Let's make one thing
Perfectly Clear.
our water
Genesee County Community Water Quality Consortium

Phase II Municipalities
Program Effectiveness Summary

Genesee County Drain Commissioner SWM

April 1, 2020 – June 30, 2023 Reporting Period

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What is the Phase II Municipalities Program?

The Phase II Municipalities Program is part of Genesee County's Municipal Separate Storm Sewer System (MS4) stormwater program. This program monitors water quality of streams and lakes within the Flint River watershed to evaluate the effects of MS4 discharges on receiving waters in the designated Flint Urbanized Area.

Why do we monitor water quality?

Water quality is monitored to protect the health of humans and the environment. Water is present everywhere in various forms (lakes, streams, groundwater, etc.) and transports nutrients, chemicals, microorganisms, and aquatic animals. Humans rely on clean water for drinking, household activities, recreation and many more uses. It is important to maintain good water quality and improve where needed to support a healthy planet. Monitoring water quality on a regular basis helps indicates areas to improve and tracks trends due to watershed management.

What is monitored?

1. Benthic

Benthic refers to the bottom of a lake or stream. Many creatures, referred to as macroinvertebrates, live in the sediment at the bottom of a waterbody and are a good indicator of water health. Some macroinvertebrates have a higher tolerance to poor water quality than others. By counting the number of each type of species present in a sample area, water quality can be quantified. Benthic data is a good source to show historical trends as species change over slowly.

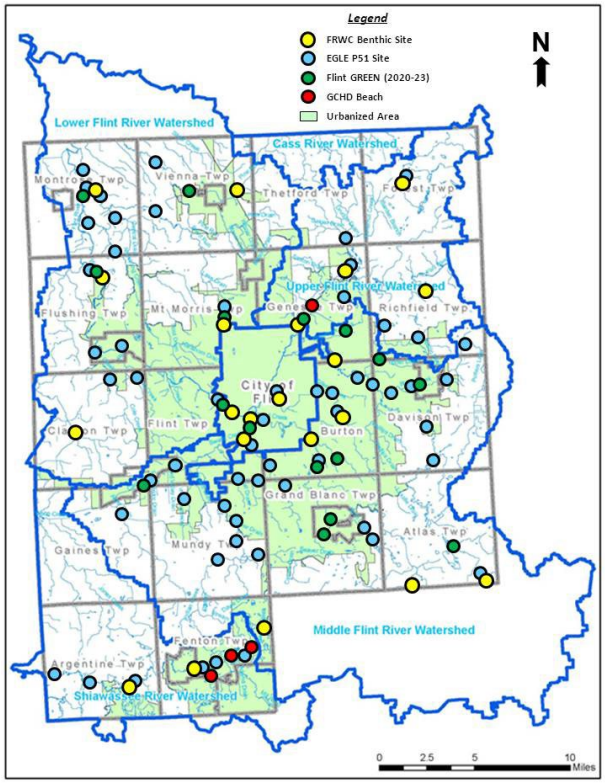


Figure 1: Sampling Locations Map

2. Water Chemistry

Water chemistry includes many types of tests. For this monitoring period, dissolved oxygen, nitrogen concentration, pH, temperature, turbidity, and phosphorus concentration were measured. The results for each sample site were compared against the expected normal and minimum regulatory results. This data is a good source for looking at current water quality but does not indicate historical health without consistent years of monitoring.

3. *E. coli* bacteria

E.coli bacteria is commonly monitored to evaluate safety for a lake's recreational use. It is also a key indicator of water quality. *E. coli* is typically found in animal waste and sewage. Similar to water chemistry measurements, this information shows the current water quality and past data can show the history of the water body's health.

How is water quality monitored?

1. Flint River Watershed Council

The Flint River Watershed Coalition (FRWC) began benthic macroinvertebrate sampling in 1999. Community volunteers contribute two days, twice a year for training, sample collection and species identification. These annual sampling events help promote watershed stewardship within the local community. Nineteen locations are currently sampled in Genesee County and are shown in yellow on Figure 1.

