

# Lower Manistee River Watershed Macroinvertebrate Assessment Volunteer Stream Monitoring Program (VSMP)

*Presented by the*  
Manistee Conservation District  
*In partnership with*  
Michigan Clean Water Corps

## Spring and Fall 2022 Results





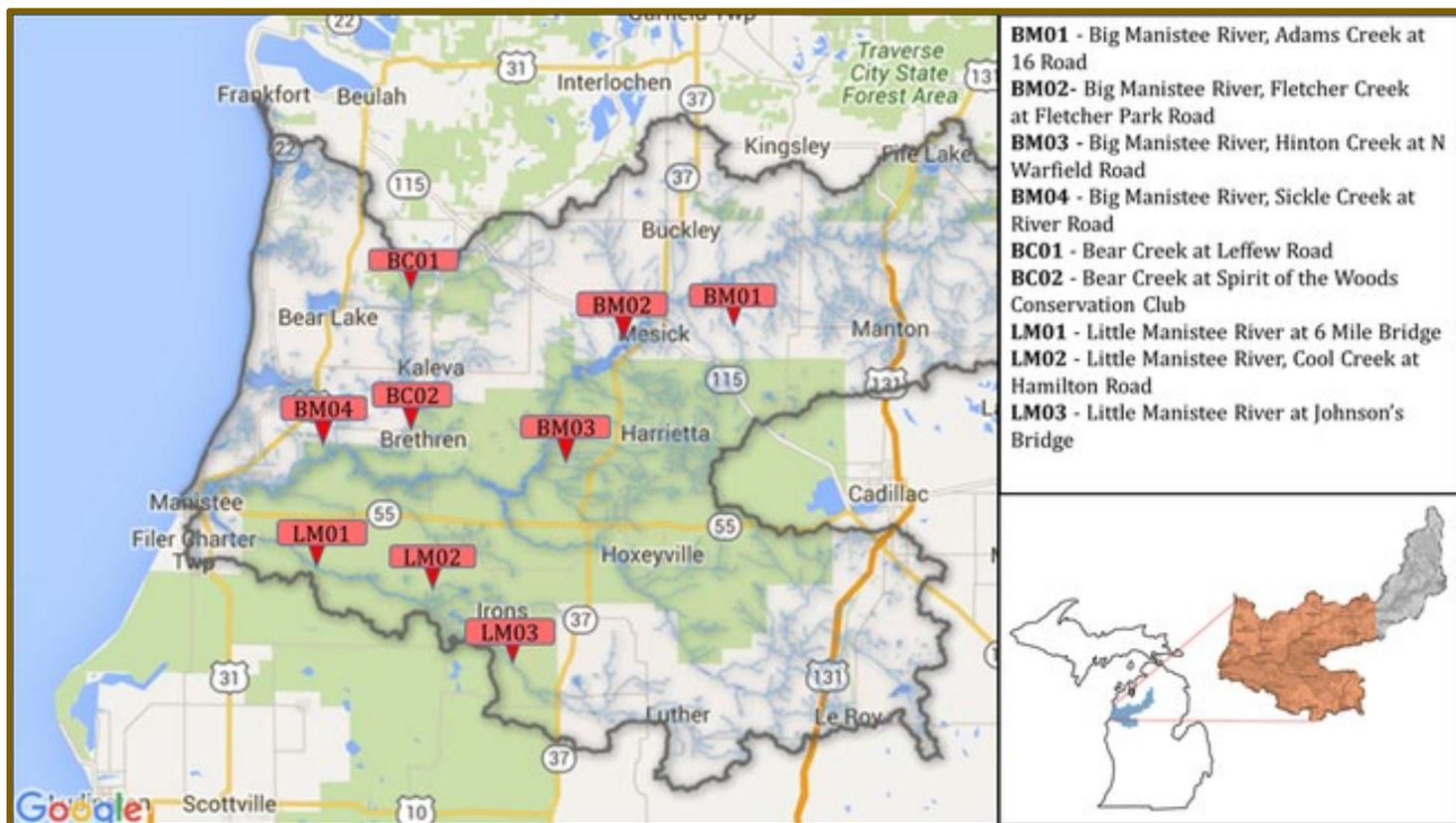
The data generated through the Manistee Conservation District's (MCD) Volunteer Stream Monitoring Program (VSMP) was established to track the relative health of the Lower Manistee River Watershed, locate specific problem areas, track changes over time, and to cross-compare sites. The water quality efforts of the Manistee Conservation District cover a broad range of objectives when it comes to serving the surrounding watershed. At the foundation of our efforts, our yearly lake and stream monitoring programs continue to offer opportunities to local citizen scientists who help us collect this invaluable data. As we continue to monitor throughout the County, these datasets are added to and expanded with each passing year, ensuring a solid baseline is being created to monitor yearly changes. Over the last few years, we have added to these foundational objectives and have reached more of the watershed than ever before. Our efforts within the Lower Manistee River Watershed continue to grow through community outreach, technical assistance, education, partnership projects, watershed organizational support, and much more. This year we have created a new VSMP volunteer training video that frames the program from a local's perspective, highlighting the stream locations that our community may recognize or have an attachment to. This has been effective in contextualizing the bigger goals of the program by allowing potential volunteers to see this work being done in their own backyards. As our stream program continues to be built upon, we're happy to report that in 2022 we had more of you come and assist us than ever before! The Manistee Conservation District would like to thank our dedicated volunteers for their contributions to the development of the VSMP program and look forward to continued success within the Lower Manistee River Watershed- a beautiful place to call home!

