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

Phase II Municipalities
Program Effectiveness Reporting

On behalf of:

Burton	Clio	Davison
Davison Twp	Fenton	Fenton Twp
Flint Twp	Flushing	Genesee Twp
Genesee County	Grand Blanc	Linden
Mt. Morris	Mt Morris Twp	Swartz Creek
Vienna Twp	Grand Blanc Twp (joined 1/1/2023)	

March 1, 2023 – March 1, 2024
Reporting Period

Prepared by:

The Genesee County Drain Commissioner SWM
On behalf of Genesee County and contracted Communities

This report summarizes activities completed for the period from March 1,2023 to March 1,2024, by the Genesee County Drain Commissioner's Office and the contracted Phase II Municipalities to meet the requirements of their National Pollutant Discharge Elimination System (NPDES) permit. This report is broken into six sections to coincide with the MI Waters website.

- PPP
- PEP
- IDEP
- **General Permit Requirements**

The effectiveness of the PEP program and the IDEP program are evaluated in several ways:

- "Bean counting" are the measurable goals in Table 2 of the permit application (PEP) being met See 2022-2023 PEP
- The outfalls in the IDEP plan being Identified and tested. see 2022-2023 IDEP
- The calls reporting Illicit Discharge being followed up on and eliminated. See 2022-2023 IDEP
- Water chemical testing from Project GREEN
- Benthic Monitoring results indicating overall water quality
- Beach testing results
- Social Survey- done each permit cycle
- Report by Tetra Tech on Program effectiveness and trend analysis. Using monitoring data collected.

GENESEE GREEN

As part of the program, students from local schools learn about water quality and testing procedures by visiting various sites to take water samples and by analyzing the collected data.

Schools are encouraged to participate in a summit, where students can present their findings. Collections were taken on 15 or more sites. The Symposium was held live at Mott in Spring of 2023 after being virtual for a couple of years. Samples for Spring 2024 are being taken and will be reported in next reporting cycle. All results, education and training on www.flintrivergreen.org

As part of the program, students from local schools learn about water quality and testing procedures by visiting various sites to take water samples and by analyzing the collected data. Many of the students get the opportunity to present their results, compare results to other sites, and get additional education at the Summit. This reporting period teachers are doing one of 3 things:

- Mentors taking samples and bringing to school to be tested.
- Mentors taking samples and testing students doing study work online with results.
- Teachers and students along with Mentors doing program as designed, pre-covid.

Each site visited is categorized as excellent, good, fair, poor, or very poor based on the National Sanitation Foundation (NSF) WQI analysis. To determine the WQI, nine tests are performed. Parameters tested include dissolved oxygen, fecal coliform, pH, biochemical oxygen demand (5-day), temperature, total phosphate, nitrates, turbidity, and total solids. After completing the nine tests, results are recorded and transferred to a weighting curve chart where a numerical value is obtained as shown in Table 7-1. For each test, the numerical value or Q-value between 0 and 10 is multiplied by a "weighting factor." For example, dissolved oxygen has a relatively high weighting factor (0.17) and therefore is more significant in determining water quality than the other tests. The nine resulting values are then added together to arrive at an overall WQI. If all nine water quality tests are not available, then the total of those samples available is multiplied by the inverse their total weighting factors.

Water Quality Index Calculation Chart

Test Parameter	Q-Value	Weighting Factor	Total
1. Dissolved oxygen	Q_{DO}	0.17	0.17 x Q_{DO}
2. Fecal coliform	Q_{FC}	0.16	0.16 x Q_{FC}
3. pH	Q_{pH}	0.11	0.11 x Q_{pH}
4.Biochemical oxygen demand	Q_{BOD}	0.11	0.11 x Q_{BOD}
5. Temperature	Q_T	0.11	0.11 x Q_T
6. Total phosphate	Q_P	0.10	0.10 x Q_P
7. Nitrates	Q_N	0.10	0.10 x Q_N
8. Turbidity	Q_{Turb}	0.08	0.08 x Q_{Turb}
9. Total solids	Q_{TS}	0.07	0.07 x Q_{TS}
		Overall WQI	Sum (Q_x)

Table I - WQI Quality Scale	
91-100:	Excellent water quality
71-90:	Good water quality
51-70:	Medium or average water quality
26-50:	Fair water quality
0-25:	Poor water quality

