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Rouge River Benthic Macroinvertebrate Monitoring Program Fall 2013 Results

This report contains benthic macroinvertebrate sampling results from 52 Rouge tributary and river sites. The Fall Bug Hunt on October 19 had 98 participants despite cold rain ALL day. There were 13 teams that sampled 26 sites that day. Additionally, this report includes data from additional FOTR sampling, one site sampled by Schoolcraft College students and 20 sites sampled by Wayne County Department of Public Services.

Overall Scores

Of the 52 sites sampled this fall, the average score was 29, in the FAIR range for the Stream Quality Index (SQI) (maps p. 4, Tables 1-2). One site had an EXCELLENT SQI: John1. Twelve sites were GOOD; 38 sites were FAIR and one site was POOR (Fowl1). The number of taxa found at sites was highest at John1 (25), LR-12 (19), and John2 (18) and lowest at LR-10 (6) and Fowl1 (7).

Some mayflies, stoneflies and/or caddisflies (EPT, see box) were found at all but three sites. The upper part of the Middle Branch and Johnson Creek had the highest number of these families.

Three sites had sensitive families. Pronggill mayflies (Leptophlebiidae) were found in the Johnson Creek (John1). Stoneflies (Perlodidae) were found in Johnson Creek at John2 and MR-23.

Forty-five sites had three years or more of past data (Chart 1, Figures 1-4, table 3). Of these, 64% were stable, 10% were improving (Fel2, LR-6, Nton, MR-23, John1) and 13% were declining (Fowl1, LR-2, LR-10, John6, Main8, MN-4, Bell2).

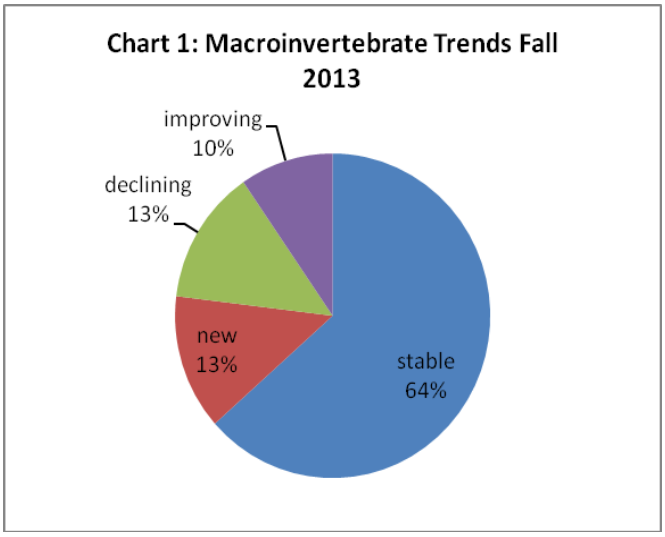
Understanding Benthic Scores

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 **SQI**. A greater number of different organisms also results in a high **SQI**. The **SQI** has four different levels: **>48=EXCELLENT, 34-48=GOOD, 19-33=FAIR, <19=POOR**.

Number of taxa represents the number of different families of organisms. Like SQI, 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.

Number of sensitive families refers to the number of families of insects that rate very sensitive on the Hilsenfhoff Biotic Index.



Long Term Trends

We have been sampling since 2001 and have collected enough data to compare scores over time for all seven Rouge subwatersheds and the Johnson Creek (treated separately because it is a cold water stream). We only compare fall data to fall data and spring data to spring data because different types of organisms are found in the two seasons (Figures 6-12, Table 3). There is a lot of variability in the data due to seasonal fluctuations so a trend is only considered significant if the p-value is 0.05 or less.

The Middle 1, Middle 3 and Johnson Creek subwatersheds continue to show a significant positive trend in scores over time while the Main 1/2 and Upper subwatersheds both had decreases in average scores. The Lower 1 and 2 subwatersheds both showed no change.

Individual sites were also examined for long term trends (Table 4). Of the 46 sites with sufficient data, only three had significant trends: John1 and John2 with positive trends and LR-3 with a negative trend.

Lower Branch

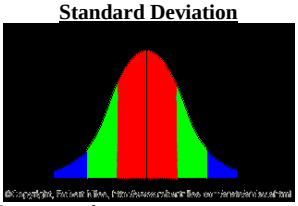
Seventeen sites were sampled on the Lower Branch of the Rouge (see Table 2). This is an unusually high proportion of sites on the Lower Branch. FOTR is working with UM-D faculty and students on a project to monitor fish community responses to restoration activities on the Lower branch of the Rouge funded through the new UM Water Center. Part of that project involves comparing benthic macroinvertebrate indices with fish community diversity indices. Therefore, all of the fish sampling sites were sampled for benthic macroinvertebrates.