2. Flint River GREEN

The Global Rivers Environmental Education Network (GREEN) is a curriculum based program designed to help inform youth about local environmental problems using water quality testing. The Genessee County Drain Commission (GCDC) on behalf of the Phase II program has partnered with the FRWC through funding and mentors. As part of the program, students from local schools learn about water quality and testing procedures by visiting various sites to take water samples, then analyzing the data.

3. County Health Department Beach Monitoring

Monitoring for *E. coli* bacteria is conducted by the Genessee County Health Department (GCHD) at several public swimming beaches throughout the summer season.

What is the health of my watershed?

The monitoring results presented are from April 2020 - June 2023. Benthic and water chemistry results are averaged by sample location with a "score". *E.coli* bacteria is measured in the number of *E.coli* in 100 milliliters of water (CFU/100mL). A geometric mean of three daily samples is used to determine if a beach is considered safe for swimming and the mean of the three samples must be below 300 CFU/100mL.

Water quality is influenced by rainfall. This is important to consider when summarizing results. High flow periods generally increase nutrient and bacteria concentrations. Benthic results may vary due to seasonal conditions.

Streams within the MS4 area ultimately drain to Saginaw Bay; a Great Lakes Area of Concern relative to excessive phosphorus loads. Sampling indicates that phosphorus concentrations in Genesee County exceed nutrient management targets used in other parts of Michigan. Future efforts to address Saginaw Bay and other areas of concerns could involve stormwater management.

1. Benthic

There appears to be an improving trend in macroinvertebrate community conditions within the MS4 urban area. Concerns remain in several streams, notably Gilkey Creek, Thread Creek, and Brent Run due to their benthic score. Improving trends are present in Thread Creek and the Flint River at Flushing Township Park while Swartz Creek, Gilkey Creek, and Brent Run have declined.