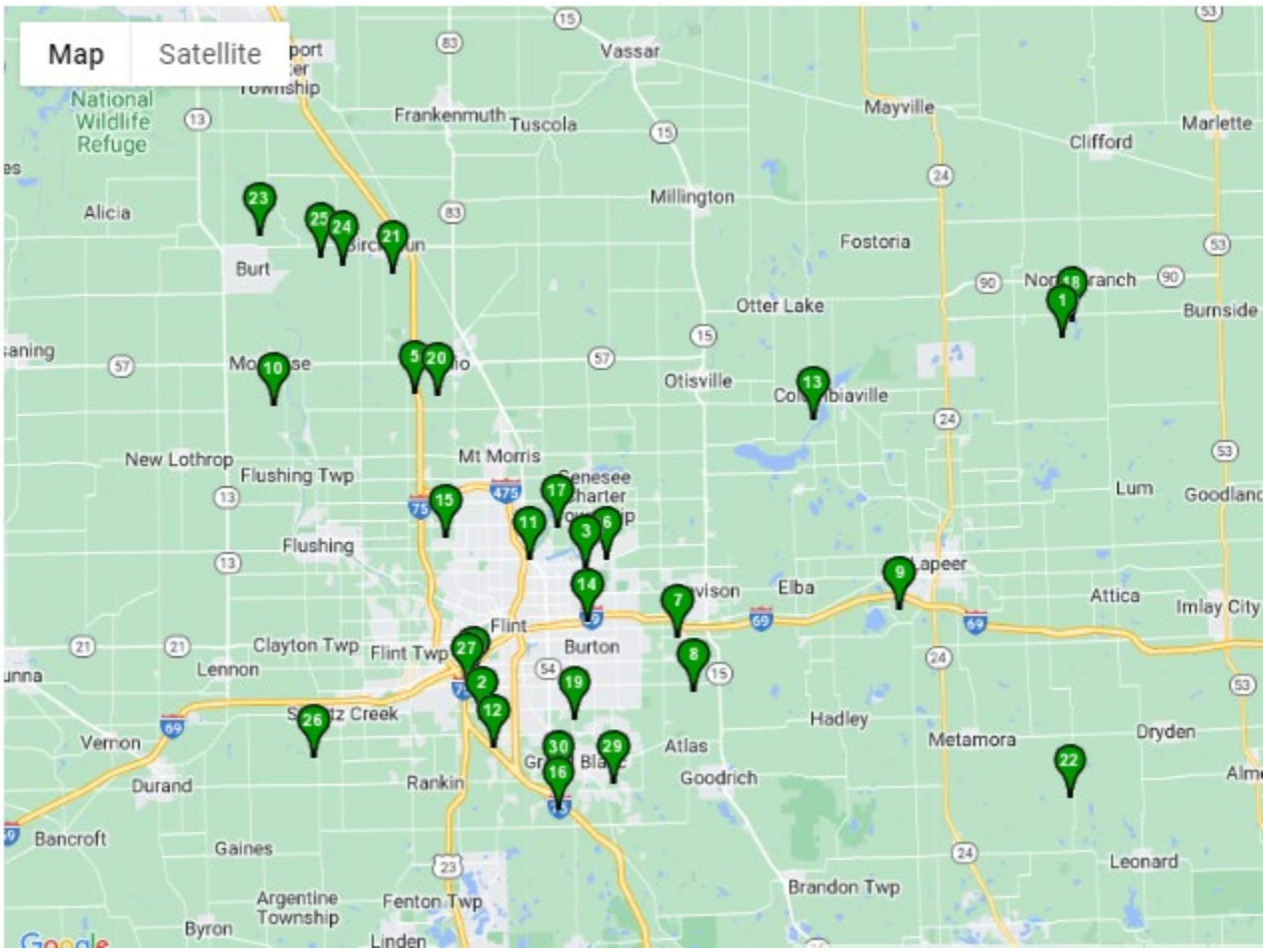
It should be noted that there was no discernible correlation between the Genesee GREEN Results and the Benthic Monitoring Results. Since the benthic monitoring results reflect the macroinvertebrates long term exposure to their environment the results are assumed to be more reflective of the overall health of the water body compared to the one-time sampling associated with Genesee GREEN.

[Reference: *Mitchell, Mark K. and William B. Sharp, 2000. Field manual for Water Quality Monitoring: An environmental education program for schools, (twelfth edition), Kendall/Hunt Publishing Company, Dubuque, Iowa*]

Much effort was spent by Tom Jones from GCDC-SWM to update the Green Website http://flintrivergreen.org/ last reporting period to allow teachers to directly enter the data and make that data available to the public. Through a grant the teacher education has been expanded.

Below are the results from the reporting period. Tetra Tech used the historic data to compile a Program Effectiveness and Trend Analysis report. Attached at end of this Document.

2023 School Year data



LOCATION	SCHOOL	MONTH / YEAR	WQI	WT WQI
Chipmunk Creek	Armstrong Middle School	4 / 2023	47.76	65
Davison Black Creek	Davison Middle School	4 / 2023	62.52	63
Flint River @ Steeping Stone Falls	Mt. Morris Middle School	4 / 2023	73.19	73
Flushing Park at Pavilion #2	Bendle Middle School	4 / 2023	67.28	67
Holloway Reservoir Columbiaville	LakeVille Middle School	4 / 2023	75.15	75
Swartz Creek at Swartz Creek M.S.	Swartz Creek Middle School	5 / 2023	67.34	67
Swartz Creek Golf Course	Southwestern Academy High School	10 / 2023	76.76	77

Swartz Creek south of Powers	Powers Catholic High School	5 / 2023	76.61	77
Thread Creek at Rust Park in Grand Blanc	Genesee Area Skill Center	4 / 2023	79.01	79
Thread Creek Rust Park Grand Blanc	Ways of Wonder	10 / 2023	45.61	62

2023 Flint River GREEN ~ Genesee County

School Detail and Educators

Teacher Count	Teacher	School	Mentor
1	Sue Pratt	Armstrong Middle School - Kearsley	Courtney Prout, Tom Esper
2	James Hall	Bendle Middle School	Darren Badgley and Cody R.
3	Todd Barden	Bendle High School	
4	Annette Young	Chatfield School	
5	Crystal Weekly	Davidson Middle School	Jody Kosiara
6	Tracey Groom	Genesee Career Institute	Anastasia Williams
7	Suzanne Powers	Grand Blanc High School	Jaime Welch
8	Tammy Wylie	Hamady Middle School - Westwood Heigh	Kelly Sanborn
9	Ken Whitney	LakeVille Memorial High School	Nicole Ferguson
10	Todd Snellenberger	Marshall Greene Middle - Birch Run	Autumn Mitchell and Julia Miller
11	Nick Finateri	Mt. Morris High School	Tom Jones and Kelly Sanborn
12	Elisabeth Rawling	Mt. Morris High School	Tom Jones and Kelly Sanborn
13	Carrie Wenta	Northbranch High School - Swartz Creek	Seven Ponds
14	Julie Lawrence	Powers Catholic High School	Powers Catholic High School
15	Hannah Lumley	Swartz Creek High School	Autumn Mitchell and Julia Miller

