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Rouge River Benthic Macroinvertebrate Monitoring Program Fall 2015 Report

This report contains benthic macroinvertebrate sampling results from 48 Rouge tributary and river sites. The Fall Bug Hunt on October 17 had 103 participants who withstood cold, wind, rain and even a few snowflakes.

There were 13 teams that sampled 26 sites. This included groups from Wayne State University (3), Marygrove College and Arch Environmental. The Schoolcraft College Geography Department once again provided the meeting space and refreshments and volunteer Daisy Lovain ran the registration.

This report also includes data from additional FOTR sampling, one site sampled by Schoolcraft College students, four sites sampled by Sue Thompson and 14 sites sampled by Wayne County DPS.

The unusually dry late summer and fall made it difficult to sample some of the small stream sites and fewer organisms were found. In contrast, some of the larger stream sites had more organisms and the sensitive dobsonfly was found just north of Eight Mile on the Main branch.



Bug hunt teams organizing at Schoolcraft College

Further Range Extension of the Tube-Making Caddisfly (*Lype diversa*; Family Psychomyiidae) By Bruce McCulloch

In 2012, the tube-making caddisfly (*Lype diversa*, Family Psychomyiidae) was documented for the first time in the Rouge River watershed. The specimen came from the Middle Branch at the Northville Recreation Area (MR-1). The SQI score for this site was 38. Two years later, *Lype diversa* was collected at two sites in the Lower Branch; Fowler Creek at Prospect and Cherry Hill roads, (Fowl1); and Lower Rouge at Godfredson Road (Low3). The SQI scores for the two sites were 38 and 41. On November 8, 2015, *Lype diversa* was collected at John7 (Middle Branch) by Sue Thompson. The SQI score was 48, which was the highest score ever recorded for this site. The previous high was 37 in fall 2009.

Could this sensitive species have occurred at these sites before now and gone undetected? Possibly. These caddisflies reach only 10 mm (0.4 in) in total length, and do not build cases, thus making them more of a challenge to see. Low3 is a recently added site, with only two fall samples undertaken (2013 and 2014). Fowl1 and John7, however, has been sampled often enough and produced high quality results, that, at least I would like to think, these caddisflies are indeed new to the Rouge watershed in the last few years. Their appearance, hopefully, is a sign of improved water quality.

Given the history of the Rouge River watershed, it is truly inspiring to continue to document range expansions of sensitive species of caddisflies.

Overall Scores

Of the 48 sites sampled this fall, the average Stream Quality Index (SQI) was FAIR (27) (map p.6, Table 1 & 3). This is a little lower than last fall's average of 29 SQI. Sites averaged 12 taxa, (8 of which were the more sensitive insect taxa), 2 mayfly, stonefly and/or caddisfly families (EPT) and zero sensitive Families. One site had an EXCELLENT SQI: Ton1. Eight sites were GOOD; 33 sites were FAIR and six sites scored POOR. The number of taxa found at sites was highest at John7 (24) and MR-27 (23), and lowest at Ing1 (4).

Average SQI	Average # of taxa	Average # of Insect Taxa	Average # EPT	Average # Sensitive Families
27	12	8	2	0

Some mayfly, stonefly and caddis fly families (EPT) were found at all but nine sites. Three Johnson Creek sites and Ton1 had the highest number of these families (6 at John7, 5 at Ton1, 4 at MR-23 & MR-27).



Only three sites had sensitive families. John7 had slender winter stoneflies (Capniidae), pronggill mayflies (Leptophlebiidae) and net-tube caddisflies (Psychomyiidae). Psychomyiidae caddisflies have only been found at three sites before. MR-27 had pronggill mayflies. The most unusual finding was a dobsonfly (Corydalidae) at a site on the Main Rouge just north of Eight Mile in Southfield, MN-5. Dobsonflies have only been found at seven sites in the Rouge and never this far downstream.

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**.

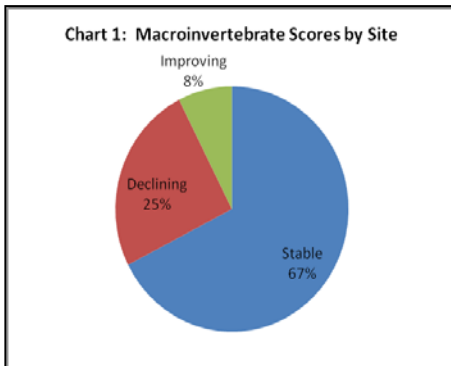
Number of taxa represents the number of different families of organisms. Like **SQI**, a higher number of taxa indicate a healthier site.

Number of insect taxa – insects are more sensitive than the non-insect taxa.

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 Hilsenhoff Biotic Index.

Data Trends



Forty-one sites had three years or more of past data (Chart 1). Of these, 67% were stable, 8% were improving and 25% were declining (also see graphs in branch sections). Compared to last fall, a higher percentage of sites are declining (17% to 25%) and fewer sites improving (15% to 8%).