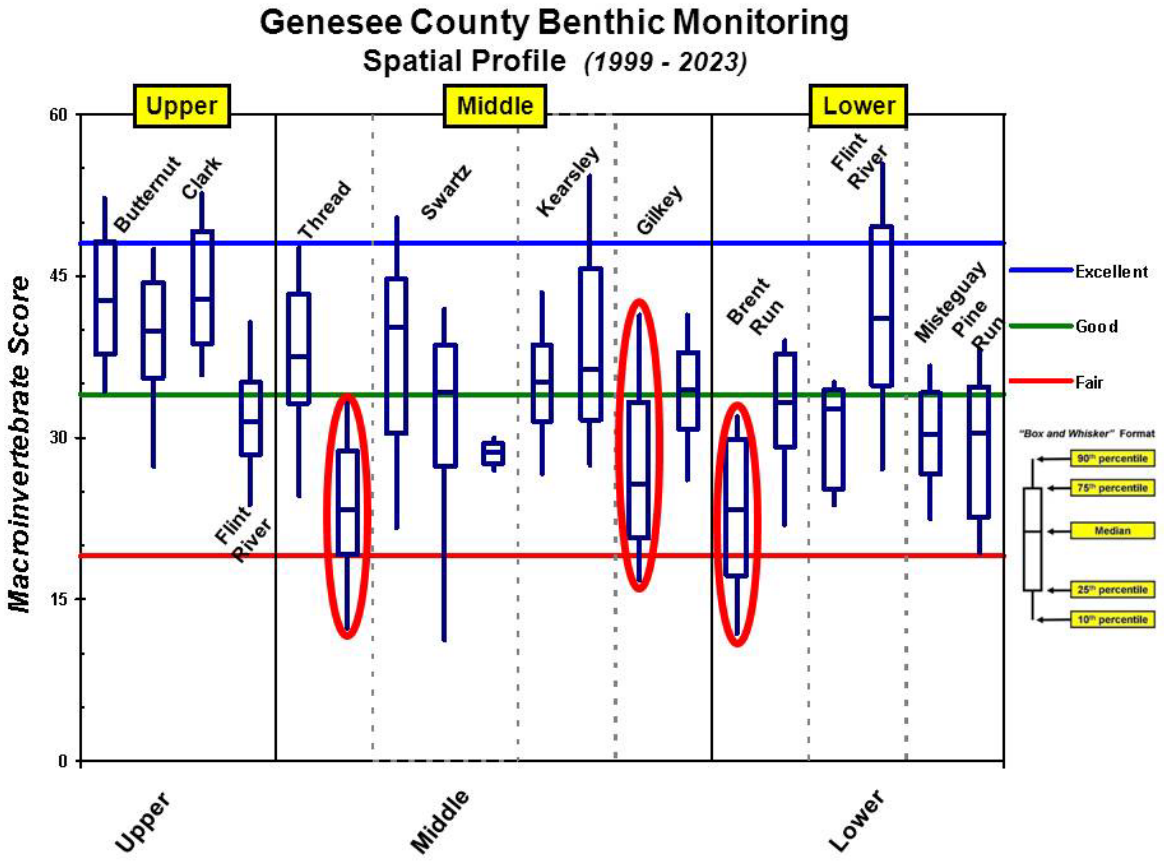
Table 1: Benthic Monitoring Summary

Stream	Location	Site ID	Reporting Period Results							Historic Median (1999-2019)	Trend
			Spring 2020	Fall 2020	Spring 2021	Fall 2021	Spring 2022	Fall 2022	Spring 2023		
Upper Flint River Watershed											
Butternut Creek	09N 08E S16 *(State Rd./M-15)*	26	30.2	44.8	52.0	---	48.0	49.2	---	42	Improving
	08N 07E S12 *(Mt. Morris Rd.)*	12	38.3	4.1	64.7	---	48.0	43.7	33.1	40	No Change
Clark Drain	08N 08E S16 *(State Rd./M-15)*	33	46.7	42.7	39.8	---	48.6	52.6	52.7	42	Improving
Flint River	*(Stepping Stone Falls)*	39	---	20.6	31.1	---	31.9	44.5		---	New Site
Middle Flint River Watershed											
Thread Creek	06N 08E S32 *(Baldwin Road)*	23	---	63.2	52.3	---	35.6	37.5		38	Improving
	07N 07E S20 *(Dort Highway)*	10	31.9	35.7	33.7	---	24.3	30.5		23	Improving
Swartz Creek	06N 06E S36 *(Baldwin Road)*	22	42.3	53.5	32.8	---	24.8	45.5		40	Mixed
	07N 06E S24 *(Golf Course)*	8	34.2	31.7	26.8	---	28.6	37.9	32.2	36	Declining
	(Confluence / Servall Big)	40	---	---	30.4	---	28.6	26.6		---	New Site
Kearsley Creek	06N 08E S36 *(Kipp Road)*	24	---	---	44.9	---	39.3	34.2		35	Improving
	07N 07E S02 *(Belsay Road)*	11	30.6	30.2	27.3	---	28.2	55.1	34.8	38	Declining
Gilkey Creek	07N 07E S23 *(Lippincott Blvd.)*	25	12.0	---	35.5	---	30.0	29.5		26	Improving
	07N 07E S07 *(Kearsley Park)*	35	33.4	30.2	37.7	---	35.3	30.4	14.3	36	Declining
Lower Flint River Watershed											
Brent Run	08N 06E S23 *(Coldwater Road)*	21	22.1	---	17.5	---	35.7	---	22.8	24	Mixed
	09N 05E S15 *(Vienna Road)*	15	28.7	---	33.4	---	26.6	14.3		34	Declining
Flint River	*(Mott Park)*	38	35.6	34.5	25.3	---	22.6	32.7		---	New Site
	08N 05E S03 *(Township Park)*	7	48.6	HAO[1]	54.4	---	52.4	47.5	53.1	40	Improving
Misteguay Creek	07N 05E S08 *(Duffield Road)*	20	---	---	31.6	---	35.0	29.2		30	Mixed
Pine Run	09N 06E S13 *(Morgan Road)*	30	19.5	---	40.9	---	35.6	33.0		30	Mixed
Shiawassee River Watershed											
Shiawassee River	05N 06E S19 *(Hogan Road)*	32	*Discontinued in 2020*							34	Declining
	05N 05E S20 *(Duffield Road)*	31								31	Mixed