Not all school results were reported in this reporting period

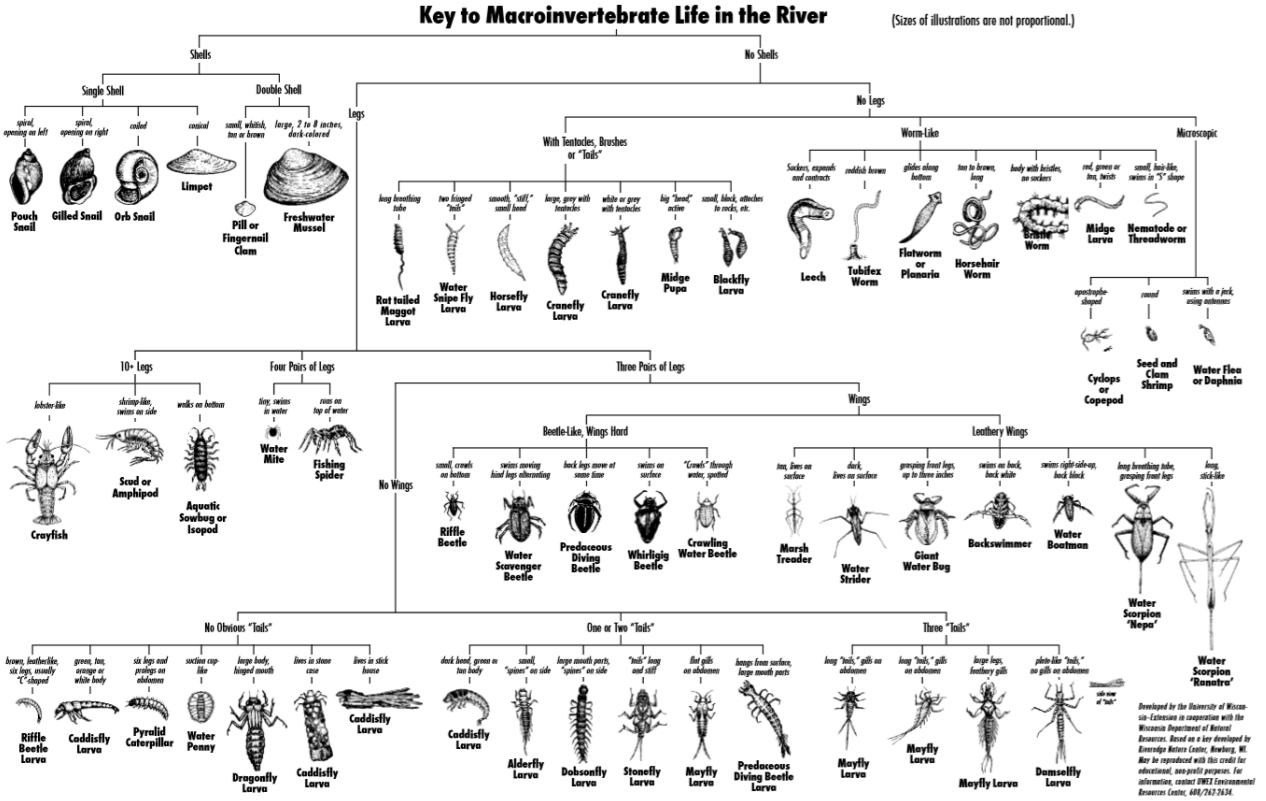
MACROINVERTEBRATE STUDY

Since 1999, the Flint River Watershed Coalition (FRWC) has executed a bi-annual Benthic Monitoring Program that has been designed to meet EGLE. This program has expanded from 18 to 30 sites since its inception.

This program is successful because volunteers who live in the watershed contribute two days, twice a year for training, sample collection and species identification. The scores for each site visit are averaged over the sample years and categorized as either Excellent (>48), Good (34 – 48), Fair (19 – 33.9), and Poor (<19). These scores not only give an indication of macroinvertebrate community health but also provide a good Water Quality Index value.

Below are the results from the reporting period. Tetra Tech used the historic data to compile a Program Effectiveness and Trend Analysis report. Attached at end of this Document.

Benthic monitoring has the benefit that it is not just a snapshot of the river. What “bugs” are found gives a good idea of the general heath of the water and soils allowing the more sensitive bugs to survive or not.



Weather prevented testing at 3 sites where water was too high or fast to safely collect samples.

It should be noted that there was no discernible correlation between the Project GREEN Results (Section 7) and the Benthic Monitoring results. Since the Benthic Monitoring results reflect the macroinvertebrates' long-term exposure to their environment, the results are assumed to be more reflective of the overall health of the water body compared to the one-time sampling associated with Project GREEN (which is more focused on inspiring youth).

Flint River- Fall of 2023 results will be reported in next reporting period. FRWC contract is based on old reporting cycle.

Keepers of the Shiawassee took over the 2 sites within the Shiawassee Watershed in 2020. They have also expanded to 3 to 4 sites. Collection sheets available at Drain Office.

FLINT RIVER WATERSHED COALITION
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Partnering to protect, preserve, and improve the Flint River watershed.
Flint River Watershed Coalition
630 W. Kearsley Street
Flint, MI 48503
810-767-6490

# of Sites	Current #	Site Name	Site Location	Score	Habitat Assessment	Monitors at Site	2022, Fall Volunteers
1	7	Flint River, Flushing	Flushing Twp T8NR5ES3	47.5	Yes	2	Molly Dalaire, Anna Darzi
2	8	Swartz Creek	Flint Twp T7NR7E	37.9	Yes	2	Sarah Scheitler and Jacques Doucet
3	9	Gilkey Creek	City of Flint T7NR7E	Discontinued			Discontinued
4	10	Thread Creek	Burton Twp T7NR7ES20	30.5	Yes	2	Stephanie and Rich Miller
5	11	Kearsley Creek (For-Mar)	Burton Twp T7NR7ES2	55.1	Yes	2	Molly Dalaire, Anna Darzi
6	12	Butternut Creek	Genesee Twp T8NR7ES12	43.7	Yes	2	Edie Almasy and Jenavieve McMurray
7	15	Brent Run	Montrose Twp T9NR5ES15	14.3	Yes	2	Darren Bagley and family
8	20	Misteguay Creek Headwaters	Clayton Twp T7NR5ES8	29.2	Yes	2	Rob Cojeen and family
9	21	Brent Run Headwaters	Mt. Morris Twp T8NR6ES23	22.8	Yes	3	Shelly Roberts, Darren Bagley and family
10	22	Swartz Creek Headwaters	Fenton Twp T5NR6ES6	45.5	Yes	2	Jaime & Jeff Welch
11	23	Thread Creek Headwaters	Grand Blanc Twp T6NR8ES32	37.5	Yes	6	Suzanne Powers and students
12	24	Kearsley Creek Headwaters	Atlas Twp T6NR8ES36	34.2	Yes	2	Molly Dallaire & Austin Brice
13	25	Gilkey Creek Headwaters	Burton Twp T7NR7ES1	29.5	Yes	8	Suzanne Powers and students
14	26	Butternut Creek, Headwaters	Forest Twp T9NR8ES16	49.2	Yes	2	Nicole Fergueson, Ryan Kelsey
15	30	Pine Run Headwaters	Vienna Twp T9NR6ES13	33	Yes	2	Jenavieve McMurray and Edie Almasy
16	31	Shiawassee River Argentine	Argentine Twp T5NR5ES20	Discontinued	Yes	Both Shiawassee sites have been handed over. Flint River sites at	
17	32	Shiawassee River Linden	Fenton Twp T5NR6ES19	Discontinued	Yes	Mott Park and Stepping Stone Falls will be replacing them	
18	33	Clark Drain, Richfield Park	Richfield Twp T8NR8ES16	52.6	Yes	3	Kellie and Bronwyn Alvarado and Jaylynn Walace
		Gilkey Creek, Kearsley Park	City of Flint T7NR7E	30.4	Yes	2	Jenavieve McMurray and Mary Jo Kietzman
20	38	Flint River, Mott Park Landing	City of Flint	32.7	Yes	2	Jaime Welch, Aaron Gievers
21		Flint River, Stepping Stone Falls East		44.5	Yes	2	Nicole Fergueson, Ryan Kelsey