Two tributaries were sampled: Fellows Creek and Fowler Creek. Fellows Creek had five sites and Fowler Creek two. An additional ten sites on the main branch of the Lower were sampled. SQIs averaged FAIR (26). There were two GOOD, 14 FAIR and one POOR. The two GOOD sites were Fel2 and LR-12 at Morton Taylor in Canton. Fowl1 had the only POOR score in the watershed despite being above average in the Fall of 2012. Fowl1 is located near the origin of the Fowler Creek and was almost dry. LR-3 had a FAIR score but in the comparison for individual sites (Table 4), it was the only site of 46 to show a negative trend. LR-3 is below where the Wayne Road Dam was before it was removed in August 2012. The streambed was altered through this project. The site will continue to be monitored for any long term effects. No sensitive families were found on the Lower.

Thirteen sites had three or more years of data (Fig. 1). Two sites (Fel2 and LR-6) had SQIs above a standard deviation of the average for the site. Three sites were below (Fowl1, LR-2 and LR-10).

Long term trend analysis showed no significant change in the scores for the Lower 1 and 2 since 2001 (Table 3, Figures 6 & 7).

Standard Deviation



Some sites have consistent scores where others vary greatly year to year. Standard deviation is a measure of how spread out your data is. 68% of your data will fall within one standard deviation of the mean (red areas shown above). On the Figures in this report, one standard deviation

Main Branch

Thirteen sites on the Main Branch were sampled. One tributary was sampled: Pebble Creek (3 sites). SQIs averaged FAIR (29). There were three GOOD and ten FAIR SQIs. The GOOD sites were Peb1, Main3 and MN-1 at Eight Mile Rd. No sensitive families were found in the Main. Near the recently removed Danvers Pond Dam on Pebble Creek, the site just upstream of the dam had the highest score (38-GOOD) of the three. The site below the dam had the next highest (27-FAIR). Further upstream was the lowest score (23-FAIR).

Twelve sites on the Main had three or more years of data. Two sites (Main8 and MN-4) were below a standard deviation of the mean. Both of these were downstream sites in the Main3/4 subwatershed: Main8 is the Fordson Island channel and MN-4 is Parkland Park in Dearborn Heights.

Long term trend analysis shows a negative trend for scores in the Main 1/2 and no trend for the Main 3/4.

Middle Branch

Seventeen sites were sampled on the Middle Branch including Bishop, Ingersoll, Johnson and Tonquish Creeks. SQI scores averaged 33-FAIR, one point away from being GOOD (34-48). There were: one EXCELLENT (John1), seven GOOD, and nine FAIR. Sensitive families were found at John1 (pronggill mayflies), and stoneflies (Perlodidae) at John2 and MR-23.

Fifteen sites had three years or more of data. Of these, three were above a standard deviation of the mean (Nton, MR-23 and John1) and one was below (John6). The site John6 was resampled due to the low score found by the team during the Fall Bug Hunt but the score was still below normal. In the comparison for individual sites (Table 4), both John1 and John2 were the only two sites of 46 that showed improving scores.

Both subwatersheds in the Middle and Johnson Creek have positive trends in scores since 2001.

Upper Branch

Five Upper branch sites were sampled this fall, including the Bell Branch and Minnow Pond. SQIs averaged 25-FAIR and ALL the scores were FAIR. No sensitive families were found in the Upper Branch. One interesting find was an unusual worm-like fish at Up1. The Team Leader photographed the fish with his smart phone and shared it with FOTR. We forwarded it to our fish biologists who identified it as a lamprey – most likely a brook lamprey which were found in the Upper Branch in the 1998 DNR survey. Brook lamprey are not parasitic like the non-native sea lamprey, in fact they have no digestive organs in the adult stage. Bob Muller plans to do additional surveys for them in the spring.

All five sites had three years or more of data. One site (Bell2) had a lower score than normal. This is the site at Schoolcraft College.

The Upper shows a significant decline in scores since 2001.

THANK YOU!!!!!

Thank you to all the **volunteers** and **Team Leaders, Schoolcraft College** for hosting the event**,** professor **Diane O'Connell and the Geography Department** for **providing +$400 worth of refreshments**, **Wayne County** for sampling and providing data for 20 sites, Susan Thompson for sampling an additional 4 sites, helping with training, identification, trend analysis and reviewing the report and to biologist **Bruce McCulloch** for SQI comparison graphs and reviewing the report, **University of Michigan-Dearborn** for providing a lab for identification night and the **Alliance of Rouge Communities** for funding the program.