To compare change over time, we analyzed the trends two different ways - plotting the straight scores and plotting a rolling three year average (Table 2). In both cases, a best line was tested to determine if the slope is significant (plots for each branch and the Johnson Creek are on p. 8-10.).

Branch	slope	p=value	R2	slope	Significant?
Lower	-0.16		0.17	decreasing	N
Lower	-0.28	0.25		decreasing	N
Middle	0.59		0.69	increasing	Y
Middle	0.53	0.006		increasing	Y
Johnson Creek	1.08		0.6	increasing	Y
Johnson Creek	0.59	0.02		increasing	Y
Main	-0.6		0.79	decreasing	Y
Main	-0.52	0.0006		decreasing	Y
Upper	-0.34		0.66	decreasing	Y
Upper	-0.46	0.007		decreasing	Y

fit

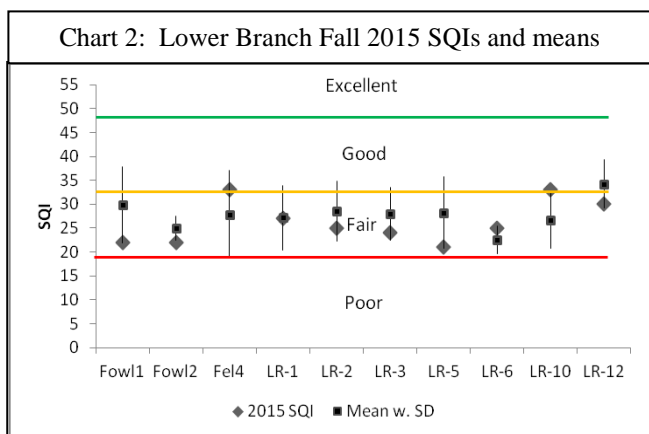
All of the branches had significant trends except the Lower Branch. Although the data shows a slight decrease in scores, there is too much variation in it to call it a trend. The Middle Branch and Johnson Creek had significant positive slopes and both the Main and the Upper Branch had significant negative slopes. These trends have been apparent in the data since 2013.

Individual sites were examined for long term trends (Table 3). Of the sites with sufficient data sampled in Fall 2015, five had significant trends. On the Middle branch, two tributaries are improving (Ton1, Wall2) and one downstream site is declining (MR-17). The Main Branch had one site showing a decline: Main8 (Fordson Island). The Upper Branch had one site showing a decline: Up2 (Shiawassee Park). This site was the only one that also showed a decline in 2014.

Branch	Site	slope	p-value	True trend	Site average score	Water Quality Rating
Middle	Ton1	1.1882	0.0331	yes, positive	44	good
Middle	Wall2	1.4872	0.0070	yes, positive	31	fair
Middle	MR17	-2.0862	0.0175	yes, negative	41	good
Main	Main8	-2.4571	0.0016	yes, negative	22	fair
Upper	Up2	-1.0833	0.0434	yes, negative	27	fair

Lower Branch

Ten sites were sampled on the Lower Branch of the Rouge (see Table 3). Two tributaries were sampled with two sites on each: Fellows Creek and Fowler Creek. An additional six sites on the main branch of the Lower were sampled.



SQIs averaged FAIR (26). All sites were in the FAIR range. No sensitive families were found at any of the sites.

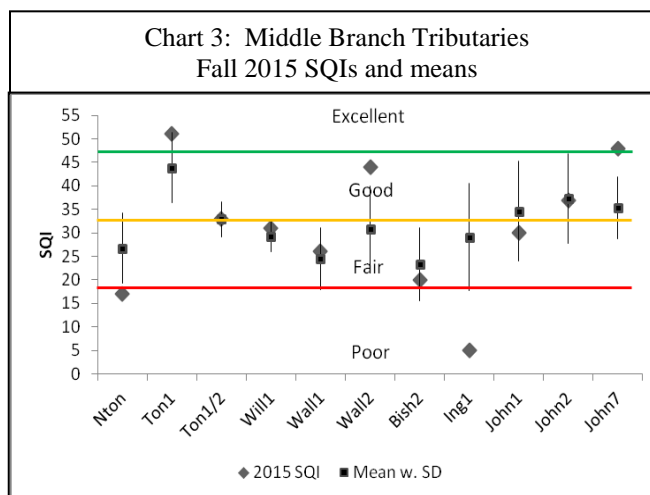
Ten sites had three or more years of data (Chart 2). All sites were within a standard deviation of the average for the site. Long term trend analysis showed no significant change in the scores for the Lower Branch since 2001 though the trend line slopes are negative.

