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Rouge River Benthic Monitoring Program Spring 2015 Report

This report covers benthic macroinvertebrate monitoring at 60 sites on Rouge River tributaries and branches in the spring of 2015. Thirty-nine sites were sampled by Friends of the Rouge (FOTR) volunteers and staff, fourteen were sampled by Wayne County Department of Public Services Water Quality Management Division, four were sampled by Susan Thompson, one was sampled by Schoolcraft College

students and two were sampled by Wayne State University's Ecology Class. Most of Friends of the Rouge's sites were sampled on April 18 during the Spring Bug Hunt in which 134 people participated. The fabulous spring weather on that date brought out an unusually large number of volunteers. The remaining sites were sampled during trainings or by FOTR staff and volunteers.

FRIENDS OF THE ROUGE BENTHIC MONITORING PROGRAM

FOTR's benthic monitoring program was started in 2001 to involve a large number of volunteers in monitoring the health of the watershed by sampling the creeks of the Rouge River. The types and number of benthic macroinvertebrates found can be used to assess water quality. Each team of volunteers samples two sites under the direction of a trained team leader. Samples of each organism are collected and field identifications are verified in the lab. The program is funded by the Alliance of Rouge Communities and in cooperation with Wayne County Department of Public Services Water Quality Management Division.

Stream Quality Index, Taxa, EPT and Sensitive Families

Each site is given a **Stream Quality Index (SQI)** which is determined by weighting each type and number of organisms found by their sensitivity ratings. A higher proportion of sensitive organisms such as mayflies and caddisflies results in a higher score. A number of different organisms also results in a high score. The SQI is then given a rating:

- >48 = EXCELLENT
- 34-48 = GOOD
- 19-33 = FAIR
- <19 = POOR

Number of **taxa** represents the number of different families of organisms. A higher number of taxa indicate a healthier site.

EPT refers to the number of mayfly, caddisfly and stonefly families found; these three orders contain some of the most sensitive organisms.

Sensitive Families refers to insects that are rated 1 on the Hilsenhoff Sensitivity Index.

Overall Scores

The majority of sites (35/60 or 58%) had FAIR Stream Quality Index scores (SQI) with an average score of 30 (Table 3). Three sites scored EXCELLENT and 16 were GOOD. Six sites had POOR SQI. The number of taxa at each site ranged from a low of six at Low4 to 22 at John7. The number of EPT (see sidebar) ranged from zero to seven at John2. Six sensitive families were found at thirteen sites (see Table 4) including two stonefly families, one mayfly family, two caddisfly families, and gomphid (clubtail) dragonfly nymphs.

Data Trends

Table 1 contains the data trends by subwatershed/creek. The Johnson Creek, the Middle 1 and the Middle 3 subwatershed are showing significant positive trends. No other subwatersheds had significant trends.

Trend Analysis

To determine whether the Rouge River is improving over time, SQI scores are averaged for each subwatershed and Johnson Creek (a cold water tributary) and the slope is plotted. A positive slope indicates an upward trend (scores increasing); a negative slope indicates a downward trend (scores decreasing). The trend is significant if the *p*-value is less than 0.05.

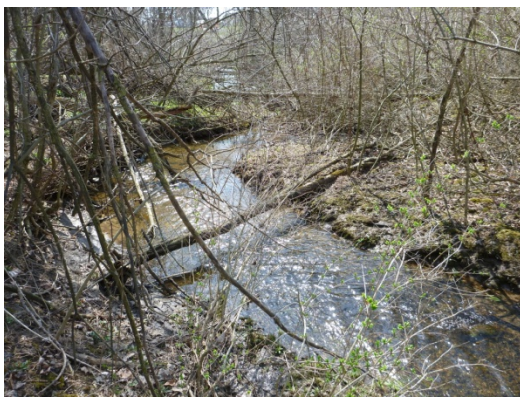
Table 1 : FOTR and WC Spring Bug Hunt Summary 2001-2015

Branch	slope	p-value	True trend	Subwatershed average score	Water Quality Rating
Main 1-2	0.2095	0.1836	no trend	27	Fair
Main3-4	-0.3969	0.4187	no trend	25	Fair
Upper	-0.0354	0.8490	no trend	24	Fair
Johnson Creek	0.7301	0.0027	yes, positive	39	Good
Middle 1	0.7332	0.0044	yes, positive	29	Fair
Middle 3	0.8640	0.0191	yes, positive	20	Fair
Lower 1	0.1440	0.4785	no trend	30	Fair
Lower 2	0.0353	0.9105	no trend	26	Fair

In addition to the trend analysis by subwatershed, a site-by-site analysis of all the sites was done (Table 2). The majority of the sites had no trend. Sites with a statistically significant positive trend were: John2, John5, MR-15 and Wall2. Two sites had statistically significant negative trends: John8 and MR-13.