Chelsea Cooper

Conservation Technician

Manistee Conservation District

A handwritten signature in black ink that reads "Chelsea Cooper".



### Manistee Conservation District's 9 sample stream locations:

These 9 sites are a collection of wadable portions of streams selected based on their direct contributions to the larger river system. Our citizen scientist volunteers revisit these sites during sampling events to collect macroinvertebrate samples from designated 300' sections. Macroinvertebrate samples can be used to investigate ecological factors that negatively influence stream conditions. Benthic macroinvertebrates are spineless, sensitive organisms that can be seen with the naked eye and inhabit various stream and river habitats. "Macro" sampling occurs in the spring and fall, the fall sample being highly critical for comparison purposes to the typically abundant spring event. During the fall, local macro communities are exposed to potentially greater levels of stress during the low-flow summer months. The summer is also a concentrated season for increased recreation and development due to our temperate climate, adding to the importance of the fall event. Two sampling events during the year is necessary to report an accurate portrayal of stream conditions, and this report will reference both sample scores to interpolate numerical results.

### Materials and methods:

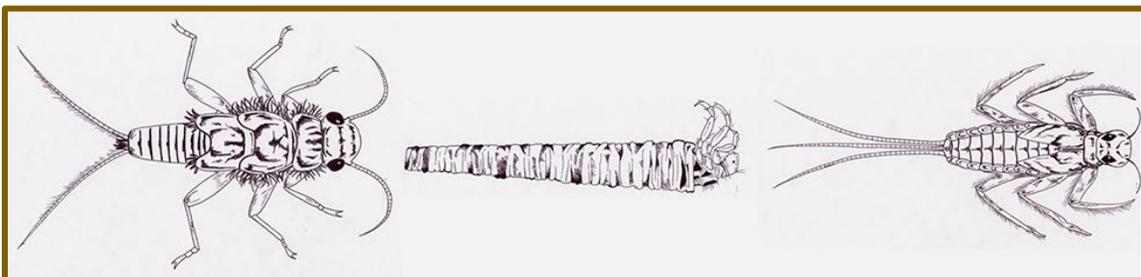
At each site location, volunteers used D-nets to sample pre-selected sections of the stream. Within each 300' stretch, volunteers sample various habitats and record which habitats they encountered. Volunteers are trained to follow their data sheets to stay consistent and sample as many different habitats as possible to increase diversity. Each site location is responsible for collecting at least 100 macroinvertebrates out of the stream, which are sorted on site. After sorting, our collection samples are then preserved in 95% ethanol and transported back to the District. Following the event, volunteers spend the next week collaboratively identifying macro species here in the office with the assistance of staff and various identification guides and keys. Macroinvertebrates are identified according to their taxonomic order and family and rated based on MiCorps' new sensitivity scoring method (2020). Following this, samples are stored indefinitely for reference and then final scores are recorded and added to MCD's historical and electronic files.