Score Ratings:
> 48 = Excellent 10-33.9 = Fair
34-48 = Good < 19 = Poor

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Partnering to protect, preserve, and improve the Flint River watershed.
Flint River Watershed Coalition
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Flint, MI 48503
810-767-6490

# of Sites	Current #	*Previous #*	Site Name	Site Location	Score	Habitat Assessment	Monitors at Site	2023, Spring Volunteers
1	**7**	*10*	Flint River, Flushing	Flushing Twp T8	53.1	Yes	4	Molly Dalaire, Micah, Terra, and +1
2	**8**	*9*	Swartz Creek	Flint Twp T7NR7	32.2	Yes	2	Jaime Welch, Aaron Gievers
3	**9**	*13*	Gilkey Creek	City of Flint T7NF	Discontinued			Discontinued
4	**10**	*11*	Thread Creek	Burton Twp T7NF	28.6	Yes	2	Rich and Stephanie Miller
5	**11**	*12*	Kearsley Creek (For-Mar)	Burton Twp T7NF	34.8	Yes	4	Teresa Yoder and students
6	**12**	*6*	Butternut Creek	Genesee Twp T8	33.1	Yes	2	U of M students Sam and Justin
7	**15**	*15B*	Brent Run	Montrose Twp T9	33.1	Yes	5	Teresa Yoder and students
8	**20**	*8B*	Misteguay Creek Headwaters	Clayton Twp T7N	30.6	Yes	4	Teresa Yoder and students
9	**21**	*15B*	Brent Run Headwaters	Mt. Morris Twp T	17.5	Yes	3	Shelly Roberts, Darren Bagley and family
10	**22**	*9B*	Swartz Creek Headwaters	Fenton Twp T5N	32.8	Yes	2	Jaime and Jeff Welch
11	**23**	*11B*	Thread Creek Headwaters	Grand Blanc Twp	52.3	Yes	4	Teresa Yoder and students
12	**24**	*12B*	Kearsley Creek Headwaters	Atlas Twp T6NR8	44.9	Yes	2	Molly Dalaire, Anna Darzi
13	**25**	*13B*	Gilkey Creek Headwaters	Burton Twp T7NF	35.5	Yes	4	Teresa Yoder and students
14	**26**	*6B*	Butternut Creek, Headwaters	Forest Twp T9NF	52	Yes	5	Teresa Yoder and students
15	**30**	*7B*	Pine Run Headwaters	Vienna Twp T9N	40.9	Yes	3	Rob Cojeen and family
16	**31**	*20*	Shiawassee River Argentine	Argentine Twp T5	Discontinued		Both Shiawassee sites have been handed over.	
17	**32**	*21*	Shiawassee River Linden	Fenton Twp T5N	Discontinued		Flint River sites at Mott Park and Stepping Stone Falls instead	
18	**33**	*16R*	Clark Drain, Richfield Park	Richfield Twp T8	39.8	Yes	3	Kellie and Bronwyn Alvarado and Pam Ruggiero
19	**35**		Gilkey Creek, Kearsley Park	City of Flint T7NF	37.2	Yes	2	Molly Dalaire, Anna Darzi
20	**38**		Flint River, Mott Park Landing	City of Flint	25.3	Yes	2	Jaime Welch, Marcell Simmons
21			Flint River, Stepping Stone Falls East		31.1	Yes	2	Ryan Kelsey, Nicole Ferguson

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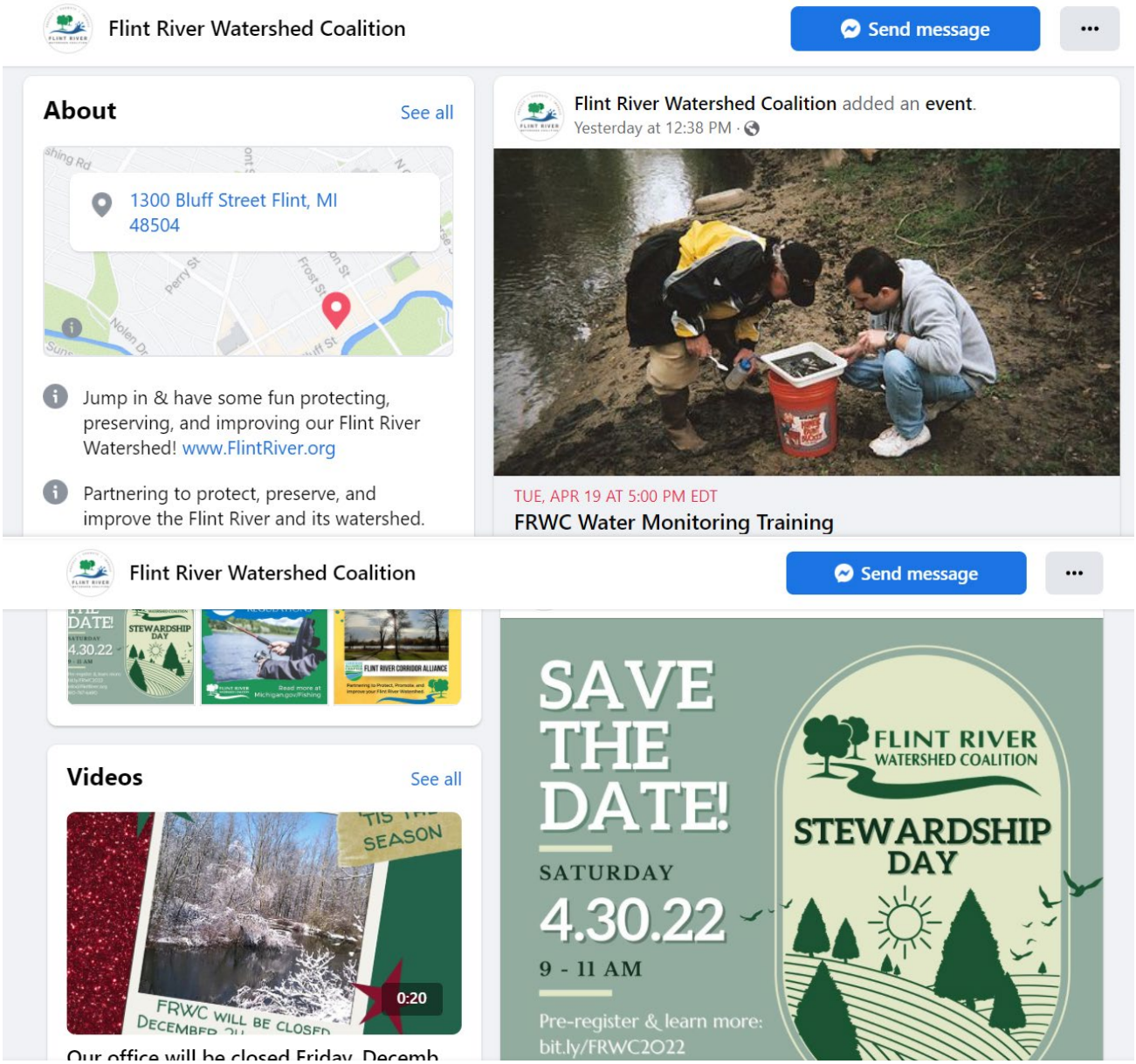
Score Ratings:	
> 48 = Excellent	10-33.9 = Fair
34-48 = Good	< 19 = Poor