Join us for the

Winter Stonefly Search

Saturday January 25, 2014

9 am – 3 pm at UM-D

Register today at www.therouge.org

2013 Fall Bug Hunt Results

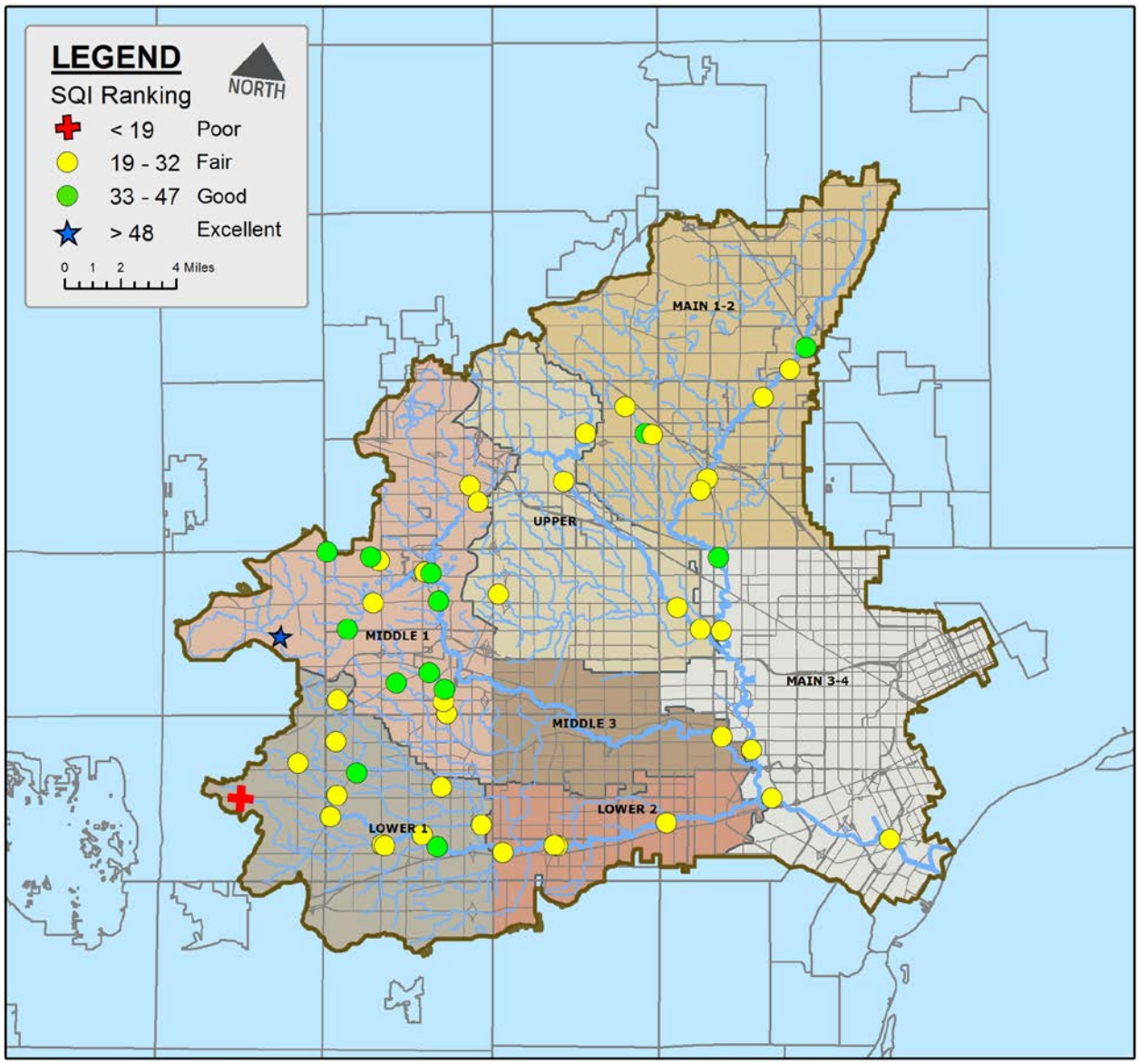


Table 1: Sampling Sites and Scores – Lower, Main and Middle Branches								
Branch	**FieldID**	**Stream Name**	**Location/Site Description**	**SQI**	**Index**	**taxa**	**EPT**	**Sensitive Family**
Lower	Fel1	Fellows Creek	Fellows Plymouth	22	FAIR	8	1	
Lower	LR-5	Fellows Creek	Meadows of Canton	24	FAIR	12	1	
Lower	Fel4	Fellows Creek	Flodin Park	25	FAIR	9	1	
Lower	Fel5	Fellows Creek	Warren bet Ridge & Napier	25	FAIR	8	2	
Lower	Fel2	Fellows Creek	South Fellows	39	GOOD	14	3	
Lower	Fowl1	Fowler Creek	Fowler Prospect	18	POOR	7	1	
Lower	Fowl2	Fowler Creek	Fowler Beck	24	FAIR	8	2	
Lower	LR-10	Lower Rouge	John Daly	19	FAIR	6	2	
Lower	LR-2	Lower Rouge	WTUA	21	FAIR	10	1	
Lower	LR-3	Lower Rouge	Goudy Park	23	FAIR	9	2	
Lower	LR-6	Lower Rouge	Wayne WDM 201 Site	25	FAIR	10	2	
Lower	LR-8	Lower Rouge	Lower Proctor	25	FAIR	11	2	
Lower	LR-1	Lower Rouge	Commerce Court	25	FAIR	10	3	
Lower	Low3	Lower Rouge	Gotfredson N of Ford	27	FAIR	10	1	
Lower	Low2	Lower Rouge	Lower Ridge	28	FAIR	11	2	
Lower	Low4	Lower Rouge	Sheldon Rd	28	FAIR	9	2	
Lower	LR-12	Lower Rouge	Morton Taylor	40	GOOD	19	3	
Middle	John1	Johnson Creek	JC 5M Salem	49	EXC	25	4	Leptophlebiidae
Middle	Bish2	Bishop Creek	Bishop Cr Scarborough	24	FAIR	10	1	
Middle	Ing1	Ingersoll Creek	Brookfarm Park	32	FAIR	14	1	
Middle	John3	Johnson Creek	JC 6M NV	31	FAIR	13	3	
Middle	John6	Johnson Creek	JC Hines	28	FAIR	10	1	
Middle	MR-25	Johnson Creek	Maybury east	26	FAIR	10	2	
Middle	MR-26	Johnson Creek	Napier Rd	33	FAIR	13	0	