### Understanding the metrics:

The metrics below are used to evaluate water quality. A lower numerical value on a 0-10 scale indicates a healthier stream for each location.

- Water Quality Rating (WQR) is determined by weighing each type and number of organisms collected by their sensitivity ratings. A larger proportion of sensitive insects like stoneflies and caddisflies results in a higher WQR. Also, higher overall diversity results in a higher WQR. There are 7 WQR ratings: Excellent, Very Good, Good, Fair, Fairly Poor, Poor, and Very Poor (*Figure 1*).
- Total Taxa represents the categories of different orders/family groupings sampled.

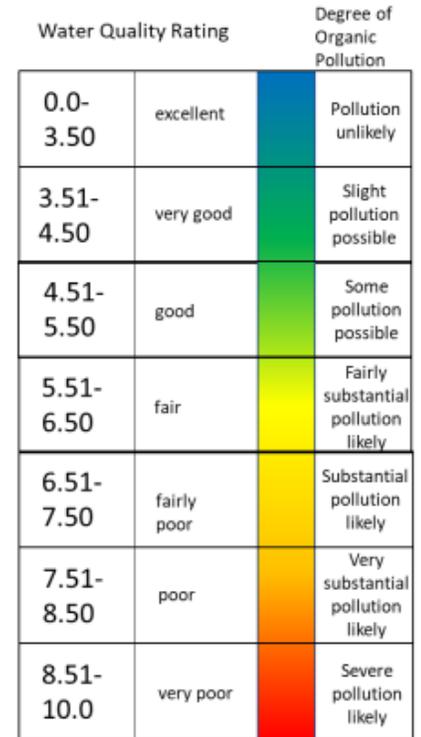
\*Sensitive refers to the number of macroinvertebrate species that rate very sensitive on the *Hilsenhof Biotic Index*, which is what MiCorps has based their new scoring system from. This biotic index bases scores for each organism on the overall tolerance of the organismal family, calculating a final score between 1 and 10 with the highest quality having a score less than 1.



**Results:**

Site ID	Stream (Spring 2022)	WQR	Result:
BM01	Adam's Creek @ 16 Rd	3.3	EXCELLENT
BM02	Fletcher Creek	3.8	VERY GOOD
BM03	Hinton Creek	4.1	VERY GOOD
BM04	Sickle Creek	3.6	VERY GOOD
LM01	Little Manistee (Downstream)	3.3	EXCELLENT
LM02	Cool Creek	2.6	EXCELLENT
LM03	Little Manistee (Upstream)	2.9	EXCELLENT
BC01	Bear Creek @ Leffew Rd	3.4	EXCELLENT
BC02	Spirit of the Woods	3.3	EXCELLENT

Site ID	Stream (Fall 2022)	WQR	Result:
BM01	Adam's Creek @ 16 Rd	4.3	VERY GOOD
BM02	Fletcher Creek	3.9	VERY GOOD
BM03	Hinton Creek	4.7	GOOD
BM04	Sickle Creek	4.5	VERY GOOD
LM01	Little Manistee (Downstream)	3.3	EXCELLENT
LM02	Cool Creek	3.7	VERY GOOD
LM03	Little Manistee (Upstream)	3.0	EXCELLENT
BC01	Bear Creek @ Leffew Rd	3.1	EXCELLENT
BC02	Spirit of the Woods	3.8	VERY GOOD