Flint River Watershed Coalition
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1300 Bluff Street Flint, MI 48504
Jump in & have some fun protecting, preserving, and improving our Flint River Watershed! www.FlintRiver.org
Partnering to protect, preserve, and improve the Flint River and its watershed.
Flint River Watershed Coalition added an event.
Yesterday at 12:38 PM
TUE, APR 19 AT 5:00 PM EDT
FRWC Water Monitoring Training
Flint River Watershed Coalition
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Videos
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SEASON
FRWC WILL BE CLOSED
0:20
SAVE THE DATE!
SATURDAY
4.30.22
9 - 11 AM
Pre-register & learn more:
bit.ly/FRWC2022
FLINT RIVER WATERSHED COALITION
STEWARDSHIP DAY

BEACH TESTING RESULTS

Blue bell beach in Genesee Township has been tested each summer by the Health Department. Results below.

Advisory Year	Start Date	Reopen Date	Days Closed	Type	Reason	Source
2023						
	6/13/2023	6/21/2023	8	Closure	High bacteria levels	Unknown
2019						
	8/27/2019	10/31/2019	65	Closure	High bacteria levels	Unknown
	6/4/2019	6/7/2019	3	Closure	High bacteria levels	Unknown
2008						
	9/15/2008	9/30/2008	15	Contamination Advisory	High bacteria levels	Runoff
	7/28/2008	8/4/2008	7	Contamination Advisory	High bacteria levels	Unknown
2007						
	8/9/2007	10/31/2007	83	Closure	High bacteria levels	Unknown
2005						
	8/8/2005	10/1/2005	54	Contamination Advisory	High bacteria levels	Unknown

Sample Year	Sample Date	Sample Type	Analysis Method	Result Value
2023				
Bluebell Beach Mott Lake	08/28/2023 8:14 AM	Individual	Colilert-18 hour	39.3
Bluebell Beach Mott Lake	08/28/2023 8:14 AM	Individual	Colilert-18 hour	142.1
Bluebell Beach Mott Lake	08/28/2023 8:14 AM	Individual	Colilert-18 hour	54.5
	08/28/2023	30-Day Mean	Colilert-18 hour	49.3016
	08/28/2023	Daily Mean	Colilert-18 hour	67.2658
Bluebell Beach Mott Lake	08/21/2023 8:20 AM	Individual	Colilert-18 hour	21.1
Bluebell Beach Mott Lake	08/21/2023 8:20 AM	Individual	Colilert-18 hour	27.8
Bluebell Beach Mott Lake	08/21/2023 8:20 AM	Individual	Colilert-18 hour	13.5
	08/21/2023	Daily Mean	Colilert-18 hour	19.9321
	08/21/2023	30-Day Mean	Colilert-18 hour	38.0131
Bluebell Beach Mott Lake	08/14/2023 8:47 AM	Individual	Colilert-18 hour	12
Bluebell Beach Mott Lake	08/14/2023 8:47 AM	Individual	Colilert-18 hour	21.3
Bluebell Beach Mott Lake	08/14/2023 8:47 AM	Individual	Colilert-18 hour	7.4
	08/14/2023	30-Day Mean	Colilert-18 hour	49.2165
	08/14/2023	Daily Mean	Colilert-18 hour	12.367
Bluebell Beach Mott Lake	08/07/2023 9:20 AM	Individual	Colilert-18 hour	88
Bluebell Beach Mott Lake	08/07/2023 9:20 AM	Individual	Colilert-18 hour	88
Bluebell Beach Mott Lake	08/07/2023 9:20 AM	Individual	Colilert-18 hour	88.4

