ROUGE RIVER COLLABORATIVE PUBLIC EDUCATION PLAN (PEP) 2022-2023 PROGRESS REPORT



Prepared by:

Alliance of Rouge Communities
OURS TO PROTECT
Working together, restoring the river

46036 Michigan Ave., Suite 126
Canton, Michigan 48188

March 22, 2024

A. Purpose

This report summarizes the activities undertaken to implement the Rouge River Collaborative Public Education Plan (Plan) which was approved by the Michigan Department of Environment, Great Lakes and Energy (EGLE) in March 2017. The Plan is part of the municipal separate storm sewer system (MS4) permits for several communities in the Rouge River watershed. The report includes activities implemented by or on behalf of members of the Alliance of Rouge Communities (ARC) from January 1, 2022, through December 31, 2023. The permittees participating in the Plan during the reporting period are listed below.

Participating Permittees

Beverly Hills, Village of
Bingham Farms, Village of
Birmingham, City of
Bloomfield Hills, City of
Bloomfield Township
Canton Township
Dearborn Heights, City of
Farmington, City of
Farmington Hills, City of
Franklin, Village of
Garden City, City of
Henry Ford College
Inkster, City of
Lathrup Village, City of
Livonia, City of
Melvindale, City of
Northville, City of
Northville Township
Novi, City of
Oakland County*
Oak Park, City of
Orchard Lake Village
Plymouth, City of
Plymouth Township
Redford Township
Schoolcraft College
Southfield, City of
Troy, City of
University of Michigan-Dearborn*
Walled Lake, City of
Wayne, City of
Westland, City of
West Bloomfield Township
Wayne County Airport Authority
Wayne County*

**Participating in the Plan, but their complete efforts will be reported in their individual progress reports.*

B. Action Strategy Status

The status of each action strategy includes a description of each activity, progress made during the reporting period and status of each metric.

PEP #1: Distribute pollution prevention literature on various topics through brochures, educational materials, and other media

Description

ARC members will be provided copies of materials to be displayed at their facilities or used at community events or will be provided electronic material to use on their community website. With ARC oversight, Wayne County and ARC staff will facilitate the selection, procurement and distribution of various watershed restoration and pollution prevention public education materials to support ARC member public education permit compliance. Other or additional copies of some handout materials are available at cost through the Wayne County Publication Clearinghouse. Materials will also be available to view on the ARC's website. The ARC will also promote its message using electronic media outlets which could include cable TV, social media and billboards.

Goal

- Create at least 2 brochures/materials during permit cycle including one to educate commercial/industrial/educational & institutional entities
- Develop at least 24 Facebook posts
- Materials available at ARC member facilities

Assessment

METRIC	STATUS
Number of materials distributed/topic/location/event name	• 2022 - created a new brochure which educates business owners that are in the Rouge River watershed on best management practices that can be incorporated to protect water quality inside, outside and under businesses. • 2022 – distributed jar opener with the message "If you live here (state of Michigan), you live in a watershed" and lists several activities that the public can do to help protect water quality in the Rouge River. 5,000 jar openers were ordered and 100 of each were distributed to ARC members. • 2022 – more than 7,000 materials distributed • 2023 – distributed 100 copies of new business BMP brochure to ARC members. • 2023 – created new brochure titled "How Watersheds Work/How Water Quality Works" • 2023 – updated the general ARC brochure • 2023 – more than 12,200 materials distributed • See Appendix A – Material Distribution Report for detailed breakdown
Number of posts/views on ARC Facebook	• 2022 – 57 created posts • 2023 – 33 created posts • See Appendix B – Electronic Media Report for detailed breakdown
Viewer numbers from electronic (tv, billboard etc.) media when used	• No activities during the reporting period

Comment

Website development:

In 2022 ARC Staff focused on developing individual pages for each of the ARC's grant-funded restoration projects. The ARC website was moved from one hosting company to another in 2022 so unfortunately the visitor statistics are either not available or incomplete and will not be reported for 2022.

In 2022 and 2023, with funding provided through an AOC GLRI grant from Michigan EGLE and assistance from SEMCOG, the ARC developed an interactive dashboard which visually documents restoration projects in the Rouge River watershed. This was created for the RRAC website which is hosted under the ARC's website.

PEP #2: Coordinate and distribute community articles and ad graphics on pollution prevention and watershed restoration and stewardship

Description

With ARC oversight, ARC staff will facilitate the selection (based on an annual theme) and distribution of various articles and/or ad graphics that support watershed restoration and pollution prevention public education themes. Other existing articles or ad graphics will be made available upon request by ARC members. Articles and ad graphics will also be posted on the ARC's website and through social media. ARC members will repost articles and ad graphics to their own social media outlets.

Goal

- Coordinate/distribute existing articles/ad graphics
- Develop 1 new article/1 new ad graphic per year (total of 5 during permit cycle)
- Increase in ARC website traffic and Facebook views

Assessment

METRIC	STATUS
List of articles/ad graphics with title, topic and date	See Appendix C – Articles/Ad Graphic Report for copies of: • 2022 –Business Owners – protect water quality inside, outside & under your building! (article) • 2022 – Have a Business in the Rouge River Watershed? (graphic) • 2023 –Water Quality Solutions (article) • 2023 – Be the Solution, Not the Pollution (graphic)
List of articles/ad graphics promoted on ARC website/Facebook	• 2022 – Business Owners – protect water quality (article/graphic) • 2023 – Water Quality Solutions (article/graphic)
Number of views on ARC website/Facebook	See Appendix B – Electronic Media Report

PEP #3: Provide static displays and posters on pollution prevention and watershed restoration and stewardship

Description

Wayne County has various pollution prevention and/or watershed awareness displays available for loan to ARC members. The ARC plans to update existing and/or create new static displays during the permit cycle. The ARC may create new static displays using SEMCOGs "What You Can Do . . ." series or other topic that will be made available for loan to ARC member communities to use at their facilities or community events in each of the subwatersheds. ARC staff may also oversee displays at community events. ARC staff may create new displays if a particular topic is deemed necessary. The ARC is also creating seasonal posters covering a variety of the PEP topics which will be provided to ARC members for display in their facilities.

Goal

- Distribute 4 seasonal posters, post and rotate seasonally at least 3 out of 5 years during permit cycle.
- Update/create at least 3 static displays and use at 3-4 ARC member community events per year during the permit cycle with a minimum of 2 events in each of the 7 subwatersheds during the permit cycle.

Assessment

METRIC	STATUS
Report of static display/date/location and title of events where displays were used *(4 events per year, 2 events in each subwatershed during permit cycle)*	• 2022 – banners at 40 events • 2023 – banner at 34 events • Banners have been at 2 events in each of the 7 subwatersheds during the permit cycle • See Appendix D – Poster/Banner Report
Number of posters distributed and location *(rotate 3 out of 5 yrs. of permit cycle)*	• 170 copies of seasonal posters were distributed at community events during the reporting period • 21 permitees displayed posters in both of the reporting years and 11 displayed them in 1 of the reporting years in their buildings • See Appendix D – Poster/Banner Report
Number of static displays created annually *(3 over permit cycle)*	• 2022 – designed a new set of banners which educates business owners that are in the Rouge River watershed on best management practices that can be incorporated to protect water quality inside, outside and under their business • 2023 – designed a new set of banners which educates the public on what a watershed is and how it relates to water quality. This banner will be available for reservation in 2024

Comment

The ARC's static display banners have far exceeded the permit requirement of 2 events in each management area as shown below:

	Main 1-2	Main 3-4	Upper	Middle 1	Middle 3	Lower 1	Lower 2
Times in management area during permit cycle	53	17	52	45	29	9	14

26 ARC Member communities displayed the seasonal posters 4 or more years during the permit cycle which exceeded the goal.

PEP #4: Promote environmental hotlines to educate the public on illicit discharges and promote public reporting of illicit discharges and improper disposal of materials into the MS4

Description

The environmental hotline numbers and collection/disposal information will be advertised by ARC members through available outlets such as the ARC website, county and local community websites, social media, through hotline brochure distribution, as well as being displayed on other topical brochures, distributed at display events and training sessions, electronic media, and other outlets.

Goal

- Distribute materials annually with hotline referenced
- Promote on ARC and ARC member community website and Facebook

Assessment

METRIC	STATUS
Number of materials distributed annually	• 2022 – 4,451 brochures distributed with hotline and collection/disposal information referenced (Waterfront Wisdom, Watershed Wisdom, When it Comes to Chemicals – Change is a Good Thing, Jar Opener) • 2023 – 8,031 brochures distributed with hotline and collection/disposal information referenced (Waterfront Wisdom, Watershed Wisdom, When it Comes to Chemicals – Change is a Good Thing, Jar Opener, Business BMP)
Number of views on ARC website and Facebook	• 2022 and 2023 – Brochures and specific content added to website that reference the hotline and collection/disposal information. • See Appendix B – Electronic Media Report

PEP #5: Distribution of "homeowner" materials to promote the importance of pollution prevention and watershed restoration and stewardship

Description

Homeowner educational materials will be available to ARC members and the public through the ARC website and Facebook. A homeowner educational brochure will be distributed and made available to ARC members to use as part of their welcome to the community new resident packets.

Goal

- Develop homeowner materials within 1 year of permit approval.

Assessment

METRIC	STATUS
Completion of brochure	Completed in 2019 "Watershed Wisdom for Homeowners-Healthy Habits for Clean Water"
Number of materials distributed annually	• 2022 – 400 copies of "Watershed Wisdom for Homeowners – Healthy Habits for Clean Water" • 2023 – 595 copies of "Watershed Wisdom for Homeowners – Healthy Habits for Clean Water" • 2022 – created a jar opener with the message "If you live here (state of Michigan), you live in a watershed" and lists several activities that the public can do to help protect water quality in the Rouge River. 5,000 jar openers were ordered and 100 of each were distributed to ARC members for distribution to homeowners
Number of materials distributed to new homeowners by ARC member communities	• Distributed at community buildings, public meetings, Lunch & Learn event and the Great Lakes Restoration Celebration
Number of views on ARC website and Facebook	See Appendix B – Electronic Media Report

PEP #6: Develop and promote educational workshops and presentations

Description

With ARC oversight, Friends of the Rouge (FOTR) and ARC staff will determine the topics, coordinate content, and present 6 workshops during the permit cycle. Workshop topics will vary based on annual education themes and/or needs as determined by the ARC. Workshops and presentations to business associations, chamber of commerce, business organizations, and focus groups could also be included. ARC members may host and participate in these workshops and presentations.

Goal

- Conduct six workshops/presentations during the permit cycle, 1 or more per year and at least 1 per subwatershed.
- Each event will average at least 15 participants.
- ARC member communities will promote and/or host events
- One or more will target businesses

Assessment

METRIC	STATUS
Number and topics of materials handed out and presented	• 2022 – ARC conducted a Stewards of the Rouge presentation to the Kiwanis Club of Colonial Plymouth on July 14, 2022, with approximately 30 participants • 2022 – ARC Staff coordinated the locations for FOTR rain barrel sales in Southfield and Livonia • 2022 – ARC promoted the FOTR Master Rain Gardener Training Program. • 2023 – ARC presented "Discover Healthy Yard Maintenance Tips to Protect Your Watershed" on March 15, 2023, at the Local Impact Alliance Lunch and Learn Program with 17 participants

	• 2023 - ARC Staff presented "Stewards of the Environment – Maintaining Detention Ponds" to the Michigan Nursery and Landscape Association on November 1, 2023, attended by 40 people and November 9, 2023, attended by 50 people • See Appendix – E Workshop/Volunteer Report for details • 2023 – ARC Staff conducted a tour of ARC restoration projects for the International Joint Commission Water Quality Board on May 3, 2023 • 2023 – ARC hosted the Great Lakes Restoration Celebration at The Henry Ford on September 22, 2023, attended by approximately 125 people • See Appendix A – Material Distribution Report for items distributed
Workshop sign-in sheets with number of attendees and survey results when collected	See Appendix E – Workshop/Volunteer Report
Report of ARC member communities promoting/hosting events	See Appendix E – Workshop/Volunteer Report and Appendix B – Electronic Media Report for additional activities that were hosted or promoted by ARC communities

PEP #7: Promote and support volunteer activities

Description

The ARC members, Wayne, Oakland and Washtenaw County, FOTR and other partners will promote and implement Rouge River awareness and restoration projects such as Rouge Rescue, River Day, workdays, water festivals and green schools programs through websites, social media, distribution of materials and presentations. In addition, four (4) workdays may be organized and coordinated to implement watershed restoration stewardship activities at new or existing green infrastructure project sites during the permit cycle. ARC members are encouraged to promote FOTR's Rouge Rescue and workdays that are held throughout the watershed.

Goal

- Coordinate 4 workdays during permit cycle
- ARC member communities will promote, participate or host volunteer and other watershed events

Assessment

METRIC	STATUS
Workday sign-in sheets documenting volunteer attendance	• 2022 – FOTR conducted 2 workday, one at Southfield's Beechwood Park on 8/19/22 with 11 volunteers and one at Plymouth Municipal Yard on 9/14/22 with 3 volunteers • 2023 – FOTR conducted 1 workday on 9/30/23 at Hulsing Elementary School in Canton with 9 volunteers
Workday survey results	See Appendix E-Workshop/Volunteer Report
Report of ARC member communities that hosted, participated or promoted events	ARC member communities hosted, participated or promoted events more than 345 times during the reporting period. (See Appendix E – Workshop/Volunteer Report)
Number of views on ARC website and Facebook annually	See Appendix B – Electronic Media Report

PEP #8: Promotion of and support for volunteer monitoring activities within the Rouge River Watershed

Description

The ARC and Oakland and Washtenaw County will promote and support Wayne County and the Friends of the Rouge to implement a watershed-wide volunteer monitoring program through websites, social media, distribution of materials, and presentations. ARC members will actively promote public and business participation and lend support to FOTR as appropriate. ARC members will host monitoring activities at their facilities when appropriate.

Goal

- Conduct 1 winter stonefly search, 1 bug hunt and 2 other volunteer monitoring training exercises annually
- ARC member communities will promote, participate or host volunteer events

Assessment

METRIC	STATUS
Monitoring events	Completed annually, see Appendix E – Workshop/Volunteer Report
Number of views on ARC website and Facebook	See Appendix B – Electronic Media Report
Sign-in sheets showing number of volunteers (when available)	See Appendix E – Workshop/Volunteer Report
Survey results (when available)	
Report of ARC member communities that hosted, participated, or promoted events	

PEP #9: Rouge River Watershed Signage

Description

Watershed signage will continue to be made available to ARC members including River/Road Crossing signs, Don't Feed the Geese/Waterfowl signs, and Grow Zone signs. ARC Staff will create one new sign and/or sticker for community use during the permit cycle regarding disposal practices of animal waste or other pollution prevention topic. ARC Staff, with assistance from Wayne County, Oakland County and ARC member communities, surveyed the watershed to 1) document current signage to determine if maintenance is needed, and 2) document where future signage placement would be beneficial. This activity helps to educate and increase public awareness about the interconnectedness of the watershed and the storm sewer system.

Goal

- Develop at least 1 new sign or sticker during permit cycle
- During first 2 years survey watershed signage for maintenance and future sign needs
- Create map during permit cycle documenting survey results
- Implement maintenance and/or new signage at high-priority locations during the permit cycle

Assessment

METRIC	STATUS
Complete at least 1 new sign/sticker or other item during permit cycle	• 2022 - A vehicle magnet was distributed with the message "If you live here (state of Michigan), you live in a watershed." A survey of ARC members showed a limited number of communities allow magnets on their vehicles, however there was enough interest to order 500 of them with 60 distributed
Number of signs/stickers or other items distributed annually	• 2022 – 60 vehicle magnets distributed to members that allow vehicle magnets • 2022 – 3,820 jar openers distributed to members • 2023 – 1,072 jar openers distributed to members
Survey results, map and recommendations during permit cycle	• Metric completed previously.
Number of signs maintained and new signage installed during permit cycle	• 21 installed to replace damaged or missing signs • 120 installed in new locations throughout the watershed • See Appendix F – Rouge River Watershed Signage Map

C. Overall Effectiveness

This report summarizes the effectiveness of the Rouge River Collaborative Public Education Program (Plan.) The ARC analyzes survey results from workshops, presentations, workdays and other activities and makes necessary adjustments to the information presented at the ARC supported workshops and presentations during the permit cycle. The ARC continues to participate in regional partnership activities which assist with implementing and improving the PEP.

The ARC conducted a water quality survey in 2022 and received more than 3,600 responses. The survey compared the public's opinion on the water quality changes in the Rouge River which will help determine future public education activities. The results are summarized in a report included in Appendix G that was produced in early 2023 and can be found on the ARC website.

The assessments detailed in this report show continued overall effectiveness of the plan including:

- Increased distribution of educational materials
- Increased creation of educational brochures, banners and other items
- Increased Facebook Likes and Followers
- Increased website content
- Increased educational materials available
- Increased website visitors
- Increased road signs throughout the watershed

Appendix A

Material Distribution Report

ARC 2022 PIE Materials Distribution Report

			PET BAGS	ALL SEASONS POSTERS				MANUALS							GIVEAWAYS				HANDOUTS/TIPCARDS/BANNERS										
Community	**Name/Location of Event**	**Event Date**	**Pet Waste Container**	**Spring Poster**	**Summer Poster**	**Fall Poster**	**Winter Poster**	**Detention Pond**	**Member Brochures**	**Waterfront Wisdom**	**Watershed Wisdom Homeowners**	**Homeowner Septic System**	**Chemical Brochures**	**FOG Brochure**	**Clips**	**Jar Openers 5,000**	**Kneeling Pad**	**Vehicle Magnets 500**	**Bookmark**	**ARC Fact Flyer**	**Value of Trees**	**Black Eyed Susan Card**	**SE MI Partner DVD**	**Working for CW DVD**	**Pet Tip Card**	**Storm Drains Tip Card**	**Fertilize Tip Card**	**Chemical Tip Card**	**Car Care Tip Card**
Auburn Hills	ARC Distribution/Member Request		30												25	100													
Beverly Hills	ARC Distribution/Member Request		110								50		150	50		100	17				50								
Bingham Farms	ARC Distribution															100													
Birmingham	ARC Distribution															100													
Bloomfield Hills	ARC Distribution															100													
Bloomfield Twp	ARC Distribution															100													
Canton	ARC Distribution															100													
Commerce Twp	ARC Distribution															100													
Dearborn Heights	ARC Distribution															100													
Farmington	ARC Distribution															100		20											
Farmington Hills	ARC Distribution															100		20											
Franklin	ARC Distribution															100													
Garden City	ARC Distribution															100													
Henry Ford College	ARC Distribution															100													
Inkster	ARC Distribution															100													
Lathrup Village	ARC Distribution/Member Request		30										30			100	5												
Livonia	ARC Distribution															100													
Melvindale	ARC Distribution															100													
Northville	ARC Distribution															100													
Northville Twp	ARC Distribution/Member Request		250								100				200	100	100	20											
Novi	ARC Distribution															100													
Oak Park	ARC Distribution/Member Request			1	1	1	1									100													
Orchard Lake	ARC Distribution															100													
Plymouth	ARC Distribution/Member Request			1	1	1	1				20				25	100	13												
Plymouth Twp	ARC Distribution/Member Request		400													100													
Redford Twp	ARC Distribution															100													
Rochester Hills	ARC Distribution															100													
Romulus	ARC Distribution															100													
Schoolcraft	ARC Distribution															100													
Southfield	ARC Distribution															100													
Troy	ARC Distribution															100													
UM Dearborn	ARC Distribution															100													
Van Buren Twp	ARC Distribution															100													
Walled Lake	ARC Distribution															100													
Wayne	ARC Distribution/Member Request													300		100													
West Bloomfield Twp	ARC Distribution															100													
Westland	ARC Distribution															100													
Wixom	Member Request		30	2	2	2	2		20								25		25		25		1						
Birmingham	Citizen Request									1		1																	
WCAA	Member Request	Poster at Willow Run		1	1	1	1						20						20	20						20		20	
Russ Tacket-Dearborn Heights	Citizen Request							100			100																		
Novi	Spring Festival	5/20/2022	150												150														
Dearborn	Environmental Justic Earth Day	4/22/2022									20		20	20	20	20			20										
West Bloomfield Twp	Citizen Request							10			10		10	10															
Royal Oak	Citizen Request			1	1	1	1																						
Oakland County	Member Request		100								100				100	100													
Plymouth-Kiwanis Club of Colonial Plymou	Annette Request	8/4/2022	150																										
Girl Scouts of Southeast Michigan	Annette Request-Day Camp	August	60																										
			1310	**6**	**6**	**6**	**6**	**110**	**20**	**1**	**400**	**1**	**230**	**380**	**520**	**3820**	**160**	**60**	**65**	**20**	**75**	**0**	**1**	**0**	**0**	**20**	**0**	**20**	**0**

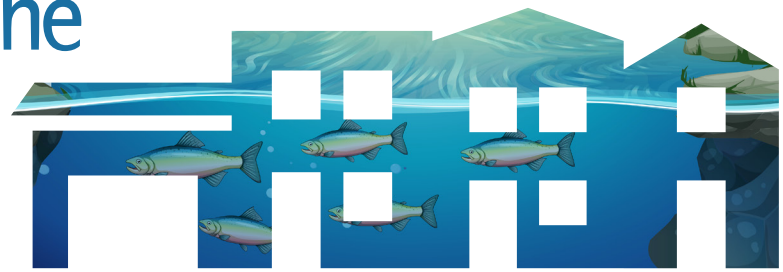
Total Items 7,237

ARC 2023 PIE Materials Distribution Report

			PET BAGS	ALL SEASONS POSTERS				MANUALS								GIVEAWAYS				HANDOUTS/TIPCARDS/BANNERS										
Community	Name/Location of Event	Event Date	Pet Waste Container	Spring Poster	Summer Poster	Fall Poster	Winter Poster	Detention Pond	Member Brochures	Waterfront Wisdom	Watershed Wisdom Homeowners	Business BMP Brochure	Homeowner Septic System	Chemical Brochures	FOG Brochure	Clips	Jar Openers 5,000	Kneeling Pad	Vehicle Magnets 500	Bookmark	ARC Fact Flyer	Value of Trees	Black Eyed Susan Card	SE MI Partner DVD	Working for CW DVD	Pet Tip Card	Storm Drains Tip Card	Fertilize Tip Card	Chemical Tip Card	Car Care Tip Card
Auburn Hills	ARC Distribution/Member Request											100																		
Beverly Hills	ARC Distribution/Member Request		110								100	300			50														100	
Bingham Farms	ARC Distribution											100																		
Birmingham	ARC Distribution											100																		
Bloomfield Hills	ARC Distribution			1	1	1	1					100																		
Bloomfield Twp	ARC Distribution		200									100		50	50	100														
Canton	ARC Distribution											100																		
Commerce Twp	ARC Distribution											100																		
Dearborn Heights	ARC Distribution											100																		
Farmington	ARC Distribution											100																		
Farmington Hills	ARC Distribution											100																		
Franklin	ARC Distribution			1	1	1	1					100																		
Garden City	ARC Distribution											100																		
Henry Ford College	ARC Distribution											100																		
Inkster	ARC Distribution											100																		
Lathrup Village	ARC Distribution/Member Request											100																		
Livonia	ARC Distribution											100																		
Melvindale	ARC Distribution											100																		
Northville	ARC Distribution											100																		
Northville Twp	ARC Distribution/Member Request		200									100				100														
Novi	ARC Distribution/HOA Breakfast & Car	10/7/23 & 11/14/23	50					50				150				50	50													
Oak Park	ARC Distribution/Member Request											100																		
Oakland County	ARC Distribution/Member Request		400					30				100				315	300													
Orchard Lake	ARC Distribution											100																		
Plymouth	ARC Distribution/Member Request											100																		
Plymouth Twp	ARC Distribution/Member Request		450									100				216														
Redford Twp	ARC Distribution											100																		
Rochester Hills	ARC Distribution											100																		
Romulus	ARC Distribution											100																		
Schoolcraft College	ARC Distribution											100																		
Southfield	ARC Distribution											100																		
Troy	ARC Distribution											100																		
UM Dearborn	ARC Distribution		30									100				10														
Van Buren Twp	ARC Distribution											100																		
Walled Lake	ARC Distribution							60		50		100				50	50			100										
Washtenaw County	ARC Distribution											100																		
Wayne County	ARC Distribution											100																		
Wayne	ARC Distribution/Member Request											100			300															
West Bloomfield Twp	ARC Distribution											100																		
Westland	ARC Distribution											100																		
Wixom	ARC Distribution											100		100			100													
Northville Twp/Livonia/Plymouth/Southfield	USFS Grant Tour with USFS	5/3/2023	2						2					2	2	2	2			2	2									
Farmington Hills	Farmers Market Earth Day	4/22/2023	100								100			100	100	100														
Oakland County	WBT Earth Day & OC Earth Fair	4/20/23 & 4/22/23	200													216	200													
Washtenaw County	Superior Twp Day	6/10/2023	30					25			25					25														
IJC Great Lakes Water Quality Board	Field Tour	5/3/2023	50							50	50	50		50	50	50	50			50	50		50							
Friends of the Rouge	Rain Barrel Sale	5/13/2023	100													100														
Birmingham	DPS Open House	5/13/2023	100	2	2	2	2				50					100														
Northville Twp	Johnson Creek Fish Hatchery Event	6/10/2023	30												20	20	20			20	20	20								
Clinton Twp	Girl Scouts of SE Michigan	7/17/2023	30																											
Inkster Wilcox Phoenix **(DISPLAYED CHEMICAL BANNERS)**	Publc Meeting	3/1/2023	100								100	100	100	100	100	100	100			100	100									
Plymouth Local Impact Alliance	Library Lunch and Learn	3/15/2023	30						20		20		20	20	20	20				20	20									
Dearborn-The Henry Ford **(DISPLAYED ALL BANNERS & POSTERS)**	Great Lakes Restoration Event	9/22/2023	100	20	20	20	20				100	100		100	100	100	100	25		100	100	100	50							
Cranbrook **(DISPLAYED GENERAL BANNERS)**	Cranbrook Spring into Science After Dark	3/30/2023	100	25	25			100			100	100	100	100	100	100	100			100	100	100								
			2412	**49**	**49**	**24**	**24**	**265**	**22**	**100**	**645**	**4700**	**220**	**622**	**892**	**1774**	**1072**	**25**	**0**	**492**	**392**	**220**	**100**	**0**	**0**	**0**	**0**	**0**	**100**	**0**

total items: 14,199

have a business in the ROUGE RIVER WATERSHED?



learn how to protect water quality inside, outside & under your building

Alliance of Rouge Communities
OURS TO PROTECT
Working together, restoring the river

A *watershed*, also referred to as a drainage basin, is the land area that delivers rain and snow/ice melt to a stream or lake. Every business in Michigan is in a watershed!

When rain and snow/ice melt travel across the land (watershed) and into storm drains, it is called stormwater or runoff. As this runoff travels, it picks up trash, animal waste, chemicals, sediments and dissolved substances along the way until it discharges into the nearest waterbody. Small streams (tributaries) join to form rivers and flow across sloping land, eventually flowing into a lake. Even if your business is not "next to the river," your actions still have an impact on the Rouge River watershed.

best management practices (BMPs) for businesses

Inside your building

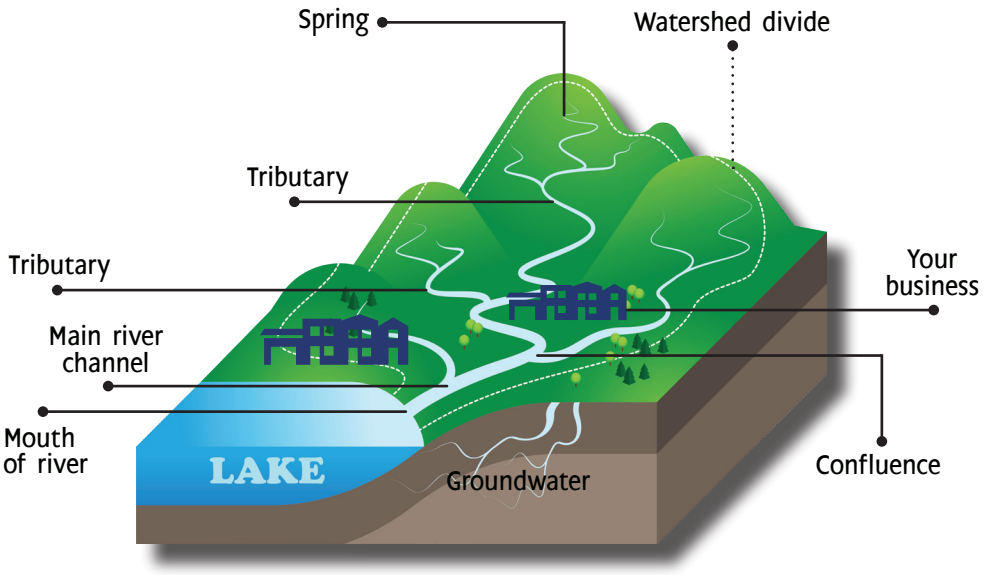
The way you use, dispose and store chemicals, batteries and other materials inside your building can influence water quality in the Rouge River.

Outside your building

Because stormwater enters streams and rivers through storm drains, the curbs, gutters, parking lots and ditches outside your building play an important role in the health of the Rouge River.

Under your building

Even things underneath your building that you can't see, like pipes that were changed with renovations or expansion, can affect the Rouge River.



How a watershed works: *rain and melting snow travel by gravity within an area of land to a single body of water such as a creek, river, or lake. As it drains it picks up trash, animal waste, chemicals, sediments and dissolved substances around homes and businesses, which eventually goes right to a body of water!*

adopting BMPs inside, outside and under your business can have a positive impact on your profits, customers, employees, wildlife and their habitat, and even the communities downstream!

BMPs Inside Your Building to Protect Water Quality

Clean grease traps in restaurants regularly so fats, oils and grease (FOG) don't build up and clog the sanitary sewer systems.

Make sure floor drains, especially those in wash bays, are properly connected to the sanitary sewer - not the storm drain.

Implement sustainable practices like switching lights to LEDs.

Wash water, stripper and wax wash from buffing floors should be disposed of in an indoor drain - not a storm drain in your parking lot.

Wash floor mats, filters and garbage cans in a location that will ensure that the wastewater will go into the sanitary system and not the storm drain outside.

Keep spill cleanup kits ready and emergency numbers clearly posted throughout your business. Sweep up spills immediately using dry cleanup methods.



Provide training sessions or informational materials to educate employees on proper disposal and pollution prevention practices for the business.



Store chemicals in a designated area which includes secondary containment in case the original containers leak.

Use drip pans or containers when repairing vehicles or equipment to reduce risk of spills.



Implement a recycling station for plastic, paper/cardboard, glass and aluminum.

Use biodegradable or environmentally-friendly cleaning products when feasible.

Dispose of hazardous wastes like chemicals, paints, and batteries properly.

Consider buying remanufactured office equipment and ink and toner cartridges to reduce your environmental impact.

BMPs Under Your Building to Protect Water Quality

Consider having your sanitary drains (sinks, floor drains, etc.) inspected to make sure they are properly connected to the sanitary sewer system and not to the storm system or directly to the ground.

Inspect decorative fountains on your property to make sure the underground filtration and circulation systems are working correctly. It should be regularly cleaned and have appropriate chlorine levels.

Work with city or county authorities if you are contacted about elevated *E. **coli*** levels close to your business. Coordinate with them to test your sanitary connections and if something is found, correct it.

Train employees to watch for signs of illicit discharges like discolored or foamy water and strange smells. Any concerns should be reported immediately.

Inspect detention/retention ponds on your property regularly to make sure pipes are clean, trash is not blocking the inlets/outlets and that no dumping has occurred.



Never reroute sanitary drains on your property without verifying their connection to a sanitary sewer system. If a sewer pipe is mis-connected to a storm drain system, this is an illicit connection and is harmful to water quality.

BMPs Outside Your Building to Protect Water Quality

Pick up trash and litter around your property to prevent it from going into the storm drain and never dump waste into a storm drain or directly to a lake or river.

Never dispose of wash water, spent fluids or any materials in the storm drain, river or on paved surfaces.

Maintain suitable loading dock areas to prevent the potential for spills and leaks.

Inspect fuel and chemical storage tanks on your property regularly for leaks.



Clean up leaks or spills outside immediately with dry absorbent and dispose of properly; never wash it down the storm drain.



Keep dumpster areas clean and lids closed so items don't blow away. Inspect containers and waste disposal areas regularly for leaks and replace or repair immediately if found.

Clean paved surfaces routinely by sweeping parking lots to pick up trash and debris to reduce pollution reaching the river.

Do not hose down sidewalks or parking lots unless it is going to a grassy area where it can infiltrate into the ground.

Don't over-apply salt to sidewalks and parking lots in winter months. Excess salt can contribute substantially to increased chloride entering our waterways through storm drains.

Make sure wash water from pressure washing drains to the sanitary sewer not a storm drain.

Apply fertilizer on golf courses properly and store fertilizer in a covered area.

Rinse golf carts on grassy areas and make sure soap wash water drains to the sanitary sewer, not a storm drain.



Stencil "no dumping, drains to river" next to your storm drains so employees are aware.

Limit the use of herbicides, pesticides or fertilizers and never apply close to any watercourse. Always follow a product's label for proper use and application.

Instruct landscapers to mulch grass which serves as a natural fertilizer. Have them avoid blowing grass clippings and leaves into the street and parking lots to keep them out of the storm drains.

Sweep fertilizer or grass clippings from paved surfaces back onto the turf area.

Clean vehicles at a commercial car/truck wash station if you don't have one on your property. They should not be washed onsite where water would go down a storm drain.

Consider adding vegetative buffers to slow stormwater runoff if your property is along the Rouge River.



Plant rain gardens around your building. Their deep roots slow runoff and provide filtration before stormwater enters the river.



Give back to the community your business is in and improve morale by having employees volunteer for river cleanup events or work days.

Why Implement BMPs in Your Business?

Businesses have a direct effect on the water quality in the Rouge River watershed. This impacts your customers, your employees, your bottom line, wildlife and their habitat, and even the communities downstream.

Training your employees to use the BMPs discussed in this brochure will improve the quality of the stormwater runoff on your property in a cost-effective manner.

As a business and important member of your community, you should understand the frequently used terms below connected to water quality.

Non-point source

Businesses in the Rouge River watershed can contribute to poor water quality through "non-point" sources, pollution which occurs when runoff picks up trash and debris on the land and discharges it to a water body.

Sanitary sewer vs. storm drain

Businesses should know the difference between sanitary sewer and storm drain systems. The water in the sanitary sewer comes from the sinks, floor drains and toilets in your business and is treated before being released back into a waterway. While water in the storm drains consists of runoff from rain and snow and sometimes groundwater which is not treated before entering the Rouge River or other waterways. Therefore, any materials and debris on your property can damage waterways.

Illicit discharges

An illicit discharge is any discharge containing polluting material, such as sediment, nutrients, oil and bacteria. These discharges can drain to lakes and streams via storm drains. The communities in Southeast Michigan are required to prevent illicit discharges from entering stormwater. It is also important for your employees to report any of the below signs of potential illicit discharges or dumping to a storm drain or water body. These discharges can be reported to your local department of public works or to the State and counties using the numbers below.

Things to report:

- Discolored water in lakes, rivers and streams.
- Spills and contamination to lakes, rivers and streams.
- Suspicious dumping to catch basins or waterways.
- Unusual discharges from pipes.
- Sewage on the ground or draining to surface water.
- Large number of dead fish in waterways.
- Failing or leaking septic systems.
- Polluted runoff from storage piles or dumpsters to catch basins or waterways.
- Sewage, detergent, chemical, petroleum or rotten egg odors.
- Soil erosion from construction sites.

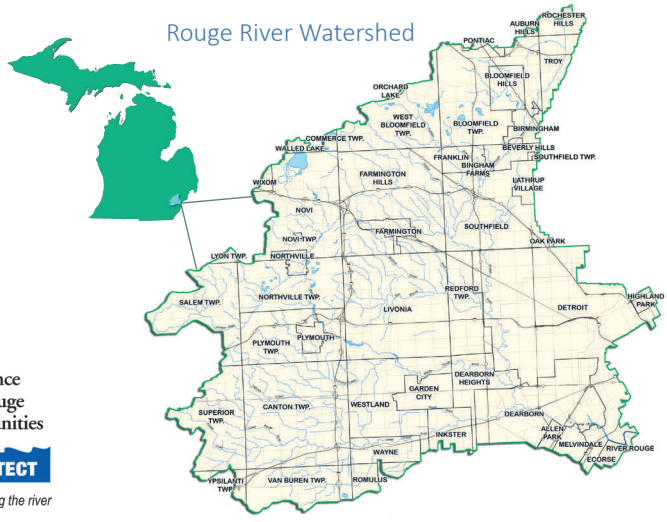
REPORT ILLEGAL DUMPING	
Michigan's Pollution Alert System	800-292-4706
Macomb County	877-679-4337 or IDEP@macombcountymi.gov
Oakland County	248-858-0931
St. Clair County	277-504-SWIM
Washtenaw County	734-222-3880 or https://washtenaw.org/196/Report-an-Issue
Wayne County	888-223-2363

Alliance of Rouge Communities

The Alliance of Rouge Communities, or ARC, is a 501(c)(3) non-profit organization consisting of local municipalities, counties, educational institutions and stewardship groups working together to improve the Rouge River. Founded in 2005, the ARC is funded by membership dues from local governments and supported by grants. The ARC and its partners work cooperatively to protect the Rouge River while meeting water quality requirements mandated by the State's stormwater permit and restoring beneficial uses, such as canoeing, fishing and other recreational activities, to the Rouge River. The ARC delivers better water quality for less cost to its members!

Contact us at: info@allianceofrougecommunities.com

Alliance of Rouge Communities
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Working together, restoring the river



For more information, visit:

www.allianceofrougecommunities.com/business.html

Alliance of Rouge Communities

Alliance of Rouge Communities
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Working together, restoring the river

For more information visit: www.allianceofrougecommunities.com

Find us on Facebook
@allianceofrougecommunities

The Alliance of Rouge Communities, or ARC, is a watershed alliance and 501(c)(3) non-profit organization consisting of local municipalities, counties, educational institutions and stewardship groups working together to improve the Rouge River. Founded in 2005, the ARC is funded by membership dues from local governments and supported by grants. The purpose of the ARC is to encourage watershed-wide cooperation and support to restore beneficial uses of the Rouge River to the area residents while meeting water quality permit requirements.

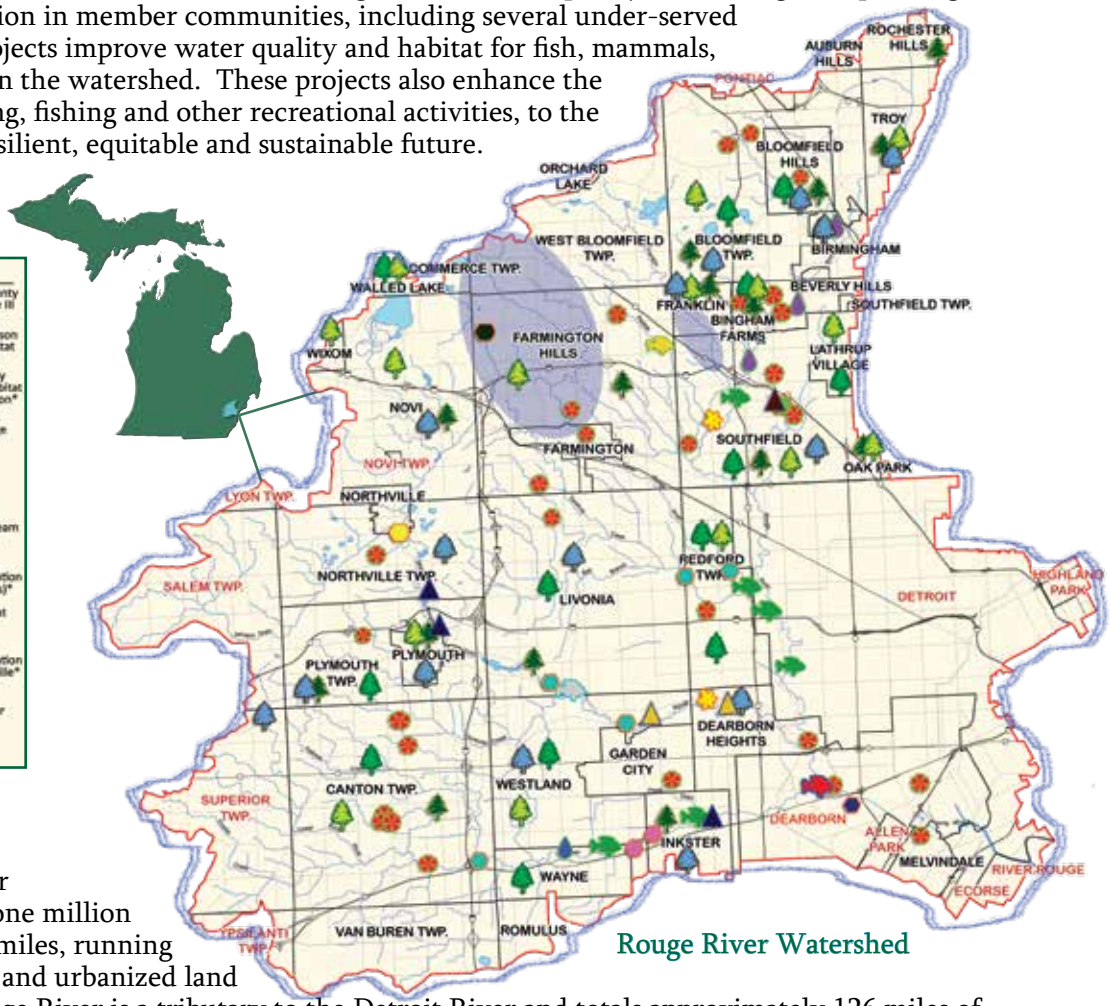
The ARC has received more than $23 million in federal and state grants for water quality monitoring, tree planting, stream restoration, and habitat creation in member communities, including several under-served communities. ARC grant-funded projects improve water quality and habitat for fish, mammals, macroinvertebrates and pollinators in the watershed. These projects also enhance the human connectivity, such as canoeing, fishing and other recreational activities, to the Rouge River for all residents for a resilient, equitable and sustainable future.

ARC Grant Projects



Watershed Education

The ARC works collaboratively to educate residents on the Rouge River watershed. It is home to more than one million people and encompasses 466 square miles, running through the most densely populated and urbanized land area in southeast Michigan. The Rouge River is a tributary to the Detroit River and totals approximately 126 miles of waterways and includes over 400 lakes, impoundments and ponds. More than 50 miles of the river flows through public parklands, making the Rouge River one of the most publicly accessible rivers in the country.



Rouge River Watershed

No matter where you are at any given time, you are in a watershed. Your actions directly impact the health of that watershed and the health of that watershed impacts you, everyone around you, and even the communities downstream. Visit the ARC's website to learn changes you can make at home, in your yard, with your vehicles and at work to protect water quality.

ARC Members

Auburn Hills
Beverly Hills
Bingham Farms
Birmingham
Bloomfield Hills
Bloomfield Twp.
Canton Twp.
Commerce Twp.
Dearborn Heights
Farmington
Farmington Hills
Franklin
Garden City
Henry Ford College
Inkster
Lathrup Village
Livonia
Melvindale
Northville
Northville Twp.
Novi
Oak Park
Oakland County
Orchard Lake
Plymouth
Plymouth Twp.
Redford Twp.
Rochester Hills
Romulus
Schoolcraft College
Southfield
Troy
University of Michigan-Dearborn
Van Buren Twp.
Walled Lake
Washtenaw County
Wayne
Wayne County
Wayne County Airport Authority
Westland
West Bloomfield Twp.
Wixom

Cooperating Partners:
Cranbrook Institute of Science
Friends of the Rouge
Great Lakes Water Authority
Rouge River Advisory Council
SEMCOG
Southeastern Oakland County Water Authority
The Henry Ford

Rouge River Restoration

The ARC continues to leverage its resources to restore the river by conducting projects through grants from the State of Michigan, the U. S. Environmental Protection Agency's Great Lakes Restoration Initiative (GLRI), the United States Department of Agriculture Forest Service and the National Oceanic and Atmospheric Administration. Relating to habitat specifically, the ARC has administered approximately 10 GLRI grants in the last 5 years totaling more than $19 million and resulting in 16 habitat restoration projects. These projects will create over 100 acres of newly restored wetland, wet prairie, in-lake, and riparian habitat; 80 acres of reforestation; and restoration of over 3,200 linear feet of stream. Below are just a few projects that have benefited ARC member communities and their residents throughout the Rouge River Watershed! Visit our website to see more ARC projects and to learn what you can do to protect water quality in the Rouge River!



Oxbow Restoration at The Henry Ford - Dearborn



Wilcox/Phoenix/Inkster Parks Habitat Restoration - Plymouth & Inkster



Wayne County Parkland Habitat Restoration - Inkster, Livonia, Redford Twp., Wayne & Westland



Tamarack Creek, & Johnson Creek Fish Hatchery Park Habitat Restoration - Southfield & Northville



Henry Ford Estate Fishway and Habitat Restoration - Dearborn



Nankin Lake Habitat Restoration - Livonia

How Watersheds Work



Learn how watersheds affect water quality

It is important to know how your watershed works in order to help protect water quality. You can contribute to the solution, not the pollution!

A ***watershed***, also referred to as a drainage basin, is the land area that delivers rain and snow/ice melt to a stream or lake. Every home, business and farm in Michigan is in a watershed!

Stormwater, or runoff, is when rain and snow/ice melt travel across the land (watershed) picking up trash, animal waste, chemicals, sediments and dissolved substances along the way until it discharges into the nearest waterbody and causes pollution. Even if your house, business or farm is not "next to the river," your actions still have an impact on the watershed.



Impervious surfaces, pavement or other hard surfaces, speed up the flow of runoff from the landscape and prevent water from soaking into the ground where it can be naturally cleaned by microorganisms that live in the soil. Many pollutants also reach our waterways from soil erosion because many chemicals attach themselves to soil particles.

Groundwater is water that is stored underground in the spaces between soil particles and fractured rocks and is a source of drinking water for many suburban and rural households. Groundwater resources can be impacted if pollutants in runoff leach through the soil. Pollutants can impact water quality by harming fish and wildlife, impairing recreation (fishing, boating and swimming) and contaminating drinking water supplies.

The ***Rouge River watershed*** is home to more than one million people and encompasses 466 square miles and runs through the most densely populated and urbanized land area in southeast Michigan. The Rouge River, a tributary to the Detroit River, is approximately 126 miles of waterways and includes over 400 lakes, impoundments and ponds. More than 50 miles of the river flows through public parklands making the Rouge River one of the most publicly accessible rivers in the country.



Understanding the watershed concept allows us to comprehend that we can have an impact on water quality far beyond our own back door. As land becomes altered or developed, the amount of stormwater runoff in the watershed increases, as well as the potential amount of pollutants that are contained in that runoff.

Stormwater pollution plays a large role in water quality. This contaminated runoff comes from many different sources and is difficult to trace back to one source on the landscape. Contaminated runoff flows without treatment into the nearest stormwater drainage system. This may consist of simple drainage ditches or infrastructure such as enclosed pipes, outfalls, catch basins and detention ponds.

Because of this infrastructure, we all have a direct effect on the water quality in the Rouge River watershed. This impacts our quality of life, home values, and the environment.

For more information on your watershed, visit:

www.allianceofrougecommunities.com

Alliance of Rouge Communities
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Working together, restoring the river

How Water Quality Works



Learn how water quality is affected by watersheds

Water quality plays an important role in a healthy watershed and you can contribute to the solution, not the pollution! Clean water provides communities with drinking water, makes recreation like boating and fishing safe for the residents of Michigan and supports a healthy ecosystem for plants and wildlife.

Knowing how watersheds work is important because it allows us to understand that our actions have an impact on water quality. When rain and snow/ice melt travel across the land (watershed) and into storm drains, it is called stormwater or runoff. As this runoff travels, it picks up trash, animal waste, chemicals, sediments and dissolved substances along the way until it discharges into the nearest waterbody which has a negative affect on water quality.

Common types of pollution in stormwater runoff include sediment, nutrients, chemicals, bacteria and illicit discharges. In addition to stormwater runoff, water velocity can decrease water quality.

Sediment can be eroded soil from unprotected construction sites, eroding streambanks and shorelines and runoff from agricultural lands.



- Adding vegetative buffers along agricultural land or at the water's edge of your waterfront property can help slow runoff.

Nutrients include natural sources (organic debris), fertilizers, animal waste (pets, wildlife, and livestock) and sewage sources coming from failing septic systems or illegal discharges of sewage.



- Don't feed the ducks and geese because the concentration of droppings adds excess nutrients to the river.
- Fertilize your yard with slow-release fertilizer and sweep excess particles off paved surfaces back onto the lawn.

Chemicals can come from pesticides used on residential and agricultural lands, leaking vehicle fluids, road salt and the improper disposal of household chemicals.

- Change to a chemical alternative for cleaning, like peroxide or baking soda and vinegar, and dispose of cleaning supplies, paints, oven cleaners, aerosol cans, etc. at a household hazardous waste collection event in your community.
- Use Michigan native plants in your yard which are naturally resistant to pests and diseases, eliminating the need for harmful pesticides.



Bacteria is another source of pollution in stormwater which comes from animal waste or human sewage sources.

- Always pick up after your pet, even in the winter, to prevent the bacteria from washing into drainage ditches and storm drains which go straight to the river and have a negative impact on water quality.
- If you have a septic tank on your property, have it inspected every 3 years and pumped out every 3-5 years.

Illicit discharges are any discharge to a storm drain or waterbody that contains polluting material, such as sediment, nutrients, oil, and bacteria.

- If you see someone dumping anything in the river or lake, on the side of the road or even down the storm drain on your street, report it to your community's pollution hotline.

Report Illegal Dumping	
Michigan's Pollution Alert System	800-292-4706
Macomb County	877-679-4337 or IDEP@macombcountymi.gov
Oakland County	248-858-0931
St. Clair County	277-504-SWIM
Washtenaw County	734-222-3800 or https://washtenaw.org/196/Report-an-Issue
Wayne County	888-223-2363

Water velocity is too much water, too quickly, which scours the streambed and banks adding to the sediment and recirculating the bacteria and chemicals in the river reducing water quality.



- Plant trees to provide a natural filter to reduce stormwater runoff, flooding and erosion.
- Disconnect downspouts around your home or business to slow runoff and reduce the amount of sediment entering the river.

For more information on how to protect water quality, visit:

www.allianceofrougecommunities.com

Alliance of Rouge Communities

OURS TO PROTECT

Working together, restoring the river

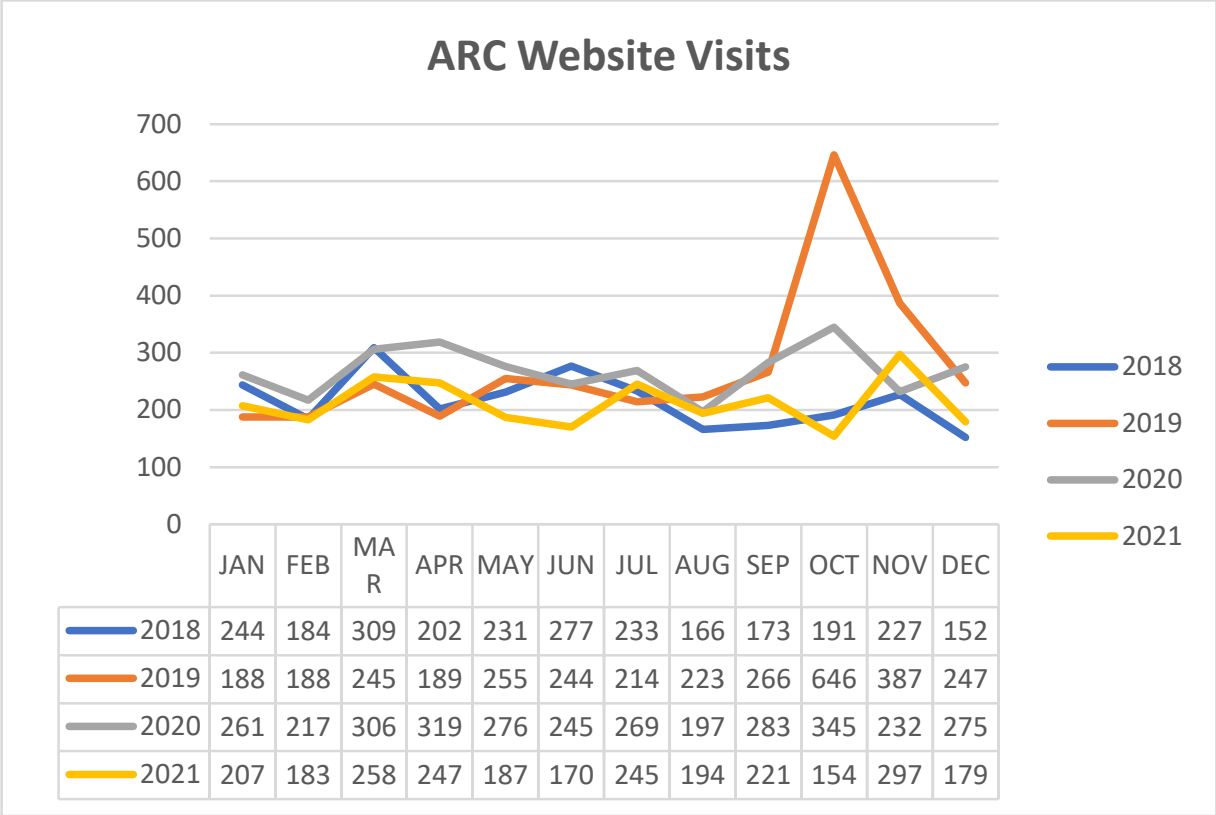
Appendix B

Electronic Media Report

2022 ARC ELECTRONIC MEDIA REPORT

ARC WEBSITE VISITORS

In 2022 visitor information was not available because the website was moved from one hosting company to another so a full year of data was not available. Below is the visit information for 2018-2021.



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2018	244	184	309	202	231	277	233	166	173	191	227	152
2019	188	188	245	189	255	244	214	223	266	646	387	247
2020	261	217	306	319	276	245	269	197	283	345	232	275
2021	207	183	258	247	187	170	245	194	221	154	297	179

**note that in 2019 the ARC hosted the Great Lakes Restoration Celebration in October and registration for the event was done through the ARC's website which increased the traffic during October and November. If those months were adjusted to an average amount of previous months there was an overall increase to visitors to the ARC's website in 2021.*

ARC FACEBOOK POSTS

- ARC created posts in 2022: 57

ARC FACEBOOK FOLLOWERS 2022: 317



ARC FACEBOOK LIKES 2022: 266



2022 Posts

12/23/2022 8:46 AM	 Tree and shrub planting is complete at Venoy-Dorsey			77	2 4	Boost post
12/20/2022 3:49 PM	 What does a forest look like before it's a forest? At			115	1 8	Boost post
11/30/2022 3:46 PM	 When it is a windy day for your communities curbside			64	0 1	Boost post
11/04/2022 8:38 AM	 We are thinking spring already!!!			71	2 1	Boost post
11/04/2022 8:30 AM	 Check out this great service to the Rouge River by the			85	3 1	Boost post
11/02/2022 10:09 AM	 Major milestone alert! Permit applications have been			2.8K	188 68	Boost post
10/29/2022 12:57 PM	 On October 16, 2022, a wetland filled to the brim			73	5 7	Boost post
10/29/2022 12:46 PM	 As part of the habitat restoration activities at			168	22 17	Boost post
10/28/2022 12:16 PM	 Habitat restoration activities continue at Nankin Lake in			106	7 16	Boost post
10/27/2022 3:36 PM	 Design and permitting efforts are underway for Phoenix			68	5 7	Boost post
10/26/2022 2:49 PM	 Riverbank restoration is complete on a section of the			72	6 5	Boost post
10/25/2022 11:26 AM	 An ARC Cooperating Partner, SEMCOG,			180	1 2	Boost post
10/21/2022 3:42 PM	 What a great weekend for outdoor cleanup! To help			63	0 1	Boost post
10/10/2022 12:24 PM	 Are you interested in helping us move the Rouge River			48	1 0	Boost post

09/27/2022 3:22 PM	 Tamarack Creek maintenance crews were out		94	8 3		Boost post
09/27/2022 12:56 PM	 Seeley Creek in improvements will begin in		77	3 0		Boost post
09/27/2022 11:42 AM	 Construction is underway at Bell Creek Recreation Area		76	7 2		Boost post
09/27/2022 11:37 AM	LAST CHANCE!!! SURVEY ENDS FRIDAY!!! THE		106	2 1		Boost post
09/14/2022 3:57 PM	 You are the eyes and ears in your community when it		127	2 7		Boost post
09/09/2022 12:13 PM	 Own a business in the Rouge River watershed?		57	1 1		Boost post
09/08/2022 2:22 PM	 The enhanced floodplain, constructed wetlands, and		119	4 6		Boost post
09/08/2022 10:42 AM	 Under an U.S. EPA Region 5 (Great Lakes Region) ,		66	2 2		Boost post
09/07/2022 1:52 PM	 That's a lot of straw! Landscapers spread straw		72	6 7		Boost post
09/07/2022 10:21 AM	 The Alliance of Rouge Communities data collection		142	4 11		Boost post
09/01/2022 1:38 PM	 Construction continues for the Colonial Park and Venoy		103	8 4		Boost post
08/29/2022 4:22 PM	 I know we don't want to think about winter yet, but		79	2 1		Boost post
07/04/2022 1:00 PM	 Data collection has begun at Wilcox Lake, Inkster Park,		720	47 19		Boost post

07/01/2022 3:32 PM	 The design is complete and permits submitted for wildlife			95	7 11	Boost post
07/01/2022 12:46 PM	 Bell Creek Park and Lola Creek projects in Wayne			240	18 29	Boost post
07/01/2022 10:00 AM	 The Sherwood Recreation Area in Wayne County			105	21 9	Boost post
07/01/2022 8:00 AM	 The Colonial Park and Venoy Park Habitat			80	9 7	Boost post
06/30/2022 3:18 PM	 Are you ready to view the results this summer of the			138	5 10	Boost post
06/30/2022 3:05 PM	 Finishing touches are happening this summer at			75	9 5	Boost post
06/30/2022 10:58 AM	 Alliance of Rouge Communities updated their			59	1 0	Boost post
06/29/2022 8:46 AM	 Learn more about the ARC's Johnson Creek and			73	10 1	Boost post
06/23/2022 3:07 PM	 Wayne County, Michigan's Nankin Lake Restoration			1.9K	210 70	Boost post
06/23/2022 1:41 PM	 Our friends at the U. S. EPA have been busy "bees!" -			65	2 1	Boost post
06/23/2022 11:04 AM	 With all the lakefront property in the Rouge River			122	3 4	Boost post
06/23/2022 8:35 AM	 We look forward to some initial flow to the fishway at			102	6 8	Boost post
06/07/2022 9:57 AM	 The Alliance of Rouge Communities and the City of			91	4 3	Boost post
06/06/2022 2:21 PM	 Thanks to ARC member City of Garden City, Michigan! A			160	1 6	Boost post
06/06/2022 2:14 PM	 Wayne County Parks, an ARC member, is starting the			2.1K	254 125	Boost post

05/31/2022 3:41 PM	THE ALLIANCE OF ROUGE COMMUNITIES WANTS TO			11.3K	628 61	View promotio
05/18/2022 3:00 PM	 Awesome work by one of the Alliance of Rouge			101	6 1	Boost post
05/18/2022 3:04 PM	 Do you ever wonder how your yard is impacting local			55	0 0	Boost post
05/17/2022 9:30 AM	 The ARC is doing its part with several restoration			58	4 2	Boost post
04/21/2022 7:58 AM	 Walking the trails in the Rouge River Watershed?			89	6 3	Boost post
04/12/2022 9:48 AM	 As part of an EPA Great Lakes Restoration Initiative			103	18 14	Boost post
03/21/2022 12:54 PM	 Get involved with Friends of the Rouge! Join the Benthic			56	1 0	Boost post
03/15/2022 10:30 AM	 If you live in Beverly Hills, Bingham Farms,			55	3 0	Boost post
03/01/2022 12:11 PM	 Check out all the great work in the Great Lakes funded			60	3 4	Boost post
02/21/2022 8:44 AM	 Keep an eye out for those spring Household			54	0 1	Boost post
02/08/2022 10:49 AM	 With funding provided through an AOC U.S.EPA			80	5 3	Boost post
02/04/2022 9:20 AM	The Oakland County Water Resources Commissioner's			113	2 3	Boost post
01/25/2022 12:32 PM	Some great information about the ARC's Tamarack			56	4 3	Boost post
01/13/2022 12:12 PM	 Oakland County! Check out some great activities coming			69	1 1	Boost post
01/05/2022 10:31 AM	 Get involved! Friends of the Rouge is looking for			489	5 2	Boost post

2022 Facebook Posts

1/5/2022 - Get involved! Friends of the Rouge is looking for volunteers to help look for sensitive aquatic insects that indicate good water quality in the Rouge River. The Annual Friends of the Rouge Winter Stonefly Search is scheduled for Sat. Jan. 22, 2022, 10:00 am – approx. 3:00 pm. For more info: https://therouge.org/bug-hunt-events-and-trainings/

1/13/2022 - Oakland County! Check out some great activities coming up through Oakland Conservation District this year! Trees, butterflies, farmers market - Oh My! http://www.oaklandconservationdistrict.org/upcoming...

1/25/2022 - Some great information about the ARC's Tamarack Creek project in City of Southfield, Michigan USA - Government with grant funding provided by the Environmental Protection Agency Great Lakes Restoration Initiative.

2/4/2022 - The Oakland County Water Resources Commissioner's office is excited to share that they have launched the: Preserve MI Waters: Stormwater Manhole Cover Art Contest.
They are seeking original art submissions to be added to 50 stormwater manhole covers throughout Oakland County. Participants must be students attending high school (9-12 Grade) or actively enrolled in an Oakland County college during the time of the contest.
Pure Oakland Water will provide the contest winner with a $1,000 scholarship.
The contest closes on March 11, 2022.

2/8/22 - With funding provided through an AOC U.S.EPA Great Lakes Restoration Initiative grant from Michigan Department of Environment, Great Lakes, and Energy and assistance from SEMCOG, Southeast Michigan Council of Governments, the Rouge River Advisory Council (RRAC) and the ARC began development of an interactive dashboard https://www.allianceofrougecommunities.com/rrac.html which visually documents restoration projects in the Rouge River watershed. The initial phase of the dashboard includes Area Of Concern (AOC) projects with future phases planned to incorporate other initiatives in the watershed.

2/21/22 - Keep an eye out for those spring Household Hazardous Waste (HHW) collection dates in the Rouge River Watershed! Use an empty coffee can to store your used batteries until there is a HHW event in your community or check your local hardware or electronics store for battery recycle bins! Learn more on our website: https://www.allianceofrougecommunities.com/rougeHHW.html

3/1/22 - Check out all the great work in the Great Lakes funded by the Great Lakes Restoration Initiative (GLRI) and the National Oceanic and Atmospheric Administration (NOAA). Can you find the projects (kinda like "Where's Waldo!") that the Alliance of Rouge Communities completed with assistance from GLRI-NOAA?

3/15/22 - If you live in Beverly Hills, Bingham Farms, Birmingham, Bloomfield Hills, Village of Franklin, Garden City, Lathrup Village, Novi, Plymouth or Troy and would like to review and comment on the recently approved Stormwater Management Plan please visit: http://www.allianceofrougecommunities.com/swplanreview.html

4/12/22 - As part of an EPA Great Lakes Restoration Initiative (GLRI) grant the Alliance of Rouge Communities, with the help of Friends of the Rouge, is planting trees throughout 80 acres of the Lower Rouge River. Learn more from this weekends WXYZ Channel 7 coverage of volunteers planting trees in Inkster and learn about the project by visiting:https://www.allianceofrougecommunities.com/.../wc...

4/21/22 - Walking the trails in the Rouge River Watershed? Keep your eyes open for illegal dumping and check out this article from Channel 4 ClickOnDetroit to know the difference from naturally occurring oily sheen on the river and pollution.
https://www.clickondetroit.com/.../see-an-oily-sheen-in.../

5/17/22 - The ARC is doing its part with several restoration projects being designed or constructed under this important funding through the Great Lakes Restoration Initiative! Learn more about our projects by visiting https://www.allianceofrougecommunities.com.

5/18/22 - Do you ever wonder how your yard is impacting local water quality? The Illinois-Indiana Sea Grant has developed a Natural Lawn Care Quiz below to find out!
https://lawntolakemidwest.org/res.../natural-lawn-care-quiz/

5/18/22 - Awesome work by one of the Alliance of Rouge Communities member communities! **City of Auburn Hills**
Are you wondering what's going on at Riverside Park with all the construction and equipment? The answer is riverbank stabilization!

5/31/22 - THE ALLIANCE OF ROUGE COMMUNITIES WANTS TO GET YOUR
OPINION - WHICH COULD GET YOU A $100 VISA GIFT CARD!
Take our survey on Water Quality Changes in the Rouge River to help direct our future activities! Once your survey is complete you will be entered in a drawing for a $100 Visa gift card to be distributed in September 2022.
Link to ARC survey: https://www.surveymonkey.com/r/arcsurvey22

6/6/22 - Wayne County Parks, an ARC member, is starting the exciting U.S. EPA Region 5 (Great Lakes Region) Great Lakes Restoration Initiative (GLRI) funded Nankin Lake Restoration Project in Livonia Community and City of Westland - Administration, Michigan (Grant # GL00E0240). Dredging operations (shown here) are beginning and anticipated to go through the summer. When complete, the project will create/restore 4 acres of habitat, remove approximately 30,000 cubic yards of lake sediment, and help control 3 acres of invasive species. For more information visit:
https://www.allianceofrougecommunities.com/.../Nankin...

6/6/22 - Thanks to ARC member City of Garden City, Michigan! A good reminder for all of us living in the Rouge River Watershed (and beyond!) Be sure to check your catch basins and clear them! **City of Garden City, Michigan** ·
Because of the risk of heavy rain tonight, please clean off your catch basins/street drains to help alleviate flooding.

6/7/22 - The Alliance of Rouge Communities and the City of Southfield, Michigan USA - Government won the 2022 APWA Michigan Chapter award for Environment $1-5 million for the Tamarack Creek -Stream and Wetland Restoration Project. This exciting project was funded by a grant from the U.S. EPA Region 5

(Great Lakes Region) Great Lakes Restoration Initiative (GLRI). To learn more visit: https://www.allianceofrougecommunities.com/.../Tamarack...

6/23/22 - We look forward to some initial flow to the fishway at the nationally historic Henry Ford Estate Dam this summer. Public cooperation is essential for the successful completion of this natural area restoration fishway project funded by the U.S. EPA Great Lakes Restoration Initiative (GLRI). The project is in the establishment phase where vegetation development is instrumental for the project to be a success. We continue to need the public's help on this exciting project. Please do not cut the fences and enter the area. Foot and bicycle traffic will cause damage to the area, slowing the natural growing process. For more information visit: https://www.allianceofrougecommunities.com/.../HFE%20Dam...

6/23/22 - With all the lakefront property in the Rouge River Watershed we can learn some important things from our friends at the Michigan Master Gardener Association and the Michigan State University Extension! **Michigan Master Gardener Association, Inc.**
A native Michigan shoreline: We did it, and so can you! Part 2 - Erick Elgin, Michigan State University Extension - June 20, 2022 - Updated from an original article written by Jane Herbert and Mike Gallagher. A lakefront property owner describes the next steps in restoring his typical lakeshore into a native lake scape that protects the lake and provides a home for birds and butterflies.

6/23/22 - Our friends at the U. S. EPA have been busy "bees!" - sorry couldn't help adding my own humor to this really great educational video that applies to all of us in the Rouge River Watershed.
U.S. Environmental Protection Agency
#PollinatorWeek has us buzzing with excitement!
Check out how you can help pollinators in your own backyard.

6/23/22 - Wayne County, Michigan's Nankin Lake Restoration project, funded by the U.S. EPA Region 5 (Great Lakes Region) Great Lakes Restoration Initiative (GLRI), continues dredging in June with approximately 10,000 cubic yards removed from the lake. Wayne County Parks and Engineer (ECT) Staff are “Kings/Queens of the Hill” during their inspections.

6/29/22 - Learn more about the ARC's Johnson Creek and Tamarack Creek Restoration project funded by the U.S. EPA Region 5 (Great Lakes Region) Great Lakes Restoration Initiative (GLRI) in this GLRI.us story! City of Southfield, Michigan USA - Government , Northville Township - Government , Northville City Hall, Michigan

6/30/22 - Finishing touches are happening this summer at the award-winning Tamarack Creek Habitat Restoration project in the City of Southfield, Michigan USA - Government which is funded by a U.S. EPA Region 5 (Great Lakes Region) Great Lakes Restoration Initiative (GLRI) grant. The project has enhanced over 2 acres of wetlands and provided restoration to 1,800 feet of creek resulting in better stream water quality and habitat in this area of the Rouge River. As the project enters the vegetation establishment phase, we need the public's help by not entering the area as foot and bicycle traffic will cause damage, slowing the natural growing process. Check out the exciting article for more information.

6/30/22 - Are you ready to view the results this summer of the U.S. EPA Region 5 (Great Lakes Region) Great Lakes Restoration Initiative (GLRI) funded Johnson Creek Restoration Project at Fish Hatchery Park in Northville City Hall, Michigan? You can view the naturalized streambank from the top of the slope and see the native vegetation species as they grow in. Please respect the newly planted areas as they are still

becoming established. Specialized maintenance crews will be onsite periodically to conduct work to make sure the site becomes well established.

7/1/22 - The Colonial Park and Venoy Park Habitat Restoration Project, a U.S. EPA Region 5 (Great Lakes Region) Great Lakes Restoration Initiative (GLRI) funded project, has begun construction. The project will create and enhance wetlands habitat at Colonial Park and Venoy Park in Wayne County Parks. For more information visit: https://www.allianceofrougecommunities.com/.../colonial...

7/1/22 - The Sherwood Recreation Area in Wayne County Parks, funded under a grant from the U.S. EPA Region 5 (Great Lakes Region) Great Lakes Restoration Initiative (GLRI) has started construction. This project will convert turf areas to native planting areas, improve and create wetland habitat and diversify native plant species at a park along Edward Hines Drive. For more information visit: https://www.allianceofrougecommunities.com/.../wc...

7/1/22 - Bell Creek Park and Lola Creek projects in Wayne County Parks are starting construction this summer. Both projects are part of a Great Lakes Restoration Initiative (GLRI) grant through the U.S. EPA Region 5 (Great Lakes Region). At Bell Creek we will convert turf areas to native planting areas, improve and create wetland habitat and diversify native plant species. At Lola Creek we will convert turf areas to native planting areas, improve and create wetland habitat and diversify native plant species.

7/1/22 - The design is complete and permits submitted for wildlife habitat improvements and wetland creation on a portion of the Rouge River that runs through the @Lawrence Technological University (LTU) campus in the @City of Southfield, Michigan USA - Government. This work has been funded by a U.S. EPA Region 5 (Great Lakes Region) Great Lakes Restoration Initiative (GLRI) grant to the Alliance of Rouge Communities (ARC). For more information visit: https://www.allianceofrougecommunities.com/.../LTU...

7/4/22 - Data collection has begun at Wilcox Lake, Inkster Park, and Phoenix Lake. The below concept graphic presents possible habitat improvements at Wilcox Lake. Designs of the habitat improvements at these three sites is funded by a $785,100 U.S. EPA Region 5 (Great Lakes Region) Great Lakes Restoration Initiative (GLRI) grant to the Alliance of Rouge Communities.

8/29/22 - Data collection has begun at Wilcox Lake, Inkster Park, and Phoenix Lake. The below concept graphic presents possible habitat improvements at Wilcox Lake. Designs of the habitat improvements at these three sites is funded by a $785,100 U.S. EPA Region 5 (Great Lakes Region) Great Lakes Restoration Initiative (GLRI) grant to the Alliance of Rouge Communities.

9/1/22 - Construction continues for the Colonial Park and Venoy Park Habitat Restoration Project in Wayne County Parks, a U.S. EPA Region 5 (Great Lakes Region) funded Great Lakes Restoration Initiative (GLRI) project (Grant # GL - 00E02830). You can see here that earthwork underway to expand existing wetlands at Colonial Park. These wetland areas will be planted with native species to improve habitat for local wildlife and increase opportunities for wildlife viewing! For more information visit https://www.allianceofrougecommunities.com/.../colonial...

9/7/22 - The Alliance of Rouge Communities data collection continues at Wilcox Lake, Inkster Park, and Phoenix Lake as part of the @U.S. EPA Region 5 (Great Lakes Region) Great Lakes Restoration Initiative grant funded design project (Grant# GL-00E02997-0) . Shown in the photo are fish community

characterization efforts which will be used in the design of lake restoration at Phoenix Lake in the Wayne County Parks system in City of Plymouth .

9/7/22 - That's a lot of straw! Landscapers spread straw mulch and installed erosion control blankets to protect native seed from washout and wildlife at Colonial Park as part of the Colonial Park and Venoy Park Habitat Restoration Project, a U.S. EPA Region 5 (Great Lakes Region), Great Lakes Restoration Initiative (GLRI) funded project (Grant #GL-00E02830). Colonial Park is located in the Lower Rouge River in the City of Inkster - City Hall. Existing wetland areas were expanded in an effort to better manage stormwater and improve habitat for wildlife.

9/8/22 - Under an U.S. EPA Region 5 (Great Lakes Region) , Great Lakes Restoration Initiative (GLRI) Grant (Grant GL-00E02700) the Alliance of Rouge Communities will soon solicit construction bids for the habitat improvements at Seeley Creek in City of Farmington Hills, Michigan - Municipal Government. This habitat project will enhance 5 acres of riparian wetland and 1,600 feet of Seeley Creek between 12 and 13 Mile Roads, upstream of the Rouge River. The project will improve the riparian vegetation buffer adjacent to the creek, stabilize several erosive gullies that flow into the creek, and create several fish and wildlife habitat structures within the creek. For more information visit: https://www.allianceofrougecommunities.com/.../Seeley...

9/8/22 - The enhanced floodplain, constructed wetlands, and riparian buffer shown here are part of the award-winning Tamarack Creek Habitat Restoration project in the City of Southfield, Michigan USA - Government. The Alliance of Rouge Communities' restoration project is funded by an U.S. EPA Region 5 (Great Lakes Region), Great Lakes Restoration Initiative (GLRI) grant and recently won the American Public Works Association Michigan Chapter Project of the Year in the category of Environment 1$ million to $5 million. The project has enhanced over 2 acres of wetlands and provided restoration to 1,800 feet of creek along this headwater of the Rouge River. Maintenance crews will be out in the coming weeks to help establish the new meandering stream and vegetated buffer, which contain new habitat structures, constructed wetlands, and an array of native forb, shrub, and tree plantings. For more information visit: https://www.allianceofrougecommunities.com/.../Tamarack...