Site	p-value	Slope	True trend	Site average score	Water Quality Rating
John2	0.0387	1.0206	yes, positive	44	Good
John5	0.0408	1.1063	yes, positive	29	Fair
John8	0.0068	-4.8054	yes, negative	49	Excellent
MR-13	0.0454	-1.0009	yes, negative	21	Fair
MR-15	0.0382	1.5917	yes, positive	24	Fair
Wall2	0.0467	0.5286	yes, positive	21	Fair

Fowl1: The Little Creek That Could
by Bruce McCulloch, FOTR Volunteer Biologist



OK, I have a soft spot for Fowl1. I admit it. It was the first site I ever sampled for Friends of the Rouge back in January, 2006. We counted about 50 winter stoneflies before phoning Sally to see if that would suffice!! Under normal flow conditions, the creek averages no more than 4 feet wide and less than a foot deep, yet the biotic diversity it produces is nothing short of extraordinary.

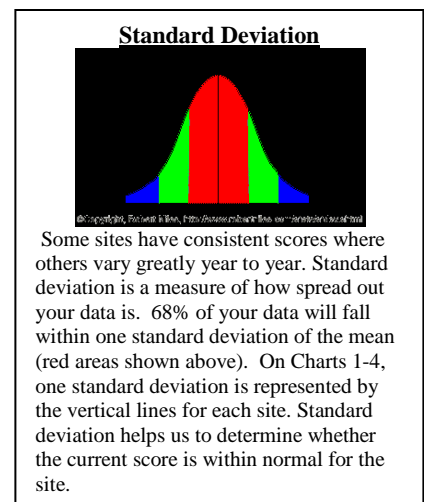
Since sampling in the Rouge began in 2001, Fowl1 has produced a total of 3 stonefly families (Capniidae, Perlodidae, and Nemouridae), and a whopping 8 caddisfly families: Hydropsychidae, Limnephilidae, Phryganeidae, Uenoidae, Molannidae, Psychomyiidae, Polycentropodidae, and Rhyacophilidae. Five of these caddisfly families were collected during the 2015 spring bug hunt alone. When *Lype diversa* (Family Psychomyiidae), and *Rhyacophila lobifera* (Family Rhyacophilidae) were collected for the first time in the watershed, it didn't take very long before they showed up at Fowl1. It is also the only site in the watershed that has produced a Siphonurid mayfly. The site's average SQI scores are 35.8 and 30.6 for spring and fall, respectively.

I believe a key to the high diversity at Fowl1 is its location downstream of a large wetland (which typically produces half a dozen species of frogs each year). Wetlands function in several ways to improve water quality by trapping sediments and retaining excess nutrients and other pollutants. As long as the wetland remains intact, and continues to supply good quality water to the creek, Fowl1 will continue to impress. It's the little creek that could!!

