

# Summary of Data

## Upper AuSable River Water Quality Monitoring Project

Gahagan Nature Preserve Inc.  
Roscommon, Michigan

data as of December 30, 2019

updated data results and information on upcoming events can be found at [www.GahaganNature.org/projects](http://www.GahaganNature.org/projects)

The *Upper AuSable River Water Quality Monitoring Project* collects benthic macro-invertebrates from six collection sites on the river and its branches. Data collection began in September 2008. Initially, collections were done twice per year - typically early June and early September. In 2015, the project changed to collecting once per year. Collections are made in June during the odd years and September in the even years. Occasionally, collections have been cancelled for high water conditions that made collections unsafe. Specimens are identified in the Kirkland Community College laboratory in the weeks that follow harvest.

Our methodology follows that of the *Michigan Clean Water Corps* (MiCorps) which is administered by the *Great Lakes Commission* and supported by the *Michigan Department of Environmental Quality*. More information on the procedures can be found at the *MiCorps* website, [www.micorps.net](http://www.micorps.net). In short, the water quality of the river is quantified by counting the number and species of “bugs” found in the stream. Certain organisms are more sensitive to water contamination and score higher. Species that can tolerate lower water quality score less. The project is conducted by volunteers. Many of the volunteers are retired or active scientists or teachers. Others are avid stream fishers who know the invertebrates from their hobby and people who have an interest in the river and its health. The addendum to this document contains more detail about the collection procedures.

This paper is a summary of all the results. Additional documents containing detailed information for individual collection dates can be found at [GahaganNature.org/projects](http://GahaganNature.org/projects). The individual collection date documents break down the count by invertebrate type. These documents are in PDF file format. The individual collection date documents contain a collection site location map.

### Contents of this document

Page 2	Averages of Stream Site Scores
Page 3	Score by Collection Date -Site 1, Mainstream at Guide’s Rest
Page 4	Score by Collection Date -Site 2, East Branch at Bobcat Trail
Page 5	Score by Collection Date -Site 3, North Branch at Dam 4
Page 6	Score by Collection Date -Site 4, Big Creek North Down River Rd
Page 7	Score by Collection Date -Site 5, South Branch, Watter’s Edge or Chase Bridge
Page 8	Score by Collection Date -Site 6, Big Creek South at Randall Rd
Addendum 1	General discussion about procedures
Addendum 2	MiCorp Identification Score Sheet (identifies organisms water quality sensitivity and their value to the score system)

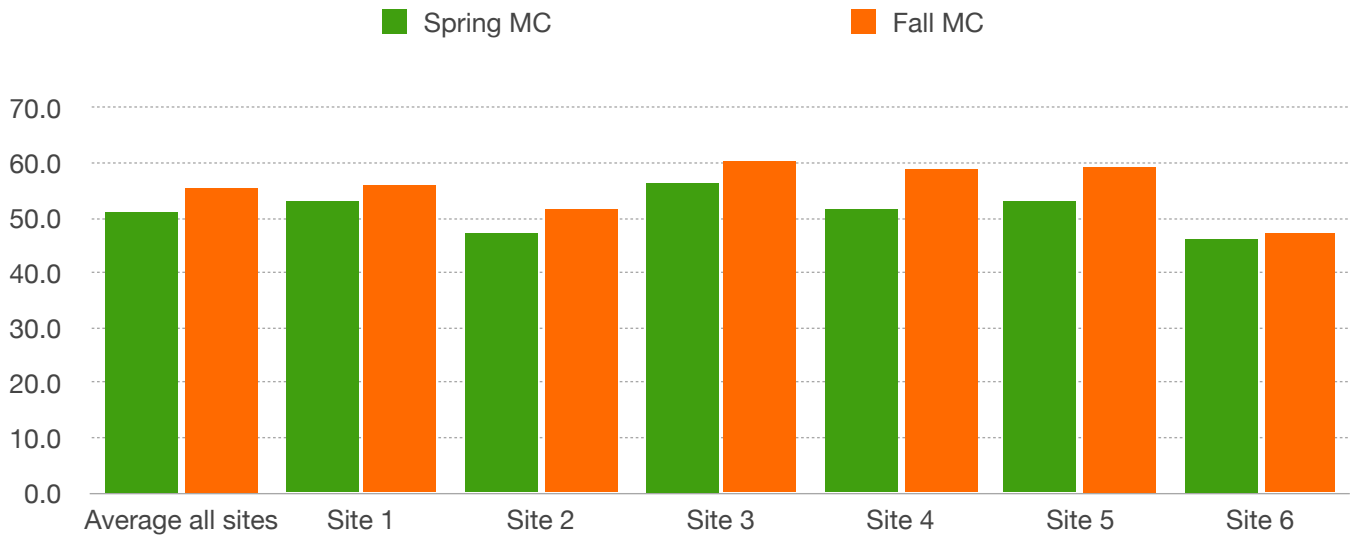
## Upper AuSable River Water Quality Average Scores - 2008-2019