9/9/22 - Own a business in the Rouge River watershed? Practicing healthy habits in your business not only protects water quality, it brings personal satisfaction whether you are the owner, an employee or a patron of a business. Healthy habits, like storing wastes using secondary containment and recycling or disposing of them properly, promotes a safe and healthy environment for employees, customers and the Rouge River. Healthy habits make it easier and less costly to prevent pollution than to endure the expense of cleaning up a spill. For more information visit: https://www.allianceofrougecommunities.com/business.html

9/14/22 - You are the eyes and ears in your community when it comes to illegal dumping! Things that should be reported include: dumping to lakes, rivers or streams; unusual discharges from pipes; foul odors; or even a large number of dead fish in waterways. If you answer "yes" to the below questions you should report it to your local municipality so they can investigate.
~Is it unusual? Does it smell? Does it look bad? Does it seem secretive?
Pollution hotlines: Michigan's Pollution Alert System - 800-292-4706
Wayne County - 888-223-2363
Oakland County - 248-858-0931
Washtenaw County - 734-222-3800
For more information visit: https://www.allianceofrougecommunities.com/illdump.html

9/27/22 - LAST CHANCE!!! SURVEY ENDS FRIDAY!!!
THE ALLIANCE OF ROUGE COMMUNITIES WANTS TO GET YOUR
OPINION - WHICH COULD GET YOU A $100 VISA GIFT CARD!
Take our survey on Water Quality Changes in the Rouge River to help direct our future activities! Once your survey is complete you will be entered in a drawing for a $100 Visa gift card to be distributed in September 2022.
Link to ARC survey: https://www.surveymonkey.com/r/arcsurvey22

9/27/22 - Construction is underway at Bell Creek Recreation Area in Wayne County Parks in Charter Township of Redford. Removal of invasive species is nearly complete and wetland areas are being graded in preparation for planting. The habitat restoration project, being conducted by the Alliance of Rouge Communities, is funded under a grant from the U.S. EPA Region 5 (Great Lakes Region) Great Lakes Restoration Initiative (GLRI) (GL-00E02896-0). For more information visit: https://www.allianceofrougecommunities.com/bell.html

9/27/22 - Seeley Creek in improvements will begin in just a few weeks! The ARC received bids from prospective contractors and a contract will be awarded soon. This U.S. EPA Region 5 (Great Lakes Region) Great Lakes Restoration Initiative (GLRI) funded project will improve 5 acres of riparian wetland and 1,600 feet of Seeley Creek in the City of Farmington Hills, Michigan - Municipal Government. This project will improve and diversify the habitat within the stream corridor for fish and wildlife. For more information: https://www.allianceofrougecommunities.com/.../Seeley...

9/27/22 - Tamarack Creek maintenance crews were out recently to help make sure the stream reconstruction and riparian buffer plantings become well established. This @U.S. EPA Region 5 (Great Lakes Region) Great Lakes Restoration Initiative (GLRI) grant funded project, located in the City of Southfield, Michigan USA - Government, has enhanced over 2 acres of wetlands and restored 1,800 feet of creek and riparian vegetation along this tributary of the Rouge River. For more information visit https://www.allianceofrougecommunities.com/tamarack.html

10/10/22 - Are you interested in helping us move the Rouge River forward? Feel free to join us for the next Rouge River Advisory Council (RRAC) virtual meeting on October 18, 2022 at 1:00 p.m. Learn more about RRAC at www.allianceofrougecommunities/rrac.html
https://teams.microsoft.com/l/meetup-join/19%3ameeting_OWY1M2Y4YmMtMzA4My00NzU0LWJlMmUtNjg4OTQ5YTAzM2M4%40thread.v2/0?context=%7b%22Tid%22%3a%22911eb1cc-54d3-4d8c-a577-3bf3ccc8105c%22%2c%22Oid%22%3a%229987047c-3db7-4fe9-bc17-0f7d917f199d%22%7d

10/21/22 - What a great weekend for outdoor cleanup! To help protect the water quality of the Rouge River collect or mulch leaves soon after they fall so they don't get carried into lakes and streams through storm drains or with the wind where they can add excess nutrients. Rather than raking and bagging your leaves, mulch them into your lawn which acts as a natural fertilizer and adds organic matter to the soil. For more information visit: https://www.allianceofrougecommunities.com/steward.html

10/25/22 - An ARC Cooperating Partner, SEMCOG, Southeast Michigan Council of Governments, is launching "Pulse of the Region" - a survey to gain public perspectives on green infrastructure in Southeast Michigan. Please take a few minutes to provide your input!
https://www.cobaltcommunityresearch.org/green.html

10/26/22 - Riverbank restoration is complete on a section of the Lower Rouge River which runs through Venoy-Dorsey Park in the City of Wayne, Michigan Administration Community Updates. Before (first photo below), failed sheet piling provided little erosion protection or habitat value. Now (second photo below), riprap stabilizes the banks. Live stakes will be planted to vegetate the banks and provide additional long-term stability. This work is part of the Colonial Park and Venoy Park Habitat Restoration Project, a U.S. EPA Region 5 (Great Lakes Region) , Great Lakes Restoration Initiative (GLRI) funded project (Grant GL-00E02830). For more information visit https://www.allianceofrougecommunities.com/.../colonial...

10/27/22 - Design and permitting efforts are underway for Phoenix Lake in Northville Township - Government and Plymouth Township. Proposed activities include installation of sand spawning habitat, emergent plantings, and invasive species treatment around Phoenix Lake. This effort is part of the Wilcox, Inkster, Phoenix Habitat Design grant funded by the U.S. EPA Region 5 (Great Lakes Region), Great Lakes Restoration Initiative (Grant# GL-00E02997-0).

10/28/22 - Habitat restoration activities continue at Nankin Lake in Livonia Community and City of Westland - Administration! The dredged sediment from the lake has been dewatered and removal from the site has begun. The removal of the sediment bags will take a few months to complete. The project, being done by Wayne County Parks, an ARC member, is funded through a U.S. EPA Region 5 (Great Lakes Region) Great Lakes Restoration Initiative (GLRI) (Grant # GL00E0240). For more information visit https://www.allianceofrougecommunities.com/nankinlake.html

10/29/22 - As part of the habitat restoration activities at Nankin Lake in Livonia Community and City of Westland - Administration native plants were installed during the summer and they like their new home! Invasive plants were treated and/or removed to make room for these beauties. This project is being done by Wayne County Parks, an ARC member, and is funded through a U.S. EPA Region 5 (Great Lakes Region) Great Lakes Restoration Initiative (GLRI) (Grant # GL00E0240). For more information visit https://www.allianceofrougecommunities.com/nankinlake.html

10/29/22 - On October 16, 2022, a wetland filled to the brim with invasive Phragmites was set ablaze in Venoy-Dorsey Park in the City of Wayne-Administration as part of a prescribed burn. The burn removed thick, dead stems and will make it easier to find and eliminate new growth of this aggressive species. In situations where it can be implemented safely and effectively, prescribed burns are a cost-effective and ecologically sound tool to help control Phragmites. Prescribed fire is recommended where Phragmites exists in large dense stands, which was certainly the case in this wetland. This work is part of the ARC's Colonial Park and Venoy Park Habitat Restoration Project in partnership with Wayne County Parks. It is funded through a U.S. EPA Region 5 (Great Lakes Region), Great Lakes Restoration Initiative (GLRI) Grant (GL-00E02830). For more information visit https://www.allianceofrougecommunities.com/.../colonial...

11/2/22 - Major milestone alert! Permit applications have been submitted to the State for the restoration projects at Wilcox Lake in City of Plymouth (shown below) and Phoenix Lake in Plymouth Township and Northville Township - Government. These projects in Wayne County Parks will create and enhance habitat in and around each lake through placement of substrate used for fish spawning, treatment and removal of invasive species, and native plantings. This effort is part of the ARC's Wilcox, Inkster, Phoenix Habitat Design grant funded by the U.S. EPA Region 5 (Great Lakes Region), Great Lakes Restoration Initiative (Grant# GL-00E02997-0).

11/4/22 - Check out this great service to the Rouge River by the City of Westland - Administration, an ARC Member community! Residents will help protect water quality by using this drop box. If no disposal option is available in your community then crush unused medication and mix it with coffee grounds before disposing in the trash. **City of Westland - Administration**
As a service to our community, the Westland Police Department offers a Medication Drop Off Box to our residents all year long.
If you have prescription medication that you would like to have disposed please bring it to the lobby of the Police Department (36701 Ford Rd.) at any time. The picture shown is of the medication drop box that is located in our lobby, and is available for you to drop expired/unwanted medications into anytime, 24/7/365.
The only restrictions are that needles and liquids are not allowed. These items can be turned into most local pharmacies. According to the FDA.gov website these locations include, (but may not be limited to:
Meijer Pharmacies located at Warren & Newburgh in Westland, and also at Middlebelt & Schoolcraft in Livonia.
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For a map listing medication take back facilities please click this link: https://www.fda.gov/.../drug-disposal-drug-take-back...

11/4/22 - We are thinking spring already!!! **North American Native Plant Society**

SAVE THE DATE!!!

NANPS is very excited to announce our first webinar of 2023!

Making Gorgeous Pollinator Gardens using Native Plants: How to do it! with Clement Kent - Tuesday January 17th 2023, 7:00-8:30 pm (EST)

Details:

Making a pollinator garden using native plants can be tons of fun, but there are real challenges. This talk will show lovely examples of wonderful gardens but will also highlight problems and how to overcome them. We'll look at working on a tiny budget, getting permissions in a timely way, getting young plants established during record breaking droughts, battling invasive weeds, and keeping neighbours or municipalities from destroying established gardens. There are solutions to all these problems, and we hope you and your neighbours will be inspired to do more and better rewilding using these ideas.

Speaker:

Clement Kent wrote "How to Make a Pollinator Garden" in 2011, and has helped create many public PGs since then, all using native plants. He co-founded Project Swallowtail, a program to help people create pollinator gardens which has over 800 participants in the GTA and elsewhere. He co-founded the Parkdale Horticultural Society and serves on the board, and is an adjunct professor of biology at York University focusing on insect genetics. As a member of the Advisory Group for the City of Toronto's Pollinator Protections Strategy, he focused on ways of building corridors of native plantings to connect larger green spaces for the benefit of pollinators.

Please check back! Link to register will be available shortly.

#nativeplants #northamericannativeplants #nativeplantsofnorthamerica #northamericannativeplantsociety #nanps #nativeplantworkshop #nativeplantwebinar #nativeplanteducation #pollinators #pollinatorgarden #pollinatorfriendly #ecology #environmentalsustainability #localecology

11/30/22 - When it is a windy day for your communities curbside recycling, consider skipping a week with your recycle bin to reduce the risk of it tipping over and the items blowing away or going into the storm drain.

12/20/22 - What does a forest look like before it's a forest? At Colonial Park, over 5 acres of mowed turf is on its way to being "reforested" through the planting of approximately 2,000 native trees and 800 native shrubs varying in size and specie. This effort is occurring as part of the Alliance of Rouge Communities' Colonial Park and Venoy Park Habitat Restoration Project in partnership with Wayne County Parks, and is funded through a U.S. EPA Region 5 (Great Lakes Region) Great Lakes Restoration Initiative (GLRI) grant (GL-00E02830). For more information visit https://www.allianceofrougecommunities.com/.../colonial...

12/23/22 - Tree and shrub planting is complete at Venoy-Dorsey Park in the City of Wayne-Administration. Water-loving native species were chosen to thrive in and around the created and restored wetlands. (Check out our species list below!) This work is part of the Colonial Park and Venoy Park Habitat Restoration Project, a U.S. EPA Region 5 (Great Lakes Region), Great Lakes Restoration Initiative (GLRI) funded project (Grant GL-00E02830) to the Alliance of Rouge Communities in partnership with Wayne County Parks.

2022 Facebook Reposts/Shares

1/5/22 - Get involved! Friends of the Rouge is looking for volunteers to help look for sensitive aquatic insects that indicate good water quality in the Rouge River. The Annual Friends of the Rouge Winter Stonefly Search is scheduled for Sat. Jan. 22, 2022, 10:00 am – approx. 3:00 pm. For more info: https://therouge.org/bug-hunt-events-and-trainings/

1/13/22 - Oakland County! Check out some great activities coming up through Oakland Conservation District this year! Trees, butterflies, farmers market - Oh My!
http://www.oaklandconservationdistrict.org/upcoming...

2/4/22 - The Oakland County Water Resources Commissioner's office is excited to share that they have launched the: Preserve MI Waters: Stormwater Manhole Cover Art Contest.
They are seeking original art submissions to be added to 50 stormwater manhole covers throughout Oakland County. Participants must be students attending high school (9-12 Grade) or actively enrolled in an Oakland County college during the time of the contest.
Pure Oakland Water will provide the contest winner with a $1,000 scholarship.
The contest closes on March 11, 2022.

3/21/22 - Get involved with Friends of the Rouge! Join the Benthic Macroinvertebrate Sampling Program. Meet a team to search for caddisflies, mayflies, dragonflies and other aquatic life in Rouge streams. The abundance and diversity of the organisms found at each site provides information on the health of the stream. Volunteers must pre-register. Site assignments are emailed to volunteers the week of the event.*** No experience is necessary. All volunteers must self-screen for covid symptoms and be fully vaccinated or have a negative test. Children eight and older are welcome when accompanied by a PARTICIPATING adult; groups limited to four people. Registration required by April 9, 2022 at https://therouge.org/bug-hunt-events-and-trainings/

5/18/22 - Awesome work by one of the Alliance of Rouge Communities member communities! **City of Auburn Hills**
Are you wondering what's going on at Riverside Park with all the construction and equipment? The answer is riverbank stabilization!

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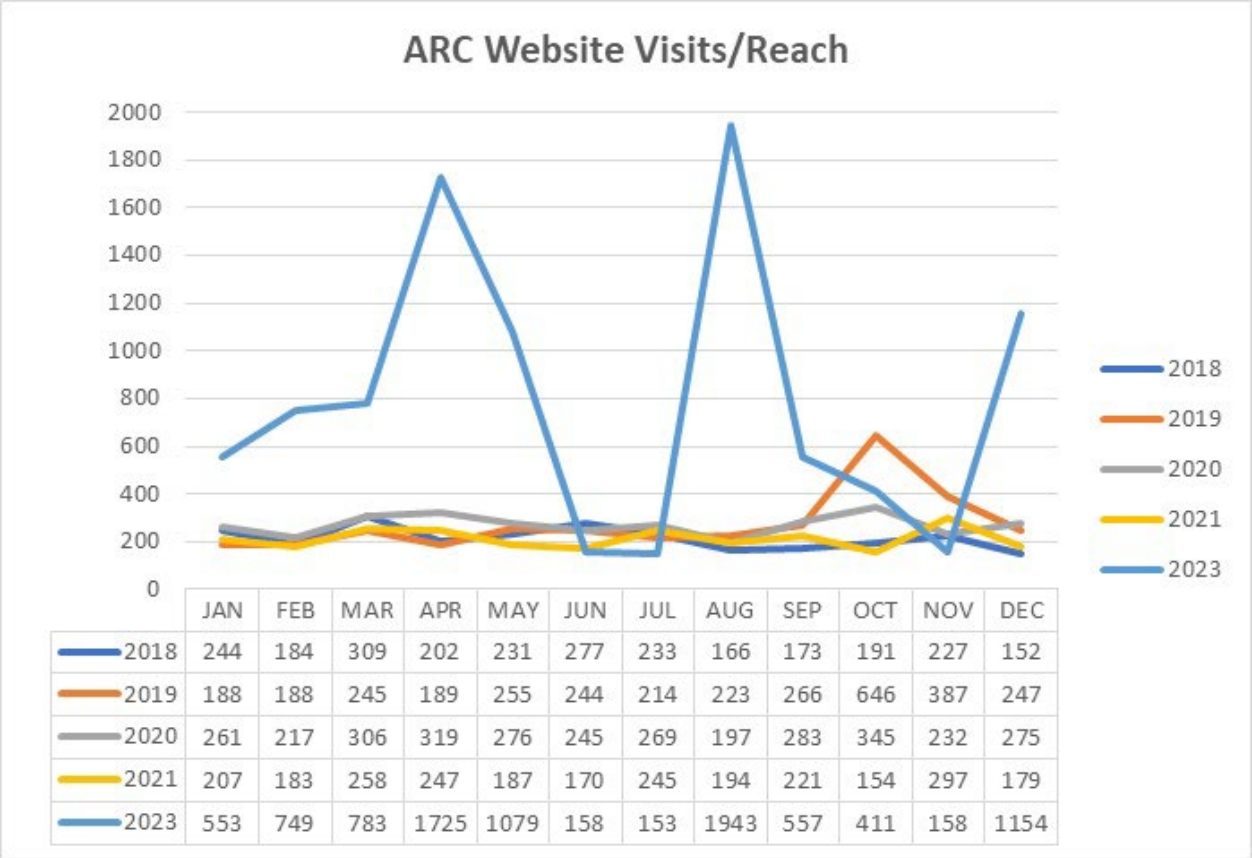
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Speaker:

2023 ARC ELECTRONIC MEDIA REPORT

ARC WEBSITE TRAFFIC (VISITORS/REACH)



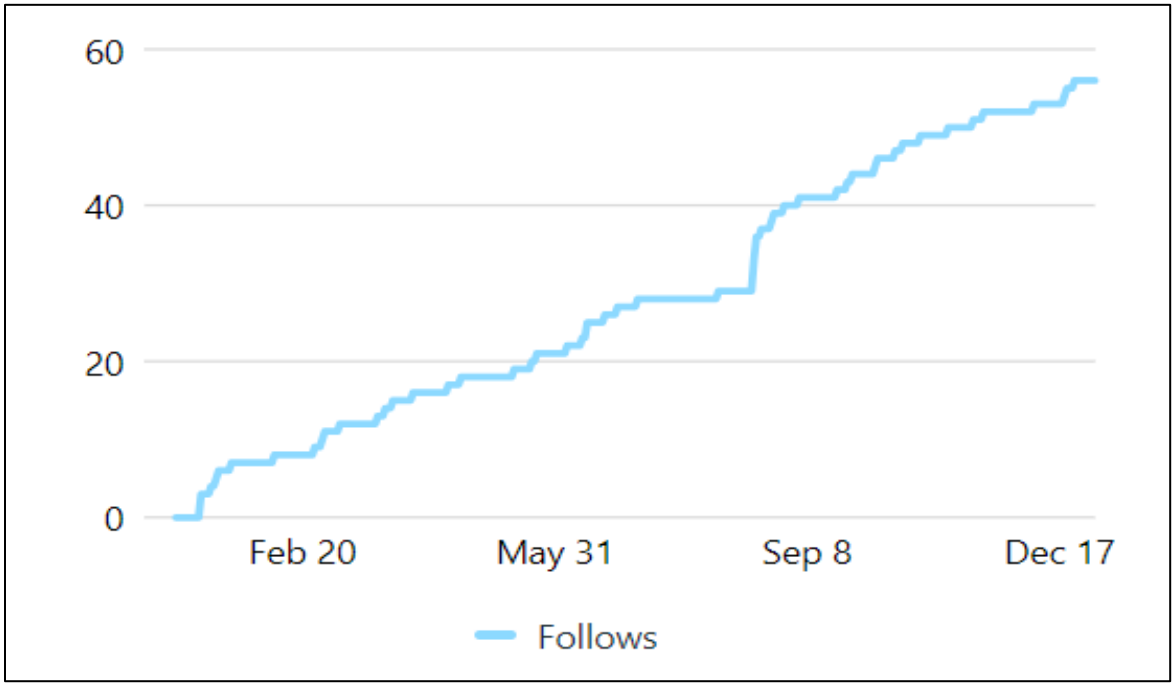
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2018	244	184	309	202	231	277	233	166	173	191	227	152
2019	188	188	245	189	255	244	214	223	266	646	387	247
2020	261	217	306	319	276	245	269	197	283	345	232	275
2021	207	183	258	247	187	170	245	194	221	154	297	179
2023	553	749	783	1725	1079	158	153	1943	557	411	158	1154

**Note: In 2022 traffic information was not available because the website was moved from one hosting company to another so a full year of data was not available.*

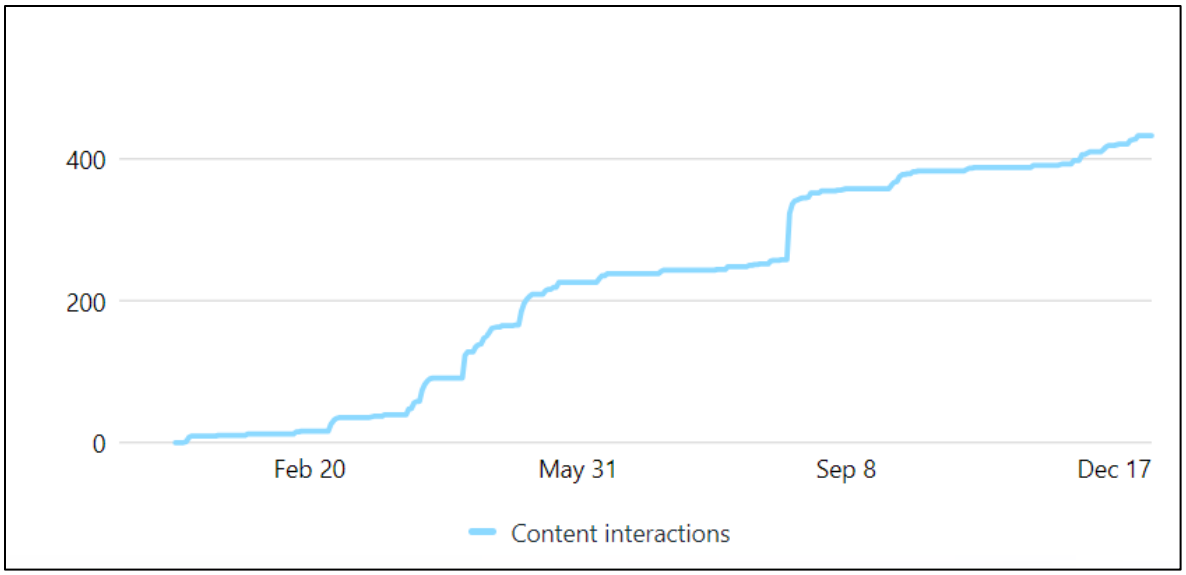
ARC FACEBOOK POSTS

- ARC created posts in 2023: 33

ARC FACEBOOK FOLLOWERS 2023: 365



ARC FACEBOOK LIKES 2023: 433



2023 Facebook Posts

Title	Date published	Status	Reach	Engagements	Likes and reactions	Comments	Shares
 Do you know how your Rouge River watershe... Alliance of Rouge Communities Boost ···	Dec 13, 2023		772 Reach	18 Post engagements	8 Reactions	0 Comments	3 Shares
 The Seeley Creek Habitat Restoration project ... Alliance of Rouge Communities Boost ···	Dec 2, 2023		379 Reach	37 Post engagements	18 Reactions	4 Comments	3 Shares
 These photos highlight the stream and flood... Alliance of Rouge Communities Boost ···	Dec 1, 2023		214 Reach	10 Post engagements	3 Reactions	0 Comments	1 Shares
 As winter settles in, use your local car wash re... Alliance of Rouge Communities Boost ···	Dec 1, 2023		63 Reach	0 Post engagements	0 Reactions	0 Comments	0 Shares
 Some great recognition for all the groups tha... Alliance of Rouge Communities Boost ···	Oct 24, 2023		66 Reach	5 Post engagements	2 Reactions	0 Comments	1 Shares
This post has no text Alliance of Rouge Communities Boost unavailable ···	Oct 3, 2023		78 Reach	1 Post engagements	1 Reactions	0 Comments	0 Shares
 The Fred A. and Barbara M. Erb Family Found... Alliance of Rouge Communities Boost ···	Oct 3, 2023		115 Reach	5 Post engagements	2 Reactions	0 Comments	1 Shares
 Draining your fountain or pool this fall? DON'... Alliance of Rouge Communities Boost ···	Sep 26, 2023		106 Reach	5 Post engagements	3 Reactions	0 Comments	1 Shares

Title	Date published	Status	Reach	Engagements	Likes and reactions	Comments	Shares
 We want to thank the organizations that prov... Alliance of Rouge Communities Boost ···	Sep 25, 2023		81 Reach	13 Post engagements	5 Reactions	2 Comments	1 Shares
 What a morning we had Friday as the Allianc... Alliance of Rouge Communities Boost ···	Sep 25, 2023		539 Reach	88 Post engagements	9 Reactions	0 Comments	2 Shares
This post has no text Alliance of Rouge Communities Boost unavailable ···	Sep 6, 2023		55 Reach	2 Post engagements	1 Reactions	0 Comments	0 Shares
 Seed is sprouting and native flowers are in bl... Alliance of Rouge Communities Boost ···	Aug 11, 2023		1.4K Reach	149 Post engagements	84 Reactions	5 Comments	8 Shares
 SAVE THE DATE! U.S. Environmental Protectio... Alliance of Rouge Communities Boost ···	Aug 3, 2023		704 Reach	10 Post engagements	1 Reactions	0 Comments	3 Shares
 Native seed is sprouting, and trees and shrub... Alliance of Rouge Communities Boost ···	Jun 8, 2023		210 Reach	26 Post engagements	10 Reactions	0 Comments	2 Shares
 If you head out to Nankin Lake in Livonia Co... Alliance of Rouge Communities Boost ···	May 22, 2023		81 Reach	3 Post engagements	2 Reactions	0 Comments	0 Shares
 Activities over the winter at the @Wayne Cou... Alliance of Rouge Communities Boost ···	May 20, 2023		92 Reach	18 Post engagements	3 Reactions	3 Comments	0 Shares
 The transformation is becoming more visible ... Alliance of Rouge Communities Boost ···	May 19, 2023		109 Reach	27 Post engagements	5 Reactions	1 Comments	0 Shares
 Construction continues at the Seeley Creek H... Alliance of Rouge Communities Boost ···	May 11, 2023		309 Reach	22 Post engagements	9 Reactions	0 Comments	2 Shares
 The Seeley Creek Habitat Restoration project ... Alliance of Rouge Communities Boost ···	May 10, 2023		65 Reach	4 Post engagements	3 Reactions	0 Comments	0 Shares
 Alliance of Rouge Communities upd... Alliance of Rouge Communities Create new ad ···	May 10, 2023		--	--	--	--	--
 The Seeley Creek Habitat Restoration project ... Alliance of Rouge Communities Boost ···	May 10, 2023		571 Reach	62 Post engagements	16 Reactions	0 Comments	2 Shares
 The first photo below shows the Tamarack Cr... Alliance of Rouge Communities Boost ···	Apr 28, 2023		199 Reach	39 Post engagements	11 Reactions	2 Comments	2 Shares

	More than 2,300 live stakes were planted alo... Alliance of Rouge Communities	Boost	···	Apr 26, 2023		103 Reach	27 Post engagements	13 Reactions	1 Comments	0 Shares
	This Rainbow Trout was spotted by Wayne Co... Alliance of Rouge Communities	Boost	···	Apr 19, 2023		298 Reach	55 Post engagements	32 Reactions	6 Comments	1 Shares
	Neighborhood Stormdrain Alliance of Rouge Communities	Boost	···	Apr 3, 2023		1.2K Reach	73 Post engagements	23 Reactions	4 Comments	4 Shares
	The newly created wetlands at Colonial Park i... Alliance of Rouge Communities	Boost	···	Mar 31, 2023		346 Reach	61 Post engagements	17 Reactions	2 Comments	5 Shares
	Rain barrels, native plants, and c... Alliance of Rouge Communities	Boost unavailable	···	Mar 29, 2023		82 Reach	11 Post engagements	6 Reactions	0 Comments	0 Shares
	Get ready for better weather by ... Alliance of Rouge Communities	Boost unavailable	···	Mar 29, 2023		65 Reach	7 Post engagements	3 Reactions	0 Comments	0 Shares
	Make sure you stop by the ARC's display! We ... Alliance of Rouge Communities	Boost	···	Mar 20, 2023		79 Reach	4 Post engagements	2 Reactions	0 Comments	0 Shares
	The ARC's Executive Director, An... Alliance of Rouge Communities	Boost unavailable	···	Mar 15, 2023		59 Reach	7 Post engagements	2 Reactions	0 Comments	0 Shares
	You didn't hear it from us but . . . . potential f... Alliance of Rouge Communities	Boost	···	Feb 28, 2023		1.3K Reach	37 Post engagements	12 Reactions	2 Comments	4 Shares
	Save the date of March 1, 2023, to learn more... Alliance of Rouge Communities	Boost	···	Feb 15, 2023		59 Reach	13 Post engagements	4 Reactions	1 Comments	0 Shares
	Businesses have a direct effect on the water q... Alliance of Rouge Communities	Boost	···	Jan 27, 2023		99 Reach	4 Post engagements	1 Reactions	0 Comments	1 Shares
	Check out this great opportunity ... Alliance of Rouge Communities	Boost unavailable	···	Jan 5, 2023		64 Reach	7 Post engagements	1 Reactions	0 Comments	1 Shares

2023 Facebook Posts

1/27/23 - Businesses have a direct effect on the water quality in the Rouge River watershed. When rain and snow/ice melt travel across the land (watershed) and into storm drains, it is called stormwater or runoff. Runoff picks up trash, animal waste, chemicals, sediments and dissolved substances until it discharges into the nearest waterbody. Even if your business is not next to the river, your actions still have an impact on the Rouge River watershed. For more information visit https://www.allianceofrougecommunities.com/business.html

2/15/23 - Save the date of March 1, 2023, to learn more about the habitat restoration projects scheduled at Wilcox and Phoenix Lakes through a Great Lakes Restoration Initiative (GLRI) grant! RSVP at https://bit.ly/wilcox-phoenix

2/28/23 - You didn't hear it from us but . . . . potential for more snow this week! Remember, rock salt doesn't just disappear when all the snow melts; it is washed into our lakes, rivers, and streams and has an almost immediate effect on water quality. As a homeowner, consider reducing salt use by applying brine, not rock salt, before a snow storm and shoveling frequently to keep snow from accumulating. For more ways to protect water quality in the Rouge River visit: www.allianceofrougecommunities.com

3/15/23 - The ARC's Executive Director, Annette DeMaria, spent some time with the Canton Community Foundation today. It was great to share some information with the group on things they can do to help protect water quality in the Rouge River! Thank you to the Canton Community Foundation!

March Lunch & Learn - Healthy Yard Maintenance Tips to Protect Your Watershed with Annette DeMaria, P.E. PMP was held Plymouth District Library today.

As spring approaches, Annette DeMaria, Executive Director of the Alliance of Rouge Communities, provided tips for residents of Plymouth, Canton, and Westland, part of the Rouge River watershed, to keep a beautiful yard while reducing their impact on the environment.

Below are some pictures from the presentation. The recording of the event will be posted on our website. Please log in to find out more Lunch & Learn events hosted by Local Impact Alliance.

https://localimpactalliance.org/

3/20/23 - Make sure you stop by the ARC's display! We will be at this unique event our partner, Cranbrook Institute of Science , is putting on! Water After Dark event

3/31/23 - The newly created wetlands at Colonial Park in Wayne County Parks are getting lots of use with the wet conditions this spring! We are excited to watch the trees and shrubs planted last fall come to life as temperatures creep up. Construction activities will wrap up at Colonial and Venoy Parks this spring; maintenance of vegetation will continue throughout the growing season. For more information visit: https://www.allianceofrougecommunities.com/colonial.html

4/3/23 - Do you know where this rainwater is going once it trickles into this stormdrain? If you guessed into the Rouge River - you are correct! In addition, any debris picked up from your driveway or chemicals that get dumped down it end up in the same place! Keep your stormdrains clear and never dump anything down a stormdrain.

4/19/23 - This Rainbow Trout was spotted by Wayne County, Michigan Environmental Specialist, Sue Thompson, in the Lower Rouge River at Ridge Road while participating in the Friends of the Rouge Spring Bug Hunt on April 14! Before taking the picture Sue said it swam up to her waders and jumped out of the water a bit (maybe to warn her of the cold weather coming!) before it swam to the calmer waters seen here. To get involved in future Friends of the Rouge bug hunts visit https://therouge.org/volunteer/

4/26/23 - More than 2,300 live stakes were planted along the banks of Tamarack Creek in the City of Southfield, Michigan USA - Government this month. The creek was reconstructed in 2022. These before and after aerial photos highlight the dramatic transformation from degraded channel to functioning stream. The Alliance of Rouge Communities' restoration project is funded by an U.S. EPA Region 5 (Great Lakes Region) Great Lakes Restoration Initiative (GLRI) grant (GL-00E02478-2) and has enhanced over 2 acres of wetlands and restored 1,800 feet of creek and riparian vegetation along this tributary of Rouge River. For more information visit https://www.allianceofrougecommunities.com/tamarack.html

4/28/23 - The first photo below shows the Tamarack Creek pre-project conditions (Sept. 2018) in the City of Southfield, Michigan USA - Government. The over-widened, straight channel upstream of a culvert crossing, and riparian buffer are dominated by invasive buckthorn and honeysuckle. The second photo shows the post-project conditions (April 2023) with a meandering stream with habitat structures after stream reconstruction and culvert removal, floodplain construction, and native plantings. The Alliance of Rouge Communities' restoration project is funded by an U.S. EPA Region 5 (Great Lakes Region) Great Lakes Restoration Initiative (GLRI) grant (GL-00E02478-2) and has enhanced over 2 acres of wetlands and restored 1,800 feet of creek and riparian vegetation along this tributary of Rouge River. For more information visit https://www.allianceofrougecommunities.com/tamarack.html

5/10/23 - The Seeley Creek Habitat Restoration project construction is underway in City of Farmington Hills, Michigan - Municipal Government. These before (first photo) and after photos show gully repair downstream of a large stormwater outfall pipe. A rock chute drop structure was constructed to convey concentrated flows from the pipe to Seeley Creek. Vertical gully banks, which were up to 8 feet tall, were reshaped and prepared for subsequent planting with native vegetation. This project was funded by the U.S. EPA Region 5 (Great Lakes Region) Great Lakes Restoration Initiative (GLRI) (Grant GL-00E02700) which was awarded to the Alliance of Rouge Communities. The project will enhance 5 acres of riparian wetland and 1,600 feet of Seeley Creek between 12 and 13 Mile Roads, upstream of the Rouge River. For more information visit https://www.allianceofrougecommunities.com/seeley.html

5/10/23 - The Seeley Creek Habitat Restoration project continues in the City of Farmington Hills, Michigan - Municipal Government. This photo shows an at-grade rock riffle constructed across Seeley Creek to enhance fish spawning habitat and minimize bed and bank erosion. This project was funded by the U.S. EPA Region 5 (Great Lakes Region) Great Lakes Restoration Initiative (GLRI) (Grant GL-00E02700) which was awarded to the Alliance of Rouge Communities. The project will enhance 5 acres of riparian wetland and 1,600 feet of Seeley Creek between 12 and 13 Mile Roads, upstream of the Rouge River. For more information visit https://www.allianceofrougecommunities.com/seeley.html

5/11/23 - Construction continues at the Seeley Creek Habitat Restoration project in the City of Farmington Hills, Michigan - Municipal Government. A horizontal log sill was constructed across Seely Creek to provide woody aquatic habitat and grade control. The transition from relatively stagnant water upstream of the log sill, to rapid, bubbly flow downstream of the log sill will improve water quality (e.g.,

dissolved oxygen) to the benefit of aquatic life. The small scour pool develops on the downstream side of the structure which enhances bedform diversity and provides fish habitat. The ARC received funding for this project from the U.S. EPA Region 5 (Great Lakes Region) Great Lakes Restoration Initiative (GLRI) (Grant GL-00E02700). The project will enhance 5 acres of riparian wetland and 1,600 feet of Seeley Creek upstream of the Rouge River. For more information visit https://www.allianceofrougecommunities.com/seeley.html

5/19/23 - The transformation is becoming more visible at Wayne County's U.S. EPA Region 5 (Great Lakes Region) Great Lakes Restoration Initiative (GLRI) funded Nankin Lake restoration project in Livonia Community and City of Westland - Administration.

Restoration activities are now focused on the upland areas. Now picture the egg drop in April . . .ARC Member Wayne County Parks is also upgrading the Nankin Lake parking lot to asphalt (see first photo) and during busy times an overflow turf lot (see second photo) has been included in the restoration of the parking lot to allow for MANY more parking spots. For more information visit https://www.allianceofrougecommunities.com/nankinlake.html .

5/20/23 - Activities over the winter at the @Wayne County Parks U.S. EPA Region 5 (Great Lakes Region) Great Lakes Restoration Initiative (GLRI) funded Nankin Lake restoration project may have had you scratching your head! The project team removed over 45,000 cubic yards of sediment from the lake in Livonia Community and City of Westland - Administration, only to place sand and stone? What gives?!? The sand is ideal habitat that was lacking in the substrate of the lake, so select locations had sand beds and large boulders added for habitat features for our aquatic friends! For more information visit https://www.allianceofrougecommunities.com/nankinlake.html.

5/22/23 - If you head out to Nankin Lake in Livonia Community and City of Westland - Administration, you'll notice new trees and shrubs and areas that were recently seeded. These were added as part of the habitat restoration project to make up for lost trees due to the Emerald Ash Borer as well as some particularly damaging storms. This Wayne County Parks project was funded through a U.S. EPA Region 5 (Great Lakes Region) Great Lakes Restoration Initiative (GLRI) grant (Grant # GL00E0240).

Learn more about the value of trees by checking out the document found here: https://www.allianceofrougecommunities.com/.../valueoftre...

6/8/23 - Native seed is sprouting, and trees and shrubs are coming alive at Venoy-Dorsey Park in City of Wayne-Administration! During construction last year, new wetland areas were bordered with a series of logs and boulders to define the border of the wetland and discourage foot traffic over newly planted areas. Please help the establishment of these areas by keeping off of the new wetland areas. This work in is part of the Colonial Park and Venoy Park Habitat Restoration Project that was awarded to the Alliance of Rouge Communities through a U.S. EPA Region 5 (Great Lakes Region), Great Lakes Restoration Initiative (GLRI) grant (Grant GL-00E02830). For more information visit: https://www.allianceofrougecommunities.com/venoy.html

8/3/23 - SAVE THE DATE! U.S. Environmental Protection Agency's SepticSmart Week is September 18-22, 2023. Lots of us in the Rouge River Watershed have septic systems on our property. Check our website for info at https://www.allianceofrougecommunities.com/septic.html and in celebration Michigan Department of Environment, Great Lakes, and Energy is hosting a webinar on the basics of septic

systems, tools on how to locate yours and use, operation and maintenance tips! Register for the webinar here: https://us06web.zoom.us/.../WN_EYtCu4dqR2ahZGB1CtiLxg...

8/11/23 - Seed is sprouting and native flowers are in bloom at Colonial Park in the City of Inkster! New wetland areas have plenty of moisture to keep native plantings well-watered, though recreation areas may be slower to establish. Please help the establishment of these plants by keeping off seeded areas. This work is part of the Colonial Park and Venoy Park Habitat Restoration Project that was awarded to the Alliance of Rouge Communities through a U.S. EPA Region 5 (Great Lakes Region), Great Lakes Restoration Initiative (GLRI) grant (Grant GL-00E02830). For more information visit: https://www.allianceofrougecommunities.com/colonial.html

9/25/23 - What a morning we had Friday as the Alliance of Rouge Communities hosted the Great Lakes Restoration Celebration at The Henry Ford. A special thank you to our sponsors: Fred A. and Barbara M. Erb Family Foundation; The Henry Ford; SEMCOG, Southeast Michigan Council of Governments; and Environmental Consulting & Technology, Inc. It was a morning of celebrating with our federal, state, and local partners along with those grassroots organizations doing the on-the-ground work being funded through the Great Lakes Restoration Initiative (GLRI) and U.S. EPA Region 5 (Great Lakes Region), National Oceanic and Atmospheric Administration (NOAA), U.S. Forest Service, and private foundations, to name just a few! WorldFish MigrationDay's Happy Fish joined us after the morning concluded to do a fish restocking at the Rouge River Oxbow on the The Henry Ford campus with Henry Ford Academy students and EPA GLNPO's Director Christopher Korleski.

9/25/23 - We want to thank the organizations that provided some great information that was shared during the Great Lakes Restoration Celebration last Friday at The Henry Ford. In addition to the Alliance of Rouge Communities, they included Wayne County Parks, Friends of the Rouge, Friends of the Detroit River, The Greening of Detroit, River Raisin Watershed Council, Clinton River Watershed Council, Alliance of Downriver Watersheds, Friends of the St. Clair River, Kawkawlin River Watershed Association, Saginaw Bay Monitoring Consortium, Partnership for the Saginaw Bay Watershed, SEMCOG, Southeast Michigan Council of Governments, and the Great Lakes Commission. The event celebrated the remarkable restoration accomplishments that have occurred in and around the river systems of Southeast Michigan over the last several years. Follow the link below for the book that was handed out which documented the great work by these organizations! https://www.allianceofrougecommunities.com/.../2023...

9/26/23 - Draining your fountain or pool this fall? DON'T be this homeowner - draining to a storm drain goes right to the Rouge River! Instead allow the chlorine to dissipate for several days before draining it to a landscaped area.

10/3/23 - The Fred A. and Barbara M. Erb Family Foundation announced today their September grants including a $375,000 grant over 3 years to the Alliance of Rouge Communities (ARC) to identify where sanitary sewage is entering the Rouge River and to provide training to municipal staff on how to comply with their stormwater permit. Doug Moore, MSA - ARC Chair and Assistant Director of Public Works, Livonia Community, said "The funding will allow the ARC to support the Erb Family Foundation's desired outcomes of healthy Great Lakes, lasting change and environmental health and justice by increasing stewardship, improving water quality, and benefiting underserved areas of the Rouge River watershed through collaborative investigation, community engagement, municipal staff training and action." Thank you to the Erb Family Foundation!

10/24/23 - Some great recognition for all the groups that were represented at the ARC hosted Great Lakes Restoration Celebration on September 22! Press and Guide – Great Lakes Restoration Initiative, Alliance of Rouge Communities talk about restoring waterways.

12/1/23 - As winter settles in, use your local car wash regularly to keep your car clean. When the snow/ice buildup on your car melts in your driveway or parking lot, it sends the road salt, oil and other pollutants to the storm drain which end up in the Rouge River. For more tips visit www.allianceofrougecommunities.com.

12/1/23 - These photos highlight the stream and floodplain reconstruction work done under the Alliance of Rouge Communities' Tamarack Creek restoration project located in City of Southfield, Michigan USA - Government . The straight creek was transformed back to the river's natural meandering state and reconnected to the floodplain to reduce erosion and slow the water moving through the system to minimize the amount of sediment contributing to poor water quality. This project was funded by a U.S. EPA Region 5 (Great Lakes Region) Great Lakes Restoration Initiative (GLRI) grant (GL-00E02478-2) and has enhanced over 2 acres of wetlands and restored 1,800 feet of creek and riparian vegetation along this tributary of Rouge River. For more information visit https://www.allianceofrougecommunities.com/tamarack.html

12/2/23 - The Seeley Creek Habitat Restoration project was substantially completed this summer in the City of Farmington Hills, Michigan - Municipal Government. The first photo below shows some of the newly constructed rock riffle that helps stabilize the bed and banks of the creek and provides fish spawning habitat. The second photo shows a deer roaming through part of the floodplain that was previously choked off with a dense stand of Phragmites, one of the invasive vegetation species treated during the project. Maintenance activities will continue into 2024. This project was funded by a grant from the U.S. EPA Region 5 (Great Lakes Region) Great Lakes Restoration Initiative (Grant GL-00E02700) which was awarded to the Alliance of Rouge Communities. For more information visit https://www.allianceofrougecommunities.com/seeley.html

12/13/23 - Do you know how your Rouge River watershed works? Do you know how water quality works? Check out the ARC's new brochure to find out how they affect each other and how you can be the solution ~ not the pollution! https://www.allianceofrougecommunities.com/.../watershed...

2023 Facebook Re-Posts/Shares

1/5/23 - Check out this great opportunity to get outside this winter and to help assess the water quality in the Rouge River with one of the ARC's partners Friends of the Rouge!
Friends of the Rouge
.
Calling all Rouge Friends!
Ring in the New Year with Friends of the Rouge to make a difference in your riverine community! You can assess the health of YOUR Rouge River this January by joining a team to search for stoneflies! Sign up to learn more at the annual Stonefly Refresher course on Jan. 12th 6-7:30pm, where you will learn how to look for these little creatures and understand why they are so important to our environment. Then, join the Stonefly Search on Jan. 21st where you will visit the river with your team to search for stoneflies and build understanding of the health of the Rouge. See you out there!
Stonefly Refresher: 1/12/2023 6pm-7:30pm via Zoom, link to register:
https://us02web.zoom.us/.../reg.../WN_yWKsR_JtQxa9rYRl9Im2mA.
Stonefly Search: 1/21/2023 approximately 10am-4pm, link to register:
https://docs.google.com/.../1FAIpQLSf8YTEHFEuOL7.../viewform.

3/29/23 - Get ready for better weather by attending this Friends of the Rouge training! Rain Gardens 101

3/29/23 - Rain barrels, native plants, and composters - OH MY! Thanks to our partner, Friends of the Rouge and ARC member community Livonia Community! Spring sale Livonia DPW

9/6/23 - **Oakland County Water Resources Commissioner (WRC)**
.
The 19th Annual Kids' Clean Water Calendar Contest is currently accepting artwork entries. #OaklandCounty fourth and fifth grade students are encouraged to submit their own original artwork. Our goal is to provide a platform for young people to share their ideas on how we can best prevent pollution of our freshwater resources. Entries are being accepted through Friday, October 6, and winners will be notified mid-November.
To learn about the contest and submit an entry, visit oakgov.com/CalendarContest.

10/3/23 - **Wayne County Parks**
.
The first Frightful Friday event will take place on Friday, October 6 at Nankin Mills from 7:00 PM - 9:00 PM and the topic is BATS AND BUGS!
You will learn how both animal groups get a bad rap and how they truly benefit humans. On our hike, we will look for bats while we shine for spiders on the ground.
To register, visit wayneco.recpro-iframe.com or check out the event page at https://www.facebook.com/events/271234509014769.

Clement Kent wrote "How to Make a Pollinator Garden" in 2011, and has helped create many public PGs since then, all using native plants. He co-founded Project Swallowtail, a program to help people create pollinator gardens which has over 800 participants in the GTA and elsewhere. He co-founded the Parkdale Horticultural Society and serves on the board, and is an adjunct professor of biology at York University focusing on insect genetics. As a member of the Advisory Group for the City of Toronto's Pollinator Protections Strategy, he focused on ways of building corridors of native plantings to connect larger green spaces for the benefit of pollinators.

Please check back! Link to register will be available shortly.

Appendix C

Articles/Ad Graphic Report

Water Quality Solutions

The water quality of the Rouge River plays an important role in a healthy watershed and you can be the solution, not the pollution! Having clean water is imperative for not just humans, but also wildlife, trees, and plants. Clean water provides communities with drinking water, makes recreation like boating and fishing safe for the residents of Michigan and supports a healthy ecosystem for plants and wildlife.

Knowing how watersheds work is important because it allows us to understand that our actions have an impact on water quality. When rain and snow/ice melt travel across the land (watershed) and into storm drains, it is called stormwater or runoff. As this runoff travels, it picks up various types of pollution along the way until it discharges into the nearest waterbody which has a negative affect on water quality. Common types of pollution in stormwater runoff include sediment, nutrients, chemicals, bacteria, and illicit discharges. In addition to stormwater runoff, water velocity can decrease water quality.

Sediment can be eroded soil from unprotected construction sites, eroding streambanks and shorelines and runoff from agricultural lands. Adding vegetative buffers along agricultural land or at the water's edge of your waterfront property can help slow runoff.



Chemicals can come from pesticides used on residential and agricultural lands, leaking vehicle fluids, road salt and the improper disposal of household chemicals. Consider changing to a chemical alternative for cleaning, like peroxide, and disposing of cleaning supplies, paints, and aerosol cans at a household hazardous waste collection event.

Illicit discharges are any discharge to a storm drain or waterbody that contains polluting material, such as sediment, nutrients, oil, and bacteria. If you see someone dumping anything in the river or lake, on the side of the road or even down the storm drain on your street, report it to your community's pollution hotline or 800-292-4706.

Nutrients include natural sources (organic debris), fertilizers, animal waste (pets, wildlife, and livestock) and sewage sources coming from failing septic systems or illegal discharges of sewage. When fertilizing your yard, use slow-release fertilizer and sweep excess particles off paved surfaces back onto the lawn.

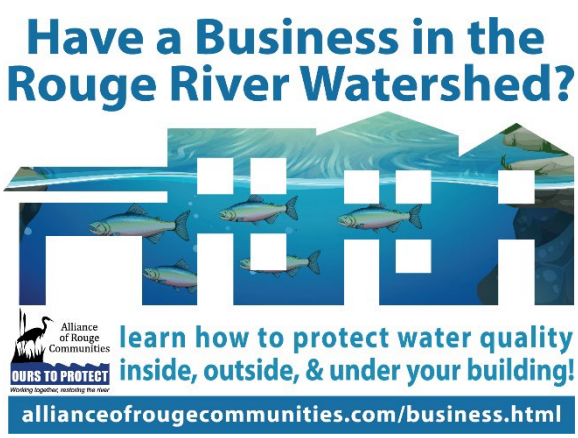
Bacteria is another source of pollution in stormwater which comes from animal waste or human sewage sources. Always pick up after your pet, even in the winter, to prevent the bacteria from washing into drainage ditches and storm drains which go straight to the river.

Water velocity is too much water, too quickly, which scours the streambed and banks adding to the sediment and recirculating the bacteria and chemicals in the river reducing water quality. Planting trees provides a natural filter to reduce stormwater runoff, flooding, and erosion.

To get more information on how you can protect water quality in the Rouge River watershed visit https://www.allianceofrougecommunities.com/steward.html.

Business Owners – protect water quality inside, outside & under your building!

Businesses have a direct effect on the water quality in the Rouge River watershed. When rain and snow/ice melt travel across the land (watershed) and into storm drains, it is called stormwater or runoff. Runoff picks up trash, animal waste, chemicals, sediments and dissolved substances until it discharges into the nearest waterbody. Even if your business is not next to the river, your actions still have an impact on the Rouge River watershed. These bodies of water impacted by runoff provide recreational opportunities, habitat for wildlife, and may even provide drinking water for communities.



The way you use, dispose and store chemicals, batteries, wastes and other materials inside your building can influence water quality in the Rouge River. Make sure your business stores chemicals in a designated area which includes secondary containment in case the original containers leak. Also consider implementing a recycling station for plastic, paper/cardboard, glass, aluminum and batteries to protect the environment.

How you maintain and clean your parking lots, dumpsters and storage areas outside your building play an important role in the health of the Rouge River. Always keep dumpster areas clean and lids closed so items don't blow away. Inspect containers and waste disposal areas regularly for leaks and replace or repair them immediately if found. To protect water quality it is important to clean up leaks or spills outside immediately with dry absorbent and dispose of properly; never wash it down the storm drain.

The lawn surrounding your business and how you maintain it also plays an important role in water quality. Limit the use of herbicides, pesticides or fertilizers and never apply them close to any watercourse. Always follow a product's label for proper use and application. Businesses should also consider planting rain gardens around buildings. Their deep roots slow runoff and provide filtration before stormwater enters the river.

Even things under your building that you can't see, like pipes that were changed with renovations or expansion, can affect the water quality in the Rouge River. Never reroute sanitary drains on your property without verifying their connection to a sanitary sewer system. If a sewer pipe is mis-connected to a storm drain system, this is an illicit connection and is harmful to water quality. If you are contacted about *E. coli* levels close to your business by city or county authorities, work with them to test your sanitary connections and if something is found, correct it.

Adopting Best Management Practices (BMPs) and training your employees to use them inside, outside and under your building will have a positive impact on your profits, customers, employees, wildlife and their habitat, and even the communities downstream! To learn more BMPs you can adopt in your business to protect water quality in the Rouge River visit www.allianceofrougecommunities.com/business.html.

Rouge in The News!

Here you can find information, press announcements on projects and pertinent articles and videos related to the Rouge River Watershed along with our partner organizations and watersheds in Southeast Michigan.

Exciting Things in & Around The Rouge River

-

Dearborn Press and Guide: Great Lakes Restoration Initiative, Alliance of Rouge Communities talk about restoring waterways
October 15, 2023

-

ARC Newsletter Article: Water Quality Solutions
December, 2023

-

Detroit Free Press: A small, troubled, Henry Ford-created lake in Wayne County is getting a makeover
July 14, 2022

-

ARC Newsletter Article: Business Owners - protect water quality inside, outside & under your building!
December, 2022

-

C & G Newspapers: State Group Names Tamarack Creek Restoration Project of the Year
June 29, 2022

-

GLRI Johnson Creek and Tamarack Creek Restoration in Rouge River Area of Concern
June 16, 2022

-

WXYZ Channel 7 EPA Great Lakes Restoration Initiative Reforestation along the Lower Rouge For more info on the project check out this PDF
May 9, 2022

-

C & G Newspapers: Southfield Tamarack Creek restoration project makes headway, to continue into 2022 For More info check out this PDF
December 9, 2021

-

ARC Newsletter Article: Let's All Dispose of Fats, Oils & Grease (FOG) Properly
November 23, 2021

-

EGLE: Sediment sampling to begin in Detroit, Rouge rivers For More info check out this PDF
September 1, 2021

-

Greatlakesnow.org: Great Lakes Moment: Sugar Island is getting an ecological makeover
August 2, 2021

-

Hometown Life: What lurks in eerily-dark tunnel that guides 1,200 feet of river under Northville Downs?
March 26, 2021

-

GLRI: Oxbow Wetland Restoration Project Completed in Rouge River Area of Concern
February 23, 2021

-

ARC Newsletter Article: When It Comes to Household Chemicals – Change Is A Good Thing!
December 2020

-

City of Northville: Johnson Creek restoration at Fish Hatchery Park-Native plants, fish passage will make a difference
October 5, 2020

-

Northville Twp.: Million-dollar Makeover Begins on Johnson Creek at Fish Hatchery Park
August 18, 2020

-

GLRI: EPA announces $4.2 million for habitat restoration work at Rouge River Area of Concern
July 28, 2020

-

GLRI: Tlaib, Dingell Applaud EPA Funding of Rouge River Restoration
June 10, 2020

-

GLRI: EPA announces over $1.8 million for habitat restoration work at Rouge River Area of Concern
May 19, 2020

-

ARC Newsletter Article: Brine instead of Rock Salt to Protect Water Quality!
December 2019

-

ARC Newsletter Article: What is a Watershed & What Does it Have to do with Me?
December 2019

-

Detroit News: Officials celebrate restoration of southeast Michigan river systems
October 2019

-

Detroit News: Michigan's Senators Push for Hike in Great Lakes Cleanup Aid
August 2019

-

Tamarack Creek Slated for Restoration
December 2018

-

GLRI: More Success in the Rouge River AOC: Oxbow Restoration Phase 3
November 28, 2018

-

GLRI: Restoration of Fish Passage at the Henry Ford Estate Dam – Rouge River Area of Concern
November 2018

-

GLRI: Dredging the Lower Rouge River Old Channel to Begin in 2019
October 2018

-

US Army Corps of Engineers: Environmental cleanup to remove sediment, debris in Lower Rouge River will begin soon
October 2018

-

This Week in Dearborn with Mayor O'Reilly - Fishway Project at The Henry Ford Estate
August 3, 2018

-

Detroit Free Press: Rouge River fish to get exclusive freeway at Ford's Fair Lane Estate
July 3, 2018

-

Hometown Life: Stabenow visits Wayne to highlight success in improving waterways like the Rouge River
August 7, 2017

-

Issue Media Group: Battling pollution's legacy in metro Detroit's 'Areas of Concern' waterways
March 24, 2016

-

Aquatic Invasive Species Newsletters - Michigan's Invasive Species Program has developed a comprehensive website providing information about existing and potential invasive species threatening our natural resources. The website, a collaborative effort of the Michigan Departments of Natural Resources, Environmental Quality, and Agriculture & Rural Development, includes a catalog containing identifying photos and reporting information.
March 2016

-

Detroit News: Two Detroit area rivers get aid to restore habitats
August 21 2015

Appendix D

Poster/Banner Report

APPENDIX D
ARC POSTER REPORT

Permitee	Year Poster Displayed							Location Poster Displayed	
	2017	2018	2019	2020	2021	2022	2023	City/Twp. Office	Community Bldg.
Beverly Hills, Village of		1	1	1	1		1	X	
Bingham Farms, Village of		1	1		1	1		X	
Birmingham, City of	1	1	1				1	X	
Bloomfield Hills, City of				1	1	1	1	X	
Bloomfield Township		1	1	1		1	1	X	X
Canton Township		1	1	1	1	1	1	X	
Dearborn Heights, City of	1	1	1	1		1	1	X	
Farmington, City of		1	1	1		1	1	X	X
Farmington Hills, City of	1	1	1	1	1	1	1	X	X
Franklin, Village of					1	1	1	X	
Garden City, City of	1				1	1		X	
Henry Ford College	1	1	1			1			X
Inkster, City of	1	1	1	1	1	1	1	X	
Lathrup Village, City of		1	1	1	1		1	X	
Livonia, City of			1	1	1	1	1	X	X
Melvindale, City of		1	1	1	1		1	X	
Northville, City of		1	1		1	1	1	X	X
Northville Township		1	1	1	1	1		X	
Novi, City of			1		1	1	1	X	
Oakland County*	1	1	1	1	1	1	1	X	
Oak Park, City of						1	1	X	X
Orchard Lake Village (in as of 2022)						1	1	X	
Plymouth, City of	1	1	1	1	1	1	1	X	
Plymouth Township		1	1	1	1	1	1	X	
Redford Township		1		1	1	1	1	X	
Schoolcraft College					1	1	1	X	
Southfield, City of		1	1			1	1	X	X
Troy, City of		1	1	1	1	1	1	X	X
University of Michigan-Dearborn*						1	1	X	
Walled Lake, City of	1	1	1	1	1	1	1	X	X
Wayne, City of		1	1	1	1		1	X	X
Wayne County*									
Westland, City of		1	1		1		1	X	X
Wayne County Airport Authority						1	1		X
West Bloomfield Township		1	1	1	1		1	X	

*Participating but this plan is not part of their pending permit application

ARC 2022 Banner (Static Display) Report

STATIC DISPLAY TOPIC	DATE DISPLAYED	COMMUNITY/ENTITY	LOCATION OR EVENT WHERE DISPLAYED	Rouge River Subwatershed						
				Main 1-2	Main 3-4	Upper	Middle 1	Middle 3	Lower 1	Lower 2
2022										
You can Protect Water Quality in the Rouge River!	4/11/22-4/22/22	Beverly Hills	Village office	1						
You can Protect Water Quality in the Rouge River!	2/28/22-3/11/22	Farmington	City Hall	1		1				
You can Protect Water Quality in the Rouge River!	9/12/22-9/23/22	Farmington	City Hall	1		1				
You can Protect Water Quality in the Rouge River!	10/10/22-10/21/22	Farmington Hills	HAWK Center	1		1	1			
You can Protect Water Quality in the Rouge River!	3/14/22-3/28/22	Garden City	City Hall					1	1	
You can Protect Water Quality in the Rouge River!	8/29/22-9/9/22	Henry Ford College (chemical)	Welcome Center		1					
You can Protect Water Quality in the Rouge River!	7/18/22-7/29/22	Inkster	DPS							1
You can Protect Water Quality in the Rouge River!	7/5/22-7/15/22	Livonia	DPW			1	1	1		
You can Protect Water Quality in the Rouge River!	11/7/22-11/21/22	Livonia (chemical)	DPW			1	1	1		
You can Protect Water Quality in the Rouge River!	10/10/22-10/24/22	Northville	City Hall				1			
You can Protect Water Quality in the Rouge River!	4/25/22-5/6/22	Novi	City Hall			1	1			
You can Protect Water Quality in the Rouge River!	8/15/22-8/26/22	Oak Park	City Hall	1						
You can Protect Water Quality in the Rouge River!	5/23/22-6/3/22	Plymouth	City Hall				1			
You can Protect Water Quality in the Rouge River!	5/9/22-5/23/22	Plymouth Twp	Twp Hall				1		1	
You can Protect Water Quality in the Rouge River!	2/28/22-3/11/22	Redford Twp	Twp Hall		1	1		1		
You can Protect Water Quality in the Rouge River!	7/5/22-7/15/22	Redford Twp	Twp Hall		1	1		1		
You can Protect Water Quality in the Rouge River!	8/1/22-8/15/22	Redford Twp (chemical)	Twp Hall		1	1		1		
You can Protect Water Quality in the Rouge River!	4/11/22-4/22/22	UM Dearborn	Welcome Center		1					
You can Protect Water Quality in the Rouge River!	1/31/22-2/11/22	Walled Lake	City Hall				1			
You can Protect Water Quality in the Rouge River!	1/31/22-2/11/22	Walled Lake (chemical)	City Hall				1			

ARC 2022 Banner (Static Display) Report

				Rouge River Subwatershed						
STATIC DISPLAY TOPIC	**DATE DISPLAYED**	**COMMUNITY/ENTITY**	**LOCATION OR EVENT WHERE DISPLAYED**	**Main 1-2**	**Main 3-4**	**Upper**	**Middle 1**	**Middle 3**	**Lower 1**	**Lower 2**
You can Protect Water Quality in the Rouge River!	6/6/22-6/20/22	WCAA-Willow Run Airport	YIP Building						1	
You can Protect Water Quality in the Rouge River!	9/26/22-10/7/22	Westland (chemical)	City Hall					1		1
Number of times in subwatershed in 2022				**5**	**5**	**9**	**9**	**7**	**3**	**2**

Banner created in 2022

have a business in the ROUGE RIVER WATERSHED?

You can protect water quality inside, outside & under your building

Businesses have a direct effect on the water quality in the Rouge River watershed. When rain and snow/ice melt travel across the land (watershed) and into storm drains, it is called stormwater or runoff. As runoff travels, it picks up trash, animal waste, chemicals, sediments and dissolved substances along the way until it discharges into the nearest waterbody. Even if your business is not "next to the river," your actions still have an impact on the Rouge River watershed.

The way you use, dispose and store chemicals, batteries and other materials inside your building can influence water quality in the Rouge River. The way you maintain and clean your parking lots, dumpsters and storage areas outside your building play an important role in the health of the Rouge River. Even things underneath your building that you can't see, like pipes that were changed with renovations or expansion, can affect the water quality in the Rouge River.

Adopting Best Management Practices (BMPs) and training your employees to use them inside, outside and under your business can have a positive impact on your profits, customers, employees, wildlife and their habitat, and even the communities downstream!

BMPS INSIDE YOUR BUILDING

- Clean grease traps in restaurants regularly so fats, oils and grease (FOG) don't clog the sanitary sewer system.
- Store chemicals in a designated area with secondary containment in case of leaks.
- Use LED lights or non-toxic cleaning products.
- Dispose of hazardous waste like chemicals, paints, and batteries properly.
- Ensure wastewater from washing floor mats, filters and garbage cans go into the sanitary system and not the storm drain outside.
- Implement recycling stations for plastic, paper/cardboard, glass and aluminum.





- Train employees on proper disposal and pollution prevention practices.
- Have spill kits ready and emergency numbers clearly posted. Sweep up spills immediately using dry cleanup methods.
- Buy remanufactured office equipment and ink/toner to reduce your environmental impact.



BMPS UNDER YOUR BUILDING

- Inspect sanitary drains (sinks, floor drains, etc.) to make sure they are connected to the sanitary sewer and not the storm system or directly to the ground.
- Make sure underground filtration/circulation of decorative fountains on your property work correctly. Keep them clean and maintain appropriate chlorine levels.
- Work with city or county authorities if elevated *E. coli* levels are found close to your business. Coordinate with them to test your sanitary connections and if something is found, correct it.
- Train employees to watch for signs of illicit discharges like discolored or foamy water and strange smells and report them immediately.





- Never reroute drains on your property, if misconnected to a storm drain it is considered an illicit connection and can be harmful to water quality.
- Inspect detention/retention ponds on your property regularly to make sure pipes are clean, trash is not blocking the inlets/outlets and that no dumping has occurred.



Alliance of Rouge Communities
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Working together, restoring the river

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have a business in the ROUGE RIVER WATERSHED?

Important terms you and your employees should know

As a business and important member of your community, you should understand the frequently used terms below connected to water quality.

Non-point source: Pollution that occurs when runoff (rain and snow/ice melt) picks up trash and debris on the land (sidewalks and parking lots around your business) and discharges it to a water body contributing to poor water quality in the Rouge River.

Sanitary sewer vs. storm drain: Water in the sanitary sewer comes from sinks, floor drains and toilets in your business and is treated before being released back into a waterway. Water in the storm drains consists of runoff from rain and snow/ice melt and sometimes groundwater which is not treated before entering the Rouge River. Therefore, any materials and debris on your property can damage waterways.

Illicit discharge: Any discharge containing polluting material, such as sediment, nutrients, oil and bacteria which can drain to lakes and streams via storm drains.

BMPS OUTSIDE YOUR BUILDING

- Pick up trash around your property to prevent it from going into the storm drain and never dump waste into the river.
- Never dispose of wash water, spent fluids or any materials in the storm drain, river or on paved surfaces.
- Inspect fuel and chemical storage tanks on your property regularly for leaks.
- Maintain suitable loading dock areas to prevent the potential for spills and leaks.
- Clean up leaks or spills outside immediately with dry absorbent and disposed of properly; never wash it down the storm drain.
- Clean paved surfaces routinely by sweeping parking lots to pick up trash and debris.





- Keep dumpster areas clean and lids closed so items don't blow away. Inspect containers and waste disposal areas regularly for leaks and replace or repair immediately if found.
- Plant rain gardens around your building. Their deep roots slow runoff and provide filtration before stormwater enters the river.



- Don't hose down sidewalks or parking lots unless it is going to a grassy area where it can infiltrate into the ground.
- Don't over-apply salt to sidewalks/parking lots in winter months. Excess salt can contribute substantially to increased chloride entering our waterways through storm drains.
- Stencil "no dumping, drains to river" next to your storm drains so employees are aware.
- Make sure wash water from pressure washing drains to the sanitary sewer not a storm drain.
- Instruct landscapers to mulch grass which serves as a natural fertilizer and avoid blowing grass clippings/leaves into the street/parking lot to keep them out of the storm drains.
- Give back to the community your business is in and improve morale by having employees volunteer for river cleanup events or work days.





- Clean vehicles at a commercial car/truck wash station if you don't have one on your property. They should not be washed onsite where water would go down a storm drain.
- Report signs of illegal dumping to lakes, rivers or streams like unusual discharges from pipes, foul odors, or even a large number of dead fish in waterways.

REPORT ILLEGAL DUMPING	
Michigan's Pollution Alert System	800-292-4706
Macomb County	877-679-4337 or IDLP@macombcountymi.gov
Oakland County	248-858-0931
St. Clair County	277-304-SWIM
Washtenaw County	734-222-3880 or https://washtenaw.org/196/Report-an-issue
Wayne County	888-223-2363

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ARC 2023 Banner (Static Display) Report

STATIC DISPLAY TOPIC	DATE DISPLAYED	COMMUNITY/ENTITY	LOCATION OR EVENT WHERE DISPLAYED	Rouge River Subwatershed						
				Main 1-2	Main 3-4	Upper	Middle 1	Middle 3	Lower 1	Lower 2
2023										
You can Protect Water Quality in the Rouge River!	4/10/23-4/21/23	Beverly Hills	City Hall	1						
Have a Business in the Rouge River Watershed?	5/8/23-5/19/23	Beverly Hills	City Hall	1						
When it Comes to Household Chemicals, Change is a Good Thing!	3/13/23-3/24/23	Beverly Hills	City Hall	1						
You can Protect Water Quality in the Rouge River!	5/8/23-5/19/23	Birmingham	City Hall	1						
When it Comes to Household Chemicals, Change is a Good Thing!	6/12/23-6/23/23	Garden City	City Hall					1		1
You can Protect Water Quality in the Rouge River!	1/16/23-1/27/23	Inkster	City Hall							1
When it Comes to Household Chemicals, Change is a Good Thing!	2/13/23-2/24/23	Livonia	DPW			1	1	1		
You can Protect Water Quality in the Rouge River!	1/16/23-1/27/23	Melvindale	City Hall		1					
Have a Business in the Rouge River Watershed?	2/13/23-2/24/23	Melvindale	City Hall		1					
When it Comes to Household Chemicals, Change is a Good Thing!	1/16/23-1/27/23	Melvindale	City Hall		1					
Have a Business in the Rouge River Watershed?	8/7/23-8/18/23	Novi	City Hall			1	1			
When it Comes to Household Chemicals, Change is a Good Thing!	6/12/23-6/23/23	Plymouth	City Hall				1			
You can Protect Water Quality in the Rouge River!	3/13/23-3/24/23	Plymouth	City Hall				1			
When it Comes to Household Chemicals, Change is a Good Thing!	8/7/23-8/18/23	Redford Twp	Twp Hall		1	1		1		
You can Protect Water Quality in the Rouge River!	6/12/23-6/23/23	Redford Twp	Twp Hall		1	1		1		
You can Protect Water Quality in the Rouge River!	2/13/23-2/24/23	Walled Lake	City Hall				1			
Have a Business in the Rouge River Watershed?	3/13/23-3/24/23	Walled Lake	City Hall				1			
When it Comes to Household Chemicals, Change is a Good Thing!	4/10/23-4/21/23	Walled Lake	City Hall				1			
You can Protect Water Quality in the Rouge River!	2/13/23-2/24/23	West Bloomfield Twp.	Twp Hall	1		1				
Have a Business in the Rouge River Watershed?	4/10/23-4/21/23	West Bloomfield Twp.	Twp Hall	1		1				

ARC 2023 Banner (Static Display) Report

				Rouge River Subwatershed						
STATIC DISPLAY TOPIC	**DATE DISPLAYED**	**COMMUNITY/ENTITY**	**LOCATION OR EVENT WHERE DISPLAYED**	**Main 1-2**	**Main 3-4**	**Upper**	**Middle 1**	**Middle 3**	**Lower 1**	**Lower 2**
When it Comes to Household Chemicals, Change is a Good Thing!	5/8/23-5/19/23	West Bloomfield Twp.	Twp Hall	1		1				
You can Protect Water Quality in the Rouge River!	5/8/23-5/19/23	Westland	City Hall					1		1
You can Protect Water Quality in the Rouge River!	4/10/23-4/21/23	Commerce Twp	Twp Hall			1				
Have a Business in the Rouge River Watershed?	7/17/23-7/31/23	Commerce Twp	Twp Hall			1				
When it Comes to Household Chemicals, Change is a Good Thing!	7/17/23-7/31/23	Commerce Twp	Twp Hall			1				
Have a Business in the Rouge River Watershed?	1/16/23-1/27/23	Rochester Hills	City Hall	1						
Number of times in subwatershed in 2023				**8**	**5**	**10**	**7**	**5**	**0**	**3**

Banner created in 2023

How Watersheds Work

It is important to know how your watershed works in order to help protect water quality. You can contribute to the solution, not the pollution!

A ***watershed***, also referred to as a drainage basin, is the land area that delivers rain and snow/ice melt to a stream or lake. Every home, business and farm in Michigan is in a watershed!

Stormwater, or runoff, is when rain and snow/ice melt travel across the land (watershed) picking up trash, animal waste, chemicals, sediments and dissolved substances along the way until it discharges into the nearest waterbody and causes pollution.

Impervious surfaces, pavement or other hard surfaces, speed up the flow of runoff from the landscape and prevent water from soaking into the ground where it can be naturally cleaned by microorganisms that live in the soil.

Groundwater is water that is stored underground in the spaces between soil particles and fractured rocks. Groundwater is a source of drinking water for many suburban and rural households. Groundwater resources can be impacted if toxins in runoff leach through the soil.





The ***Rouge River watershed*** is home to more than one million people and encompasses 466 square miles and runs through the most densely populated and urbanized land area in southeast Michigan. The Rouge River, a tributary to the Detroit River, is approximately 126 miles of waterways and includes over 400 lakes, impoundments and ponds. More than 50 miles of the river flows through public parklands making the Rouge River one of the most publicly accessible rivers in the country.

Understanding the watershed concept allows us to comprehend that we can have an impact on water quality far beyond our own back door. As land becomes altered or developed, the amount of stormwater runoff in the watershed increases, as well as the potential amount of pollutants that are contained in that runoff.

Stormwater pollution plays a large role in water quality. This contaminated runoff comes from many different sources and is difficult to trace back to one source on the landscape. Contaminated runoff flows without treatment into the nearest stormwater drainage system. This may consist of simple drainage ditches or infrastructure such as enclosed pipes, outfalls, catch basins and detention ponds.

Because of this infrastructure, we all have a direct effect on the water quality in the Rouge River watershed. This impacts our quality of life, home values, and the environment.

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How Water Quality Works

Water quality plays an important role in a healthy watershed and you can contribute to the solution, not the pollution! Clean water provides communities with drinking water, makes recreation like boating and fishing safe for the residents of Michigan and supports a healthy ecosystem for plants and wildlife.

Knowing how watersheds work is important because it allows us to understand that our actions have an impact on water quality. When rain and snow/ice melt travel across the land (watershed) and into storm drains, it is called stormwater or runoff. As this runoff travels, it picks up trash, animal waste, chemicals, sediments and dissolved substances along the way until it discharges into the nearest waterbody which has a negative affect on water quality.

Common types of pollution in stormwater runoff include sediment, nutrients, chemicals, bacteria and illicit discharges. In addition to stormwater runoff, water velocity can decrease water quality.

Sediment can be eroded soil from unprotected construction sites, eroding streambanks and shorelines, and runoff from agricultural lands.

- Adding vegetative buffers along agricultural land or at the water's edge of your waterfront property can help slow runoff.



Chemicals can come from pesticides used on residential and agricultural lands, leaking vehicle fluids, road salt and the improper disposal of household chemicals.

- Change to a chemical alternative for cleaning, like peroxide, and dispose of cleaning supplies, paints, and aerosol cans at a household hazardous waste collection event.
- Use Michigan native plants in your yard which are naturally resistant to pests and diseases, eliminating the need for harmful pesticides.



Illicit discharges are any discharge to a storm drain or waterbody that contains polluting material, such as sediment, nutrients, oil, and bacteria.

- If you see someone dumping anything in the river or lake, on the side of the road or even down the storm drain on your street, report it to your community's pollution hotline.

REPORT ILLEGAL DUMPING	
Michigan's Pollution Alert System	800-292-4706
Macomb County	877-679-4337 or IDEP@macombcountymi.gov
Oakland County	248-858-0931
St. Clair County	277-504-SWIM
Washtenaw County	734-222-3800 or https://washtenaw.org/196/Report-an-Issue
Wayne County	888-223-2363

Nutrients include natural sources (organic debris), fertilizers, animal waste (pets, wildlife, and livestock) and sewage sources coming from failing septic systems or illegal discharges of sewage.

- Don't feed the ducks and geese, the concentration of droppings adds excess nutrients to the river.
- Fertilize your yard with slow-release fertilizer and sweep excess particles off paved surfaces back onto the lawn.



Bacteria is another source of pollution in stormwater which comes from animal waste or human sewage sources.

- Always pick up after your pet, even in the winter, to prevent the bacteria from washing into drainage ditches and storm drains which go straight to the river.
- If you have a septic tank, have it inspected every 3 years and pumped out every 3-5 years.



Water velocity is too much water, too quickly, which scours the streambed and banks adding to the sediment and recirculating the bacteria and chemicals in the river reducing water quality.

- Plant trees to provide a natural filter to reduce stormwater runoff, flooding and erosion.
- Disconnect downspouts around your home or business to slow runoff and reduce the amount of sediment entering the river.