Lower Branch

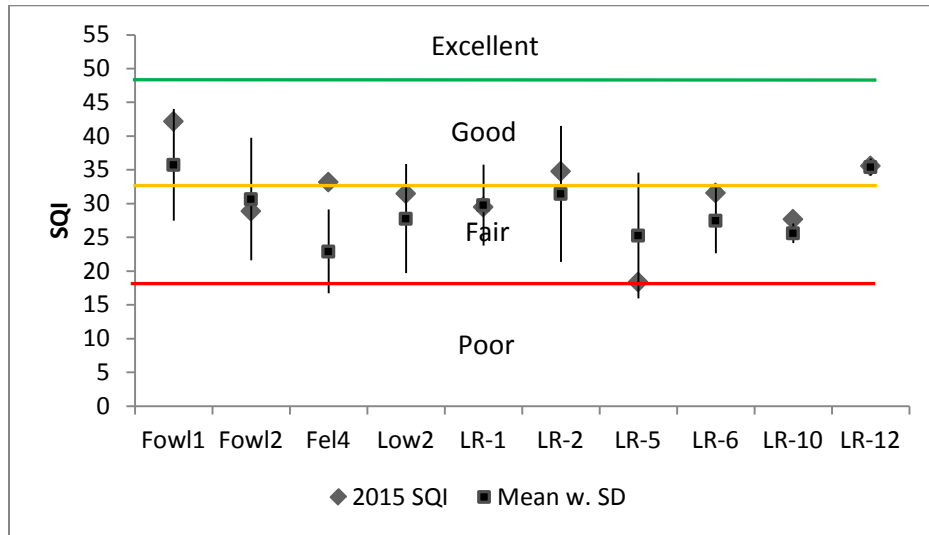
Sixteen sites were sampled on the Lower Branch of the Rouge (see Table 3). Fellows Creek was sampled at four locations (Fel4, Fel5, Fel6, LR-5) and Fowler Creek at two (Fowl1 and Fowl2). On the main branch of the Lower, ten sites were sampled.

The Lower subwatershed did not have a significant trend and most sites scored FAIR (average 31). Four sites had GOOD scores (Fel5, Fowl1, LR-12 and LR-2). One site (LR-5) scored POOR. The number of taxa ranged from 6-1 and EPT: 0-4. Two sensitive families were found: pronggill (Leptophlebiidae) mayflies at Fel6 and LR-2 and free-living (Rhyacophilidae) caddisflies at Fowl1 (Table 4).



Ten sites had past data for three years or more (Chart 1). Two sites were above a standard deviation of average (Fel4 and LR-10). No sites were below a standard deviation of average for the site. No sites showed any trend when analyzed by site.

Chart 1: Lower Branch SQI and Mean with Standard Deviation



Main Branch

Twelve sites on the Main Branch were sampled. Seven were on tributaries: Evans, Murphy, Nottingham, Pebble and Quarton Creeks. Two of these were new sites: an additional Evans Creek site and a new site on the Quarton Lake branch.

The Main1/2 subwatershed is not showing any trend (Table 1). The majority (8) of the scores were FAIR (average 25). There were two GOOD SQIs (Mur2 and Main11) and two were POOR (Evan1 & Evan2). The number of taxa ranged from 7-15 and EPT 0-2. Sensitive clubtail dragonfly larvae (Gomphidae) were found at the new site on the Quarton Lake branch.

For the nine sites with three years or more of past data, SQI was within a standard deviation of the mean except Main8 which was below and Mur2 which was below (Chart 2). Main8 is on the Main Stem in the oxbow around Fordson Island. Mur2 is on a creek that flows through the Roeper School in Bloomfield Hills.

Chart 2: Main Branch & Tributary SQI and Mean with Standard Deviation



Middle Branch

Twenty-four sites were sampled on the Middle branch including four tributaries: Johnson, Tonquish, Walled Lake and Willow Creeks.

Average scores for the Johnson Creek, the Middle1 and the Middle3 subwatersheds are all showing positive trends (Table1). The average score was GOOD (34) and the Middle Branch had three EXCELLENT SQIs (John1, MR-25, MR-27). There no POOR scores, 10 GOOD and eleven FAIR. The number of taxa ranged from 7-22 and EPT 0-7. Sensitive families were found in most of the Johnson Creek sites. Sensitive families included slender winter (Capniidae) stoneflies (MR-23) Perlodidae stoneflies (John2, John8, MR-23 and MR-25), pronggill (Leptophlebiidae) mayflies (John2, John7, John8, MR-22 and MR-25), free-living (Rhyacophilidae) caddisflies (John1, John2, John) and saddle-case maker (Glossosomatidae) caddisflies (John5and John6).

For sites with past data (Chart 3 and 4), three of the SQIs were above a standard deviation (John2, John5, and John6). Four sites were below (Bish2, MR-20, MR-22, MR-25). Two of these were Johnson Creek tributaries (MR-22 and MR-25).

For the twelve sites with past data, all were within a standard deviation of the mean for the site. The Middle Branch had the only trends when analyzed site by site. John2, John5, MR-15 and Wall2 all had positive trends. John8 and MR-13 had negative trends.