	Spring			Fall		
	MC	TT	EPT	MC	TT	EPT
<b>Average all sites</b>	<b>51.1</b>	<b>24.9</b>	<b>12.4</b>	<b>55.6</b>	<b>26.0</b>	<b>11.1</b>
Site 1	52.8	25.4	12.1	55.8	24.7	10.8
Site 2	47.1	22.8	11.5	51.8	26.6	12.3
Site 3	56.3	28.1	14.1	60.5	26.7	11.8
Site 4	51.7	25.4	12.7	58.9	28.6	12.3
Site 5	52.9	24.8	11.9	59.5	26.7	9.3
Site 6	46.0	22.9	11.9	47.0	22.8	10.0

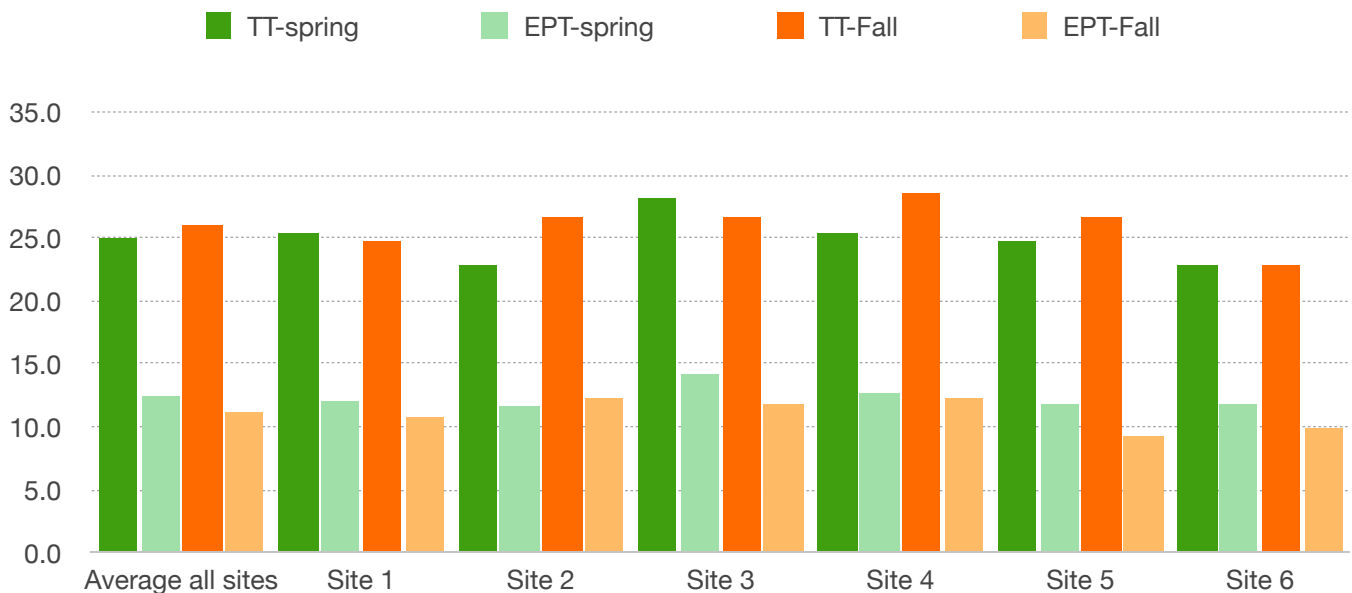
MC = MiCorps stream quality score.  
 TT = Total Taxa; number of different kinds macro invertebrates found.  
 EPT = total of ephemeroptera, plecoptera and trichoptera taxa found.