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Appendix E

Workshop/Volunteer Report

2022 ARC MEMBER COMMUNITIES HOSTING/PROMOTING
WORKSHOPS & PRESENTATIONS/VOLUNTEER/MONITORING ACTIVITIES

				ROUGE RIVER SUBWATERSHED						
EVENT	**TOPIC**	**DATE**	**ARC COMMUNITY**	**Main 1-2**	**Main 3-4**	**Upper**	**Middle 1**	**Middle 3**	**Lower 1**	**Lower 2**
FOTR Bug Hunt	Volunteer monitoring event	2022	Northville Twp.			1	1			
Household Hazardous Waste Collection Day	HHW collection event	4/2/2022	Westland					1		1
FOTR Spring Bug Hunt	Volunteer monitoring event	4/23/2022	Farmington	1		1				
FOTR Fall Bug Hunt	Volunteer monitoring event	10/15/2022	Farmington	1		1				
FOTR Winter Stone Fly Search	Volunteer monitoring event	1/22/2022	Plymouth				1			
FOTR Fall Bug Hunt	Volunteer monitoring event	10/15/2022	Plymouth				1			
FOTR Spring Bug Hunt	Volunteer monitoring event	4/23/2022	Plymouth				1			
Arbor Day Celebration & Tree Planting w/keep Plymouth leafy	Benefit of trees	4/30/2022	Plymouth				1			
River Clean Up Day	Volunteer clean up event	5/14/2022	Plymouth				1			
Jacobs Drain Student Volunteer Cleanup	Volunteer clean up event	4/22/2022	West Bloomfield Twp.	1		1				
Pollinator Festival	Pollinator education	8/24/2022	West Bloomfield Twp.	1		1				
Rouge River Water Festival	Student education water festival	9/13 - 9/16/2022	Oakland County	1	1	1	1			
Regional Stormwater Summit	Stormwater issues	10/21/2022	Oakland County	1						
Master Rain Gardener Online Certification Program	Rain garden education	3/3-4/6/2022	Oakland County	1	1	1	1	1	1	1
Kids' Clean Water Calendar Contest	Student education on water issues	fall 2022	Oakland County	1		1	1			
Enviroscape Watershed Model	Student education on water issues	2/22/2022	Novi				1			
Dirt Doctors Program	Student education on water issues	6/10/2022	Farmington			1				
Livonia Nature Reclamation Day	Volunteer clean up event	5/21/2022	Livonia			1		1		
FOTR Spring Bug Hunt	Volunteer monitoring event	4/23/2022	Livonia			1		1		
FOTR Fall Bug Hunt	Volunteer monitoring event	10/15/2022	Livonia			1		1		
FOTR Stonefly Search	Volunteer monitoring event	1/22/2022	Livonia			1		1		
Rain Barrel Sale	Rain barrel sale	6/12/2022	Livonia			1		1		
IDEP Training	IDEP training	3/29-3/30/2022	Livonia			1		1		
River Day	Volunteer clean up event	6/4/2022	Canton						1	
IDEP Alert Observer Training / IDEP Investigator	Training event	10/18/2022	Farmington Hills	1		1	1			
ARC Technical/PIE Committee meeting	ARC meeting	10/3/2022	Farmington Hills	1		1	1			
Rouge River Day - Heritage Park	Cleanup event	5/21/2022	Farmington Hills	1		1	1			
FOTR Spring Bug Hunt	Volunteer monitoring event	4/23/2022	Farmington Hills	1		1	1			
Native Plant Expo & Marketplace	Community event	6/1/2022	Washtenaw County	1	1	1	1	1	1	1
Earth Day	Earth Day	4/14/2022	West Bloomfield Twp.	1		1				
Native Plant Sale	Native Plant Sale	5/12/2022	West Bloomfield Twp.	1		1				
Advanced Chemical Training	Training event	8/2/2022	Plymouth Township				1			
FOTR ID event	Bug identification and sampling techniques	8/3/2022	Plymouth Township				1			
Releaf Tree Planting	Park tree planting event	10/22/2022	Plymouth Township				1			
Rain Garden Cleanup	Park cleanup event	7/13/2022	Plymouth Township				1			
Rain Garden Cleanup	Park cleanup event	9/14/2022	Plymouth Township				1			
FOTR Spring Bug Hunt	FOTR monitoring event	4/23/2022	Plymouth Township				1			
FOTR Fall Bug Hunt	FOTR monitoring event	10/15/2022	Plymouth Township				1			
Aerokats and Rover Network Intro Training	NASA science technologies for students	8/5/2022	Plymouth Township				1			
Garlic Mustard Pull	Invasive species management event at Coldwater Springs Park	5/21/2022	Northville Township			1	1			
May Day Cleanup	Cleanup event	4/30/2022	Westland					1		1
FOTR Spring Bug Hunt	FOTR monitoring event	4/23/2022	Westland					1		1
FOTR Spring Bug Hunt	FOTR monitoring event	4/23/2022	Farmington	1		1				
FOTR Fall Bug Hunt	FOTR monitoring event	10/15/2022	Farmington	1		1				
FOTR Spring Bug Hunt	Volunteer monitoring event	4/23/2022	Troy	1						

2022 ARC MEMBER COMMUNITIES HOSTING/PROMOTING WORKSHOPS & PRESENTATIONS/VOLUNTEER/MONITORING ACTIVITIES

				ROUGE RIVER SUBWATERSHED						
EVENT	**TOPIC**	**DATE**	**ARC COMMUNITY**	**Main 1-2**	**Main 3-4**	**Upper**	**Middle 1**	**Middle 3**	**Lower 1**	**Lower 2**
FOTR Spring Bug Hunt	Volunteer monitoring event	4/23/2022	Schoolcraft College				1			
Oakland Co. Water Resources Commissioner's Office Dirt Doctors	Student education	2022	Bloomfield Hills, Farmington	1		1				
Household Hazardous Waste Day Collection	HHW collection event	4/2/2022	Wayne County-Westland					1		1
Household Hazardous Waste Day Collection	HHW collection event	6/23/2022	Wayne County-Henry Ford College		1					1
Household Hazardous Waste Day Collection	HHW collection event	8/13/2022	Wayne County-Detroit		1					
FOTR Winter Stonefly Search promotion event (Fox 2 News)	Volunteer monitoring event	1/6/2022	Wayne County				1			
FOTR Winter Stonefly Search	Volunteer monitoring event	1/19/2022	Wayne County						2	
FOTR Winter Stonefly Search	Volunteer monitoring event	1/22/2022	Wayne County			2	2			
FOTR Winter Stonefly Search	Volunteer monitoring event	1/31/2022	Wayne County						2	
FOTR Team Leader Training	Training event	4/9/2022	Wayne County				1			
FOTR Spring Bug Hunt	Volunteer monitoring event	4/23/2022	Wayne County			2	2			
FOTR Spring Bug Hunt	Volunteer monitoring event	4/27/2022	Wayne County			2	2			
FOTR Spring Bug Hunt	Volunteer monitoring event	4/28/2022	Wayne County	2		1				
FOTR Fall Bug Hunt	Volunteer monitoring event	9/30/2022	Wayne County			1		2		1
FOTR Fall Bug Hunt	Volunteer monitoring event	10/7/2022	Wayne County							2
FOTR Team Leader Training	Training event	10/8/2022	Wayne County				1			
FOTR Fall Bug Hunt	Volunteer monitoring event	10/10/2022	Wayne County						2	
FOTR Fall Bug Hunt	Volunteer monitoring event	10/12/2022	Wayne County		1					
FOTR Fall Bug Hunt	Volunteer monitoring event	10/17/2022	Wayne County	2		2	2			
Oakland Co. Water Resources Commissioner's Office Enviroscape Watershed Model	Student education	2022	Novi				1			
			Total in subwatershed:	23	6	36	37	14	9	10

2023 ARC MEMBER COMMUNITIES HOSTING/PROMOTING
WORKSHOPS & PRESENTATIONS/VOLUNTEER/MONITORING ACTIVITIES

				ROUGE RIVER SUBWATERSHED						
EVENT	TOPIC	DATE	ARC COMMUNITY	Main 1-2	Main 3-4	Upper	Middle 1	Middle 3	Lower 1	Lower 2
Open House	Community event	10/1/2023	Bloomfield Twp.	1						
Rouge River Day - Heritage Park	Volunteer clean up event	5/20/2023	Farmington Hills	1		1	1			
FOTR Spring Bug Hunt	Volunteer monitoring event	4/15/2023	Farmington	1		1				
FOTR Fall Bug Hunt	Volunteer monitoring event	10/14/2023	Farmington	1		1				
Master Rain Gardener Online Certification Program	Rain garden education	2/1/2023	Watershed-wide	1	1	1	1	1	1	1
Master Rain Gardener Course (in-person)	Rain garden education	4/1/2023	Watershed-wide	1	1	1	1	1	1	1
Native Plant Expo & Marketplace	Community event	6/1/2023	Washtenaw County	1	1	1	1	1	1	1
Superior Day	Community event	6/10/2023	Washtenaw County	1	1	1	1	1	1	1
Cranbrook Spring into Science After Dark	Community event	3/30/2023	Cranbrook Institute of Science	1	1	1	1	1	1	1
Great Lakes Restoration Celebration	Government/Watershed Group event	9/22/2023	The Henry Ford		1			1		1
Earth Day	Earth Day	4/22/2023	Northville				1			
Rouge River Cleanup	River cleanup	5/20/2023	Southfield	1						
Rouge River Cleanup	River cleanup	5/21/2023	Southfield	1						
FOTR Spring Bug Hunt (2 locations)	Monitoring event	4/17/2023	Southfield	1						
FOTR Fall Bug Hunt (2 locations)	Monitoring event	10/14/2023	Southfield	1						
Advanced Chemical Training	Training event	8/8/2023	Plymouth Township				1			
FOTR ID event	Bug identification and sampling techniques	8/9/2023	Plymouth Township				1			
Rain Garden Cleanup	Park cleanup event	5/6/2023	Plymouth Township				1			
Rain Garden Cleanup	Park cleanup event	10/29/2023	Plymouth Township				1			
FOTR Fall Bug Hunt	FOTR monitoring event	10/14/2023	Plymouth Township				1			
FOTR Fall Bug Hunt	FOTR monitoring event	10/14/2023	Northville Township			1	1			
FOTR Stonefly Search	FOTR monitoring event	1/21/2023	Northville Township			1	1			
Westland Rotary Canine Corral Cleanup Day	Cleanup event	4/19/2023	Westland					1		1
Canton River Day	Cleanup event	6/3/2023	Canton Township						1	
Canton River Day	Cleanup event	6/4/2023	Canton Township						1	
Open House	Public open house	10/1/2023	Bloomfield Twp.	1						
Rouge River Day - Heritage Park	Cleanup event	5/20/2023	Farmington Hills	1		1	1			
FOTR Spring Bug Hunt	FOTR monitoring event	4/15/2023	Farmington	1		1				
FOTR Fall Bug Hunt	FOTR monitoring event	10/14/2023	Farmington	1		1	1			
FOTR Fall Bug Hunt	FOTR monitoring event	10/14/2023	Plymouth				1			
FOTR Spring Bug Hunt	FOTR monitoring event	4/15/2023	Plymouth				1			
FOTR Spring Bug Hunt	FOTR monitoring event	4/15/2023	Livonia			1		1		
FOTR Fall Bug Hunt	FOTR monitoring event	10/14/2023	Livonia			1		1		
FOTR Stonefly Search	FOTR monitoring event	1/21/2023	Livonia			1		1		
FOTR Rain Barrel pick-up event	FOTR Rain Barrel Sale	5/13/2023	Livonia			1		1		
IDEP Training Investigator and Awareness	Training event	10/11/2023	Livonia			1		1		
Earth Day event	Earth Day event	4/3/2023	West Bloomfield Twp.	1		1				
Native Plant Sale	Native Plant Sale	5/23/2023	West Bloomfield Twp.	1		1				
Bees, Butterflies & Blooms Pollinators event	Pollinator education	8/23/2023	West Bloomfield Twp.	1		1				
Oakland Co. Water Resources Commissioner's Office Dirt Doctors	Student education	2023	Bloomfield Hills, West Bloomfeild Twp.	1		1				
Oakland Co. Water Resources Commissioner's Office Enviroscape Watershed Model	Student education	2023	Bloomfield Hills	1						
Oakland County Regional Stormwater Summit	Stormwater education	11/9/2023	Lawrence Tech University, Southfield	1						
Rouge River Water Festival at Cranbrook Institute of Science	Student education	9/19/23-9/22/23	Watershed-wide	1	1	1	1	1	1	1
International Joint Commission WQB Meeting	IJC tour	5/3/2023	The Henry Ford		1			1		1

2023 ARC MEMBER COMMUNITIES HOSTING/PROMOTING
WORKSHOPS & PRESENTATIONS/VOLUNTEER/MONITORING ACTIVITIES

				ROUGE RIVER SUBWATERSHED						
EVENT	**TOPIC**	**DATE**	**ARC COMMUNITY**	**Main 1-2**	**Main 3-4**	**Upper**	**Middle 1**	**Middle 3**	**Lower 1**	**Lower 2**
USDA Forest Service Tour	Grant project tour sites	3/30/2023	Northville Township			1	1			
USDA Forest Service Tour	Grant project tour sites	3/30/2023	Plymouth				1			
Rouge Rescue	Volunteer clean up event	6/10/2023	Plymouth				1			
USDA Forest Service Tour	Grant project tour sites	3/30/2023	Livonia			1		1		
USDA Forest Service Tour	Grant project tour sites	3/30/2023	Southfield	1						
Trout Unlimited/City of Northville Fish Day	Presentation on ARC restoration projects	6/10/2023	Northville				1			
Earth Day Celebration	Earth Day event	4/22/2023	Troy	1						
Climate Change as of 2023: Simple, Serious, Solvable	Workshop/Presentation	1/18/2023	Troy	1						
Stage Nature Center Earth Day Celebration	Earth Day event	4/22/2023	Troy	1						
FOTR Spring Bug Hunt	Volunteer monitoring event	4/15/2023	Troy	1						
FOTR Winter Stonefly Search	Volunteer monitoring event	1/21/2023	Troy	1						
FOTR Fall Bug Hunt	Volunteer monitoring event	10/14/2023	Troy	1						
FOTR Fall Bug Hunt	Volunteer monitoring event	10/14/2023	Schoolcraft College				1			
FOTR Spring Bug Hunt	Volunteer monitoring event	4/15/2023	Schoolcraft College				1			
Full ARC Meeting	ARC Meeting	4/6/2023	Farmington Hills	1		1	1			
Full ARC Meeting (virtual)	ARC Meeting	11/20/2023	Watershed-wide	1	1	1	1	1	1	1
ARC Executive Committee meeting	ARC Meeting	3/21/2023	Livonia			1		1		
ARC Executive Committee meeting	ARC Meeting	7/25/2023	Livonia			1		1		
ARC Executive Committee meeting	ARC Meeting	11/6/2023	Livonia			1		1		
ARC Technical Committee meeting	ARC Meeting	2/28/2023	Farmington Hills	1		1	1			
FOTR Winter Stonefly Search	Volunteer monitoring event	1/21/2023	Wayne County			2	2			
FOTR Winter Stonefly Search	Volunteer monitoring event	1/23/2023	Wayne County			1	2			
FOTR Winter Stonefly Search	Volunteer monitoring event	1/30/2023	Wayne County			1	2			
FOTR Winter Stonefly Search	Volunteer monitoring event	2/2/2023	Wayne County	2		2	1			
FOTR Winter Stonefly Search	Volunteer monitoring event	2/4/2023	Wayne County			1	1			
FOTR Spring Bug Hunt	Volunteer monitoring event	4/14/2023	Wayne County						2	
FOTR Spring Bug Hunt	Volunteer monitoring event	4/15/2023	Wayne County					1	1	
FOTR Spring Bug Hunt	Volunteer monitoring event	4/19/2023	Wayne County	2						
FOTR Spring Bug Hunt	Volunteer monitoring event	4/20/2023	Wayne County	2		2	2			
FOTR Spring Bug Hunt	Volunteer monitoring event	4/25/2023	Wayne County		1	1		2	1	
FOTR Spring Bug Hunt	Volunteer monitoring event	4/27/2023	Wayne County							2
FOTR Team Leader Training	Training event	9/30/2023	Wayne County				1			
FOTR Fall Bug Hunt	Volunteer monitoring event	10/14/2023	Wayne County	2					2	
FOTR Fall Bug Hunt	Volunteer monitoring event	10/16/2023	Wayne County	3						
FOTR Fall Bug Hunt	Volunteer monitoring event	10/18/2023	Wayne County			1		2		1
FOTR Fall Bug Hunt	Volunteer monitoring event	10/19/2023	Wayne County	3						
FOTR Fall Bug Hunt	Volunteer monitoring event	10/25/2023	Wayne County							2
FOTR Fall Bug Hunt	Volunteer monitoring event	11/2/2023	Wayne County						1	
FOTR Fall Bug Hunt	Volunteer monitoring event	11/3/2023	Wayne County							1
Household Hazardous Waste Day Collection	HHW collection event	4/1/2023	Wayne County-Van Buren Twp						1	
Household Hazardous Waste Day Collection	HHW collection event	6/17/2023	Wayne County-Dearborn		1					1
Household Hazardous Waste Day Collection	HHW collection event	8/26/2023	Wayne County-Westland					1		1
Shiver on the River	Benthic Macro Display	2/4/2023	Wayne County-Detroit		1					
Bugtopia	Benthic Macro Display	7/22/2023	Wayne County Parks-Westland					1		1
SEMCOG's GREEN Summit	Presentation on ARC restoration projects	4/27/2023	University of Michigan-Dearborn EIC					1		
Local Impact Alliance Lunch and Learn Program	Presentation on healthy yard maintenance tips to protect your watershed	3/15/2023	Plymouth				1			
Michigan Nursery and Landscape Association	Presentation on stewards of the environment-maintaining detention ponds	11/1/2023	Washtenaw County				1		1	

2023 ARC MEMBER COMMUNITIES HOSTING/PROMOTING
WORKSHOPS & PRESENTATIONS/VOLUNTEER/MONITORING ACTIVITIES

				ROUGE RIVER SUBWATERSHED						
EVENT	**TOPIC**	**DATE**	**ARC COMMUNITY**	**Main 1-2**	**Main 3-4**	**Upper**	**Middle 1**	**Middle 3**	**Lower 1**	**Lower 2**
Michigan Nursery and Landscape Association	Presentation on stewards of the environment-maintaining detention ponds	11/9/2023	Washtenaw County				1		1	
ARC Joint Technical/PIE Committee meeting	ARC Meeting	10/16/2023	Farmington Hills	1		1	1			
			Total in subwatershed:	49	12	43	43	27	19	19

ARC Collaborative MS4 Permit Report January 1, 2022-December 31, 2023

ARC Seasonal Poster displays

No posters were distributed to Wayne County buildings/facilities during 2022-2023

Rouge Water Quality Monitoring

Benthic Macroinvertebrate Monitoring

ESD collaborates with Friends of the Rouge (FOTR) to monitor benthic macroinvertebrates in the Rouge River watershed by coordinating monitoring, sampling sites, providing team leaders, and performing specimen identifications and data trend analysis. The details of monitoring activities are detailed in the FOTR bug hunt event reports (reports attached).

FOTR benthic monitoring events held in 2022 and 2023: Winter Stonefly Search January 22, 2022, Spring Bug Hunt April 23, 2022, Fall Bug Hunt October 15, 2022, Winter Stonefly Search January 21, 2023, Spring Bug Hunt April 15, 2023, and Fall Bug Hunt October 15, 2023. The table below lists the benthic monitoring sites that ESD monitored with or without FOTR volunteers supporting during the January 1, 2022-December 31, 2023, reporting period:

Date	Location	Event
1/6/2022	John 5 Fish Hatchery Park Northville City (Fox 2 News)	Winter Stonefly Search Promotion
1/19/2022	LR-9 Fellows Beck/Warren Canton Township	Winter Stonefly Search
1/19/2022	Fel4 Flodin Park Canton Township	Winter Stonefly Search
1/22/2022	MR-20 Waterford Bend Northville Township	Winter Stonefly Search
1/22/2022	MR-1 Northville Recreation Area Northville Township	Winter Stonefly Search
1/31/2022	Fowl2 Fowler/Beck Canton Township	Winter Stonefly Search
1/31/2022	LR-2 YCUA Outlet Canton Township	Winter Stonefly Search
4/9/2022	Ton1 Plymouth Township Park Team Leader Training	Spring Bug Hunt
4/23/2022	MR-23 Maybury North Northville Township	Spring Bug Hunt
4/23/2022	MR-27 Ridge Rd Northville Township	Spring Bug Hunt
4/27/2022	John2 Five Mile Northville Township	Spring Bug Hunt
4/27/2022	John3 Six Mile Northville Township	Spring Bug Hunt
4/28/2022	Up2 Shiawassee Park Farmington	Spring Bug Hunt
4/28/2022	Main6 Southfield Civic Center Southfield	Spring Bug Hunt
9/30/2022	MR-4 Levan Knoll Livonia	Fall Bug Hunt
9/30/2022	MR-11 Elm Grove Westland	Fall Bug Hunt
10/7/2022	LR-1 Commerce Court Wayne	Fall Bug Hunt
10/7/2022	LR-3 Goudy Park Wayne	Fall Bug Hunt
10/8/2022	Ton1 Plymouth Township Park Team Leader Training	Fall Bug Hunt

10/10/2022	Will1 Barchester Park Canton Township	Fall Bug Hunt
10/10/2022	LR-12 Morton Taylor Canton Township	Fall Bug Hunt
10/12/2022	MN-7 Spinoza Detroit	Fall Bug Hunt
10/17/2022	See3 Kennedy Ct Farmington Hills	Fall Bug Hunt
10/17/2022	Up1 Heritage Park Farmington Hills	Fall Bug Hunt
1/21/2023	John7 Arcadia Ridge Northville Township	Winter Stonefly Search
1/21/2023	John3 Six Mile Northville Township	Winter Stonefly Search
1/23/2023	John6 Hines Northville City	Winter Stonefly Search
1/23/2023	MR-20 Waterford Bend Northville Township	Winter Stonefly Search
1/30/2023	MR-1 Northville Recreation Area Northville Township	Winter Stonefly Search
1/30/2023	MR-18 Springbrook Recreation Area Plymouth Township	Winter Stonefly Search
2/2/2023	See3 Kennedy Ct Farmington Hills	Winter Stonefly Search
2/2/2023	Up2 Shiawassee Park Farmington	Winter Stonefly Search
2/4/2023	John2 Five Mile Northville Township	Winter Stonefly Search
4/14/2023	Low2 Cherry Hill Canton Township	Spring Bug Hunt
4/14/2023	LR-8 Proctor Rd Canton Township	Spring Bug Hunt
4/15/2023	Fel1 Top of the Hill Plymouth Township	Spring Bug Hunt
4/15/2023	Fel2 Vintage Valley Canton Township	Spring Bug Hunt
4/19/2023	Main6 Southfield Civic Center Southfield	Spring Bug Hunt
4/19/2023	Evan2 LTU Southfield	Spring Bug Hunt
4/20/2023	Peb2 13 Mile Farmington Hills	Spring Bug Hunt
4/20/2023	Peb3 d/s Dam Farmington Hills	Spring Bug Hunt
4/25/2023	MR-4 Levan Knoll Livonia	Spring Bug Hunt
4/25/2023	MR-13 Warrendale Dearborn Heights	Spring Bug Hunt
4/27/2023	LR-1 Commerce Court Wayne	Spring Bug Hunt
4/27/2023	LR-3 Goudy Park Wayne	Spring Bug Hunt
9/30/2023	Ton1 Plymouth Township Park Team Leader Training	Fall Bug Hunt
10/14/2023	Low2 Cherry Hill Canton Township	Fall Bug Hunt
10/14/2023	LR-8 Ridge/Proctor Canton Township	Fall Bug Hunt
10/14/2023	Nott Detroit County Day Beverly Hills	Fall Bug Hunt
10/14/2023	Main 5 Douglas Evans Beverly Hills	Fall Bug Hunt
10/16/2023	Sprag Lloyd Stage Nature Center Troy	Fall Bug Hunt
10/16/2023	Main1 Firefighters Park Troy	Fall Bug Hunt
10/16/2023	Main 11 Quarton at Lakeside B	Fall Bug Hunt
10/18/2023	MR-4 Levan Knoll Livonia	Fall Bug Hunt
10/18/2023	MR-11 Elm Grove Westland	Fall Bug Hunt
10/19/2023	Main3 Booth Park Birmingham	Fall Bug Hunt
10/19/2023	Main4.5 Fairway Park Birmingham	Fall Bug Hunt
10/19/2023	Main4 Linden Park Birmingham	Fall Bug Hunt

10/25/2023	LR-1 Commerce Court Wayne	Fall Bug Hunt
10/25/2023	LR-3 Goudy Park Wayne	Fall Bug Hunt
11/2/2023	LR-12 Morton Taylor Canton Township	Fall Bug Hunt
11/3/2023	LR-7 McClaugherty Drain Romulus	Fall Bug Hunt

Other Monitoring

Water quality monitoring-Lower Rouge Water Trail

ESD monitored sites on Lower Rouge between Morton Taylor and John Daly for *E. coli* during April-September/October of 2022 and 2023. These sites are on the Lower Rouge Water Trail located in the communities of Canton Township, Wayne, Inkster, Dearborn Heights and Dearborn. Attached is a summary of the sites monitored and the data collected during this monitoring effort.

Lower Rouge Water Trail Leadership Committee

ESD and WC Parks staff regularly participate in and attend the Lower Rouge Water Trail Leadership Committee meetings. ESD reports on the Lower Rouge water quality monitoring and IDEP efforts that affect the Lower Rouge Water Trail.

The dates the Leadership Committee met in 2022 and 2023 are as follows:

2022: February 17, 2022, April 13, 2022, June 16, 2022, August 18, 2022, October 27, 2022

2023: February 16, 2023, April 20, 2023, June 15, 2023, August 15, 2023, October 19, 2023

Mussel Survey Support

ESD provided staff support to assist FOTR, DNR and Joe Rathbun in conducting a mussel survey at two sites on the Middle Rouge River (MR-18 I-275 Clam Bar and Mid 3 Newburgh Lake Outflow) on September 28, 2022. The surveyors found live Plain pocketbooks, Giant floaters and Paper pondshells (state special concern) but no live Lilliputs, a state endangered species. There were some Lilliput shells, indicating they may be present in small numbers. Invasive zebra mussels and Asian clams were abundant at the sites and compete with native species. The Rouge is home to 13 species of freshwater mussels, a decrease from 22 species that used be found historically.

TMDL Monitoring

ESD collected *E. coli* samples for the Rouge TMDL monitoring on August 15, 2022, at five instream priority sites in the Rouge River Watershed. The data and its analysis are included in the *2022 Rouge River Water Quality Assessment Final Report*, December 31, 2022, prepared by ECT.

Other PEP Involvement

Miscellaneous PI information distribution for ARC Biennial report 2022-2023

ESD provided public education material and displays at local environmental education events listed below. The public education material available included the “Seven Steps for Clean Water” tabletop display, Seven Steps for Clean water PI material giveaways, “Yours to Protect” magnets, “Storm Drains Aren’t Garbage Cans” brochures, and Wayne County 24-Hour Hotline brochures.

A benthic macroinvertebrate display was also provided for the event participants to learn about the role that the role macroinvertebrates play in stream ecosystems and water quality monitoring.

2023

Shiver on the River- Dossin Museum Belle Isle Saturday, February 4, 2023

Bugtopia- Wayne County Parks Nankin Mills Park Westland July 22, 2023

Public Education Material Distribution

"Storm Drains Aren't Garbage Cans" bags were provided to Wayne County Parks for distribution at Wayne County Parks events held in 2022-2023

27 Rouge River "Yours to Protect" Magnets distributed at Hope Lutheran Church Dearborn August 3, 2022

Household Hazardous Waste Day Collection Events

Wayne County hosts four County-wide Household Hazardous Waste (HHW) collection events annually.

Below are the HHW events held during January 1, 2022, through December 31, 2023, reporting period:

Date	Location
4/2/2022	Westland Mall- Westland
6/23/2022	Henry Ford College- Dearborn
8/13/2022	Second Ebenezer Church- Detroit
10/15/2022	Wayne County Community College Downriver Campus- Taylor
4/1/2023	Wayne County Community College Ted Scott Campus- Van Buren Township
6/17/2023	Henry Ford College- Dearborn
8/26/2023	Westland Mall-Westland
10/21/2023	Wayne County Community College Downriver Campus- Taylor

Action/Activity	Oakland CDC MS4 NPDES Permit No. MI0060089 FY 2022 and 2023 Measurables (October 1, 2021 - September 30, 2023)
Public Paticipation/Involvement Program (PPP)	
Stormwater Management Plan (SWMP) Homepage	The Oakland County Stormwater Management Plan (SWMP) is available on the WRC's SWMP website at: https://oakgov.com/government/water-resources-commissioner/stormwater/stormwater-management-program-swmp As of FY 2023, no comments have been received on the County's SWMP. There were **1,070** hits to the SWMP webpage in FY 2022 and **581** website hits in FY 2023.
Public Education Plan	
Bulletin Boards	Throughout FY 2022/2023, the WRC had a variety of information related to storm drain awareness on display in its main lobby. Information on the “Seven Simple Steps to Clean Water”, and copies of the “Waterfront Wisdom” Booklet, “Kids Clean Water Calendar” and “Oakland County 24-Hour Pollution Hotline” brochure are available year-round. The Alliance of Rouge Communities developed a variety of seasonal posters on protecting water quality with tips to consider for spring, summer, winter and fall. That poster was framed and hung in the WRC lobby beginning in FY 2017 and is rotated out seasonally.
Commercial, Industrial and Institutional Entities Stormwater Education	The WRC added information on its website on pollution prevention best practices information for commercial, industrial and institutional properties in FY 2022. Best management practices to prevent nonpoint source pollution from machine shops, food service companies, composting facilities, concrete washout areas, marinas and general boating, commercial car washes, landscaping and lawn care, auto care facilities, school properties, homeowner associations and general businesses is acccessible on WRC's website at: https://www.oakgov.com/government/water-resources-commissioner/resources/education/pollution-prevention-for-commercial-industrial-and-institutional-properties. In FY 2022, there were **89** website hits and **94** website hits in FY 2023.
Dirt Doctors Program	-Approximately 2,749 students and adults and 61 teachers in 283+ different presentations at 12 different events were reached in FY 2022. The Dirt Doctors attended events in Ann Arbor, Bloomfield Hills, Detroit, Farmington, Macomb, Pontiac, Rochester Hills, and Royal Oak. -Approximately 3,300 students, adults and teachers in 660+ different presentations at 14 different events were reached in FY 2023. The Dirt Doctors attended events in Ann Arbor, Bloomfield Hills, Detroit, Macomb, Pontiac, Rochester Hills, Royal Oak, Walled Lake and West Bloomfield Twp. -A pre-recorded Dirt Doctors program was put together in September 2020 and as of September 30, 2023, it has been viewed **221** times. The pre-recorded program is available online at: https://www.youtube.com/watch?list=PLxN0wQGF96CL-c9anor-74HawzUbgXk61&v=aOOQjrSD8vg&feature=youtu.be -There were no pre-/post-surveys for the program disseminated in FY 2022 or 2023. All of WRC's Environmental Education program descriptions are available on its website at: https://oakgov.com/government/water-resources-commissioner/resources/education/educational-school-programs. In FY2022, the site received **246** visits and in FY2023 it received **188** visits.
Drain Detectives Program	-There were no Drain Detectives programs requested in FY 2022. There were (8) presentations of the Drain Detectives in FY2023 at the Detroit River Water Festival on Belle Isle in Detroit reaching approximately 208 4th and 5th grade students and 8 teachers. All of WRC's Environmental Education program descriptions are available on its website at: https://oakgov.com/government/water-resources-commissioner/resources/education/educational-school-programs. In FY2022, the site received **246** visits and in FY2023 it received **188** visits.

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Enviroscape Watershed Model Program	-Approximately 34 students, teachers and Girl Scout leaders in 2 different presentations at two (2) different events were reached in FY 2022. In addition, the Rouge River Water Festival was held virtually for 47 classrooms and 1,062 students and the virtual Watershed Model Demonstration link was shared with teachers. -WRC staff presented the Enviroscape watershed model at events in Oxford and Novi. -There were no pre- or post-evaluations administered in FY 2022. In FY 2023, the program reached more than 1,064 students, teachers and parents in more than 118 presentations at four different events in Bloomfield Hills, Rochester Hills and Walled Lake. There were no pre- or post-evaluations administered in FY 2023. In order to reach people virtually, a 32 minute pre-recorded Enviroscape Watershed Model demonstration was created in September 2020 and is available online at: https://www.youtube.com/watch?list=PLxN0wQGF96CL-c9anor-74HawzUbgXk61&v=ipIlqsx1Zvc&feature=youtu.be. As of September 30, 2023, the video has been viewed **448** times. All of WRC's Environmental Education program descriptions are available on its website at: https://oakgov.com/government/water-resources-commissioner/resources/education/educational-school-programs. In FY 2022, the site received **246** visits and in FY 2023 it received **188** visits.
Green Stormwater Infrastructure (GSI) Education	The WRC hosts a website on GSI: https://oakgov.com/government/water-resources-commissioner/stormwater/green-infrastructure -There were **201** website hits in FY2022 and **333** in FY2023 to the GSI website. 'In FY 2022, the 1st annual Master Rain Gardener Certification Program was held virtually from Mar, 3, 2022 - April 7, 2022. The course is taught virtually, with in person rain garden tours, with many project partners including: Washtenaw County Water Resources, Huron River Watershed Council, Friends of the Rouge, River Raisin Watershed Council, Clinton River Watershed Council, Oakland County Water Resources, Friends of the Detroit River, and the Clinton-Oakland Metroparks. There were a total of 82 participants in the 2022 virtual class from the following watersheds: Rouge: 29; Huron: 18; Clinton: 10; Raisin: 2; Detroit: 6; Other: 17. Nineteen (19) of the participants resided in Oakland County. In FY2023, the 2nd annual Master Rain Gardener Certification Program was held virtually from Feb. 23 - March 23, 2023. The course is taught virtually, with in person rain garden tours, with many project partners including: Washtenaw County Water Resources, Huron River Watershed Council, Friends of the Rouge, River Raisin Watershed Council, Saline Be Green, City of Ann Arbor, Clinton River Watershed Council, Oakland County Water Resources, Friends of the Detroit River, Alliance of Downriver Watersheds, and the Clinton-Oakland Metroparks. There were a total of 70 participants in the 2023 virtual class from the following watersheds: Rouge: 16; Huron: 24; Clinton: 9; Raisin: 3; Detroit: 9; Other: 9. Thirteen (13) of the participants resided in Oakland County. More information about the program can be found online at: www.MasterRainGardener.org. In FY 2023, MSU-Extension authored an article about GSI and Building Sustainable and Resilient Communities in the July 2023 edition of the Oakland Lakefront Lifestyles magazine. The article is provided in **Appendix X**. It highlighted the connection of nonpoint source pollution sources and best practices for the homeowner, and waterfront property owners, to reduce pollutation associated with stormwater runoff. Oakland County hosts a website with a host of education resources on native plants and their benefits at: https://www.oakgov.com/community/oakland-county-parks/get-involved/native-plant-information. In FY 2022, there were **241** website hits.

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Household Hazardous Waste Information	In FY 2022, the Oakland County Planning & Local Business Development Dept. sponsored four (4) household hazardous waste disposal days: April 30, June 4, July 23 and September 24, 2022. The April 30 and September 24 collection events were held at the Oakland County Service Center in Pontiac, June 4 at Oxford Middle School in Oxford and July 23 at Kensington Church in Orion Township. A total of 641,797 pounds of household hazardous waste was collected during the four collection events. In FY 2023, the Oakland County Planning & Local Business Development Dept. sponsored four (4) household hazardous waste disposal days: April 29, June 3, July 22 and September 16, 2023. The April 29th event was held at Pine Knob Music Theatre in Independence Twp; the June 3rd event was held at Oxford Middle School in Oxford, the July 22nd event was held at Kensington Church in Orion Township and the September 16th event was held at the Oakland County Service Center in Pontiac. A total of 507,324 pounds of household hazardous waste was collected during the four collection events. Since the program began in 2003, residents of almost 69,000 households have disposed of more than 9 million pounds of hazardous materials which have been recycled or disposed of properly. Information on household hazardous waste disposal in Oakland County is available online at: www.nohaz.com. There were **35,755** website hits in FY2022 and **29,327** website hits in FY2023 to the County's Household Hazardous Waste Recycling Information. There are two solid waste authorities in the southern portion of the county that handle the waste for several member communities. One of these authorities holds several household hazardous waste collection events for residents, while the other offers year-round service for residents of its member communities. A few communities offer their own collection events each year.
	OCPRC: OCPR maintains a sizable invasive species management program within the Natural Resources Department, responsible for strategic management of invasive species throughout the park system's 6,800 acres. OCPR holds blanket contracts with aquatic spray and biocontrol contractors for the purposes of combating identified locations of aquatic invasive species inhibiting recreational use or ecological health of OCPR's inland lakes. Blanket contracts for upland invasive species control are also held. As part of OCPRC's invasive species management program, OCPRC requires contractors involved in natural resource vegetation management to perform equipment-cleaning good housekeeping practices to limit the introduction and spread of upland and aquatic invasives in park natural areas. In FY2022, approximately 1,800 acres of invasive species were treated. In FY 2023, approximately 1,408 acres of invasive speacies were treated. The Oakland County CISMA is a partnership of county and local governments, non-profit organizations and universities with a focus on managing the spread of numerous invasive species. Information on the Oakland County Cooperative Invasive Species Management Area (CISMA) is available online at: https://www.michiganinvasives.org/occisma/, https://oaklandinvasivespecies.org/, and at https://www.sixriversrlc.org/oakland-county-cisma.
	OCFM: FY 2022 - continued mowing of European Buckthorn seedlings and phragmites. FY 2023 - continued mowing of European Buckthorn seedlings and phragmites.

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Invasive Species Management and Education and Outreach	**WRC:** In FY2022 and 2023, the WRC treated the following drains and basins for *Phragmites australis* and/or Canada Thistle: Caddell Drain and associated North and South Basins - Farmington Hills - 5.58 acres Minnow Pond Detention Pond - Farmington Hills - 2.76 acres Tribute Drain Basins - Wixom - 1.9 acres Bloomfield Pines Drain Basin 7 - West Bloomfield - .04 acres West Bloomfield Pines Condo Drain Basin - West Bloomfield - .03 acres Maple Creek Drain Basin A - West Bloomfield - .12 acres Hidden Creek Drain Basin - West Bloomfield - .09 acres 522 S. Opdyke Rd Basin - Pontiac - .21 acres Bishop Drain Basin - Rochester Hills - 1.52 acres Twin Lakes Drain Basin 5 - Oakland Twp - .13 acres Wyndate Basin 2 - Oakland Twp - .26 acres Barnard Drain Basins - Troy - .26 acres Sturgis Drain - Troy - .51 acres Mainland Drain - Pontiac - .79 acres Ferry Drain - Troy - .46 acres
	OCPLBD: In FY 2023, administered the Oakland County Spongy Moth Suppression Program in partnership with the Oakland County Board of Commissioners task force and MSU Extension.
Kids' Clean Water Calendar Contest	FY 2022: -A total of 586 children across Oakland County participated in the 2022 Kids' Clean Water Calendar Contest. -A total of 5,500 calendars were distributed across Oakland County. -Drawings were submitted from classes representing 27 schools (31 classes). There were also 26 separate entries from individual residents. An online gallery of the 2022 contest winners is available at: **https://www.oakgov.com/government/water-resources-commissioner/resources/education/kids-clean-water-calendar-contest/2022-contest-gallery** An article featuring the grand prize winner, Aditya Yogesh, Troy 4th grader, and details on the 2022 calendar contest was published in the Oakland Press: **https://www.theoaklandpress.com/2022/01/23/troy-student-wins-kids-clean-water-calendar-contest/** Another article featuring the grand prize winner, Aditya Yogesh, Troy 4th grader, and details on the 2022 calendar contest was published in the Oakland County Legal News: **https://www.legalnews.com/oakland/1507444** Another article featuring the grand prize winner, Aditya Yogesh, Troy 4th grader, and details on the 2022 calendar contest was published in the Royal Oak Tribune: **https://www.dailytribune.com/2022/01/23/troy-student-wins-kids-clean-water-calendar-contest/** Aditya Yogesh, the 2022 Kids Clean Water Calendar Contest winner, was featured in Commissioner Nash's Water By the Quarter online show, along with WRC's Environmental Planner, Jacy Garrison, at: **https://www.youtube.com/watch?v=hIygElQiNCA**

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	FY 2023: -A total of 718 4th and 5th graders across Oakland County participated in the 2023 Kids' Clean Water Calendar Contest. -A total of 5,500 calendars were distributed across Oakland County. -Drawings were submitted from students representing 42 schools (41 classes) and there were also 39 separate entries from individual residents. -An online gallery of the 2023 contest winners is available at: https://www.oakgov.com/government/water-resources-commissioner/resources/education/2023-contest-gallery -In FY2023, there were a total of **1,508** hits to the Calendar Contest website. 2023 Calendar Press: -An article and video, featuring two-time grand prize winner, Aditya Yogesh, was published by Fox2 Detroit online at: https://www.fox2detroit.com/news/oakland-county-students-highlight-importance-of-clean-water-and-air-through-art
Lakefront Lifestyles Magazine Advertisements and Articles	The Lakefront Lifestyles magazine gets mailed to 15,600 lakefront homeowners on any of 226 inland lakes in west and central Oakland County. The magazine is also reported to make 40,000 monthly ad impressions on the Lakefront website at: www.oaklandlakefront.com. WRC coordinated and funded the publication of the following educational advertisements in the Oakland Lakefront magazine during FY 2022/2023: April 2022/2023 - Pet Care (pet waste management) May 2022/2023 - Storm Drain Awareness (Oakland County's 24-Hour Pollution Hotline is also advertised within this ad) June 2022/2023 - Earth-friendly Landscaping (promotion of the use of native plants) July 2022 - Car Care August 2022** - Household Hazardous Waste (proper disposal and chemical alternatives) September 2022** - Septic Maintenance **NOTE: Due to a family matter, the publisher was unable to publish the August and September editions of the Lakefront Lifestyles magazine in FY 2023; therefore, only 4/6 ads were published and invoiced for FY2023. -A total of $5,070.00 was spent on ads in FY 2022 (six ads at $845 ea.) -A total of $3,580.00 was spent on ads in FY 2023 (four ads at $895 ea.)
Michigan Green Schools Program	For the 2021-2022 school year, 91 Oakland County schools earned the Michigan Green School designation by participating in a minimum of 10 out of 20 environmental and/or energy saving activities. 22 of the schools received the special designation of Emerald Schools by successfully participating in 15-19 activities and 46 schools participated in 20 or more activities to earn the special designation of Evergreen status. 19 of the 28 public school districts had schools represented. In addition, 8 of the schools were recognized for participation for all 15 years of the program.
	For the 2022-2023 school year, 86 schools were designated a Michigan Green School. There were 13 schools that also received the special designation of Emerald status by successfully earning an additional 15 points for extra activities and 51 schools earned the Evergreen status, by receiving an extra 20 points. 15 of the 28 public school districts were represented in the program this year. Information on the program for Oakland County is available on Oakland Schools' Web site at: https://www.oakland.k12.mi.us/student-programs/environmental#:~:text=The%20Michigan%20Green%20Schools%20Program%20encourages%20public%20and%20private%20schools,designated%20a%20Michigan%20Green%20School

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Oakland County Environmental Stewardship and Water Resource Websites	WRC, OCPLBD, OCPRC and MSU-Extension Oakland County maintain environmental stewardship and/or water resource information on their Web sites at: OCPLBD: **https://www.oakgov.com/community/community-development/environmental-stewardship** (a total of 1,306 website hits in FY 2022 and 2023) WRC: **www.oakgov.com/riparian** (a total of 1,545 website hits in FY 2022 and 2023) WRC 24-Hour Pollution Hotline: **https://oakgov.com/government/water-resources-commissioner/stormwater/24-hour-pollution-hotline** (a total of 1,209 website hits in FY 2022 and 2023) OCPRC: **https://oakgov.com/community/oakland-county-parks/get-involved/natural-resources-management** (a total of 1,738 website hits in FY 2022 and 2023) MSU-Extension: **https://www.canr.msu.edu/natural_resources/** (a total of XXX website hits in FY 2022 and 2023) In FY 2018, Oakland County Information Technology developed a Seven Simple Steps to Clean Water Story Map and that is available at: **https://oakgov.maps.arcgis.com/apps/Cascade/index.html?appid=1676f95c659d408e94bf73096db93387**; a link to the Story Map is on WRC's "Seven Simple Steps to Clean Water" website at: **https://oakgov.com/government/water-resources-commissioner/resources/education/seven-simple-steps-to-clean-water**. The page also promotes the 24-Hour Pollution Hotline and viewers can explore land use changes from 1940 vs. 2017 imagery within Oakland County. There were **280** website hits in FY 2022 and **184** website hits in FY 2023 to the WRC's Seven Simple Steps to Clean Water website. The Storymap received **129** website hits in FY 2022 and **100** hits in FY 2023. To date, the Storymap has received 1,000 views.
Onsite Sewage Disposal (Septic System) Maintenance Education	**OCHD:** OCHD offers a septic system installer education class that instructs on the Oakland County Sanitary Code and policies related to onsite wastewater treatment systems. The class is open to contractors wishing to complete installations in Oakland County as well as private homeowners wishing to install their own septic system. There were 11 classes totaling 70 attendees in FY 2022 and 11 classes with 54 attendees in FY2023. Renewal licenses were issued to sewage disposal system installers in FY 2022 and 241 installers in FY 2023. **WRC:** -An ad on Septic System Maintenance was published in the September 2022 issue of the Oakland Lakefront Lifestyles Magazine that reaches 15,600 lakefront property owners on 226 different inland lakes annually in Oakland County. There are also 40,000 monthly ad impressions on the Lakefront website at: **www.oaklandlakefront.com**.
Operation Medicine Cabinet	There are currently 36 drop-off sites throughout Oakland County where unused pharmaceuticals can be properly disposed of, including the following: Oakland County Sheriff's offices (13) in Addison Twp, Brandon Twp, Commerce Twp, Highland Twp, Independence Twp, Lyon Twp, Oakland Twp, Orion Twp, Oxford Twp, Pontiac, Rochester Hills and Springfield Twp; additionally, partner law enforcement agencies Auburn Hills PD, Beverly Hills Village Dept. of Public Safety, Birmingham PD, Bloomfield Hills Dept. of Public Safety, Bloomfield Twp. PD, Clawson PD, Farmington Hills PD, Ferndale PD, Franklin PD, Hazel Park PD, Holly PD, Huntington Woods Dept. of Public Safety, Keego Harbor PD, Madison Heights PD, Oak Park PD, Rochester PD, Royal Oak PD, Southfield PD, Troy PD, West Bloomfield PD, and White Lake PD, who all serve as OMC drop-off sites. New in FY 2017, a GIS-based online application is available for the public to see drop-off sites throughout the county and is available at: **https://oakgov.maps.arcgis.com/apps/webappviewer/index.html?id=db4052d9ca5c4e1798a7dfd2a54e3c25**. There were **1,613** website hits in FY2022 and **1,232** in FY2023 to the Operation Medicine Cabinet website at: **https://www.oakgov.com/government/sheriff/community-services/domestic-safety/operation-medicine-cabinet**.

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Presentations and Displays	**WRC:** -WRC provided displays for four (4) events in FY 2022 that highlighted the public education programs and water resource-related programs offered by Oakland County. The events were held in Novi, Pontiac, Royal Oak, and Southfield. -New in FY 2010, the WRC instituted a Speaker's Bureau where interested people can ask for a WRC representative to come and talk to their civic group about one of many aspects of the work we do at WRC (with a focus on our wastewater and stormwater management programs). In FY 2022 and 2023, Commissioner Nash participated in 57 speaking engagements, reaching more than 3,200 people (and likely many more that weren't trackable due to public broadcasting venues) and sharing info on the WRC's role in protecting water resources and the environment. See **Appendix C** for a complete listing. In FY 2022, WRC staff responded to a series of questions regarding pollution and littering in Oakland County, and how WRC tackles the topic of pollution prevention in Oakland County. The questions were for a school Podcast project for a 5th grade project at a school in Rochester. In FY 2023, WRC staff responded to a series of questions regarding beach closures - what causes it and can they be prevented. The questions were for a school project in their government class. -In FY 2023, WRC staff presented two talks on flooding and related topics on stormwater management and environmental stewardship: 10/5/2022 - 75 3rd grade students at Leonard Elementary in Troy (provided a copy of the Waterfront Wisdom booklet to all students; also donated a copy of "Let's Build a Rain Garden" by local author, Sally Wenczel) 11/3/2022 - 130 6th grade students at West Hills Middle School in Bloomfield Hills (provided a copy of the Waterfront Wisdom booklet to all students) 3/22/2023 - In honor of World Water Day, the WRC provided content on watersheds, stormwater pollution prevention and actions we can all take to help curb stormwater runoff pollution in the Oakland County Blog that is seen by all Oakland County employees. The blog is viewable online at: https://oaklandcountyblog.com/2023/03/22/world-water-day/. The County's 24-Hour Pollution Hotline was also highlighted. 5/17/2023 - WRC staff presented at the 33rd annual "Leadership Oakland" event for their Environment track on the topic of "Water Resources in Oakland County" to approximately 40 attendess. Topics covered included stormwater management, stormwater pollution prevention, watersheds and water quality in Oakland County. **OCPRC:** 6/2 – 6/3/23 – Native Plant Event – 107 attendees 6/15/23 – Boat Launch outreach – Clean, Drain, Dry and AIS – 2 attendees 8/17/23 – Boat Launch outreach – Clean, Drain, Dry and AIS – 1 attendee 9/16/23 – Metro Boat Show – ~ 20-30 attendees 11/11/23 – Royal Oak Garden Club Presentation – aquatic invasive species – 20 attendees **OCPLBD:** FY 2022: - 10/15/2021, 2/18/2022, 6/17/2022: Oakland County Planning & Local Business Development hosted the Trail, Water & Land Alliance (TWLA) meetings with the following topics: Metropark Express-a Pilot Partnership between HCMA and SMART; Protecting Michigan's lakes and streams from aquatic invasive species with the RIPPLE program; Micro- and Nanoplastic Pollution: From Sources to Solutions; An Overview of the Moutrie Pollinator Garden and New Trail Signage; City of Rochester Hills Greenspace Program; Southfield City Centre Trail; Clinton River Area Mountain Bike Association Bike Patrol FY 2023: • 2/23/2023, 9/27/2023 – Hosted Planner's Gathering workshops with the following topics: Oakland County Hazard Mitigation Plan Update, Oakland County Hazard Mitigation Plan – A Draft Review. • 10/13/2022, 2/14/2023, 6/13/2023 - Hosted the Trail, Water & Land Alliance (TWLA) meetings with the following topics: MI Air Line Trail Phase 2 Update, Tour of the MI Air Line Trail, Spotted Lanternfly – One of Oakland County's Newest Invasive Species; GREEN Initiative – Growing Our Resilience, Equity & Economy with Nature; Climate Adaptation in Metro Detroit's Urban Ecosystems: An Overview of Resources from the Northern Institute of Applied Climate Science; Norton Street Innovation: Augusta Drain Stormwater Improvement Project. • Presented at the Michigan Conservation Stewards Program - Oakland County Cohort.

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	OCHD: FY 2022: - OCHD presented at the Great Lakes Beach Association Conference in Fall 2022 to discuss qPCR standard for E. coli in inland lakes. - OCHD presented at the Clinton River Water Festival in May 2022. - OCHD gave a presentation on Legionella investigations in Long Term Care facilities at the LARA Joint Provider Surveyor Training Conference. -Participated with MPART in presentations about PFAS sites for investigations of private wells. These presentations at open meetings for municipal officials and residents were held in Lake Orion on 2-23-2022 and Milford on 4-27-2022. FY 2023: - OCHD presented "Well and Septic 101:" for residents in Franklin, 3-2-2023. - OCHD presented at the Clinton River Water Festival in May 2023.
Regional Stormwater Summit	For FY 2022, the 8th Annual Storwmater Summit was held virtually on October 29, 2021 via Zoom. Speakers included representatives from WRC, SEMCOG, OHM Advisors, Drummon Carpenter, the City of Royal Oak, EGLE and the City of Grand Rapids. The agenda is available upon request.
	For FY 2023, the 9th Annual Stormwater Summit was held on October 21, 2022 with approximately 170 attendees. Event details are available online at: **https://www.mi-stormwatersummit.com/**.
Riparian Information Distribution	-To date, more than 17,000 Waterfront Wisdom booklets have been distributed. An excel spreadsheet that details the distribution list is available upon request -There were **713** website hits during FY 2022 and **832** website hits in FY 2023 to WRC's website on riparian education.
School Program - Detroit River Water Festival on Belle Isle in Detroit	In FY 2022, the festival was held on September 27, 2022. A total of 5 classes from 4 schools participated. The festival was open to 5th and 6th graders in the Detroit Public Schools. A total of 238 students and 16 teachers and chaperones attended. There were 10 organizations that presented, 18 volunteers and 2 Friends of the Detroit River staff to make the 2022 festival a success. Photos and video of the 2022 Festival are available online at: **https://drive.google.com/drive/folders/15fQ8SbSlLNGgFKvSvPAPOMe49HlTkHkg**. The WRC Dirt Doctors presented to 4 classes, approximately 110 students and 4 teachers.
	In FY 2023, the festival was held on Sept. 27 and 28, 2023. A total of 800 4th and 5th grade students from Detroit were engaged in outdoor, interactive presentations! The festival also reached 55 teachers and chaperones. A total of 9 schools representing 30 classes were able to participate. Fifteen (15) different organizations presented at the festival. Forty-six (46) volunteers and 4 staffers from the Friends of the Detroit River were also integral to the success of the 2023 festival. There were three (3) different media sources that covered the festival! Photos and videos from this year's festival are available online at: **https://drive.google.com/drive/folders/1nbAPjWGeQCfAxg1P1t67yp9vVh-ooAbT**. The WRC Dirt Doctors presented to 8 classes, approximately 223 students and 8 teachers. The WRC also presented the Drain Detectives program to 8 classes, approximately 208 students and 8 teachers.

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School Program - Rouge River Water Festival at Cranbrook Institute of Science	In FY 2022, the festival was held both virtually and in person. The virtual session was held on October 12-15, 2021. A total of 1,062 students and 4 teachers participated. WRC, OCPRC and MSU-Extension Oakland County provided virtual programming to virtual attendees. MSU-Extension provided a video of their groundwater model (located here: https://mediaspace.msu.edu/id/1_9vwq3qh8). WRC provided a link to its virtual Dirt Doctors and Enviroscape Watershed Model programs. In FY 2022, the festival was held in person from Sept. 13-16, 2022 at Cranbrook Institute of Science. Approximately 1,142 students from 40 classes and 17 different schools in 10 different communities attended (Beverly Hills, Bingham Farms, Birmingham, Bloomfield Hills, Bloomfield Twp, Commerce, Farmington Hills, Southfield, Troy and Walled Lake). Twenty-eight (28) organizations presented during this year's Water Festival. The following **WRC** staff presented at the 2022 Festival: **Dirt Doctors**: Two staff members presented Dirt Doctors to 15 classes, approximately 335 students Three staff members from **OCPRC** presented "Macroinvertebrate Mayhem" to 4 classes, approximately 98 students One staff member from **MSU-Extension** presented "All Our Water is Connected & Ours to Protect" to 7 classes, approximately 167 students Two **WRC** staff members attended and worked the registration area all four days of the festival.
School Program - Rouge River Water Festival at Cranbrook Institute of Science	In FY 2023, the festival was held from Sept. 19-22, 2023 at the Cranbrook Institute of Science. The following **WRC** staff presented at the 2022 Festival: Dirt Doctors: 8 staff members presented Dirt Doctors to 15 classes, approximately 284 students and 30 teachers/chaperones Three staff members from OCPRC presented "Macroinvertebrate Mayhem" to 8 classes, approximately 183 students and 8 teachers/chaperones One staff member from MSU-Extension presented "All Our Water is Connected & Ours to Protect" to 8 classes, approximately 173 students and 8 teachers/chaperones Two WRC staff members attended and worked the registration area all four days of the festival.
Extra Activities (Not included in SWMP)	
Native Plant Initiative	In the summer of 2020, the Oakland County Board of Commissioners launched the Native Plant Initiative. The program is designed to educate residents about the ecological benefits of cultivating native plants. Native plants help prevent the spread of invasive species, which can crowd out other local species, contribute to erosion, promote the use of toxic pesticides and cause other problems for natural habitats. Events hosted in 2022 and spring of 2023 have helped distribute more than 1200 bundles, each containing dozens of native plants, to residents from many cities, villages and townships across Oakland County. Participants signed an environmental stewardship pledge and received kits with native flora along with information on how to plant and care for these beneficial species in their own gardens. More information about the program is available at: https://www.oakgov.com/community/oakland-county-parks/get-involved/native-plant-information.

Action/Activity	Oakland CDC MS4 NPDES Permit No. MI0060089 FY 2022 and 2023 Measurables (October 1, 2021 - September 30, 2023)
Seeley Creek Habitat Restoration (Rouge River Watershed)	In FY 2023, this project, located on the Seeley Creek (a County Drain) in the City of Farmington Hills, created habitat in the creek and adjacent floodplain by stabilizing the streambed, eroding banks, and adding stream substrate. Invasive species management was also conducted to increase diversity of native plant species. The project will provide habitat for fish and aquatic species as well as improve habitat for birds, amphibian and terrestrial species. Details about the project are available at: **https://www.allianceofrougecommunities.com/seeley.html** and **https://www.allianceofrougecommunities.com/PDFs/general/Seeley%20ck%20public%20ed%20piece.pdf**. Key measurables as part of the project include 5 acres of invasive plant species management and wetland restoration, 30+ stream grade control riffles and 4,000 feet of restored/improved stream habitat. The project was funded by the US EPA Great Lakes National Program Office with an approximate GLRI grant of $815,000. Project partners included the WRC, EPA, GLRI, and the Alliance of Rouge Communities.
Stormwater Utility Legislation	Since 2014, the WRC has continued to lead a workgroup of stakeholders to develop language for a bill that would help clarify how communities can establish dedicated funding sources for managing their stormwater systems. On November 9, 2023, Senator Rosemary Bayer introduced SB-660'23, a bill to enact new law known as the "Stormwater Management Utility Act". Although similar legislation has been introduced in Lansing many times over the past several years, this refined bill is gaining regional and statewide support with enough momentum to be addressed by the full Legislature in calendar year 2024. The WRC continues to monitor court cases that are trending in manner favorable to support the passage of a stormwater management utility bill. Since FY 2021, the WRC hosted a regional community forum to review material revisions to prior draft bills, educate community leaders, and solicit feedback from a cross-section of professionals to ensure all aspects of creating and maintaining a stormwater management utility are considered and incorporated into the new proposed law.
Preserve MI Waters: Stormwater Manhole Cover Art Contest	In FY 2022, the WRC coordinated a contest to highlight the importance of awareness that stormwater runoff enters our lakes, streams and rivers without treatment. The initiative was meant to highlight the importance of protecting our waterways from pollution from nonpoint sources. The winner was Troy Athens high school student, Mandy Chu. The contest received a total of 74 entries. Mandy received a $1,000 scholarship in honor of her achievement from Pure Oakland Water. Details on the initiative were shared in an Oakland County Blog post on April 21, 2022 and is available online at: **https://oaklandcountyblog.com/2022/04/21/oakland-county-spreads-awareness-around-stormwater/#more-51100**. In FY 2023, CDM staff installed 48 storm drains covers featuring Mandy's artwork in walkable locations throughout Oakland County. A full report on the locations of the installed storm drain covers, along with installed images in the field, are available in **Appendix X**.

Washtenaw County's relevant activities for 2022-2023

Master Rain Gardener Course (webinar-style) – Regional Partnership

- March 2022 – Hosted by Washtenaw County Water Resources, Oakland County Water Resources, Friends of the Rouge, River Raisin Watershed Council, Clinton River Watershed Council and Huron River Watershed Council; ~84 participants.
- February 2023 – Hosted by Washtenaw County Water Resources, Oakland County Water Resources, Huron River Watershed Council, Friends of the Rouge, Friends of the Detroit River, River Raisin Watershed Council, Clinton River Watershed Council, Huron -Clinton Metroparks; ~70 participants.

Master Rain Gardener Course (in-person) – promoted throughout the region

- April 2023 – Hosted/presented by Washtenaw County Water Resources, River Raisin Watershed Council, Huron-Clinton Metroparks; ~35 participants.

SEMCOG – Regional Training – IDEP Awareness & IDEP Investigator Training Sessions

- October 11, 2023 – Hosted at Washtenaw County Water Resources for our partners in the region. SEMCOG/ECT trainers & coordination.

Events

Native Plant Expo & Marketplace (a Washtenaw Conservation District event, sponsored by Washtenaw County Water Resources & others)– The Native Plant Expo & Marketplace hosts several companies specializing in native plants and seeds as well as landscaping companies and non-profit organizations focused on native plant landscapes. There will be ample opportunity to purchase a wide variety of additional plants, seeds and services. The event offers both pre-ordered and day-of sales.

- June 2022 ~1600 attendees
- June 2023 ~2250 attendees

Superior Day – held at Oakbrook Park (8460 Berkshire)

- 6/10/23 – Washtenaw County Water Resources hosted a booth w/watershed info, public ed materials and giveaways.

Radio

Issues of the Environment – WEMU 89.1FM & wemu.org

Issues of the Environment is a weekly radio show featuring environmental topics in our community that is produced in partnership between WEMU and the office of the Washtenaw County Water Resources Commissioner. WEMU89.1 transmits in Ypsilanti and covers Washtenaw County and the western suburbs of Detroit. A listing of shows can be found on WCWRC's webpage at https://www.washtenaw.org/340/Issues-of-the-Environment---Radio

2022-23 example show topics included:

- The drive to improve Washtenaw County's ecological health with expansion of native plant species
- Legacy Land Conservancy adds more Washtenaw County acreage to its conservation efforts
- Protecting Washtenaw County's waters in the season of campfires and wood-burning
- 'Resilient Washtenaw' climate action plan advances toward approval and implementation

- The impact of 'forever chemicals' on Michigan's fish and wildlife
- A pre-Earth Day look at progress and challenges in Washtenaw County
- Motivating the Catholic Church to become more sustainable in land use practices
- The Conservancy Initiative works to rid Johnson Creek of 'forever chemicals'
- Takeaways from Washtenaw County's '500-year, 3-hour storm'
- Tracking and mapping rain gardens in Washtenaw County and measuring beneficial impacts
- Washtenaw County expands its program to properly dispose of toxic household materials
- Michigan Clean Water Corps works to keep Washtenaw County's water clean and safe

Lucy Ann Lance Show – WLBY 1290AM & 1290WLBY.com

- 2/14/22 – WCWRC's Susan Bryan interviewed on Rain Gardens & Native Plants
- 3/6/23 – WCWRC's Susan Bryan interviewed on Rain Gardens & Native Plants

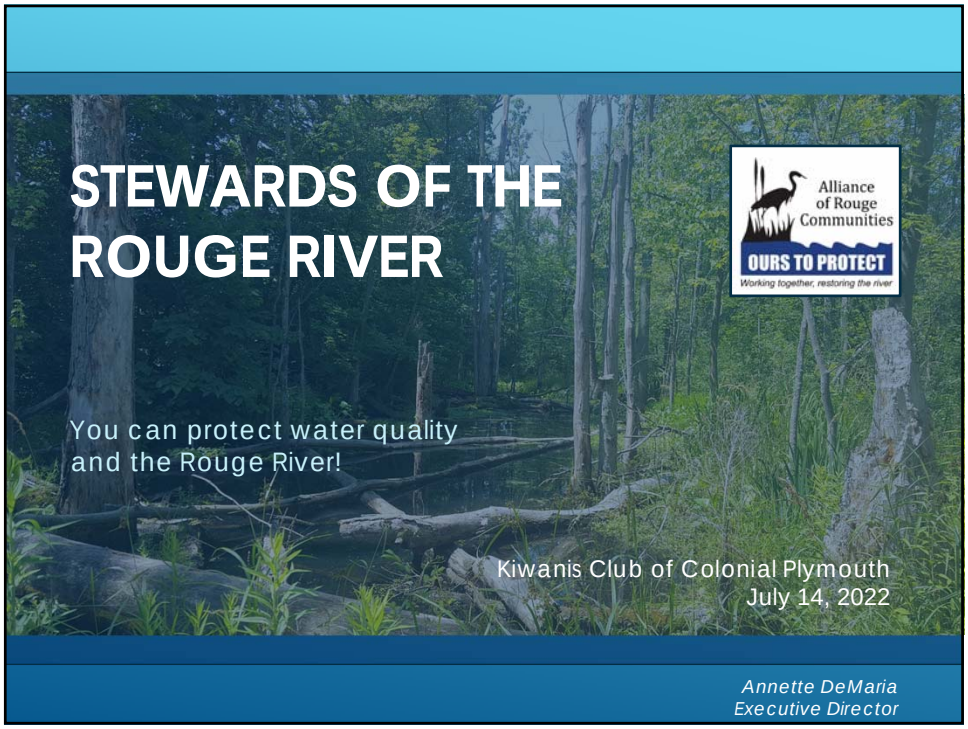
PEP Material - Distribution

- Washtenaw County Water Resources distributed over 12,000 public educational materials in 2022-23 which included ~275 Rouge-specific public education materials.

Website – ARC PEP Materials on Washtenaw.org

01/04/23 – Business in the Rouge BMP brochure added to WCWRC's website –

- news article
- added to Programs for Business webpage (/408);
- added to Reports & Publications webpage (/197)



1

ALLIANCE OF ROUGE COMMUNITIES (ARC)

- **Quasi-governmental organization**
  - Local municipalities
  - Counties
  - Educational institutions
  - Stewardship groups
- **Work cooperatively to meet State permit requirements & restore the Rouge River**
- **Funded by membership dues from local governments and supported by grants**

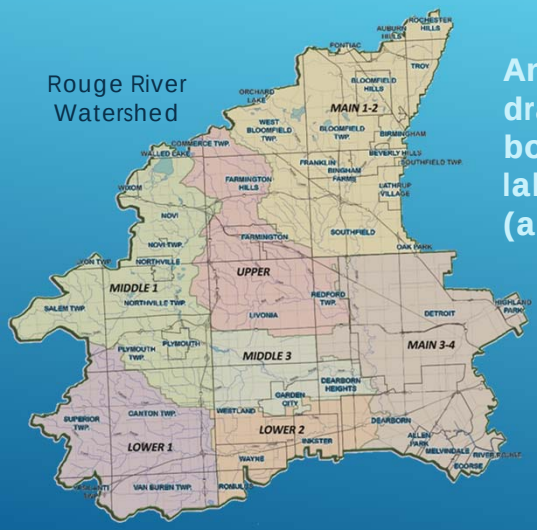
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2

WE ALL LIVE IN A WATERSHED

Rouge River Watershed



An area of land that drains to a common body of water, such as a lake, river or stream (and even groundwater)

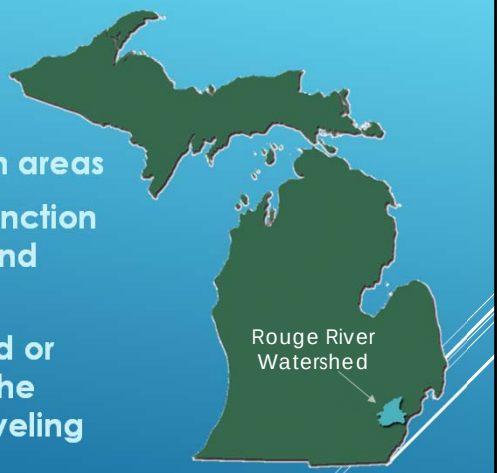
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WE ALL LIVE IN A WATERSHED

- Pollutants travel from upstream to downstream areas
- Pollutants travel at the junction between groundwater and surface water
- As land becomes altered or developed it increases the amount of pollutants traveling



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WHAT IS STORMWATER?

- Water that originates during rain events and snow/ice melt
- Carries the pollutants
- Travels over land or through storm drains, catch basins or pipes (called outfalls)
- Ends up untreated in our rivers, streams and lakes



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5

WHAT IS WASTEWATER?

- Water that has been used in the home, in a business, or as part of an industrial process
- Is treated before it is released back to the environment

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6

WHY PROTECT WATER QUALITY IN THE ROUGE RIVER?

- Understanding allows us to comprehend that we can have an impact on water quality far beyond our own back door



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IMPROVED WATER QUALITY MEANS

- Better habitat
- More aquatic species
- More canoeing and recreational activities
- More fishing and swimming
- Healthier Rouge River!



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8

QUESTIONS?

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9

WHAT YOU CAN DO . . .

- In your home
- In your yard
- With your vehicles
- In your community
- In your business



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10

IN YOUR HOME

- Minimize use of your washing machine, dishwasher or shower
- Pour greasy or oily food waste into a jar – not the sink
- Recycle your chemicals at a Household Hazardous Waste (HHW) collection event in you community



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IN YOUR HOME

- What can you take to a HHW event?

- Acids
- Aerosols
- Antifreeze
- Batteries (household & auto)
- Brake fluid
- Bug sprays
- Car wax
- Caulk
- Cell phones
- Computer equipment
- Cleaning solvents
- Drain cleaners
- Fertilizer/weed killer
- Floor care products
- Fluorescent light bulbs
- Oil & diesel fuel
- Gasoline
- Glue
- Ink cartridges
- Kerosene
- Light bulbs
- Lighter fluid
- Medicine
- Mercury waste
- Moth balls
- Oils (fuel, cooking & cutting)
- Paint
- Paint stripper & thinner
- Polishes (auto, furniture, metal & nail)
- Pool chemicals
- Primer
- Propane tanks (from grills)
- Rat poison
- Sealant
- Sharps (in metal/plastic containers)
- Smoke detectors
- Stereos/TVs
- Turpentine
- Varnish/Wood preservatives

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IN YOUR HOME

- Do not put “disposable wipes” down a drain or toilet
- Recycle your holiday greenery



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IN YOUR HOME

- Maintain your septic system
  - Have it inspected every 3 years
  - Have your tank pumped every 3-5 years





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IN YOUR HOME

- **Why are we concerned about septic systems?**
  - Significant contributing source of pollution in the Rouge River Watershed
  - Often neglected and not routinely maintained after the initial installation
  - A malfunctioning system can contaminate our waterways and groundwater supply



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IN YOUR HOME

- **A properly functioning septic system will:**
  - Help protect and enhance the quality of surface and groundwater resources
  - Protect public health from disease causing organisms and nuisance conditions
  - Properly dispose of your wastewater
  - Preserve the waterways, including the Rouge River, for recreational enjoyment
  - Save you money!



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QUESTIONS?

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IN YOUR YARD

- **Winterize your pool, spa or fountain**
  - Allow the chlorine to dissipate for several days
  - Drain it to a landscaped area



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IN YOUR YARD

- Cut grass to a height of no less than 3 inches
- Don't over-water
- Mulch your grass and leaves



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IN YOUR YARD

- Don't overuse fertilizer
- Use slow release, phosphorous-free fertilizer
- Use a broom to sweep fertilizer and grass clippings back onto your yard
- Avoid weed & feed products





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IN YOUR YARD

- Pick up after your pet (even in the winter)
- Don't feed the geese



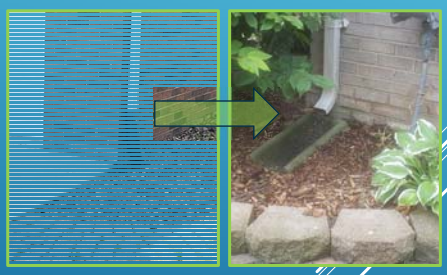
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IN YOUR YARD

- Install a rain barrel to capture rainwater
- Winterize rain barrel to extend use
- Disconnect downspouts and direct them into your garden
- Install a compost bin





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IN YOUR YARD

- Use non-toxic cleaning alternatives such as white vinegar, baking soda and hydrogen peroxide
- During winter months shovel often to reduce salt use or choose an environmentally-friendly alternative



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QUESTIONS?

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IN YOUR YARD

- **Use native trees and plants**
  - Do not require fertilizers
  - Require less water
  - Provide wildlife habitat
  - Promote biodiversity
  - Reduce maintenance costs
  - Improved water quality





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IN YOUR YARD

- **Michigan Native Plant Producers Association – www.mnppa.org**
  - American Roots – www.americanrootswildflowers.com
  - Hidden Savanna Nursery – www.hiddensavanna.com
  - Michigan Wildflower Farm – www.michiganwildflowerfarm.com
  - Native Connections – www.nativeconnections.net
  - The Native Plant Nursery, LLC – www.nativeplant.com
  - Wetlands Nursery, Inc. – 231-848-4202
  - WILDTYPE Design, Native Plant & Seed, LTD – www.wildtypeplants.com

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IN YOUR YARD

- Install a rain garden to reduce stormwater runoff



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IN YOUR YARD

- Rain gardens
  - Filter runoff pollution
  - Recharge local groundwater/conserve water
  - Improve water quality/ protect rivers & streams
  - Remove standing water
  - Reduce mosquito breeding
  - Habitat creation
  - Reduce potential home flooding





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IN YOUR YARD

- Protect waterfront property
- Create buffer zones to restore the shoreline





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IN YOUR YARD

- Shoreline buffers
  - Provide shade & moderate water temperature
  - Stabilize stream banks & reduce erosion
  - Filter & trap sediment from runoff
  - Absorb nutrients from runoff
  - Slow runoff & reduce flooding
  - Provide food & habitat for invertebrates, fish, & wildlife
  - Deter Canada Geese





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IN YOUR YARD

- **Include pollinators**
  - Bees & butterflies
  - Essential to health of the environment
  - How plants reproduce & produce fruit
  - Great ecosystem health





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IN YOUR YARD

- **Planting trees**
  - Increases property values
  - Combats climate change
  - Improves air quality
  - Conserves energy
  - Conserves water
  - Reduces stormwater runoff
  - Improves habitat



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QUESTIONS?

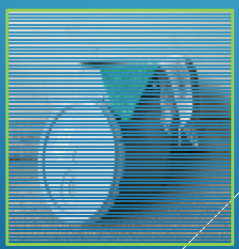
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WITH YOUR VEHICLES

- Use your local car wash so built-up road salt, oil and other pollutants don't go down storm drains
- When cleaning your garage, sweep it and dispose of it in the garbage
- Prevent fluid leaks from reaching paved surfaces





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WITH YOUR VEHICLES

- **Boat owners**
  - Wash your boat to remove plants & aquatic animals after every use
  - Dump unused bait in the trash not the water
  - Drain water from equipment before transporting
  - Dispose of your boat waste properly
- **RV owners**
  - Dispose of sanitary waste at a drop-off location – never down a storm drain or roadside ditch



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QUESTIONS?

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IN YOUR COMMUNITY

- **Detention ponds**
  - Plant a variety of native species
  - Remove invasive species
  - Remove trash around detention ponds
  - Install bat boxes & bird houses
  - Regular inspections





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IN YOUR COMMUNITY

- **Keep storm drains clear of debris**
- **Don't pour chemicals or other liquids down a storm drain**





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IN YOUR COMMUNITY

- Report illegal dumping





Michigan's Pollution Alert System	800-292-4706
Macomb County	877-679-4337
Oakland County	248-858-0931
St. Clair County	877-504-SWIM
Washtenaw County	734-222-3800
Wayne County	888-223-2363

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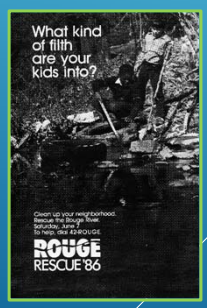
IN YOUR COMMUNITY

- Get involved!