Chart 3: Walled Lake and Middle Branch SQI and Mean with Standard Deviation

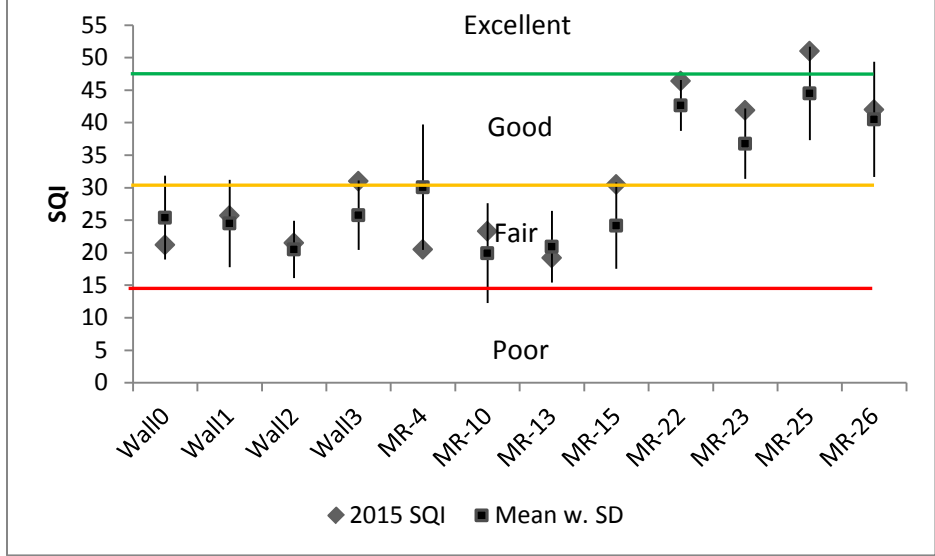
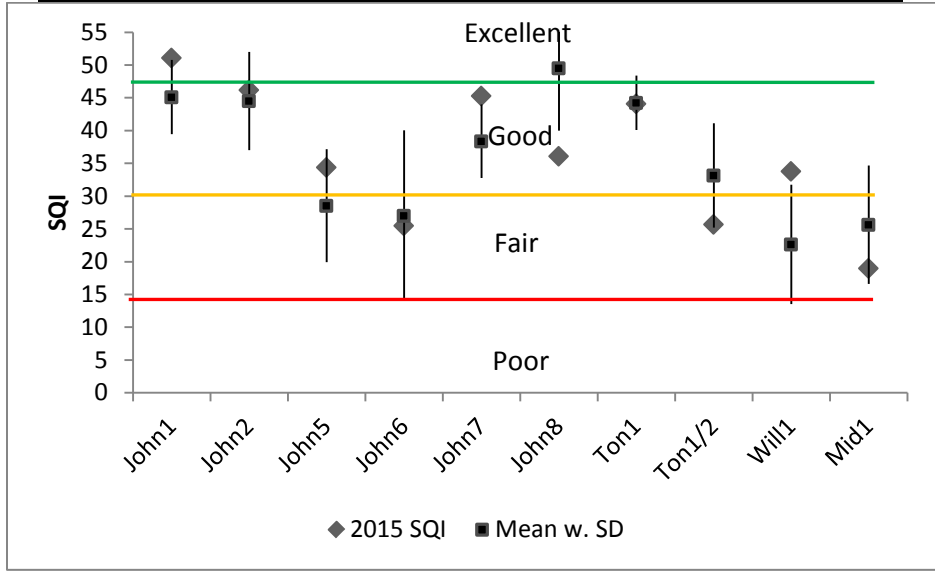