Middle	MR-13	Middle Rouge	Warrendale	19	FAIR	11	3	
Middle	MR-19	Tonquish Creek	Tonquish - Joy Rd	22	FAIR	9	1	
Middle	Ton2	Tonquish Creek	Tonquish-Ann Arbor Rd	25	FAIR	9	2	
Middle	John2	Johnson Creek	JC 5M NV	47	GOOD	18	4	Perlodidae
Middle	MR-23	Johnson Creek	Maybury north	38	GOOD	15	4	Perlodidae
Middle	MR-1	Middle Rouge	Northville Rec Area	36	GOOD	14	2	
Middle	MR-20	Middle Rouge	Waterford Bend	39	GOOD	15	4	
Middle	MR-24	Tonquish Creek	Lion's Park	36	GOOD	14	2	
Middle	Nton	Tonquish Creek	North Tonquish	38	GOOD	12	2	
Middle	Ton1	Tonquish Creek	Plymouth Twp Pk	46	GOOD	16	3	
Main	Main10	Main Rouge	HF Estate Dam	22	FAIR	12	3	
Main	Main3	Main Rouge	Booth Park	35	GOOD	14	2	
Main	Main4.5	Main Rouge	Fairway Park	24	FAIR	10	1	
Main	Main5	Main Rouge	Douglas Evans	31	FAIR	12	2	
Main	Main6	Main Rouge	Sfld	31	FAIR	12	2	
Main	Main7	Main Rouge	Sfld 10 Mile	29	FAIR	11	1	
Main	Main8	Main Rouge	Fordson Island	21	FAIR	10	0	
Main	MN-1	Main Rouge	Eight Mile	38	GOOD	15	3	
Main	MN-2	Main Rouge	Eliza Howell	26	FAIR	11	3	
Main	MN-4	Main Rouge	Parkland Park	27	FAIR	12	2	
Main	Peb1	Pebble Creek	Pebble Creek-Danvers	38	GOOD	13	2	
Main	Peb2	Pebble Creek	Pebble Creek 13 Mile	23	FAIR	9	1	
Main	Peb3	Pebble Creek	d/s Danvers Pond	27	FAIR	12	1	

Table 2: Sampling Sites and Scores – Upper Branches								
Branch	**FieldID**	**Stream Name**	**Location/Site Description**	**SQI**	**Index**	**taxa**	**EPT**	**Sensitive Family**
Upper	Bell2	Bell Branch	Schoolcraft College	19	FAIR	11	0	
Upper	Min3	Minnow Pond	Dunckel MS	27	FAIR	10	1	
Upper	Up1	Upper Rouge	Heritage Pk	26	FAIR	11	2	
Upper	UR-1	Upper Rouge	Lola Valley	29	FAIR	11	3	
Upper	UR-4	Upper Rouge	Five Mile Beech Daly	27	FAIR	11	3	