Friends of the ROUGE
www.therouge.org

PROMOTING RESTORATION AND STEWARDSHIP OF THE ROUGE RIVER SINCE 1986





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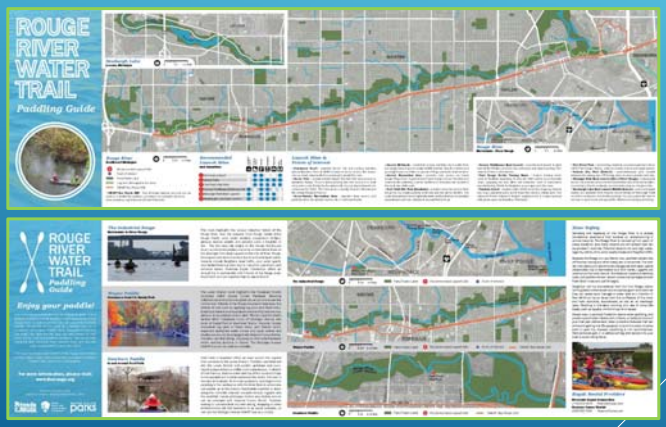
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IN YOUR COMMUNITY

Friends of the ROUGE

EXPLORE—ROUGE RIVER WATER TRAIL



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IN YOUR COMMUNITY

Friends of the ROUGE

- Explore together
  - Bug hunts
  - Frog & toad survey











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IN YOUR COMMUNITY

Friends of the ROUGE

- Restore
  - Rouge Rescue
  - Restoration workdays







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IN YOUR COMMUNITY

Friends of the ROUGE

RESTORE—RAIN GARDENS

MASTER RAIN GARDENER





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IN YOUR COMMUNITY

Friends of the ROUGE

SPEAK UP FOR THE OUTDOORS!



- VOLUNTEER
- BECOME A MEMBER
- www.therouge.org

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IN YOUR BUSINESS

- Personal satisfaction whether you are the owner, employee or patron
- Easier and less costly to prevent pollution than to try to clean it up
- Get employees involved!



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IN YOUR BUSINESS

- **May be polluting if businesses**
  - Rinse washwater down a storm drain
  - Spill materials or wastes in parking lot without cleaning them up
  - Allow materials or wastes stored outside to leak



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IN YOUR BUSINESS

- **Facility management**
- **Cleaning paved surfaces**
- **Cleaning up spills & leaks**
- **Storing & handling inventory**
- **Storing & disposing wastes**
- **Dumpster & loading dock maintenance**
- **Cleaning equipment**
- **Maintaining landscaped areas**
- **Employee training & education**





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QUESTIONS?

https://therouge.org/heart-of-the-rouge/

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1

WHAT ARE WE GETTING INTO?

- **Introduction**
- **Water Quality**
  - **Watershed Protection**
  - **Stormwater**
  - **Improved water quality**
- **Basin Maintenance**
  - **Best Management Practices**
  - **Native and Invasive Plants**
- **In Your Community**

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2

Christopher Bobryk

Location: Watershed Ecologist, Project Manager – Environmental Consulting & Technology
Years experience: 15 years
Education: Ph.D. Forestry, University of Missouri-Columbia.





EXPERIENCE:

- Watershed Planner (Clinton River Watershed Council).
  Provided guidance to municipalities on GSI system planning and construction
- Restoration/Reclamation Scientist (Missouri Department of Natural Resources)
  Led reclamation projects for abandoned coal mines.
- Soil Scientist (USDA Agriculture Research Service)
  Precision ag management activities.
- Associate Scientist (ECT)
  Water resources and soil remediation.

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ALLIANCE OF ROUGE COMMUNITIES (ARC)

- Quasi-governmental organization
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  - Counties
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4

ALLIANCE OF ROUGE COMMUNITIES (ARC)

Public Education

- Business Owners – protect water quality inside, outside & under your building!
- Brine instead of Rock Salt to Protect Water Quality!
- When It Comes to Household Chemicals – Change Is A Good Thing!
- Let's All Dispose of Fats, Oils & Grease (FOG) Properly!
- Business Owners – protect water quality inside, outside & under your building!

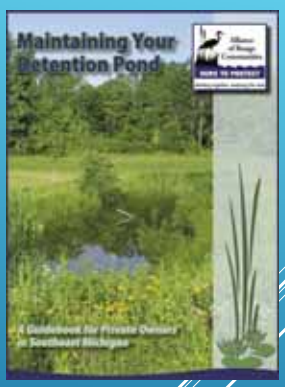
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ALLIANCE OF ROUGE COMMUNITIES (ARC)

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6

WE ALL LIVE IN A WATERSHED

Rouge River Watershed



An area of land that drains to a common body of water, such as a lake, river or stream (and even groundwater)

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WE ALL LIVE IN A WATERSHED



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WE ALL LIVE IN A WATERSHED

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9

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10

IMPROVED WATER QUALITY MEANS

- Better habitat
- More aquatic species
- Improved biologic function
- Better filtration
- Slower water
- Healthier water systems!





11

IMPROVED WATER QUALITY



EUTROPHICATION OR ALGAE BLOOMS

Algae found in neighborhood ponds are caused by excess fertilizer, pesticides, and grass clippings entering the water. Try to limit fertilizer usage and sweep lawn clippings off of sidewalks and driveways and back onto lawn.



INVASIVE SPECIES

Be sure to remove invasive species such as phragmites when possible. Replant these areas with native plants to ensure invasives stay out. Native plants will also help keep extra nutrients out of the water, preventing algae.



LACK OF WILDLIFE HABITAT

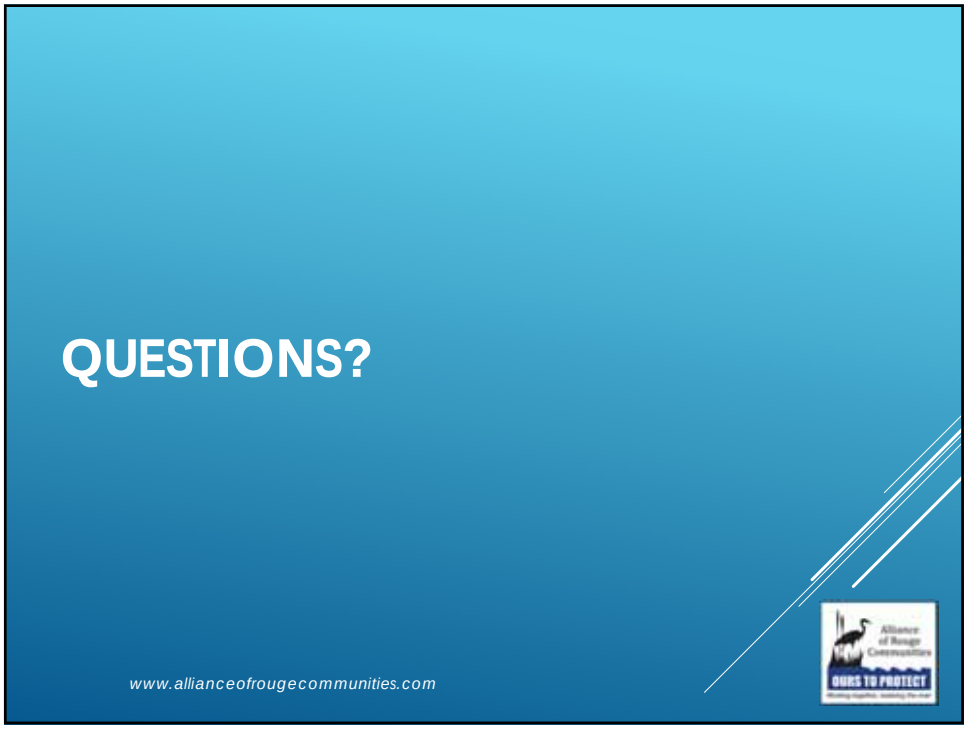
Many neighborhoods lack trees, shrubs, and grasses that are good for wildlife. Adding these plants, as well as bat boxes, bee houses, and bird houses can help different species thrive.

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Understanding allows us to comprehend that we can have an impact on water quality far beyond our own back door
Education → Awareness → Protecting
INCREASING AWARENESS TO WATER QUALITY

13


QUESTIONS?
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Alliance of Rouge Communities
OURS TO PROTECT

14

BEST MANAGEMENT PRACTICES

- regular inspections;
- review by a licensed professional;
- vegetation management;
- embankment and outlet stabilization;
- debris and litter control; and
- sediment/pollution removal.



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DETENTION POND

- An engineered depression that collects and cleans water runoff.
- Collects, filters, protects, and reduces downstream flow.



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BEST MANAGEMENT PRACTICES







- **Maintenance**
  - Turn shoots away from water
  - Uphold buffers
  - Be judicious in applications
    - low-phosphorus, slow-release varieties
  - Know your species
  - Check structures
    - Siltation, clear and grub
  - Education
    - Crew
    - Client

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BEST MANAGEMENT PRACTICES

- **Herbicides**
  - Forest management
  - Agriculture/crop cultivation
  - Parks
  - Golf courses
  - Lawns
  - Roads/rights of way
  - Aquatic weed control

Herbicides are chemicals used to manipulate or control undesirable vegetation

- **Effects**
  - Inhibiting cell division
  - photosynthesis
  - Amino acid production
  - Mimicking growth hormones
- **Applications**
  - Foliar
  - Soils
  - Aquatic weed control

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BEST MANAGEMENT PRACTICES



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WHAT CAN WE DO . . .



- Community engagement
- Native species
- Big picture - watershed

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NATIVE SPECIES

Warm season vs. cool season grasses

Warm = grow during summer
big blue-stem, little bluestem, Indiangrass, and switchgrass.





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NATIVE SPECIES

Warm season vs. cool season grasses

Cool = grow during spring, early summer, and fall
June grass, Canada wildrye, Virginia wildrye





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INVASIVE SPECIES

Trees and shrubs

Buckthorn, Tree of heaven, Autumn olive





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QUESTIONS?

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IN YOUR COMMUNITY

- Keep storm drains clear of debris
- Don't pour chemicals or other liquids down a storm drain
- County household hazardous Waste Disposal
- MDARD Clean Sweep





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IN YOUR COMMUNITY

- Report illegal dumping





Michigan's Pollution Alert System	800-292-4706
Macomb County	877-679-4337
Oakland County	248-858-0931
St. Clair County	877-504-SWIM
Washtenaw County	734-222-3800
Wayne County	888-223-2363

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IN YOUR COMMUNITY

- **Get involved!**

Friends of the ROUGE
www.therouge.org

PROMOTING RESTORATION AND STEWARDSHIP OF THE ROUGE RIVER SINCE 1986





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OURS TO PROTECT

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IN YOUR COMMUNITY

RESTORE—RAIN GARDENS

MASTER RAIN GARDENER





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OURS TO PROTECT

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RAIN GARDENS



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IN YOUR BUSINESS

- Personal satisfaction whether you are the owner, employee or patron
- Easier and less costly to prevent pollution than to try to clean it up
- Get employees involved!



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IN YOUR BUSINESS

- **May be polluting if businesses**
  - Rinse washwater down a storm drain
  - Spill materials or wastes in parking lot without cleaning them up
  - Allow materials or wastes stored outside to leak



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IN YOUR BUSINESS

- Facility management
- Cleaning paved surfaces
- Cleaning up spills & leaks
- Storing & handling inventory
- Storing & disposing wastes
- Dumpster & loading dock maintenance
- Cleaning equipment
- Maintaining landscaped areas
- Employee training & education





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QUESTIONS?

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GREAT LAKES RESTORATION















Celebrating our Accomplishments
Celebrating the Future in Southeast Michigan

GREAT LAKES RESTORATION
September 22, 2023
The Henry Ford
Rouge River~Detroit River~Clinton River~Saginaw River~River Raisin~St. Clair River~Kawkawlin River~

September 22, 2023
The Henry Ford

Hosted by:

Alliance of Rouge Communities
OURS TO PROTECT
Working together, restoring the river

Cover photos:

Left column from top to bottom: North Branch of the Clinton River at Wolcott Metropark in Romeo, Michigan; Henry Ford Estate fishway looking upstream on the Lower Rouge River in Dearborn, Michigan; and Blue Heron Lagoon at Belle Isle on the Detroit River in Detroit, Michigan.

Middle column: River Raisin near Manchester, Michigan.

Right column from top to bottom: Birding along the St. Clair River Bridge to Bay Trail in Port Huron, Michigan; Kawkawlin River Mouth at Saginaw Bay, Lake Huron, Michigan (photo credit: Matt Nemode); and banks of the Saginaw River in Saginaw, Michigan (photo credit: Doug Pearsall).

Additional copies of this document can be downloaded from the Alliance of Rouge Communities website. Links to previous Great Lakes Restoration Celebration books can be found on page 68 of this book.

Thank you to our sponsors:

Fred A. and Barbara M. Erb Family Foundation

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the Henry Ford

SEMCOG SOUTHEAST MICHIGAN COUNCIL OF GOVERNMENTS

A special thank you to the Fred A. and Barbara M. Erb Family Foundation for financial support of this event and The Henry Ford for providing meeting space at the Lodge at Christie & Main along with Village admission for those attending.

Printing of this document courtesy of the Southeast Michigan Council of Governments (SEMCOG).

Event coordination and graphic design for the Great Lakes Restoration Celebration donated by Environmental Consulting & Technology, Inc.

Great Lakes Restoration

Celebrating the Accomplishments and Looking to the Future in Southeast Michigan

This book celebrates the remarkable restoration accomplishments that have occurred in the river systems of Southeast Michigan over the past few years and renews our commitment to continuing such efforts into the future. Six areas in Southeast Michigan - the Rouge River, the Detroit River, the Clinton River, the River Raisin, the St. Clair River, and the Saginaw River/Saginaw Bay are designated as Areas of Concern (AOC) because of their history of contamination. The restoration of these historically contaminated areas, as well as efforts on the Kawkawlin River and the region in general, have been led by numerous watershed groups that are being celebrated today. In the pages of this book, these watershed groups and other stakeholders will share information on the variety of ecological restoration efforts that have been completed or are being completed. These stories will emphasize some of the larger-scale Great Lakes restoration projects funded through the U.S. Environmental Protection Agency (USEPA), Great Lakes Restoration Initiative (GLRI), the National Oceanic and Atmospheric Administration (NOAA), the Forest Service and other funding sources.

We welcome our congressional delegation and sincerely thank them for their continued support of the GLRI. By assuring that the resources are available to continue the restoration they have allowed us all to restore our Great Lakes. Our federal and state leaders continue to provide the technical and financial support to be able to complete these large scale restoration efforts. We must also extend a special thanks to the counties, municipalities, non-governmental organizations (NGOs) and other community groups for their continued efforts to restore our region. They are the backbone of this massive effort.

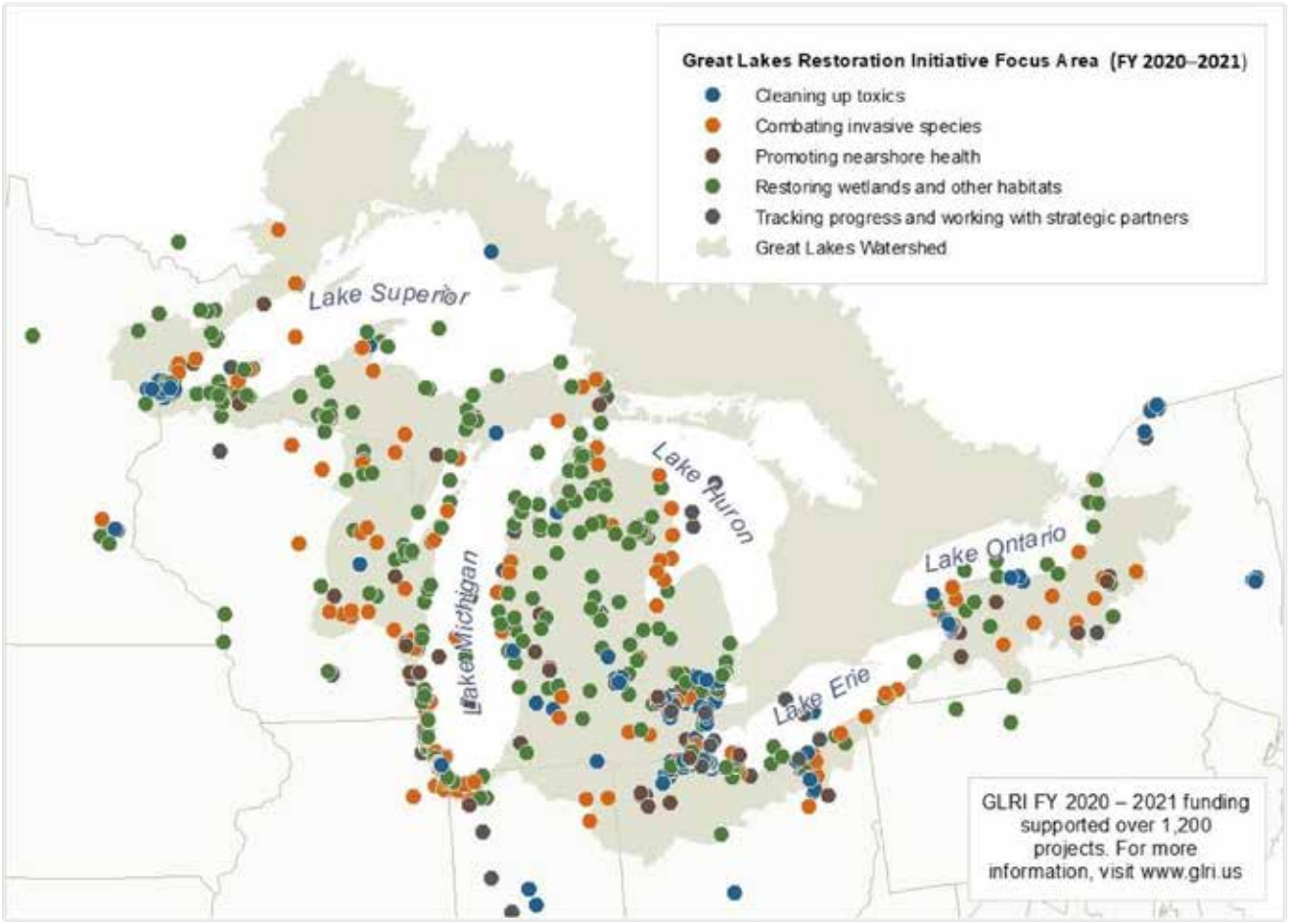
Partners in this endeavor include:

- Alliance of Rouge Communities
- The Henry Ford
- Fred A. and Barbara M. Erb Family Foundation
- Rouge River Advisory Council
- Michigan Department of Environment, Great Lakes and Energy
- Clinton River Watershed Council
- Southeast Michigan Council of Governments
- National Oceanic and Atmospheric Administration
- Great Lakes Restoration Initiative
- Friends of the Detroit River
- Friends of the St. Clair River
- Detroit River Public Advisory Council
- Alliance of Downriver Watersheds
- Friends of the Rouge
- River Raisin Watershed Council
- U. S. Environmental Protection Agency
- USEPA Great Lakes National Program Office
- Wayne County Environmental Services Division
- Wayne County Parks Division
- Kawkawlin River Watershed Association
- The Greening of Detroit
- Partnership for the Saginaw Bay Watershed
- Saginaw Bay Monitoring Consortium
- Great Lakes Commission

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Executive Summary from the March 2023 Great Lakes Restoration Initiative FY 2020 - FY 2021 Report to Congress



Section 1 – Executive Summary

The Great Lakes Restoration Initiative, or the GLRI, has greatly accelerated efforts to protect and restore the Great Lakes—the largest system of fresh surface water in the world. Since its 2010 inception, the GLRI has continued to address the historically challenging environmental problems and imminent threats facing this indispensable ecosystem.

Under the U.S. Environmental Protection Agency's (EPA's) leadership, the GLRI has been a catalyst for unparalleled coordination among the federal agencies or departments that make up the GLRI Interagency Task Force and the GLRI Regional Working Group. Through Fiscal Year (FY) 2021, GLRI has funded over 6,500 projects that focus on the most important Great Lakes environmental issues, including cleaning up highly contaminated Areas of Concern (AOCs), protecting and restoring native habitat and species, and preventing and controlling invasive species.

Section 118 of the Clean Water Act authorizes GLRI funding and directs efforts across five priority areas, including: (i) the remediation of toxic substances and areas of concern; (ii) the prevention and control of invasive species and the impacts of invasive species; (iii) the protection and restoration of nearshore health and the prevention and mitigation of nonpoint source pollution; (iv) habitat and wildlife protection and restoration, including wetlands restoration and preservation; and (v) accountability, monitoring, evaluation, communication, and partnership activities.

The five priority areas correspond directly with the Action Plan III Focus Areas described below. This report provides an overview of progress during FY 2020–FY 2021 for each Focus Area within Action Plan III.

GLRI Action Plan III Focus Areas

1) Toxic Substances and Areas of Concern

During FY 2020–FY 2021, GLRI federal agencies[1] and their partners made significant progress remediating contaminated sediment and restoring habitat in AOCs. A total of 17 Beneficial Use Impairments (BUIs) were removed, bringing the cumulative total of BUIs removed to 106, which surpasses the FY 2021 target set in GLRI Action Plan III (see Appendix A, Table A-1). Two AOCs were delisted: the Lower Menominee River and the Ashtabula River, representing the fifth and sixth U.S. AOCs ever delisted. Through the end of FY 2021, GLRI federal agencies and their partners also completed all management actions necessary for delisting at an additional three AOCs (Manistique River, Eighteen Mile Creek, and Muskegon Lake), bringing the total of AOCs either delisted or with completed management actions to about half of the original number of U.S. AOCs (i.e., 15 out of 31). The GLRI federal agencies and their partners also continued their work to protect human health from contaminants in Great Lakes fish and assess the impacts of chemicals of emerging concern on fish and wildlife populations in the Great Lakes basin.

2) Preventing and Controlling Invasive Species

During FY 2020–FY 2021, GLRI federal agencies and their partners continued efforts to prevent introductions of new invasive species and to control existing invasive species throughout the Great Lakes ecosystem. Ongoing work continued to prevent the migration of silver carp, bighead carp, and black carp into the Great Lakes. Since the GLRI began, federal agencies and their partners have taken actions to control invasive species on over 216,000 terrestrial and aquatic acres, including over 38,000 acres in FY 2020–FY 2021.

3) Nonpoint Source Pollution Impacts on Nearshore Health

During FY 2020–FY 2021, GLRI federal agencies and their partners implemented conservation activities to reduce nonpoint sources of pollution that threaten Great Lakes nearshore regions. These partners worked collaboratively to target nonpoint sources of excess phosphorus runoff that contribute to harmful algal blooms (HABs) around the Great Lakes in priority watersheds, such as the Lower Fox River, Saginaw River, and Maumee River. GLRI federal agencies estimate that GLRI-funded projects implemented since the program's inception have prevented over 2 million pounds of phosphorus (including over 500,000 pounds of phosphorus in FY 2020–FY 2021) from leaving farms and entering the Great Lakes. In addition, GLRI federal agencies and their partners worked collaboratively in urban areas to prevent about 140 million gallons of polluted stormwater from entering the Great Lakes in FY 2020–FY 2021.

4) Habitat and Species

During FY 2020–FY 2021, GLRI federal agencies and their partners protected, restored, and enhanced habitats and native species throughout the Great Lakes basin. Since GLRI began, these efforts have protected and restored over 479,000 acres (including over 37,000 acres in FY 2020–FY 2021) of coastal wetland, nearshore, and other habitats. These efforts benefit native fish, bird, and amphibian species, including actions that significantly protected and promoted recovery of the lakeside daisy and piping plover. Since the start of the GLRI, these actions have increased connectivity for aquatic organisms in more than 6,725 miles (including over 1,200 miles in FY 2020–FY 2021) of streams and rivers.

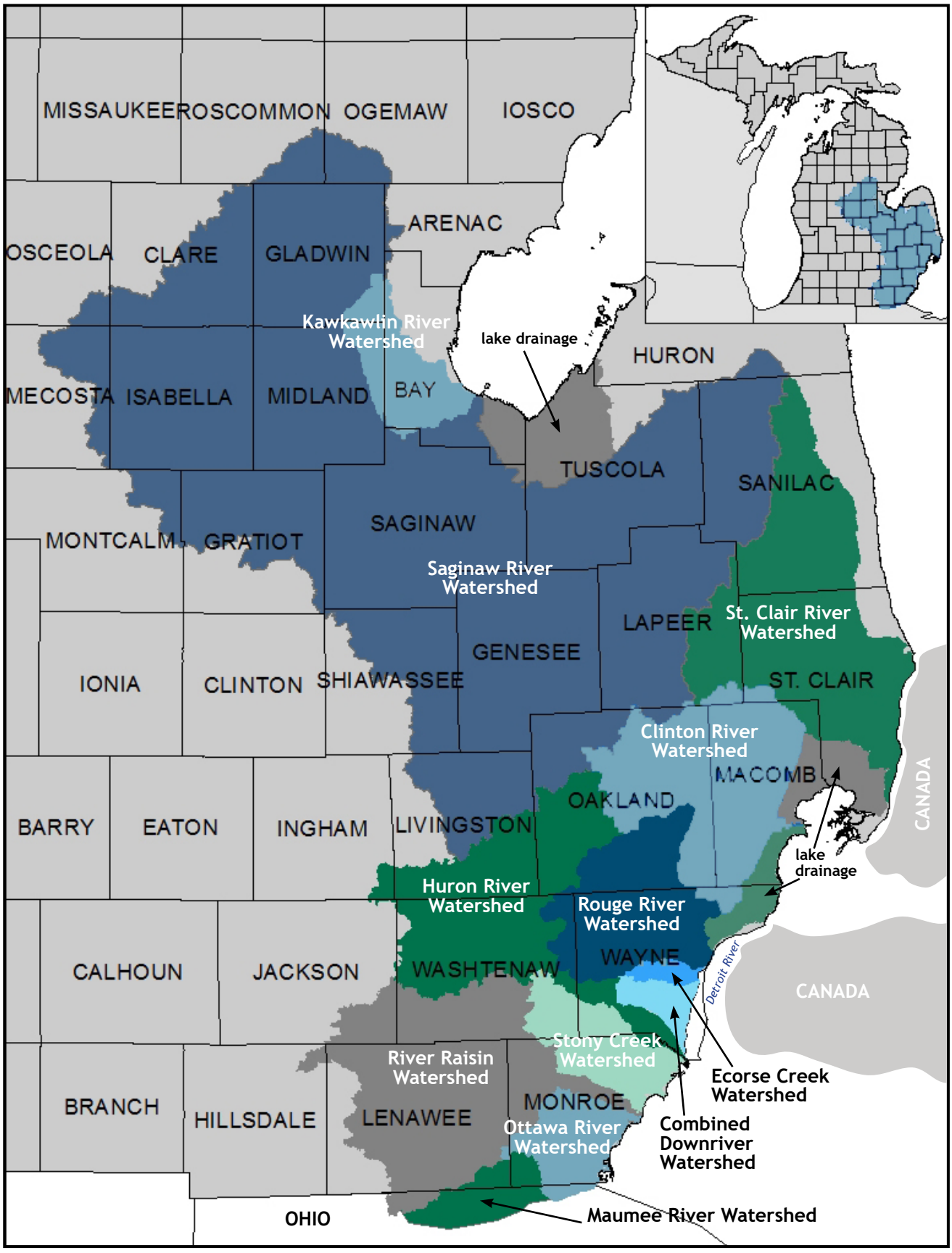
5) Foundations for Future Restoration Actions

During FY 2020–FY 2021, GLRI federal agencies and their partners engaged over 165,000 youth through hands-on education and stewardship projects. GLRI federal agencies and their partners also conducted comprehensive monitoring to assess and collect data on Great Lakes ecosystem status and trends. These data guided plans for projects addressing coastal resiliency and both nuisance and harmful algae.

[1] Includes U.S. Department of Agriculture (Animal and Plant Health Inspection Service, Natural Resources Conservation Service, and U.S. Forest Service); U.S. Department of Commerce (National Oceanic and Atmospheric Administration); U.S. Department of Army (U.S. Army Corps of Engineers); U.S. Department of Health and Human Services (Agency for Toxic Substances and Disease Registry and Centers for Disease Control and Prevention); U.S. Department of State; U.S. Department of Homeland Security (U.S. Coast Guard); U.S. Department of the Interior (Bureau of Indian Affairs, U.S. Fish and Wildlife Service, National Park Service, and U.S. Geological Survey); U.S. Department of Transportation (Federal Highway Administration and Maritime Administration; and EPA (Great Lakes National Program Office).

View the entire report here: *https://www.glri.us/sites/default/files/glri_rtc20-21_2023-03-01.pdf*

Southeast Michigan Watersheds



Everything we do on land **matters**

Everyone lives on waterfront property because everything people do on their land – no matter if it's located on a river or lake or simply dry land – ends up in one of the Great Lakes. Together with The Nature Conservancy, we created a new map of the Great Lakes, color coding every drainage basin (watershed) in our region to demonstrate that, no matter where you are located, you are in a watershed.

Thank you to the region's leaders, organizations, and businesses. Your tireless efforts support restoration of the Great Lakes that improves our communities and watersheds.



Download a high-resolution version of the map or request a free printed copy by scanning the QR code.

www.erbff.org | Follow us on Twitter @ErbFamilyFdn

Fred A. and Barbara M.
Erb Family Foundation

Alliance of Rouge Communities

The Alliance of Rouge Communities, or ARC, is a watershed alliance and 501(c)(3) non-profit organization consisting of 35 local municipalities, 3 counties (Wayne, Oakland and Washtenaw), educational institutions and stewardship groups working together to improve the Rouge River.

Founded in 2005, the ARC is funded by membership dues from local governments and supported by grants. The purpose of the ARC is to provide an institutional mechanism to encourage watershed-wide cooperation, mutual support to meet water quality requirements mandated by the state's stormwater permit and restore the Rouge's beneficial uses.

Relating to habitat specifically, the ARC has administered approximately 10 GLRI grants in the last 5 years totaling more than $19 million and resulting in 16 habitat restoration projects. These projects will create over 100 acres of newly restored wetland, wet prairie, in-lake, and riparian habitat; 80 acres of reforestation; and restoration of over 3,200 linear feet of stream. In addition to improving the water quality in the Rouge River, the projects feature inter-related supporting components: creation of floodplain riparian habitat reconnected to stream systems; restored stream systems with barriers and channelization removed; and related ecosystem improvements to restore habitat for fish and terrestrial wildlife.

Stormwater permit activities conducted by the ARC include the development and implementation support of collaborative plans required by the permit:

- **Public Education/Participation:** Develop webinars, presentations and social media posts for the residents; provide watershed education through brochures, giveaways and billboard campaigns; distribute tree seedlings, black-eyed susan seeds to schools and residents; and ensure public can view/ comment on stormwater management plans.



- **Illicit Discharge Elimination Program:** Train municipal staff on pollution prevention good housekeeping and how to identify illicit discharges; complete water quality monitoring to identify illicit discharges, gauge the health of the river and identify areas for illicit discharge investigation; and coordinate and conduct illicit discharge elimination efforts that have successfully eliminated millions of gallons of sewage from the river.
- **Total Maximum Daily Load:** Complete water quality monitoring for *E. coli*, total suspended solids, and dissolved oxygen to assess pollutant levels in the watershed and identify areas for future improvement.

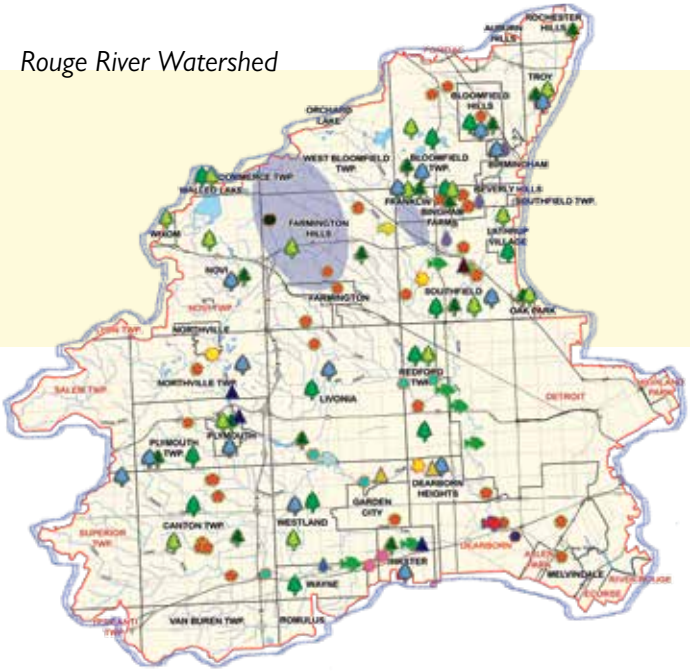
Contact Information:
Alliance of Rouge Communities
46036 Michigan Ave., Suite 126
Canton, MI 48188
Phone: 734-768-2180

Website: www.allianceofrougecommunities.com

Chair: Doug Moore
Email: dmoore@livonia.gov
Phone: 734-466-2617

Executive Director: John O'Meara, P.E.
Email: jomeara@allianceofrougecommunities.com

Rouge River Watershed



** Area Of Concern (AOC) project which benefits entire watershed & is a designated project to remove BUIs and eventually delist the Rouge as an AOC*

BLACK TEXT - ARC Members *RED TEXT - Non ARC Members*

Tamarack Creek & Johnson Creek Fish Hatchery

Southfield, Northville, & Northville Twp., MI

FUNDING SOURCE: U. S. Environmental Protection Agency (USEPA) Great Lakes Restoration Initiative (GLRI)

ENTITY RECEIVING FUNDING: Alliance of Rouge Communities (ARC)

BUDGET: Design - $583,220, Implementation - $3.4 Million

START/END DATE: 2018 - 2023

Implementation has been completed on the Tamarack Creek and Johnson Creek Fish Hatchery habitat restoration projects. These projects addressed the Rouge River Area of Concern (AOC) through a USEPA GLRI grant to the ARC, in partnership with City of Southfield, City of Northville, and Northville Township. The project resulted in 1,950 linear feet of stream restored and 4.6 acres habitat area restored at Tamarack Creek and 1,250 linear feet of stream restored and 0.5 acres habitat area restored at Johnson Creek.

Tamarack Creek receives uncontrolled stormwater runoff from a large portion of its drainage area resulting in erosion from excessive channel velocity associated with peak flows. Bank erosion was leading to excessive sediment loading and sedimentation of instream habitat. Sedimentation was also exacerbated by nonpoint sources of sediment delivered to Tamarack Creek via stormwater. Excessive channel velocity was destabilizing large woody debris and gravel/cobble substrates that are important to fish and macroinvertebrate habitat.

To address the habitat impairments, restoration of Tamarack Creek was completed in conjunction with wetland restoration which improved hydrology and in-stream flows, repaired wetland hydrology, managed invasive species, and diversified the flora through native plantings. Stream restoration increased channel and habitat stability by altering the channel cross-section. Streambank grading created a two-stage channel capable of conveying flood flows on stable flood terraces adjacent to the channel. Native plant communities were established along both sides of the channel and on floodplain terraces following construction. Rock riffles were installed in the creek bottom to stabilize the streambed and create habitat diversity. Trees cleared from the corridor for construction were used in large woody debris complexes.

Fish and wildlife habitat associated with Johnson Creek had been lost and impacted by sedimentation, loss or conversion of riparian vegetation, and streambank armoring (concrete walls), reducing its viability as a cold-water fishery; the only remaining cold water fishery in the Rouge River. A spring-fed pond, which flows into Johnson Creek, had been degraded by sediment-laden stormwater runoff from the unimproved parking lot at Fish Hatchery Park. In addition, the earthen wall separating the pond from Johnson Creek was failing. In time, it was understood that the wall would collapse, eliminating the potential cleansing properties of the pond and transferring the accumulated sediment into the creek. Streambanks in the park had been impacted by the removal of native vegetation and the lining with concrete.

To address the ecosystem issues accumulated sediment was removed from the pond to create deeper pools and a bioswale was installed to improve the quality of runoff. The outlet of the pond was modified to create a fish passage channel between the pond and the creek. The concrete wall lining the creek was removed and the streambanks naturalized.



Native plantings flourish along the restored Johnson Creek



Improved floodplain connectivity along the restored Tamarack Creek

Reducing Runoff in the Rouge River AOC

Rouge River Watershed, MI

FUNDING SOURCE: U. S. Environmental Protection Agency (USEPA) Great Lakes Restoration Initiative (GLRI) U. S. Department of Agriculture (USDA) Forest Service

ENTITY RECEIVING FUNDING: Alliance of Rouge Communities (ARC)

BUDGET: $168,125

START/END DATE: 2020 - 2025

In 2020 the ARC was awarded a GLRI-USDA Forest Service grant that sought to restore native trees to the Rouge River watershed. This current project will build on past Forest Service grants by intercepting a total of 1.3 million gallons of annual runoff by planting a minimum of 900 new trees and installation of 2.9 acres of green infrastructure throughout the watershed. The project is expected to treat 9.0 acres (100 trees/acre), with actual watershed coverage greater with trees throughout 16+ communities and 3 counties.

Green infrastructure design and implementation in the form of rain gardens, bio retention installation and expansion, and native plant grow zone areas will complement the tree planting efforts. This green infrastructure will increase the urban canopy and mitigate the effects of stormwater by reducing soil erosion, air pollution, and loss of habitat. The ARC has partnered with Friends of the Rouge, who will coordinate/host volunteer workdays to install plant materials within the proposed bio retention areas.

Tree planting is a priority project in The Rouge River Area of Concern (AOC) BUI Delisting Strategy (2012). In addition to the stormwater benefits, this work helps to mitigate damage done by the Emerald Ash Borer (EAB) over the past decades. The watershed is a high to medium priority area for EAB according to the State Forest Action Plan and this project addresses the plan's Issue 9: Reforestation of Urban and Ex-Urban Areas. The approach for restoration was evolved from merely improving water quality to maximizing ecological integrity within the AOC.

The ARC received three previous USDA Forest Service grants from 2012, 2014 and 2017 with the outcomes allowing 3,850 trees to be planted within the watershed. Lessons learned from previous grants was used to make this project more efficient.

The four grants combined, based on the trees species selected and using I-Tree Design analysis, result in an estimated total benefit of $35,906.49 per year from energy, carbon dioxide (CO_2), air quality, stormwater and aesthetic benefits. In addition, approximately 120,927 gallons of rainfall each year will be intercepted by the trees from the four combined grants reducing stormwater pollution.





Friends of the Rouge volunteer planting day at Plymouth Township Park

Rouge River AOC Habitat Restoration in Wayne County Parkland

Rouge River Watershed, MI

FUNDING SOURCE: U. S. Environmental Protection Agency (USEPA) Great Lakes Restoration Initiative (GLRI)

ENTITY RECEIVING FUNDING: Alliance of Rouge Communities (ARC)

BUDGET: Design - $770,000, Implementation - $5.1 Million

START/END DATE: 2019 - 2024

Implementation is in progress for the Wayne County Parkland habitat restoration projects in the Rouge River AOC. The projects were funded under a grant from USEPA GLRI to the ARC, in partnership with Wayne County. The projects consist of a variety of habitat restoration efforts in the Wayne County, Michigan park system and the Lower Rouge River corridor.

At Sherwood Park, Bell Creek Park, Lola Valley Park, and Riverview/Levan Knoll Park, portions of each park had been routinely mowed and used for active recreation, but are low-lying and experience frequent flooding. Restoration and naturalization of existing wetlands, and creation of new wetlands provides a habitat benefit while reducing maintenance needs. At each park a combination of the following activities were completed or are currently in progress: conversion of mowed turf to native vegetation; excavation for creation of new wetlands; excavation for connection of fragmented wetlands; treatment of invasive species; and native plantings including trees, shrubs, plugs, bulbs, and live stakes.

The Lower Rouge River habitat restoration project improved fish and wildlife habitat along a 6-mile stretch of the Lower Rouge River. This project created habitat for benthic organism colonization and fish habitat in the project area by removing problematic in-stream debris jams. Non-problematic logjams and large woody debris pieces will remain in place to conserve fish and wildlife habitat. Also, replanted native trees in open canopy areas of the forested corridor will significantly improve wildlife habitat within the riparian forest along the Lower Rouge River.

The completion of these projects will result in over 120 acres of new and restored wetland, riparian, wet meadow, prairie, and reforestation habitat:

- Sherwood Park Habitat Restoration - 6.8 acres of wetland/wet meadow
- Bell Creek Park Habitat Restoration - 10.0 acres of wetland/wet meadow/riparian/invasive species
- Lola Valley Park Habitat Restoration - 8.8 acres of wetland/wet meadow/prairie
- Riverview Park Habitat Restoration - 16.5 acres of wetland/wet meadow/riparian/prairie/invasive species
- Lower Rouge River Habitat Restoration - 80 acres of riparian forest habitat, 20 log jams removed for fish connectivity with 600 logs used for floodplain structural habitat



Created wetland areas at Bell Creek



Created wetland areas at Lola Valley Park

Rouge River AOC Colonial & Venoy Parks Habitat Restoration

Inkster & Westland, MI

FUNDING SOURCE: U. S. Environmental Protection Agency (USEPA) Great Lakes Restoration Initiative (GLRI)

ENTITY RECEIVING FUNDING: Alliance of Rouge Communities (ARC)

BUDGET: $1.8 Million

START/END DATE: 2020 - 2024

As water quality in the Rouge River continues to improve, the restoration at Colonial and Venoy Parks in the Lower Rouge River has built on past efforts to restore some of the damage done during the last century. Tributaries of the Rouge River have suffered from loss and impairment of aquatic habitat and increased frequency and magnitude of flood flows, primarily due to increasing urbanization within the watershed. Both parks were routinely mowed and used for active recreation. The flat river slope and the meandering channel cannot pass the large flows associated with rain events. Upstream urbanization continues to exacerbate this problem as runoff from increased amounts of impervious surfaces culminates in flooding within the river system, bank erosion, and continued habitat degradation.

Degraded areas in these parks were restored and mowed areas were converted to native habitat and floodplain restoration zones, providing more diverse habitat for birds, amphibians and pollinators, while also providing stormwater storage, and filtration to aid in the reduction of flood flows within the river system. This project resulted in:

- 9 acres of wetland habitat created or improved
- 150 feet of streambank stabilized
- 5 acres of tree plantings/reforestation
- 0.5 acres of meadow habitat created
- 4.0 acres of invasive species treated

The Colonial Park project in Inkster created wetlands in maintained lawn areas by establishing wet meadow habitat and depression wetlands to provide habitat and manage floodwater. Additionally, invasive species were managed in the proposed wetland enhancement areas. Maintained lawn areas were converted to wetlands through excavation of shallow depressions and planting of a diverse native wet-meadow seed mix. The wet meadow community contains diverse flowering forbs that provide food for pollinators. Small mammals and birds benefit by the increased habitat diversity and cover. Wetland diversity was achieved in the maintained lawn areas increase through the excavation of shallow depressions in low lying areas that store floodwater. The more diverse topography allows for increased plant diversity by creating varying hydrological conditions. Outcomes included increased wetland habitat and improved floodwater storage, water quality and increased plant diversity.

The Venoy Dorsey Park project, with sections in the cities of Inkster and Westland, had some areas in the park that were forested wetlands but many wetlands were not hydrologically connected. This project created and restored wetlands in the park by establishing depression wetlands which hydrologically connected the existing wetlands. Additionally, a section of failing streambank was stabilized using bioengineering methods. Lastly, invasive species was treated and managed in a portion of the existing riparian and wetland habitat. Outcomes included more diverse and intact riparian habitat, improved stormwater management and water quality and increased plant diversity.



Native flowers in bloom at Colonial Park



Created wetland at Venoy Dorsey Park

Rouge River AOC Habitat Restoration at Wilcox & Phoenix Lake

Plymouth, MI

FUNDING SOURCE: U. S. Environmental Protection Agency (USEPA) Great Lakes Restoration Initiative (GLRI)

ENTITY RECEIVING FUNDING: Alliance of Rouge Communities (ARC)

BUDGET: Design - Approximately $515,000, Implementation $5 Million

START/END DATE: 2022 - 2026

The ARC received grant funding from the USEPA GLRI to design habitat restoration at Wilcox Lake, Phoenix Lake, and Inkster Park within the Rouge River Watershed and in 2022 received grant funding to implement habitat improvements for Wilcox and Phoenix Lakes. The project will result in 6 acres of restored/enhanced in-lake habitat; 6.5 acres of invasive species control and approximately 6,000 cubic yards of sediment removal at Wilcox and Phoenix Lake.

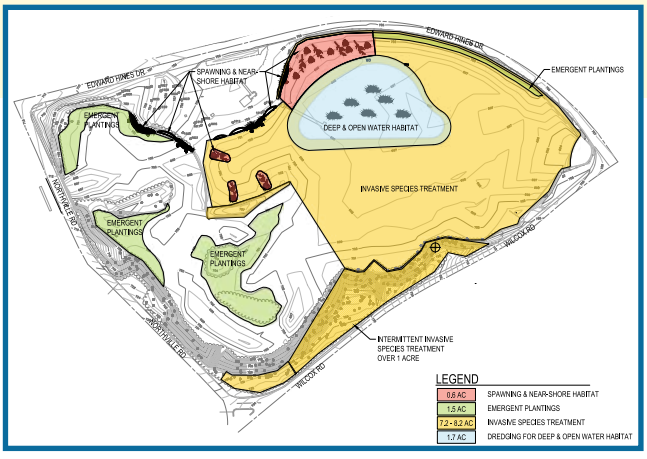
Tributaries of the Rouge River have suffered from loss and impairment of aquatic habitat and increased frequency and magnitude of flood flows, primarily due to increasing urbanization within the watershed. The flat river slope and the meandering channel cannot pass the large flows associated with rain events. Upstream urbanization continues to exacerbate this problem as runoff from increased amounts of impervious surfaces culminates in flooding within the river system, bank erosion, and continued habitat degradation.

Project goals at Wilcox Lake are to enhance the in-lake and riparian habitat at the site through:

- Removal of sediment and re-shaping of the lake to create habitats for fish spawning, nursery, and cover habitat.
- Restoration of aquatic benthic substrates submerged and emergent aquatic vegetation and riparian habitat. New substrates to include sandy gravel, cobbles, and boulders to provide spawning areas, attachment points, and cover for fishes, insects and fauna.
- Placement of woody debris along the shoreline to increase habitat diversity. Boulder clusters will be added offshore to add cover and feeding areas.
- Conducting invasive species management and planting of native shrubs and trees.
- Improvements to reduce direct non-point source pollution with bioswales and native plants.

Project goals Phoenix Lake are to enhance the in-lake habitat value through:

- Installation of new substrates that include sandy gravels, cobbles, and boulder clusters providing spawning substrate, attachment points, and cover for fishes, insects, crustaceans, and fauna. Submerged, emergent, and floating aquatic vegetation will be planted in shallow water to create lacustrine wetland habitat for waterfowl feeding, fish spawning and nursery habitat, and nutrient sequestration.
- Placement of woody debris along the shoreline and placed offshore to increase habitat diversity. Boulder clusters will be added offshore to add cover and feeding areas.



Wilcox Lake Concept Plan



Existing conditions at Phoenix Lake

Rouge River Advisory Council

The Rouge River Advisory Council (RRAC), formerly the Rouge River Remedial Action Plan (RAP) Advisory Council, was founded in 1993 to advise the Rouge River Remedial Action Plan Team on RAP issues. Work on "The Rouge River Strategy" was started in October 1985. It later became the Rouge River RAP, and was completed and adopted by stakeholders in 1989. The RAP describes actions needed to clean up and preserve the Rouge River. The mission of the RRAC is to assist in the attainment of the goals of the RAP by enhancing public awareness and education concerning RAP issues, providing a mechanism for the participation of all interested parties, seeking broad-based support for the RAP, assisting in implementation of the Rouge RAP, and evaluating progress toward the goal of restoring designated uses and delisting the Rouge River watershed as an Area of Concern (AOC).

Responsible for advising the Michigan Department of Environment, Great Lakes, and Energy (EGLE) on the update and implementation of the Rouge RAP, the RRAC formed a number of subcommittees to deal with more specific issues such as habitat destruction, nonpoint source pollution (such as stormwater runoff), on-site sewage disposal, public education, contaminated sites, and headwater land use. They also act as liaison with the public at large and with interest groups to ensure that there is adequate public participation in the RAP process.

In 2008, the RRAC developed the Delisting Targets for Fish and Wildlife Habitat & Population Beneficial Use Impairments (BUIs) for the Rouge River Area of Concern (Delisting Document). Since that time, RRAC continues to support and advocate for activities in the Rouge AOC that will benefit the AOC and the large population within it boundaries. RRAC is a visible member at the annual AOC and SPAC meetings, sharing its lessons learned. RRAC focused time and effort on developing the final management action Rouge AOC Habitat Project list for the removal of the Habitat BUIs that was approved by EGLE and USEPA in 2018. In 2022 the RRAC Bylaws were updated to better serve the mission and goals of the RRAC. RRAC is currently focused on expanding membership to continue to provide a place for interested parties to get involved in the RAP process.

Contact Information:
Rouge River Advisory Council
c/o Alliance of Rouge Communities
46036 Michigan Ave., Suite 126
Canton, MI 48188

Website:
www.allianceofrougecommunities.com/rrac.html

RRAC Chair: Marie McCormick
Email: rrac@allianceofrougecommunities.com

RRAC Vice-Chair: Dan Ballnik
Email: dcballnik@gmail.com

SPAC Representative: Bill Craig
Email: envirowhc@yahoo.com

Area of Concern Coordinator: Jennifer Tewkesbury
Email: tewkesburyj@michigan.gov



RRAC Website



Volunteers conducting a bug hunt on the Rouge River

Rouge River Watershed Initiatives

Rouge River Watershed, MI

FUNDING SOURCE: GLRI, Michigan Department of Environment, Great Lakes, and Energy Areas of Concern Program

ENTITY RECEIVING FUNDING: Alliance of Rouge Communities (ARC)

BUDGET: $154,500

START/END DATE: 2022 - 2025

Rouge River Advisory Council (RRAC) Facilitation

Alliance of Rouge Communities (ARC) staff facilitate and support the activities of the RRAC. This includes:

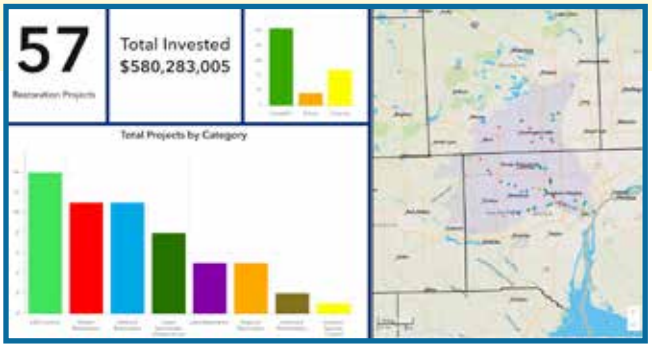
- General business activities including the support and facilitation of RRAC meetings, maintaining the RRAC website and develop additional content to the website based on the habitat work being done within the AOC, and conducting other administrative duties of the RRAC.
- Continued development of Area of Concern (AOC) habitat project descriptions/lists as needed by EGLE and USEPA. The RRAC formally developed the Rouge River AOC Habitat Restoration Projects List. This list includes projects that have been completed and ones that will need to be completed in order to achieve the associated goal of fish and wildlife habitat and fish and wildlife population's beneficial use impairments (BUI) removal.
- An interactive dashboard was developed under a previous grant. This dashboard, found on the RRAC's website (follow QR code), allows for an easy understanding of the location and status of projects and supports watershed restoration, in an easy-to-understand geospatial format for use by the general public and agencies. The dashboard takes a comprehensive view of watershed restoration efforts. This will continue to be maintained and updated with projects that are happening.

RRAC Business & Monitoring

Friends of the Rouge (FOTR) provides the following activities for the RRAC:

- PAC Business including social media support boosting AOC projects happening in the Rouge River watershed.
- RRAC member targeted recruitment, skills matrix, asset mapping and development of recruitment welcome package.
- Coordination with SPAC EJ-DEI subcommittee to implement EJ-DEI goals into the Rouge PAC.
- Develop of QAPP for benthic macroinvertebrate monitoring and fish surveys.
- Conduct fish sampling using seine nets at 20 sites in the spring/summer 2023, 2024, 2025. Analysis of the fish community and how it relates to restoring the fish BUIs.
- Conduct benthic macroinvertebrate monitoring with trained volunteers and staff to collect benthic macroinvertebrate data at a minimum of 25 stream sites in the Spring and Fall of 2023, 2024, 2025.
- Prepare report for all monitoring data.

scan to view project dashboard



RRAC project dashboard



FOTR staff conducting fish sampling

Wayne County Environmental Services Division & Parks Division

The mission of the Wayne County Department of Public Services (WCDPS) is to provide roads, buildings and park maintenance services; recreational opportunities; as well as high quality, cost-effective storm water, wastewater, and solid waste services to Wayne County residents, municipalities, businesses and visitors so they can experience safe, convenient and reliable travel, abundant recreational opportunities, proficient and well-managed drains and environmentally sound solid waste disposal.

The WCDPS Parks Division (WCP) and the Environmental Services Division (ESD) have been collaborating, together with the Alliance of Rouge Communities (ARC), the Alliance of Downriver Watersheds (ADW) and SEMCOG as well as other municipal and non-profit partners (e.g. FOTR, FDR, HRWC) to restore and protect the land and water resources in Wayne County and the region. Wayne County was the grant recipient and WCDPS staff managed the County's Rouge River National Wet Weather Demonstration Project, a 20+-year national demonstration of the watershed approach to pollution control and natural resource management. Wayne County DPS staff have participated in the Rouge AOC's Public Advisory Council (PAC), the Rouge River Advisory Council (RRAC) since its formation, and coordinates Wayne County's current GLRI grant projects.

WCDPS works to protect and restore Wayne County's rivers, lakes, streams and the parks through the advancement of a holistic management approach to protect the region's natural heritage and provide outdoor recreational and educational experiences that inspire a personal connection with our natural areas and recreational amenities. This includes working in partnership with communities, businesses, residents and others to reduce discharges of stormwater, combined sewer overflows (CSOs), and sanitary sewer overflows (SSOs) to the County's waterways. Activities include detection and correction of illicit sewer connections, public education, sanitary sewer operations, soil erosion and sedimentation control, drains maintenance, Parks planning, design and maintenance as well as habitat protection and restoration efforts. The WCP vision is to be the conservation leader of a vital, active, nature-based community that encourages wise recreation uses of our park lands for the general welfare of the public.

Contact Information:

Patrick Cullen
Director, Environmental Services Division
County Deputy Drain Commissioner
Wayne County Department of Public Services
3600 Commerce Court, Building E
Wayne, MI 48184
Email: pcullen@waynecounty.com
Phone: 734-326-4437

Alicia Bradford
Director, Parks Division
Wayne County Department of Public Services
33175 Ann Arbor Trail
Westland, MI 48185
Email: abradford@waynecounty.com
Phone: 734-261-1990

Website:

Environmental Services Division:
https://www.waynecounty.com/departments/environmental/home.aspx

Parks Division:
https://www.waynecounty.com/departments/publicservices/parks-recreation.aspx



Wayne County Green Schools tree planting at Commerce Elementary School



ESD staff assisting volunteers with FOTR bug hunt

Henry Ford Estate Dam Fishway

Dearborn, MI

FUNDING SOURCE: U. S. Environmental Protection Agency (USEPA) Great Lakes Restoration Initiative (GLRI)

ENTITY RECEIVING FUNDING: Wayne County Department of Public Services (WCDPS)

BUDGET: $4.04 Million

START/END DATE: 2016 - 2023

The Henry Ford Estate (HFE) Dam is located 8 miles upstream of the Rouge River's confluence with the Detroit River. It is the first dam on the Rouge River upstream from the Great Lakes system. Therefore, providing fish passage at the HFE Dam has been identified by the Rouge River Advisory Council (RRAC) as one of the highest priority projects within the watershed to address the habitat and population BUIs within the AOC.

The primary goal of the project was to restore and improve fish and wildlife habitat to promote healthy populations of desirable native fish, wildlife and benthos populations within the Rouge River Watershed. The Project objectives were to:

- Construct passage around the HFE Dam and hydrologically reconnect the Rouge River and its tributaries to the Great Lakes system.
- Create riparian corridor along both sides of the fish passage channel and along the west bank of the Rouge River.
- Optimize passage characteristics (depth, velocity, discharge) during the spring migration season (March through May).
- Contain quality aquatic habitat for wildlife, aquatic insects, crayfish, and fish.
- Control invasive species through implementation of integrated pest management strategies and best management practices.

To achieve these objectives a natural channel fishway was constructed as follows:

- Channel slope of approximately 0.8% and length of 850 feet.
- 20-foot wide, two-stage flood channel constructed of native stone and cobble with a series of riffles and pools to create deep water habitat, shorten high velocity flow fields, dissipate energy, and increase habitat diversity.
- The fishway channel banks and floodway over-bank areas and slopes were planted with a variety of grasses, forbs, shrubs, and trees to establish native vegetation that provides habitat, shades the fishway, stabilizes the banks, and reduces flow velocity.

The outcome of the HFE Fishway Project reconnects approximately 44 river miles and 123 miles of Rouge River tributary stream to the Great Lakes system. This provides passage for native fish species such as walleye, white sucker, gizzard shad, channel catfish, white bass, smallmouth bass, smallmouth bass, largemouth bass, rock bass, northern pike, emerald shiner and spotted sucker, as well as for nonnative, stocked steelhead and chinook salmon. This access, to upstream spawning area, has not existed for over 100 years. The HFE Fishway also provides a natural channel for improved habitat diversity within the passage channel for macroinvertebrates, mussels, and other aquatic life as well as provides improved riparian corridor habitat with the planting of native grasses, forbs, shrubs, and trees.



Fishway channel construction



Fishway channel nearing completion



Completed fishway looking downstream

Nankin Lake Restoration

Livonia, MI

FUNDING SOURCE: U. S. Environmental Protection Agency (USEPA) Great Lakes Restoration Initiative (GLRI)

ENTITY RECEIVING FUNDING: Wayne County Department of Public Services (WCDPS)

BUDGET: $3.5 Million

START/END DATE: 2016 - 2023

Over the years, Nankin Lake, an impoundment located in Livonia, Michigan, along the Middle Branch of the Rouge River, had slowly filled in with sediment. Due to this buildup, the lake was very shallow and had visible depositional areas and islands, decreasing the total acreage of water and habitat present by approximately 1.5 acres. Sedimentation had also degraded shallow water habitat in the littoral zone. Invasion of phragmites and narrow-leaf cattail had further degraded the aquatic habitat. Overall, fish productivity and the carrying capacity of the lake had declined dramatically. As a result, the Nankin Lake Restoration Project was a priority project for the Rouge River AOC as approved by the Rouge River Advisory Council (RRAC) to address the fish and wildlife habitat and population-related, beneficial use impairments (BUIs). The Project restored the ecosystem services of the lake by providing valuable spawning, nursery, and forage habitat for fishes and other aquatic species of all life stages. Restoration project elements included:

- Removal of 35,000 yds^3 of sediments from within the lake and re-shaping of the reservoir basin morphology to create more open water area, shallow water habitats, littoral zone aquatic bed wetlands, structured drop-offs, and over-wintering deep water habitat.
- Diversification of the aquatic benthic substrates through the addition of new substrates including sandy gravels in strategic locations to provide spawning substrate, attachment points, and cover for fishes, aquatic insects, crustaceans, and other aquatic fauna.
- Planting native submerged, emergent, and floating aquatic vegetation in shallow water areas around the lake to create habitat for waterfowl feeding, fish spawning and nursery habitat, and nutrient sequestration within the lake.
- Woody debris in the form of felled trees placed offshore to increase habitat diversity and provide cover for forage fish and spawning fish, basking sites for waterfowl and turtles, and attachment surfaces for aquatic insects. Boulder clusters were also added off-shore for spawning fish that require deeper water, and to add cover for small fish, and feeding areas for adult fish.
- Riparian habitat was accomplished through implementation of invasive species management within the lake/riparian corridor (approximately 50-foot on the north and south shorelines). Target invasive species included buckthorn, honeysuckle, autumn and Russian olive, privet, Siberian elm, tree of heaven, and garlic mustard. In addition, native fruit- and nut-bearing shrubs and trees were planted.
- Improvements to impervious surfaces to reduce direct non-point source pollution to the lake were also implemented. This included vegetative upland buffers (no-mow zones) and bioswales near the parking lots to collect and filter surface drainage.

To enhance the park site, additional amenities were added with funding from a Wayne County park millage. These included a bike rack, bike service station, kayak rack, and kayak launch and dock. Recreators were eager to get back into the park once construction activities were completed.



Sediment removal in progress



Completed rock shelf in use

Shaping the Future of the Great Lakes



Environmental Consulting & Technology, Inc. (ECT) is a water and natural resource management consulting firm that leads policy, planning, and implementation projects across the Great Lakes basin. We've established close working relationships with public and citizen advisory councils in the Areas of Concern (AOC) and offer strong technical capabilities, committed staff, and proven experience executing Great Lakes Restoration Initiatives (GLRI) projects.

ECT serves as trusted advisors to many local communities, nonprofits and other NGOs, as well as state and federal agencies. Leveraging opportunities presented by the GLRI, ECT staff assists our clients on habitat restoration projects.

Our staff assists stakeholders and the public with delisting targets and restoration blueprints for AOC located in Minnesota, Wisconsin, Illinois, Indiana, Michigan, and Ohio. ECT also serves as part of Jacobs team under contract to the U.S. Environmental Protection Agency on the Superfund Great Lakes Architect and Engineering Services (SFGLAES & GLAES II) contract vehicles.

ECT EXPERIENCE

- Ecosystem habitat restoration
- Wetland/avian/bat/fish assessments and studies
- Development of natural resource restoration policy/planning
- Hydraulics, hydrology & water quality modeling
- Green stormwater infrastructure & low impact design
- Grant assistance
- NPDES stormwater compliance

$200M+

GRANT FUNDS ECT HAS SECURED FOR CLIENT PROJECTS

30+

GLRI HABITAT RESTORATION PROJECTS IN SOUTHEAST MICHIGAN



Celeron Island Restoration



Nankin Lake Restoration



Henry Ford Estate Dam Fishway



Oxbow Restoration

CONTACTS

Ecosystem Restoration Director
John O'Meara, PE
734.740.7000
jomeara@ectinc.comv

Natural Resource Director
Tom Stanko
678.229.7789
tstanko@ectinc.com

Ecosystem Ecologist
Marty Boote
734.478.2589
mboote@ectinc.com

Landscape Architect, Operations Director
Jason Cooper, PLA
630.640.2163
jacooper@ectinc.com

Great Lakes Offices Ann Arbor, Detroit, Bay City, Lansing & Traverse City, MI | Lombard, IL | Columbus & Northfield, OH

ECT
> ectinc.com

Experts on subjects that matter

Friends of the Rouge

Friends of the Rouge (FOTR) is an environmental non-profit organization whose mission is to restore, protect, and enhance the Rouge River watershed through stewardship, education, and collaboration. FOTR envisions a future where a clean and vibrant Rouge River is the center of our community; where individual and community actions protect and improve the health of the Rouge River, assuring that its natural, economic, and recreational value enhances the quality of life in the Rouge River ecosystem. The entire Rouge River watershed is an Area of Concern located in metropolitan Detroit, Michigan.

Since 1986, FOTR has been encouraging Rouge River Watershed community members to take action and become directly involved in cleaning up and restoring their rivers. FOTR stands at the forefront of providing residents of the Rouge River Watershed with the opportunity to achieve a sense of "ownership" of their local streams, as well as the Rouge River as a whole. With multiple education and stewardship programs, the FOTR has engaged over 80,000 public volunteers and educated over 100,000 students in the watershed.

FOTR meets their mission through a variety of public engagement, education and stewardship activities, programs and approachable materials that aim to provide effective, accessible and inclusive outreach and engagement opportunities. These include a snapshot of the following programming:

1. Education Programs - including the Rouge Education Project, legislative outreach, and many public education and outreach events and marketing campaigns.
2. Restoration Programs - including Rain Gardens to the Rescue, Master Rain Gardner Certification, Rain Gardens 101, RainSmart, consultations/fee-for-service, and contract work.
3. Monitoring Programs - includes stonefly search, fall and spring bug hunts, fish monitoring, Rouge Frog & Toad Listening Survey and aquatic invasive surveys (European frog bit, and red swamp crayfish), emerging contaminant research (PFAS in fish), and culvert inventories.
4. Recreation Programs - includes the Lower Rouge River Water Trail, bisection of blueways and greenways in the Rouge, hosting bike, paddling and walking tours, and other outdoor recreation marketing campaigns.
5. Advocacy - includes consideration of various environmental issues or legislation that protects or harms the Great Lakes and the Rouge river. Increasingly weaving in environmental justice issues in regard to overall programming as a priority.



FOTR open water birding paddle trip

FOTR proudly serves as a trusted local clearinghouse for information about the Rouge River, readily collaborates with other organizations on projects and research, and actively promotes equitable access to recreation on the river.

Contact Information:
Friends of the Rouge
650 Church St., Suite 209
Plymouth, MI 48170

Website: www.therouge.org

Executive Director: Marie McCormick
Email: mmccormick@therouge.org
Phone: 734-927-4900

Restoration Manager: Cyndi Ross
Email: cross@therouge.org
Phone: 734-927-4905

Watershed Ecologist: Sally Petrella
Email: spetrella@therouge.org
Phone: 734-927-4904



FOTR team

Monitoring Program

Rouge River Watershed, MI

FUNDING SOURCE: U. S. Environmental Protection Agency (USEPA) Great Lakes Restoration Initiative (GLRI) through Alliance of Rouge Communities (ARC), Michigan Department of Environment, Great Lakes and Energy (EGLE), U. S. Fish & Wildlife Service, Michigan Department of Natural Resources (MDNR), Michigan Invasive Species Grant, Michigan Association of Environmental Professionals, Waste Management, Bosch Community Foundation

ENTITY RECEIVING FUNDING: Friends of the Rouge (FOTR)

BUDGET: $200,000 annually

START/END DATE: 2001 - ongoing

Friends of the Rouge (FOTR) has been monitoring the Rouge River watershed for 25 years, developing and maintaining programs to meet the changing needs of the community including monitoring the success of Great Lakes Restoration Initiative projects. Biological indicator species are a focus for much of the monitoring as the ability for these organisms to thrive in the system reflects the long term health of the river and its ecosystem. FOTR engages local residents in collecting the data when at all possible as this has the added benefit of developing environmental stewardship. These community volunteers are provided with training and support to ensure that high quality reliable data can be shared and submitted to the local and state communities and regulatory agencies. FOTR monitors benthic macroinvertebrates, calling amphibians and fish communities.

Over the past few years, FOTR has expanded the monitoring to include invasive species, fish contaminants and culvert inventories, all due to local need and through partnerships. FOTR began surveying local waterbodies for the invasive aquatic plant European frogbit in 2020 and red swamp crayfish in 2023 in response to a request for more monitoring of recent invasions in the Rouge River watershed from the state of Michigan. In 2022, FOTR began engaging local anglers and the FOTR fish survey team in collecting fish for PFAS testing in partnership with the Ecology Center and Wayne State University. In 2023, FOTR began an inventory of road/stream crossings on the Lower Rouge River using the Great Lakes Road Stream Crossing Inventory protocol and app in response to a Michigan Department of Natural Resources request.



Volunteers at the FOTR Stonefly Search



River Science participants

Lower Rouge Reforestation

Lower Rouge River, MI

FUNDING SOURCE: U. S. Environmental Protection Agency (USEPA) Great Lakes Restoration Initiative (GLRI)

ENTITY RECEIVING FUNDING: Alliance of Rouge Communities (ARC)

BUDGET: Grant amount - $5.1 Million; FOTR contracted amount - $136,730

START/END DATE: 2019 - 2024

Friends of the Rouge (FOTR) has worked to inform and involve residents of Southeast Michigan about threats to the health of the Rouge River and actions that can be taken by individuals to minimize threats and improve river conditions as well as protecting and improving critical habitat for people and wildlife to enjoy. Research overwhelmingly supports health benefits associated with human connections to nearby nature in urban and suburban neighborhoods. Green infrastructure practices such as rain gardens and tree plantings help reduce flooding and the transport of pollutants to the Rouge River while providing people with connections to nature in their own backyards or in their community.

Through the GLRI-funded Rouge River AOC Habitat Restoration in Wayne County Parkland project, awarded to the Alliance of Rouge Communities, FOTR was contracted to complete the Lower Rouge reforestation. FOTR engaged 621 volunteers who contributed 2,350 hours to support the installation of 13,000+ bare-root tree seedlings across an 80 acre stretch of corridor along the Lower Rouge River in Southeast Michigan. Nine species of trees were added to diversify the riparian floodplain and upland areas in the Lower Rouge Parkway from Canton to Dearborn during the spring of 2022 and 2023. Forty-two (42) workdays have been organized to complete the work to date. Additional work days will be held to install weed mats and to monitor the seedlings survivability rate.

The public has been very receptive to planting trees in the Parkway. Individuals of all ages and demographics, families, university students, K-12 school groups and corporate volunteers have participated. Many people participated for multiple workdays. The news media were also attracted to the project. Multiple news stories aired on Fox 2 and WXYZ newscasts.



Boy Scout Troop #647 stop for a quick pic while planting trees in Inkster



University of Michigan-Dearborn students help plant trees along the Lower Rouge River

Rouge Recreation & Access: Blueways & Greenway Development in an Urban Watershed

Rouge River Watershed, MI

FUNDING SOURCE: Ralph C. Wilson Jr. Foundation, Community Foundation for Southeast Michigan, National Kidney Foundation, Center for Disease Control, Gilbert Family Foundation, Marathon Foundation, MDNR Trust Fund, ARAPA Funding and Congressional Appropriations

ENTITY RECEIVING FUNDING: Friends of the Rouge (FOTR)

BUDGET: $3 Million

START/END DATE: 2003 - ongoing

Friends of the Rouge is committed to creating meaningful and equitable access to the greatly restored Rouge River. FOTR is spearheading the community-led effort to establish a water trail and network of connected greenways on the Lower Branch of the Rouge River. The 29-mile Lower Rouge River Water Trail connects 10 cites and intersects with Wayne County Parks' assets. The Rouge Gateway Greenway will parallel the water trail and extend from the University of Michigan Dearborn, to Fort Street Bridge Park in Detroit. Friends of the Rouge's trails vision is part of a larger network of blueway and greenway trails that includes the Iron Belle Trail, Joe Louis Greenway, Downriver Linked Greenways, and the Great Lakes Way.

FOTR began paddling the Rouge in 2003 as interest in reclaiming the Rouge for recreation and enjoyment grew due to improving river health conditions. The Water Trail Strategic Plan, developed in 2019, incorporates community-informed recommendations for capital improvement, and fosters the development of key relationships, and coalitions that provide a vehicle for ongoing community engagement and ownership.

The Lower Rouge Water Trail Leadership Committee is the vehicle that connects people and communities to this vision to be champions in their community to do the heavy lifting to advance built environment projects. FOTR chairs the Lower Rouge Water Trail Leadership Committee, and the committee includes Municipalities, community organizations, businesses, passionate individuals, and Wayne County Parks. Much of the trail runs through Wayne County property. The committee meets bi-monthly and leverages its collective resources and capacity, to seek state, federal, and private grant funding to advance this effort.

FOTR coordinates paddle trips, promotional and educational events, and meets people where they are to uplift the community and health benefits of trails. Blueways and greenways can help improve health and quality-of-life by providing places for exercise, recreation, and community gatherings. Through the trail's lens, people and communities are the beneficiaries of our collective restoration, monitoring, and education efforts. The goal is to restore this undervalued asset back to the people and back to communities for their recreation and enjoyment. Research shows that people are healthier when there is meaningful access to outdoor recreation and nature in their community. 8 of the 9 strategically planned trailheads with universal access launches are 100% shovel ready with several being planned for construction within the next 12-24 months.



A rendering of the multi-purpose trailhead with a universally accessible boat launch at Kessey Fieldhouse in Melvindale.



Paddlers gather on the water for the FOTR Outdoor Afro Paddle Trip on the Rouge in the City of Dearborn.

Rouge Education Project

Rouge River Watershed, MI

FUNDING SOURCE: National Oceanic and Atmospheric Administration (NOAA) Bay Watershed Education & Training Program (B-WET)

ENTITY RECEIVING FUNDING: Friends of the Rouge (FOTR)

BUDGET: $235,000

START/END DATE: 2019 - 2024

The Rouge Education Project (REP) is a 35+ year long school-based environmental education program involving elementary, middle, and high schools from across southeastern Michigan. Students learn about the Rouge River in their classroom, and then perform hands-on scientific exploration of the river on a field trip to its banks. They assess chemical, biological, and physical parameters of water quality to determine overall stream health, and report their results to FOTR. Students are further encouraged to take action to restore and protect the river based on their results.

Primary goals are to:

1. Provide opportunities for schools to engage students in hands-on, real-world science, through water quality monitoring of the Rouge River
2. Increase participants' awareness of the Rouge River watershed by showing them how they impact the river, and how its health impacts them
3. Empower participants to apply knowledge and awareness gained through the REP to identify and address environmental issues in the Rouge River watershed and beyond.

The REP is coordinated and facilitated by FOTR, who trains K-12 teachers how to monitor surface water quality through a series of workshops. Resources are provided to help them plan the Rouge River watershed unit and field trip for their classroom(s), along with monitoring equipment. The Project began its relationship with the NOAA B-WET in 2019. The goal is to provide ongoing training and support for ~30 schools annually, while building on a program framework that has been extremely successful engaging students with their local river. Throughout the course of three grants, FOTR has deepened their relationship with Earth Force, an organization that empowers youth to take action in their community based on the information they learn through monitoring their river. This allows students to make important connections between their classroom's "monitoring project", community organizations, and their local connection to the Great Lakes.

Project highlights in 2023 include:

- 4,267 students visited the banks of the Rouge River for hands-on river science
- 79 teachers trained through 19 professional development opportunities
- Seven schools new to the program
- 141 participants took 1,496 actions in our online Explore the Rouge activity
- 43 students from 3 schools participated in a Student Symposium where they interacted, shared, reflected, and explored
- Partnership with the GLOBE and NASA-hosted Aerokats & Rover Education Network, to provide new technology for additional data-collection



Students and Friends of the Rouge representatives gather around a 3D model of the Rouge River Watershed at the Student Symposium

LaNita's Pollinator & Rain Garden Pocket Park

Detroit, MI

FUNDING SOURCE: National Fish and Wildlife Foundation (NFWF)

ENTITY RECEIVING FUNDING: Friends of the Rouge (FOTR)

BUDGET: $75,000 with $20,000 in match from Mercedes Benz Financial Services

START/END DATE: 2021 - 2023

FOTR has worked to inform and engage Detroiters in stormwater management practices since 2011. This focused effort is in support of Detroit's green stormwater infrastructure initiative to reduce combined sewer overflows (CSOs) into the Rouge and Detroit Rivers through the use of rain gardens, bioswales, permeable pavers, and stormwater harvesting, rather than creating additional large-scale gray infrastructure (very expensive storage facilities and pipes). If goals of this initiative are achieved, the City and its residents will save millions of dollars in reduced construction costs needed to manage rainwater and protect local rivers.

LaNita's Pollinator and Rain Garden Pocket Park is a wonderful example of the community coming together to solve a neighborhood street flooding problem while also reducing stormwater flowing into the sewer system; creating a pocket park where neighbors can gather; providing habitat for pollinators and memorializing a pillar of the community.

LaNita was a neighborhood care-giver and mom to all. She loved the artist formerly known as Prince and butterflies. A unique and beautiful little pocket park was created in her memory. Twelve hundred (1,200) sq. ft. of pollinator gardens flank a crushed stone walking path in the shape of the Prince symbol. An 850 sq. ft. rain garden was constructed to receive runoff from 6,000 sq. ft. of roadway – keeping up to 6,000 gallons of rainwater out of the system every time it rains and preventing neighbors from having to walk through 4 – 8 inches of water just to get from their car to their home. Annually, the rain garden has the potential of preventing 116,000 gallons of rainwater from flowing into the combined sewer system. This helps to prevent CSO discharges that contain a slurry of dilute raw sewage, chemicals, oils, road salt, sediment and other pollutants from entering the Rouge and Detroit Rivers.