Chart 4: Middle Branch Tributary SQI and Mean with Standard Deviation



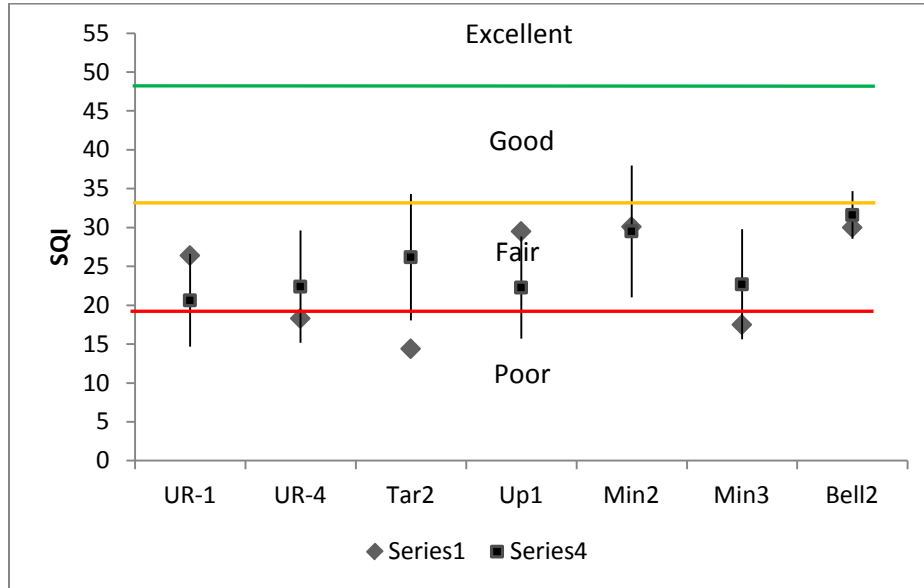
Upper Branch

Eight Upper branch sites were sampled this spring, including three tributaries: Bell, Beitz, Minnow Pond, and Tarabusi Creeks. The Beitz Creek site is a new one, sampled by Wayne County.

The Upper Subwatershed did not show any overall trend (Table1). The average score was FAIR (23). Three sites scored POOR (Min2, Tar2, and UR-4). All the rest of the sites scored FAIR. There were no GOOD or EXCELLENT scores. The number of taxa ranged from 7-12 and EPT 0-2. There were no sensitive families found.

For the seven sites with past data, one site was below a standard deviation of the mean: Tar2. One site was above a standard deviation of the mean: Up1. In the trend analysis for sites, no Upper sites showed any trend.