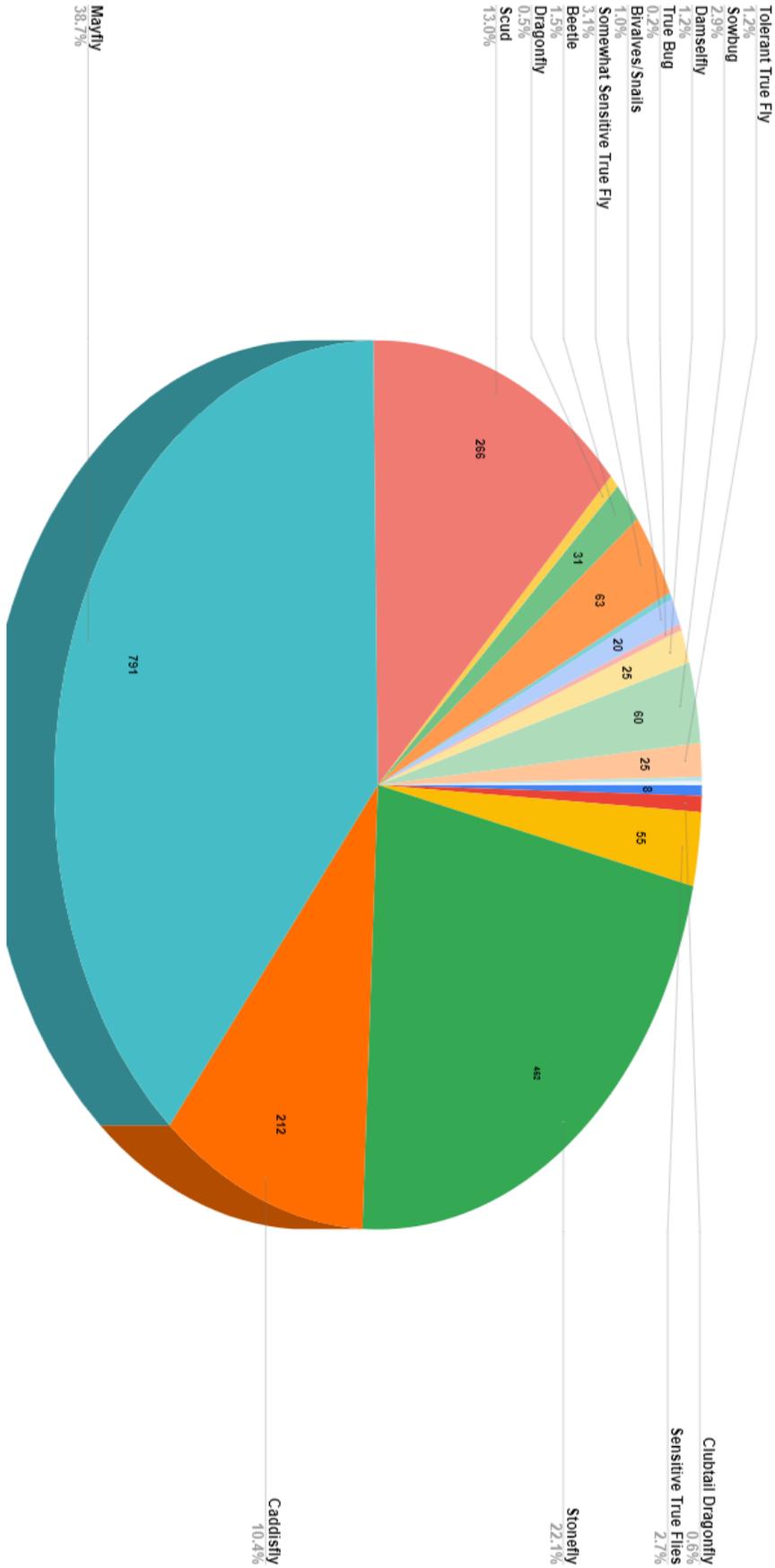
(Figure 1.)

Note- Beaver activity has significantly changed the dynamics at site BM01 Adam's Creek. A large dam was built upstream of our sample site sometime in the early spring of 2022 and has remained there since. This site has since become much deeper, and the creek's floodplain is quite saturated. A fair bit of silt has been added to the substrate as well. Despite these changes, the creek is still scoring quite high, and we will continue to keep it as one of our monitoring locations.