Figure 1 - Lower Branch Mean SQIs

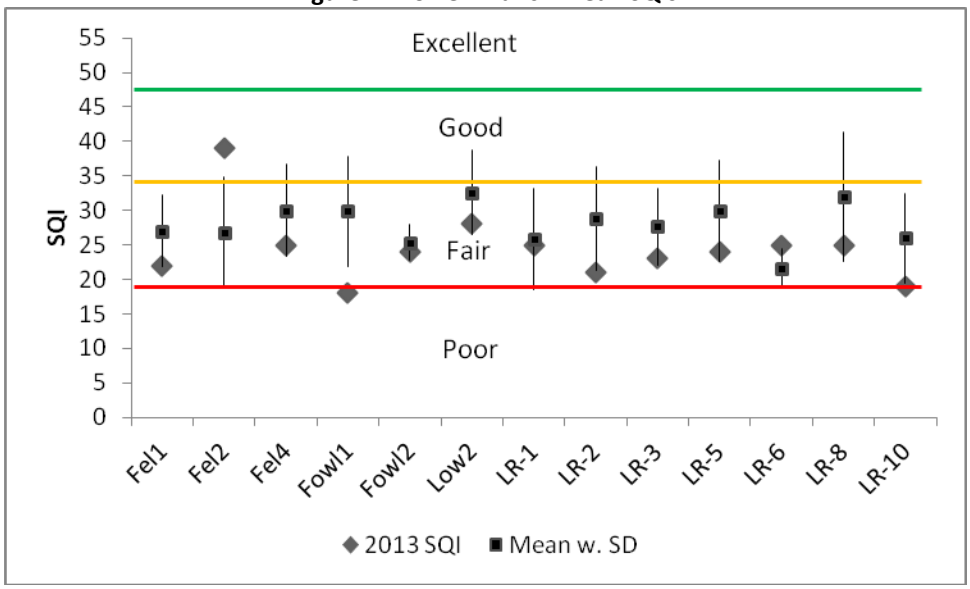


Figure 2 - Main Branch Mean SQIs

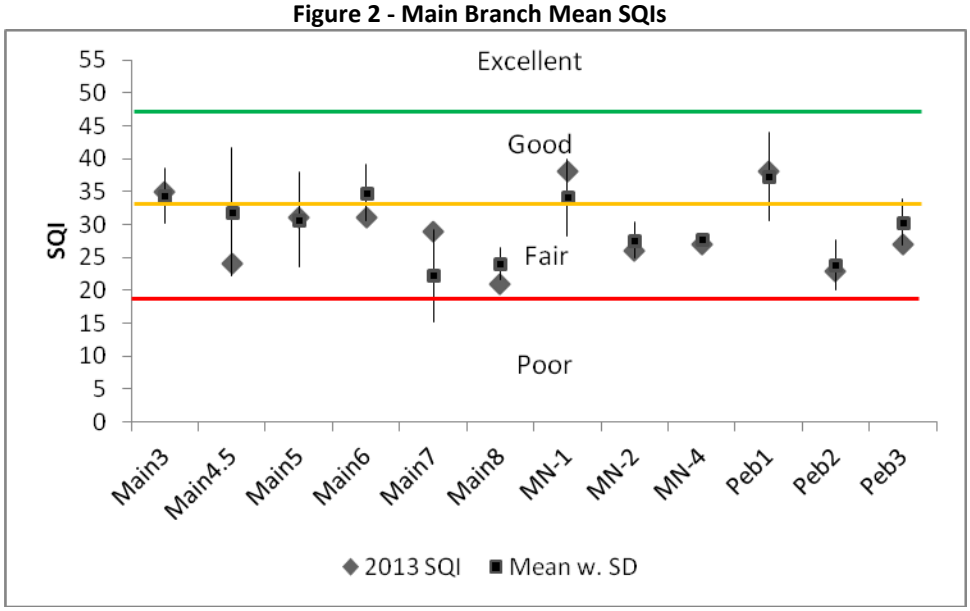


Figure 3 - Middle Branch Mean SQIs

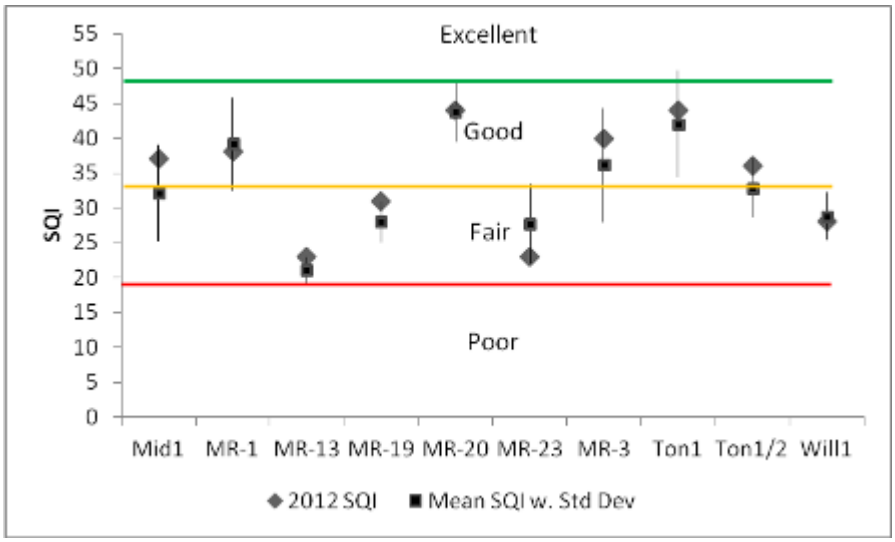
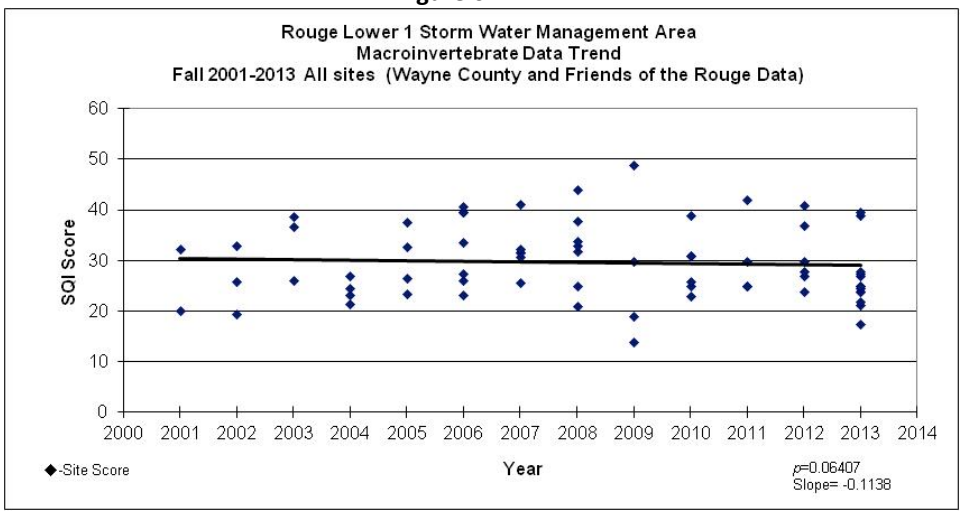


Figure 4- Upper Branch Mean SQIs

Table 3: Long Term Trends

Fall Bug Hunt summary All Sites 2001-2013			
Subwatershed	**slope**	***p*-value**	**True trend**