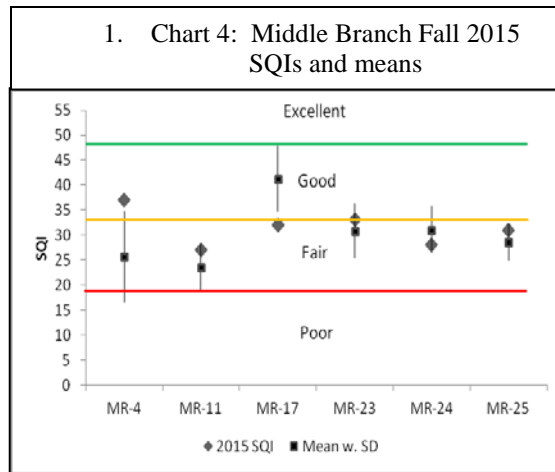
Middle Branch

Twenty sites were sampled on the Middle Branch including Johnson and Tonquish Creeks and the Walled Lake drainage (Table 3). SQI scores averaged 31-FAIR. There was one EXCELLENT (Ton1), 6 GOOD, 11 FAIR and two POOR (Ing1, Nton). Sensitive families were found at John7 (Capniidae, Leptophlebiidae and Psychomyiidae) & MR-27 (Leptophlebiidae).

Seventeen sites had three years or more of data (Charts 3 & 4). Of these, three were above a standard deviation of the mean (John7, MR-4 and Wall2) and two were below (Nton, Ing1).

In long term trend analysis, the Middle and Johnson Creek have positive trends in scores since 2001 and for the three year rolling average (Table 2, charts p. 8-10).



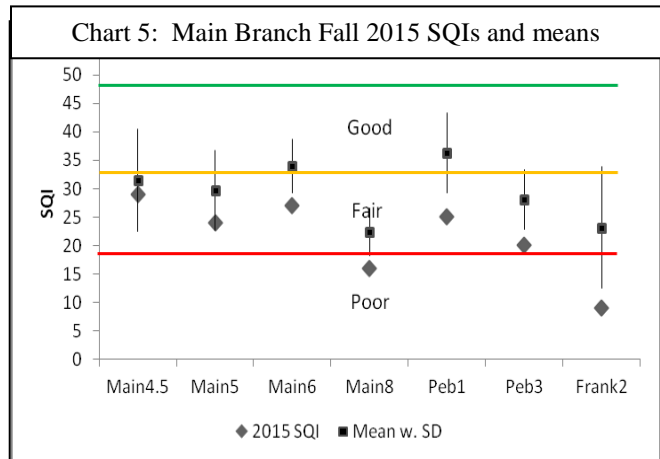


Main Branch

Ten sites on the Main Branch were sampled. Two tributaries were sampled: Franklin and Pebble Creeks. SQIs averaged FAIR (26). There were two GOOD, six FAIR, and two POOR SQIs. The GOOD sites were MN-5 and MN-6. Sensitive families were found at MN-5 (dobsonfly larvae-Corydalidae). This is an unusual pattern. Upstream sites usually score higher than the downstream sites. This is the first time dobsonfly larvae have been found this far downstream on the Main branch.

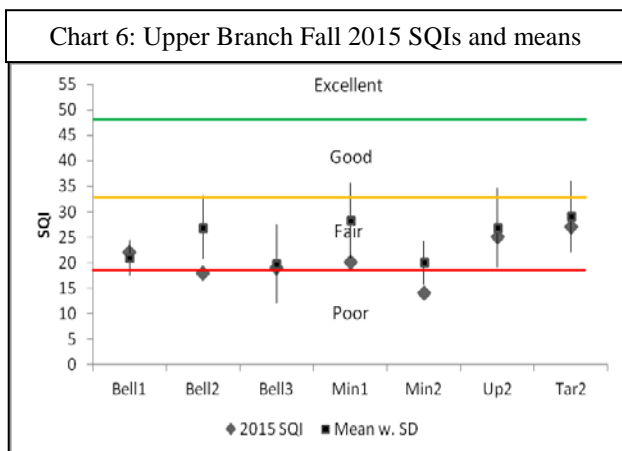
Seven sites on the Main had three or more years of data (Chart 5). Five sites (Frank2, Peb1, Peb3, Main6, Main8) were below a standard deviation of the mean and none were above.

Long term trend analysis shows a significant negative trend for the Main using both methods (Table 2, charts p. 8-10). This trend was first seen in 2010 and has been consistent since 2013.



Upper Branch

Eight Upper branch sites were sampled this fall, including the Bell, Minnow and Tarabusi Creeks (Table 3). SQIs averaged 21-FAIR. Six sites were Fair and two POOR (Bell3 & Min2). No sensitive families were found in the Upper Branch.



Seven sites had three years or more of data (Chart 6). Three sites were below a standard deviation of the norm (Bell2, Min1 and Min2).

Long term trend analysis shows a significant decline in scores since 2001 using both the rolling three year average method and plotting the scores.