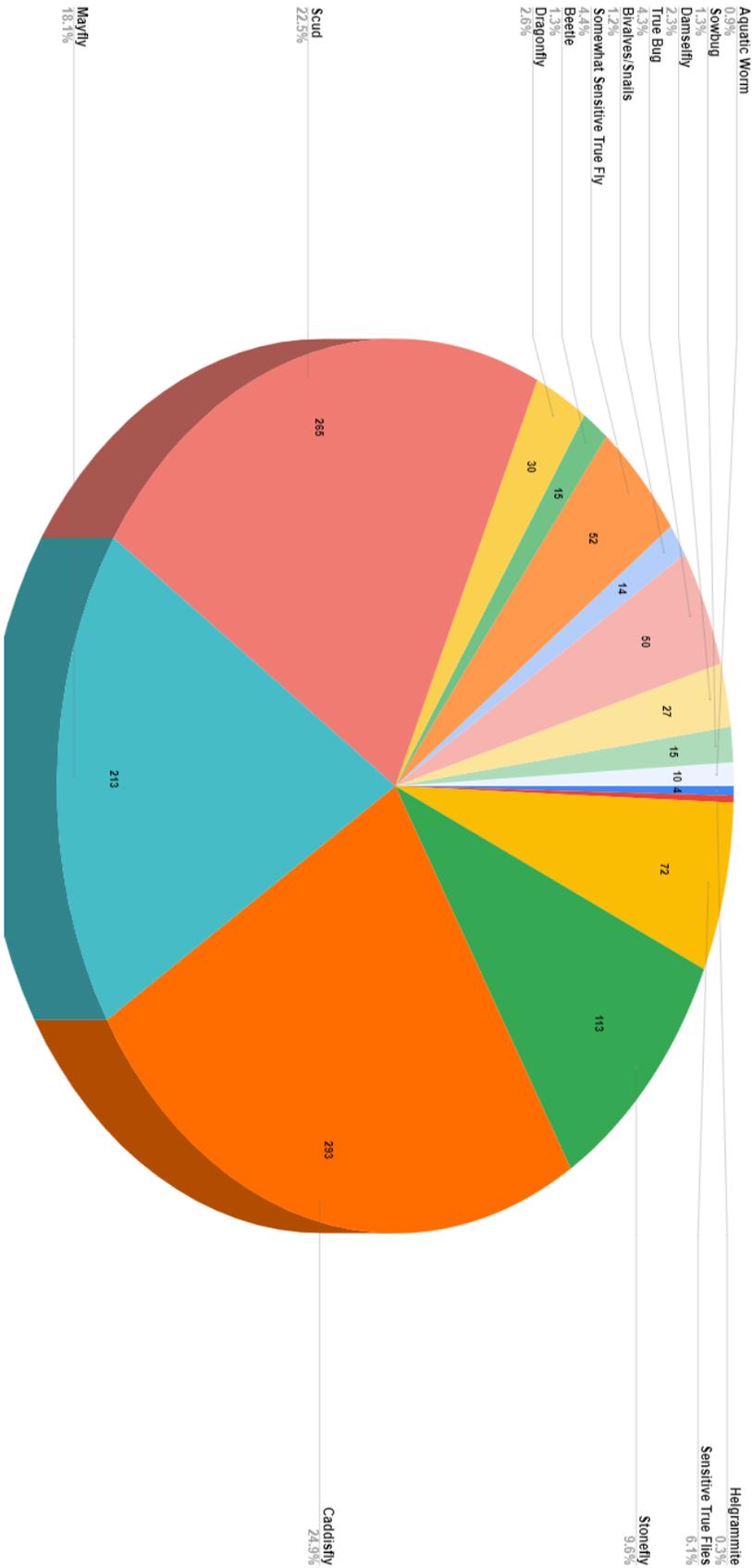


Total Taxa Spring 2022



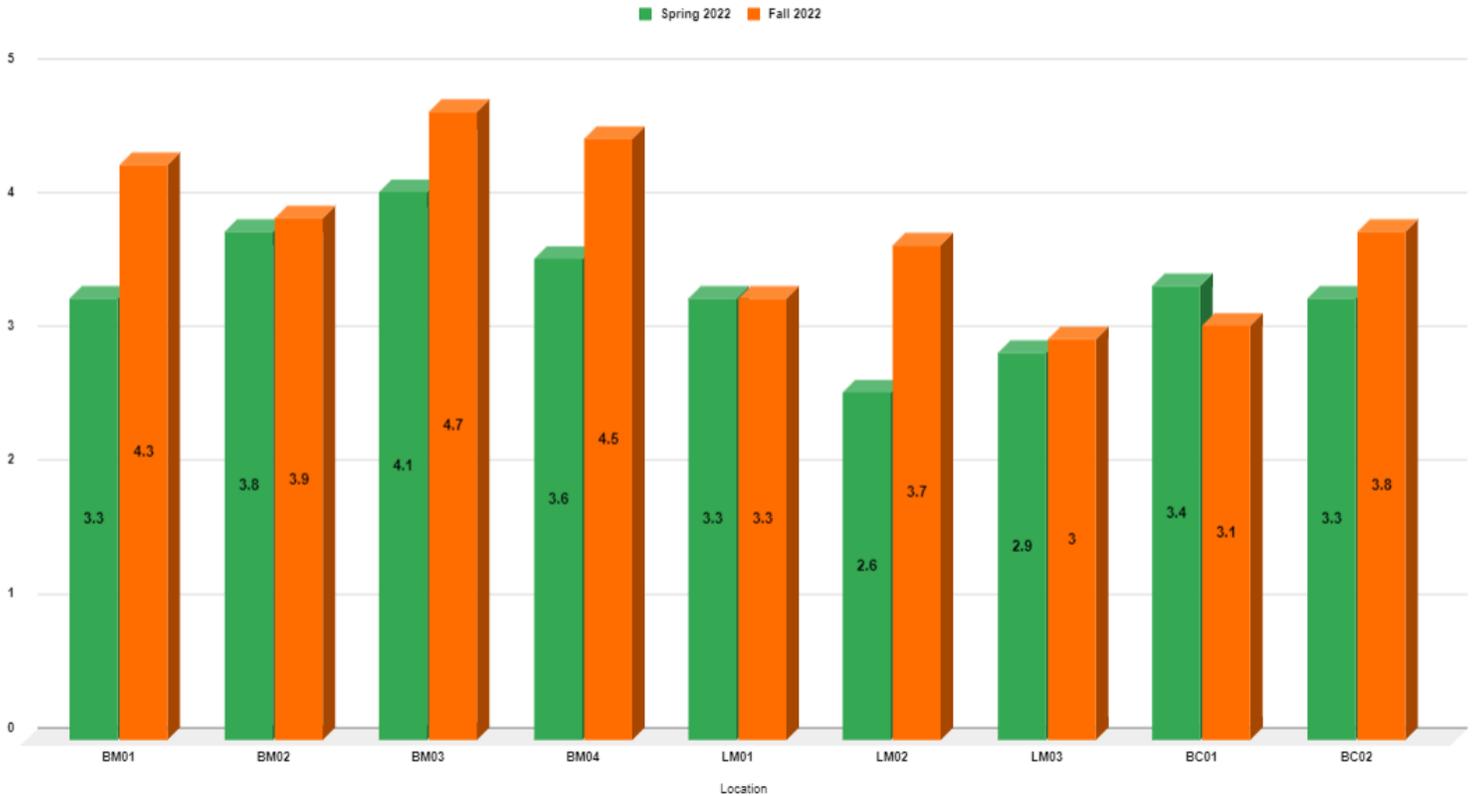


Total Taxa Fall 2022



## 2022 Spring and Fall Score Comparison

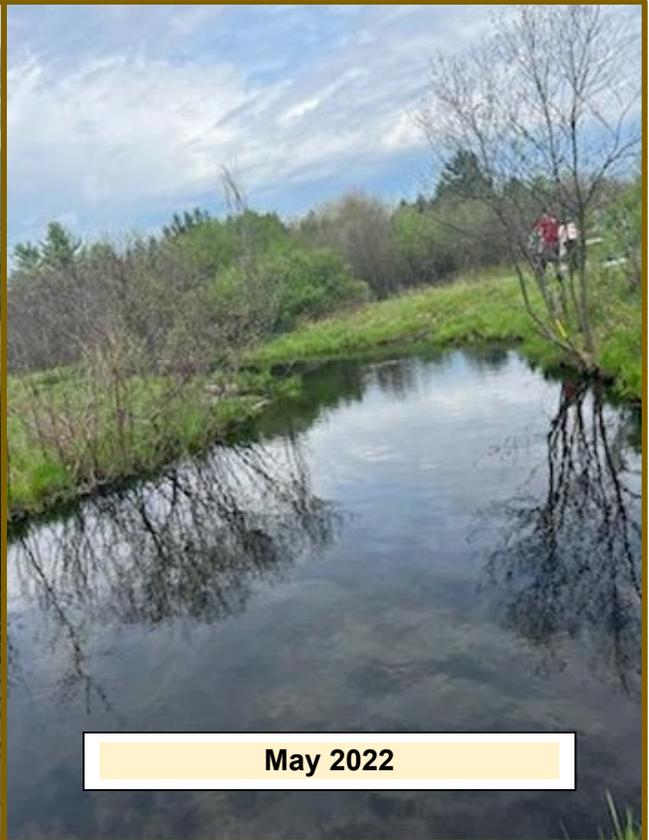
(\*lowest scores are highest rated)



Varying macroinvertebrate communities are likely to be encountered during the spring and fall seasons, and sampling twice a year provides a more complete picture of the total stream community. Sampling is always conducted within the same 2-week window each season to provide comparable results from year to year.



Beaver activity at BM01 Adam's Creek- before and after:



**In summation:**

All of MCD's test streams scored within the 3 highest quality tiers of the MiCorps biotic index scoring system, indicating high-quality conditions on average within our 9 test streams. The average score for 2022 was 3.5, which falls at the lower end of "excellent". Differences among streams have been relatively consistent throughout the years and have increased under