Notes: [1] HAO : Habitat only evaluated *(no benthic monitoring)*

Cell shading: ***Excellent (>48)*** ***Good (34-48)*** ***Fair (19-33.9)*** ***Poor (<19)***

Figure 2: Benthic Monitoring Summary Box and Whiskers Plot



2. Water Chemistry

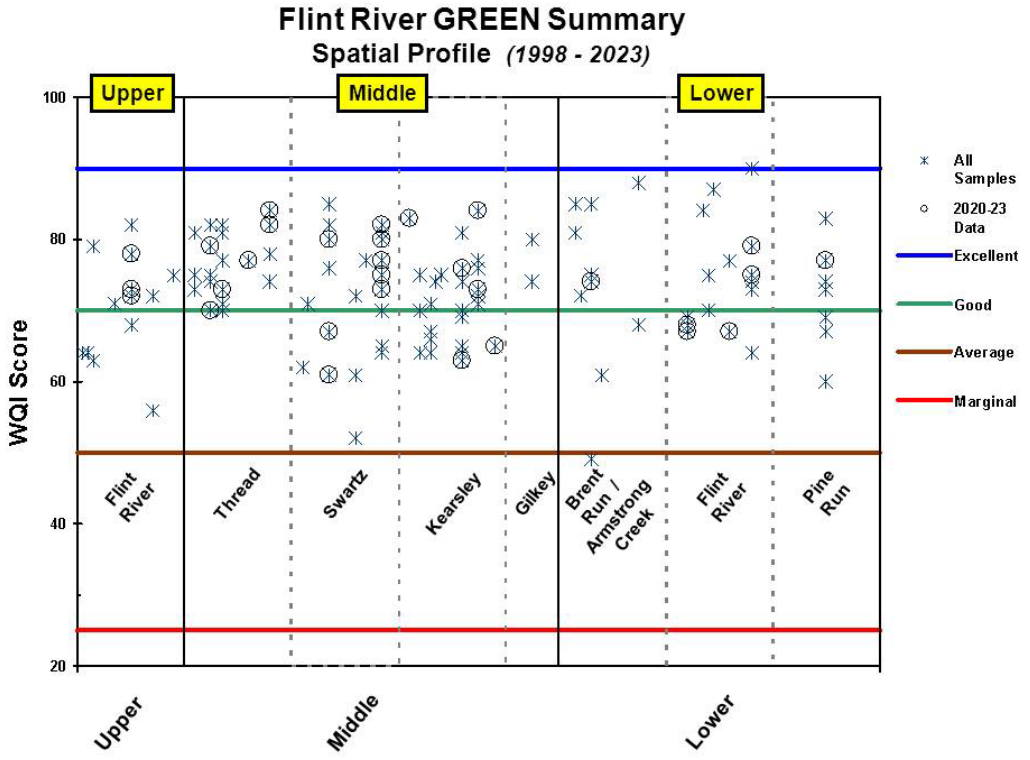
Several other streams were sampled for water chemistry data but not benthic data. All of the sampled streams scored as average to good within the water quality index (WQI).