LaNita's pollinator garden surrounds the Prince love symbol walking path in Detroit



The rain garden in LaNita's pocket park prevents 116,000 gallons of rain water from flowing into Detroit's combined sewer system annually

Detroit River Public Advisory Council/Friends of the Detroit River

The Friends of the Detroit River (FDR) is a grass roots citizen's organization dedicated to improving the quality of life for people, plants and animals along the Detroit River and within the communities of the Detroit River watershed in southeastern Michigan and southwestern Ontario. FDR is a community-based advocacy, educational, and environmental group whose mission is to protect, defend, and improve the Detroit River through community-based stewardship and restoration, now and for future generations. Since 1992, FDR has focused on Detroit River issues and has endeavored to protect the river through grass roots activism, educational programs, environmental stewardship, research and partnerships.

The Detroit River Public Advisory Council (PAC) was established in conjunction with the Great Lakes Areas of Concern (AOC) Program to facilitate public involvement in cleanup efforts due to legacy contaminants and environmental issues. Since 2005, Friends of the Detroit River has been acting fiduciary for the Detroit Public advisory Council (PAC) who is responsible for implementing the Detroit River Remedial Plan for the Detroit Area of concern. One of the goals of the PAC is to address contaminated Legacy sediments in the Detroit River. Working closely with USEPA and EGLE the PAC has provided support, input and outreach efforts towards a number of ongoing sediment remediation projects. To date over a dozen projects have been completed or are in the process of being completed, with over 320,000 cubic yards of material remediated and approximately 4-5 million yet to be addressed.

Contact Information:
Detroit River PAC
c/o Friends of the Detroit River
20600 Eureka Rd., Suite 250
Taylor, MI 48180
Phone: 734-288-3889

Website: www.detroitriver.org

Executive Director: Tricia Blicharski
Email: tblicharski@detroitriver.org

Detroit Riverkeeper: Robert Burns
Email: rlb315@detroitriver.org

Detroit River PAC Chair: Mary Bohling
Email: river@detroitriver.org
Phone: 734-288-3889



Paddlers enjoying Humbug Marsh



Construction of Celeron Island shoals on the Lower Detroit River

Celeron Islands Habitat Restoration- Post Construction Habitat & Wildlife Improvements

Detroit, MI

FUNDING SOURCE: U.S. Environmental Protection Agency (USEPA) Great Lakes Restoration Initiative (GLRI), National Oceanic and Atmospheric Administration (NOAA)

ENTITY RECEIVING FUNDING: Friends of the Detroit River (FDR)

BUDGET: $7.5 Million

START/END DATE: 2013 - 2019

In 1815, the Detroit River shoreline included coastal wetlands up to a mile wide. Since then, the shoreline development and hardening, industrial and combined sewer contamination, and deep shipping channel excavation has destroyed all but a few acres of this life-rich environment. The completion of the Celeron Island habitat restoration project is a significant step toward removing the fish and wildlife related Beneficial Use Impairments (BUI's) in the Detroit River Area of Concern (AOC).

FDR received GLRI funding through NOAA for the Celeron Island habitat restoration project. Activities included data gathering and analysis, engineering, permitting and construction, monitoring and habitat assessment. Restoration of Celeron Island was completed in 2019.

The Celeron Island habitat restoration project created 2,800 linear feet of rock shoals that support vegetation and aquatic habitat, while protecting and promoting growth of over 68 acres of backwater habitat - a calm, vegetated water zone suitable for fish spawning and nursery activity. Over 70 new habitat structures provide homes for fish, turtles, snakes and amphibians. Access to the restoration site also greatly benefit birders, anglers and hunters using the island and surrounding waters for recreation.

Since the completion of the project, post-construction habitat observations continue to be made each year, showing increased weed bed growth behind the shoals, bird and waterfowl use, and fish spawning on the gravel spawning areas installed behind the shoals.



Celeron Island before restoration



Celeron Island after restoration

South Hennepin Marsh Habitat Restoration

Detroit, MI

FUNDING SOURCE: U. S. Environmental Protection Agency (USEPA) Great Lakes Restoration Initiative (GLRI) National Oceanic and Atmospheric Administration (NOAA)

ENTITY RECEIVING FUNDING: Friends of the Detroit River (FDR)

BUDGET: $4.5 Million

START/END DATE: 2022 - 2023

Friends of Detroit River, through the implementation of the Hennepin Marsh habitat restoration project, is working to remove the beneficial use impairments (BUIs) associated with Degraded Fish and Wildlife Populations and Loss of Fish and Wildlife Habitat for this Area of Concern (AOC). South Hennepin Marsh, an emergent wetland in the Trenton Channel is one of the most important remaining habitats for fish and wildlife in Michigan waters of the Detroit River. Historically, it contained exceptional fish habitat that provides forage for shore birds, waterfowl, turtles, and amphibians. The marsh encompasses approximately 20 acres of submerged macrophyte beds that are now being protected by new habitat shoals resulting in excellent warm water fish nesting areas, in addition to new bird, reptile and amphibian habitat.

Specific considerations that needed attention during the design included: adjacent shipping routes in the Trenton Channel; site-specific hydrologic pressures and ice flow patterns; engagement with the riparian property owners along the marsh; one-on-one engagement with the property owners of which easements were required; and determination of native vegetation.

The project was completed in 2023 and constructed two habitat shoals that resulted in 1220 liner feet of new shoals. These shoals included the incorporation of 12 turtle log bundles and 6 mudpuppy structures. This has resulted in immediate use by several adult Longnose Gar using the marsh for foraging or spawning. Numerous largemouth bass have been observed including multiple active spawning nests in the open marsh and along the east side of both shoals near large woody debris. In general, the marsh and shoal habitat are being used extensively by fish and wildlife.



Aerial of Hennepin shoals just after construction



Native plants growing on the shoals of South Hennepin Marsh

Ecorse Creek Support Effort

Ecorse Creek Watershed, MI

FUNDING SOURCE: Michigan Department of Environment, Great Lakes, and Energy (EGLE)

ENTITY RECEIVING FUNDING: Friends of the Detroit River (FDR)

BUDGET: $40,000

START/END DATE: 2022 - 2023

With years of urbanization, much of the Ecorse Creek's historical floodplain and wetland areas have been filled in and lost. As a result, with substantial stormwater flows, the creek's water quality has declined, and flooding has increased. As a conduit of potential contaminated sediments, excessive stormwater and combined sewer overflow (CSO) constituents, there is clear evidence that Ecorse Creek is impacting the water quality of the Detroit River at its discharge point, and in turn is impacting the ability to remove several of the Detroit Area of Concern Beneficial Use Impairments (BUIs), which Friends of the Detroit River (FDR) and Detroit River Public Advisory Council (PAC) are working to address.

With this concern in mind, FDR worked with the Alliance of Downriver Watersheds (ADW) in developing and implementing the Ecorse Creek Watershed Management Plan. FDR received a grant through EGLE's Nonpoint Source Program to help identify and implement projects that can be done to improve water quality and coastal wetland habitat, reduce flashy flows and flooding conditions, address public access, and expand recreational opportunities on the north and south branches of the creek. FDR brought its years of habitat restoration and water quality improvement experience to help the Ecorse Creek Committee develop organizational capacity and expand its stewardship capabilities to implement what needs to be done to begin tackling many of these problems within the Ecorse Creek watershed.

The main objective for this project was the identification of potential restoration sites. This was done using a suite of environmental, social, and recreational factors determined by a variety of available data sources, holding public meetings, and conversations with community stakeholders. FDR focused on sites that will result in the creation of things such as stream bank restoration, fishery improvements, recreational access, and improvements in in-stream water quality. FDR understands the challenges that environmental justice (EJ) communities face when it comes to tackling water quality related issues due to a higher percentage of burdens that exist in these communities. To determine where these communities are located, allocate appropriate attention, and ensure proper benefits are received, FDR utilized available demographic data and EJ mapping sources to target potential restoration sites in these areas.



Aerial Confluence of Ecorse Creek into Detroit River



Flooding in Dearborn Heights from Ecorse Creek

The Greening of Detroit

The Greening of Detroit's mission is to guide and inspire the sustainable growth of a healthy urban community through trees, green spaces, healthy living, education, training and job opportunities.

The Greening of Detroit accomplishes its mission through three major programs:

- Green Infrastructure (including Community Forestry to restore the tree canopy in Detroit, Highland Park and Hamtramck)
- Workforce Development (Detroit Conservation Corps adult job training and Green Corps summer youth employment)
- Nursery Operations and Landscape Services (Tree nursery and fee for service operations)

Founded in 1989, The Greening works with many partners to transform landscapes and lives by supporting productive, multi-functional green spaces that improve the environment, provide employment opportunities, and promote social outcomes that nurture a vibrant and revitalized Detroit. Over the last 34 years, The Greening has led the collaborative effort to restore Detroit's urban forest, planting over 141,000 trees throughout the city that manage stormwater runoff to the Great Lakes, address air quality and heat island impacts, remediate soil pollutants, and mitigate for climate change. Efforts to rebuild Detroit's urban tree canopy and support residents to repurpose vacant land into healthy green spaces are supported by thousands of community volunteers each year.

Our organization works to address the needs of the most vulnerable in our community with equitable, inclusive forestry programs. The Greening serves as a key partner of the Detroit Tree Equity Partnership (DTEP), a coalition of public and private entities working to develop long-term strategies to create equitable access to trees for all city residents. As the only DTEP partner with on-the-ground expertise and experience, The Greening of Detroit is significantly expanding its core programs to take the lead role for the coalition's tree planting and urban forestry workforce training in order to support a three-fold increase in annual tree planting over the next five years, and create hundreds of new tree care industry jobs for Detroit residents.

Contact Information:
The Greening of Detroit
13000 W. McNichols
Detroit, MI 48235

Website: www.greeningofdetroit.com

President: Lionel Bradford
Email: lionel@greeningofdetroit.com
Phone: 313-237-8733 ext. 248

Vice President: Monica Tabares
Email: monica@greeningofdetroit.com
Phone: 313-237-8733 ext. 227

Director of Green Infrastructure: Fai Foen
Email: fai@greeningofdetroit.com
Phone: 313-757-0788



The Greening of Detroit's Green Corps - Summer Youth Employment Program providing maintenance to over 1,000 trees annually each summer.



The Greening of Detroit's Planting Crew Leader demonstrating tree planting techniques at Littlefield Playfield.



The Greening of Detroit's Detroit Conservation Corps graduates and planting crew.

Emerald Ash Borer Mitigation & Urban Canopy Restoration

Detroit, MI

FUNDING SOURCE: Great Lakes Restoration Initiative (GLRI), U. S. Department of Agriculture (USDA) Forest Service

ENTITY RECEIVING FUNDING: The Greening of Detroit

BUDGET: $199,930 with match of $50,860 in volunteer installation labor and $31,100 in Green Corps maintenance

START/END DATE: 2021 - 2022

The Littlefield neighborhood was identified as one of the top 20 most vulnerable census tracts lacking tree canopy by the University of Michigan in 2019. With the generous GLRI funding award, The Greening of Detroit was able to engage with residents, block clubs, and community groups to plant a total of 200 trees during four planting events in Fall 2022.

Kicking off the first two planting events were 100 community streets trees that surround Littlefield Playfield along Indiana, Kentucky, Grand River and Cloverlawn Avenue. The Greening's community engagement team worked with the Littlefield Community Association and their block club members to help identify planting locations and participate in species selections.

An additional 100 trees were planted in the park itself and with the immediately adjacent Noble Elementary school. All 200 trees were balled and burlapped (1.5" caliper). Tree species included Ivory Silk Lilac, Autumn Brilliance Serviceberry, Crabapple 'Royal Raindrops', Sweetgum, Tulip Tree, Hackberry, Swamp White Oak, Eastern Redbud, Blackgum, and American Hornbeam.

The Greening of Detroit was pleased to engage 339 volunteers and another 141 residents to help plant these trees. Collectively 500 community residents and volunteers contributed 2,000 hours of sweat equity back into the neighborhood. In addition to tree planting, Greening's team engaged the principal, teachers, and staff to engage 200+ students in environmental education.

With the completion of this 2021 GLRI award, we sought to build on our community connections and expand tree planting efforts in one of the top 20 most vulnerable census tracts in Detroit. We applied and were awarded 2022 GLRI project funds to continue working with residents and block clubs of the Littlefield neighborhood, as well as expand to the nearby Midwest neighborhood to address community tree planting applications. That project will plant 200 balled and burlapped trees (1.5" caliper) with local community groups, residents, and another local school beginning this Fall 2023.



Students participating in environmental education



Volunteers planting trees in Littlefield neighborhood

Increasing Green Infrastructure to Build Climate Change Resiliency in Southwest Detroit

Detroit, MI

FUNDING SOURCE: U. S. Fish and Wildlife Foundation, Southeast Michigan Resilience Fund

ENTITY RECEIVING FUNDING: The Greening of Detroit

BUDGET: $245,788 with match of $15,000 from Michigan Department of Natural Resources (MDNR), $85,620 in volunteer installation labor, $30,000 in Green Corps maintenance, $18,750 from Freudenberg, and $53,755 of in-kind services from The Greening of Detroit

START/END DATE: 2022 - 2023

The Southwest Detroit community is a majority-Latino community affected by high rates of poverty and public health concerns due to nearby oil and manufacturing industry and vehicle traffic pollution, with the high rates of asthma. The Greening of Detroit proposed to plant 318 new trees in six parks located in Southwest Detroit to offset the massive tree loss caused by the devastating emerald ash borer infestation during the last two decades and help to create greater tree equity in underserved neighborhoods.

Prior to the Fall 2022 and Spring 2023 planting seasons, The Greening conducted outreach to solicit community planting applications and to recruit volunteers in cooperation with long-established and new partners in the community, including Friends of Patton Park, Hubbard Richard Residents Association, Urban Neighborhoods Initiative, Cesar Chavez Upper Elementary School, Saint Hedwig Catholic Church, Southwest Solutions, and Historic Fort Wayne.

Through our community volunteer tree planting program, our team of technical tree experts and community connectors engaged with residents, block clubs, faith-based organizations, schools, and community groups to identify tree locations, choose species, and install and maintain trees. Throughout the process, The Greening's forestry staff assessed prospective planting sites for suitability, provided native and urban tolerant, non-invasive species options for a diverse and resilient urban tree canopy, and handled all the logistics of procurement and placement of balled and burlap and container tree stock, mulch, tools, and water to the planting sites for each planting day event.

Each park was the hosting site for one to two planting day events. These parks already serve as the center of recreation, respite, and celebration for their respective neighborhoods. On planting morning, volunteers arrived to register, and were provided a welcome by the community, and all instructions, tools, light refreshments, and staff support to ensure a happy, successful community tree planting. To date, The Greening has hosted 274 volunteers who have contributed 1,096 hours in planting 232 trees in the parks and the surrounding neighborhoods, with the remainder to be completed through additional planting events in Fall 2023.

The trees planted for this project will intercept 69,521 gallons of stormwater annually (per i-Tree calculations); increase tree canopy by 4.6%; sequester 93,640 pounds of CO_2; and complement and enhance park development activities currently underway, planned or needed at each site.

In October 2022, The Greening of Detroit received a $365,235 grant from the Sustain Our Great Lakes grant program to expand our tree planting program in Southwest Detroit.



Trained Citizen Foresters provide tree planting demonstration for day of volunteers.



Local students volunteer to plant at their local park.

Membership Partner

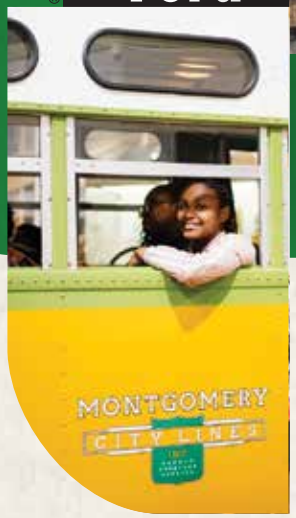
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River Raisin Watershed Council

The River Raisin Watershed Council (RRWC) was formed in 1974 under the state of Michigan's Local River Management Act and is governed by a Board of Directors appointed by member municipalities. RRWC is a public service, non-profit, 501(c)(3) organization.

The mission of RRWC is to inspire behaviors that promote stewardship, improve water quality, and encourage public participation to protect, preserve and enhance the River Raisin Watershed. The organization meets these goals by working with partners on various activities, including classroom and public education, outreach to farmers, water quality monitoring, volunteer cleanups, and encouraging recreation on the river. Through these actions, RRWC strives to promote and foster an understanding of the connection between our quality of life and the health and well-being of the plants and wildlife living in the watershed.

The RRWC applies for and participates in many grants that are available to help achieve our goals. These grants are often in partnership with other nonprofits, agencies, and businesses, all of which are eligible to become associate members. Local residents can also support the RRWC by becoming individual members. Associate and individual members contribute to the strength of the RRWC through membership dues, volunteer activities, and participation in various committees that make recommendations to the Executive Committee regarding RRWC activities.

RRWC has three full-time staff, two part-time staff, two current interns, and over 100 members, including individuals, families, nonprofit organizations, and businesses. Members come from all over southeast Michigan including the Western Lake Erie Basin. Municipal Members represent 54 of 63 potential members including cities, villages & townships.

We envision a healthy and vibrant watershed that is resilient to environmental stressors and provides benefits to its communities, businesses, and ecosystems.

Contact Information:
River Raisin Watershed Council
320 Springbrook, Suite 102
Adrian, MI 49221
Phone: 517-264-4754

Website: www.riverraisin.org

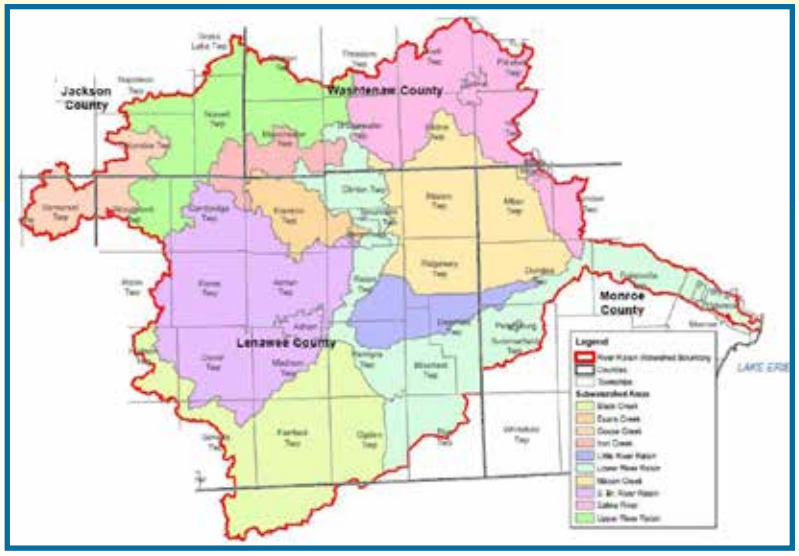
Executive Director: Steve May
Email: steve.may@lenawee.mi.us
Phone: 517-264-4754

Outreach Coordinator: Meja Knafl
Email: rrwc@lenawee.mi.us
Phone: 517-264-4754

Water Stewardship Coordinator: Lydia Lopez
Email: riverraisin001@gmail.com
Phone: 517-264-4754



RRWC staff



River Raisin watershed

Adopt-A-Stream

River Raisin Watershed, MI

FUNDING SOURCE: River Raisin Watershed Council (RRWC) Membership Dues

ENTITY RECEIVING FUNDING: River Raisin Watershed Council

BUDGET: $500 Annually, with match provided by Adrian College and Lenawee Intermediate School District

START/END DATE: 2002 - Ongoing

River Raisin Watershed Council's Adopt-A-Stream is a volunteer based programs, where community members work together to play a vital role in assessing the health of our streams and rivers through the study of macro-invertebrates, also known as aquatic bugs.

Research efforts are focused on these bugs as they are critical indicators of water quality. Different species have varying tolerances to pollution and oxygen levels, so when we find specific species dominating a stream, it provides valuable insight into its overall health. By understanding this, we can prioritize conservation efforts and allocate resources where they are needed the most.

The Adopt-A-Stream program is compromised of three key events: Training Day, Stream Search, and Bug I.D. Day. Volunteers from across the watershed come together to collect macro-invertebrates from twenty sites, helping us gauge the water quality of each location. These collections occur in both spring and fall, allowing us to assess seasonal variations.

Training Day: Volunteers meet with our team of scientists and staff to prepare for the upcoming Stream Search day. They receive valuable guidance on collection methods and safety protocols.

Stream Search Day: In this exciting event, two collectors venture into the stream at each site equipped with special nets to carefully collect the macro-invertebrates. On the stream's bank, sorters sift through the nets to isolate these bugs, placing them in jars for further analysis during Bug ID Day.

Bug ID Day: During this portion of the program, experts collaborate with volunteers to identify the macro-invertebrates up to the family level. The data is then quantified and analyzed to generate a comprehensive report that ranks each site's water quality as poor, fair, good, or excellent. This report is shared with the Michigan Department of Environmental Quality, contributing to broader efforts to safeguard our waterways.

By focusing on the fascinating world of macro-invertebrates, we gain a deeper understanding of our streams and rivers, working together to ensure a healthier, more sustainable environment for everyone.



Adopt-A-Stream bug identification



Adopt-A-Stream bug identification

Upper River Raisin Connectivity

Upper River Raisin, MI

FUNDING SOURCE: U. S. Fish and Wildlife Service (FWS), National Fish Passage Program under the Bipartisan Infrastructure Act, Michigan Department of Natural Resources (MDNR)

ENTITY RECEIVING FUNDING: River Raisin Watershed Council (RRWC)

BUDGET: $1.05 Million ($800,000 from FWS and $252,000 from MDNR)

START/END DATE: 2021 - 2024

River power in the River Raisin watershed was harnessed often during the twentieth century, with frequent dams and mills altering the original course of the river. Dams completely changed the river sediment balance. Rivers like the Raisin naturally move water and sediment to varying degrees. Dams disrupt this natural movement and act as sediment traps on one side and a force for erosion on the other.

The Brooklyn Dam is one of the remaining dams still left on the Raisin. The Brooklyn Dam is regulated by the Department of Environment, Great Lakes, and Energy (EGLE) due to its height and size of the associated mill pond. EGLE classifies the dam as a High Hazard Potential Dam, and notes that loss of life and severe impacts are expected if a dam failure were to occur. The dam was constructed in 1939 and was originally used to supply hydroelectricity for the adjacent manufacturing plant. However, it is no longer used to supply hydroelectric power.

The MDNR River Raisin Assessment highlights the importance of the high gradient reach of the River Raisin directly around the dam as being significant for the health of the river and associated aquatic life. Fish and other aquatic animals are typically most diverse and productive in high gradient habitat. The report states that only 5% of the Raisin is classified as high gradient habitat, and that habitat is only found in the headwaters and localized in Brooklyn and small reaches in Manchester and Tecumseh. Much of the high gradient habitat has been inundated by dams and their impoundments, thus eliminating this unique and productive habitat and fragmenting the river.

Modification of the High Hazard Potential dam and restoration of a functioning stable river channel, alongside replacement of Mill Street bridge and construction of natural rock rapids over Nooney Dam will permanently eliminate risk and liabilities associated with the dam, improve public safety, and restore habitat and resiliency in the river. Project activities will provide up to 44 miles of connectivity to headwater reaches of the River Raisin allowing for daily, seasonal and annual fish movement to access habitat necessary to live out their lives once completed.

The cost of doing business along the River Raisin once resulted in chronic pollution problems, but despite these historic challenges the Raisin still has many beautiful natural wonders. The mainstem of the river has some of the richest mussel beds in the state of Michigan. Twenty-one species of mussels have been identified along with eighty species of fish – most of the original fishery. High quality, mesic hardwood forests, riparian and floodplain forests, prairie fens and remnant oak barrens in the upper watershed support rare species such as the eastern massasauga rattlesnake, Blanchard's cricket frog, Indiana bat, spotted turtle and the Karner Blue butterfly. These same upper watershed areas are also among the most significant inland migratory bird stopover areas in the Western Lake Erie Basin. With projects like the Upper River Raisin Connectivity Project keeping the river and its inhabitants healthy, the natural wonders of the River Raisin will continue to enrich the lives of watershed residents for decades to come.



Mussel found near Brooklyn Dam



Farmer Led Watershed Conservation Group

Western Lake Erie Basin

FUNDING SOURCE: Fred A. and Barbara M. Family Foundation

ENTITY RECEIVING FUNDING: Michigan Association of Conservation Districts

BUDGET: $500,000

START/END DATE: 2023 - 2026

The River Raisin watershed is a major producer of corn and soybeans in the state of Michigan. Over 75% of the watershed is in agricultural production. But the River Raisin is caught in the middle of the great dilemma of modern, industrialized agriculture. The RRWC works hard to support farmer leaders who promote sustainable practices, often referred to as "Best Management Practices" (BMP's) which benefit the farmer and water quality alike.

The Farmer Led Watershed Environmental Working Group (FLC) will continue and expand farmer-led activities to increase farmer adoption of conservation practices to protect water quality in the Western Lake Erie Basin through farmer leadership to encourage neighbor action. Building upon the accomplishments of farmer leaders thus far, we will build and strengthen networks and relationships by continued focus on farmer-led leadership and expansion of efforts, targeting three specific farming sub-group audiences to increase adoption of conservation practices within the basin.

Of the estimated 1 million acres of cropland in Michigan's part of the Western Lake Erie Basin (WLEB), approximately 15% are now MAEAP verified. In order to move forward, beyond the innovators and early adopters, this project seeks to build relationships and trust to address the chasm between early adopters and the early majority. Through MAEAP, the "low hanging fruit" has been secured, the challenge now is to build understanding, support and engagement with more farmers within the basin to reach the water quality objectives set out in the Domestic Action Plan (DAP) to reduce phosphorus by 40% by 2025.

The FLC Leadership Committee has hosted a multitude of shop talks, semi-annual meetings, and recruited neighbors to engage in conversations about conservation. We learned that farmers can get meeting-ed out and that one large group meeting is a better fit for the audience and timing, instead of the semi-annual large group meetings. Having the farmers run the meetings, with conservation staff available in the back of the room led to more discussion back and forth about farmer experiences with each practice or equipment that was demonstrated. Farmer leaders represented a range of attitudes and geographic areas, and brought concerns to the table for discussion. We heard from our farmer leaders a lot about trust and relationships and learned how quickly and drastically conservation practices can change when trust is lost with a federal partner.





Farmers participating in FLC

We have learned that the experience of the farmer leaders provides outstanding insight and guidance so critical to successfully working with farmers within the watershed. Additionally, the farmer leaders are trusted community members and have been able to foster conversation and interest within the farming community, resulting in expanded understanding of the environmental issues and the need for the adoption of conservation practices. This trust will continue to help us promote BMP's on our agricultural lands to benefit all residents of the River Raisin Watershed.

Upper Wolf Creek Watershed Management Plan

Adrian, Village of Blissfield & Village of Deerfield, MI

FUNDING SOURCE: Michigan Department of Environment, Great Lakes and Energy (EGLE)

ENTITY RECEIVING FUNDING: River Raisin Watershed Council (RRWC)

BUDGET: EGLE - $100,967 with match of $33,000 from Loch Erin Property Owners Association

START/END DATE: 2021 - 2023

The River Raisin (Riviere Aux Raisin – River of Grapes), known as "Nummasepee" (River of Sturgeon) by its American Indian inhabitants, drains to the Western Lake Erie Basin. The watershed covers most of Lenawee County and smaller portions of Monroe, Washtenaw, Jackson and Hillsdale counties in Michigan along with a piece of Fulton County in northeastern Ohio. The watershed covers about 1,072 square miles and drains from the north and west, entering Lake Erie at Monroe Harbor.

Recent water quality sampling of Loch Erin (Lake Erin) in the Irish Hills and its drains in the immediate watershed have revealed significant water quality concerns such as the presence of high nutrients, E. coli bacteria, and cyanobacteria blooms. This is of great concern as Loch Erin is a tributary to Lake Adrian via Wolf Creek. Lake Adrian serves as a drinking water source to the City of Adrian in Lenawee County, Michigan and the connected River Raisin serves the villages of Blissfield and Deerfield.

The RRWC and its partners for this proposed upper Wolf Creek watershed management plan recognize that conflicts with land use may arise with the intended plan development and future improvements, given the prevalence of abundant agricultural lands and activities within this subwatershed. The partners further recognize that collaboration and parity will be key to the success of future watershed protection. This project is proposed to develop an upper Wolf Creek watershed management plan so that future implementation of BMPs to reduce nonpoint source pollutants to Wolf Creek, Loch Erin, Lake Adrian, and Lake Erie can be realized.

The RRWC and its partners plan to develop and complete a detailed upper Wolf Creek watershed management plan that supports primary goals within the larger River Raisin watershed including the attainment of water quality standards, achieving all designated uses, and protecting source water supply for Adrian, Blissfield and Deerfield. We also plan to identify specific Critical Source Areas (CSAs) that are contributing to elevated E. coli bacteria, nutrients, and cyanobacteria blooms within Loch Erin and Lake Adrian via Wolf Creek. This could include but is not limited to leaking septic fields, farm runoff, stormwater drainage pipes, and tile drains. Finally, we will develop a GIS story map to highlight the watershed management plan project and assist with community outreach and involvement efforts. The final product will be shared on the River Raisin Watershed Council's website and used as a tool at stakeholder meetings to help educate the public concerning watershed health and potential improvement projects.

Once the project is completed, the partnering Loch Erin Property Owners Association (LEPOA) will continue monitoring Loch Erin and its tributary drains to assure that improvements are maintained. Continued water quality monitoring will help assess the impacts of future BMP implementation on water quality for the benefit of all residents who rely on this water for recreation and as a drinking water source.



Sampling tributary stream of Loch Erin in Irish Hills, MI

Discover the Raisin & Poster Contest

River Raisin Watershed

FUNDING SOURCE: River Raisin Watershed Council (RRWC) Membership Dues and Donations

ENTITY RECEIVING FUNDING: River Raisin Watershed Council

BUDGET: $2,000 Annually

START/END DATE: Annually from March to May

The RRWC hosts an annual poster contest and "Discover the Raisin" scholarship program aiming to engage the community in artistic and educational initiatives focused on the conservation and protection of the River Raisin watershed.

The poster contest provides an excellent opportunity for school-aged individuals to showcase their creative talents while raising awareness about the significance of safeguarding our local environment. The RRWC will award prizes to the top three posters, judged based on their creativity, artistic merit, relevance to the theme, and the strength of the environmental message conveyed. The winning posters, along with select honorable mentions, will be showcased at community events, local schools, libraries, and other public spaces within the River Raisin Watershed to raise awareness about the importance of preserving our natural resources.

The "Discover the Raisin" is a RRWC sponsored scholarship award. This program is a opportunity for teachers in grades 5th-8th to apply for a $250 award to implement or maintain environmental education activities in their classroom related to the River Raisin Watershed or Water Quality. Five awards are given out annually to the teachers who submit projects that best implement engaging environmental education and reach the largest number students each year.

Additionally, for both programs, the RRWC will promote the winning entries on its website and social media platforms to reach a broader audience and inspire further environmental consciousness.



Discover the Raisin program



RRWC Poster contest winner

Clinton River Watershed Council

Home to heron, trout, mink, and other wildlife, the Clinton River watershed is comprised of thousands of lakes, ponds, wetlands, and hundreds of miles of clear, cold streams. The Clinton River watershed is the most populous in Michigan, spanning 760 square miles over four counties: Oakland, Macomb, Lapeer, and St. Clair. The Clinton River Watershed encompasses more than 70 communities and 1.5 million people.

The Clinton River Watershed Council (CRWC) is a nonprofit organization that has been dedicated to the protection, enhancement, and celebration of the Clinton River, its watershed, and Lake St. Clair for more than 50 years.

One of the primary objectives of CRWC is environmental education and volunteer stewardship. They collaborate with local governments, educational institutions, and individuals to implement projects aimed at improving water quality, restoring wetlands and natural habitats, and mitigating pollution. Through the Keeping-It-Clean Program, Weekly Clean, Trash Runs, private clean-ups, the RiverSafe LakeSafe program, and education on native plants, CRWC works to protect the watershed.

CRWC actively engages residents, schools, and businesses in restoration and conservation efforts. They organize wildlife surveys, invasive species removals, restoration projects, habitat installation projects, and facilitate the Adopt-A-Stream water quality monitoring program. CRWC works to enhance watershed health and access to clean water.

In addition to ecological projects, CRWC also provides programs like River Day, the Clinton River Quest, Crafts on the Clinton, and Nourished by Nature that celebrate local lakes, rivers, and streams. By actively participating in and hosting these programs, CRWC advocates for the recreational use of the Clinton River and its tributaries.

Recognizing the complexity of watershed management, CRWC engages various community partners, including government agencies, associations, environmental organizations, individuals, and private businesses. By forging strong partnerships, CRWC leverages resources, expertise, and collective efforts to achieve more significant positive impacts on the environment. CRWC is committed to the health and preservation of the Clinton River watershed. Through research, education, community engagement, and advocacy, CRWC continues to work to protect, enhance, and celebrate the Clinton River to ensure surrounding ecosystems thrive, providing clean water and enriching the lives of both people and wildlife in Southeast Michigan.

Contact Information:
Clinton River Watershed Council
1115 West Avon Rd.
Rochester Hills, MI 48326
Phone: 248-601-0606

Website: www.crwc.org

Executive Director: Jennifer Hill
Email: jennifer@crwc.org



Clinton River spillway



Paddlers enjoying Black Creek

Bald Mountain Pond Dam Removal

Oakland, MI

FUNDING SOURCE: Michigan Department of Natural Resources (MDNR) and U. S. Fish & Wildlife Service (USFWS)

ENTITY RECEIVING FUNDING: Clinton River Watershed Council (CRWC)

BUDGET: $26,000 MDNR Grant, $13,000 USFWS Grant, $3,000 from local donor

START/END DATE: 2021 - 2023

Located in Paint Creek subwatershed in the ecologically important upper reaches of the Clinton River, the Bald Mountain Pond Dam once served as a recreational stream crossing within the Bald Mountain Recreation Area. However, degrading conditions and safety concerns led to its abandonment as a pedestrian passageway across Trout Creek. In addition to its lost function, the Bald Mountain Pond Dam was identified as a barrier to fish passage and a restriction to natural flow, thermal regimes, and sediment transport—making it a primary target for removal.

After close collaboration with both agencies on potential solutions, in 2021, CRWC was awarded grant funding from MDNR and USFWS to address this issue. CRWC subsequently performed pre-dam removal stream monitoring, ecological surveys, and planned the dam removal process. In January 2023, the Bald Mountain Pond Dam was successfully removed, restoring approximately 1.25-miles of fish passage within Trout Creek. In addition to enhanced connectivity for fish species, native mussel communities (including the state-threatened slippershell) are expected to benefit from this stream restoration project.

This project pairs with an earlier GLRI-funded dam removal effort to reconnect 16-miles of fish passage by CRWC on downstream Paint Creek, a coldwater-designated trout stream for which Trout Creek is a tributary. In the larger scheme, both dam removal projects build on CRWC's Clinton River Coldwater Conservation Project (CRCCP). The CRCCP is a collaboration between CRWC, four Trout Unlimited chapters, EGLE, MDNR, and local municipalities whose mission is to enhance and restore coldwater stream habitat within the watershed. Ultimately, these projects collectively work to benefit the health of the Clinton River watershed as a whole.

In the fall of 2023, CRWC will further site restoration by planting native vegetation at the former dam site to help stabilize the streambanks and enhance the riparian buffer zone. Post-dam removal monitoring, ecological surveys, and road-stream crossing evaluations will help quantify the benefits of the dam removal on Trout Creek and the greater Clinton River watershed.



Deconstruction of the Trout Creek Dam took place in January of 2023.



In July of 2023, the stream banks now are covered in vegetation and it has become difficult to tell that a dam stood here at all.

Southeast Michigan Red Swamp Crayfish Early Detection Collaborative

Macomb, Oakland & Wayne, MI

FUNDING SOURCE: Michigan Department of Natural Resources (MDNR) & Oakland County

ENTITY RECEIVING FUNDING: Clinton River Watershed Council (CRWC) and Friends of the Rouge (FOTR)

BUDGET: $53,400 MDNR Grant, plus $7,000 match from Oakland County

START/END DATE: 2023 - 2025

The Red Swamp Crayfish Collaborative is an ongoing partnership between CRWC, FOTR, and the MDNR focused on the early detection of Red Swamp Crayfish (Procambarus clarkii) within the Clinton River and Rouge River watersheds. Red Swamp Crayfish (RSC) are an aquatic invasive species to Michigan, known to cause habitat degradation and negatively impact both aquatic organisms and communities. The presence of RSC has been confirmed in both the Clinton River (2019 & 2023) and Rouge River (2017) watersheds.

As a part of the Michigan Invasive Species Grant Program (MISGP), with funds directly linked to the Great Lakes Restoration Initiative (GLRI), the Red Swamp Crayfish Collaborative was developed with four primary goals:

1. Identify the distribution/potential spread of RSC in the Clinton River and Rouge River watersheds.
2. Expand the current knowledge of crayfish distributions, both native and invasive.
3. Expand awareness of RSC and the impacts of invasive species in Southeast Michigan.
4. Grow and maintain partnerships revolving around RSC and invasive species early detection efforts.

To achieve these goals, CRWC and FOTR have begun early detection surveys and crayfish monitoring in sites across the two watersheds. By the conclusion of the grant period, over 10 linear miles of waterways will have been monitored for RSC and overall crayfish distribution. In addition to monitoring, CRWC is committed to developing accessible and multi-lingual public education materials aimed at increasing awareness surrounding RSC and the impact of these aquatic invasive species on our waterways and ecosystems.



While surveying for Red Swamp Crayfish, CRWC identified many native crayfish species.



Crayfish traps consist of metal enclosures and mesh bait bags. After being assembled in the field, the traps are baited with dog food.



Crayfish traps are secured to metal rods in the various locations throughout the watershed, and periodically checked, baited, and reset.

Clinton River - Yates Mill Bypass

Rochester Hills, MI

FUNDING SOURCE: Great Lakes Fisheries Commission (GLFC) Infrastructure Funds

ENTITY RECEIVING FUNDING: Great Lakes Fisheries Commission

BUDGET: $700,000

START/END DATE: 2020 - 2024

The Clinton River - Yates Mill Bypass Project is an ongoing collaboration between CRWC, GLFC, Michigan Department of Natural Resources (MDNR), Michigan Department of Environment, Great Lakes and Energy (EGLE), US Fish and Wildlife Service (USFWS), Yates Cider Mill, City of Rochester, City of Rochester Hills, Berry Global, and Green Watershed Restoration. It is the second project that CRWC has collaborated on at the Yates Cider Mill in recent years, as CRWC has a deep relationship with Yates Cider Mill and MDNR that allowed for successful habitat restoration of ~500 feet of Clinton River habitat in 2020.

The Yates Dam serves as the lowermost barrier on the Clinton River, an important feature for preventing the spread of invasive species such as Sea Lamprey from Lake St. Clair upstream into the greater Clinton River watershed. These upstream connecting waterways span hundreds of miles and include our highest quality watersheds (Paint Creek and Stoney Creek) and the headwaters of the Clinton River. In 2015, a bypass channel began to naturally form upstream of Yates Dam, and in 2020 the channel completed its route—thus creating a "bypass" to the dam and redirecting the river's flow from the historical route to the newly formed channel. This redirection of flow provided direct passage to invasive species, migratory fishes, and decreased the water supply to Yates Dam. In response to this threat, CRWC, Hubbell, Roth, & Clark (HRC), DNR, and the GLFC worked to design and implement a project to stabilize the streambanks and redirect flow from the bypass channel back to Yates Dam. After the design was successfully implemented in 2020, a sustained storm event in 2021 caused the design to fail—allowing the bypass to reform and establish a direct connection once again.

CRWC is actively working with the GLFC and partners to design and implement a long-term solution for Yates Dam with updated site assessments planned for summer of 2023. Potential solutions include re-meandering the river upstream of the dam site in order to restore balance, connectivity, and reduce sedimentation. This evolving project showcases CRWC's role in providing on the ground expertise and partner collaboration focused on implementing complex ecological solutions to protect and enhance the Clinton River and its watershed.



In February of 2023, sea lamprey were examined by stakeholders at a site visit to the Yates bypass.



A section of the river now bypasses the dam that served as a natural barrier to invasive species.

Sterling Relief & Red Run Drain Confluence Habitat Restoration & Regional Trail Connector

Sterling Heights, MI

FUNDING SOURCE: Southeast Michigan Resilience Fund (SEMiRF) through the National Fish and Wildlife Foundation (NFWF), Macomb County Department of Roads (MCDR) Non-Motorized Trail funding, Red Run Inter-County Drain Board (RRICDB)

ENTITY RECEIVING FUNDING: Macomb County Planning & Economic Development on behalf of the RRICDB

BUDGET: $300,000 SEMiRF grant, $313,000 MCDR funds, $500,000 from RRICDB

START/END DATE: 2021 - 2023

From 2018-2020, a collaborative group worked to plan and execute the Sterling Relief Drain daylighting project—an effort focused on "daylighting" 2.5 miles of underground drains, installing Green Stormwater Infrastructure (GSI), and restoring ecosystem services within the Sterling Relief Drain of Sterling Heights. Building on the success of the initial project, the Sterling Relief & Red Run drain confluence habitat restoration and regional trail connector project focuses on restoring natural resources and improving access to green spaces for the community. To achieve this goal, work is currently in progress to enhance connectivity between Freedom Hill County Park, the Red Run Drain, and the Sterling Relief Drain — both for human recreation and for wildlife passage. Furthermore, habitat restoration on site through invasive species removal and establishment of native plant communities will help decrease erosion and cut stormwater runoff by an estimated 200,00 gallons per year.

The ecosystem services provided by the regional trail connector project build on those from the initial Sterling Relief Drain daylighting project, which include annual reductions of nitrogen (3,488lbs), phosphorus (600lbs), and sediment (233,317lbs) as well as the capture and filtration of over 156.5 million gallons of stormwater/year. Together, these two GLRI-funded projects work towards addressing beneficial use impairments within the Clinton River Area of Concern by increasing flood resiliency, habitat availability, & nutrient filtration, restoring aesthetics, and improving connectivity within the Clinton River watershed.

Currently, CRWC is collaborating with Macomb County Planning & Economic Development for further ecological monitoring on the Sterling Relief Drain portion of the regional trail connector project. Our responsibilities are monitoring-focused and include: Anuran (frog and toad) surveys, macroinvertebrate and habitat evaluations according to the Michigan Department of Environment, Great Lakes and Energy's Procedure 51 protocols, and collection of water quality parameters. Paired with earlier monitoring from the Sterling Relief Drain daylighting project, these data will help us assess the ecological impacts of restoration efforts and plan for future site work.

Work on restoration and maintenance of the Sterling Relief Drain does not stop here, as the USEPA has provided funds to protect and enhance the GSI investments made by the GLRI through infrastructure improvements, invasive species monitoring/removal, and establishment of a buffer strip. A Phase 2 of the Sterling Relief drain habitat and daylighting project restoring an additional 1.5 miles of drain at the western terminus has been submitted for funding. Together, these projects work to address stormwater and pollution concerns while simultaneously increasing available habitat, green spaces, and recreational opportunities for all.



The newly restored habitat at Sterling Relief Drain after initial daylighting.



Restoration progress and recreational trail access in 2023.

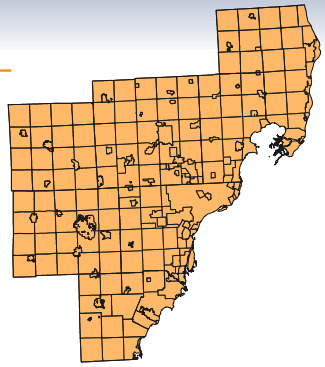
SEMCOG | *SOUTHEAST MICHIGAN COUNCIL OF GOVERNMENTS*



SEMCOG Vision

All people in Southeast Michigan benefit from a connected, thriving region of small towns, dynamic urban centers, active waterfronts, diverse neighborhoods, premier educational institutions, and abundant agricultural, recreational, and natural areas.

Since its inception in 1968, the Southeast Michigan Council of Governments has acted as a regional planning partner with local member governments. SEMCOG serves the Southeast Michigan region, made up of Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw, and Wayne Counties. Membership is open to all counties, cities, villages, townships, intermediate school districts, and community colleges.



Alliance of Downriver Watersheds

The Alliance of Downriver Watersheds (ADW) is a permanent watershed organization in southeast Michigan and formed under Public Act 517 of the Public Laws of 2004. The ADW formally established themselves in 2007 but have been working together for many years to manage the area's water resources.

The ADW consists of 21 public agencies in the Ecorse Creek, Combined Downriver and Lower Huron River Watersheds within Wayne and Monroe Counties. The ADW is relatively urban in nature consisting of 203.3 square miles. Major watercourses within the ADW that drain to the Detroit River and Lake Erie include the Ecorse Creek, Sexton Kilfoil Drain, Frank and Poet Drain, Blakely Drain, Brownstown Creek, Huron River, Silver Creek and Woods Creek.

The consortium of agencies that make up the ADW meet on a regular basis and work together to cooperatively manage the rivers, lakes and streams within the watershed. Examples of ADW efforts include:

- Long-term water quality monitoring
- Stormwater permit compliance
- Reporting to the State
- Submittal of grant applications for water quality improvements
- Public education on items such as rain barrel use, no phosphorus fertilizer, and proper pet waste management.

Contact Information:

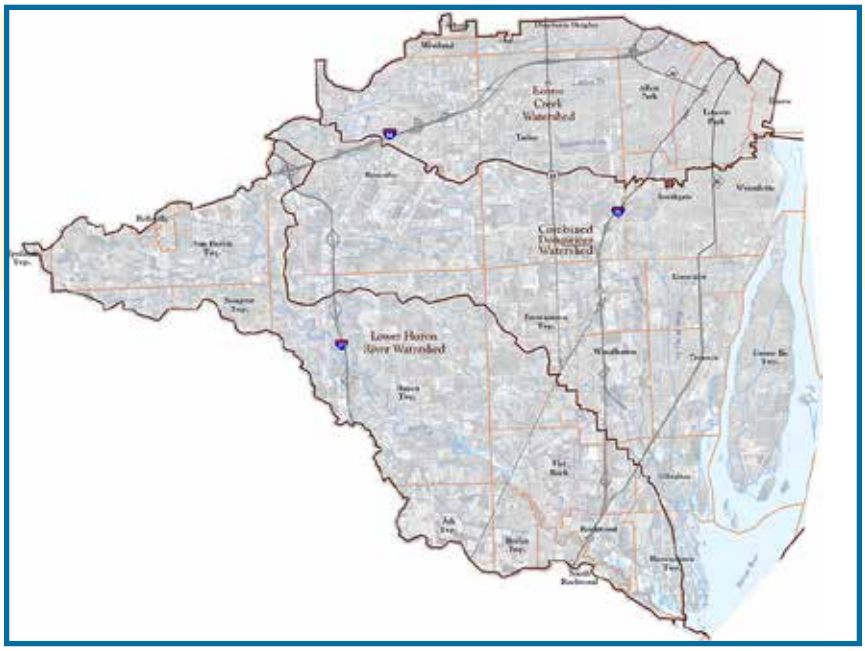
Website: www.allianceofdownriverwatersheds.com

Facilitator: Valerie Novaes, OHM
Email: valerie.novaes@ohm-advisors.com
Phone: 734-466-4567

Treasurer: John Danci
Sumpter Township
Email: johndanci@sumptertwp.org
Phone: 734-461-6201



Water quality monitoring efforts



Alliance of Downriver Watershed communities

Chemistry & Flow Monitoring

Southeast MI

FUNDING SOURCE: Membership dues

ENTITY RECEIVING FUNDING: Alliance of Downriver Watersheds

BUDGET: $101,000

START/END DATE: 2012 - Ongoing

The Alliance of Downriver Watersheds Chemistry and Flow Monitoring Program brings together dedicated volunteers and passionate environmentalists to track and safeguard the health of the local watersheds. Taking place annually from April to September, the program focuses on collecting crucial stream health data, engaging Downriver residents, fostering environmental stewardship, and promoting best management practices.

The goal of the program is to evaluate progress toward improving overall water quality of Downriver streams and rivers. ADW collaborates with residents, local organizations, governmental agencies, and academic institutions to ensure the program's success and enhance the accuracy and credibility of the collected data.

During the 6-month monitoring season, volunteers collect water samples, measure stream flow, and record water chemistry measurements. Water is analyzed for dissolved oxygen, pH, nutrients, sediments, bacteria, and temperature, which provides valuable insights into water quality and potential environmental stressors.

In 2022, the Chemistry and Flow Monitoring Program yielded a wealth of data and insights into the health of Downriver waterways. Over 30 volunteers participated, contributing a total of 191 hours to collect 357 water samples, record 595 in-stream chemistry measurements, and monitor flow. ADW used this information to identify areas that require targeted follow up efforts. This included additional monitoring, screening, and investigation as part of the Municipal Separate Storm Sewer System (MS4) Illicit Discharge Elimination Program (IDEP).

By combining the efforts of passionate volunteers, scientific expertise, and collaboration with Downriver stakeholders, the Chemistry and Flow Monitoring Program contributes to the understanding, preservation, and restoration of Downriver waterways. The program, which showcases the power of volunteer stewardship and data-driven conservation, is implemented on an annual basis.



Volunteers collecting water quality samples



Volunteers taking measurements to calculate stream flow

2022 "Focus on Downriver Water" Photo Contest

Southeast MI

FUNDING SOURCE: Membership dues

ENTITY RECEIVING FUNDING: Alliance of Downriver Watersheds

BUDGET: $15,000 biennially

START/END DATE: 2018 - ongoing

Each year, the ADW holds a "Focus on Downriver Water" Photo Contest to celebrate the natural beauty and ecological importance of our precious watersheds! By requesting the public to submit captivating photos based on monthly themes, we aim to raise awareness about the significance of preserving and protecting these vital ecosystems. Our contest showcases the unique charm of water bodies, flora, fauna, and human interactions within the watershed.

In 2022, 71 people submitted 293 photos to the contest. A supporting social media advertising campaign reached more than 108,000 Facebook and Instagram users and brought over 2,000 people to the ADW's website, which helps build brand awareness of the ADW in the Downriver communities.

Here are the project highlights that make this contest a standout:

- Monthly Theme: Each month, we introduce a new theme related to watersheds, such as "Winter Activity," "Spring Rain," or "Fall Colors." Participants are encouraged to capture moments that best represent the theme, challenging their creativity and photographic skills.
- Inclusivity and Accessibility: We prioritize making the contest inclusive and accessible to all, from amateur photographers to seasoned professionals. The competition allows people of all ages and backgrounds to participate, fostering a sense of community and collaboration.
- Monthly Winners and Prizes: At the end of each month, winners are selected based on their photo's artistic merit, adherence to the theme, and overall impact. The winners receive attractive prizes, such as paddle trips, gift cards, and dinner dates!
- Exhibition: A number of winners and popular photographs from the 2022 Focus on Downriver Water Photo Contest are showcased in the upcoming 2024 ADW Biennial Watersheds Community Calendar. The calendar is packed with practical tips for keeping Downriver water clean and beautiful with photos immortalizing the beauty of our waterway. ADW members will distribute 20,000 calendars to their residents in the fall of 2023.

In conclusion, the "Focus on Downriver Water" Photo Contest stands as a beacon of creativity, conservation, and community engagement. By participating in the contest, the community helps to spread the word about the simple, everyday actions we all can take to keep our water safe for drinking, recreation, and wildlife.



2022 Winner - Grosse Ile Lighthouse taken by Chris Zawistowicz



2022 Winner - Monarch butterfly taken by Rebecca Lowe

Michigan's Areas of Concern Program

Supporting Restoration and Revitalization for over 30 Years!



Three Areas of Concern delisted and 11 in various stages of recovery and improvement.

Tens of millions of dollars of investment in fish and wildlife habitat restoration and cleanup of contaminated sediments in Michigan's waterways.

Funding support to multiple Michigan Public Advisory Councils comprised of residents and local stakeholders, as well as coordination of the greater Statewide Public Advisory Council.

Find out more at *Michigan.gov/AOCprogram*

EGLE
MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

Great Lakes RESTORATION

SPAC
Statewide Public Advisory Council

Friends of the St. Clair River

Friends of the St. Clair River has been getting their feet wet and hands dirty around Michigan's Thumb Coast for nearly two decades. That's 16 years of pulling on waders, collecting insects, maneuvering thorny bushes, and handling the tiniest seeds and largest fish to restore the highest priority landscapes and streams.

Founded in 2007 in response to the St. Clair River Area of Concern designation, our mission is to protect and restore the St. Clair River watershed through community education, environmental monitoring, hands-on stewardship, and advocacy. We are led by a Board of Directors, part-time staff, seasonal interns, and hundreds of volunteers. Friends of the St. Clair River is supported by state and foundation grants, environmental service contracts, corporate sponsorships, and individual contributions. Our flagship fundraiser is the annual Blue Water Sturgeon Festival, now in it's tenth year.

The St. Clair River watershed includes 58 miles of Great Lakes shoreline, 1,000 miles of tributaries, and forms an international boundary between the U.S. and Canada. The watershed is home to the largest Lake sturgeon population in the Great Lakes, forms the largest freshwater delta in North America, and is home to Michigan's first National Water Trail. It is a world-class scuba diving, duck hunting, fishing and freighter-watching destination. The St. Clair River is a Binational Area of Concern.

Our core programs are:

- **Community Education** | We provide nature-based programs to over 10,000 people through wetland explorations, stream monitoring, and ecology hikes. Our classroom program uses lake sturgeon as a local phenomenon to educate hundreds of students on critical watershed issues.
- **Land Stewardship** | Our volunteers work outdoors with us 52 weeks a year conducting cleanups, removing invasive species, and planting native plants. Since 2015, our volunteers have given 15,000 hours of stewardship work.
- **Environmental Monitoring** | Our community science activities look like counting butterflies, inventorying endangered wildlife, relocating protected mussels, and mapping invasive species. Stream Team is our largest program which sees 140 volunteers collecting water quality data in all seasons.
- **Responsible Recreation** | Trails are a meaningful way we engage residents in stewardship of our natural resources. We lead oversight of the Bridge To Bay Trail, an urban 50-mile non-motorized trail that parallels the St. Clair River through 13 waterfront communities.

Contact Information:
Friends of the St. Clair River
301 N. Ninth Street
St. Clair, MI 48079

Website: www.scriver.org
Facebook: facebook.com/stclairriver
Twitter: @bwriverwalk
Instagram: friendsofthescriver

Executive Director:
Sheri Faust
Email: sheri@scriver.og
Phone: 810-730-5998

Director of Programs & Services:
Lynnea McFadden
Email: lynnea@scriver.org
Phone: 906-869-1530

St. Clair River AOC U.S. Co-Chair:
Paulette Duhaime
Email: scrbpac@att.net



MSU Extension Mi Paddle Stewards training on the St. Clair River in Clay Twp., MI

Invasive Species Management Coordination

St. Clair River Watershed

FUNDING SOURCE: Michigan Department of Natural Resources (MDNR) Michigan Invasive Species Grant Program, Six Rivers Land Conservancy, Lake St. Clair Cooperative Invasive Species Management Areas (CISMA)

ENTITY RECEIVING FUNDING: Friends of the St. Clair River

BUDGET: $50,282

START/END DATE: 2020 - Ongoing

The Friends of the St. Clair River partners with the Lake St. Clair Cooperative Invasive Species Management Area (CISMA), under the umbrella of Six Rivers Land Conservancy, to support monitoring, reporting, and management of invasive species in Macomb and St. Clair Counties. This multi-agency collaboration boosts regional efforts to stay current on the latest research, best practices, and emerging issues in invasive species management.

Friends of the St. Clair River has surveyed 771 acres of invasive species infestations and treated 35 acres. Through The Stewardship Network's annual spring challenge, our volunteers amassed 530 hours pulling 6,600 pounds of garlic mustard and dame's rocket from local parks.

Our Lake St. Clair CISMA activities include:

- Conduct forest health surveys for Beech Leaf Disease
- Conduct boat washes, native plant sales, and MI Paddle Steward trainings
- Roll out the Go Beyond Beauty program statewide as Michigan's first hub
- Enhance education through media, newsletters, and workshops

Michigan's first Beech Leaf Disease Detection | Our staff discovered beech leaf disease in St. Clair County in 2022, which became the State's first confirmed case. We are working with the State to develop beech leaf disease survey methods, help standardized protocols for treatment, and establish a demonstration treatment trial site to improve beech tree health and reduce disease symptoms.

Monitoring Across Trails | We survey land and water trails with the use of Midwest Invasive Species Identification Network (MISIN). Volunteers took to the Bridge to Bay Trail to survey 25 miles for invasive species, and took to the St. Clair River in kayaks to survey Port Huron's Blue Water River Walk to investigate erosion impacts due to record-high water levels.

Spongy Moth Suppression Program | St. Clair County faced a severe spongy moth (formerly gypsy moth) outbreak in 2021, which led to the County contracting our services to reinstate a suppression program. Friends of the St. Clair River completed 450 surveys covering 5,180 acres as reported by 1,800 property owners. This data allowed for an aerial spray suppression and control program for the first time in twenty years.



Invasive species removal work day, Columbus County Park, Columbus Twp., MI



Bridge To Bay Trail invasive species survey and mapping, Marine City, MI

Sturgeon Science School & Blue Water Sturgeon Festival

St. Clair River Watershed

FUNDING SOURCE: Michigan Department of Labor and Economic Opportunity's MI STEM Network

ENTITY RECEIVING FUNDING: Friends of the St. Clair River, St. Clair County Regional Education Service Agency

BUDGET: $15,720 and numerous corporate sponsors

START/END DATE: 2014 - Ongoing

Our Sturgeon Science School and Blue Water Sturgeon Festival are an innovative 3-day event focused on education and stewardship of the St. Clair River's threatened lake sturgeon. Since we hatched Sturgeon Festival in 2014, it has provided an exciting setting to learn the fascinating story of this ancient fish – a mascot for the Great Lakes' recovery.

The MI STEM Network grant sparked a relationship with St. Clair County Regional Education Services Agency (RESA). We are expanding placed-based education to increase student understanding of water quality needs and stewardship behaviors.

Sturgeon Science School is a one-of-kind classroom program that emphasizes the impact humans have on their environment and connects students to Great Lakes sturgeon research happening at their doorstep. Nearly 800 fifth graders across six school districts receive a presentation and free field trip aboard the Huron Lady to watch U.S. Fish and Wildlife (USFWS) biologists catch and release sturgeon. Students meet an invasive sea lamprey, watch live sturgeon research underneath the Blue Water Bridges, and conduct water quality testing. Partners include the Michigan DNR, Alpena Fish and Wildlife Conservation Office, St. Clair-Detroit River Sturgeon for Tomorrow, and Great Lakes Fishery Commission.

During our Blue Water Sturgeon Festival Huron Lady Cruises, 200 passengers watch researchers from the USFWS's sturgeon program catch sturgeon, which they measure, weigh, and tag. Sturgeon captured during this research receive a pit-tag for tracking and are used in the Great Lakes restocking program before being released. Students play a significant role in the annual release of young sturgeon from our captive-rearing program by gently hand-releasing them back into the wild.

The work of lake sturgeon conservation in the St. Clair River is very important; it extends beyond the borders of Michigan with the introduction of this species into other Great Lakes. Once on the brink of extinction, lake sturgeon are making a comeback and have become a spotlight for the St. Clair River Area of Concern habitat work. Sturgeon Festival is our largest annual fundraiser supported with sponsorships, merchandise sales, and donations. The festival continues to attract thousands of visitors from around the state and country each year.



Sturgeon Science School Huron Lady Cruise for 5th grade students with the USFWS research vessel, N'me, St. Clair River, Port Huron, MI



Student hand releases a baby lake sturgeon back into the wild in Lake Huron at the Sturgeon Festival, Port Huron, MI

Stream Team Water Quality Monitoring

St. Clair River Watershed

FUNDING SOURCE: ZF North America, Inc., Michigan Department of Environment, Great Lakes, and Energy's (EGLE) Michigan Clean Water Corps (MiCorps) Program

ENTITY RECEIVING FUNDING: Friends of the St. Clair River

BUDGET: $4,000 (Friends of the St. Clair River match $500)

START/END DATE: 2021 - Ongoing

Friends of the St. Clair River's volunteer stream monitoring program, funded with a MiCorps Program grant, launched in 2008 by using macroinvertebrate and habitat data to prioritize streams for restoration and to correct habitat impairments across the watershed.

Friends of the St. Clair River partners with the St. Clair County Health Department to conduct macroinvertebrate monitoring, acquiring valuable water quality data for watershed management efforts. Our original program allowed for monitoring at seven sites, which later expanded to twelve sites. The program grew to 100 volunteers and a dozen certified leaders and continued for five years.

Stream Team was revived in 2021 with the award of a MiCorps Maintenance Grant. In 2022, volunteers monitored three different streams across our watershed. Several rare, native freshwater mussel species were documented. Stream Team has become our largest volunteer program which sees 140 volunteers venturing into waterways in all seasons to collect water quality data.

Data is used by the St. Clair River Area of Concern Binational Public Advisory Council to evaluate progress towards Beneficial Use Impairment restoration goals. Since macroinverebrates tell us about river health, diving into the data to view trends, diversity and the history of our streams gives us an indication of how healthy rivers are. Having ten years of data from monitoring is invaluable.

Wetland Wanderings | We host macroinvertebrate explorations at Blue Water River Walk County Park, a St. Clair River Area of Concern Fish and Wildlife Habitat project. This urban coastal park received GLRI funding in 2016 to clean-up a three-acre brownfield providing habitat and storm water filtration. Continual investments in maintenance have allowed us to monitor this site since 2019. Our data shows an increase in species diversity and abundance, as well as the return of herons, turtles, mink and beaver.

Winter Stonefly Search | We set out once a year to search for winter stoneflies in the Belle River. Since we launched the stonefly search in 2021, we have uncovered nearly 1,000 stoneflies.



Winter stonefly search, Belle River, Columbus Twp., MI



Stream Team volunteers, Pine River, Goodells

Kawkawlin River Watershed Association

The Kawkawlin River Watershed Association (KRWA) was formed in 1993 with the objectives of promoting and advocating for watershed issues in the Kawkawlin River basin. Primary among these issues include recreation, safety, education about watershed issues, and the conservation and protection of water quality.

To that end, the KRWA sponsors several events and projects that increase appreciation of the Kawkawlin River. These projects include a long-term water monitoring effort, the placement of channel marker buoys for recreational boaters, an annual river cleanup event, an annual kayaking event, installation of a kayak launch for the public to enjoy, promotion of establishment of a special assessment district to fund treatment of weeds, a website, and the publication of a quarterly newsletter. The KRWA also works in the interest of watershed residents and property owners with regard to issues such as dredging and marine and winter safety patrolling of the navigable area of the river.

The association's representation in governmental projects such as river restoration, water quality and E. coli issues are important to everyone; especially those of us who live along the river. Water quality, navigability and weed control are at the forefront of KRWA attention. Over the years, valuable relationships with local and state entities have been imperative in achieving watershed goals. The KRWA continues to work closely with numerous partners such as:

- Saginaw Valley State University (SVSU)
- Delta College
- University of Michigan (Flint)
- Bay County Conservation District
- Kawkawlin Township
- Monitor Township
- Bangor Township
- Michigan Department of Environment, Great Lakes and Energy (EGLE)
- State of Michigan

KRWA was also present in the creation of a speed limit for ATVs and snowmobiles to help improve safety of those who enjoy the river. We are very proud of our accomplishments, but we also like to have some fun!

The KRWA currently has approximately 200+ members who subscribe at a minimum of $25.00 per member per year.

The Kawkawlin River Watershed drains nearly 250 square miles in four counties (Bay, Midland, Gladwin, and Saginaw) and contains land area in 14 townships.

Contact Information:
Kawkawlin River Watershed Association
P. O. Box 506
Kawkawlin, MI 48631
Email: kawkawlin.river.mi@gmail.com

Website: www.kawkawlinriver.org

Facilitator: Julie Kleinau
Environmental/Restoration Committee Chair
Email: julie.kleinau@gmail.com

President: Mark Kondziola
Email: markkondziola@gmail.com

Vice President: Marci Norgan
Email: marci.norgan@yahoo.com



Saginaw Bay Watershed – Agricultural Runoff Intercept

Bay City, MI

FUNDING SOURCE: Great Lakes Restoration Initiative (GLRI), U. S. Department of Agriculture (USDA) Forest Service

ENTITY RECEIVING FUNDING: Kawkawlin River Watershed Association (KRWA)

BUDGET: $98,000

START/END DATE: 2020 - 2023

The KRWA was awarded a grant from the USDA Forest Service to design and plant buffer strips with trees, shrubs and seeding with a native grass mix to address the goals, priorities, and emphasis of improving water quality and habitat into the waters of the Great Lakes. The project areas were constructed adjacent to agricultural lands to intercept drain tile outlet pipes from the fields and distribute the flow horizontally along the banks in the newly implemented drainage swales and vegetated buffer strips. Implementation areas will be distributed throughout the Saginaw Bay watershed, a water body internationally recognized on the Area of Concern (AOC) list within the Lake Huron watershed.

Project work took place in contributing watersheds to Saginaw Bay where runoff waters from the upland farming areas are laden with excess nutrients such as nitrogen, phosphorus and sediment. Due to poorly infiltrating soils and flat topography, the runoff waters flow directly to channelized road-side drains into contributing water bodies and the bay itself. These excess nutrients degrade the Bay and contribute to the large algae blooms for which this portion of Saginaw Bay is known. This project improved the quality of the Great Lakes through enhanced filtration by using native plantings to intercept runoff from the upland agricultural focal areas allowing for additional nutrient uptake, infiltration and transpiration prior to entering Saginaw Bay. The roots of these plants will also reduce sediment and erosion on the upland portions of the watershed, creating a buffer and reducing the habitual clogging of the culverts within the critical areas.

Design tasks were completed in late 2021 with implementation starting in 2022. The goal was to complete implementation in a phased approached to allow for vegetation establishment prior to releasing drain tile water into the newly constructed swales. Late last fall after seasonal work was completed in the adjacent agricultural fields, the project implementation team went to work making modifications that would allow for the newly planted vegetation to become established.



New drain design showing materials and vegetation

Swale layouts to implement the drainage design were installed, including excavation and installation of coconut fiber mats underneath the rip rap (stone) to protect the soil from erosion. A native grass and wildflower buffer zone was planted and an erosion blanket and cover crop installed. This spring the project team was able to plant a significant number of 338 cell plug flats each of Silky Dogwood, Common Elderberry, and Ninebark throughout the project sites. The goal of implementing these native plantings is to help evapo-transpire and filter the tile drain water being pumped in from the fields, to reduce runoff to the County Drain system. This fall, the vegetation will be fully established and water from the drain tile outlet pumps will be turned into the new swales for filtration.

Tobico Marshland Revitalization: Tributary to Saginaw Bay

Bay City, MI

FUNDING SOURCE: Great Lakes Restoration Initiative (GLRI), U. S. Department of Agriculture (USDA) Forest Service

ENTITY RECEIVING FUNDING: Kawkawlin River Watershed Association (KRWA)

BUDGET: $200,000

START/END DATE: 2017 - 2021

Tobico Marsh is a 900-acre body of water (lagoon) and the largest remaining wetland along Saginaw Bay. The marshland is the largest inland lake in Bay County, and the variety of aquatic plants found there combine to make Tobico one of the finest places to witness the fall migration in the Great Lakes Region. Biologists estimate that in October there are usually 3,000 to 5,000 birds in the Marsh. During peak migration, from the third week of October to early November, more than 25,000 have been known to gather at one time. The Marsh sits within the greater Tobico Marsh Wildlife Refuge, an 1,848-acre wildlife refuge that lies within Bay City State Park adjacent to Saginaw Bay.

Sadly, Tobico Marsh is now considered an impaired wetland area as the water quality has become degraded over time due to upstream inputs. The Marsh is located directly downstream from agricultural lands within the Kawkawlin River Watershed. Runoff waters from the upland farming areas are laden with excess nutrients such as nitrogen, phosphorus and sediment. Due to poorly infiltrating soils, the runoff waters flow directly into Tobico Marshland through a system of road-side drains. From there, the Tobico Marsh drains into the Saginaw Bay, a water body internationally recognized on the Area of Concern (AOC) list. These excess nutrients degrade the Saginaw Bay and contribute to the large algae blooms for which this portion of Saginaw Bay is known.

In 2017, the KWRA was awarded the GLRI USDA Forest Service grant to help filter and improve water quality into the Tobico Marsh, and therefore functionality of the Marsh itself. The project design utilized native plantings to intercept runoff from the upland agricultural lands allowing for additional nutrient uptake, infiltration and transpiration prior to entering the Tobico Marsh. The roots of these plants also reduced sediment and erosion on the upland portions of the marshland, creating a buffer and reducing the habitual clogging of the culverts within the Tobico Marsh areas - restoring the hydraulics. These plantings also supported additional flood storage and wildlife habitat. In total, 2,356 native small trees and shrubs, and approximately 2 acres of native grass seed was installed at the implementation sites under this project. Anticipated agricultural runoff uptake of approximately 30 gallons of runoff water/day per tree for approximately 120 days/year within the growing season of the Saginaw Bay Region.

Project partners included the Michigan Department of Natural Resources (MDNR), Bay County Conservation District (BCCD), Bay County State Recreation Area, Saginaw Valley State University (SVSU), Bay County Drain Commissioner and local farmers to identify project goals and potential planting areas. SVSU completed pre-implementation monitoring for baseline water quality assessment and will do so again post-implementation to gauge project success.



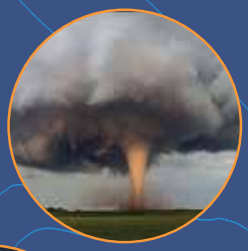
View of native plantings



Tobico Marsh overlook

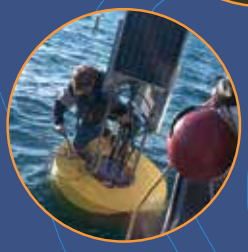
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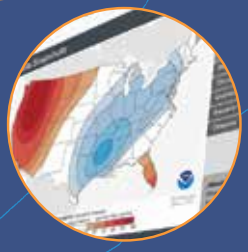
Coasts

Protecting maritime heritage, supporting coastal communities, and providing nautical charts



Habitat

Restoring habitat for a healthy fishery, clean water, and recreation



Climate

Preparing communities for changing conditions

N

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Saginaw Bay Monitoring Consortium

Understanding the condition of a complex system like the Saginaw Bay Watershed, the largest in Michigan, requires robust, comprehensive data that captures trends in water quality over time. Unfortunately, monitoring efforts for Saginaw Bay to date have been neither long-term nor coordinated, and the data that exists is not easily accessible. We know that water quality in Saginaw Bay is degraded—including elevated levels of nutrients (phosphorus and nitrogen) caused largely from farmland runoff—but we lack a detailed, location-specific understanding of the management implications.

The Saginaw Bay Monitoring Consortium (SBMC)* seeks to establish a coordinated and comprehensive water quality monitoring system and associated tools and resources for the watershed. This will help us understand water quality trends over time, including the impacts of changes in agricultural practices in the watershed. It will contribute to an important scientific knowledge base and improved information flow to stakeholders, and ultimately help inform decision-making and best practices around restoration and resource management, such as:

- Actions to reduce significant environmental damage (i.e. Beneficial Use Impairments) in the Saginaw Bay "Area of Concern."
- Targets for reducing nutrient levels in Saginaw Bay, under Annex 4 of the Great Lakes Water Quality Agreement.
- Watershed restoration and management decision-making by watershed groups and municipal stormwater managers.

Recently, USGS has installed 11 new stream gages at strategic points in the watershed, adding to seven existing gages. Similarly, NOAA has added 5 new monitoring sites in the bay, bringing the total to 10 bay monitoring sites. Together, these bay and tributary monitoring stations provide a comprehensive data collection network.

Monitoring data will be made publicly available through an online dashboard so that all partners can understand how water quality is changing—over time and at scale—and better align complementary efforts.

**SBMC is a collaborative effort among Michigan Department of Environment, Great Lakes and Energy (EGLE), U.S. Geological Survey (USGS), The Nature Conservancy (TNC), Saginaw Bay Environmental Science Institute at Saginaw Valley State University (SVSU), National Oceanic and Atmospheric Administration Great Lakes Environmental Research Laboratory (NOAA GLERL), LimnoTech, Central Michigan University (CMU), Michigan Department of Agriculture and Rural Development (MDARD), and Saginaw Chippewa Indian Tribe of Michigan.*

Contact Information:
Saginaw Bay Monitoring Consortium
101 E. César E. Chávez Ave.
Lansing, MI 48906

Conservation Associate, Saginaw Bay:
Rebecca McNitt
Email: rebecca.mcnitt@tnc.org
Phone: 517-316-2282

Senior Conservation Scientist:
Douglas R. Pearsall
Email: dpearsall@tnc.org
Phone: 517-927-4419

SAGINAW BAY MONITORING CONSORTIUM
COORDINATING TEAM



Saginaw Bay Nutrient Monitoring

Saginaw Bay, MI

FUNDING SOURCE: U. S. Environmental Protection Agency (USEPA), Great Lakes Restoration Initiative (GLRI)

ENTITY RECEIVING FUNDING: NOAA Great Lakes Environmental Research Laboratory

BUDGET: $1 Million

START/END DATE: 2023 - 2026

To assess Saginaw Bay's nutrient dynamics and ecosystem ecology during ice-free periods, and to provide the empirical basis to develop models that will inform management scenarios, the National Oceanic and Atmospheric Administration Great Lakes Environmental Research Laboratory (NOAA GLERL) and the Cooperative Institute for Great Lakes Research (CIGLR) are conducting intensive monitoring that combines shipboard sampling and real-time instrumentation on buoys. This research builds on monitoring that began in Saginaw Bay in the 1990s.

The monitoring program includes biweekly sampling cruises from May – October at 10 sites in the inner and outer bay. These sampling cruises monitor key biological, chemical, and physical parameters, which will strengthen our understanding of the systems water quality and factors contributing to cyanobacteria bloom progression and toxicity within the bay. Measurements include:

- Total phosphorus (P)
- Particulate carbon and nitrogen
- Phytoplankton community composition and abundance
- Total dissolved P
- Total organic carbon (TOC)
- Total alkalinity
- Nitrate and ammonium
- Total carbon (TC)
- Suspended solids
- Dissolved reactive phosphorus
- Chlorophyll *a*
- Chromophoric dissolved organic matter
- Particulate phosphorus
- Phycocyanin
- eDNA







Bay Monitoring by Glenn Cooper and Anna Boegehold

Online Dashboard: Connecting Conservation & Water Quality

Saginaw Bay Watershed, MI

FUNDING SOURCE: Jury Family Foundation and Cook Family Foundation

ENTITY RECEIVING FUNDING: The Nature Conservancy

BUDGET: $191,468

START/END DATE: 2023 - 2026

The Saginaw Bay Monitoring Consortium's online Dashboard is intended to serve both the general public and water quality scientists and will host water quality monitoring data for 18 stream stations and 10 bay stations. These data will be presented within the context of an interactive map with accompanying graphs that depict trends. Initially, the dashboard will include a subset of all the parameters being monitored, and in the coming months all parameters will be incorporated. Beyond the data dashboard, there is a story-map with narrative text that tells about the Saginaw Bay region beginning with its first peoples through early European settlement and land use changes and development within the context of how humans have altered the landscape and impacted the water quality of the regions along with how these changes impact people's lives today.

The data presented within the story-map and dashboard will help determine the nutrient and sediment loads from stream tributaries to the bay, help identify priority sub-watersheds for soil and nutrient conservation, help evaluate and update the Saginaw Bay annual phosphorus loading target, and provide information to monitor progress of Saginaw Bay restoration efforts.