a more accurate scoring method that was implemented by MiCorps in 2020. Going forward into 2023, special attention will be focused on site BM01's beaver activity and how this will affect spring and fall macro communities and alter habitat areas within this 300 ft stretch. In addition to these areas of focus, we will also continue to enhance our volunteer training techniques and will be bringing back our "Stream Team Leaders" strategy and our Macro ID Workshops to ensure we're continuing to get the most out of this program.

**A special thanks to our volunteers who join us at our collection events, we could not provide the Lower Manistee River Watershed with these stream scores without YOU!**

 <b>MANISTEE CONSERVATION DISTRICT VOLUNTEER STREAM MONITORING PROGRAM DATA CHART</b>									
SITE ID	BC01	BC02	BM01	BM02	BM03	BM04	LM01	LM02	LM03
SITE LOCATION	Bear Creek Leflew Rd.	Bear Creek Spirit of the Woods	Adam's Creek	Fletchers Creek	Hinton Creek	Big Manistee Sickle Creek	Six Mile Bridge	Cool Creek at Hamilton	Little Manistee Johnson's Bridge
FALL 2016	Excellent	Excellent	Good	Good	Good	Good	Excellent	Good	Good
SPRING 2017	Good	Fair	Poor	Fair	Fair	Fair	Good	Fair	Fair
FALL 2017	Excellent	Excellent	Good	Good	Good	Good	Fair	Good	Good
SPRING 2018	Good	Good	Good	Fair	Fair	Fair	Good	Good	Fair
FALL 2018	Good	Good	Good	Good	Good	Good	Excellent	Good	Good
SPRING 2019	Good	Good	Good	Fair	Good	Fair	Excellent	Good	Excellent
FALL 2019	Excellent	Good	Fair	Good	Good	Good	Good	Excellent	Good
SPRING 2020	Covid 19	Covid 19	Covid 19	Covid 19	Covid 19	Covid 19	Covid 19	Covid 19	Covid 19
FALL 2020	Excellent	Good	Excellent	Excellent	Good	Fair	Good	Good	Good
SPRING 2021	Excellent	Excellent	Excellent	Good	Excellent	Very Good	Excellent	Excellent	Excellent
FALL 2021	Very Good	Very Good	Excellent	Good	Excellent	Good	Very Good	Very Good	Excellent
SPRING 2022	Excellent	Excellent	Excellent	Very Good	Very Good	Very Good	Excellent	Excellent	Excellent
FALL 2022	Excellent	Very Good	Very Good	Very Good	Good	Very Good	Excellent	Very Good	Excellent