Chart 5: Upper Branch SQI with Mean and Standard Deviation



2015 Spring Bug Hunt Results

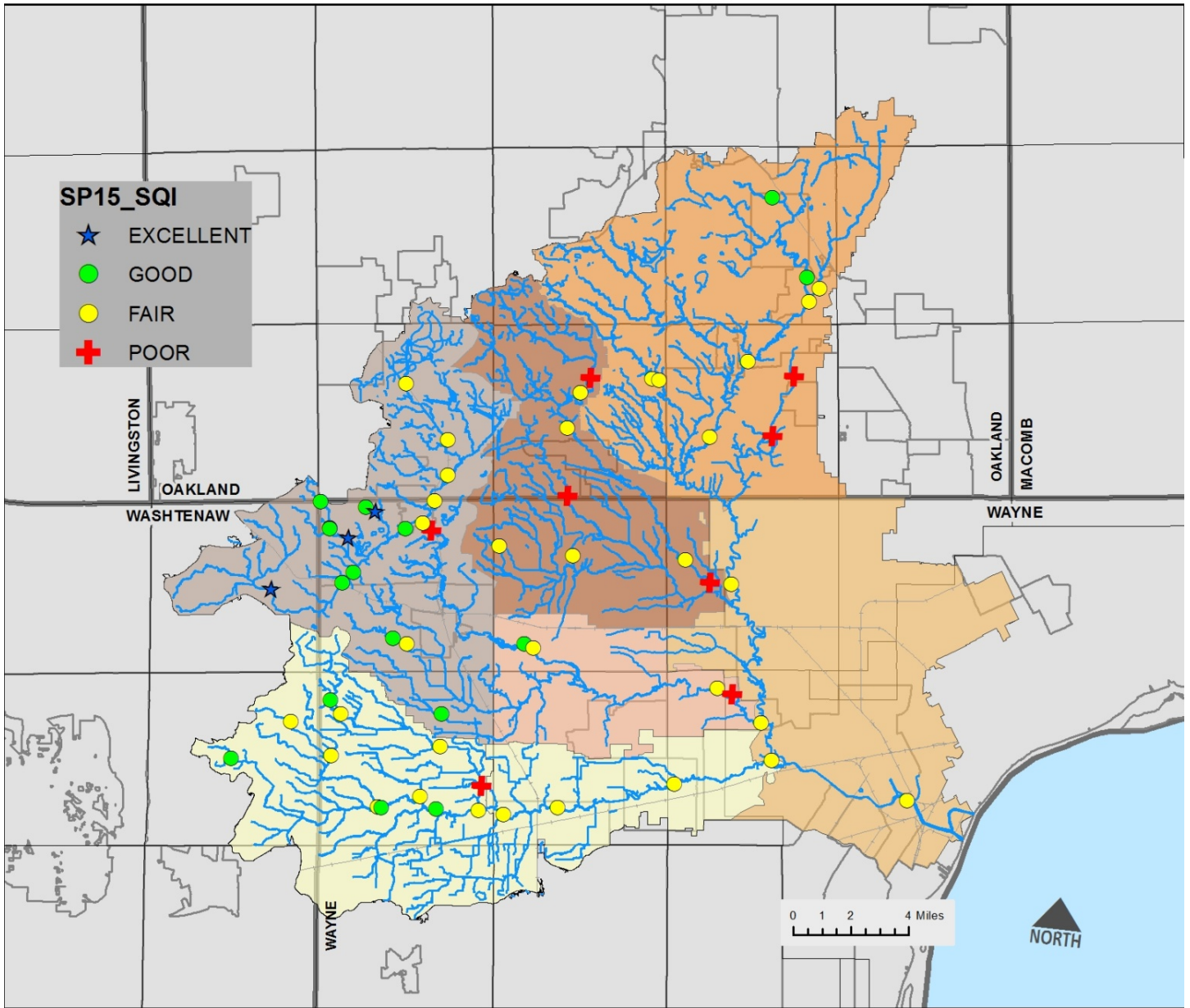


Table 3: Stream Quality Index (SQI), score, taxa, EPT (mayfly, stonefly and caddisfly families) and Sensitive families found

