda (scuds)	15	2	28
Decapoda (crayfish)	1	1	7
Isopoda (sowbugs)	1	10	68
Insecta			
Ephemeroptera (mayflies)			
Baetidae	37	10	29
Heptageniidae	2		9
Odonata			
Anisoptera (dragonflies)			
Aeshnidae	1		1
Zygoptera (damselflies)			
Calopterygidae	7	1	3
Coenagrionidae	3		
Hemiptera (true bugs)			
Corixidae			2
Gerridae	1		
Notonectidae			1
Veliidae			1
Trichoptera (caddisflies)			
Hydropsychidae	24	26	12
Leptoceridae	2		
Coleoptera (beetles)			
Elmidae	40	2	18
Diptera (flies)			
Ceratopogonidae		2	
Chironomidae	65	45	19
Culicidae			1
Simuliidae	5		
MOLLUSCA			
Gastropoda (snails)			
Ancylidae (limpets)		1	3
Hydrobiidae	1		
Planorbidae		6	
Pelecypoda (bivalves)			
Corbiculidae	9		
Sphaeriidae (clams)	263		3
TOTAL INDIVIDUALS	492	284	240

Table 7b (continued). Qualitative macroinvertebrate metric evaluation of selected stations in the Rouge River watershed, 2015.

	Middle River Rouge East Hines Drive		Lower River Rouge Outer Drive		River Rouge downstream Outer Drive	
	STATION 25		**STATION 26**		**STATION 27**	
METRIC	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	20	0	14	0	18	0
NUMBER OF MAYFLY TAXA	2	0	1	-1	2	0
NUMBER OF CADDISFLY TAXA	2	0	1	-1	1	-1
NUMBER OF STONEFLY TAXA	0	-1	0	-1	0	-1
PERCENT MAYFLY COMPOSITION	7.93	0	3.52	0	15.83	0
PERCENT CADDISFLY COMPOSTITION	5.28	0	9.15	0	5.00	0
PERCENT DOMINANT TAXON	53.46	-1	53.17	-1	28.33	0
PERCENT ISOPOD, SNAIL, LEECH	0.61	1	8.80	0	30.83	-1
PERCENT SURFACE AIR BREATHERS	0.20	1	0.00	1	2.08	1
TOTAL SCORE		0		-3		-2
MACROINVERTEBRATE COMMUNITY RATING	ACCEPTABLE		ACCEPTABLE		ACCEPTABLE	

Table 8. Results of water quality monitoring in the Rouge River, 2010.

		STATION 51	**STATION 52**	**STATION 53**	**STATION 54**	**STATION 55**	**STATION 56**	**STATION 57**
		Bishop Creek	Bishop Creek	Bishop Creek	Bishop Creek	Seeley Drain	Seeley Drain	Seeley Drain
		12 Oaks Mall	Delwal Ave.	Pond Outlet	Upstream Pond	13 Mile Rd.	Haggerty Rd.	14 Mile Rd.
		8/25/2010	8/25/2010	8/25/2010	8/25/2010	8/23/2010	8/23/2010	8/23/2010
Parameter	**Units**							
Alkalinity (as CaCO)	mg/L	281	156	97	274			
Ammonia	mg N/L					0.05	0.06	0.05
Chloride	mg/L	2510	1160	804	1840			
Conductivity	umhos/cm	8020	4080	2726	6230			
Nitrate + Nitrite	mg N/L					21	22	23
Nitrite	mg N/L					0.05	0.05	0.05
Ortho-phosphate	mg P/L					0.04	0.07	0.08
pH	pH	8.04	7.88	8.73	8.17			
Solids - Total Dissolved	mg/L	4600	2400	1500	3700			
Sulfate	mg/L	177	78	36	146			
Total Kjeldahl Nitrogen	mg N/L					1.14	1.41	1.42
Total Phosphorus	mg P/L					0.09	0.18	0.15

Table 9 Qualitative fish sampling results for Seeley Drain Halstead Road. Habitat results can be found under Table 5a and 5b, Station 7.

TAXA	**Seeley Drain Halsted Road 8/26/2015 STATION 28**	
Semotilus atromaculatus (Creek chub)	51	
Luxilus cornutus (Common shiner)	4	
Rhinichthys atratulus (Blacknose dace)	25	
Cottus bairdii (Mottled sculpin)	4	
Lepomis cyanellus (Green sunfish)	2	
Etheostoma nigrum (Johnny darter)	2	
TOTAL INDIVIDUALS	88	
METRIC	Value	Score
TOTAL NUMBER OF TAXA	6	0
NO. OF DARTER, SCULPIN, MADTOM TAXA	2	0
NUMBER OF SUNFISH TAXA	1	0
NUMBER OF SUCKER TAXA	0	-1
NUMBER OF INTOLERANT TAXA	1	-1
PERCENT TOLERANT	90.91	-1
PERCENT OMNIVOROUS TAXA	86.36	-1
PERCENT INSECTIVOROUS TAXA	13.64	-1
PERCENT PISCIVOROUS TAXA	0.00	-1
% SIMPLE LITHOPHILIC SPAWNER TAXA	32.95	0
TOTAL SCORE		-6
FISH COMMUNITY RATING	Poor	