Lower 1	-0.1138	0.6407	No trend
Lower 2	-0.6202	0.1102	No trend
Main 1-2	-0.5859	0.0268	Yes, negative
Main3-4	-1.0969	0.155	No trend
Middle 1	0.4923	0.0480	Yes, positive
Middle 3	0.5663	0.0483	Yes, positive
Johnson Creek	0.8219	0.01228	Yes, positive
Upper	-0.4802	0.0357	Yes, negative

Figure 6



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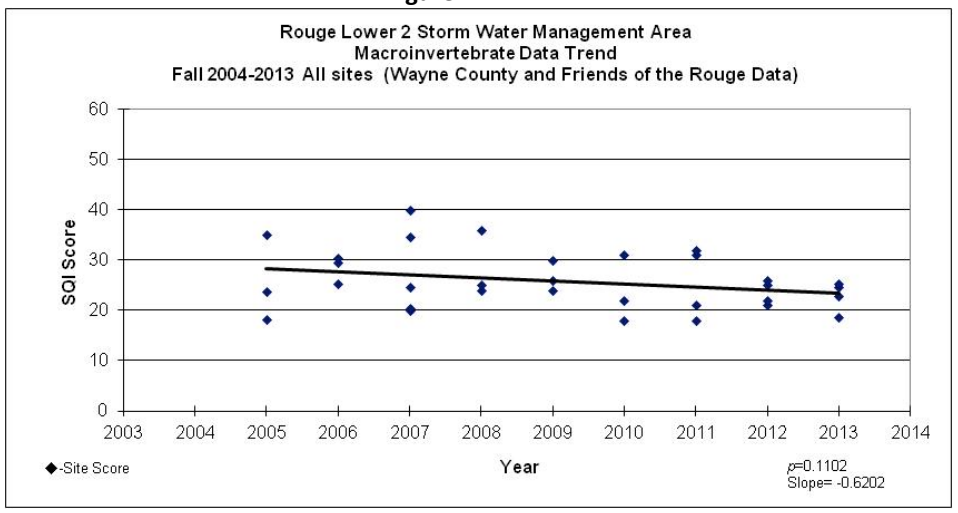