MC >48 = excellent  
 MC 34-48 = good  
 MC 19-33 = fair  
 MC <19 = poor

MiCorps Stream Quality - Average Scores Over Project History



Total Taxa and EPT Taxa Averages Over Project History

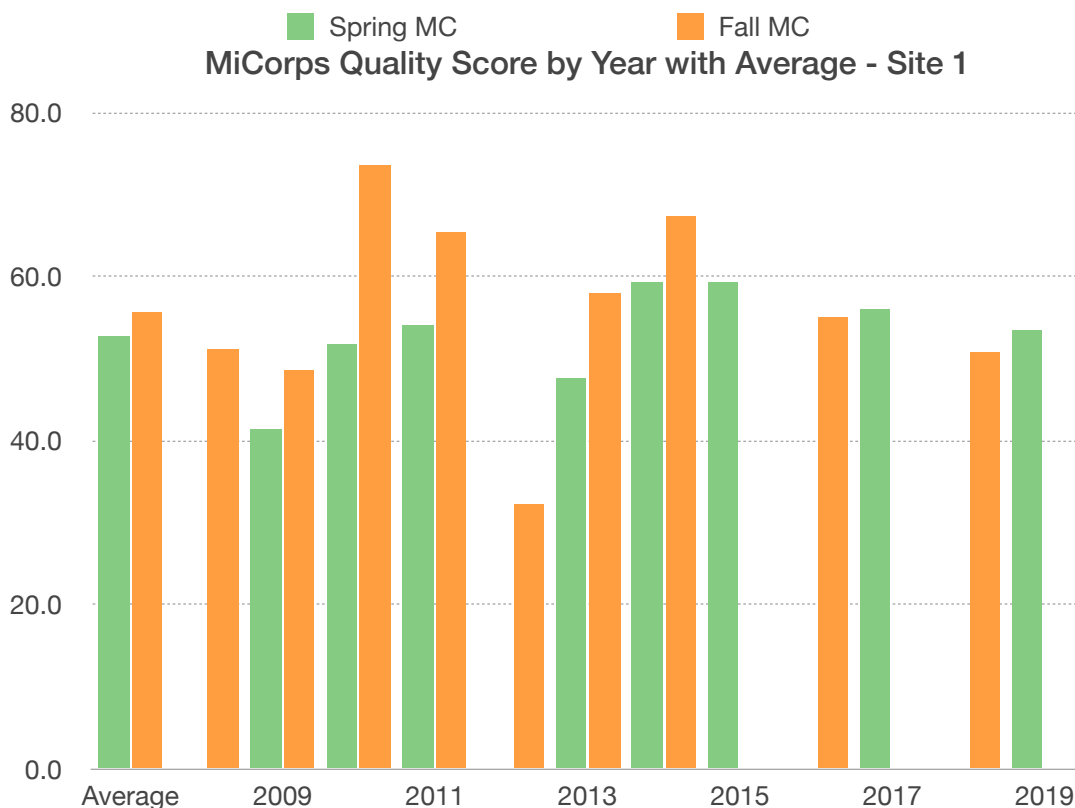


Site 1 - Mainstream at Guides' Rest

	Spring			Fall		
	MC	TT	EPT	MC	TT	EPT
<b>Average</b>	<b>52.8</b>	<b>25.4</b>	<b>12.1</b>	<b>55.8</b>	<b>24.7</b>	<b>10.8</b>
2008	NS	NS	NS	51.2	23	10
2009	41.5	22	9	48.4	28	15
2010	51.7	24	12	73.4	32	15
2011	54.0	28	13	65.3	22	7
2012	NS	NS	NS	32.2	11	1
2013	47.5	26	14	57.9	21	9
2014	59.1	31	15	67.5	32	13
2015	59.1	27	11	NS	NS	NS
2016	NS	NS	NS	55.1	29	15
2017	56.1	25	14	NS	NS	NS
2018	NS	NS	NS	50.8	24	12
2019	53.5	20	9	NS	NS	NS

MC = MiCorps stream quality score.  
 TT = Total Taxa; number of different kinds macro invertebrates found.  
 EPT = total of ephemeroptera, plecoptera and trichoptera taxa found.