Team 9 at Upper Rouge

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 refreshments**, **Daisy Lovain** for running registration, **Wayne County** for sampling and providing data for 14 sites, **Sue Thompson** for sampling additional sites and assisting with Fordson Island, helping with training, identification, trend analysis and reviewing the report and to biologist **Bruce McCulloch** for identifying most of the specimens, 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 through a SAW Grant.

Join us for the Winter Stonefly Search

Saturday February 13, 2016

9 am – 3 pm at UM-D

Celebrate Valentine's Day with us by finding stoneflies looking for love

Register today at www.therouge.org (deadline Jan. 29, 2016)

2015 Fall Bug Hunt SQIs

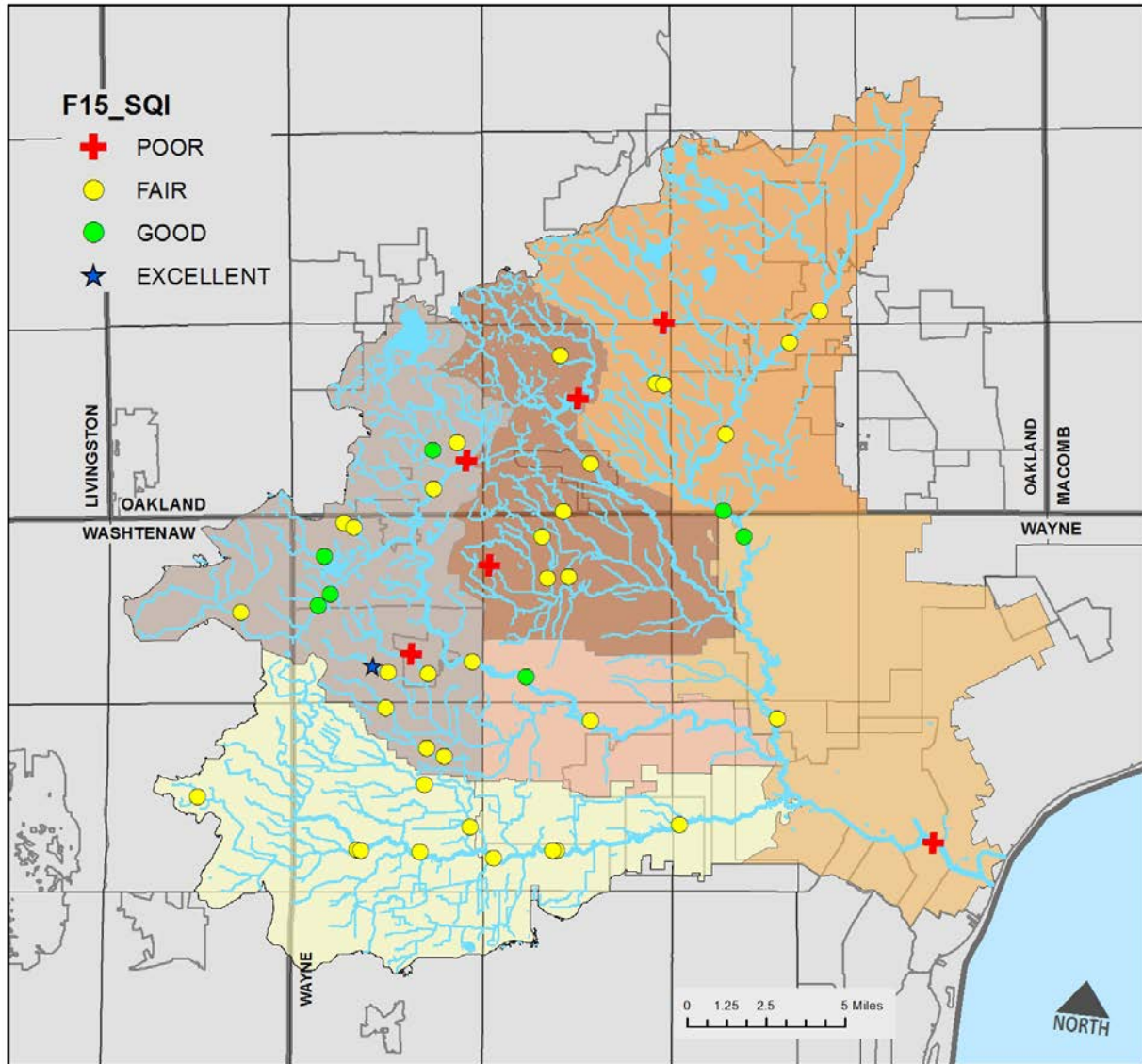


Table 3 - 2015 Fall Bug Hunt Results

FIELDID	Stream Name	Site	collector	SQI	rating	TAXA	EPT	SENS
Lower								
Fel4	Fellows Creek	Flodin Pk	FOTR	33	FAIR	13	2	0
LR-5	Fellows Creek	Lotz Finley Dr	FOTR	21	FAIR	10	1	0
Fowl1	Fowler Creek	Prospect	FOTR	22	FAIR	9	0	0
Fowl2	Fowler Creek	Fowler Beck	FOTR	22	FAIR	9	1	0
LR-2	Lower Rouge	WTUA	WC	25	FAIR	11	1	0
LR-12	Lower Rouge	Morton Taylor	WC	30	FAIR	12	2	0
LR-1	Lower Rouge	Commerce Ct	WC	27	FAIR	12	2	0
LR-6	Lower Rouge	Wayne WDM	WC	25	FAIR	11	3	0
LR-3	Lower Rouge	Goudy Park	WC	24	FAIR	9	2	0
LR-10	Lower Rouge	Inkster	WC	33	FAIR	14	3	0
Middle								
Bish2	Bishop Creek	Scarborough	FOTR	20	FAIR	8	0	0
Ing1	Ingersoll Creek	Brookfarm Park	FOTR	5	POOR	4	0	0
MR-23	Johnson Creek	Maybury north	ST	33	FAIR	16	4	0
MR-25	Johnson Creek	Maybury East	ST	31	FAIR	15	3	0
MR-27	Johnson Creek	Ridge	ST	41	GOOD	23	4	1
John1	Johnson Creek	5M Salem	FOTR	30	FAIR	11	2	0