Table 2: Flint River GREEN Data Summary

Stream	Location	School	Mentor Affiliation	Reporting Period Results (weighted WQI)					
				Fall 2020	*Spring 2021*	*Fall 2021*	*Spring 2022*	*Fall 2022*	*Spring 2023*
Upper Flint River Watershed									
Flint River	Stepping Stone Falls	*Mt. Morris Middle School*	*GCDC & FRWC*		*72*		*78*		*73*
Middle Flint River Watershed									
Thread Creek	Rust Park	*Genesee Area Skill Center*	*General Motors*				*70*		*79*
	Bristol Road	*Bendle High School*	*FRWC*				*73*		
Layman Drain	Perry Innovation Ctr.	*Perry Innovation Center*	*FRWC & MSU Ext.*		*77*				
Pierson Drain	Atherton High School	*Atherton High School*	*General Motors*		*82*		*84*		
W.B. Swartz Creek	Swartz Creek Middle School	*Swartz Creek High School*	*GM, MSU Ext, & Genesee CD*	*61*					
		Swartz Creek M.S.					*80*		*67*
Swartz Creek	south of Powers H.S.	*Powers Catholic H.S.*	*City of Flint*	*73*	*82*	*80*	*73*	*75*	*77*
Kearsley Creek	Goodrich High School	*Goodrich Middle School*	*Genesee Co. Parks*		*83*				
Black Creek	Jack Abernathy Park	*Davison Middle School*	*Genesee Co. Parks*				*76*		*63*
Crampton Drain	Kearsley Armstrong	*Armstrong Middle School*	*Genesee Co. Parks*		*84*		*73*		
Chipmunk Creek	Kearsley High School	*Armstrong Middle School*	*Genesee Co. Parks*						*65*
Lower Flint River Watershed									
Lake Drain	Coldwater Road	*Hamady High School*	*Genesee CD*				*74*		

Stream	Location	School	Mentor Affiliation	Reporting Period Results (weighted WQI)					
				Fall 2020	Spring 2021	Fall 2021	Spring 2022	Fall 2022	Spring 2023
Pine Run	Clio Park / Bike Path	*Clio Middle School*	*Genesee CD*				77		
Flint River	Mott Golf Course Bridge at hole #6	*St. John Vianney*	*City of Flint & GM*		67		68		
	Flushing County Park	*Bendle Middle School*	*Genesee Co. Parks*						67
	Barber Memorial Park	*Montrose Middle School*	*General Motors*		79		75		
Shiawassee River Watershed									
No Shiawassee Watershed sampling during reporting period									
Cell shading note:	***Excellent (>90)***	***Good (71-90)***	***Average (51-70)***	***Fair or Poor (0-50)***					

Figure 3: Flint River GREEN Data Summary Box and Whiskers Plot



3. *E. coli* bacteria

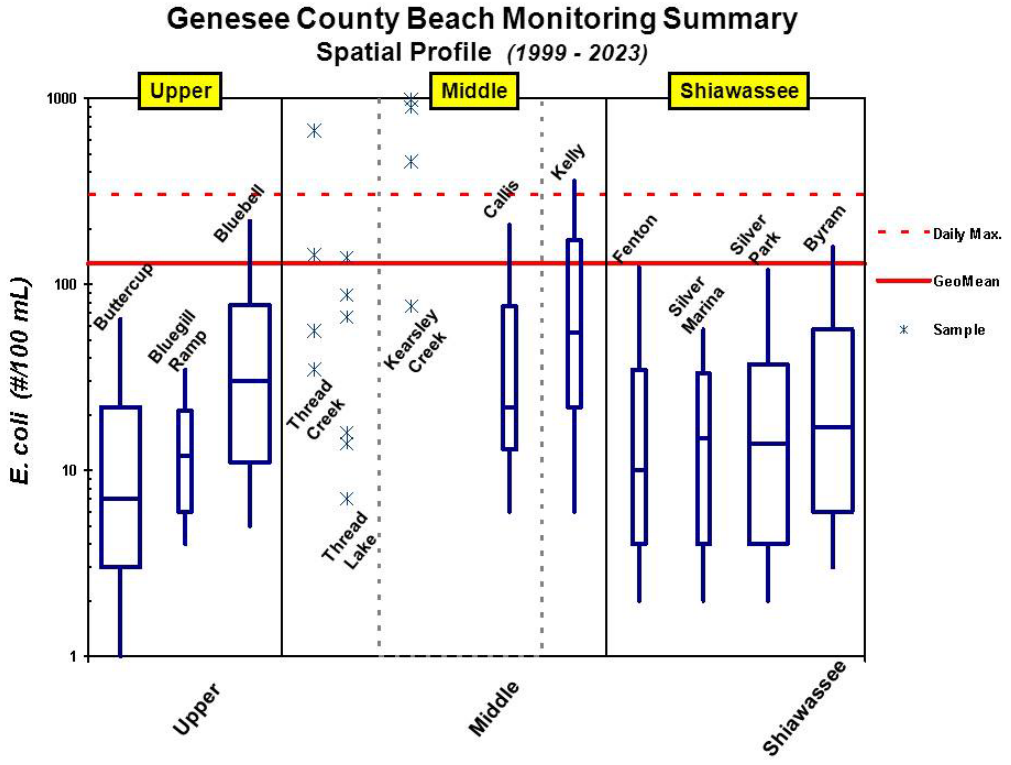
Results indicate elevated bacteria levels in the Upper Flint (Mott Lake) and Lower Flint watersheds with potential concerns in the Kearsley Creek subwatershed. However, data collected at Bluebell Beach on Mott Lake shows an improving trend evidenced by decreasing *E. coli* concentrations. The Michigan Department of Environment, Great Lakes, and Energy (EGLE) sampling highlights exceedances of Michigan's water quality criteria for total body contact recreation in the Swartz Creek and Thread Creek subwatersheds at multiple locations within the MS4 area.