MC >48 = excellent  
 MC 34-48 = good  
 MC 19-33 = fair  
 MC <19 = poor

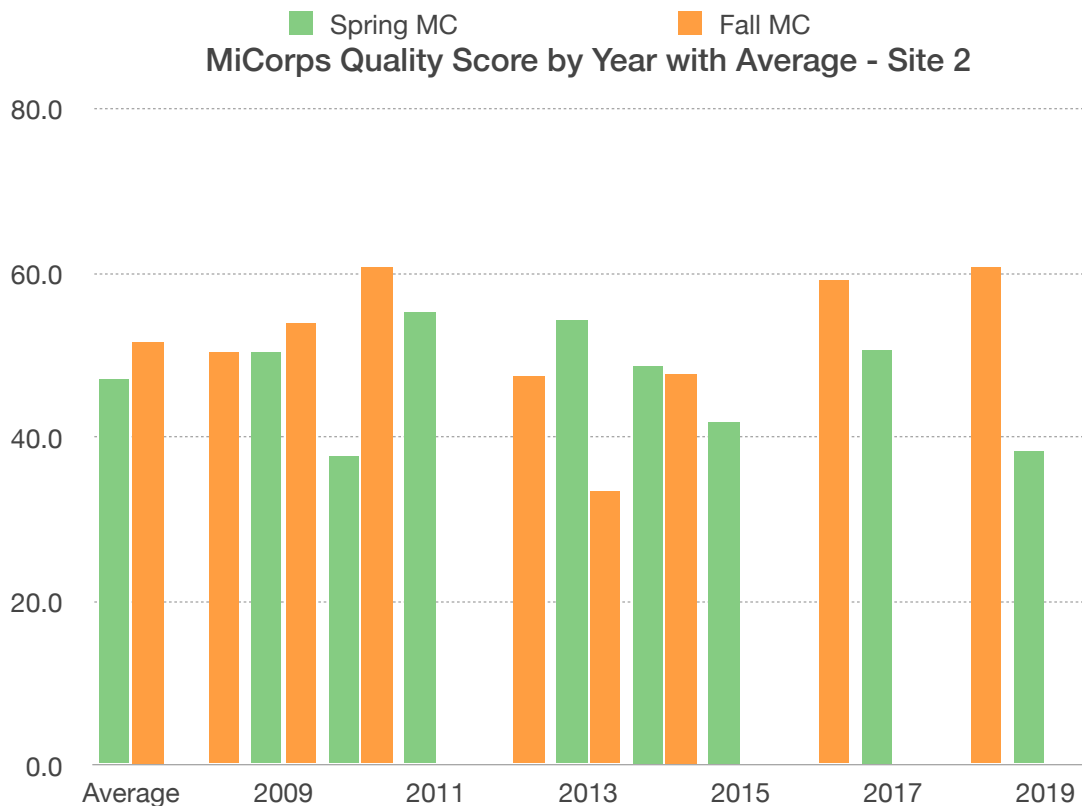


Site 2 - East Branch at Bobcat Trail

	Spring			Fall		
	MC	TT	EPT	MC	TT	EPT
<b>Average</b>	<b>47.1</b>	<b>22.8</b>	<b>11.5</b>	<b>51.8</b>	<b>26.6</b>	<b>12.3</b>
2008	NS	NS	NS	50.3	23	8
2009	50.3	26	11	54.1	34	15
2010	37.7	18	7	60.9	30	12
2011	55.1	27	13	NS	NS	NS
2012	NS	NS	NS	47.5	23	11
2013	54.2	23	12	33.3	18	12
2014	48.7	22	10	47.8	24	12
2015	41.9	17	9	NS	NS	NS
2016	NS	NS	NS	59.3	32	15
2017	50.7	30	18	NS	NS	NS
2018	NS	NS	NS	60.8	29	13
2019	38.2	19	12	NS	NS	NS

MC = MiCorps stream quality score.  
 TT = Total Taxa; number of different kinds macro invertebrates found.  
 EPT = total of ephemeroptera, plecoptera and trichoptera taxa found.