John2	Johnson Creek	5M NV	FOTR	37	GOOD	15	1	0
John7	Johnson Creek	Arcadia	ST	48	GOOD	24	6	3
Ton1	Tonquish Creek	Plym Twp Pk	FOTR	51	EXCELLENT	19	5	0
Ton1/2	Tonquish Creek	Canton Ctr Rd	FOTR	33	GOOD	10	3	0
MR-24	Tonquish Creek	Lion's Pk	WC	28	FAIR	13	2	0
Nton	Tonquish Creek	S Evergreen St	FOTR	17	POOR	7	0	0
Wall2	Walled Lk Drainage	WL 10 Mile	FOTR	44	GOOD	17	2	0
Wall1	Walled Lk Drainage	Rotary Pk	FOTR	26	FAIR	13	1	0
Will2	Willow Creek	Canton High School	FOTR	25	FAIR	9	2	0
Will1	Willow Creek	Barchester Pk	FOTR	31	FAIR	15	0	0
Will3	Willow Creek	IKEA	FOTR	22	FAIR	12	2	0
MR-17	Middle Rouge	I-275 Clam Bar	WC	32	FAIR	15	2	0
MR-4	Middle Rouge	Levan Knoll	WC	37	GOOD	16	2	0
MR-11	Middle Rouge	Elm Grove	WC	27	FAIR	11	2	0
Main								
Frank2	Franklin Creek	Inkster Pumping Station	FOTR	9	POOR	5	0	0
Peb1	Pebble Creek	Danvers Ct	FOTR	25	FAIR	9	1	0
Peb3	Pebble Creek	Pebble d/s Dam	FOTR	20	FAIR	9	1	0
Main4.5	Main Rouge	Fairway Pk	FOTR	29	FAIR	11	2	0
Main5	Main Rouge	Douglas Evans	FOTR	24	FAIR	10	2	0
Main6	Main Rouge	Sfld Civic Ctr	FOTR	27	FAIR	14	3	0
MN-5	Main Rouge	Bridge St	WC	42	GOOD	19	3	1
MN-6	Main Rouge	Seven Mile	WC	38	GOOD	20	3	0
MN-7	Main Rouge	Rouge Park	WC	25	FAIR	11	3	0
Main8	Main Rouge	Fordson Island	FOTR	16	POOR	7	0	0

FIELDID	Stream Name	Site	collector	SQI	score	TAXA	EPT	SENS
Upper								
Bell1	Bell Branch	Bicentennial Park	FOTR	22	FAIR	9	1	0
Bell2	Bell Branch	Schoolcraft College	SCH	18	POOR	10	1	0
Bell3	Bell Branch	Livonia 6 Mile	FOTR	19	FAIR	9	0	0
UR-5	Bell Branch	Beitz Creek/6 Mile	WC	24	FAIR	10	1	0
Min1	Minnow Pond	Minnow 13 Mile	FOTR	20	FAIR	8	1	0
Min2	Minnow Pond	OCC	FOTR	14	POOR	8	0	0
Tar2	Tarabusi Creek	Tara 8 Mile	FOTR	27	FAIR	11	1	0
Up2	Upper Rouge	Shiawassee Park	FOTR	25	FAIR	9	2	0