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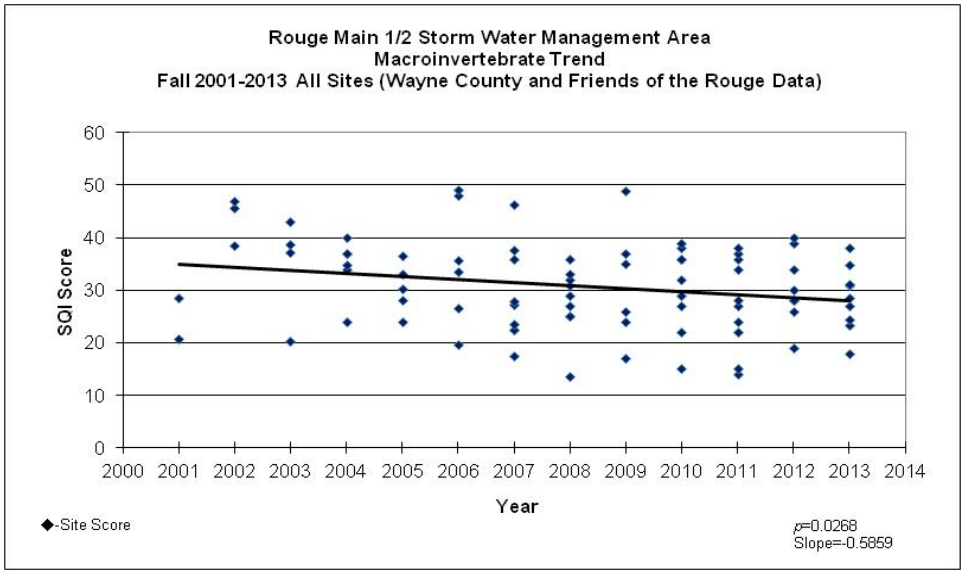

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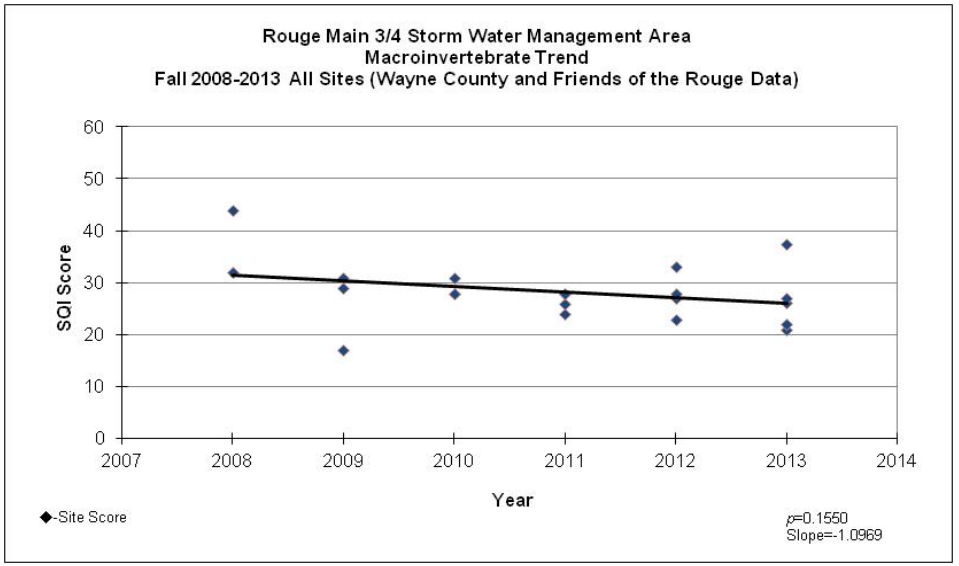

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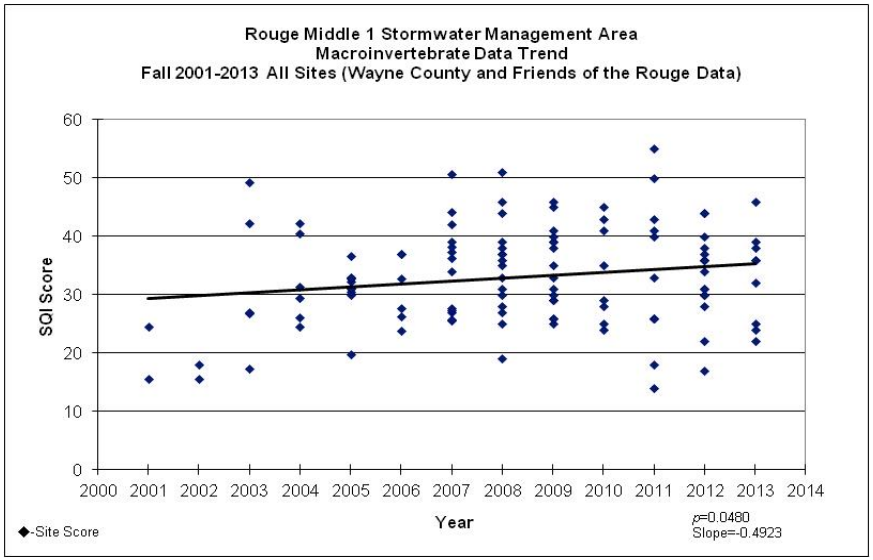