	08/07/2023	Daily Mean	Colilert-18 hour	88.1331
	08/07/2023	30-Day Mean	Colilert-18 hour	48.3566
Bluebell Beach Mott Lake	07/31/2023 9:00 AM	Individual	Colilert-18 hour	228.2
Bluebell Beach Mott Lake	07/31/2023 9:00 AM	Individual	Colilert-18 hour	201.4
Bluebell Beach Mott Lake	07/31/2023 9:00 AM	Individual	Colilert-18 hour	172.3
	07/31/2023	30-Day Mean	Colilert-18 hour	37.6603
	07/31/2023	Daily Mean	Colilert-18 hour	199.321
Bluebell Beach Mott Lake	07/24/2023 8:47 AM	Individual	Colilert-18 hour	14.6
Bluebell Beach Mott Lake	07/24/2023 8:47 AM	Individual	Colilert-18 hour	22.8
Bluebell Beach Mott Lake	07/24/2023 8:47 AM	Individual	Colilert-18 hour	18.5
	07/24/2023	Daily Mean	Colilert-18 hour	18.3296
Bluebell Beach Mott Lake	07/17/2023 9:30 AM	Individual	Colilert-18 hour	90.6
Bluebell Beach Mott Lake	07/17/2023 9:30 AM	Individual	Colilert-18 hour	56.5
Bluebell Beach Mott Lake	07/17/2023 9:30 AM	Individual	Colilert-18 hour	74.5
	07/17/2023	Daily Mean	Colilert-18 hour	72.5177
Bluebell Beach Mott Lake	07/10/2023 9:30 AM	Individual	Colilert-18 hour	10
Bluebell Beach Mott Lake	07/10/2023 9:30 AM	Individual	Colilert-18 hour	11
Bluebell Beach Mott Lake	07/10/2023 9:30 AM	Individual	Colilert-18 hour	13.2
	07/10/2023	Daily Mean	Colilert-18 hour	11.3237
Bluebell Beach Mott Lake	07/05/2023 8:15 AM	Individual	Colilert-18 hour	22.9
Bluebell Beach Mott Lake	07/05/2023 8:15 AM	Individual	Colilert-18 hour	27.9
Bluebell Beach Mott Lake	07/05/2023 8:15 AM	Individual	Colilert-18 hour	25.2
	07/05/2023	Daily Mean	Colilert-18 hour	25.2511
Bluebell Beach Mott Lake	06/20/2023 9:12 AM	Individual	Colilert-18 hour	51.2

Bluebell Beach Mott Lake	06/20/2023 9:10 AM	Individual	Colilert-18 hour	83.6
Bluebell Beach Mott Lake	06/20/2023 9:09 AM	Individual	Colilert-18 hour	63.8
	06/20/2023	Daily Mean	Colilert-18 hour	64.8782
Bluebell Beach Mott Lake	06/12/2023 9:14 AM	Individual	Colilert-18 hour	360.9
Bluebell Beach Mott Lake	06/12/2023 9:12 AM	Individual	Colilert-18 hour	436
Bluebell Beach Mott Lake	06/12/2023 9:10 AM	Individual	Colilert-18 hour	419.8
	06/12/2023	Daily Mean	Colilert-18 hour	404.239 *
Bluebell Beach Mott Lake	06/05/2023 8:30 AM	Individual	Colilert-18 hour	4.1
Bluebell Beach Mott Lake	06/05/2023 8:30 AM	Individual	Colilert-18 hour	12.2
Bluebell Beach Mott Lake	06/05/2023 8:30 AM	Individual	Colilert-18 hour	13.4
	06/05/2023	Daily Mean	Colilert-18 hour	8.7515
Bluebell Beach Mott Lake	05/30/2023 8:20 AM	Individual	Colilert-18 hour	75.4
Bluebell Beach Mott Lake	05/30/2023 8:20 AM	Individual	Colilert-18 hour	59.4
Bluebell Beach Mott Lake	05/30/2023 8:20 AM	Individual	Colilert-18 hour	55.4
	05/30/2023	Daily Mean	Colilert-18 hour	62.838

Silver Lake- City Park beach in Fenton Township has also been tested each summer by the Health Department. Results below. No Closures and Advisories for 2023-2024 reporting period. Although it shows sampling was to be done, results for reporting period were not given to State.

Advisory Year	Start Date	Reopen Date	Days Closed	Type	Reason	Source
2021						
	8/25/2021	8/31/2021	6	Closure	High bacteria levels	Unknown
	6/29/2021	7/2/2021	3	Closure	High bacteria levels	Unknown
2019						
	8/20/2019	10/31/2019	72	Closure	High bacteria levels	Unknown
	6/11/2019	6/12/2019	1	Closure	High bacteria levels	Unknown

Although there are othe Beaches within Genesee County, these are the ones that have reported reults in the past.

SOCIAL SURVEY

In 2006 GCDC-SWM did a baseline social survey. Through a SAW grant a new survey was performed in 2016 and compiled in 2017. The same survey was not used. The original 2006 survey was custom made. By 2016 there had been many water quality surveys produced and the 2016 survey was revised to follow best practices.

The complete survey results and conclusions for the 2017 survey with in the appendix compiled results for the 2006 survey are located at http://www.gcdcswm.com/PhaseII/Survey%20Results/survey_results.htm

Then next Social survey is planned for the 2024-2029 permit cycle.

The executive Summary and Introduction have been included following:

EXECUTIVE SUMMARY

In late winter and early spring of 2016, the Our Water consortium in conjunction with the Genesee County Drain Commissioner's office conducted a social survey within the urbanized watershed areas of Genesee County. The format was a mail survey with the option given to complete it on-line. Administered by the Genesee County Drain Commissioner's office, and partially funded through a Department of Environmental Quality Stormwater, Asset Management and Wastewater (SAW) Grant, the social survey produced a statistically significant sample for the County. A total of 958 were mailed out and 345 responses were collected for a confidence level of 94.7% for the survey. Individual responses from residential landowners are confidential and anonymous. The survey assessed: public awareness, perception, and knowledge of the watershed and storm pollution issues; current activities impacting water resources; and willingness to take action to protect water resources. Following are some of the key findings revealed by the survey.

RESULTS

Perceptions of Current Water Quality

Thirty-four percent of respondents indicated that they thought that the current water quality had stayed the same over time, all though 32% said they didn't know. Respondents were not required to answer for each of the activities. Hence the high "No Response" rate. When asked whether local water quality was "good" for various activities the following results were reported:

Question #	Poor	Okay	Good	No Response
For canoeing / kayaking / other boating	8%	30%	34%	28%
For eating locally caught fish	29%	21%	15%	35%
For swimming	22%	35%	18%	25%
For picnicking and family activities	6%	31%	44%	19%
For fish habitat	14%	26%	23%	37%
For scenic beauty	6%	36%	48%	10%

The overwhelming majority of respondents perceive the non-contact recreational uses to be 'good' to 'okay'; only a small fraction rated these uses as 'poor.' Non- contact recreational uses include; canoeing, kayaking, boating, picnicking, family activities, and general scenic beauty.

Your Water Resources

About 64% of respondents said they spent leisure time on Genesee County water body in the last year. The activities that they indicated they did, in order of preference were:

1.0	For scenic beauty	74%
2.0	Hiking/walking/cycling along shoreline	46%
3.0	For fish habitat	37%
4.0	For swimming	35%
5.0	For canoeing / kayaking / other boating	35%
6.0	For eating locally caught fish	29%

The six top waterbodies mentioned were the Holloway Reservoir, Mott Lake/Bluebell Beach, the Flint and Shiawassee Rivers and Fenton and Silver Lakes.