Table 3: Beach Advisories Summary

Beach	Advisory Notification				Source
	Year	Dates	Type	Reason	
Bluebell Beach *(Mott Lake)*	**2023**	6/13-6/21	Closure	High bacteria levels	Unknown
	2019	8/27-10/31	Closure	High bacteria levels	Unknown
		6/6-6/7	Closure	High bacteria levels	Unknown
	2008	9/15-9/30	Contamination Advisory	High bacteria levels	Runoff
		7/28-8/4	Contamination Advisory	High bacteria levels	Unknown
	2007	8/9-10/31	Closure	High bacteria levels	Unknown

Beach	Advisory Notification				Source
	Year	Dates	Type	Reason	
	2005	8/8-10/1	Contamination Advisory	High bacteria levels	Unknown
Silver Lake *(City Park)*	**2021**	8/25-8/31	Closure	High bacteria levels	Unknown
		6/29-7/2	Closure	High bacteria levels	Unknown
	2019	8/20-10/31	Closure	High bacteria levels	Unknown
		6/11-6/12	Closure	High bacteria levels	Unknown
Byram Lake *(Clover Beach)*	**2015**	7/29-10/31	Closure	High bacteria levels	Unknown
		6/16-6/18	Closure	High bacteria levels	Unknown
		6/15-6/16	Contamination Advisory	High bacteria levels	Unknown
	2009	8/13-9/2	Contamination Advisory	High bacteria levels	Other Reason
	2006	6/29-7/1	Closure	High bacteria levels	Unknown
Fenton Lake *(Township Hall)*	**2010**	8/5-9/2	Contamination Advisory	High bacteria levels	Unknown
	2009	8/27-10/31	Contamination Advisory	High bacteria levels	Unknown

Figure 4: Beach Monitoring Summary Box and Whiskers Plot



How can we improve water quality?

The County manages stormwater with two main strategies. First, annual monitoring of storm sewer is conducted through water sampling and additional investigation if needed to identify and remove potential sanitary connections to the storm sewer. Second, maintaining and improving collection and treatment systems to prevent sewer overflows and effectively treat wastewater before releasing it back to surface waters.

Anyone can help improve water quality by observing your nearby storm drains or creeks for potential problems. Potential problems include:

- White bubbles or soap/chemical odors
- Sewage debris or odors
- Unnatural water or deposits coloring

If you notice anything that does not seem correct, please report to the GCDC at (810) 732-1590 or *https://www.gcdcwws.com/*.