Branch	FIELDID	Stream Name	Site Name	Location	SQI*	score**	taxa***	EPT****	Sens*****
Lower	Fel4	Fellows Creek	Flodin Pk	Saltz Rd, Morton Taylor/ Sheldon	33	FAIR	15	1	0
Lower	Fel5	Fellows Creek	Warren Ridge		41	GOOD	13	1	0
Lower	Fel6	Fellows Creek	Hanford Ridge		25	FAIR	9	3	1
Lower	LR-5	Fellows Creek	Fellows Lotz	Finley Drive	18	POOR	9	1	0
Lower	Fowl1	Fowler Creek	Prospect	Prospect/Cherry Hill	42	GOOD	19	5	1
Lower	Fowl2	Fowler Creek	Fowler Beck	Beck, N of Geddes, E side of Rd	29	FAIR	12	1	0
Lower	Low2	Lower Rouge	Cherry Hill	Cherry Hill/Ridge	32	FAIR	13	0	0
Lower	Low3	Lower Rouge	Gotfredson		33	FAIR	12	2	0
Lower	Low4	Lower Rouge	Sheldon Rd	n of Michigan	21	FAIR	6	1	0
Lower	Low5	Lower Rouge	Lotz Rd		30	FAIR	9	2	0
Lower	LR-1	Lower Rouge	Commerce Ct	Michigan Ave, WCDOE Office	30	FAIR	12	2	0
Lower	LR-10	Lower Rouge	Inkster	John Daly north of Michigan	28	FAIR	11	1	0
Lower	LR-11	Lower Rouge	Ford Field	Brady & Cherry Hill	26	FAIR	14	1	0
Lower	LR-12	Lower Rouge	Morton Taylor	e of Morton Taylor, n of Mich Ave	36	GOOD	14	3	0
Lower	LR-2	Lower Rouge	WTUA	Geddes/Beck, N, d/s of outfall	35	GOOD	14	4	1
Lower	LR-6	Lower Rouge	Wayne WDM	Wayne Rd W	32	FAIR	15	2	0
Main	Evan1	Evans Creek	Evans Green Spruce	12 Mile/Evergreen	15	POOR	9	0	0
Main	Evan2	Evans Creek	LTU	10 Mile/Northwestern	14	POOR	7	0	0
Main	Main3	Main Rouge	Booth Pk	Old Woodward/Euclid	30	FAIR	11	2	0
Main	Main4	Main Rouge	Linden Pk	15 Mile/Southfield	23	FAIR	9	1	0
Main	Main7	Main Rouge	Sfld 10 M	10 Mile	32	FAIR	15	1	0
Main	Main8	Main Rouge	Fordson Island	Fort Street	20	FAIR	10	0	0
Main	MN-2	Main Rouge	Eliza Howell	5 Mile/Telegraph	25	FAIR	11	1	0
Main	Mur2	Murphy Creek	Roeper School	41190 Woodward	34	GOOD	14	1	0
Main	Nott	Nottingham Creek	Country Day	Lahser/13 Mile	22	FAIR	9	1	0
Main	Peb1	Pebble Creek	Danvers Ct	28314 Danvers Ct	27	FAIR	10	1	0
Main	Peb3	Pebble Creek	Pebble d/s Dam	Danvers Drive	28	FAIR	11	1	0
Main	Main11	Quarton Branch	Quarton at Lakeside	Lakeside/Midland Dr	36	GOOD	13	2	1
Middle	John1	Johnson Creek	5M Salem	5 Mile/Salem Rd	52	EXCELLENT	20	5	1
Middle	John2	Johnson Creek	5M NV	5 Mile/Ridge	46	GOOD	17	7	3
Middle	John5	Johnson Creek	Fish Hatchery Pk	7 Mile/Sheldon	34	GOOD	12	2	1
Middle	John6	Johnson Creek	Hines	Hines/Sheldon	26	FAIR	11	3	1
Middle	John7	Johnson Creek	Arcadia	S of 6 Mile, W of Beck	45	GOOD	22	6	2
Middle	John8	Johnson Creek	Maybury Angell	7 Mile & Napier	36	GOOD	14	6	2
Middle	MR-22	Johnson Creek	Maybury south	7 Mile N & Napier	46	GOOD	12	3	1
Middle	MR-23	Johnson Creek	Maybury north	8 Mile	42	GOOD	17	4	2
Middle	MR-25	Johnson Creek	Maybury East	Beck/Main St	51	EXCELLENT	21	6	2
Middle	MR-26	Johnson Creek	Napier Rd		42	GOOD	15	0	0
Middle	MR-27	Johnson Creek	Ridge	Ridge S of 7 Mile	51	EXCELLENT	19	4	1
Middle	Mid1	Middle Rouge	Northville Rec E	Northville Rd/7 Mile	19	FAIR	7	2	0
Middle	Mid3	Middle Rouge	Newb Dam outflow	Ann Arbor Rd	37	GOOD	15	2	0
Middle	MR-10	Middle Rouge	Parr Rec	Across from Wallaceville yd, S of Hines	23	FAIR	9	2	0
Middle	MR-13	Middle Rouge	Warrendale	Hines/Warren	19	FAIR	7	2	0
Middle	MR-15	Middle Rouge	Outer Dr Ford	Ford Road/Outer Drive	31	FAIR	11	2	0
Middle	MR-4	Middle Rouge	Levan Knoll	W of Levan Knoll, S of Hines	21	FAIR	9	1	0
Middle	Ton1	Tonquish Creek	Plym Twp Pk	Beck/Ann Arbor Tr	44	GOOD	16	3	0

Branch	FIELDID	Stream Name	Site Name	Location	SQI*	Score**	Taxa***	EPT****	Sens*****
Middle	Ton1/2	Tonquish Creek	Canton Ctr Rd	Canton Ctr Rd, N of Ann Arbor Rd	26	FAIR	11	1	0
Middle	Wall0	Walled Lk Drainage	Parm Cider Mill	Old Baseline/ Old Novi Rd	21	FAIR	10	1	0
Middle	Wall1	Walled Lk Drainage	Rotary Pk	9 Mile/Meadowbrook	26	FAIR	12	1	0
Middle	Wall2	Walled Lk Drainage	WL 10 M	10 Mile/Novi	22	FAIR	9	1	0
Middle	Wall3	Walled Lk Drainage	WL 12 M	12 Mile/Taft	31	FAIR	12	1	0
Middle	Will1	Willow Creek	Willow Barchester Pk	Ford/Lilley	34	GOOD	13	3	0
Upper	Bell2	Bell Creek	Schoolcraft College	Haggerty	30	FAIR	10	0	0
Upper	UR-5	Beitz Creek	Beitz Drain/6 Mile	6 Mile west of Farmington Rd	20	FAIR	10	1	0
Upper	Min2	Minnow Pond	OCC	Farmington Rd	30	FAIR	12	1	0
Upper	Min3	Minnow Pond	Dunckel	12 Mile/OL	18	POOR	7	0	0
Upper	Tar2	Tarabusi Creek	Tara 8 M	8 Mile/Gill	14	POOR	7	0	0
Upper	Up1	Upper Rouge	Heritage Park	Farmington/10 Mile	30	FAIR	11	2	0
Upper	UR-1	Upper Rouge	Lola Valley	Kinloch	26	FAIR	10	2	0
Upper	UR-4	Upper Rouge	5M Beech Daly	east of Inkster	18	POOR	8	1	0