If local residents' needs are being met by the currently perceived water quality conditions, then it will be difficult to motivate them to improve conditions. For marketing purposes it would be best to communicate proposed actions as necessary to preserve the current level of amenities for the future rather than improving conditions for activities that may not be supported.

Personal Responsibility

The results of the questions on benefits and responsibilities statements indicate that respondents believe it is their responsibility to help protect local water quality, their actions have an impact, and believe that their quality of life depends on it. They do not appear to be willing to sacrifice water quality even if slows economic development. They are only somewhat inclined to change how they do things and even less likely to want to pay for improvements. These results suggest a slight disconnect between comprehending the importance of water quality and respondents' willingness to take immediate action or pay to ensure its continuance into the future.

A deep analysis through the creation of constructs by combining the answers from multiple questions confirms the above findings. Respondents recognize the importance of having good water quality and that their actions impact it. They also recognize that the cost of protection (economics) influences decisions.

These findings are encouraging since it commonly requires a high level of conviction by individuals to carry through with their intentions (to protect water quality) if the barriers to implementation are high.

Water Impairments, Sources of Pollutants, and Consequences of Poor Water Quality

Water quality testing and expert opinion have identified: sediment, bacteria, oil and grease, arsenic, pesticides, and temperature as key water impairments. These impairments emanate from multiple sources and impact waterbodies in a variety of ways (consequences). Sources of these impairments are located throughout the watershed and have led to the State classifying two area as not attaining some of the designated uses. The survey results indicated a *low* awareness of the sources of water impairments, the impairments themselves, and the consequences associated with the presence of these impairments.

Practices to Improve Water Quality

The survey looked at respondents' awareness of, and willingness to adopt various best management practices (BMPs) designed to protect water quality. Results from this section are complex. In summary, the respondents believe they are doing a good job of implementing BMPs (about 50% reported they were currently using many of the practice), which may or may not be true. Respondents were overwhelmingly willing to adopt the majority of the residential practices surveyed. BMPs requiring construction received the least support, perhaps due to the perceived expense.

Awareness Indicators

Indicators to measure respondent awareness of the "types", "sources" and "consequences" of pollutants were constructed using the respective sections. An indicator for respondent awareness of the "practices to improve water quality" was also constructed. The indicators were calculated by re-coding the answers and then summing the new values for each respondent and dividing by the number of responses that apply.

Respondents indicated an overall awareness of pollutants, sources, consequences and the practices available to improve water quality. The gap between their awareness scores and knowledge scores reported above points to a lack of confidence in what they think they know is true and being confident enough to make decisions. These results indicate that although there needs to be a continued general education effort there is also an emerging need for technical information and support aimed at improving local water quality that people can access and implement behavioral changes and building confidence in their actions.

Making Management Decisions

This section solicited responses on perceived constraints to adopting new management practices. Examples of constraints included cost, skill level required to implement, and available equipment. Only two of the nine constraints pose barriers (out-of-pocket expenses and access to necessary equipment) to roughly one-third of the residential respondents.

The results of questions on constraints were supported by two indicators, one on behavior and the other on adopting key practices that were constructed from a variety of questions. The indicator results suggest that overall, respondents do not perceive themselves having major constraints to changing their behavior (attitude) nor to adopting key practices (structural). There is a substantial standard deviation on these indicators but results (based on valid responses) are fairly robust and therefore reliable.

Septic Systems

Thirty-five percent of residential property owners had septic systems. The average age for respondents' septic systems was 33 years, while the median score was 35 years. The age of the septic systems presents a looming problem.

Information Sources and Policy

The top trusted source indicated by residential respondents was MSU Extension, by about 18% over other sources. The other five sources ranged between 50% - 63% support with no other clear preference. MSU Extension was also the most trusted source in the 2006 survey.

The primary disseminators of information with regard to stormwater management are the Drain Commissioner's Office and the Flint River Watershed Coalition. Both sources were rated by respondents as being in the moderate rage with regard to trust. This has implications with how messages/information is distributed; supporting sources should always be clearly cited, thus lending credibility to the message.

It is also recommended that MSU Extensions and the County Health Department's roles be expanded/strengthened based on the respondent reported trust level. Partnering for the purposes of disseminating information as well as joint events are two possible actions that might be explored.

<u>Information Methods</u>

Newsletters/brochures/fact sheets and the internet, were the methods of communication that were most preferred.

The top two preferred information formats are indeed the primary avenues that the "Our Water" group disseminates information. Cross pollinating between the two is a necessity and should be continued. Other vehicles should refer to these two primary methods of information. Based on the results from the 2006 survey, newspapers/magazines should be a part of the media methods employed. Radio appears to have a declining audience.

RECOMMENDATIONS

The following recommendations are based solely on the results of the Social Survey and the detected changes from the 2016 survey. Furthermore, there are not intended to be any recommendations that duplicate NPDES Phase II storm water permit requirements (e.g. street sweeping). The recommendations are as follows:

1. Move to the next stage in the public education process. Respondents indicated they knew the key actions that need to be taken to protect local water quality. Public education should move towards incorporating more information on impairments and the consequences associated with them; techniques available to protect waterways (e.g. no-mow buffers); and providing technical assistance for the practices such as rain barrels and rain gardens.

2. Focus marketing messages on enjoying the local scenic beauty, and Hiking/walking/cycling along the shoreline. These are the most important activities to respondents.
3. All existing and new programs should be cross referenced with the constraints identified by respondents as documented in this report, and then tailored to help the target audience reach the desired behavior. For example, work with local suppliers to provide technical information for the installation of rain barrels.
4. Institute a proactive septic system program aimed at the inspection and maintenance of existing systems.
5. All information disseminated should refer back to the 'Our Water" website. Information should be coordinated between agencies. Not all information sources carry equal credibility with all stakeholders, so the message and delivery mechanism (e.g. internet) should be coordinated to be most effective.
6. The internet is increasingly becoming the preferred information delivery method. Efforts should be made to strengthen links between the subwatershed program information page and trusted information sources, such as with the MSU Extension.