MC >48 = excellent  
 MC 34-48 = good  
 MC 19-33 = fair  
 MC <19 = poor



Site 3- North Branch at Dam 4

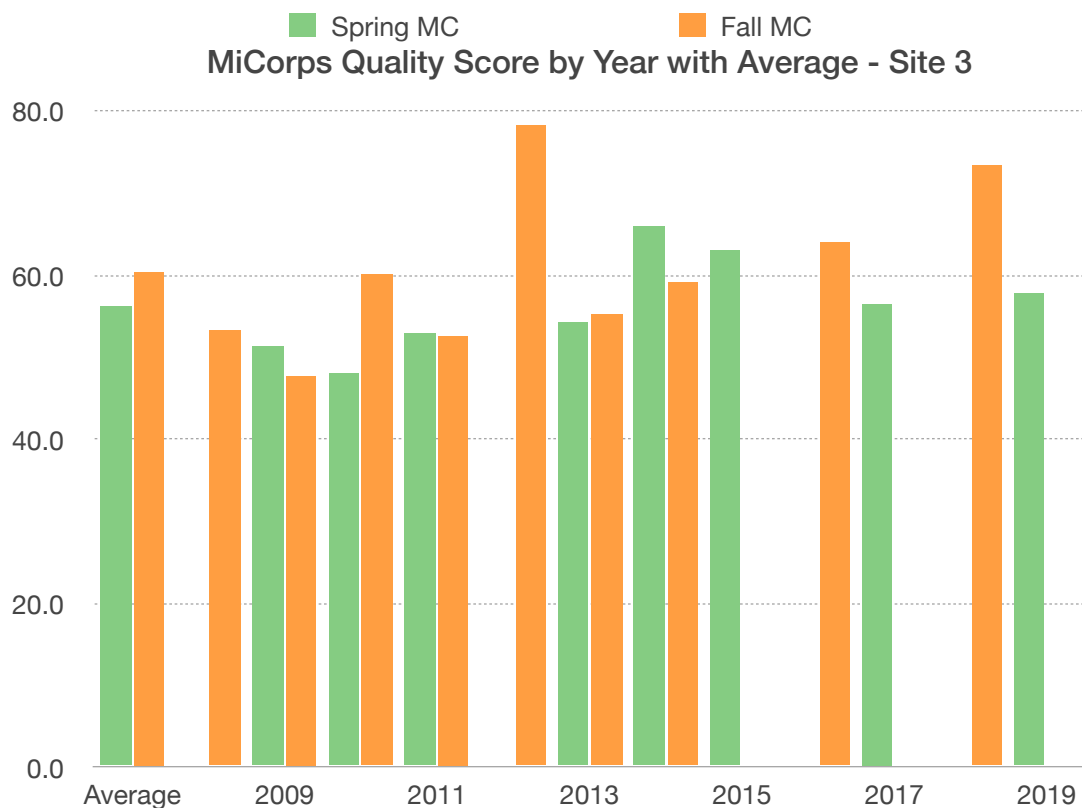
	Spring			Fall		
	MC	TT	EPT	MC	TT	EPT
<b>Average</b>	<b>56.3</b>	<b>28.1</b>	<b>14.1</b>	<b>60.5</b>	<b>26.7</b>	<b>11.8</b>
2008	NS	NS	NS	53.4	27	13
2009	51.2	22	10	47.6	22	10
2010	48.2	21	13	60.0	29	15
2011	53.0	25	14	52.6	20	8
2012	NS	NS	NS	78.3	29	13
2013	54.3	31	16	55.3	28	11
2014	66.0	37	17	59.3	27	13
2015	63.0	25	12	NS	NS	NS
2016	NS	NS	NS	64	29	13
2017	56.5	29	14	NS	NS	NS
2018	NS	NS	NS	73.6	29	10
2019	57.9	35	17	NS	NS	NS

MC = MiCorps stream quality score.

TT = Total Taxa; number of different kinds macro invertebrates found.

EPT = total of ephemeroptera, plecoptera and trichoptera taxa found.