Figure 5- Lower Branch Mean SQIs

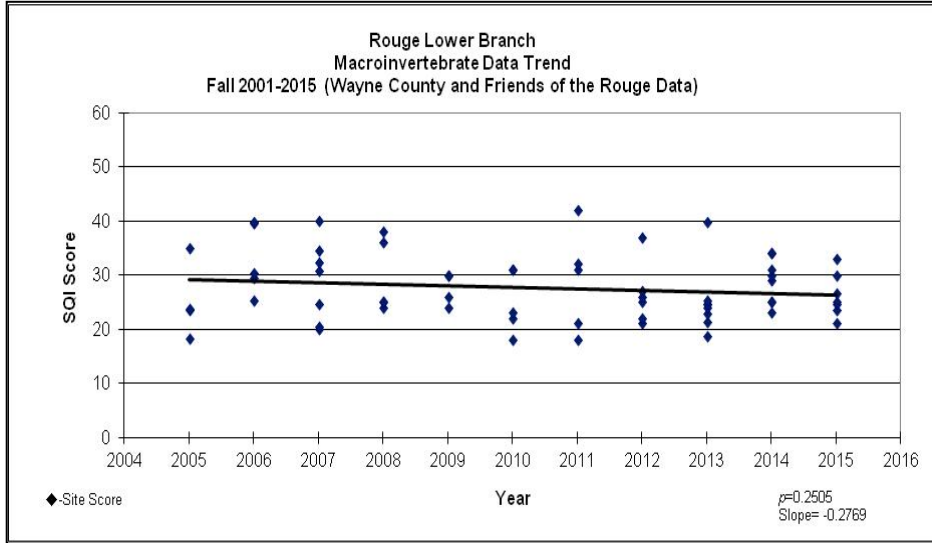


Figure 6- Lower Branch 3 Year Rolling Average SQIs

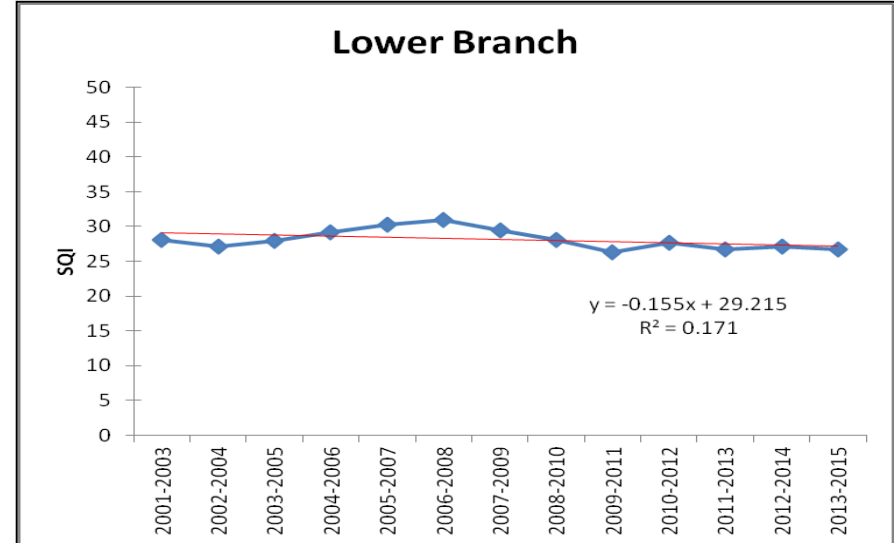


Figure 7- Middle Branch Mean SQIs

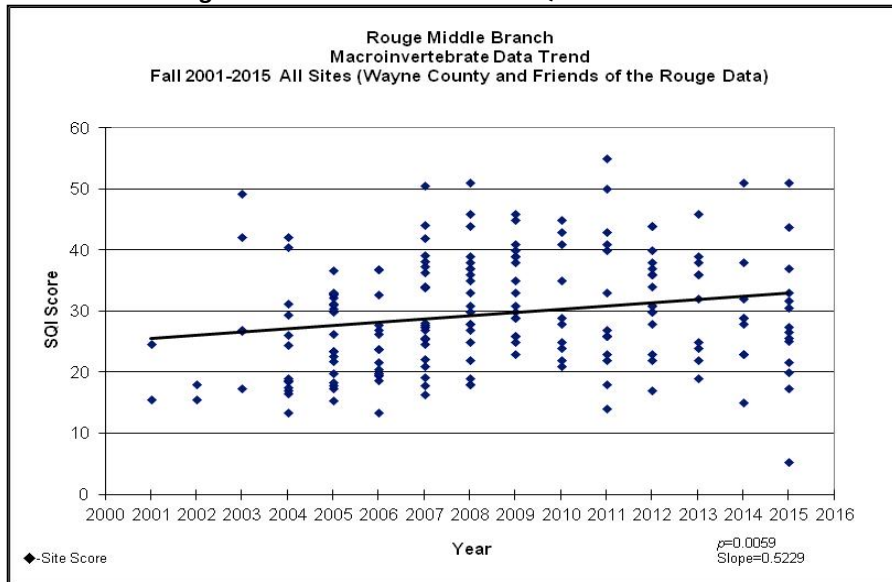


Figure 8- Middle Branch 3 Year Rolling Average SQIs