Online dashboard

Coordinated Tributary Water Quality Monitoring in the Saginaw Bay Watershed

Saginaw Bay, MI

FUNDING SOURCE: U. S. Environmental Protection Agency (USEPA), Great Lakes Restoration Initiative (GLRI)

ENTITY RECEIVING FUNDING: Saginaw Valley State University (SVSU) by grant contract from Michigan Department of Environment, Great Lakes and Energy (EGLE); United States Geological Survey (USGS)

BUDGET: SVSU (via EGLE): $1.2 Million; USGS: $1.5 Million

START/END DATE: 2023 - 2026

The Saginaw Bay Environmental Science Institute at Saginaw Valley State University is working with the United States Geological Survey and Michigan's Department of Environment, Great Lakes, and Energy to address tributary data needs in the Saginaw Bay Watershed. USGS is collecting continuous data on stage and discharge, and SVSU student teams are collecting data on nutrients and sediment in order to evaluate tributary water conditions, determine annual loading to the bay, and monitor progress toward restoration. These data will allow conservation efforts to focus on sub watersheds where sediment and nutrient run-off issues are evident.

This project addresses tributary data needs through weekly measurements of water quality parameters (see table below) at 18 tributary locations throughout the watershed. The sampling sites, which represent the major sub watersheds of the Saginaw River as well as coastal tributaries with substantial agricultural land, are located at or near USGS gaging stations to enable loading calculations. Data from the sites will provide valuable information about sediment and nutrient sources and impacts on the Bay. This tributary monitoring effort will be coordinated with open water monitoring in Saginaw Bay (by NOAA GLERL and existing EGLE stations) as part of the Saginaw Bay Monitoring Consortium.

Tributary measurements include the following:

- Total phosphorus
- Soluble reactive phosphorus
- Nitrate-N
- Nitrite-N
- Ammonium-N
- pH
- Total Suspended Solids
- Turbidity
- Dissolved Oxygen
- Water Temperature
- Conductivity
- Discharge (USGS)



SVSU sampling at a tributary site (photo credit: Alaina Seman, SVSU)



USGS gaging station, Saginaw River at Holland Avenue (photo credit: David Karpovich, SVSU)

Partnership for the Saginaw Bay Watershed

If you live in one of the 22 counties that are a part of the Saginaw Bay Watershed your land drains to Saginaw Bay, Lake Huron. Our watershed contains more than 175 inland lakes, about 7,000 miles of rivers and streams, and contains America's largest contiguous freshwater coastal wetland system! More than 1 million people call the Saginaw Bay watershed home and live in cities, suburbs, and farming communities.

The Saginaw River and Saginaw Bay were designated as an Area of Concern (AOC) by the International Joint Commission in 1987. According to the USEPA, an AOC is a region along the Great Lakes with water quality problems and degraded environmental conditions which are likely to cause beneficial use impairments (BUIs). Originally there were 12 BUIs in the Saginaw River and Saginaw Bay AOC. Since then 3 BUIs have been removed.

The Partnership for the Saginaw Bay Watershed (PSBW) is a voluntary, membership-based coalition of public and non-governmental agencies, organizations, and individuals committed to sustaining or restoring the ecology of the Saginaw Bay Watershed, while ensuring economic viability. Toward that end, the Partnership promotes comprehensive resource management and educational services by facilitating inter-governmental coordination and public involvement, conducting studies, formulating public policy recommendations, providing advice to public officials and citizens, and undertaking various programs and projects to restore, protect and enhance Michigan's largest watershed.

A big part of the PSBW work is to try to keep track of the activities of people who reside, study, regulate, enforce, and engage in business throughout the Saginaw Bay watershed. Our partners from state and federal agencies and educational institutions are primary compilers and interpreters of valuable information.

The Partnership is fortunate to interact with the Saginaw Bay Watershed Initiative Network (WIN), perhaps America's most effective sustainability organization. In recent years, the Partnership's top priority has been preparation of a Management Action List of projects that need to occur to restore BUIs and, ultimately, delist Saginaw River/Bay as an AOC.

Contact Information:
Partnership for the Saginaw Bay Watershed
P. O. Box 2056
Bay City, MI 48707

Website: www.psbw.org

Chair: Laura Ogar
Email: ogarl@baycounty.net

Vice Chair: Bill Wright
Email: impart77@gmail.com



Tall Ships Weekend on the Saginaw River



Egrets gather near I-75's Zilwaukee Bridge over the Saginaw River

Frankenmuth Dam Fish Passage

Frankenmuth, MI

FUNDING SOURCE: Saginaw Bay Watershed Initiative Network (WIN), U. S. Army Corps of Engineers, Great Lakes Fishery Commission

ENTITY RECEIVING FUNDING: City of Frankenmuth

BUDGET: $4 Million

START/END DATE: 2014 - 2015

In 2005, the PSBW, using a grant from the Saginaw Bay Watershed Initiative Network (WIN), conducted an assessment and developed a report, Enhancing Fish Passage over Low-head Barrier Dams in the Saginaw River Watershed, which was intended to help dam owners make informed and collaborative decisions about the future of their dam. It strived to establish social, economic, and ecological contexts for decision-making and describes potential costs and benefits of enhancing fish passage in several key tributaries in the Saginaw River watershed.

The City of Frankenmuth got a grant from Saginaw Bay WIN that helped put its dam on the Cass River "onto the radar screen" for the U. S. Army Corps of Engineers. The Corps took on the Frankenmuth project as one of its own.

The Frankenmuth Dam is located on the Cass River within the city of Frankenmuth, approximately 20 miles south of Lake Huron's Saginaw Bay. The Cass River originates in Tuscola County in east central Michigan near Cass City. The Cass River's watershed encompasses 848 sq. miles and lies within the Saginaw Bay watershed. The Frankenmuth Dam is a concrete dam approximately 240 feet long with a structural height of 14 feet. It was built in the 1850s to supply water to a local mill. Although walleye and lake sturgeon are the species targeted by the Michigan Department of Natural Resources & Environment and the Partnership for the Saginaw Bay Watershed, a fish passage at the Frankenmuth Dam would also increase habitat connectivity for a variety of other species including white sucker, white bass, smallmouth bass, channel catfish, northern pike, and steelhead. Connecting river habitat for these species would benefit the overall diversity of Cass River and Saginaw Bay watershed species.

Construction was complete in 2015. The fish passage (especially for walleye) now allows access to 73 miles of stream habitat upstream from the dam for possible spawning, opportunity for re-introduction of historically observed species (notably sturgeon), fishing opportunities created at the rock ramp (dam replacement). The impoundment above the former dam was still holding plenty of water for the Frankenmuth Belle to carry passengers on its popular river tours. Fish had already begun to use the combination of quiet pools and fast rapids offered by the new "structure." The walkway and observation platform have now become popular with residents and tourists alike.



Frankenmuth Dam fish passage

Coreyon Reef Restoration

Saginaw Bay, MI

FUNDING SOURCE: U.S. Environmental Protection Agency (USEPA), Great Lakes Restoration Initiative (GLRI), Saginaw Bay Watershed Initiative Network and Michigan Department of Environment, Great Lakes and Energy

ENTITY RECEIVING FUNDING: Michigan Department of Environment, Great Lakes and Energy (EGLE)

BUDGET: $1.4 Million

START/END DATE: 2018 - 2019

The rock reef restoration project is the culmination of years of work to restore historical fish spawning habitat within inner Saginaw Bay. The goal of this project was not simply to create additional spawning habitat for native fish species, but rather to help facilitate a resilient and diverse fish population. Evaluation of this demonstration project can also inform future reef restoration throughout the Great Lakes.

The first major step in this habitat restoration effort concluded in 2016 with the completion of a multi-year assessment of several potential reef restoration sites. Funded by the U.S. Fish and Wildlife Service, the project helped resource managers determine the feasibility of restoring rock reef habitat within Saginaw Bay. The results of the assessment found that conditions in the inner bay are suitable for restoration, with the Coreyon Reef identified as a priority restoration site.

Historically, rock reefs formed in the Great Lakes as glacial deposits and provided important spawning habitat for many native fish species. This project mimiced these naturally-formed reefs by placing approximately 10,000 cubic yards of rock material at the restoration site. The rocks ranged in size from 4 to 8 inches in diameter and were placed on the lakebed by barge and crane. This created a pile of rocks covering up to 3 acres and rising 2 to 4 feet from the lake bottom. The height of the rock piled varied to prevent navigational hazards and maintained a minimum of 6.5 feet of water depth based on the recorded low water level.

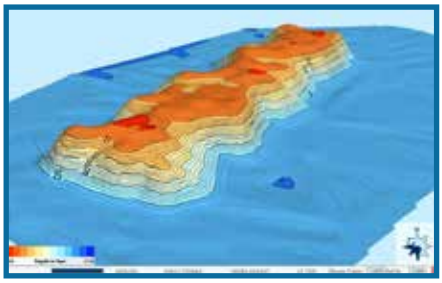
The restored reef created important spawning and juvenile habitat for many native fish, including species that spawn in spring (Walleye, Smallmouth Bass, Suckers) or fall (Lake Whitefish, Cisco, Lake Trout, Burbot). During spawning, the gaps formed between the rocks create a sheltered environment protected from predators where fish eggs can incubate. As the eggs hatch, the warm and highly productive waters of the inner Bay provide excellent nursery habitat and abundant food sources for larval and young fish, encouraging fast growth and increasing survival potential.

The goal of this reef restoration project was not simply to create additional spawning habitat, but rather to facilitate a resilient and diverse fish population. This project also serves as a demonstration project which can be evaluated to inform future reef restoration throughout the Great Lakes.

The Partnership for the Saginaw Bay Watershed was one of many partners that participated on the reef restoration team and planning calls.



Barges heading for Coreyon Reef



Purdue 3D reef plan



Coreyon Reef construction

REINTRODUCTION OF STURGEON TO THE SAGINAW RIVER SYSTEM

Saginaw River Watershed, MI

FUNDING SOURCE: U.S. Fish & Wildlife Service (USFWS), Michigan Department of Natural Resources (MDNR), Sturgeon for Tomorrow, Saginaw Bay Foundation

ENTITY RECEIVING FUNDING: Saginaw Bay Sturgeon Restoration, Saginaw Bay Watershed Initiative Network

BUDGET: $25,000 Annually

START/END DATE: 2018 - 2028

Lake Sturgeon are found throughout rivers and lakes in North America including Michigan. Lake Sturgeon were common to all of the Great Lakes in the early 1800s. However, due to habitat degradation and an increase in commercial utilization sturgeon numbers declined.

In the 1990s habitat restoration efforts and education began. In 2018, the Saginaw Bay Sturgeon Restoration, a member of the Saginaw Bay Watershed Initiative Network along with many partner agencies, nonprofit organizations, schools and more, started releasing more than 1,000 juvenile Lake Sturgeon into four Saginaw Bay Watershed rivers: Cass, Tittabawassee, Shiawassee, and Flint. The partners include Sturgeon for Tomorrow, The Conservation Fund, MDNR, USFWS, Michigan Sea Grant, Michigan State University Extension, and many local partners including the Partnership for the Saginaw Bay Watershed.

The Lake Sturgeon rehabilitation in the Saginaw River is utilizing surplus fish from both the Black River Streamside Rearing Facility and the Genoa National Fish Hatchery. It is expected that up to 2,000 Lake Sturgeon will be stocked into the Tittabawassee, Flint, Shiawassee and Cass rivers annually for the next decade or longer. It is expected that when the fish mature, which can take up to 20 years, they will return to their natal river to spawn. All fish are fitted with a microchip PIT tag which will allow for data gathering in future assessments.

The goal is for a self-sustaining lake sturgeon population to be restored in Saginaw Bay and Lake Huron.



Sturgeon release



Young conservationist participating in Sturgeon release

Southeast Michigan Council of Governments

SEMCOG, the Southeast Michigan Council of Governments, supports local planning through its technical, data, and intergovernmental resources, striving to improve the region's water quality, enhance transportation systems, revitalize communities, and spur economic development. Since its inception in 1968, SEMCOG has conducted regional planning in partnership with local member governments. SEMCOG serves the Southeast Michigan region, made up of Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw, and Wayne Counties. Membership is open to all counties, cities, villages, townships, intermediate school districts, and community colleges.

The Function of SEMCOG

- Promote informed decision-making by improving Southeast Michigan and its local governments through insightful data analysis and direct assistance to members;
- Promote the efficient use of tax dollars for infrastructure investment and governmental effectiveness;
- Develop regional solutions that go beyond the boundaries of individual local governments; and
- Advocate on behalf of Southeast Michigan in Lansing and Washington.

SEMCOG's Environment and Infrastructure group provides planning and implementation assistance across air quality, water resources, water infrastructure, materials management, parks and recreation, and land conservation topic areas. We bring together local governments and other agencies to improve the quality of the region's natural resources and protect public health. The collaborative efforts address various environmental- and water-related challenges and identify best practices for local implementation. We advance cost-effective and strategic initiatives that provide direct benefits to the region. Examples of these initiatives and products include:

- Water Infrastructure Planning Guide
- Growing our Resilience, Equity and Economy with Nature (GREEN) Initiative
- Water infrastructure and environment legislative and regulatory support.
- Federal grant funding subaward programs.

Upcoming projects will focus on developing the Southeast Michigan Healthy Climate Plan and the Regional Resilience Improvement Plan.

In addition, SEMCOG helps to disseminate environmental education to its members and the public through programs such as the One Water campaign, which promotes shared responsibility for our water resources. Overall, SEMCOG and its Environment and Infrastructure team play a vital role in enhancing the region's sustainability and quality of life through comprehensive planning and coordination.

Contact Information:
SEMCOG
1001 Woodward Ave #1400
Detroit, MI 48226

Website: www.semcog.org

Executive Director:
Amy O'Leary, CAE
Email: oleary@semcog.org
Phone: 313-324-3350

Manager, Environment & Infrastructure:
Kelly Karll, PE
Email: karll@semcog.org
Phone: 313-324-3375



Ambassador Bridge – Detroit, MI



Green infrastructure implementation on Auburn Road, Rochester Hills, MI



SEMCOG members tour Innovation Hills Park, Rochester Hills, MI

Green Infrastructure Assessments for Coastal Resilience

FUNDING SOURCE: Michigan Department of Environment, Great Lakes and Energy (EGLE), Coastal Management Program that is funded, in part, by the National Oceanic and Atmospheric Administration (NOAA)

ENTITY RECEIVING FUNDING: Southeast Michigan Council of Governments (SEMCOG)

BUDGET: $124,457 with $62,253 in match from SEMCOG

START/END DATE: 2022 - 2023

SEMCOG, in partnership with the Center for Watershed Protection (CWP), was awarded a Michigan Coastal Management Grant to support resilience capacity building in Southeast Michigan. Specifically, the Green Infrastructure Assessments for Coastal Resilience in Southeast Michigan project identified high-priority, publicly-owned properties and looked at the feasibility for green infrastructure (GI) on these sites. Green infrastructure elements identified through this project included shoreline softening, bioretention, permeable pavement, and impervious cover removal. Developing resilient solutions, especially within coastal communities, is a local and regional priority to ensure that communities can withstand and recover from extreme weather events. The implementation of nature-based solutions like GI is key to enhancing coastal resilience.

SEMCOG and CWP coordinated with over 50 local agencies and partners to identify potential GI project site locations. Individual discussions, virtual meetings, and an online ArcGIS Survey123 facilitated collection of potential project site locations.

After stakeholder input was received for potential project locations, the project team completed approximately 75 site field assessments. The project team used a Site Analysis Approach from the CWP Urban Stormwater Retrofit Practices Manual to determine if a site met the criteria for green infrastructure implementation. Separate processes were developed for shoreline and upland sites in partnership with the project stakeholders. Through these field assessments, 45 unique sites were found to be potentially feasible for green infrastructure implementation. Four sites had both upland and shoreline opportunities resulting in a total of 48 distinct projects. These sites represent $20 million investment in nature-based solutions, and would result in 60 acres of drainage area managed, 1.6 million gallons of stormwater runoff captured, and 2 miles of shoreline restored.

The project team developed concept plans for all 48 potential opportunities. Each concept design includes a narrative describing the proposed work, including a cost estimate and a one-page layout of the plan. Having these plans in place will help stakeholders move forward with project design and implementation. SEMCOG will work with communities to identify potential funding opportunities for implementation.



GI concept plan



Tour of GI at Sterling Relief Drain

Green Infrastructure Partnerships in Southeast Michigan

FUNDING SOURCE: U. S. Environmental Protection Agency (USEPA), Great Lakes Restoration Initiative (GLRI)

ENTITY RECEIVING FUNDING: Southeast Michigan Council of Governments (SEMCOG)

BUDGET: $1.3 Million

START/END DATE: 2022 - 2024

SEMCOG has partnered with the USEPA GLRI to establish a green infrastructure subaward program. This program has and continues to support implementation of small-scale green infrastructure techniques that work towards regional and local stormwater management goals. It is also building capacity at the local level for a number of disadvantaged communities.

The two subaward programs have and are supporting fifteen (15) local agencies to construct a variety of green stormwater infrastructure techniques that provide multiple community benefits. SEMCOG has awarded GLRI funds to the following local agencies:

- Clinton Township
- Independence Township
- City of Madison Heights
- City of Rochester Hills
- Pittsfield Township
- City of Center Line
- Clinton Township
- City of Dearborn
- City of Grosse Pointe Park
- Huron River Watershed Council – in coordination with the City of Walled Lake and the City of Wixom
- City of Northville
- Oakland County Water Resources Commission
- City of River Rouge
- City of Southfield
- City of Trenton

These techniques are located in parks, along major transportation corridors, adjacent to waterways, in residential neighborhoods and at local government facilities. Together, they will achieve more than 12- million gallons of runoff reduction on an annual basis within the southeast Michigan portion of the Lake Erie watershed.
These subaward partnerships between SEMCOG and USEPA have provided multiple benefits across the region, including:

- Supporting small-scale projects with federal funds;
- Building capacity at the local level;
- Expanding demonstration project opportunities in underserved communities;
- Raising additional public awareness through community engagement about stormwater; and
- Increasing stormwater collaboration opportunities and partnerships across the region.



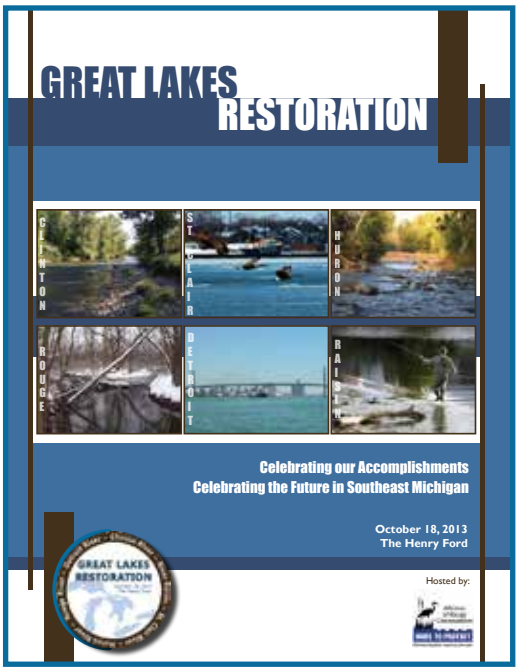
GI along Auburn Road in Rochester Hills, MI



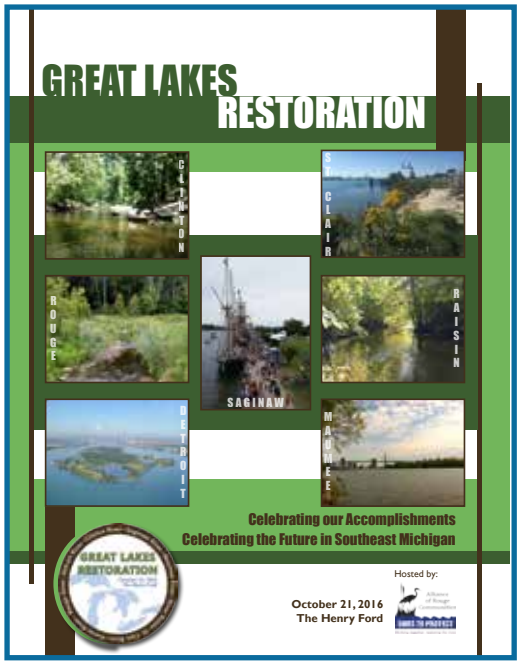
GI in Normandy Park in Clinton Twp., MI

View past Great Lakes Restoration Celebration books online!

2013 Book:



2016 Book:



2019 Book:



Great Lakes Commission

Since it was established in 1955 by the Great Lakes Basin Compact, the Great Lakes Commission (GLC) has worked with its member states and provinces to address issues of common concern, develop shared solutions and collectively advance an agenda to protect and enhance the region's economic prosperity and environmental health.

Our Vision
The Great Lakes Commission is a binational leader and a trusted voice ensuring the Great Lakes and St. Lawrence River support a healthy environment, vibrant economy and high quality of life for current and future generations.

Our Mission
The Great Lakes Commission represents, advises and assists its member states and provinces by fostering dialogue, developing consensus, facilitating collaboration and speaking with a unified voice to advance collective interests and responsibilities to promote economic prosperity and environmental protection and to achieve the balanced and sustainable use of Great Lakes – St. Lawrence River basin water resources.

Our Membership
Our members include the eight Great Lakes states with associate member status for the Canadian provinces of Ontario and Quebec. Each jurisdiction appoints a delegation of three to five members comprised of senior agency officials, legislators and/or appointees of the governor or premier.

The GLC is developing and managing several regional collaborative partnerships to restore and protect habitat for fish and wildlife, support the remediation of degraded areas, and ensure resiliency to changing lake levels and impacts from climate change. The GLC coordinates regional engagement, improves management, advances research, and facilitates communication and outreach to address coastal conservation challenges.

Contact Information:
Great Lakes Commission
1300 Victors Way, Suite 1350
Ann Arbor, MI 48108

Website: www.glc.org

Coastal Conservation and Habitat Restoration Project Manager:
Eric Ellis
Email: eellis@glc.org
Phone: 734-396-6089

Coastal Conservation and Habitat Restoration Senior Program Specialist:
Jillian Estrada
Email: jestrada@glc.org
Phone: 734-396-6059







Ford Cove Feasibility

Grosse Pointe Shores, MI

FUNDING SOURCE: National Oceanic and Atmospheric Administration (NOAA), Great Lakes Restoration Initiative (GLRI), and Great Lakes Commission (GLC) Regional Partnership

ENTITY RECEIVING FUNDING: Edsel & Eleanor Ford House

BUDGET: $264,514

START/END DATE: 2020 - 2022

Lake St. Clair is an approximately 430-square mile lake between Michigan and Ontario that connects Lake Huron with Lake Erie. Nearly 8 million people live within a one-hour drive of Lake St. Clair. Most of the U.S. Lake St. Clair coastline is in Macomb County and the shoreline has been heavily developed. Of Macomb County's 31.5 miles of shoreline only 2,140 linear feet remain in a natural condition, a 99.9 percent reduction in natural shoreline. Ford Cove is one of the few remaining areas in this portion of Lake St. Clair that is suitable for large scale shoreline restoration to improve aquatic habitat and replace hardened shoreline with natural features.

This project implemented an initial feasibility study to evaluate and plan for the restoration of degraded coastal wetland, nearshore, and shoreline habitat in a heavily developed section of Lake St. Clair. The proposed project activities will benefit a wide diversity of species by reducing high-energy wave impacts and improving nursery habitat, cover, and forage for fish, herps, waterfowl, and invertebrates. The consultant, OHM Advisors, performed detailed baseline chemical, geotechnical, and ecological evaluations, preliminary hydrologic and hydraulic modeling, and produced conceptual plans with estimated implementation costs and restoration recommendations.

Just over $260,000 was provided for this project by NOAA through a Regional Partnership with the Great Lakes Commission. Funding came from the GLRI, a regional program that supports the implementation of a comprehensive plan for the Great Lakes. Additional funding in the amount of $7 million has been secured by the Eleanor & Edsel Ford House to complete the engineering & design and implementation phases of the project.



View of Ford Cove



Powderhorn Lake Connectivity

Chicago, IL

FUNDING SOURCE: National Oceanic and Atmospheric Administration (NOAA), Great Lakes Restoration Initiative (GLRI), and Great Lakes Commission (GLC) Regional Partnership

ENTITY RECEIVING FUNDING: Audubon Great Lakes

BUDGET: $1.1 Million

START/END DATE: 2019 - 2023

Powderhorn Lake is a 50-acre freshwater lake with an adjacent 55-acre shallow pool, owned by the Forest Preserves of Cook County (FPCC), and located in Chicago, Illinois. To the north lies Wolf Lake, a 950-acre freshwater lake, owned by the Illinois Department of Natural Resources (IDNR). Powderhorn Lake is embedded within one of the few remaining examples of the dune and swale topography that once characterized the Calumet Region along the south shore of Lake Michigan. Once connected as part of a large collection of marshes, lakes, and rivers adjacent to Lake Michigan, these lakes have been isolated by urban and industrial development. Despite their isolation, populations of aquatic species characteristic of the Great Lakes basin persist. However, the impacts of isolation threaten their future survival. Currently, Powderhorn Lake remains separated from its northern neighbor, Wolf Lake, which connects to Lake Michigan through the Indian Creek pathway to the Calumet River.

Due to this disconnection, Powderhorn Lake has no natural outlet for water discharge and currently drains north to Wolf Lake under the railroad blocking all fish passage. During times of high-water levels, the lake's variety of marsh and hemi-marsh habitats are transformed into open water areas which overflow into adjacent habitats and nearby residential areas.

In 2016, the Forest Preserves of Cook County (FPCC)'s grant request to conduct a hydrological study of Powderhorn Lake was supported by the Illinois Department of Natural Resources' Coastal Management Program through a federal grant from the National Oceanic & Atmospheric Administration. The project sought to study, define, and propose practices to mitigate hydrologic impacts and non-point source (i.e., stormwater runoff) pollution to the Powderhorn Lake site.

The study was completed in 2018, with the major finding that the lake and adjacent pool have elevated water levels due to artificial impoundment. Elevated water levels reduce the function of the pool for early age fish habitat, marsh bird habitat, and refugia for small non-game fishes. The resulting plan designed hydrological improvements which would allow for the adjustment of water levels by reconnecting Powderhorn Lake to Wolf Lake and, eventually, Lake Michigan.

The project implemented the creation of 630 linear feet of stream habitat and the installation of two water control structures that restore the hydrologic connection of 192 acres of emergent wetland habit between Powderhorn Lake and Wolf Lake.



Aerial view of Powderhorn Lake



Construction of hydrologic connection

Cascade Valley View River Restoration

Akron, OH

FUNDING SOURCE: National Oceanic and Atmospheric Administration (NOAA), Great Lakes Restoration Initiative (GLRI), and Great Lakes Commission (GLC) Regional Partnership

ENTITY RECEIVING FUNDING: Summit Metroparks

BUDGET: $3 Million

START/END DATE: 2018 - 2022

Located in northeast Ohio, the Cuyahoga River AOC is comprised of the lower 46.5 miles of the Cuyahoga River, including all the tributaries that drain to that section of river, and the adjacent Lake Erie shoreline and its tributaries. The AOC begins at the head of the Gorge Dam pool in Akron/Cuyahoga Falls, ends at Lake Erie, and includes the shoreline from the western Cleveland border to Euclid Creek on the east. The Cuyahoga River has a history of heavy industrial use and unmanaged pollution. Periodic pollution fires plagued the river beginning in 1936, with the largest river fire occurring in 1952. By the 1960s, the lower Cuyahoga River in Cleveland was used for waste disposal and was choked with debris, oils, sludge, industrial wastes, and sewage. These toxins were considered a major source of pollution to Lake Erie, which was considered "dead" at the time. On June 22, 1969, the Cuyahoga River caught fire and captured national attention. This incident led to important environmental legislation including the Clean Water Act. It also spurred the creation of federal and state environmental protection agencies.

Summit Metro Parks (Metroparks) has completed the process of restoring a 200-acre golf course (Valley View Golf Club) along a two-thirds mile stretch of the Cuyahoga River at Cascade Valley View Metropark in Akron, Ohio. Initial restoration activities at the site were implemented and funded by a Clean Ohio grant. This includes the restoration of headwater tributaries via daylighting of culverted streams, wetlands restoration, and reforestation of upland areas. $1,226,041 was awarded to fund the engineering and design of this restoration plan through a 2016 NOAA/GLC Regional Partnership. An additional award of $1,842,919 was funded in 2019 under a second NOAA/GLC Regional Partnership to fund the implementation phase to restore an estimated 5,000 linear feet of the mainstem of the Cuyahoga River and 60 acres of associated floodplain. The restoration monitoring plan was also initiated during this phase of the project and builds on active Metropark monitoring activities.

Completion of this project resulted in the restoration of 55 acres of floodplain habitat and 4,750 linear feet of stream habitat, 55 acres of native plant establishment, and the installation of 476 habitat structures placed in-stream.



Before restoration *After restoration*

Collins Park Golf Course Restoration & Ottawa River Restoration at Jermain Park

Toledo, OH

FUNDING SOURCE: National Oceanic and Atmospheric Administration (NOAA), Great Lakes Restoration Initiative (GLRI), and Great Lakes Commission (GLC) Regional Partnership

ENTITY RECEIVING FUNDING: City of Toledo

BUDGET: $1.2 Million

START/END DATE: 2021 - 2027

Designated as an Area of Concern (AOC) under the Great Lakes Water Quality Agreement in 1987, the Maumee is one of the largest AOCs in the United States. The area has a two-century history of development, contamination, and degradation that led to the impairment of water flowing into Lake Erie and the need for focused restoration efforts. Located in Northwest Ohio, the Maumee AOC comprises 787 square miles that includes approximately 23 miles of the lower Maumee River downstream to Maumee Bay, as well as other waterways such as Swan Creek, Ottawa River (Ten Mile Creek), Grassy Creek, Duck Creek, Otter Creek, Cedar Creek, Crane Creek, Turtle Creek, Packer Creek, and the Toussaint River.

Established in 1932, the nine-hole, roughly 90-acre Collins Park Municipal Golf Course is located in eastern Toledo, Ohio. Duck Creek runs through the middle of the course and has been significantly altered through subsurface culverts, resulting in degraded fish and wildlife habitat. The site has significant potential to provide improved habitat for a variety of native species while addressing the Loss of Fish and Wildlife Habitat and Degradation of Benthos Beneficial Use Impairments designated for the Maumee AOC.

$201,035 was awarded through the 2019 Regional Partnership between GLC and NOAA to fund a feasibility study which is currently exploring restoration options of Duck Creek at the Collins Park Golf Course. Another $2,03,116 has been awarded to complete engineering and design once a final concept design has been created. Restoration will result in the removal of subsurface culverts, improved sinuosity, an expanded floodplain, and the installation of in-water habitat structures at Duck Creek.

Jermain Park is located on land purchased by the City of Toledo in 1915 which was then added to the Toledo Park system. The Ottawa River runs through the park and has undergone dredging and infrastructure development over time, including previous use as an amusement park. Past activity at the site degraded fish and wildlife habitat, but the potential to provide significant habitat for a variety of native species exists.

$849,720 was awarded through the 2019 Regional Partnership between GLC and NOAA to fund final engineering & design and construction for this project. Completion of this project will enhance approximately 2.7 acres of wetland habitat, stabilize 2,300 linear feet of eroding streambank, and enhance approximately 1.5 acres of riparian habitat.



Ottawa River at Jermain Park



Duck Creek at Collins Park Golf Course

Ralph C. Wilson Centennial Park Shoreline Restoration

Erie & Niagara Counties, NY

FUNDING SOURCE: National Oceanic and Atmospheric Administration (NOAA), Great Lakes Restoration Initiative (GLRI), and Great Lakes Commission (GLC) Regional Partnership

ENTITY RECEIVING FUNDING: Buffalo Urban Development Corporation

BUDGET: $11.2 Million from multiple NOAA/GLC Regional Partnership grants

START/END DATE: 2020 - 2027

The Niagara River Area of Concern (AOC) is located in both Erie and Niagara counties in western New York and connects Lake Ontario and Lake Erie. In 1987, the Niagara River was designated as an AOC under the Great Lakes Water Quality Agreement with seven designated beneficial use impairments (BUIs). Currently, only one BUI has been removed.

Anticipated outcomes of the proposed project include approximately 2 acres of submerged and emergent wetland, including deep water channels and fish enhancement structures. This newly created wetland ecosystem will directly contribute to the Niagara River AOC delisting by addressing BUI #14, Loss of Fish and Wildlife Habitat, and will serve a critical coastal resiliency function for the Western New York region.

This project is part of a larger transformative effort to completely redesign and re-construct LaSalle Park into the new Ralph C. Wilson, Jr. Centennial Park. In addition to the ecological and coastal resiliency benefits, the project will provide many public amenities and aesthetic improvements, as well as utilize innovative approaches to managing stormwater and filtering pollutants using green and living infrastructure features. While these features will be designed and funded separately, they leverage the requested GLRI funding, expanding its catalytic effect. As one of the jewels in the City of Buffalo's emerald necklace of parks and open spaces, the transformation of LaSalle Park into a world-class waterfront space directly contributes to Western New York's emerging Blue Economy, serving as a driver for community revitalization and economic sustainability.



Current conditions at R. C. Wilson Centennial Park



Hardened shoreline at R. C. Wilson Centennial Park

Organization Name: Friends of the Rouge
Project Title: FOTR-2022-1 PIE Activities
PIE2-BMP7-Workday and Rain Barrel Sale
Period Covered: January 1, 2022 – September 16, 2022
Date Submitted: September 16, 2022
Invoice Number: 22-00005

ACTIVITY REPORT

- Held two rain garden maintenance workdays
  - 8/19/2022 1st workday at Southfield's Beechwoods Park weeded the newly planted rain garden funded via ARC's GLRI Forest Service grant. The project engaged 11 volunteers to weed the 3,000 SF rain garden.
  - 9/14/2022 2nd workday at Plymouth Municipal Yard, weeded the newly planted rain garden from Spring 2022, funded via ARC's GLRI Forest Service grant. The project engaged 3 volunteers to weed the combined 2,000 SF new rain garden and 1,000 SF rain garden installed in 2018.
  - Marketed both projects and recruited volunteers
  - Provided rain garden education to all attendees
- Held two rain barrel sales in Southfield and Livonia in May/June 2022 with 136 barrels sold to 19 ARC member communities.

FRIENDS OF THE ROUGE
RAIN BARRELS SOLD TO ARC COMMUNITIES AT EVENTS IN SOUTHFIELD AND LIVONIA IN MAY/JUNE 2022

COMMUNITIES PURCHASING RAIN BARRELS	RAIN BARRELS SOLD
Beverly Hills	3
Bloomfield Hills	2
Canton	8
Dearborn	14
Dearborn Heights	6
Farmington	5
Farmington Hills	13
Garden City	5
Lathrup Village	1
Livonia	13
Northville	3
Novi	9
Oak Park	1
Plymouth	18
Redford	6
Southfield	14
Troy	8
West Bloomfield	6
Westland	1
TOTAL RAIN BARRELS SOLD	**136**

Friends of the ROUGE

Renato — Entered 9-15-22 GGL

Program: ~~Blackwood~~ GLRE

Date: 9/14/22

Location:

Liability Waiver: I, the undersigned, being of lawful age or the parent or legal guardian of the volunteer involved in the Friends of the Rouge Program in c in the Program, I hereby release, discharge, and forever acquit Friends of the Rouge, a non-profit organization, and its officers, agents, employees, contribu actions, causes of action, claims or any other liabilities whatsoever, known or unknown, or may arise in the future, on account of or in any way related to or a Program. Further, I assume liability for any non-participants who accompany me.

Photo Release: I hereby grant permission to FOTR, their legal representatives and assigns, those for whom FOTR is acting, and those acting v use, and publish, and re-publish photographic portraits or pictures, television/video, web and radio/audio recordings of me without further consi crop or treat the photographs at its discretion. I hereby waive any right that I may have to inspect or approve the finished product or products or recorded.

COVID-19: In the last 14 days, to my best knowledge, I have not been experiencing any COVID-19 symptoms, have not been exposed to anyone with COV COVID.

First name	Last name	Email	Organization / community	City
Linda	VanderLaan	linda_vander_laan@hotmail.com	—	Ply to
Ron	Sayre	ron.s@umich.edu		Canton
Jim	Robertson	ejrobertsonii@gmail.com		Ply Twp

Organization Name: Friends of the Rouge
Project Title: FOTR-2022-1 PIE Activities
PIE2-BMP6-Rain Garden Workshop
Period Covered: January 1, 2022 – December 31, 2022
Date Submitted: September 16, 2022
Invoice Number: 22-00005

ACTIVITY REPORT

- Held one instance of the Master Rain Gardener Training Program, a five part course, on the dates below
    - 3/3/2022
    - 3/10/2022
    - 3/17/2022
    - 3/24/2022
    - 4/7/2022
- 29 students participated from the Rouge River Watershed service area. An additional 53 students participated from outside the Rouge River Watershed, for a total of 82 students.
- As of 8/31/2022, 7 Rouge students are known to have completed construction of their rain garden. 18 total students include the 7 Rouge students have built rain gardens.

Timestamp	Do you intend to build your rain garden? When?	What about this class helped you to plan your rain garden?	This is our first time teaching the class *all together* as a team. Is there something we could do to make it easier or more fun for you?
4/7/2022 12:00	Yes! This spring	Everything	You did an incredible job!
4/7/2022 12:01	Yes! This spring	Everything...I had no clue how to do this and now I feel like I know enough to at least go for it and see what happens!	This format was awesome...You all working together to educate us certainly enriched our experience! Keep this format!!!
4/7/2022 12:02	Yes! This spring	Everything was so thorough, I feel confident about my design and am excited to put this knowledge to work.	This was wonderful, thank you so much! The hard work that the organizers did to make this happen really shows and is inspiring!
4/7/2022 12:02	Yes! This summer	Having specific feedback to help me install my rain garden.	I can't think of anything.
4/7/2022 12:02	Yes! This spring	SO VERY MUCH —- information basis was essential for me. the support was amazing. Felt so very inclusive in all levels of skills and experience which really encouraged me	I think you did so very well.
4/7/2022 12:02	Yes! This spring	All of it! Especially liked the plant info.	I felt like the how to parts of digging and creating berm and notch could be given a little more attention for those of us not so mechanically abled.
4/7/2022 12:03	Yes! This spring	This is my first rain garden so the class was very insightful and I enjoyed learning about native plants and the many benefits of rain gardens.	I thought everyone did a really good job collectively. Especially for their first time as a team! Thank you so much for sharing your knowledge!
4/7/2022 12:04	Other	Just knowing more about how to do this period. So many local sources seem to underestimate that amount of planning and work it really entails.	I think you did a really good job with this. For the first time it went very well despite some technical glitches here and there.
4/7/2022 12:04	Yes! This spring	Learning how to measure the area needed and plants to use was very helpful. Seeing the examples and progress photos too.	This worked well overall, the early break out sessions needed a bit more time, as we were getting our bearings.
4/7/2022 12:04	Yes! This spring	The structure to follow through and the interaction with hosts and other students	I liked the different personalities
4/7/2022 12:04	Yes! This fall	General layout requirements/suggestions.	Nope. Good as is.
4/7/2022 12:05	Yes! This summer	the 1:1 suggestions for my site / the excellent plant list from Wash Co.	great to meet everyone... such variety of expertise.... a bit choppy the first go round, sure to smooth out
4/7/2022 12:05	Yes! This summer	Lots of great information on the step by step process of planning and implementing a project. I really enjoyed the feed back, plant recommendations, and suggestions for how to obtain plants.	I think it was great and have no complaints!
4/7/2022 12:05	Yes! This spring	I really appreciated the calculations so I could determine how big of an area to construct. Also, all the plant information...what plant would be best for my garden.	LOVED IT!!!! Each person has a different perspective and emphasis. Please continue.
4/7/2022 12:06	Yes! This spring	Experienced input to direct me to the most viable place to start, PLUS the warning NOT to dig near the gas line!	I think you did an amazing job, it was just enough information, sharing and support from all the participants to give me the courage to take this on, will start tomorrow and send photos.
4/7/2022 12:09	Yes! This summer	I think the class was structured into very manageable bites and followed a logical progression. I especially appreciated the plant lists!!! Really glad this was offered. Will recommend to other gardeners, new and old.	I like the flexibility of the Zoom format. It would be nice if it could be taught just a few weeks later in the season to allow for a more complete experience for the field trips. (For me, personally, this timing was better, but for the sake of demonstration, later might be better.)
4/7/2022 12:09	Yes! This spring	Everything was great. Would really like if there was a reference of potential plants with photos and major characteristics (heights, sun/shade, etc) to aid in selection of plants	Love the team approach & different perspectives
4/7/2022 12:18	Yes! This spring	This classed showed me there were endless possibilities to installing and planting a rain garden. Also, the best practices that are the most efficient. Learning about how to dig, and the percolation testing was something I hadn't even thought of before taking this class.	No class was awesome! You all did a great job cohosting, I loved it!

4/7/2022 15:37 Yes! This summer	Having the coursepack with the plant lists and info about light, moisture and soils.	I feel that each module was taught well. The only suggestion would be to do pairs of presenters for each module so there is more dialog. This would give the opportunity for one of the presenters to monitor the chat and be able to respond directly to questions or comments in real time.
4/8/2022 17:05 Yes! This spring	Plant list, Input/critique form breakout leader Chris)	I like to have some fun with a class setting. But I felt there could of been more detail specific, less cross interaction among instructors, and better organized relating to assigning breakout rooms. I felt more instruction/teaching and less interaction with students. I took the class to learn details and specifics. Please take these points as constructive. Thank you...Ron McMillan
4/9/2022 11:39 Yes! Sometime next year	Everything! It was so useful to get the information about how o plan, construct and which plants to get.	All was good
4/11/2022 14:40 Yes! This spring	So many things helped me! I especially appreciated how to calculate how big the garden should be; how to connect the drain spout to appropriate pcv pipe; and interviews of those that accomplished their gardens....this helped give me confidence.	Absolutely continue the "all together" format!
4/12/2022 7:51 Yes! Sometime next year	The concepts of water flow, size of roof, size of area to consider and the problem with tree roots. I love rain gardens but had not clue about any of the technicalities.	I think zoom skills are important and you guys did really well for a first time with lots of folks. I like a big class, I can just sit back and listen. I did really appreciate the office hours prior to class as a way to have personal attention - that was very helpful. I thought all the presenters were extremebly engaging!
4/12/2022 11:01 Yes! This spring	I appreciate having a rain garden plants guide and specific samples of rain gardens.	I can’t think of anything.

First Name	Last Name	NOTES	Class 1-Intro	Class 2	Class 3	Class 4	Class 5	CERTIFIED?
Luke	Contos		yes	yes			yes	
Emily	Somers		yes	yes	yes		yes	
Noreen	Gillman		Recovering from illness, planning to return					
Donald (Don)	Hess		yes	yes	yes	yes	yes	
Linda	Gobeski		yes	yes	yes	yes	yes	
Mimi	Sullivan		yes	yes	yes	yes	yes	YES
John	Kownacki		yes	Surprise mother-in-lav		yes		
Adam	Gerlach		yes	yes	yes	yes	yes	
Dave	Cirilli		yes	yes	yes	yes	yes	
Terri	Koller		yes	yes	yes	yes	yes	
Julia	Ingle		yes	yes	yes	yes	yes	
Susan	Nuar	Dropped?						
Therese	Nagi		yes	yes	yes	yes	yes	
Jodi (and Christopher)	Whitmore		yes	yes	yes; yes	yes	yes	YES
Joy (and Gerald)	Karpinski	Emergency on Class 3	yes	yes		yes	yes	
Nancy	Kelley	Checking in	yes					
Reef	Morse	Emergency on Class 3	yes	yes		yes	yes	YES
Marie	Kuge		yes	yes	yes	yes	yes	
Tina	Miller		yes	yes	yes	yes	yes	
Jill (Dr)	Norbury-Jaranson	has final garden plan; PLANTED	yes	yes	yes	yes	yes	YES
Len	Ores	has final garden plan	yes		yes	yes	yes	
Candius	Elliott	has final garden plan; PLANTED	yes	yes	yes	yes	yes	YES
Erin	Martinez	working on plan	yes	yes	yes	yes	yes	
Audrey	McPartlin-Corps							
Willie	Morgan	Planning a rain garden in site lot, also working with ECN	yes	yes		yes		
Lola	Gibson-Berg		yes	yes	yes	yes		
Ethel	Hines		yes	yes	yes	yes	excused absence (at tree planting)	
Michelle (and Penelope)	Paich	has final garden plan; PLANTED	yes	yes	yes	yes	yes	YES
Jodi	Toma	has final garden plan (for a customer)	yes	yes	yes	yes	yes	YES

Organization Name: Friends of the Rouge
Project Title: FOTR-2023 BMP7 Promote & Support Volunteer Activities
Period Covered: October 1, 2023 – October 31, 2023
Date Submitted: 11/1/2023
Invoice Number: 23-00195

ACTIVITY REPORT

Green Infrastructure Maintenance Workday

- The workday was held Saturday, September 30 from 9AM – 12PM
- Nine attendees
- Work completed:
    - Removed 7 leaf bags full of weeds
    - Planted native plants on berm (that was destroyed by utility work) (76 plants)
    - Planted native plants in few bare spots in rain garden (12 plants)
    - Applied 3 cy of mulch
    - Moved boulders back in place at entrance to rain garden (that were moved by utility work or snow plow)
- Hulsing Elementary School project is now complete

Rain Barrel Sale

- Complete

Friends of the ROUGE

SIGN-IN FORM
Date: 9/30/23

Project: Hulsing Elementary
Location: 8055 Fleet St, Canton, MI 48187

Thank you for volunteering for a cleaner Rouge River!

Welcome, volunteers!

Liability Waiver
I, the undersigned, being of lawful age or the parent or legal guardian of the volunteer involved in the Friends of the Rouge (FOTR) River Restoration Program (hereinafter referred to as "Program") in consideration of being allowed to participate in the Program, I hereby release, discharge, and forever acquit FOTR a non-profit organization, and its officers, agents, employees, contributors, and sponsors from any and all actions, causes of action, claims or any other liabilities whatsoever, known or unknown, or may arise in the future, on account of or in any way related to or arising out of my participation in the Program. Further, I assume liability for any non-participants who accompany me.

Thank you

First Name	Last name	Email address	Group (If applicable)	Signature
Linda	Cleary	lindaccleary@icloud.com		
Rachel	Nagy	rnagy@ltu.edu	✓	Rachel Nagy
Saara	Patel	saarayp@gmail.com	✓	Saara Patel
Bob	Pennock	bobbypennock@gmail.com	✓	Bob Pennock
Thomas	Wall	Wall1t@cmich.edu	✓	Thomas Wall
Linda	VanderLaan	linda_vander_laan@hotmail	✓	L. VanderLaan
Michelle	Anderson-Romej	lazarides17@yahoo.com	✓	MA
Jackson	Romej	hamsandwich72@yahoo.com	✓	— Host Wall
Rob	Wall		✓	

Friends of the ROUGE

www.therouge.org
650 Church Street Suite 209
Plymouth, MI 48170
734-927-4904

Rouge River Benthic Monitoring Program Spring 2022 Report

This report covers benthic macroinvertebrate monitoring at 29 sites on Rouge River tributaries and branches in the spring of 2022. Most sites were sampled during the Spring Bug Hunt on April 23, 2022 where 73 attendees sampled 19 sites in 14 teams. The plan had been to sample 27 sites on April 23 but the night before the event, as much as 1.1 inches of rain fell. Many sites were simply too deep and fast to sample. Five sites were moved upstream. FOTR staff, Wayne County staff and volunteers sampled seven additional sites before and after the event, one site was sampled as part of the spring team leader training and two additional sites were sampled by Sue Thompson on her own.

FRIENDS OF THE ROUGE BENTHIC MONITORING PROGRAM

FOTR's benthic monitoring program was started in 2001 to involve a large number of volunteers in monitoring the health of the watershed by sampling the creeks of the Rouge River. The types and number of benthic macroinvertebrates found can be used to assess water quality. Each team of volunteers samples two sites under the direction of a trained team leader. Samples of each organism are collected and field identifications are verified in the lab.

Stream Quality Index, Taxa, EPT

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 score. A number of different organisms also results in a high score. The SQI is then given a rating:

>48 = EXCELLENT
34-48 = GOOD
19-33 = FAIR
<19 = POOR

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

EPT refers to the number of mayfly, caddisfly and stonefly families found; these three orders contain some of the most sensitive organisms.

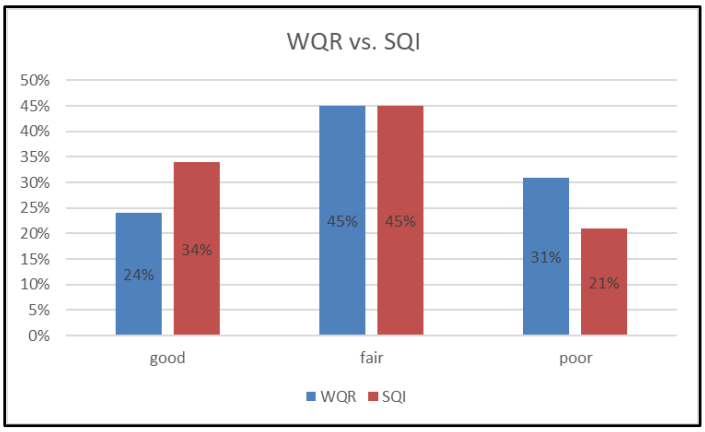
Water Quality Rating

Starting in Fall 2021, Michigan Clean Water Corps, the statewide organization that provides the protocol for monitoring groups in the state, replaced **SQI** (see box above) with **Water Quality Rating (WQR).** The new WQR rates each Family based on the Hilsenhoff Sensitivity Index. The number of individuals found for each family is then multiplied by the family's sensitivity rating, then divided by the total number of individual organisms found. Leaders strive to collect at least 100 organisms. If they collect under 60, the score is automatically 7, if under 30, it is automatically 10. Unlike SQI, the lower the WQR, the higher quality the rating.

00.0-3.50 = EXCELLENT
3.51-4.50 = VERY GOOD
4.51-5.50 = GOOD
5.51-6.50 = FAIR
6-51-7.50 = FAIRLY POOR
7.51-8.50 = POOR
9.51-10.0 = VERY POOR

Overall Scores

Stream Quality Index (SQI) and the new Water Quality Index (WQR) both averaged fair or 45% of the sites (map p. 5, Table 3 p. 6, and graph below). SQI rated more sites in the good range and fewer sites in the poor range than WQR.



Data Trends

We compared the spring 2022 scores to the average for each site (see each section). Of the 29 sites, four (14%) scored above a standard deviation of the mean, four (14%) were below and 21 (72%) were stable.

To compare trends over time, we analyzed the trends in SQIs (Table 1, p. 3; graphs p. 7-11). The Middle 1 and the Middle 3 subwatersheds are showing significant positive trends, even when combined. No other subwatershed showed significant trends.

Table 1: Spring Data Trend Summary 2001-2022					
Branch	**slope**	**p-value**	**True trend**	**Subwatershed average score**	**Water Quality Rating**
Main 1-2	0.1027	0.3421	no trend	27	Fair
Main3-4*	-0.1351	0.7504	no trend	25	Fair
Upper	-0.0650	0.5683	no trend	24	Fair
Johnson Creek	0.1870	0.2072	no trend	39	Good
Middle 1	0.5320	0.0009	yes, positive	30	Fair
Middle 3*	0.5756	0.0110	yes, positive	20	Fair
Lower 1	0.1125	0.2344	no trend	30	Fair
Lower 2*	-0.1050	0.6097	no trend	26	Fair
Middle 1 and Middle 3 combiined	0.689	0.000005	yes, positive	27	Fair
		*no sites sampled in spring 2022 in these subareas			

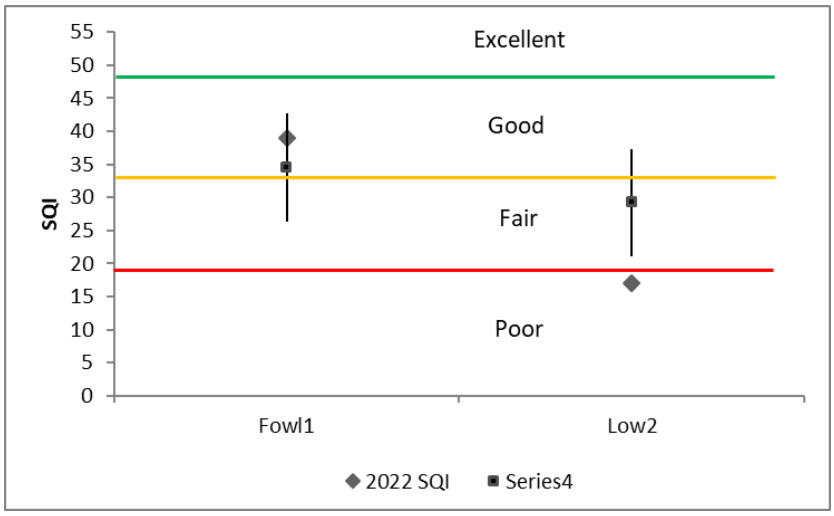
In addition to the trend analysis by subwatershed, a site-by-site analysis of all the sites was done (Table 2). Three sites had significant **negative** trends. Two sites had positive trends.

Table 2: Spring Bug Hunt Trends by Site 2001-2022				**Site average score**	**Water Quality Rating**
Site	**p-value**	**Slope**	**True trend**		
Nott	0.0346	-0.4555	yes, negative	24	Fair
MR22	0.0249	-0.8073	yes, negative	40	Good
MR27	0.0012	-3.9403	yes, negative	42	Good
Nton	0.0265	0.5290	yes, positive	19	Fair
Wall2	0.0162	0.4541	yes, positive	22	Fair

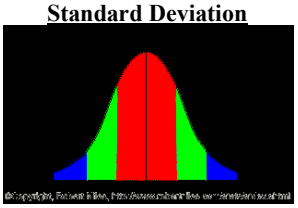
Lower Branch

Two sites were sampled on the Lower Branch of the Rouge: Fowl1 and Low2. The Fowl1 site had a fair WQR and a good SQI with 17 taxa including 4 EPT. The Low2 site had a poor score for both SQI and WQR and was below a standard deviation of the mean for the site.

Chart 1: Lower Branch SQI and Mean with Standard Deviation



Standard Deviation

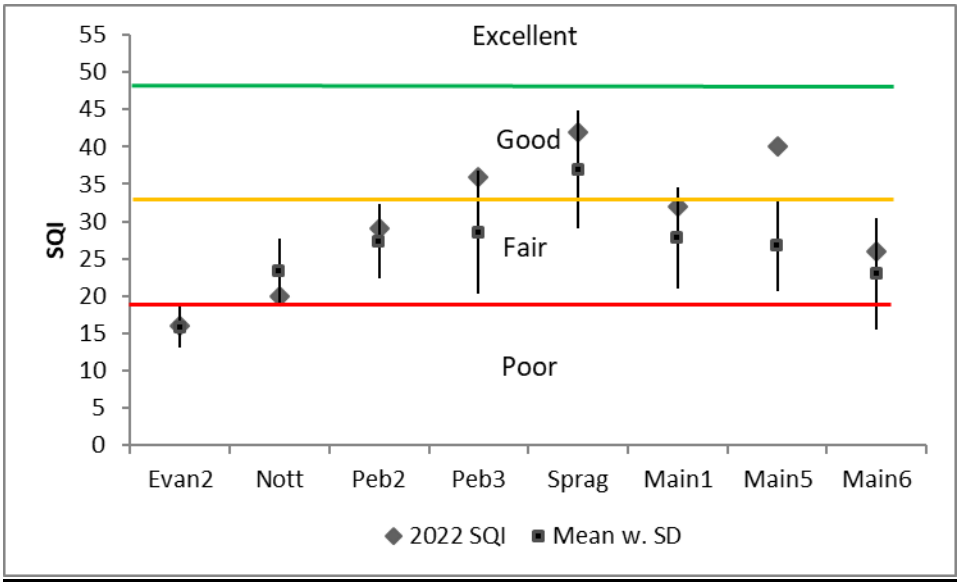


Some sites have consistent scores where others vary greatly year to year. Standard deviation is a measure of how spread out your data is. 68% of your data will fall within one standard deviation of the mean (red areas shown above). On Charts 1-4, one standard deviation is represented by the vertical lines for each site. Standard deviation helps us to determine whether the current score is within normal for the site.

Main Branch

Eight sites on the Main Branch were sampled, including Evans, Pebble, Nottingham and Sprague Creeks. For SQI, three sites were good, four fair and one poor. For WQR, 2 sites were good, 4 fair and 2 fairly poor. The site that scored poor or fairly poor for both scoring systems, Evan2, had less than 60 organisms found. Seven sites were within a standard deviation of the mean and one was above – Main5.

Chart 2: Main Branch & Tributary SQI and Mean with Standard Deviation



Middle Branch

Thirteen sites were sampled on the Middle branch including three tributaries: Johnson, Tonquish and Walled Lake Branch Creeks. For SQI, six sites were good, six were fair and one was poor. For WQR, four sites were good (one very good), six fair and three fairly poor – all because they had less than 60 organisms. For the Johnson Creek (Chart3), most sites were within a standard deviation of the mean and one was below – MR-27. For the other tributaries and main Middle (Chart 4), four sites were within a standard deviation of the man, one was above (Wall2) and one was below (MR-2). High water was likely the cause for the two low scores.

Chart 3: Johnson Creek SQI and Mean with Standard Deviation

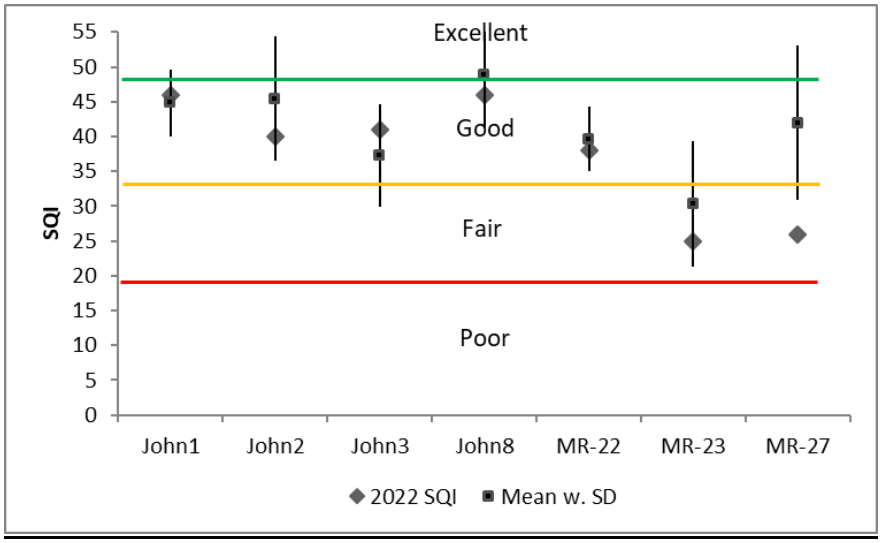
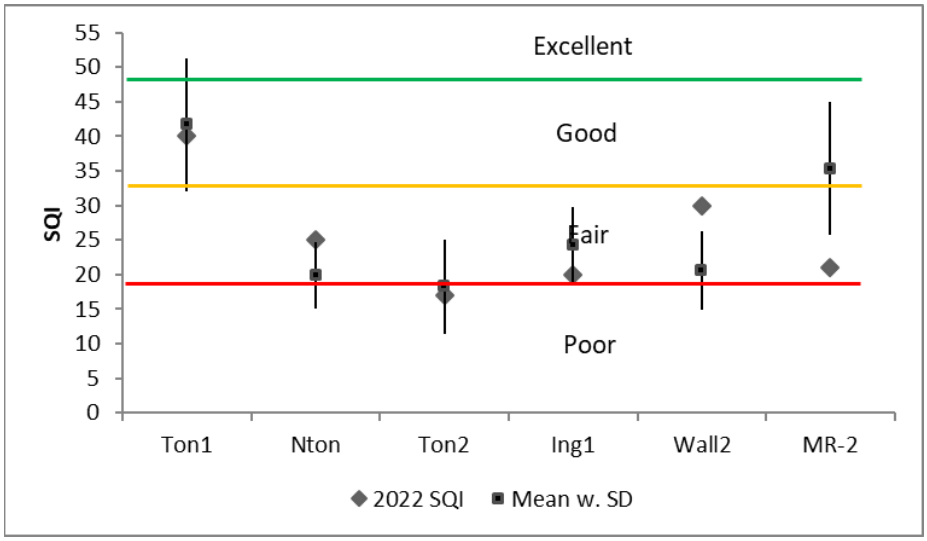


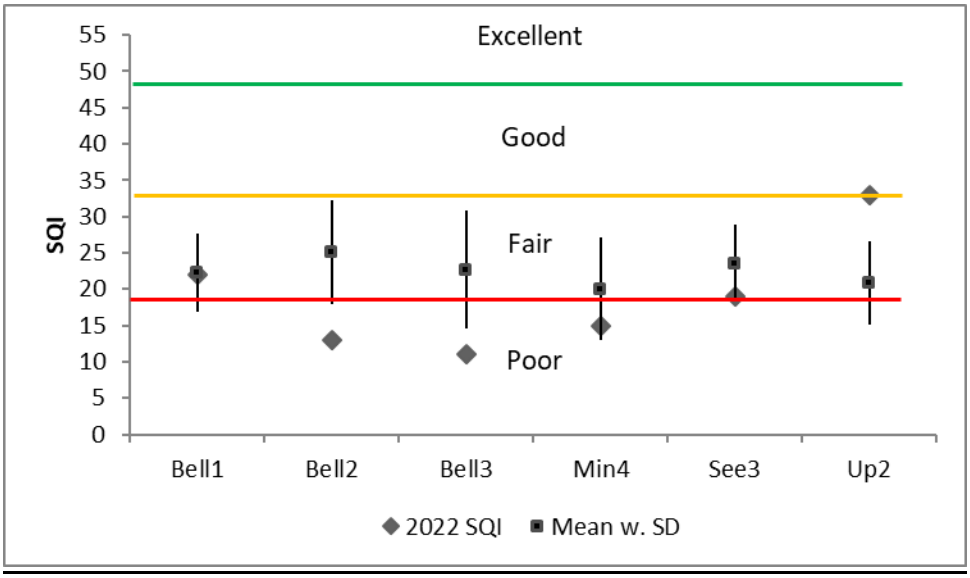
Chart 4: Tonquish, Walled Lake and Middle Branch SQI and Mean with Standard Deviation



Upper Branch

Six Upper branch sites were sampled this spring, including the Bell Branch, Minnow Pond and Seeley Creeks. For SQI, three were fair and three poor. For WQR, one was good, two were fair and three poor (2 very poor, 1 fairly poor). Three sites were within a standard deviation of the mean, two were below (Bell2 and Bell3) and one was above (Up2).

Chart 5: Upper Branch SQI with Mean and Standard Deviation



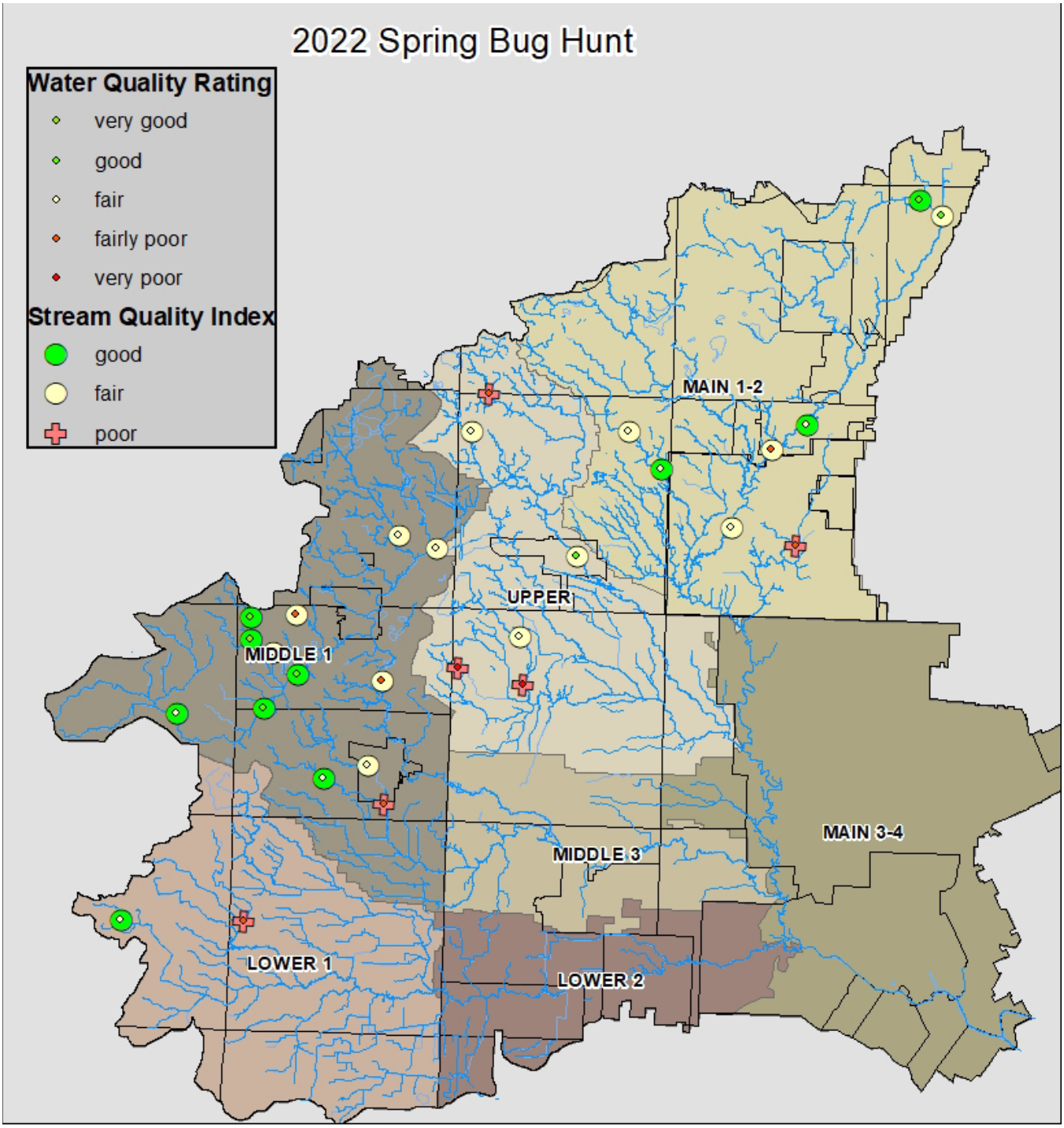

2022 Spring Bug Hunt
Water Quality Rating
very good
good
fair
fairly poor
very poor
Stream Quality Index
good
fair
poor
MAIN 1-2
UPPER
MIDDLE 1
MAIN 3-4
MIDDLE 3
LOWER 1
LOWER 2

Table 3: Sampling Sites and Scores											
Branch	**Stream Name**	**FIELDID**	**Site Description**	**city/village/township**	**WQR**	**WQRR**	**SQI**	**comparison to average SQI**	**SQIR**	**TAXA**	**EPT**
Lower	Fowler Creek	Fowl1	Prospect	Superior Twp	5.48	fair	39	up	good	17	4
Lower	Lower Rouge	Low2	Cherry Hill	Canton Twp	7.00	fairly poor	17	down	poor	8	1
Main	Evans Creek	Evan2	LTU	Southfield	7.00	fairly poor	16	same	poor	6	1
Main	Nottingham Creek	Nott	Country Day	Beverly Hills	7.08	fairly poor	20	down	fair	11	0
Main	Pebble Creek	Peb2	Pebble 13 Mile	Farmington Hills	5.85	fair	29	up	fair	13	1
Main	Pebble Creek	Peb3	Pebble d/s Dam	Farmington Hills	5.68	fair	36	up	good	14	2
Main	Sprague Creek	Sprag	Main Lloyd Stage	Troy	4.63	good	42	up	good	15	3
Main	Main Rouge	Main1	FF Pk	Troy	5.34	good	32	up	fair	11	2
Main	Main Rouge	Main5	Douglas Evans	Beverly Hills	6.16	fair	40	up	good	16	1
Main	Main Rouge	Main6	Sfld Civic Ctr	Southfield	6.43	fair	26	up	fair	14	1
Middle	Johnson Creek	John1	5M Salem	Salem Twp	5.69	fair	46	up	good	17	3
Middle	Johnson Creek	John2	5M NV	Northville Twp	4.93	good	40	down	good	15	6
Middle	Johnson Creek	John3	6M NV	Northville Twp	5.30	good	41	up	good	16	6
Middle	Johnson Creek	John8	Maybury Angell	Northville Twp	4.16	very good	46	down	good	18	5
Middle	Johnson Creek	MR-22	Maybury south	Northville Twp	5.19	good	38	down	good	18	3
Middle	Johnson Creek	MR-23	Maybury north	Northville Twp	7.00	fairly poor	25	down	fair	11	1
Middle	Johnson Creek	MR-27	Ridge	Northville Twp	6.05	fair	26	down	fair	10	2
Middle	Tonquish Creek	Nton	S Evergreen St	Plymouth	6.00	fair	25	up	fair	9	2
Middle	Tonquish Creek	Ton1	Plym Twp Pk	Plymouth Twp	6.24	fair	40	down	good	16	2
Middle	Tonquish Creek	Ton2	Ann Arbor Rd	Plymouth Twp	7.00	fairly poor	17	down	poor	7	1
Middle	Ingersoll Creek	Ing1	Brookfarm Park	Novi	6.35	fair	20	down	fair	8	1
Middle	Walled Lk Drainage	Wall2	WL 10 M	Novi	6.09	fair	30	up	fair	10	1
Middle	Middle Rouge	MR-2	Reservoir Rd	Northville Twp	7.00	fairly poor	21	down	fair	8	2
Upper	Bell Branch	Bell1	Bicentennial Park	Livonia	6.21	fair	22	same	fair	10	1
Upper	Bell Branch	Bell2	Schoolcraft College	Livonia	10.00	very poor	13	down	poor	6	0
Upper	Bell Branch	Bell3	Livonia 6 Mile	Livonia	10.00	very poor	11	down	poor	6	0
Upper	Minnow Pond	Min4	14 Mile	Farmington Hills	7.00	fairly poor	15	down	poor	7	1
Upper	Seeley Creek	See3	Kennedy Ct	Farmington Hills	5.77	fair	19	down	fair	14	1
Upper	Upper Rouge	Up2	Shiawasee Park	Farmington	5.23	good	33	up	fair	12	2
				AVERAGE	**6.27**		**28.45**			**11.83**	**1.93**

Thank you to all the **volunteers, Wayne County** and **Sue Thompson** for sampling additional sites, identifiying difficult specimens and doing the trend analysis, and **Deirdre Devlin** and **Schoolcraft College** students for sampling one site.

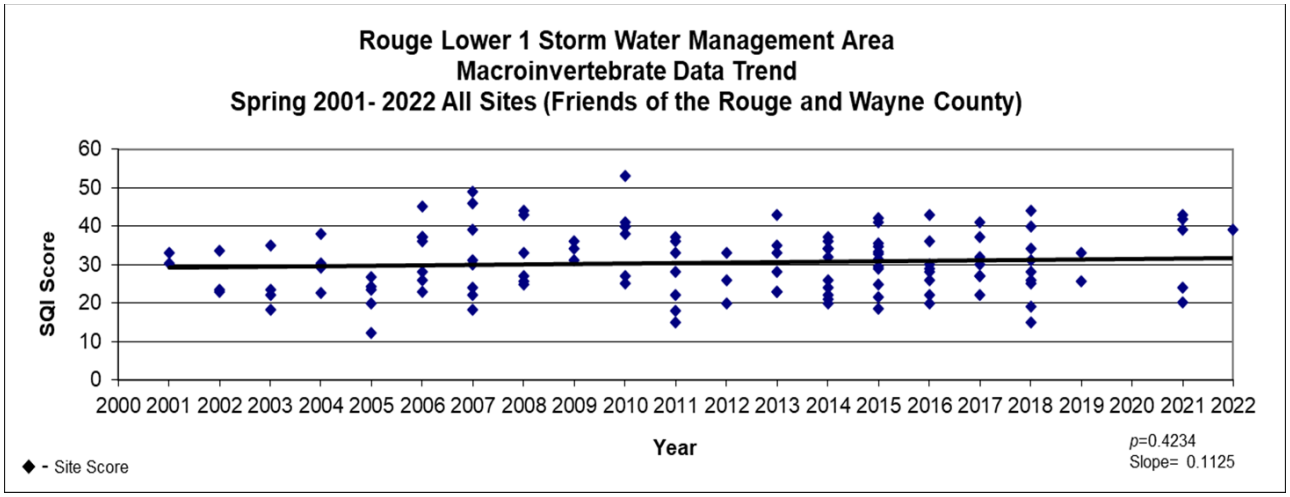
This program is supported by the Erb Family Foundation, EGLE, Washtenaw County, the City of Southfield, the City of Troy, the Village of Beverly Hills, Northville Township, the City of Plymouth, Plymouth Township, the City of Novi, the City of Livonia and the City of Farmington.