MC >48 = excellent  
 MC 34-48 = good  
 MC 19-33 = fair  
 MC <19 = poor

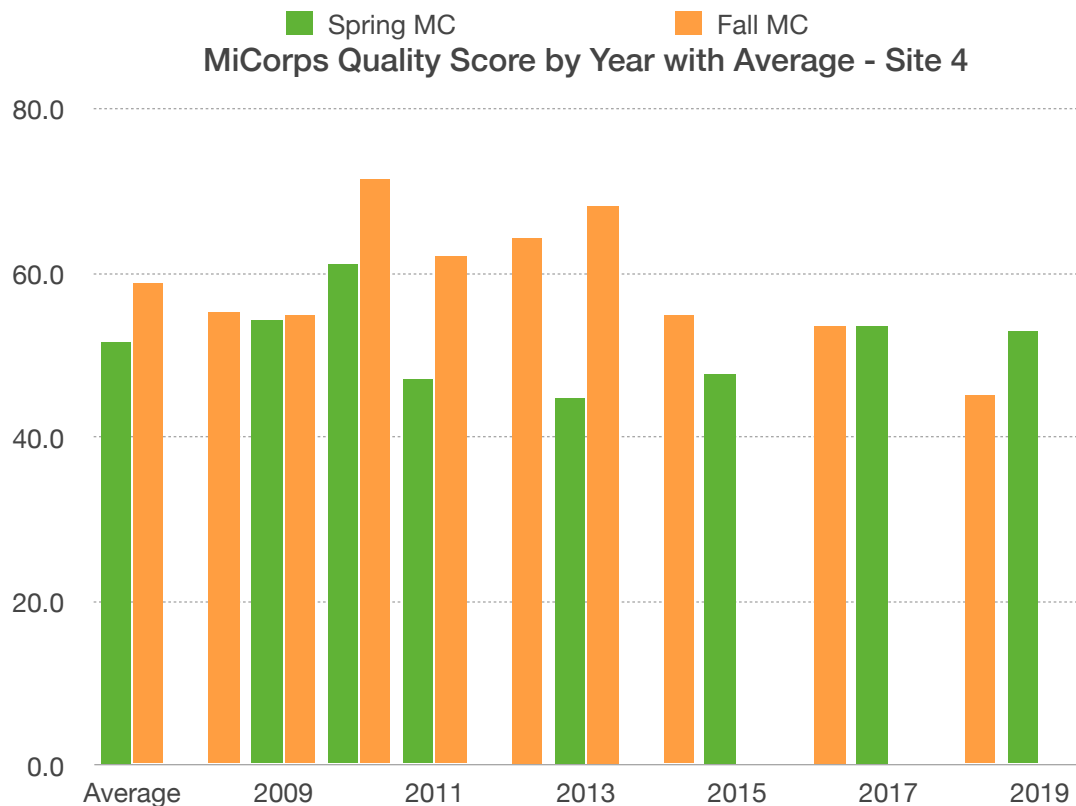


Site 4- Big Creek North at North Down River Rd

	Spring			Fall		
	MC	TT	EPT	MC	TT	EPT
<b>Average</b>	<b>51.7</b>	<b>25.4</b>	<b>12.7</b>	<b>58.9</b>	<b>28.6</b>	<b>12.3</b>
2008	NS	NS	NS	55.4	24	11
2009	54.4	27	13	54.8	27	10
2010	61.1	27	13	71.4	38	15
2011	47.2	21	11	62.2	29	13
2012	NS	NS	NS	64.5	34	14
2013	44.7	23	14	68.3	38	15
2014	NS	NS	NS	54.9	22	9
2015	47.8	23	10	NS	NS	NS
2016	NS	NS	NS	53.7	26	13
2017	53.5	26	12	NS	NS	NS
2018	NS	NS	NS	45.2	19	11
2019	53.1	31	16	NS	NS	NS

MC = MiCorps stream quality score.  
 TT = Total Taxa; number of different kinds macro invertebrates found.  
 EPT = total of ephemeroptera, plecoptera and trichoptera taxa found.

MC >48 = excellent
MC 34-48 = good
MC 19-33 = fair
MC <19 = poor



Site 5- South Branch near Steckert or Chase Bridge

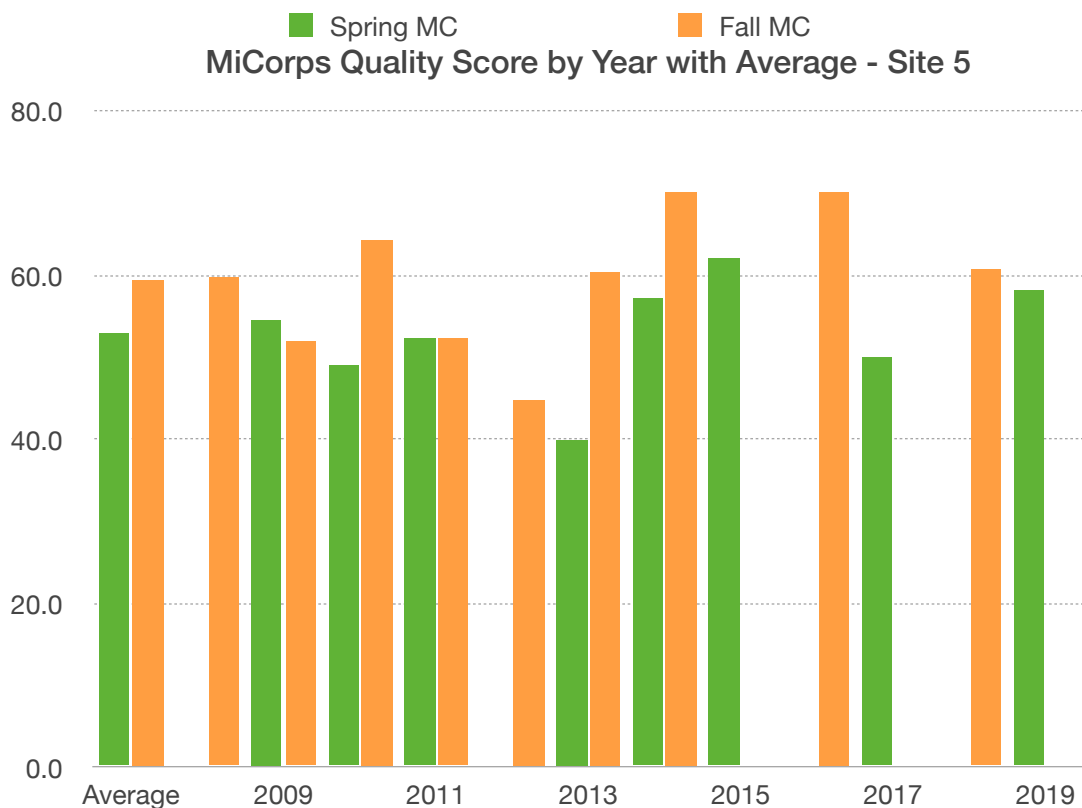
	Spring			Fall		
	MC	TT	EPT	MC	TT	EPT
<b>Average</b>	<b>52.9</b>	<b>24.8</b>	<b>11.9</b>	<b>59.5</b>	<b>26.7</b>	<b>9.3</b>
2008	NS	NS	NS	59.9	28	10
2009	54.7	23	11	51.9	25	7
2010	49.1	24	12	64.2	23	9
2011	52.3	22	10	52.3	25	8
2012	NS	NS	NS	44.9	18	4
2013	39.8	22	12	60.6	28	11
2014	57.1	28	14	70.2	33	12
2015	62	32	16	NS	NS	NS
2016	NS	NS	NS	70.2	33	12
2017	50	23	9	NS	NS	NS
2018	NS	NS	NS	60.9	27	11
2019	58.3	24	11	NS	NS	NS