*SQI=Stream Quality Index, gives an overall assessment of how healthy a site is. Index is calculated by rating each Order of macroinvertebrate found, with sensitive insects like stoneflies and caddisflies rated higher than tolerant organisms like midge larvae. Abundance is measured by distinguishing between rare (10 or less individuals) and common (11 or more), with common sensitive insects receiving a higher number (5.3) and common rare tolerant receiving a lower number (1.0).

**Score =the SQI category: >48=EXCELLENT, 34-48=GOOD, 19-33=FAIR, <19=POOR

***Taxa = Total number of Families of organisms found. A higher number of taxa indicates more diversity and therefore a better site.

****EPT= Number of families of Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies). These three orders are some of the most sensitive so a large number of these would indicate a good quality site.

*****Sensitive Families=Number of Families of insects that are considered very sensitive, based on a score of one in the Hilsenhoff Sensitivity Index.

Table 4: Sensitive Families Found					
Branch	FIELDID	Stream Name	Site Name	Location	Sensitive Family
Lower	Fel6	Fellows Creek	Hanford Ridge		Leptophlebiidae
Lower	Fowl1	Fowler Creek	Prospect	Prospect/Cherry Hill	Rhyacophilidae
Lower	LR-2	Lower Rouge	WTUA	Geddes/Beck, N, d/s of outfall	Leptophlebiidae
Main	Main11	Quarton Branch	Quarton at Lakeside	Lakeside/Midland Dr	Gomphidae
Middle	John2	Johnson Creek	5M NV	5 Mile/Ridge	Perlodid, Leptophlebiidae, Rhyacophilidae
Middle	John7	Johnson Creek	Arcadia	S of 6 Mile, W of Beck	Leptophlebiidae, Rhyacophilidae
Middle	John8	Johnson Creek	Maybury Angell	7 Mile & Napier	Perlodid, Leptophlebiidae
Middle	MR-23	Johnson Creek	Maybury north	8 Mile	Capniidae, Perlodidae
Middle	MR-25	Johnson Creek	Maybury East	Beck/Main St	Perlodidae, Leptophlebiidae
Middle	John1	Johnson Creek	5M Salem	5 Mile/Salem Rd	Rhyacophilidae
Middle	John5	Johnson Creek	Fish Hatchery Pk	7 Mile/Sheldon	Glossosomatidae
Middle	John6	Johnson Creek	Hines	Hines/Sheldon	Glossosomatidae
Middle	MR-22	Johnson Creek	Maybury south	7 Mile N & Napier	Leptophlebiidae

Thank you to all the **volunteers** and **Team Leaders, Wayne County**, (especially **Sue Thompson**) for sampling and providing data for 14 sites and doing the trend analysis, **Bruce McCulloch** for identifying our bugs, graphing data and advising us, **University of Michigan-Dearborn** for providing the meeting place for the Spring Bug Hunt and a lab for identification night, **Sue Thompson** for sampling additional sites, **Wayne State University** students for sampling two sites and **Diane O'Connell** and **Schoolcraft College** students for sampling one site.

Fall Bug Hunt - Oct. 17, 2015 9am-4pm Schoolcraft College VisTaTech Center

Sign up online today (deadline Oct. 9, 2015) at www.therouge.org

Team Leader Training – Sat. Oct. 3, 2015 9am-2pm (must have participated in a previous event)