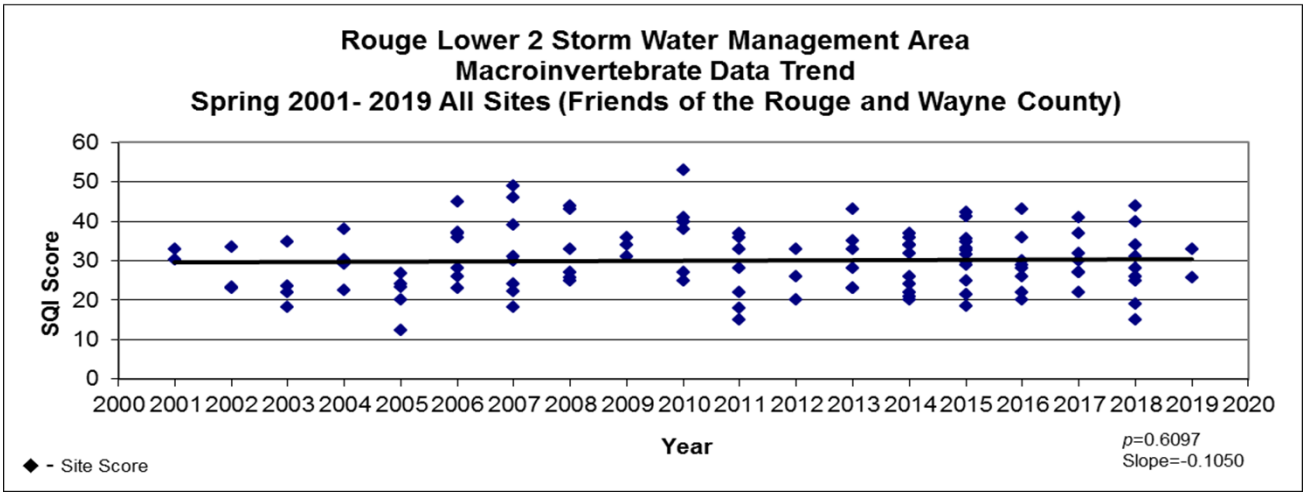
Fall Bug Hunt
Oct. 15, 2022 10 am-4pm

Sign up online today (deadline Oct. 1, 2022 at [www.therouge.org)](http://www.therouge.org)
Team Leader Training – Sat. Oct. 8, 2022 9am-3pm (must have participated in a previous event)

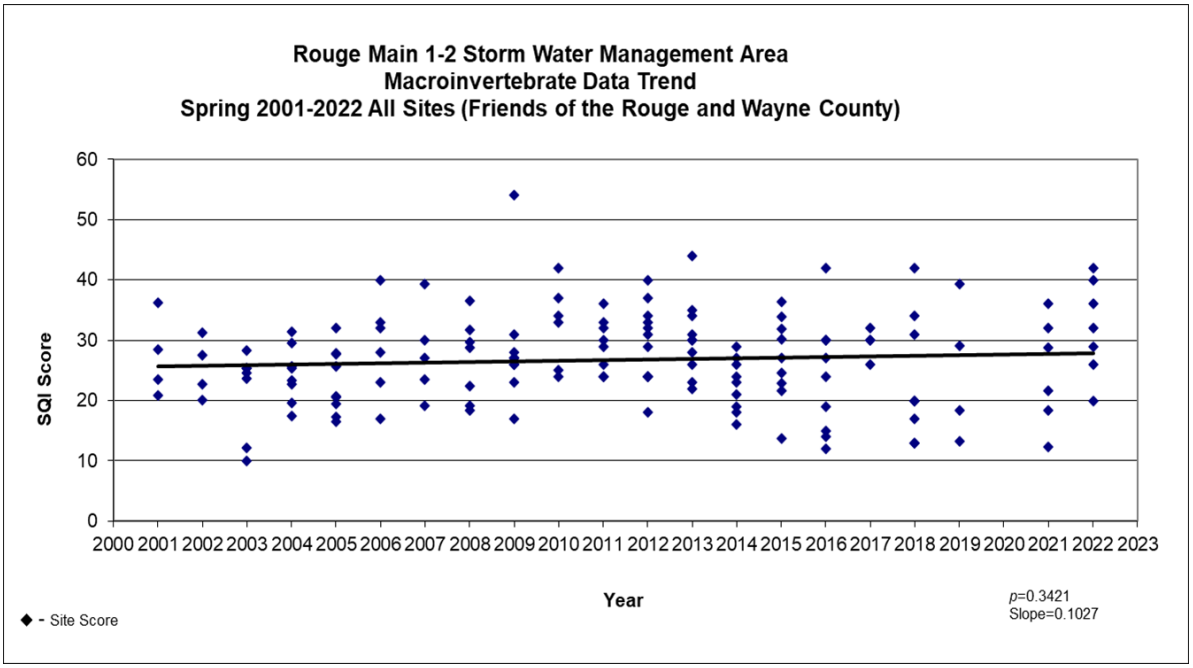
Trend Graphs

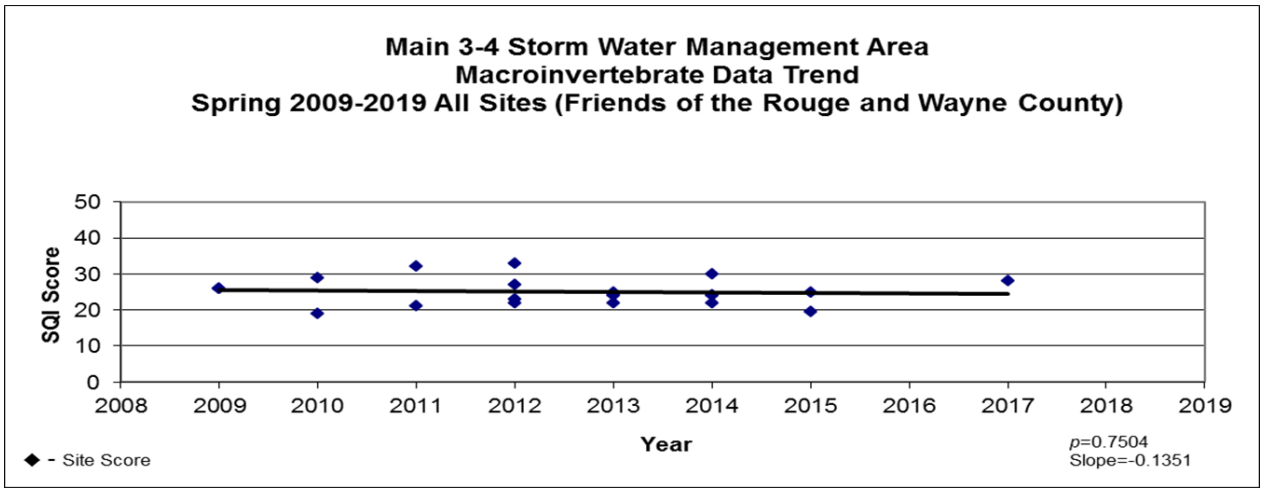
Lower Branch



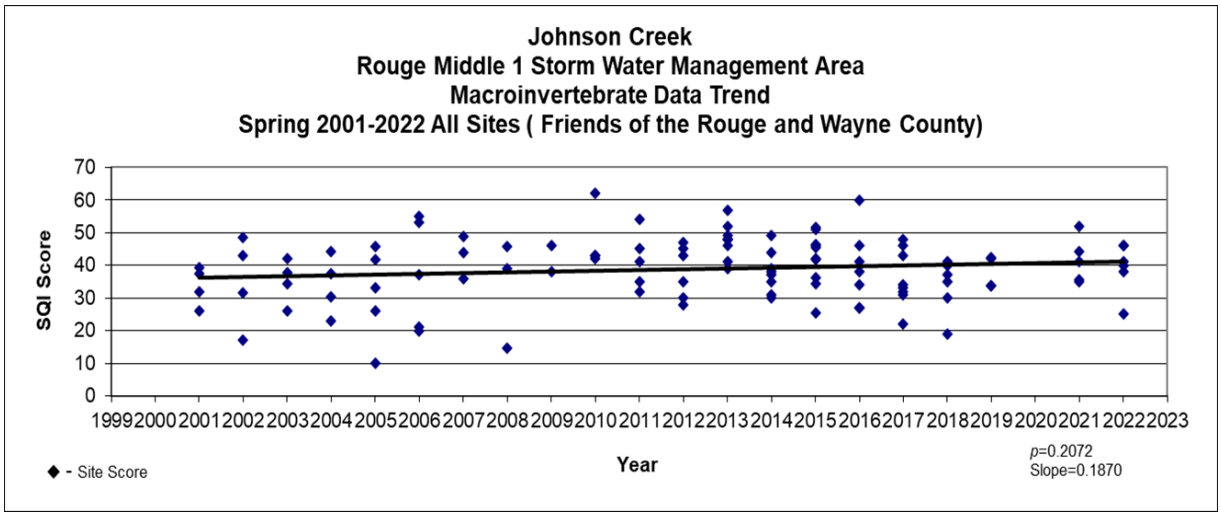


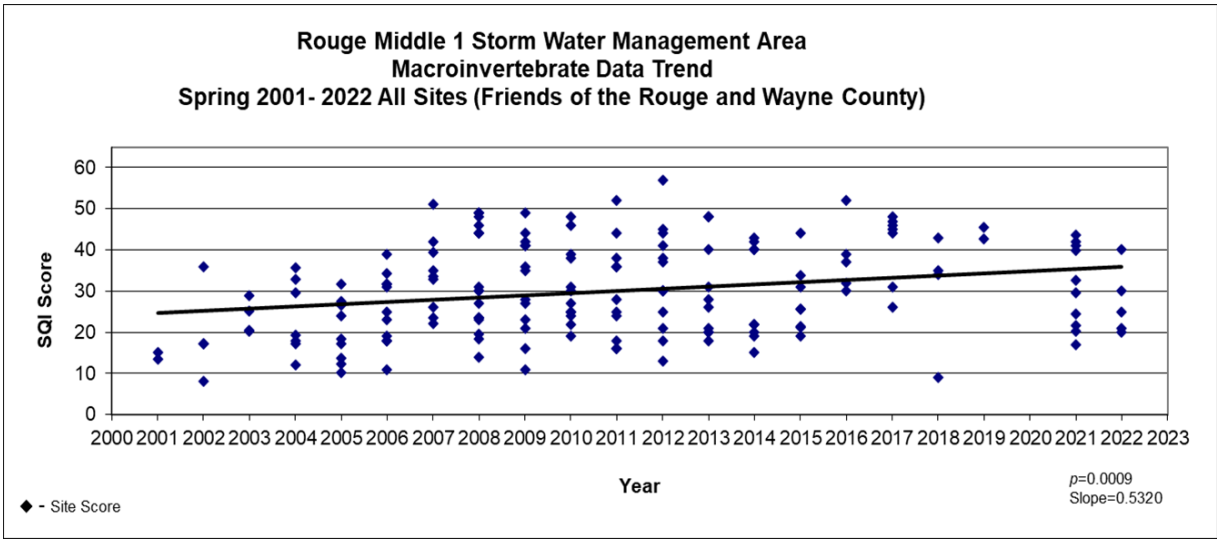
Main Branch

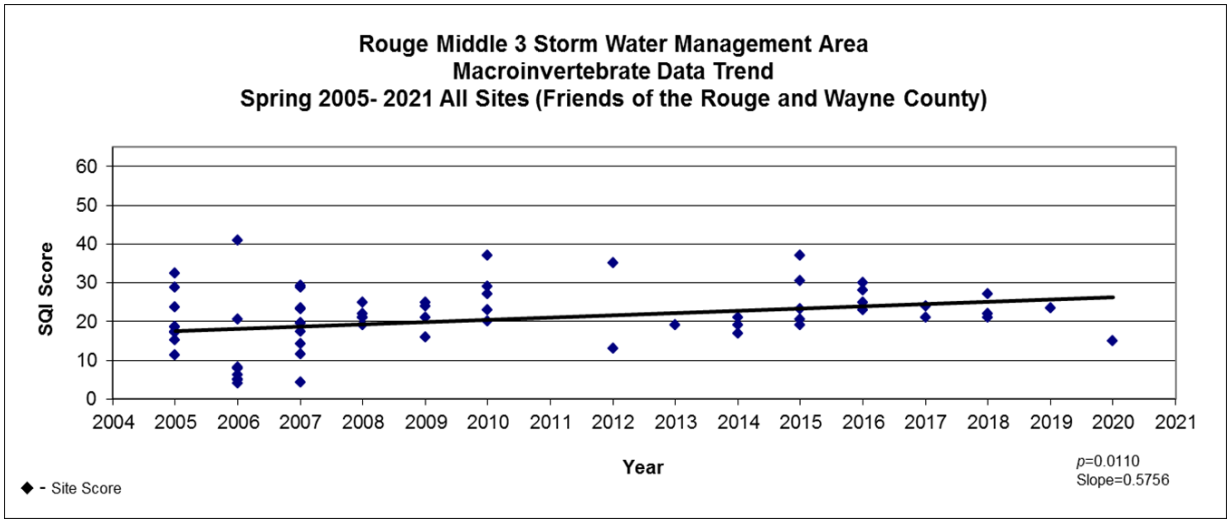

Rouge Main 1-2 Storm Water Management Area
Macroinvertebrate Data Trend
Spring 2001-2022 All Sites (Friends of the Rouge and Wayne County)
SQI Score
Year
◆ - Site Score
p=0.3421
Slope=0.1027


Main 3-4 Storm Water Management Area
Macroinvertebrate Data Trend
Spring 2009-2019 All Sites (Friends of the Rouge and Wayne County)
SQI Score
Year
◆ - Site Score
p=0.7504
Slope=-0.1351

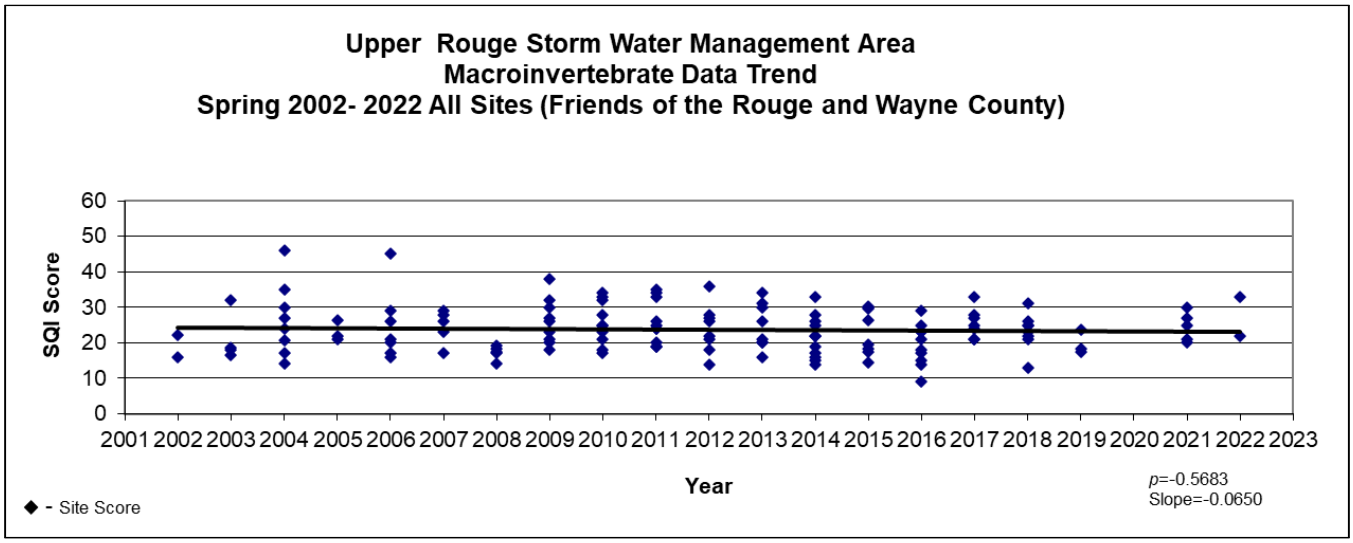
Middle Branch







Upper Branch



Rouge River Watershed
2022 Winter Stonefly Search

www.therouge.org

Stoneflies are sensitive indicators of healthy streams. Unlike other insects, winter stoneflies develop into adult flies in the winter. The Winter Stonefly Search is part of Friends of the Rouge volunteer benthic macroinvertebrate monitoring program.

Sixty-five people participated in Friends of the Rouge (FOTR)'s 2022 Winter Stonefly Search on January 22, 2022. The weather was on the cold side (as Stonefly Searches go) and many teams had to hack through ice to find running water. With covid rates soaring due to the Omicron variant, we continued having Team Leaders pick up equipment and meet their team in the field rather than everyone meeting together in an indoor facility. Without the opportunity for an introduction in person, we hosted a virtual "Stonefly Primer" to prepare new volunteers and refresh veteran volunteers. Held on January 13, we had 34 attendees and the assistance of veteran team leader Sue Thompson.

This report contains data for 33 sites. Twenty-three sites were sampled by 12 teams during the Stonefly Search on January 22. Ten additional sites were sampled by teams of volunteers, Wayne County Department of Public Services staff, FOTR staff and Sue Thompson. FOTR staff included Biological Monitoring Intern Amber Puckett who started in January. An additional sites – Ton2 – was tested for salt but not searched for stoneflies.

Stoneflies were found at thirteen of the thirty-three sites (39%) (map and Table 1). All were found on the Middle, Lower and Upper branches. All sites had slender winter stoneflies (Capnids-family Capniidae) and three sites also had Perlodids (family Perlodidae).

Lower Branch

Ten sites were sampled on the Lower Branch: four on Fellows Creek, three on Fowler Creek and two on the main branch of the Lower. Three of the ten (30%) sites had stoneflies, and all were slender winter stoneflies (Capnids). This included one site on each tributary and the Lower: Fellows Creek (LR-9), Fowler Creek (Fowl5) and the main Lower branch (LR-8).

Middle Branch

Eighteen sites were sampled on the Middle Branch: ten on Johnson Creek, four on Tonquish Creek, and four on the Middle branch. Eight (44%) of the sites had stoneflies and ALL were on the Johnson Creek. All sites had slender winter stoneflies (Capnids) and three sites (John2, John3, John7) also had Perlodids. The Middle Branch has the largest diversity of macroinvertebrates in the watershed and most of the stoneflies we find in the Rouge are in the Johnson Creek. It was disappointing not to find any stoneflies in Tonquish Creek this year. But it is also concerning that all the Johnson Creek sites with stoneflies were upstream of Six Mile Road.

Upper Branch

Five Upper Branch sites were sampled including two sites on Minnow Pond Creek, one site on Bell Creek and two on the main Upper branch. Stoneflies were found at two sites (40%) - Min4, and Up1. Both sites had slender winter stoneflies (Capnids). Stoneflies are very rarely found in the Upper Branch.

Winter Salt Watch

WINTER SALT WATCH

FOTR Stonefly Search teams have been testing sites for chloride or road salt since 2020 through the Izaak Walton League's Winter Salt Watch program. In 2019, recognizing that chloride and sulfate can have significant harmful effects on aquatic life, Michigan's Department of Environment, Great Lakes, and Energy developed water quality values for chloride and sulfate. For chloride, the limit is 320 mg/L (ppm) for acute (short-term) impacts and 150 mg/L (ppm) for chronic (long-term) impacts.

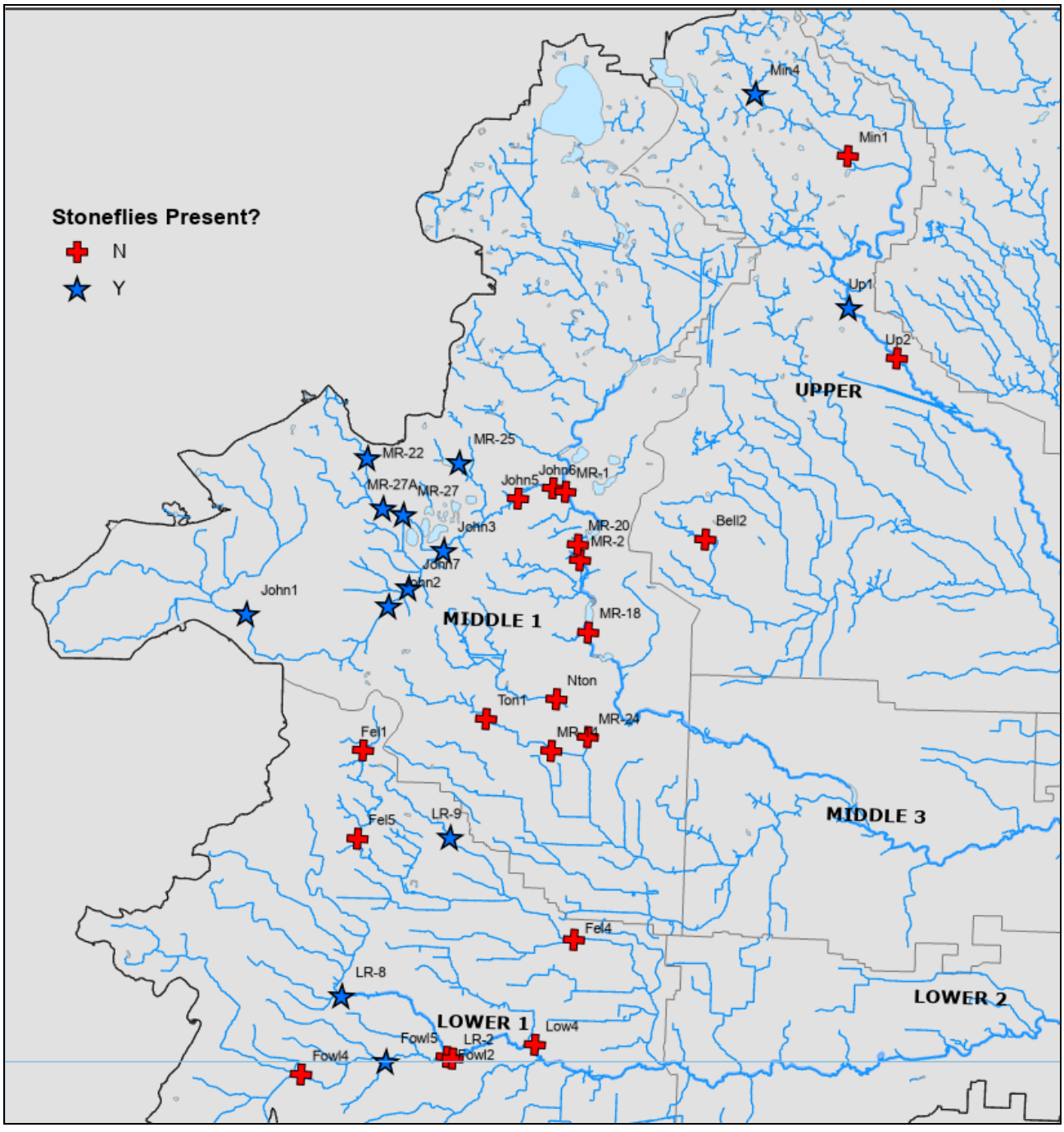
Seven of our Stonefly Search sites were above EGLE's limit of 320 ppm (plus an additional site – Ton2 that we only tested for salt) with some well over the limit on the test strips. Eight were above 150 ppm (Table 1, Map 2). Sites in highly urbanized areas like the Tonquish Creek in the city of Plymouth and Bell Creek on the Schoolcraft College campus are high most likely due to road runoff. On the Middle branch, chloride levels generally rise in a downstream direction, as would be expected as stormwater inputs and urbanization increase. Two headwater stream sites that are neither in urban areas and not downstream - John1 and Fowl4 (see map 2) had elevated levels. We double-checked the Fowl4 site because all the nearby sites on Fowler Creek were low. Washtenaw County traced it to a road roundabout that drains next to the creek.

The Upper branch sites are somewhat of an anomaly as all Upper branch sites have had consistent high levels all three years we have tested them for chloride. Sampling by EGLE showed similarly high levels in the Upper branch. We will continue to monitor and investigate this.

Road salt helps to keep us safe but can cause serious damage to water quality. More information on the Winter Salt Walt program can be found here: https://www.iwla.org/water/stream-monitoring/winter-salt-watch. Residents can sign up for Salt Watch on their own and receive free test strips to test sites during the winter and are encouraged to do so. Results are posted on the Izaak Walton League's Salt Watch site (https://www.iwla.org/water/stream-monitoring/winter-salt-watch/results)

Thank you to all the volunteers, Team Leaders, Wayne County, and Sue Thompson for additional sampling. The Winter Stonefly Search is part of the Friends of the Rouge long-term volunteer monitoring program and is funded through the Alliance of Rouge Communities, Washtenaw County Water Resources Commission, the Erb Family Foundation and individual donations.

Map 1: 2022 Stonefly Search Results



Map 2: 2022 Chloride Readings

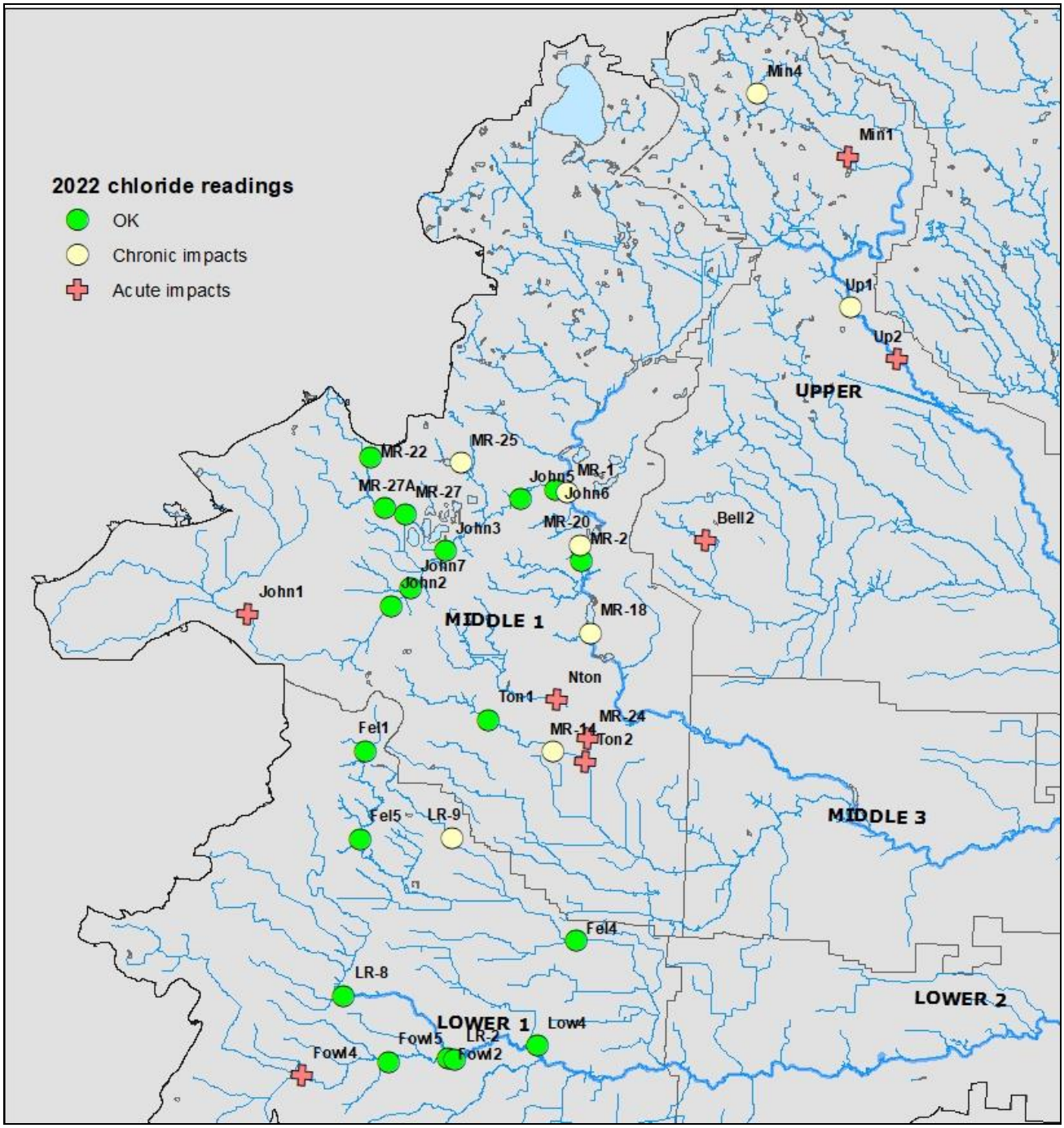


Table 1: Stonefly and Chloride Findings									
Branch	Stream Name	FIELDID	Site Location	sampling date	Stoneflies?	Stonefly Family	2022 Chloride, ppm	2021 Chloride, ppm	2020 Chloride, ppm
Lower	Fellows Creek	Fel1	Top of Hill Ct	1/22/2022	N		91	86	56
Lower	Fellows Creek	Fel5	Warren Ridge	1/22/2022	N		91	43	46
Lower	Fellows Creek	LR-9	Fellows Beck Warren	1/19/2022	Y	Capnids	153		91
Lower	Fellows Creek	Fel4	Flodin Pk	1/19/2022	N		140		
Lower	Fowler Creek	Fowl4	Ridge Rd S of Geddes	1/22/2022	N		650		46
Lower	Fowler Creek	Fowl5	Fowler Denton	1/22/2022	Y	Capnids	101		
Lower	Fowler Creek	Fowl2	Fowler Beck	1/31/2022	N		55	86	
Lower	Lower Rouge	LR-8	Ridge Proctor	1/22/2022	Y	Capnids	91		
Lower	Lower Rouge	LR-2	WTUA	1/31/2022	N		124		
Lower	Lower Rouge	Low4	Sheldon Rd	1/22/2022	N		130	145	
Middle	Johnson Creek	John1	5M Salem	1/22/2022	Y	Capnids	342	86	30
Middle	Johnson Creek	John2	5M NV	1/22/2022	Y	Capnids, Perlodids	40	108	25
Middle	Johnson Creek	John3	6M NV	1/22/2022	Y	Capnids, Perlodids	91	97	56
Middle	Johnson Creek	John7	Arcadia	1/22/2022	Y	Capnids, Perlodids	81	97	46
Middle	Johnson Creek	MR-22	Maybury south	1/16/2022	Y	Capnids	140	203	
Middle	Johnson Creek	MR-27A	Florissant Dr.	1/23/2022	Y	Capnids	114		
Middle	Johnson Creek	MR-27	Ridge	1/16/2022	Y	Capnids	114	174	
Middle	Johnson Creek	MR-25	Maybury East	1/17/2022	Y	Capnids	182		
Middle	Johnson Creek	John5	Fish Hatchery Pk	1/22/2022	N		101		
Middle	Johnson Creek	John6	Hines	1/22/2022	N		91	114	
Middle	Tonquish Creek	Ton1	Plym Twp Pk	1/22/2022	N		86	222	187
Middle	Tonquish Creek	Nton	S Evergreen St	1/22/2022	N		615		
Middle	Tonquish Creek	MR-14	Smith Elem	1/23/2022	N		153		
Middle	Tonquish Creek	MR-24	Lion's Pk	1/23/2022	N		632		
Middle	Tonquish Creek	Ton2	Ann Arbor Road	1/23/22	Not searched		632		
Middle	Middle Rouge	MR-1	Northville Rec W	1/22/2022	N		277		
Middle	Middle Rouge	MR-20	Waterford Bd	1/22/2022	N		258		
Middle	Middle Rouge	MR-2	Reservoir Rd	1/22/2022	N		140	370	
Middle	Middle Rouge	MR-18	Springbrook Rec	1/22/2022	N		250	346	
Upper	Bell Branch	Bell2	Schoolcraft College	1/22/2022	N		450	602	
Upper	Minnow Pond	Min4	14 Mile	1/22/2022	Y	Capnids	155	455	335
Upper	Minnow Pond	Min1	Minnow 13 M	1/22/2022	N		366		
Upper	Upper Rouge	Up1	Heritage Park	1/22/2022	Y	Capnids	310	455	
Upper	Upper Rouge	Up2	Shiawasee Park	1/22/2022	N		360	487	

Check out photos of the 2022 Stonefly Search here:
https://photos.app.goo.gl/g7HAzgmnsaj2baPR9

We need you!

Spring Bug Hunt: Sat. April 23 10 am-4 pm
Volunteers needed to help look for bugs in Rouge streams

Want to get more involved? Train to be a Team Leader – bank person or collector
Team Leader Training: virtual session followed by field training
Field Training Sat. April 9, 2022 9am-12pm

Register for both at therouge.org/bug-hunt-events-and-trainings

More info: spetrella@therouge.org or call 734 927-4904

Friends of the ROUGE
www.therouge.org
650 Church Street, Suite 209
Plymouth, MI 48170

Rouge River Benthic Macroinvertebrate Monitoring Program Fall 2022 Report

This report contains benthic macroinvertebrate sampling results from 46 Rouge tributary and river sites. The Fall Bug Hunt on October 15, 2022 had 89 attendees that sampled 30 sites in 16 teams. Groups that participated included Wayne State University's Transformative Research in Urban Sustainability Training program and the Sustainability Learning Community; Schoolcraft College; and teachers in Wayne County RESA's Master Science Teacher Fellowship. Additional sites were sampled during the Team Leader Training, with the University of Michigan-Dearborn's Watershed Analysis class, by Wayne County Department of Public Services Environmental Services Division separately and with FOTR staff and interns, and by Sue Thompson for a total of 46 sites. Funding for the monitoring was provided by the communities of Beverly Hills, Canton Township, Farmington, Livonia, Northville Township, Novi, Plymouth, Plymouth Township, Southfield, Troy and Washtenaw County Water Resources who sponsored sites the Michigan Clean Water Corps and a donation from Lynn DeGrande and Stuart Steele.

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**.

SQI – Stream Quality Index, a measure of the degree of organic pollution that is calculated by rating and scoring organisms based on their sensitivity (sensitive, somewhat sensitive and tolerant) and frequency in the sample (rare or common). Higher scores reflect better quality sites. Recommend keeping SQI paragraphs together

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.

NEW in Fall 2021

WQR – Water Quality Rating is a measure of the degree of organic pollution similar to SQI. Organisms are rated based on the Hilsenhoff Index of Biotic Integrity and scores are weighted by the number of individuals found. Unlike SQI, a LOWER score is indicative of less pollution. There are seven categories rather than four. 0.0-3.50=excellent, 3.51-4.50=very good, 4.51-5.50=good, 5.51-6.50=fair, 6.51-7.50=fairly poor, 7.51-8-50=poor, 8.51-10.0=very poor. WQR is calculated based on family level identification.

Overall Scores

The average Stream Quality Index (SQI) for sites was FAIR (26) (map p.6-8, Table 1 & 5). Seven sites rated GOOD; 29 sites were FAIR and nine sites scored POOR. The average Water Quality Rating (WQR) was FAIR (6.00) with 1 site very good, 17 good, 16 fair, 7 fairly poor, 1 poor, and 3 very poor. Sites averaged 12 taxa, 8 Aquatic Insect Taxa, and 2 EPT. SQI was highest at Up2 and John1 (41) and WQR highest at Sprag (4.45). The number of taxa found at sites was highest at Main6 (19) and lowest at Fel2 (6). Insect taxa which includes the more sensitive groups, was highest at Up2 (14) and lowest at MR-24 (4). Some mayfly, stonefly and caddisfly families (EPT) were found at all but nine sites with an average of 2 of these families per site. Up2 had the highest number of EPT (5). In comparison to last fall, SQI and taxa were lower but WQR was higher and EPT was the same.

Table 1: Averages

	Average SQI	Average WQR	Average # of taxa	Average # Insect Taxa	Average EPT
2022	26 fair	6.00 fair	12	8	2
2021	30 fair	6.25 fair	13		2

Data Trends

In comparison to past years, 78% of sites were stable, more than last year (Chart 1). But only 11% were improving and 9% were declining. Last fall, 22% were improving and 6% were declining.



To compare change over time, we analyzed the trends by subwatershed, with Johnson Creek analyzed separately as it is a coldwater tributary (Table 2 and graphs p. 11-19). The Middle 3 subwatershed and Johnson Creek had significant positive trends. The Main 1-2, the Upper and the Lower 1 subwatersheds had significant negative trends. These trends are similar to last year.

Table 2: Fall Bug Hunt Trend Summary All Sites 2001-2022

Subwatershed	slope	*p*-value	True trend	Subwatershed average score	Water Quality Rating
Main 1-2	-0.4679	0.00007	yes, negative	29	Fair
Upper	-0.2446	0.0123	yes, negative	24	Fair
Johnson Creek	0.2765	0.0330	yes, positive	35	Good
Middle 1	-0.1539	0.1948	no trend	32	Fair
Middle 3*	0.5255	0.00002	yes, positive	23	Fair
Lower 1	-0.3435	0.0052	yes, negative	28	Fair
Lower 2**	-0.2370	0.1790	no trend	26	Fair
Main3-4**	-0.4411	0.2203	no trend	27	Fair

* no sites sampled in Fall 2020-2021 **no sites sampled in Fall 2019-2021

The data was further analyzed for trends by tributaries and subareas. Table 3 contains a summary of this analysis; the graphs are on p. 11-19. When the upper and lower sections of the Main, Middle and Lower subwatersheds were combined, the trends stood – negative for the Main and Lower and positive for the Middle. The Middle also remained positive when combined with Johnson Creek. When all the sites were combined, there was no significant trend.

Table 3: Fall Bug Hunt Trend Summary Branches/Tributaries 2001-2022

Branch	slope	*p*-value	True trend	Branch average score	Water Quality Rating
Main combined (Main 1/2 and Main 3/4)	-0.4671	0.00002	yes, negative	29	Fair
Bell Creek only	-0.1479	0.3554	no trend	23	Fair
Upper only	-0.0878	0.0652	no trend	27	Fair
Middle 1 and 3 combined	0.1491	0.1468	yes, positive	29	Fair
Tonquish Creek only	0.0877	0.6783	no trend	31	Fair
Johnson Creek and Middle Rouge	0.2459	0.00320	yes, positive	31	Fair
Middle without Tonquish Creek	0.1407	0.23750	no trend	29	Fair
Lower 1 and Lower 2 combined	-0.3223	0.0015	yes, negative	27	Fair
Rouge all subwatersheds combined	-0.0599	0.3024	no trend	29.5	Fair

Individual sites were examined for long term trends (Table 4). Of the sites sampled in fall 2022, six had a significant negative trend.

Table: 4 Fall Bug Hunt Data Trend 2001-2022 by site

Site	slope	*p*-value	Statistically significant trend	Site average score	Water Quality Rating
Main6	-0.3841	0.0348	yes, negative	33	Fair
Nott	-0.5540	0.0178	yes, negative	26	Fair
Bell2	-0.5925	0.0418	yes, negative	24	Fair
MR-14	-0.9744	0.0061	yes, negative	28	Fair
Fowl2	-0.4070	0.0468	yes, negative	24	Fair
LR-3	-0.6013	0.0448	yes, negative	27	Fair

SALT WATCH™
IZAAK WALTON LEAGUE OF AMERICA

Since 2020, we have been testing sites for road salt (chloride) through the Izaak Walton League's Salt Watch program during the Stonefly Search and Bug Hunts. Salt we apply to our roads and sidewalks for snow and ice removal washes into our streams and is toxic to aquatic life when it reaches high levels. Recognizing this, the State of Michigan Department of Environment, Great Lakes and Energy (EGLE) set water quality values aiming to protect surface water from chloride, based on parts per million (ppm) concentrations. These are:

150 ppm and above - causes long term effects to aquatic life (chronic)
320 ppm and above - causes acute effects to aquatic life (toxic)

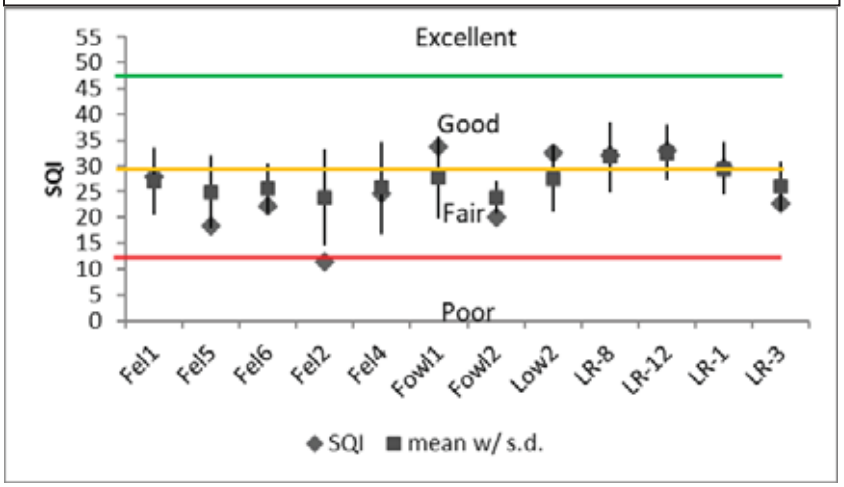
This fall, seven sites had toxic levels of chloride (table 5, map p. 9). This is particularly concerning as one would expect road salt applied last winter to be washed out of the system by October. EGLE has already listed Bishop Creek as "impaired" due to high salt levels. Tonquish Creek, Bell Creek and Evans Creek also need further examination due to elevated concentrations.

Table 5: Sites with Toxic Levels of Chloride

BRANCH	Stream Name	FIELDID	Site Description	Cl ppm
Main	Evans Creek	Evan2	LTU	551
Middle	Bishop Creek	Bish2	Bishop Scarborough	637
Middle	Tonquish Creek	Nton	S Evergreen St	365
Middle	Tonquish Creek	MR-24	Lion's Pk	440
Middle	Tonquish Creek	Ton2	Ann Arbor Rd	341
Upper	Bell Branch	Bell1	Bicentennial Park	418
Upper	Bell Branch	Bell3	Livonia 6 Mile	391

Lower Branch

Chart 1: Lower Branch Fall 2022 SQIs and means



Thirteen sites were sampled on the Lower Branch (Table 5), including two tributaries: Fellows and Fowler Creeks. LR-9 was sampled but the results were not included in the analysis since water was too low to adequately sample. SQIs averaged FAIR (24). One site had a GOOD SQI, nine had FAIR SQIs and two were POOR. In the new WQR system, sites averaged fair – 6.45. Sites had an average of 11 taxa, 7 insect taxa and 1 EPT. Chloride levels were the lowest overall in the Lower branch with most below the standard, two sites at chronic levels (Fel2 and Fel4) and none at the toxic level.

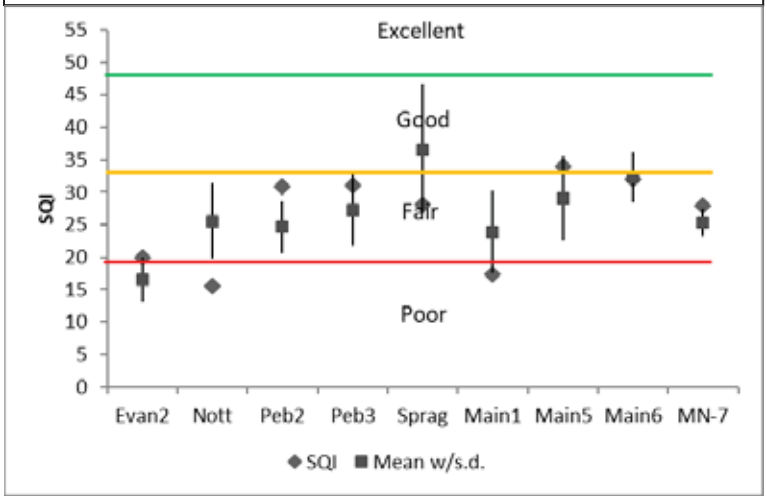
SQI scores were compared with past data (Chart 1). Eleven were within a standard deviation of the average for the site and one was below.

Long term trend analysis showed a significant negative trend for the Lower 1 and for all of the Lower when the subwatersheds are combined (Table 2-3 above, graphs p. 17-18). Fowl2 and LR-3 both had significant negative trends (Table 4).

Main Branch

Nine sites on the Main Branch were sampled, including four tributaries: Evans, Nottingham, Pebble and Sprague Creek. Creeks. SQIs averaged FAIR (25). One rated GOOD, six rated FAIR and two POOR. WQRs averaged fair (6.27). Taxa averaged 12, 7 insect taxa and 2 EPT. Chloride levels averaged 238 ppm, and most sites were at the chronic effects level, with one site at the toxic level (Evan2).

Chart 2: Main Branch Fall 2022 SQIs and means



In comparing averages and past data (Chart 2), one site was above a standard deviation of the mean (Peb2) and one was below (Nott).

Long term trend analysis shows a significant negative trend for the Main 1-2 subwatershed as

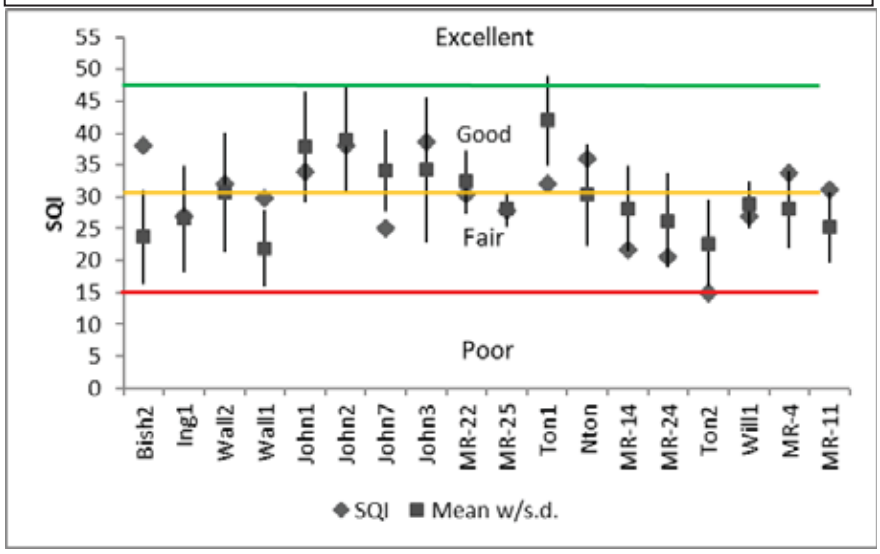
well as for all of the Main when the subwatersheds are combined (Table 2-3 above, graphs p. 11-12). Main6 and Nott had significant negative trends when considered separately (Table 4).

Middle Branch

Eighteen sites were sampled on the Middle Branch including Johnson (6), Tonquish (5), the Walled Lake drainage (4 – includes Bishop and Ingersoll Creeks) and Willow Creek. SQI scores averaged FAIR (29). There were six GOOD, 11 FAIR and one POOR SQIs. WQRs averaged fair (5.63). Taxa averaged 13, 8 insect taxa and 2 EPT.

In comparing averages and past data (Chart 3), the majority of sites (14) were within a standard deviation of the average for the sites. Two sites were above (Bish2 & Wall1) and two sites were below (John7 and Ton1). Chloride levels averaged 230 ppm and three sites had toxic levels, all on Tonquish Creek.

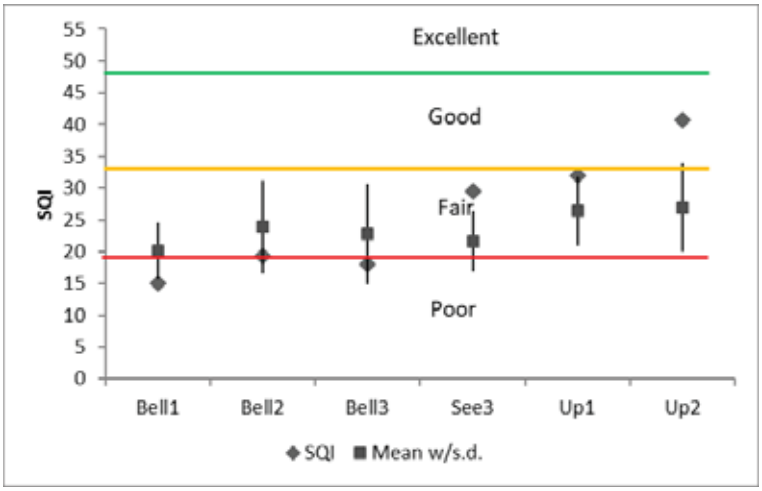
Chart 3: Middle Branch Fall 2022 SQIs and means



In long term trend analysis, the Middle 3 and Johnson Creek had positive trends (Table 2 above, graphs p. 9-10). When the Middle 1 and Middle 3 subwatersheds were combined, there a significant positive trend (Table 3 above, graphs p. 14-17). When Johnson Creek was combined with the Middle branch, there was also a significant positive trend. MR-14 had a negative trend when considered by site (Table 4).

Upper Branch

Chart 5: Upper Branch Fall 2022 SQIs and means



Six Upper branch sites were sampled including Bell (3), and Seeley Creeks. SQIs averaged FAIR (22). One site was GOOD, three FAIR and two POOR. WQR averaged fair (5.81). Taxa averaged 12, 8 insect taxa and 2 EPT. Chloride levels averaged 296 and 2 sites had toxic levels (Bell1 and Bell3).

In comparing averages and past data (Chart 5), two sites were above a standard deviation of the average (See3 and Up2).

Long term trend analysis shows a significant decline in scores for the Upper Branch but not for Bell Creek or the Upper considered without Bell Creek (Table 2 & 3, graphs p. 12-13). Bell2 had a negative trend when considered separately.

THANK YOU!!!!!

Thank you to all the **volunteers** and **Team Leaders, Sue Thompson** for sampling additional sites, helping with identification, analyzing trends and reviewing the report, and Beverly Hills, Canton Township, Farmington, Livonia, Northville Township, Novi, Plymouth, Plymouth Township, Southfield, Troy and Washtenaw County Water Resources who sponsored sites, the Michigan Clean Water Corps and a donation from Lynn DeGrande and Stuart Steele for funding the program.

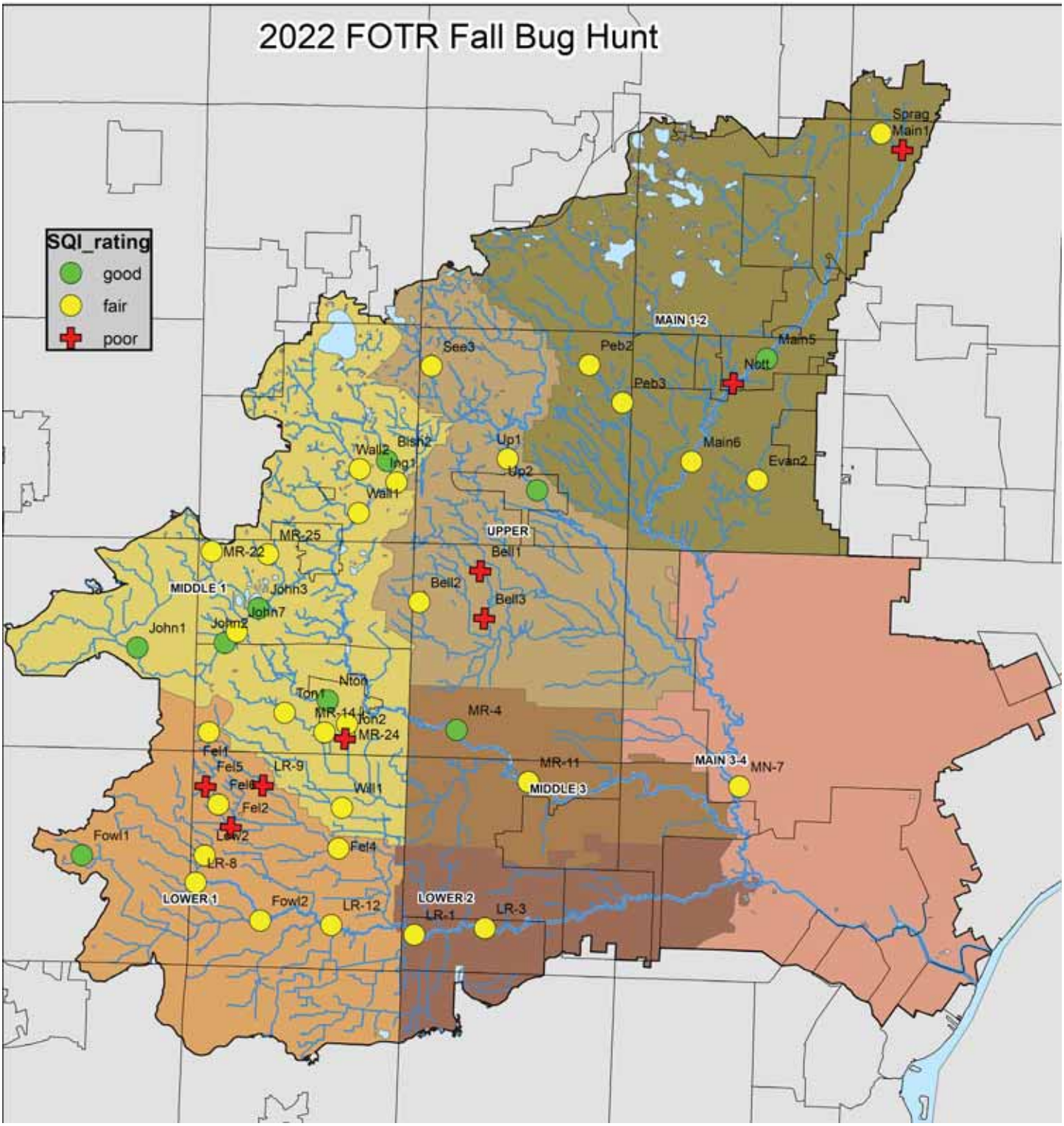
Join us for the Winter Stonefly Search

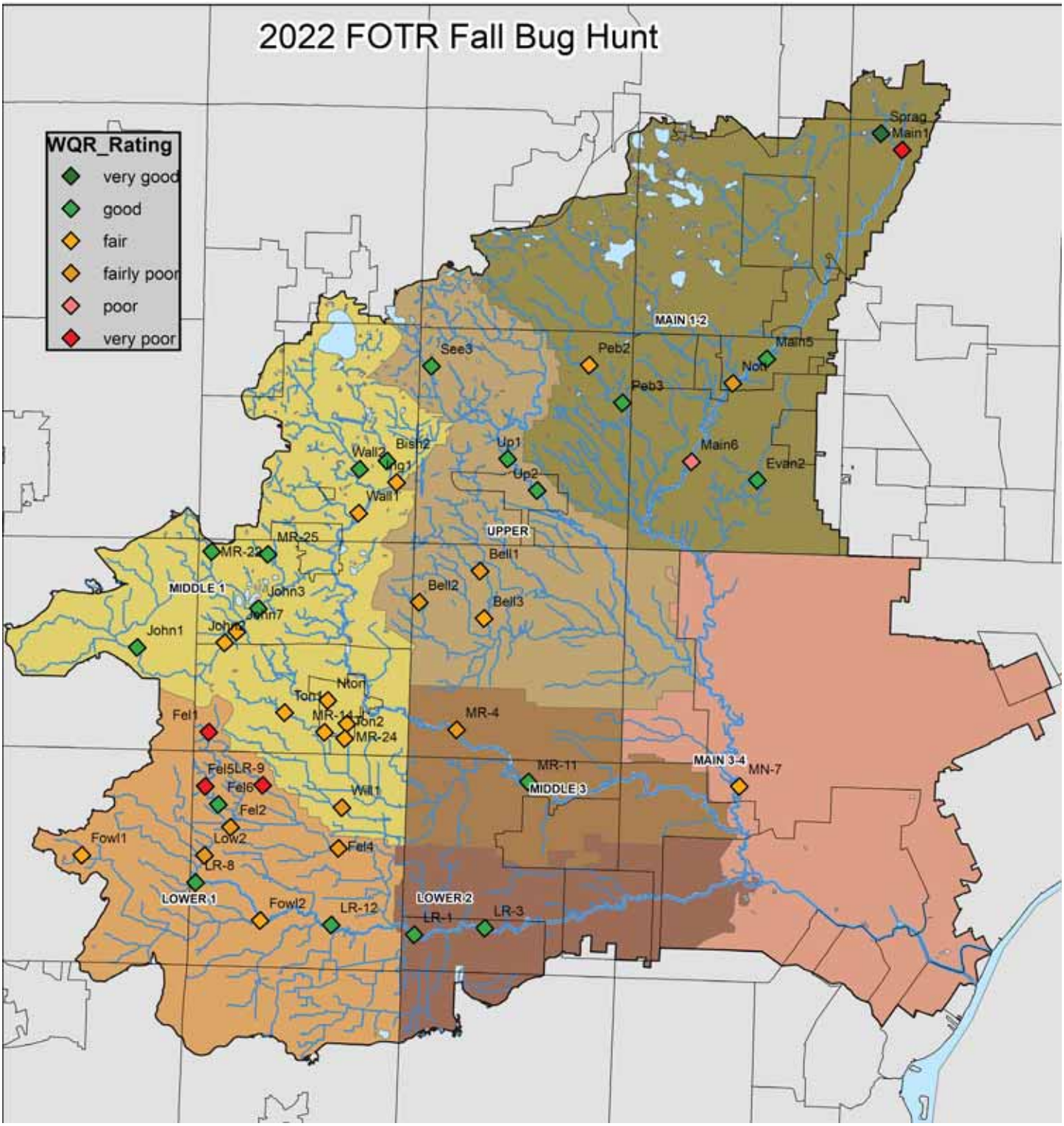
Sat. Jan. 21, 2023 10 am – 3 pm

Register at www.therouge.org by Jan. 6, 2023

Virtual Stonefly Primer Thurs. Jan. 12 6-7:00 pm on Zoom to get ready




2022 FOTR Fall Bug Hunt
SQI_rating
good
fair
poor
Sprag
Main1
MAIN 1-2
See3
Peb2
Main5
Nott
Peb3
Main6
Evan2
Bish2
Wall2
Ing1
Up1
Up2
Wall1
UPPER
MR-25
MR-22
Bell1
MIDDLE 1
John3
Bell2
John7
Bell3
John1
John2
Nton
Ton1
MR-14
Jon2
MR-4
MR-24
Fel1
Fel5
LR-9
MR-11
MAIN 3-4
MN-7
Fel6
Wil1
MIDDLE 3
Fel2
Fowl1
Lew2
Fel4
LR-8
LOWER 1
Fowl2
LR-12
LOWER 2
LR-1
LR-3


2022 FOTR Fall Bug Hunt
WQR_Rating
very good
good
fair
fairly poor
poor
very poor
Sprag
Main1
MAIN 1-2
See3
Peb2
Main5
Non
Peb3
Main6
Evan2
Up1
Up2
Bish2
Wall2
Wall1
UPPER
MR-25
MR-22
Bell1
Bell2
Bell3
MIDDLE 1
John3
John7
John1
John2
Non
Ton1
Ton2
MR-14
MR-24
Fel1
MR-4
MAIN 3-4
MN-7
MR-11
MIDDLE 3
Fel5
LR-9
Fel6
Fel2
Will1
Fowl1
Low2
Fel4
LR-8
LOWER 1
Fowl2
LR-12
LOWER 2
LR-1
LR-3

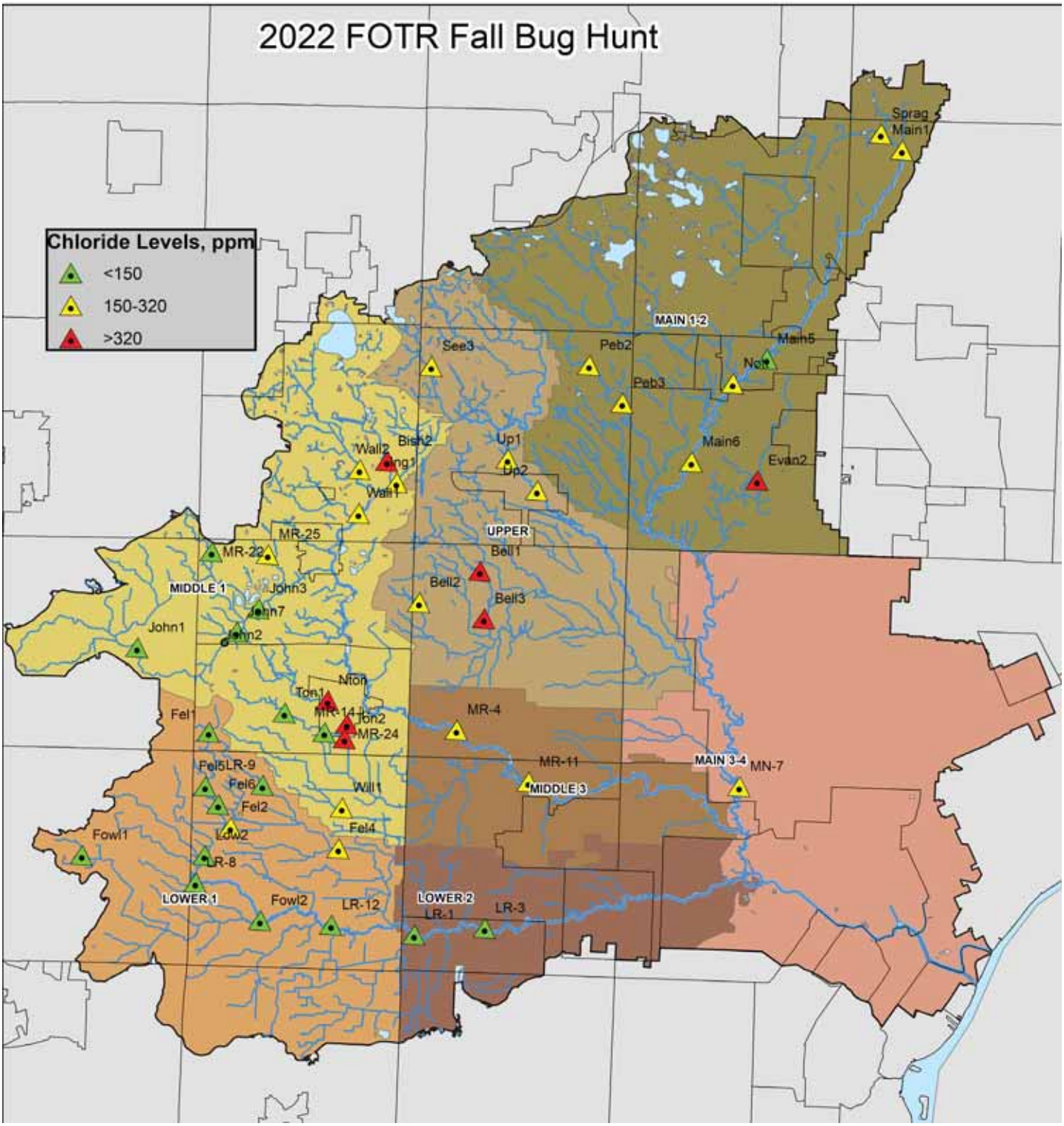
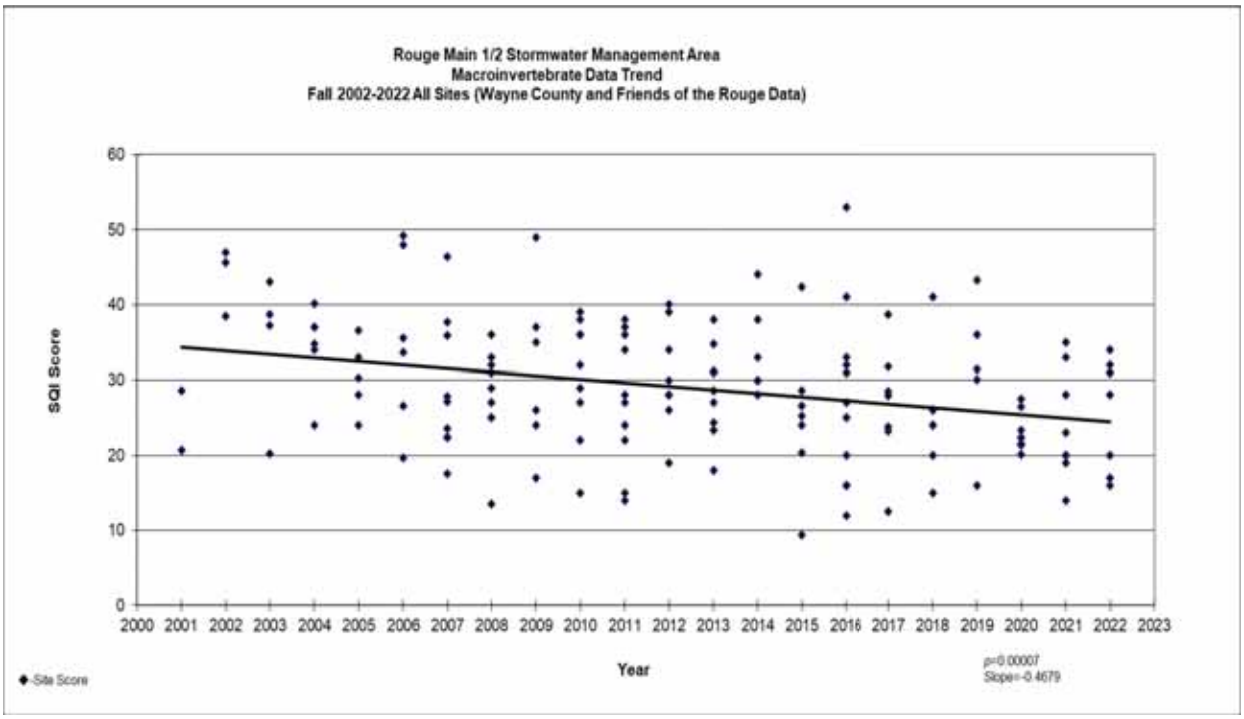
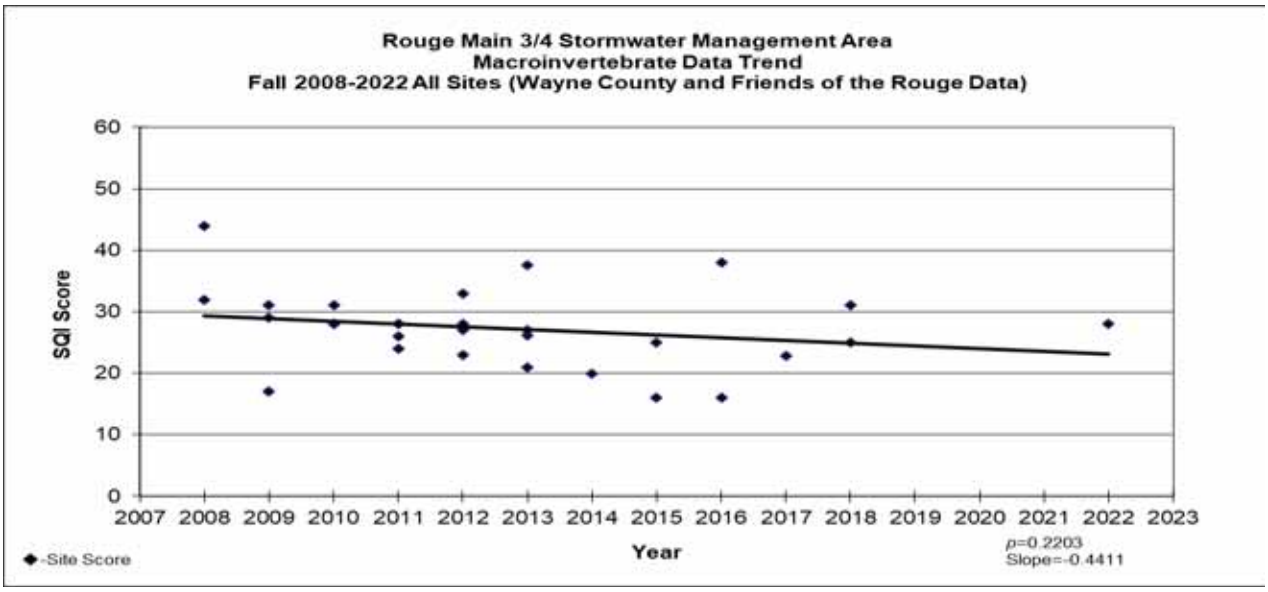

2022 FOTR Fall Bug Hunt
Chloride Levels, ppm
<150
150-320
>320
Sprag
Main1
MAIN 1-2
Main5
See3
Peb2
Peb3
Nob
Main6
Evan2
Up1
Up2
Bish2
Wall2
Wall1
MR-25
MR-22
UPPER
Bell1
Bell2
Bell3
MIDDLE 1
John3
John7
John1
John2
Nton
Ton1
MR-14
Jon2
MR-24
MR-4
Fel1
Fel5
LR-9
Fel6
Fel2
Will1
Fel4
Fowl1
Low2
LR-8
LOWER 1
Fowl2
LR-12
LOWER 2
LR-1
LR-3
MR-11
MIDDLE 3
MAIN 3-4
MN-7

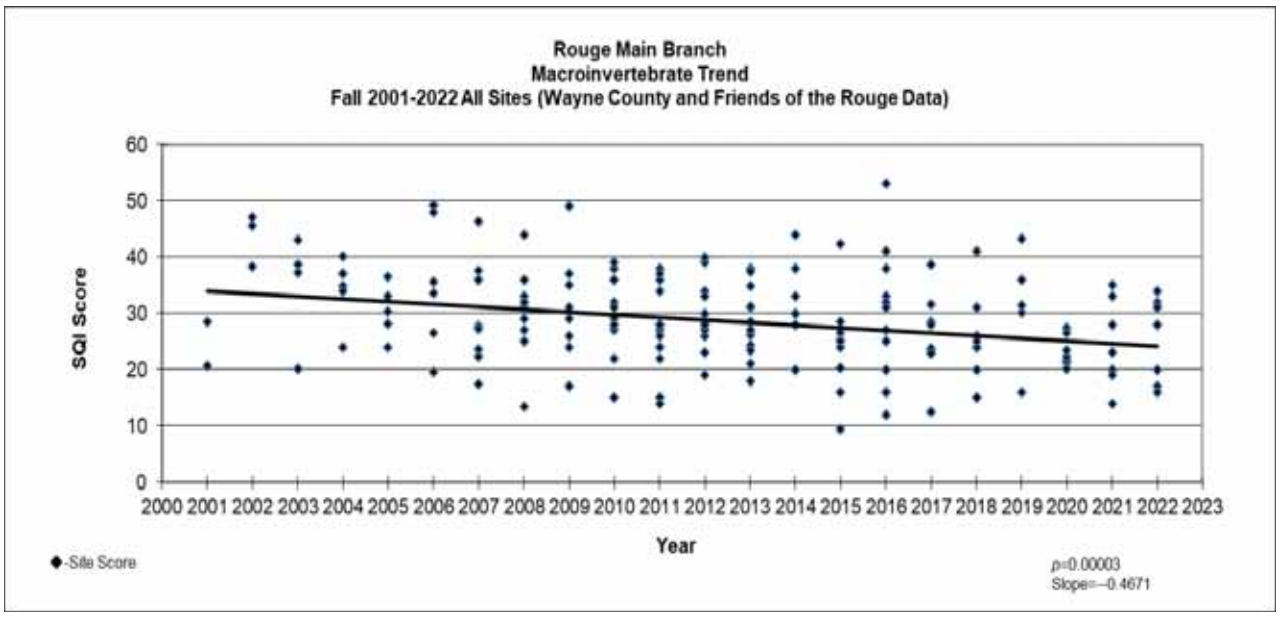
Table 5: Fall 2022 Data												
BRANCH	Stream Name	FIELDID	Site Description	SQI	SQI Rating	Taxa	Insect Taxa	EPT	WQR	WQR Score	Cl ppm	Cl Rating
Lower	Fellows Creek	Fel1	Top of Hill Ct	28	fair	10	6	2	10.00	very poor	106	ok
Lower	Fellows Creek	Fel5	Warren Ridge	18	poor	8	6	0	10.00	very poor	95	ok
Lower	Fellows Creek	Fel6	Hanford	22	fair	9	7	2	5.23	good	95	ok
Lower	Fellows Creek	Fel2	Vintage Valley	11	poor	6	6	0	7.00	fairly poor	276	chronic
Lower	Fellows Creek	LR-9	Fellows Beck Warren	5	poor	3	2	0	10.00	very poor	143	ok
Lower	Fellows Creek	Fel4	Flodin Pk	25	fair	13	4	0	6.61	fairly poor	172	chronic
Lower	Fowler Creek	Fowl1	Prospect	34	good	17	11	2	5.97	fair	31	ok
Lower	Fowler Creek	Fowl2	Fowler Beck	20	fair	9	6	3	5.88	fair	44	ok
Lower	Lower Rouge	Low2	Cherry Hill	33	fair	15	8	1	7.40	fairly poor	44	ok
Lower	Lower Rouge	LR-8	Ridge Proctor	32	fair	12	8	2	4.72	good	85	ok
Lower	Lower Rouge	LR-12	Morton Taylor	33	fair	15	11	2	4.67	good	133	ok
Lower	Lower Rouge	LR-1	Commerce Ct	30	fair	13	8	2	5.17	good	133	ok
Lower	Lower Rouge	LR-3	Goudy Park	23	fair	11	7	2	4.80	good	144	ok
Main	Evans Creek	Evan2	LTU	20	fair	11	7	1	5.02	good	551	acute
Main	Nottingham Creek	Nott	Country Day	16	poor	8	5	0	6.73	fairly poor	172	chronic
Main	Pebble Creek	Peb2	Pebble 13 Mile	31	fair	14	8	2	6.50	fair	238	chronic
Main	Pebble Creek	Peb3	Pebble d/s Dam	31	fair	13	8	2	5.11	good	220	chronic
Main	Sprague Creek	Sprag	Main Lloyd Stage	28	fair	11	9	2	4.45	very good	220	chronic
Main	Main Rouge	Main1	FF Pk	17	poor	10	5	0	9.40	very poor	157	chronic
Main	Main Rouge	Main5	Douglas Evans	34	good	17	8	2	5.40	good	106	ok
Main	Main Rouge	Main6	Sfld Civic Ctr	32	fair	19	10	3	8.21	poor	187	chronic
Main	Main Rouge	MN-7	Rouge Park	28	fair	13	6	3	6.15	fair	292	chronic
Middle	Bishop Creek	Bish2	Bishop Scarborough	38	good	15	10	2	4.74	good	637	acute
Middle	Ingersoll Creek	Ing1	Brookfarm Park	27	fair	14	10	1	6.06	fair	238	chronic
Middle	Walled Lk Drainage	Wall2	WL 10 M	32	fair	12	8	2	4.96	good	276	chronic
Middle	Walled Lk Drainage	Wall1	Rotary Pk	30	fair	16	9	3	5.70	fair	257	chronic
Middle	Johnson Creek	John1	5M Salem	34	good	15	12	2	5.48	good	95	ok
Middle	Johnson Creek	John2	5M NV	38	good	17	11	3	5.52	fair		
Middle	Johnson Creek	John7	Arcadia	25	fair	12	9	1	5.99	fair	50	ok
Middle	Johnson Creek	John3	6M NV	39	good	14	10	3	4.69	good	58	ok
Middle	Johnson Creek	MR-22	Maybury south	30	fair	13	8	2	5.23	good	144	ok
Middle	Johnson Creek	MR-25	Maybury East	28	fair	14	10	2	5.14	good	203	chronic
Middle	Tonquish Creek	Ton1	Plym Twp Pk	32	fair	12	6	1	6.50	fair	78	ok
Middle	Tonquish Creek	Nton	S Evergreen St	36	good	12	8	3	5.73	fair	365	acute
Middle	Tonquish Creek	MR-14	Smith Elem	22	fair	11	6	1	5.56	fair	121	ok
Middle	Tonquish Creek	MR-24	Lion's Pk	21	fair	9	4	1	6.23	fair	440	acute
Middle	Tonquish Creek	Ton2	Ann Arbor Rd	15	poor	9	7	1	5.85	fair	341	acute
Middle	Willow Creek	Will1	Willow Barchester Pk	27	fair	13	5	0	6.60	fairly poor	172	chronic
Middle	Middle Rouge	MR-4	Levan Knoll	34	good	12	8	3	6.69	fairly poor	202	chronic
Middle	Middle Rouge	MR-11	Elm Grove	31	fair	14	8	2	5.20	good	235	chronic
Upper	Bell Branch	Bell1	Bicentennial Park	15	poor	9	6	0	7.01	fairly poor	418	acute
Upper	Bell Branch	Bell2	Schoolcraft College	19	fair	11	8	1	7.23	fairly poor	313	chronic
Upper	Bell Branch	Bell3	Livonia 6 Mile	18	poor	11	7	1	6.00	fair	391	acute
Upper	Seeley Creek	See3	Kennedy Ct	30	fair	14	10	1	4.52	good	157	chronic
Upper	Upper Rouge	Up1	Heritage Park	32	fair	16	11	1	5.39	good	220	chronic
Upper	Upper Rouge	Up2	Shiawassee Park	41	good	18	14	5	4.78	good	275	chronic
LR-9 water levels too low to effectively sample, not included in averages and trends												