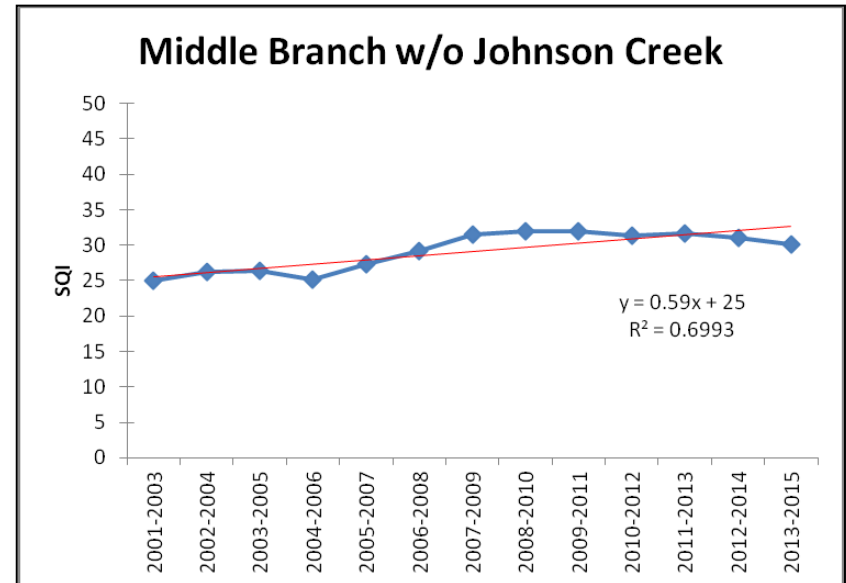


Figure 9 – Johnson Creek Mean SQIs

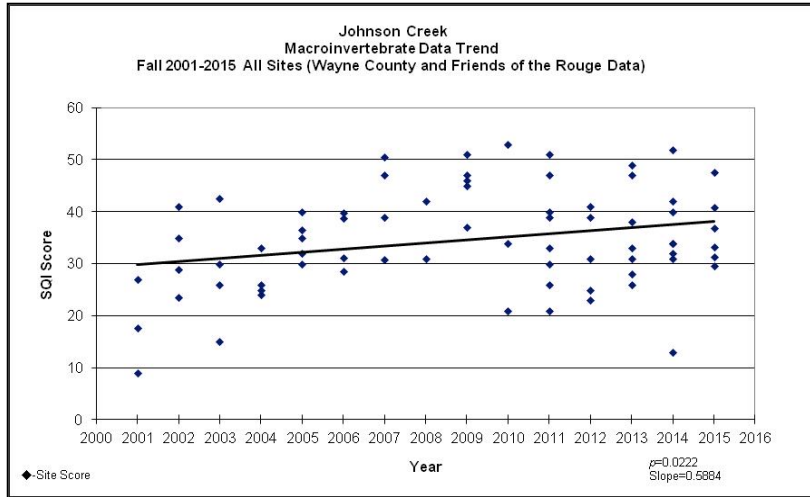


Figure 10 – Johnson Creek 3 Year Rolling Average SQIs

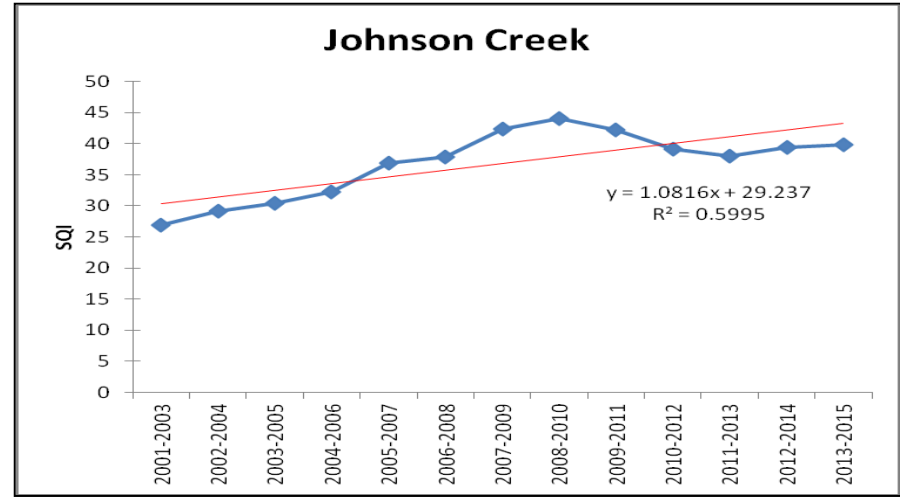


Figure 11 – Main Branch Mean SQIs