MC = MiCorps stream quality score.

TT = Total Taxa; number of different kinds macro invertebrates found.

EPT = total of ephemeroptera, plecoptera and trichoptera taxa found.

MC >48 = excellent
MC 34-48 = good
MC 19-33 = fair
MC <19 = poor

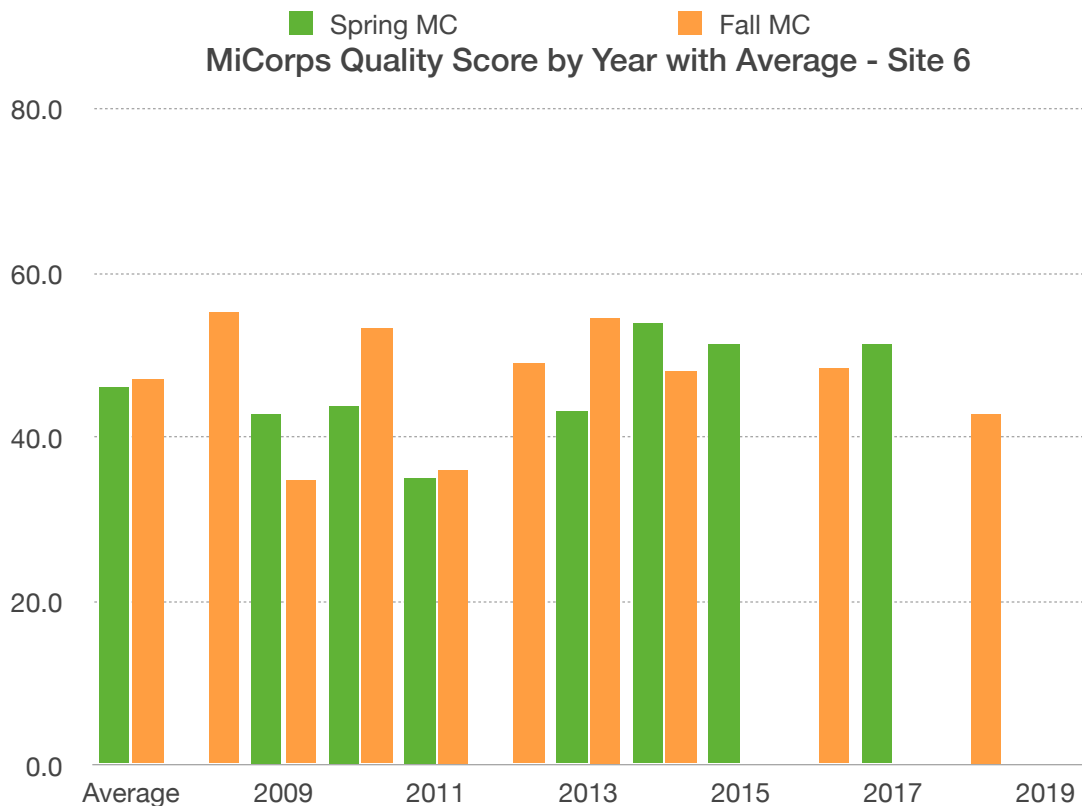


Site 6 - Big Creek South at Randall Road

	Spring			Fall		
	MC	TT	EPT	MC	TT	EPT
<b>Average</b>	<b>46.0</b>	<b>22.9</b>	<b>11.9</b>	<b>47.0</b>	<b>22.8</b>	<b>10.0</b>
2008	NS	NS	NS	55.3	24	12
2009	42.9	23	11	34.9	16	6
2010	43.9	19	11	53.3	25	10
2011	35.2	18	9	36.0	19	12
2012	NS	NS	NS	49.2	21	11
2013	43.3	20	10	54.6	30	13
2014	54.0	27	13	48.2	27	11
2015	51.2	28	16	NS	NS	NS
2016	NS	NS	NS	48.4	26	9
2017	51.4	25	13	NS	NS	NS
2018	NS	NS	NS	42.9	17	6
2019	NS	NS	NS	NS	NS	NS

MC = MiCorps stream quality score.  
 TT = Total Taxa; number of different kinds macro invertebrates found.  
 EPT = total of ephemeroptera, plecoptera and trichoptera taxa found.