INTRODUCTION

PURPOSE OF THE STUDY

The social data collected for this project is intended to develop indicators to serve both as intermediate measures for the purpose of performance review, and information to assist in the design of effective outreach and education interventions for Non-Point Source (NPS) pollution management. The purpose of the evaluation is to collect baseline information on environmental awareness and attitudes for the Genesee County watersheds. This project was in part funded through a Department of Environmental Quality Stormwater, Asset Management and Wastewater (SAW) Grant.

PROBLEM DEFINITION AND RATIONALE

Data collection is for socio-behavioral information. Municipal NPS projects, both structural and non-structural, aim to reduce pollution and involve the interaction of humans with their natural environment. Evaluating the effectiveness of programs to reduce NPS water pollution, therefore, needs to include an assessment of the human behavior underlying the pollution. Water quality problems have built up over many decades and may take decades to amend. Even when appropriate practices are put into place, there will be a lag before water quality shows improvement. Confirming the adoption of corrective practices, and beneficial attitudinal changes, are more immediate indicators of anticipated water quality change.

Evaluating the social component of NPS water quality programs and projects involves more than identifying changes in behavior in critical areas of the watershed; it also requires consideration of the continuum of knowledge, awareness, attitudes, constraints, and capacity that eventually leads to behavioral change. Because decisions regarding individual behaviors are influenced by a complex interplay of factors, measuring the precursors or contributing factors leading to the change will give managers additional information that will help insure that funded activities will accomplish water quality goals, and provide direction for future projects. If an NPS project or program positively influences the precursors, it is advancing the goal of achieving the desired behavioral change.

Measuring change in behavioral precursors requires the use of a variety of *social indicators* that represent or reflect those precursors. *Social indicators are measures that describe the capacity, skills, knowledge, values, beliefs, and behaviors of individuals, households, organizations, and communities.* By measuring these indicators, water quality managers can determine whether policies, programs, and initiatives are likely to lead to the intended behavioral change in a watershed's most critical areas and, ultimately, to improvements in water quality.

In 2006 a phone survey was administered prior to the commencement of the public outreach effort. The purpose of the survey focused on determining the publics' current actions and willingness to adopt the *Seven Simple Steps* program (http://www.cleargeneseewater.org/). Since 2006, the science of stormwater management social surveys had advanced significantly, as evidenced by the SIPES program (see below) and although not statistically significant, the information collected will be used for comparison when applicable.

TOOLS

This project used the Social Indicator Planning and Evaluation System (SIPES) for NPS management and an on-line data tool – the Social Indicators Data Management and Analysis (SIDMA) system (both can be found at http://35.8.121.111/si/Projects/ProjectsHome.aspx).

STUDY DESIGN AND ANALYSIS

Questions

The data collected for this project was intended to serve both as an intermediate measure for the purpose of performance review, and as information to assist in the design of effective interventions outreach, and education interventions for NPS pollution management. Data will help to answer a variety of questions related to awareness, attitudes, and behavior related to NPS pollution. Questions in the survey aimed to help determine public awareness or misconceptions about topics such as:

- Connections between storm water and pollution
- The community's level of concern about pollution
- Individual practices that contribute to NPS
- Individual characteristics and barriers to behavior change

Questions and answers have been designed to provide information in order to work towards the following intended outcomes:

- Increased awareness of relevant technical issues and/or recommended practices;
- Changed attitudes to facilitate desired behavior change;
- Reduced constraints to behavior change;
- Increased capacity to leverage resources in critical areas;
- Increased capacity to support appropriate practices;
- Increased adoption of practices to maintain or improve water quality;
- Increased adoption of improved management of septic systems; and
- Increased efficiency and effectiveness in delivery of information to the public.

Sample Size

The project planned to survey a sample population of the target audience, of 383 residential landowners. A total of 958 were mailed out and 345 responses were collected for a confidence level of 94.7% for the survey. Individual responses from residential landowners are confidential and anonymous.

Survey Process

The survey process included a series of mailings. Respondents were given the option to complete the survey on-line or return the survey by mail. Identification numbers, included in the mailed survey packet, were required to access the on-line system in order to ensure that duplication did not occur.

The survey was administered using the following steps:

Step 1: Sent an initial letter of introduction to notify the homeowner that they would be receiving a survey and to stress the importance of completing and returning it.
Returned letters were dropped and replaced on the master list of recipients.
Step 2: Two to two-and-a-half weeks after the introduction letter was mailed, the survey itself was delivered, along with an accompanying letter and pre-paid return envelope.
Step 3: One to two weeks after the survey was delivered, a reminder post card explaining the importance of filling out the survey is sent.
Step 4: Three to four weeks after the first survey is sent out, a second survey and accompanying letter were mailed out.
Step 5: A final survey and letter were mailed out two to three weeks after the second survey was delivered.
Respondents who submit surveys have their names removed from the follow-up list and are not contacted again throughout the process.

SIDMA DATA ANALYSIS AND INTERPRETATION

The SIDMA report presents the frequency of the results and the averages for each survey question. The report also produces calculated scores for the social indicators. Average values for each question provide a quick and easy way to understand how respondents answered each question. The SIDMA report provides an idea of the overall strengths and weaknesses within the watershed. Are people familiar with the practices you are hoping to have installed? Does the population as a whole understand the sources and consequences of the pollutants of concern? These are the sorts of questions answered by frequency and average data. The SIDMA report also helps to find important relationships in the survey results. While the averages will help identify characteristics that may facilitate or impede practice adoption for the watershed, it may miss important trends that can help focus future efforts.

ORGANIZATION OF THIS DOCUMENT

The surveys for the residential land owners contained thirteen (13) categories of questions. This document looks at each questionnaire category. Within each category, information is presented on the specific questions asked, the raw results, and a brief analysis with observations. A copy of the survey instrument used is in Appendix A. A summary of overall recommendations follows the survey categories results.

The following survey question categories are included in this report:

1.0 Rating of Water Quality
2.0 Your Water Resources
3.0 Your Opinions
4.0 Water Impairments
5.0 Sources of Water Pollutants
6.0 Consequences of Water Pollutants
7.0 Practices to Improve Water Quality (residential)
8.0 Septic Systems
9.0 Specific Constraints to Practices
    8.1 Rain Gardens
    8.2 Rain Barrels
10.0 Reported Behavior
11.0 Making Management Decisions
12.0 Information Sources and Policies
13.0 About You (demographics)