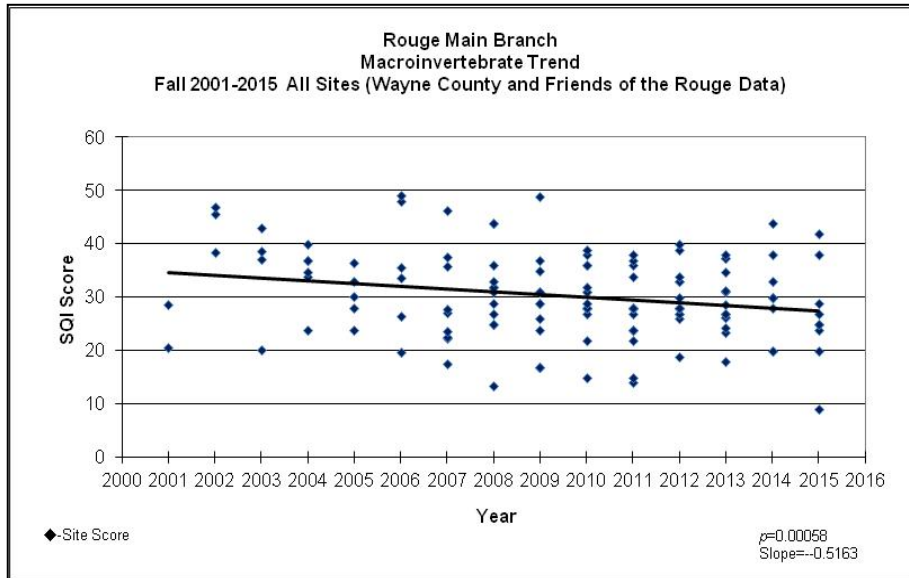


Figure 12 – Main Branch 3 Year Rolling Average SQIs

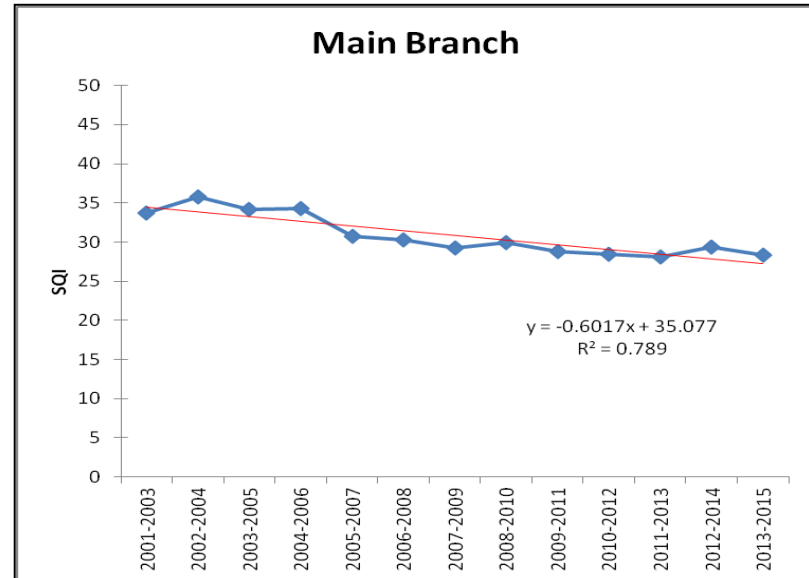


Figure 13 - Upper Branch Mean SQIs

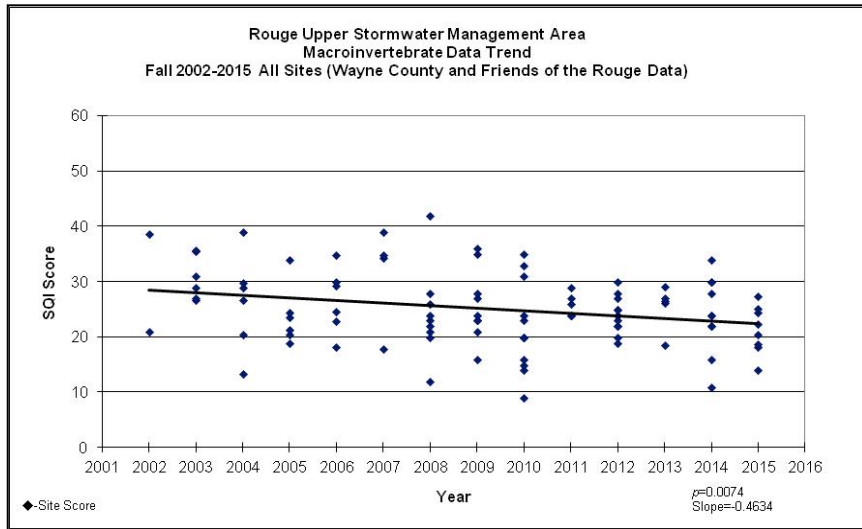


Figure 14 – Upper Branch 3 Year Rolling Average SQIs