MC >48 = excellent  
 MC 34-48 = good  
 MC 19-33 = fair  
 MC <19 = poor





## Addendum 1

### Generalized Sampling Techniques

Stream sampling locations were chosen to represent each branch of the upper AuSable watershed. Each site was picked because public access was readily available and it was considered safe to wade. In the Spring of 2013, Site 5 - AuSable South Branch was moved from Watter's Edge Canoe Livery downstream to just above Chase Bridge. The move was made because the Watter's Edge location often had dangerous currents after a large rain event.

The sampling protocol requires collection in various types of environments along a 300-foot length of the stream. The stream sections were pre-mapped and staked. The same stream sections are then sampled each sample date. "Bugs" are collected with nets from the bottom, undercuts of the banks, in eddies, muck bottoms, gravel and logs. Collection is done for 1 person-hour; usually 2 people collecting for 1/2-hour each. Others ferry samples to shore and pick organisms from the debris and buckets placing them in jars of alcohol. Stream characteristics and environments are measured and noted.

At a later date, teams identify the organisms under microscope in the laboratory. Specimens are separated and counted. Each type is jarred and labeled. The final assessment of the stream's quality is made by using the score sheet on the next page. The jarred organisms are stored for future reference.

MiCorps Site ID#: \_\_\_\_\_



**IDENTIFICATION AND ASSESSMENT**

Use letter codes [R (rare) = 1-10, C (common) = 11 or more] to record the approximate numbers of organisms in each taxa found in the stream reach.

**\*\* Do NOT count empty shells, pupae, or terrestrial macroinvertebrates\*\***

**Group 1: Sensitive**

- \_\_\_ Caddisfly larvae (Trichoptera)  
*EXCEPT Net-spinning caddis*
- \_\_\_ Hellgrammites (Megaloptera)
- \_\_\_ Mayfly nymphs (Ephemeroptera)
- \_\_\_ Gilled (right-handed) snails (Gastropoda)
- \_\_\_ Stonefly nymphs (Plecoptera)
- \_\_\_ Water penny (Coleoptera)
- \_\_\_ Water snipe fly (Diptera)

**Group 2: Somewhat-Sensitive**

- \_\_\_ Alderfly larvae (Megaloptera)
- \_\_\_ Beetle adults (Coleoptera)
- \_\_\_ Beetle larvae (Coleoptera)
- \_\_\_ Black fly larvae (Diptera)
- \_\_\_ Clams (Pelecypoda)
- \_\_\_ Crane fly larvae (Diptera)
- \_\_\_ Crayfish (Decapoda)
- \_\_\_ Damselfly nymphs (Odonata)
- \_\_\_ Dragonfly nymphs (Odonata)
- \_\_\_ Net-spinning caddisfly larvae (Hydropsychidae; Trichoptera)
- \_\_\_ Scuds (Amphipoda)
- \_\_\_ Sowbugs (Isopoda)

**Group 3: Tolerant**

- \_\_\_ Aquatic worms (Oligochaeta)
- \_\_\_ Leeches (Hirudinea)
- \_\_\_ Midge larvae (Diptera)
- \_\_\_ Pouch snails (Gastropoda)
- \_\_\_ True bugs (Hemiptera)
- \_\_\_ Other true flies (Diptera)

Identifications made by: \_\_\_\_\_

Rate your confidence in these identifications: Quite confident 5 4 3 Not very confident 2 1

<b>STREAM QUALITY SCORE</b>	
Group 1:	
___ # of R's * 5.0 =	___
___ # of C's * 5.3 =	___
Group 1 Total = ___	
Group 2:	
___ # of R's * 3.0 =	___
___ # of C's * 3.2 =	___
Group 2 Total = ___	
Group 3:	
___ # of R's * 1.1 =	___
___ # of C's * 1.0 =	___
Group 3 Total = ___	
Total Stream Quality Score = ___	
<i>(Sum of totals for groups 1-3; round to nearest whole number)</i>	
Check one:	
___ Excellent	(>48)
___ Good	(34-48)
___ Fair	(19-33)
___ Poor	(<19)

Datasheet checked for completeness by: \_\_\_\_\_ Datasheet version 10/08/05  
Data entered into MiCorps database by: \_\_\_\_\_ Date: \_\_\_\_\_