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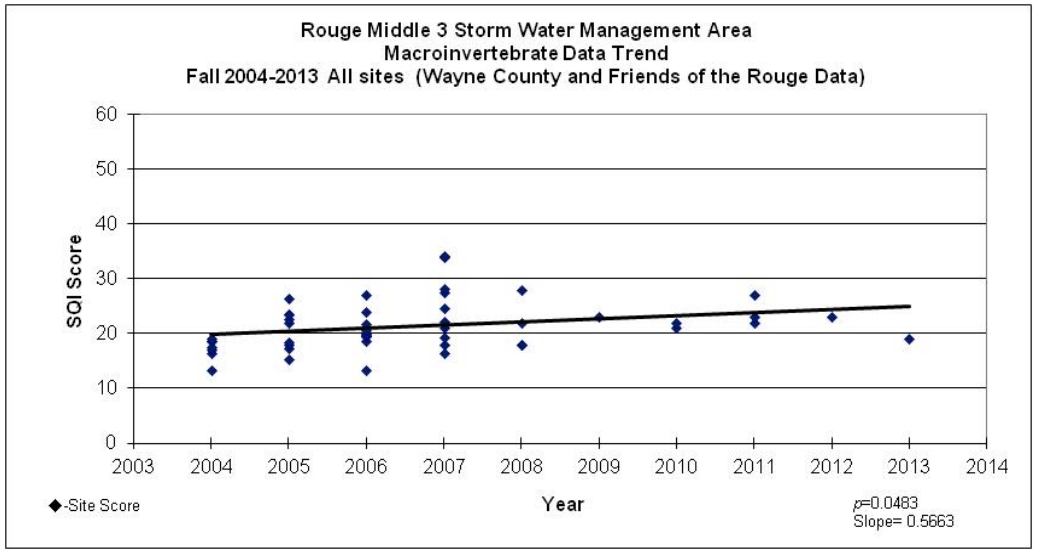

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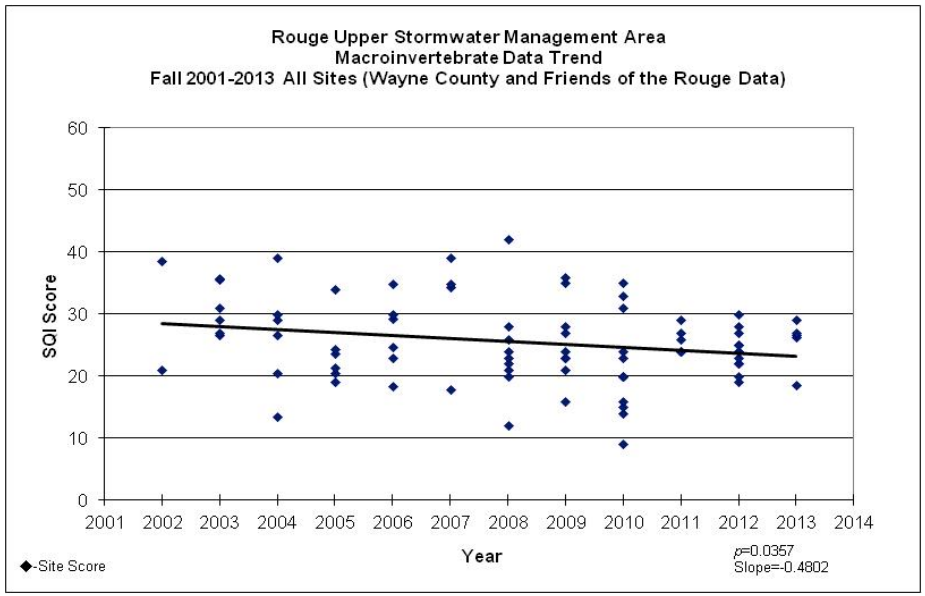

Table 4 : Trend Summary by Site 2001-2013

**Only sites with significant trends listed; 43 sites had sufficient data*

Site	**slope**	***p*-value**	**True trend**
John1	1.8261	0.0433	yes, positive
John2	1.9049	0.0130	yes, positive
LR3	-1.4690	0.0311	yes, negative