Data Trend Tables

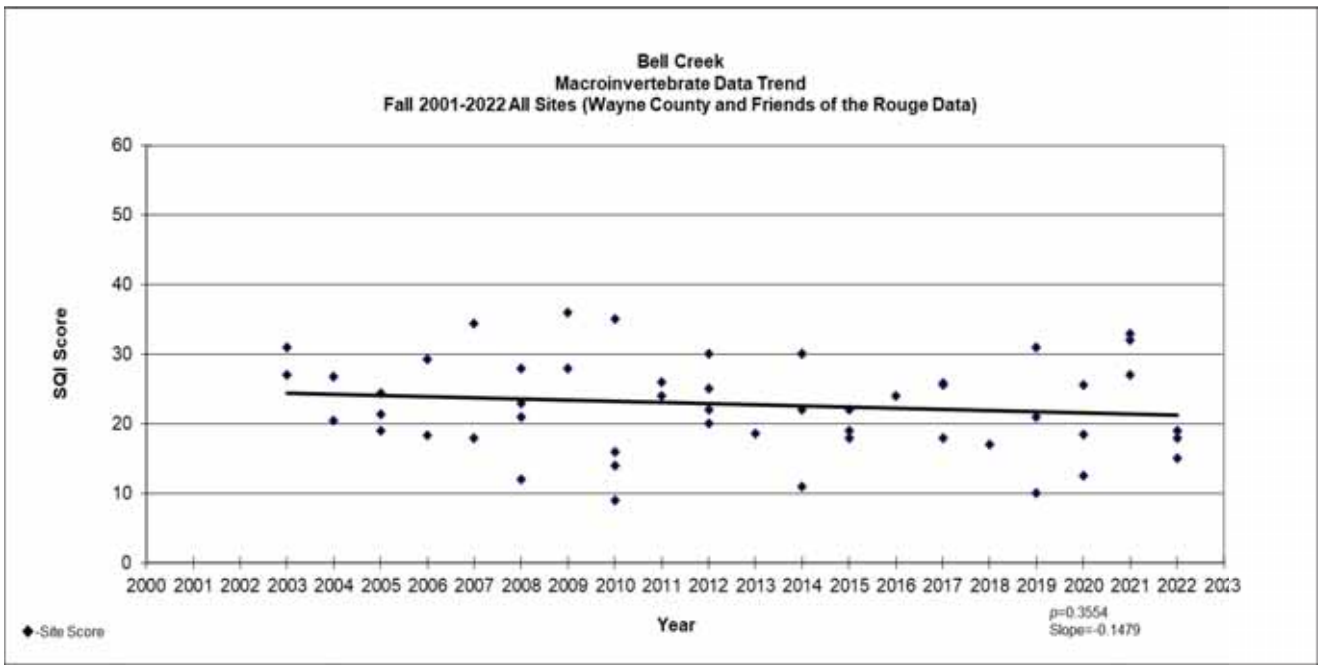
Main

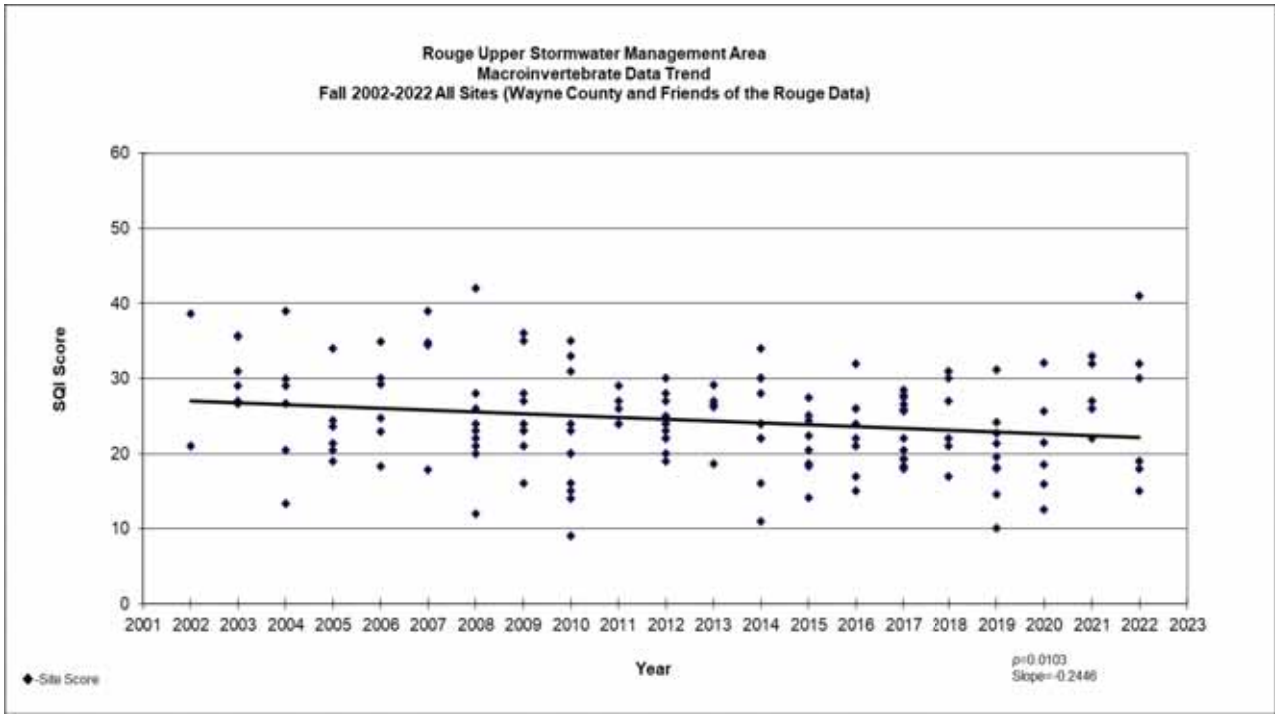




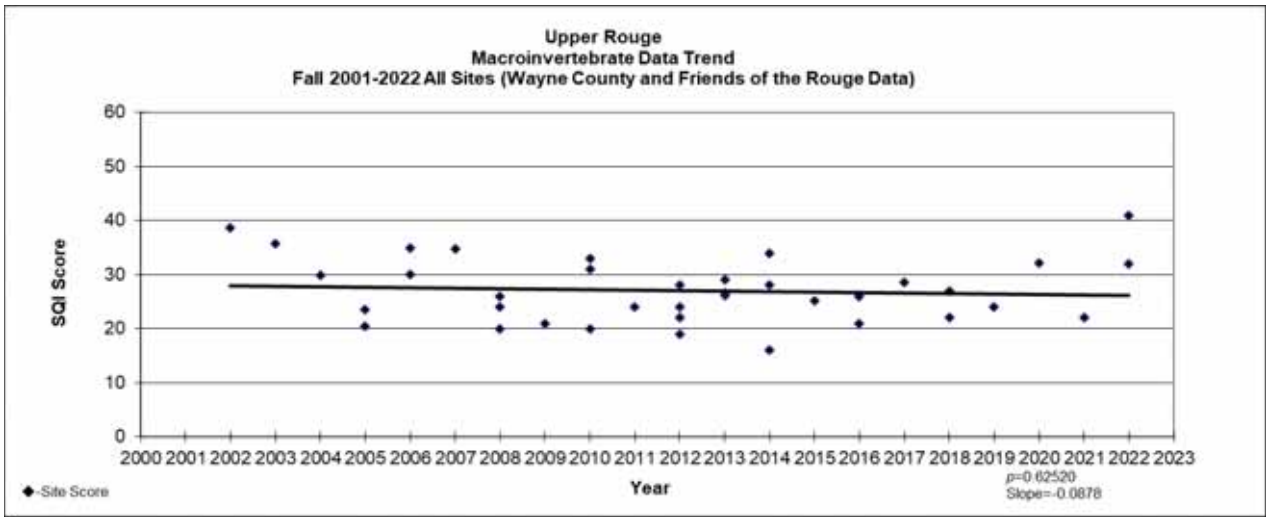

Rouge Main Branch
Macroinvertebrate Trend
Fall 2001-2022 All Sites (Wayne County and Friends of the Rouge Data)
SQI Score
Year
-Site Score
p=0.00003
Slope=-0.4671

Upper

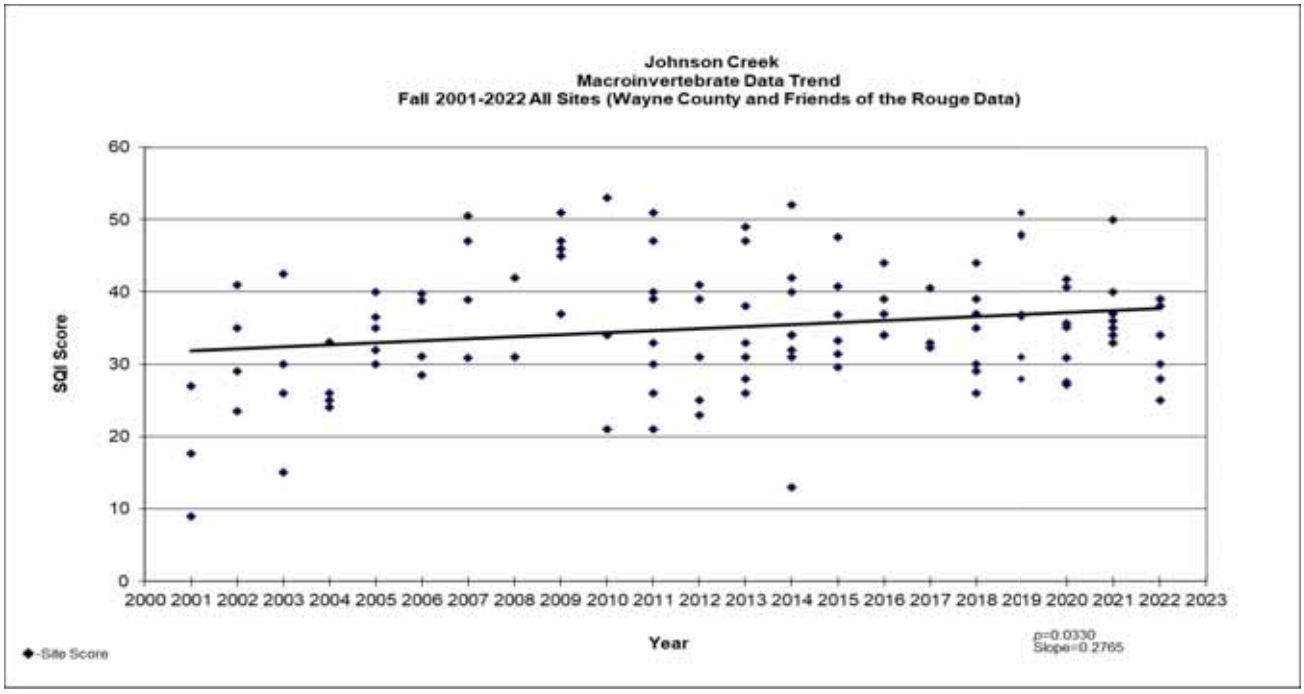

Bell Creek
Macroinvertebrate Data Trend
Fall 2001-2022 All Sites (Wayne County and Friends of the Rouge Data)
SQI Score
Year
-Site Score
p=0.3554
Slope=-0.1479

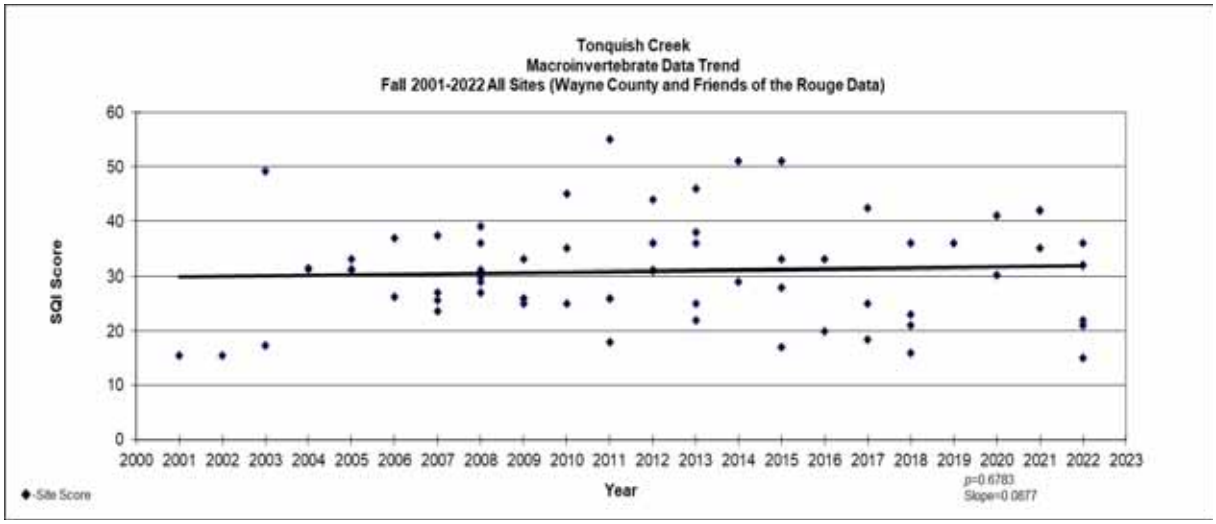


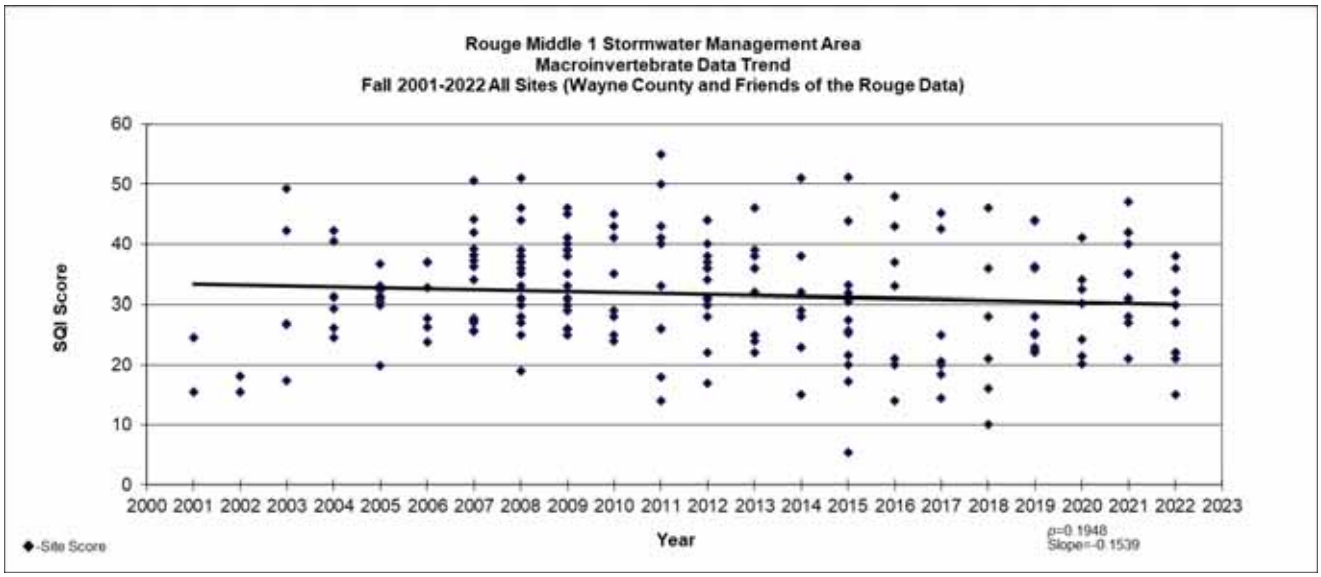
Upper with no tributaries

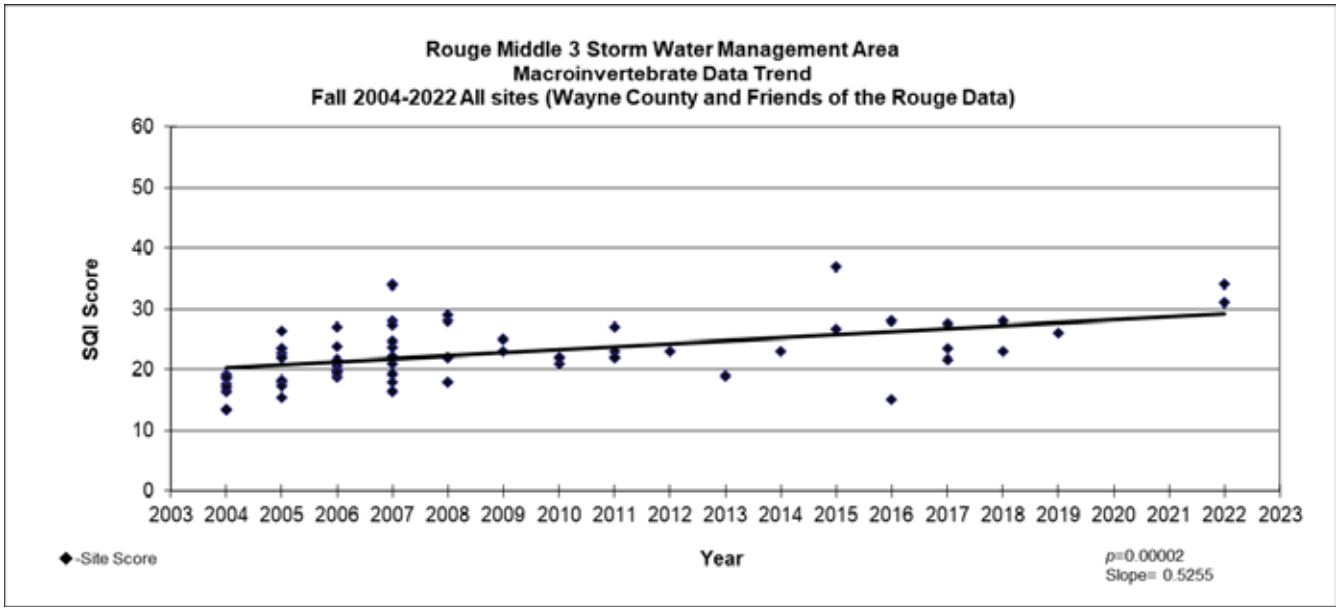


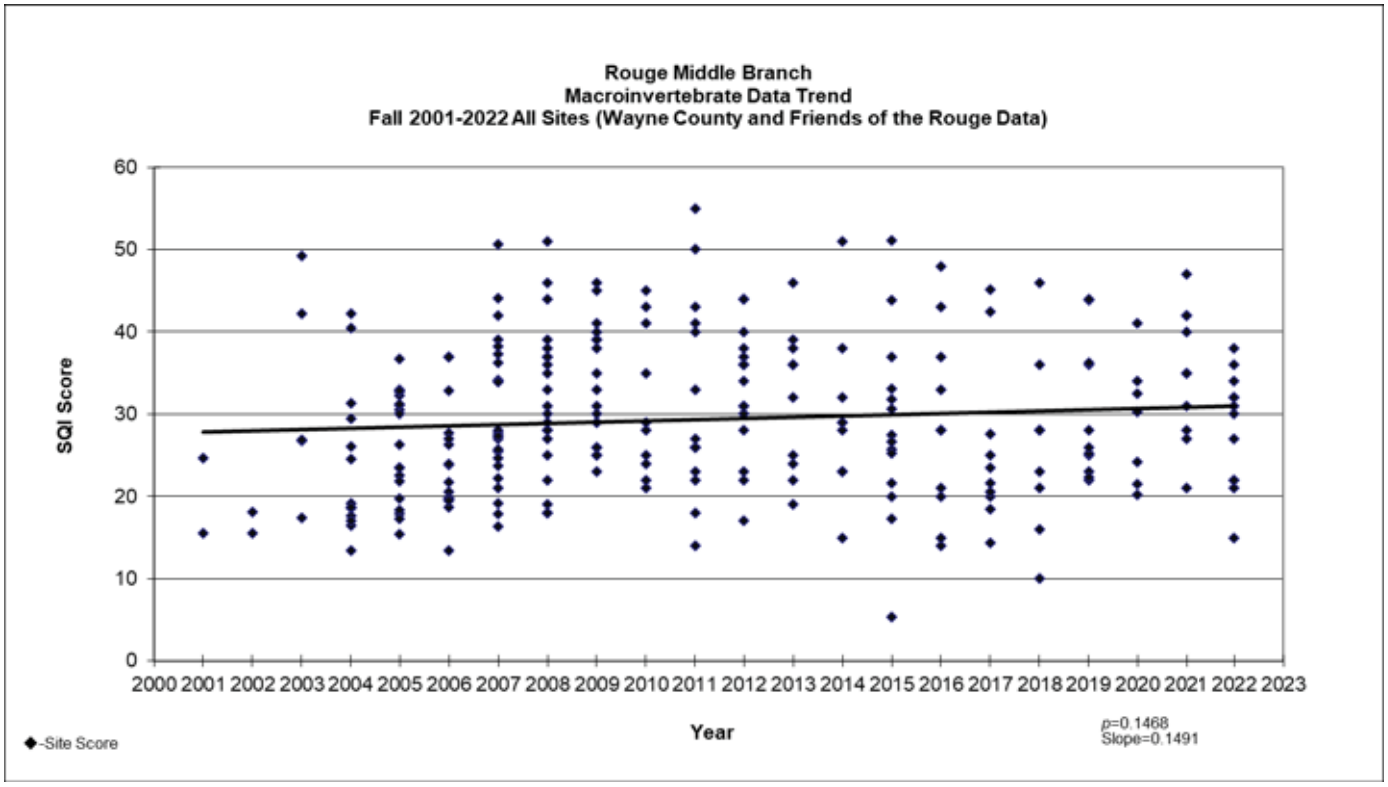
Middle

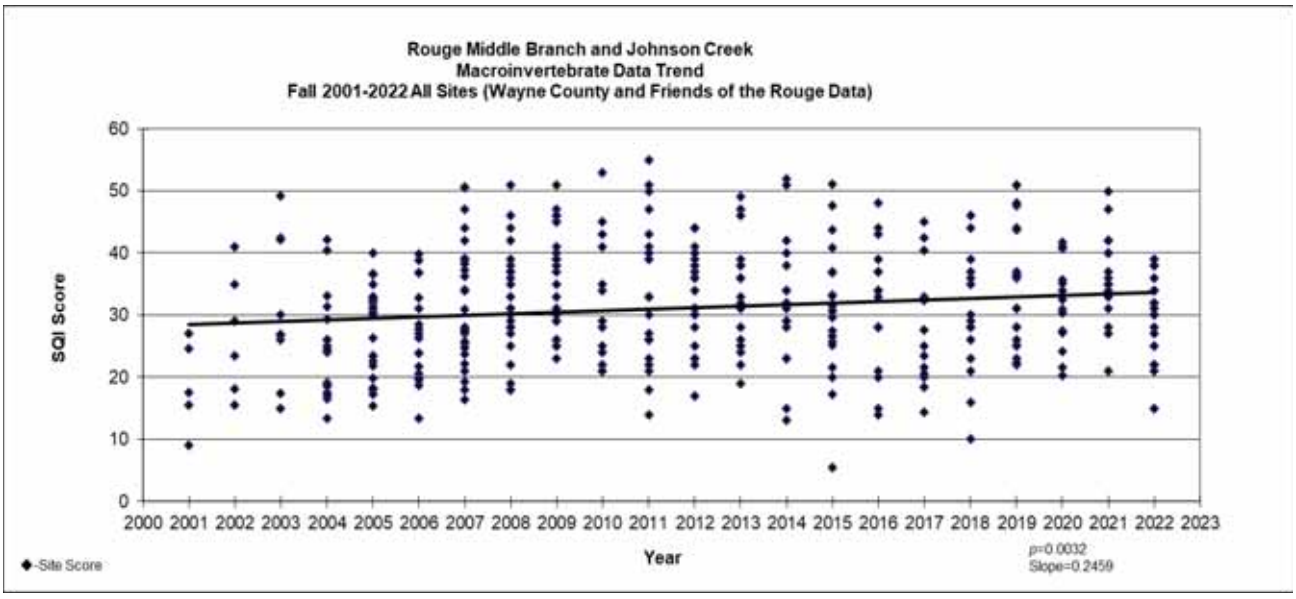

Johnson Creek
Macroinvertebrate Data Trend
Fall 2001-2022 All Sites (Wayne County and Friends of the Rouge Data)
SQI Score
Year
Site Score
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Slope=0.2765

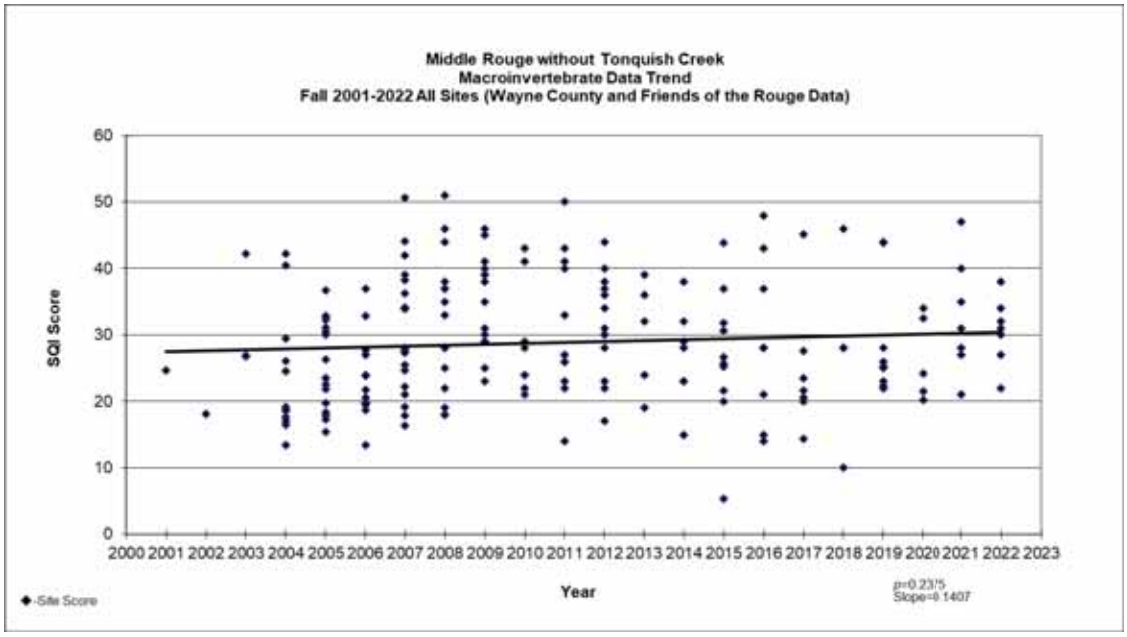

Tonquish Creek
Macroinvertebrate Data Trend
Fall 2001-2022 All Sites (Wayne County and Friends of the Rouge Data)
SQI Score
Year
Site Score
p=0.6783
Slope=0.0677


Rouge Middle 1 Stormwater Management Area
Macroinvertebrate Data Trend
Fall 2001-2022 All Sites (Wayne County and Friends of the Rouge Data)
SQI Score
Year
◆-Site Score
p=0.1948
Slope=-0.1539

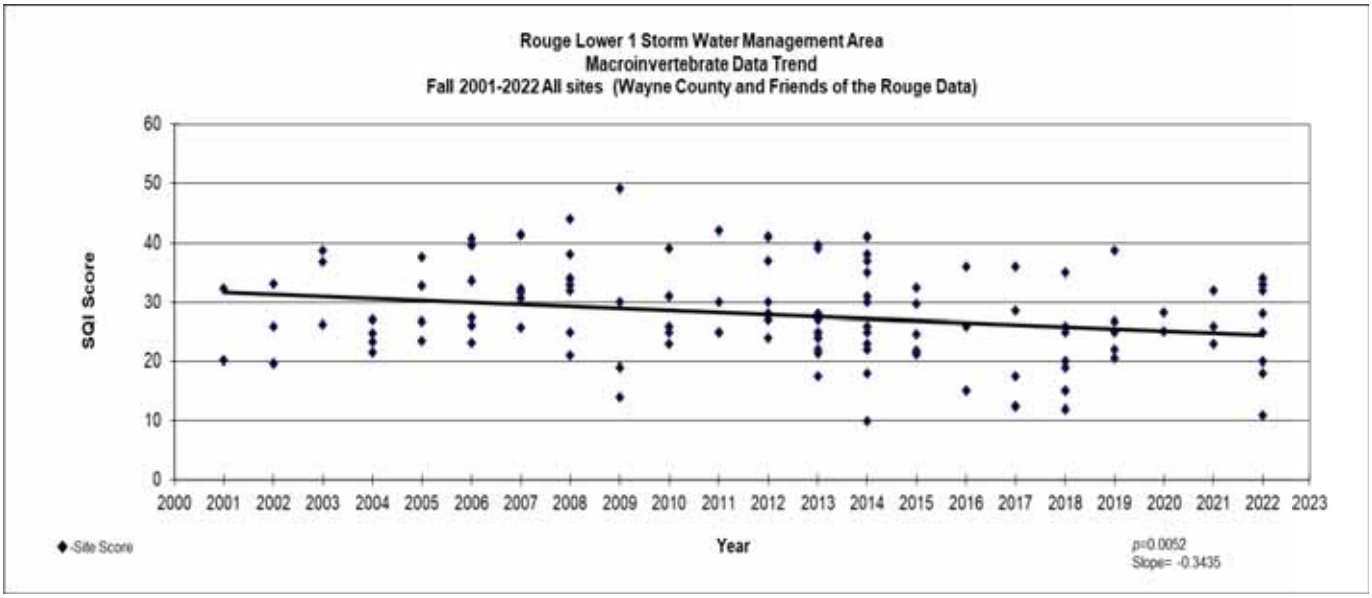

Rouge Middle 3 Storm Water Management Area
Macroinvertebrate Data Trend
Fall 2004-2022 All sites (Wayne County and Friends of the Rouge Data)
SQI Score
Year
◆-Site Score
p=0.00002
Slope= 0.5255

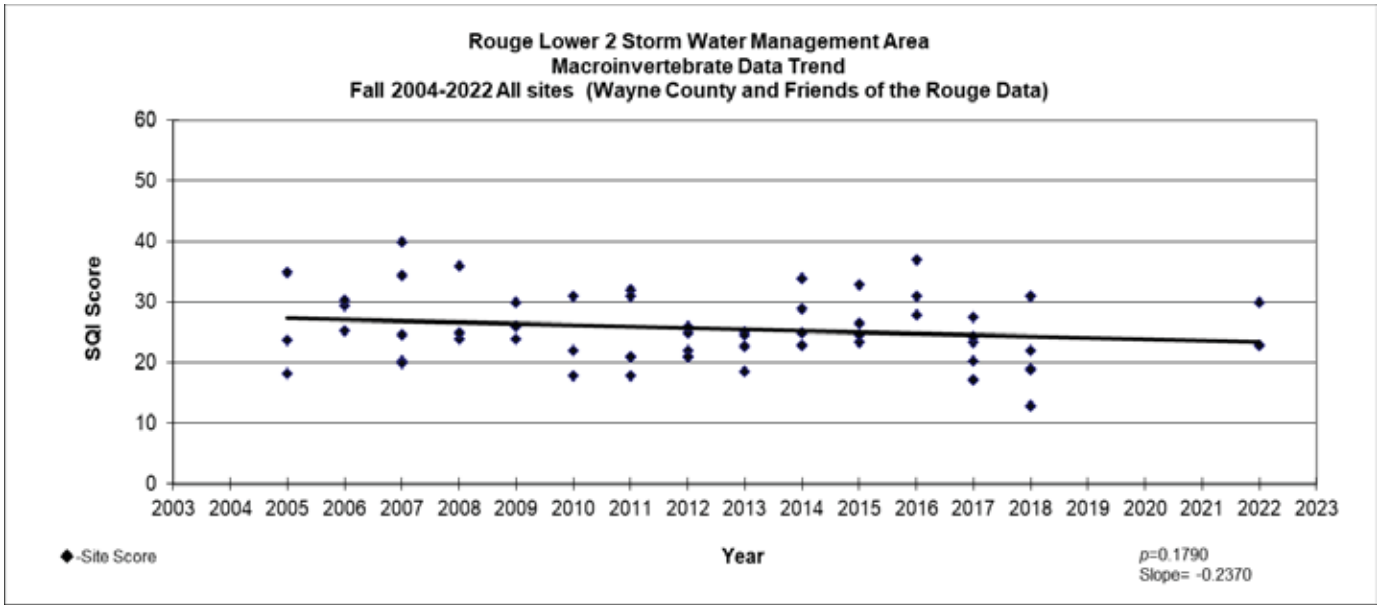

Rouge Middle Branch
Macroinvertebrate Data Trend
Fall 2001-2022 All Sites (Wayne County and Friends of the Rouge Data)
SQI Score
Year
◆-Site Score
p=0.1468
Slope=0.1491

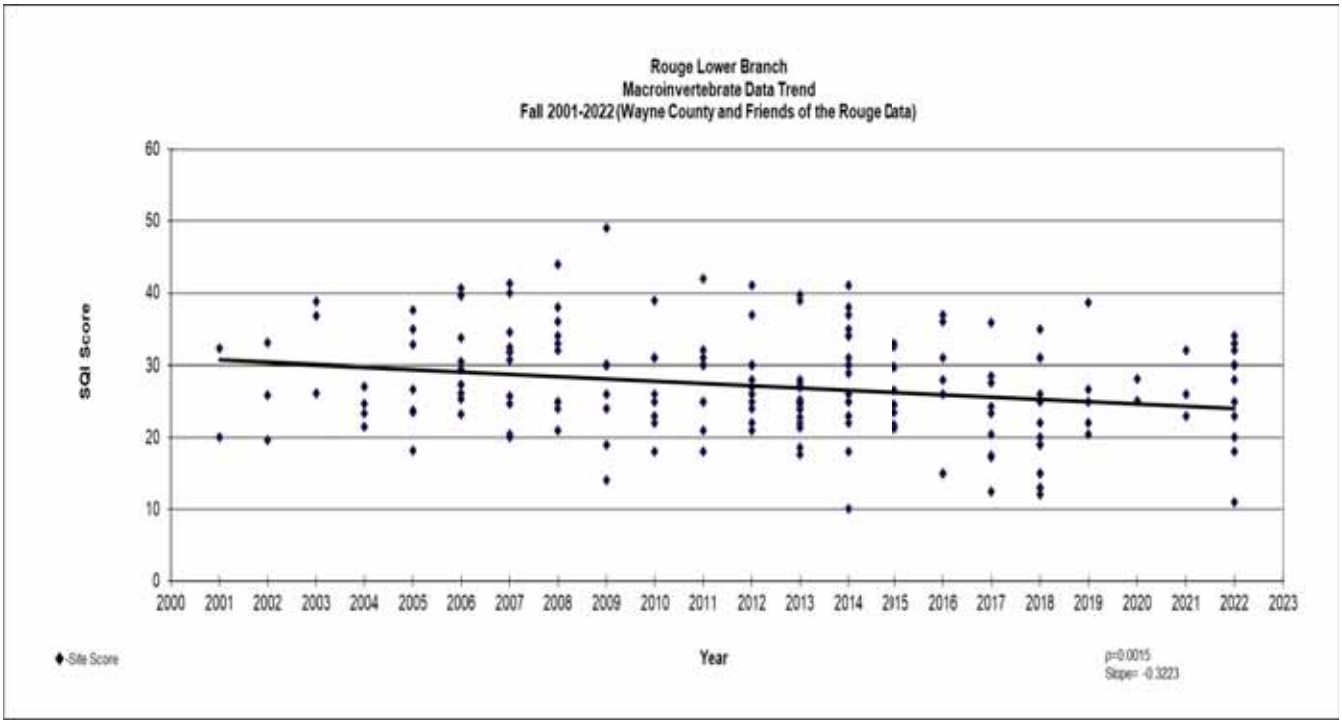

Rouge Middle Branch and Johnson Creek
Macroinvertebrate Data Trend
Fall 2001-2022 All Sites (Wayne County and Friends of the Rouge Data)
SQI Score
Year
◆-Site Score
p=0.0032
Slope=0.2459


Middle Rouge without Tonquish Creek
Macroinvertebrate Data Trend
Fall 2001-2022 All Sites (Wayne County and Friends of the Rouge Data)
SQI Score
Year
Site Score
p=0.2375
Slope=0.1407

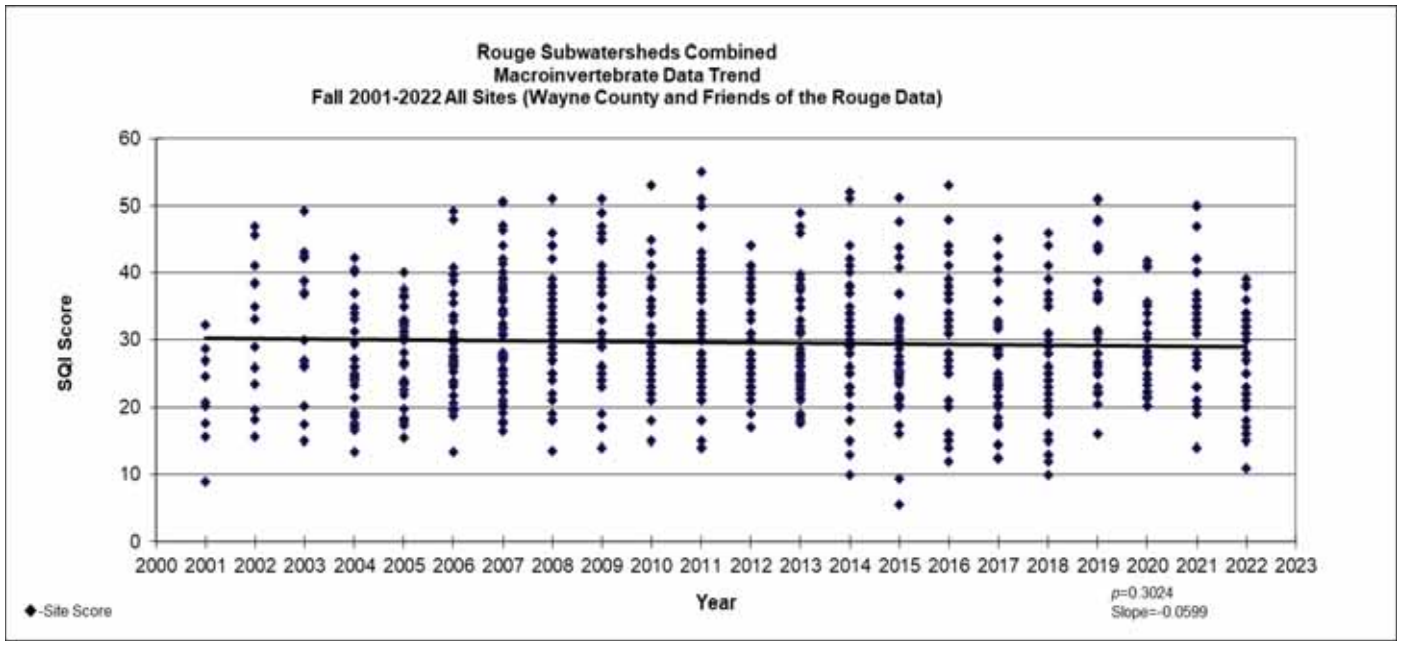
Lower


Rouge Lower 1 Storm Water Management Area
Macroinvertebrate Data Trend
Fall 2001-2022 All sites (Wayne County and Friends of the Rouge Data)
SQI Score
Year
Site Score
p=0.0052
Slope= -0.3435


Rouge Lower 2 Storm Water Management Area
Macroinvertebrate Data Trend
Fall 2004-2022 All sites (Wayne County and Friends of the Rouge Data)
SQI Score
Year
-Site Score
p=0.1790
Slope= -0.2370


Rouge Lower Branch
Macroinvertebrate Data Trend
Fall 2001-2022 (Wayne County and Friends of the Rouge Data)
SQI Score
Year
-Site Score
p=0.0015
Slope= -0.3223

All Sites


Rouge Subwatersheds Combined
Macroinvertebrate Data Trend
Fall 2001-2022 All Sites (Wayne County and Friends of the Rouge Data)
SQI Score
60
50
40
30
20
10
0
2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023
Year
-Site Score
p=0.3024
Slope=-0.0599

www.therouge.org
650 Church Street Suite 209
Plymouth, MI 48170
734-927-4904

Rouge River Benthic Monitoring Program
Spring 2023 Report

This report covers benthic macroinvertebrate monitoring at 41 sites on Rouge River tributaries and branches in the spring of 2023. Most sites were sampled during the Spring Bug Hunt on April 15, 2023 where 84 attendees sampled 27 sites in 14 teams. Wayne County staff sampled six additional sites, FOTR sampled additional sites and Sue Thompson sampled six additional sites. Team Leader training was cancelled due to extremely high water and could not be rescheduled. A Bug Identification Night was held for Team Leaders on May 2 and 13 people attended. FOTR staff identified the rest of the specimens with assistance from Sue Thompson and dragonfly identification with assistance from Darrin O'Brien and Julie Craves.

FRIENDS OF THE ROUGE BENTHIC MONITORING PROGRAM

FOTR's benthic monitoring program was started in 2001 to involve a large number of volunteers in monitoring the health of the watershed by sampling the creeks of the Rouge River. The types and number of benthic macroinvertebrates found can be used to assess water quality. Each team of volunteers samples two sites under the direction of a trained team leader. Samples of each organism are collected and field identifications are verified in the lab.

Water Quality Rating

Starting in Fall 2021, Michigan Clean Water Corps, the statewide organization that provides the protocol for monitoring groups in the state, replaced **SQI** (see box above) with **Water Quality Rating (WQR).** The new WQR rates each Family based on the Hilsenhoff Sensitivity Index. The number of individuals found for each family is then multiplied by the family's sensitivity rating, then divided by the total number of individual organisms found. Leaders strive to collect at least 100 organisms. If they collect under 60, the score is automatically 7, if under 30, it is automatically 10. Unlike SQI, the lower the WQR, the higher quality the rating.

00.0-3.50 = EXCELLENT
3.51-4.50 = VERY GOOD
4.51-5.50 = GOOD
5.51-6.50 = FAIR
6-51-7.50 = FAIRLY POOR
7.51-8.50 = POOR
9.51-10.0 = VERY POOR

Summary

Stream Quality Index (SQI) averaged 30 or FAIR and the Water Quality Index (WQR) averaged 5.93 FAIR (map p. 7, Table 3 p. 9, and graph below). Taxa averaged 13 Families per site, EPT 2, and Chloride 201 (Table 3). Compared to average, ten sites were above a standard deviation of the mean SQI and seven were below.

To compare trends over time, we analyzed the trends in SQIs. When all of the sites were compared, there was a small but significant upward trend in SQIs (see graph below).

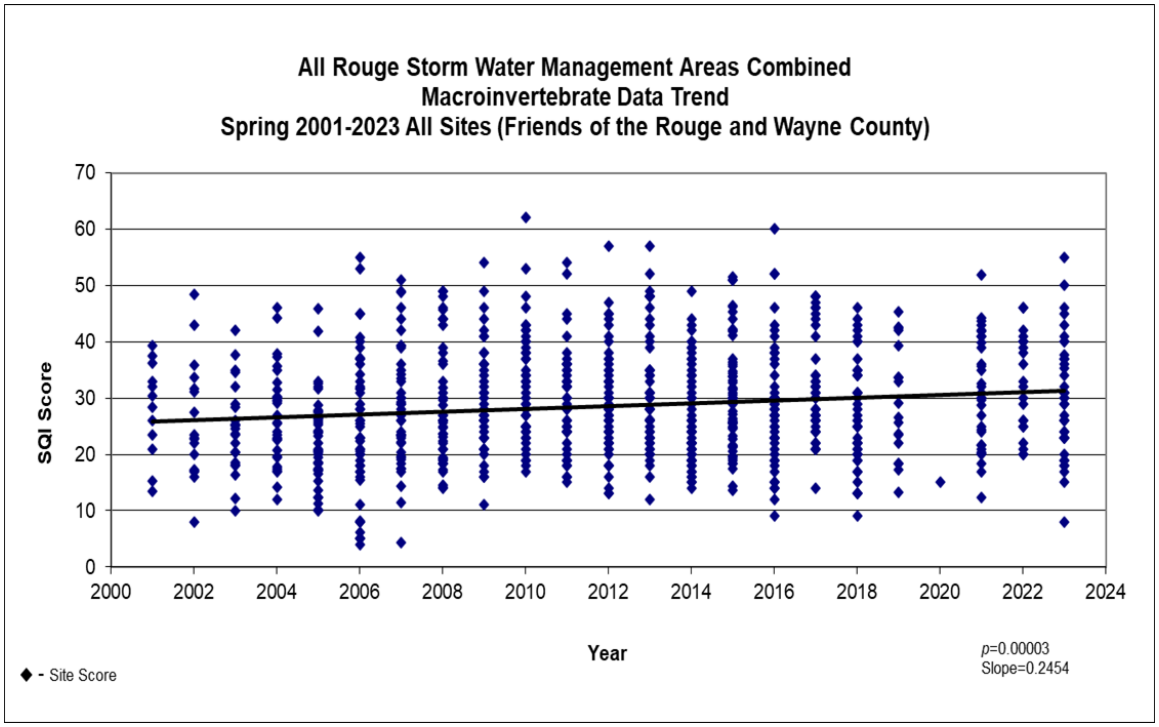
Stream Quality Index, Taxa, EPT

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 score. A number of different organisms also results in a high score. The SQI is then given a rating:

>48 = EXCELLENT
34-48 = GOOD
19-33 = FAIR
<19 = POOR

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

EPT refers to the number of mayfly, caddisfly and stonefly families found; these three orders contain some of the most sensitive organisms.



Treated separately or together, the Middle 1 and the Middle 3 subwatersheds also had significant positive trends (Table 1, graphs p. 12-15). No other subwatershed showed significant trends.

Table 1 - FOTR and WC Spring Bug Hunt Trend Summary 2001-2023

Branch	slope	p-value	True trend	Subwatershed average score	Water Quality Rating
Main 1-2	0.1756	0.0779	no trend	27	Fair
Main3-4*	-0.1351	0.7504	no trend	25	Fair
Upper	-0.0542	0.6070	no trend	24	Fair
Johnson Creek	0.1475	0.2771	no trend	39	Good
Middle 1	0.3572	0.0163	yes, positive	30	Fair
Middle 3	0.4600	0.0218	yes, positive	20	Fair
Lower 1	0.1277	0.2921	no trend	31	Fair
Lower 2	-0.1708	0.3521	no trend	26	Fair
Middle 1 and Middle 3 combined	0.4421	0.0007	yes, positive	27	Fair

*no sites sampled in spring 2023 in this subarea

In addition to the trend analysis by subwatershed, a site-by-site analysis of all the sites was done (Table 2). The majority of sites had no trend. Five sites had significant trends and all were positive.

Table 2 - Spring Bug Hunt Data Trend 2001-2023 by site

Site	slope	*p*-value	Statistically significant trend	Site average score	Water Quality Rating
Main5	0.7662	0.0129	yes, positive	28	Fair
Bish2	0.7239	0.0397	yes, positive	23	Fair
Nton	0.6263	0.0052	yes, positive	21	Fair
Ton2	0.7134	0.0241	yes, positive	22	Fair
Fel2	0.5799	0.0202	yes, positive	29	Fair

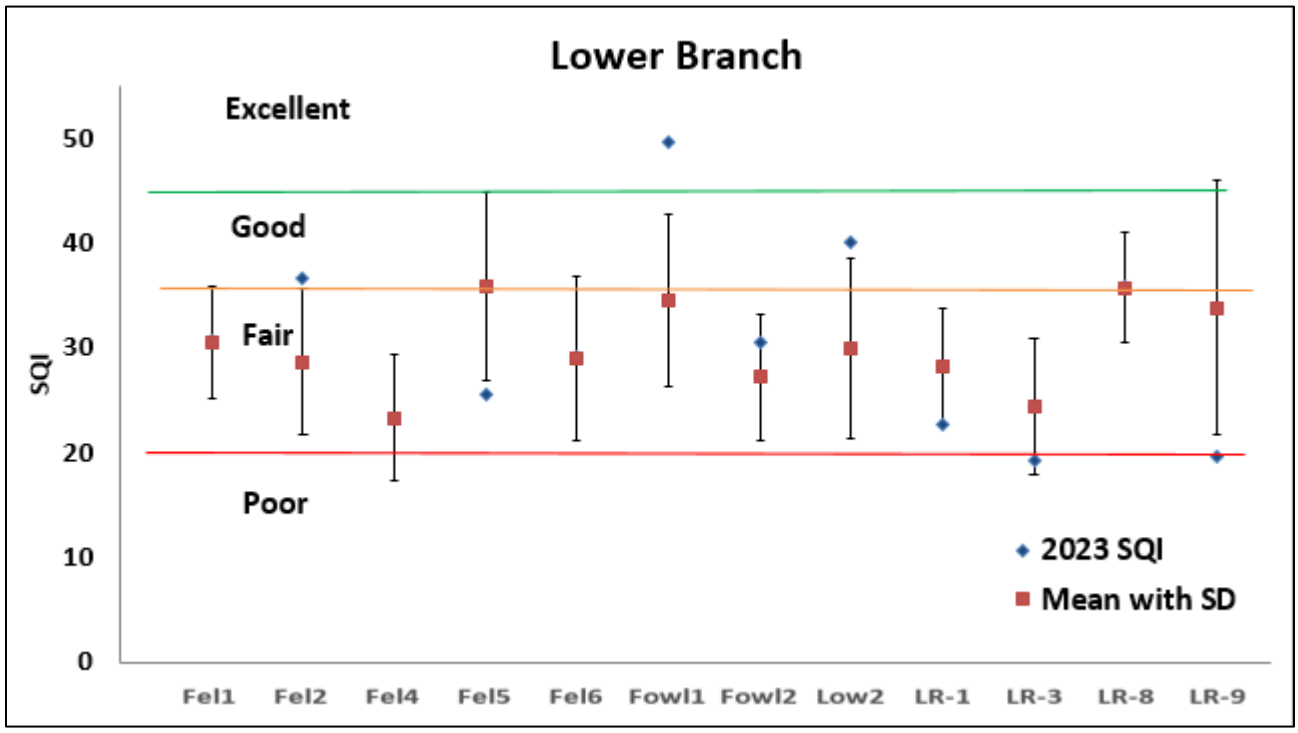
Chloride (Road Salt)

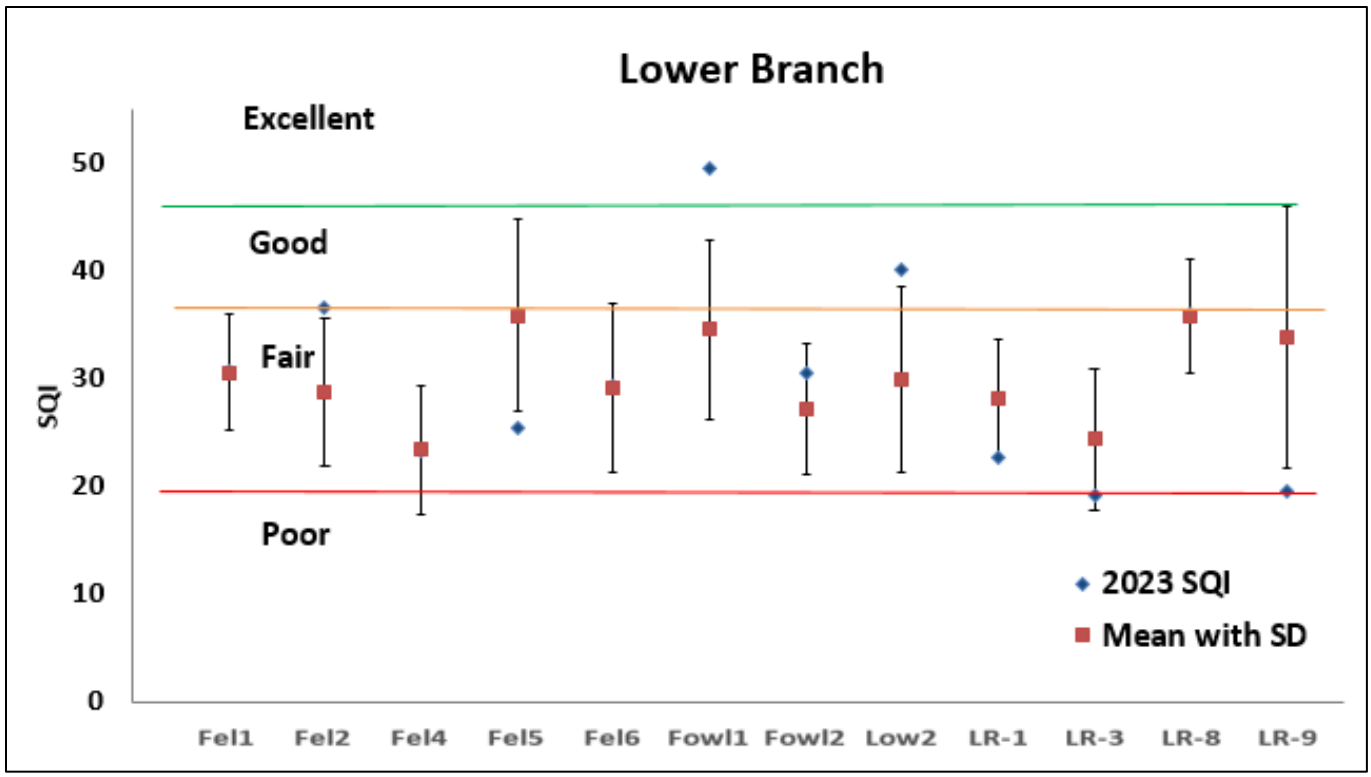
Teams tested each site for chloride using Hach test strips provided by the Izaak Walton League's Salt Watch Program (Table 3, Map p. 10). High levels of salt in streams is detrimental to aquatic life. The state of Michigan's chloride water quality values for surface waters (to protect aquatic life) are 320 mg/L (ppm) to protect against acute (short term) impacts, and 150 mg/L (ppm) to protect for chronic (long term) impacts. While the headwaters of the Lower and Middle branches had low levels of chloride, the Middle branch's Tonquish Creek and Bishop Creek had levels considered toxic (acute), above 320 ppm. In the Upper and Main, all but two upstream sites had elevated levels and Pebble Creek, Bell Creek and Evans Creek all had levels above 320 or acute.

Lower Branch

Twelve sites were sampled on the Lower since Canton Township began sponsoring sites (Table 3, p. 9, map p. 9-10). One site had an EXCELLENT SQI, three were GOOD and eight were FAIR, averaging out to 30 or FAIR. Four sites had GOOD WQRs, six were FAIR and two FAIRLY POOR, averaging 5.87 or FAIR. The number of taxa averaged 13 and EPT 2. In comparison to average, three sites: Fel2, Fowl1 and Low2 were all above a standard deviation for the SQI and two sites (Fel5 and LR-9) were below. One site had a positive trend when treated individually (Table 2). Overall the Lower1 and Lower2 subwatersheds had no significant trends (Table 1)

Road salt or chloride had the lowest average in the Lower branch as compared to the other three branches. It averaged 86 ppm, below any threshold for impairment. Two sites were above – LR-1 and LR-3, the furthest downstream sites.

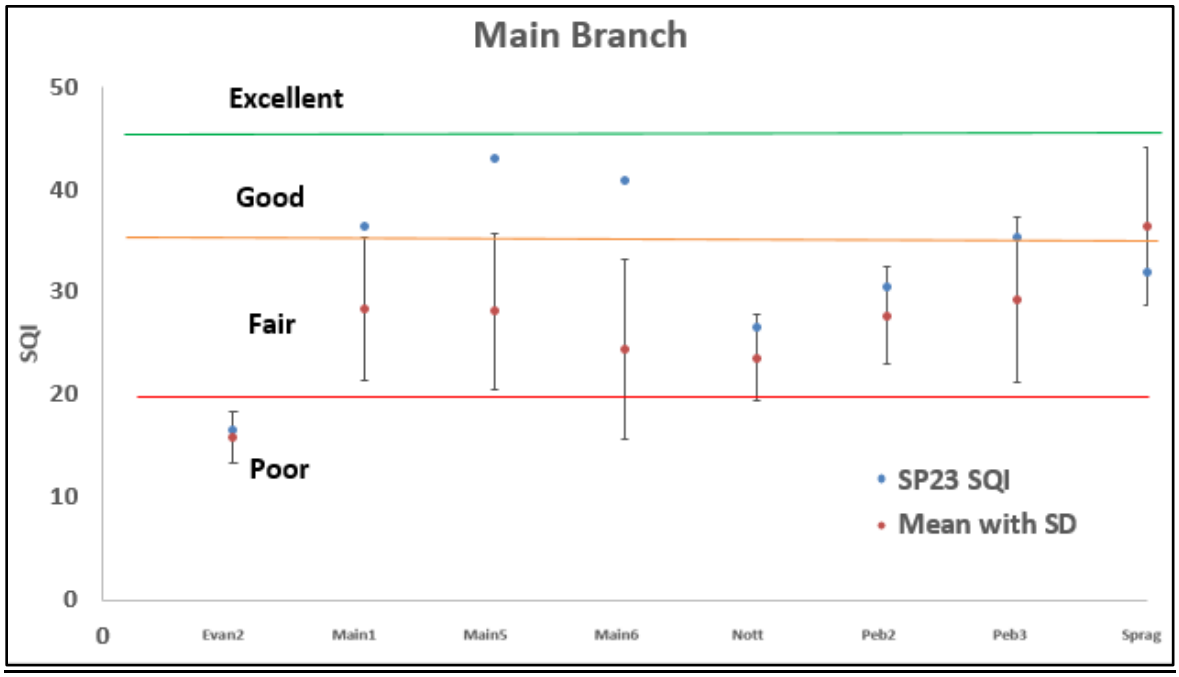




Main Branch

Eight sites on the Main Branch were sampled, sponsored by Beverly Hills, Southfield and Troy. Four sites had GOOD SQIs, three were FAIR and one POOR, averaging 33 or FAIR. Two sites had GOOD WQRs, four were FAIR and two were FAIRLY GOOD, averaging 6.02 or FAIR. The number of taxa averaged 13 and EPT 2. In comparison to averages for the sites, three sites were above a standard deviation and the rest did not deviate from the average. One site (Main5) had a positive trend when treated individually (Table 2). There was no significant trend for the Main Branch.

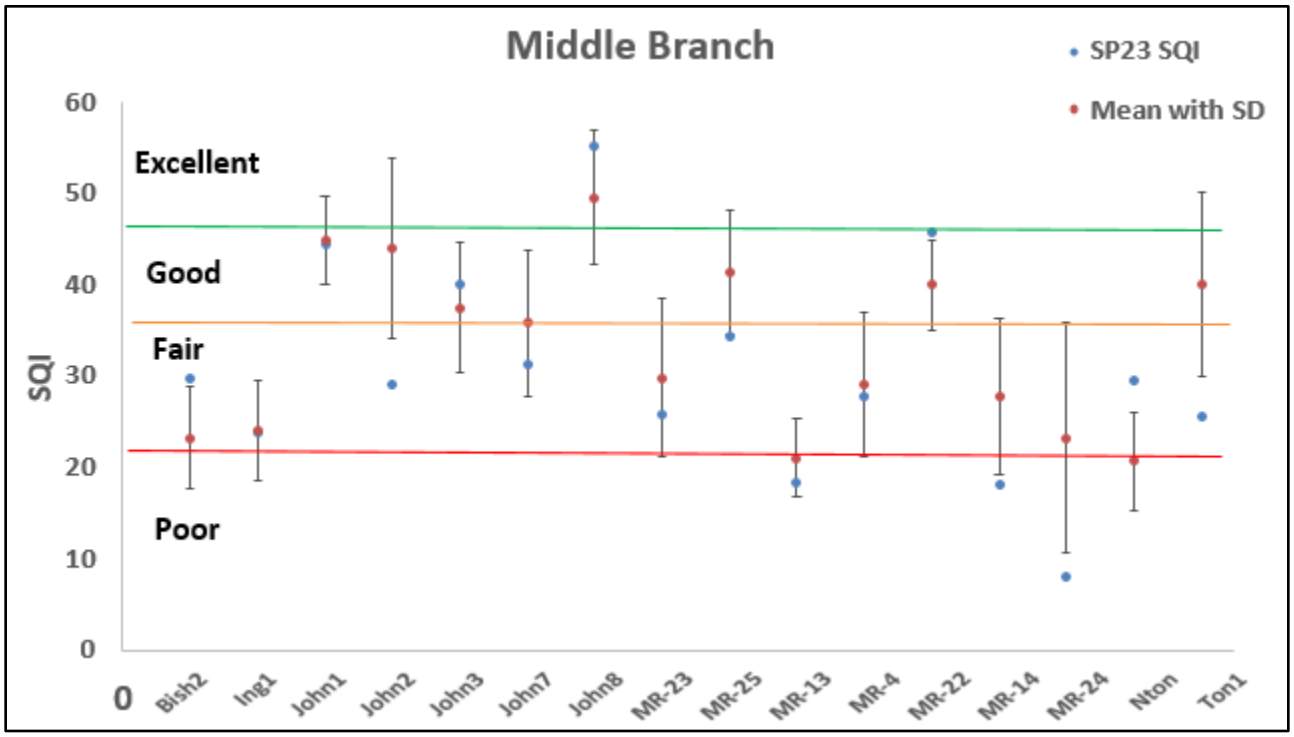
Road salt or chloride averaged 310 ppm, at the level that causes chronic problems for aquatic life. Only the two upstream sites (Sprag and Main1) were low enough to have no effect. Evans Creek in Southfield had a dangerously high level at 637 ppm.

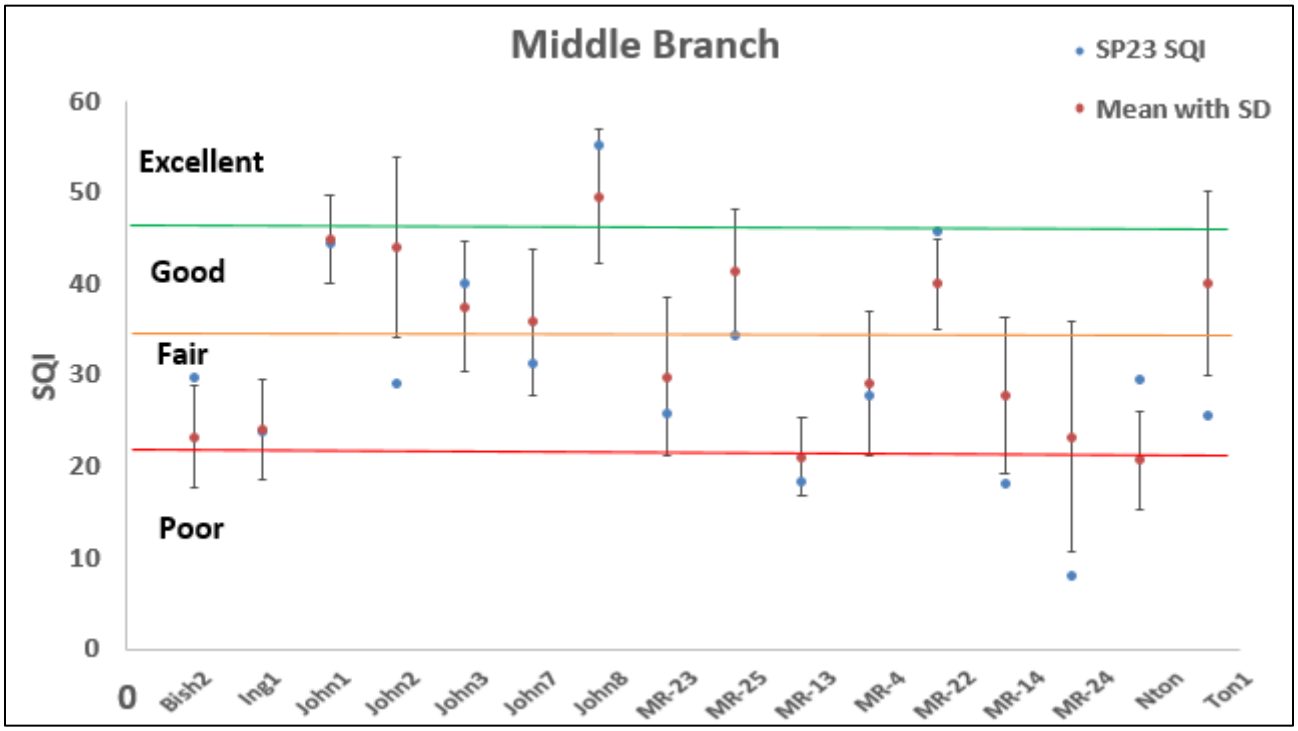


Middle Branch

Sixteen sites were sampled on the Middle branch, sponsored by Novi, Northville Township, Plymouth, Plymouth Township, and Washtenaw County. One site had an EXCELLENT SQI, four were GOOD, eight were FAIR and three POOR, averaging 30 or FAIR. Five sites had GOOD WQRs, seven were FAIR and four FAIRLY POOR, averaging 5.93 or FAIR. The number of taxa averaged 15 and EPT 3. In comparison to averages for the sites, three sites were above a standard deviation for the site (Bish2, MR-22, Nton) and four were below (John2, MR-14, MR-24, Ton1). One Bishop Creek site and two Tonquish Creek sites had positive trends when considered separately (Table 2). The Middle branch had a positive trend for the Middle 1 and Middle 3 combined as well as separately.

Road salt or chloride averaged 196 ppm, at the level that causes chronic problems for aquatic life. Three sites were in the acute range – Bish2, Nton and MR-24.

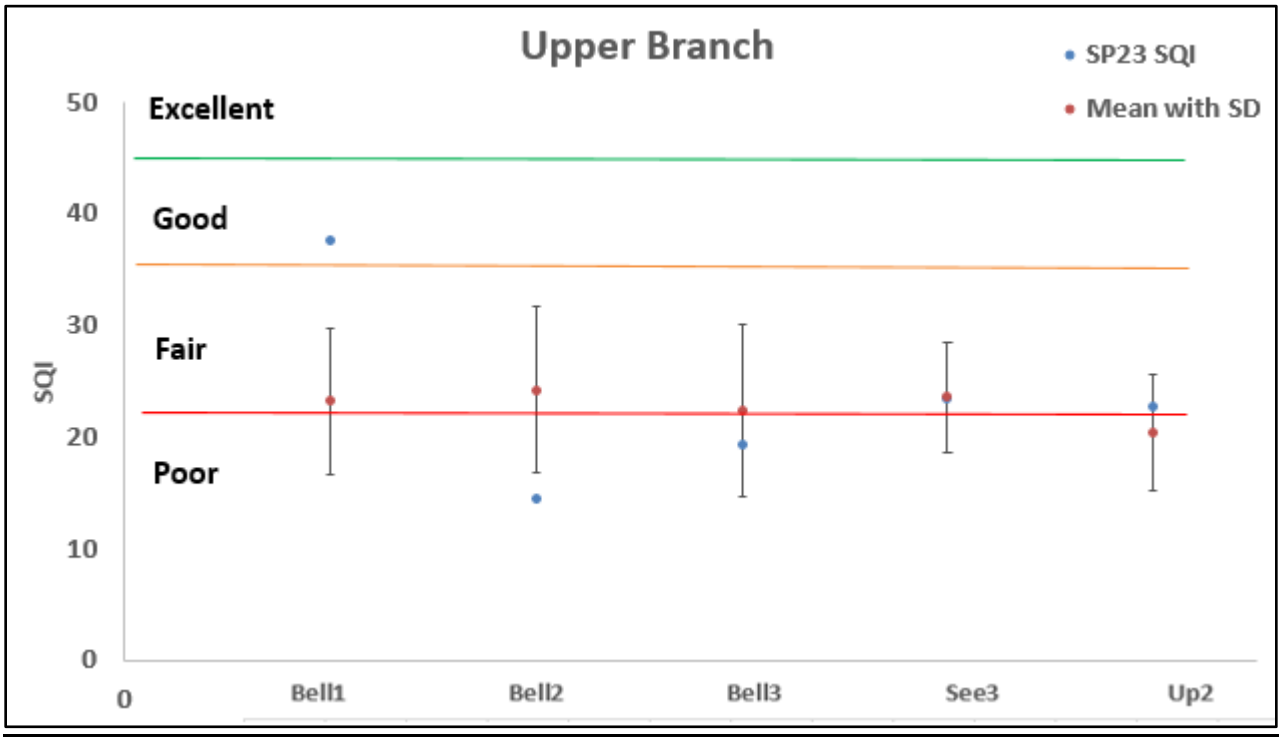


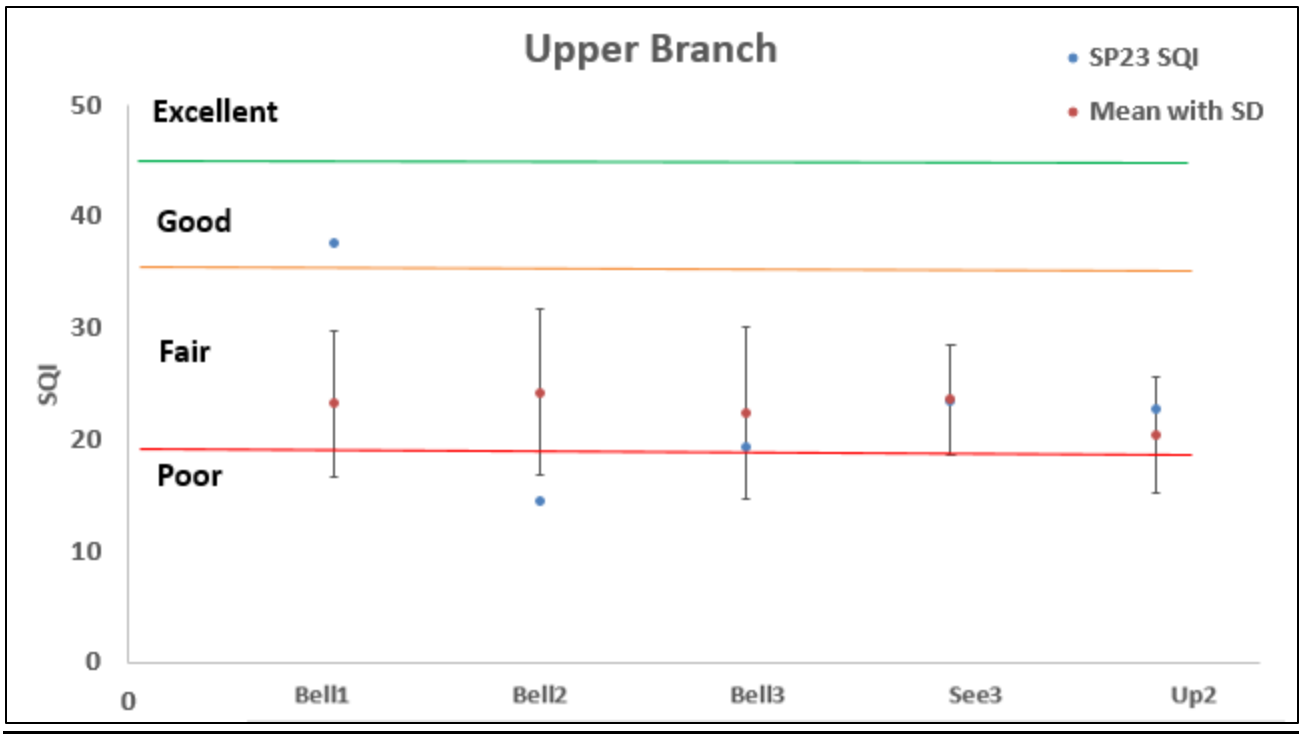


Upper Branch

Five Upper branch sites were sampled this spring, sponsored by Livonia and Farmington. One site had a GOOD SQI, three were FAIR and one was POOR, averaging a low FAIR ar 24. Two sites had GOOD WQRs, one was FAIR and two were FAIRLY POOR, avearaging 5.89 or FAIR. The number of taxa averaged 10 and EPT 1. In comparison to past years, SQIs were above a standard deviation for Bell1 and below for Bell2. The Upper did not have any significatn trend.

Road salt or chloride averaged 320 ppm, at the level that causes acute problems for aquatic life. Two sites were at the chronic level and three at the acute level.





Dragonfly Diversity



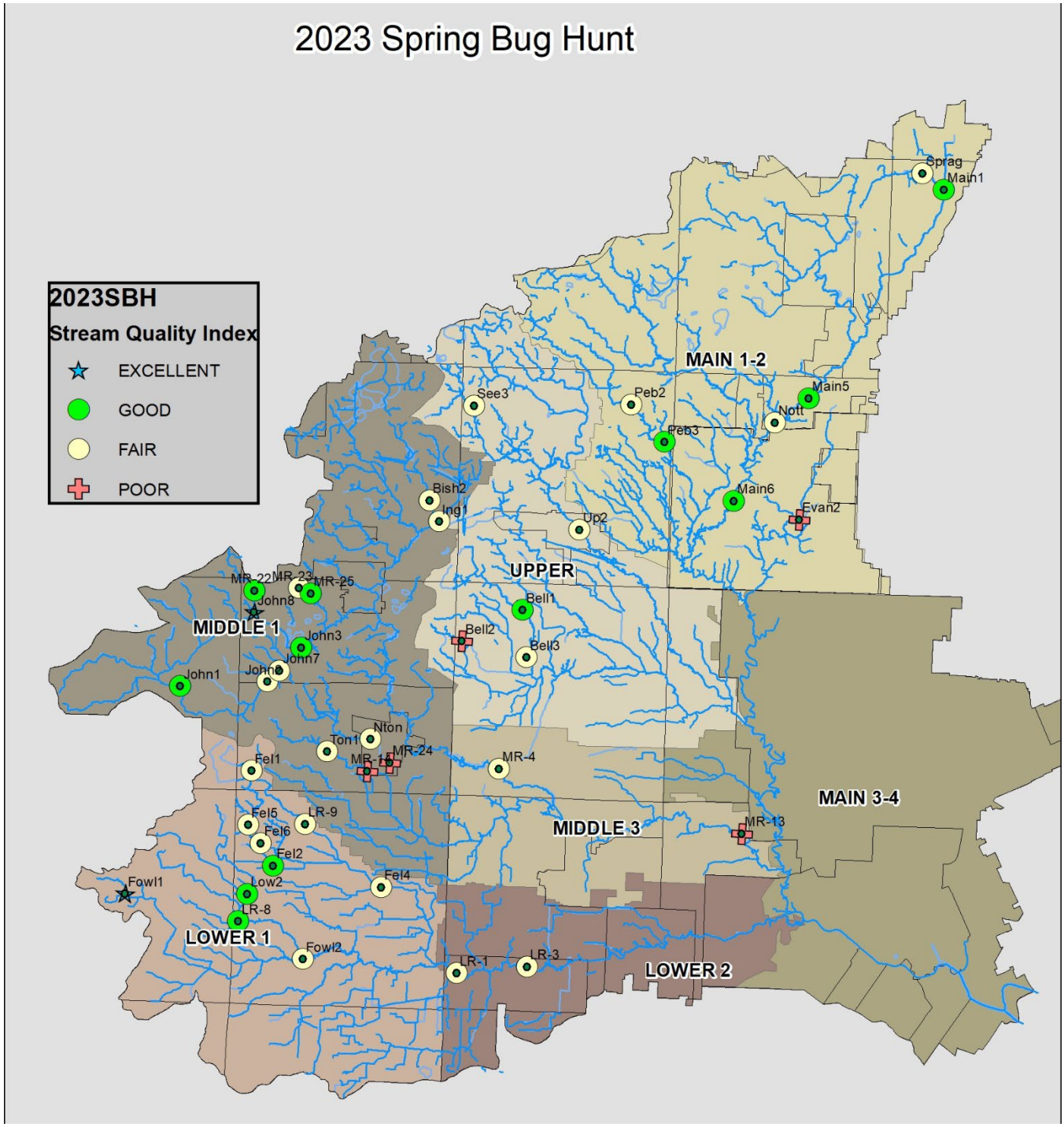
By Eric Haley - Flickr: Mocha Emerald female, Pulaski Co, 6-26-10, CC BY 2.0, https://commons.wikimedia.org/w/index.php?curid=17375671

We were surprised to find some very large dragonfly nymphs this year. Since we regularly preserve specimens, we were able to gather more information about the dragonflies. We sent some specimens to our local dragonfly expert and adjunct curator of Odonata at MSU, Darrin O'Brien. Darrin and his wife, Julie Craves, have been identifying Odonates(dragonflies and damselflies) for many years. In 2021, they identified a Hine's emerald dragonfly, a federally endangered species, in Oceana County and Julie just published a paper on it.



By Judy Gallagher https://www.flickr.com/photos/52450054@N04/27442522210/, CC BY 2.0, https://commons.wikimedia.org/w/index.php?curid=54618877

Darrin identified a mocha emerald (*Somatochlora linearis*) and an arrowhead spiketail (*Cordulegaster obliqua*). While neither of these species are listed (endangered or threatened), two of them are quite rare for Wayne County. Thank you to Darrin for examining our specimens for rare species. Photos of what the adults look are shown here.


2023 Spring Bug Hunt
2023SBH
Stream Quality Index
EXCELLENT
GOOD
FAIR
POOR
MAIN 1-2
MAIN 3-4
UPPER
MIDDLE 1
MIDDLE 3
LOWER 1
LOWER 2
Sprag
Main1
See3
Peb2
Main5
Nott
Peb3
Main6
Evan2
Bish2
Ing1
Up2
MR-22
MR-23
MR-25
John8
Bell1
Bell2
Bell3
John3
John7
John1
John6
Nton
Ton1
MR-24
MR-14
MR-4
Fel1
Fel5
LR-9
Fel6
Fel2
Fel4
MR-13
Fowl1
Low2
LR-8
Fowl2
LR-1
LR-3

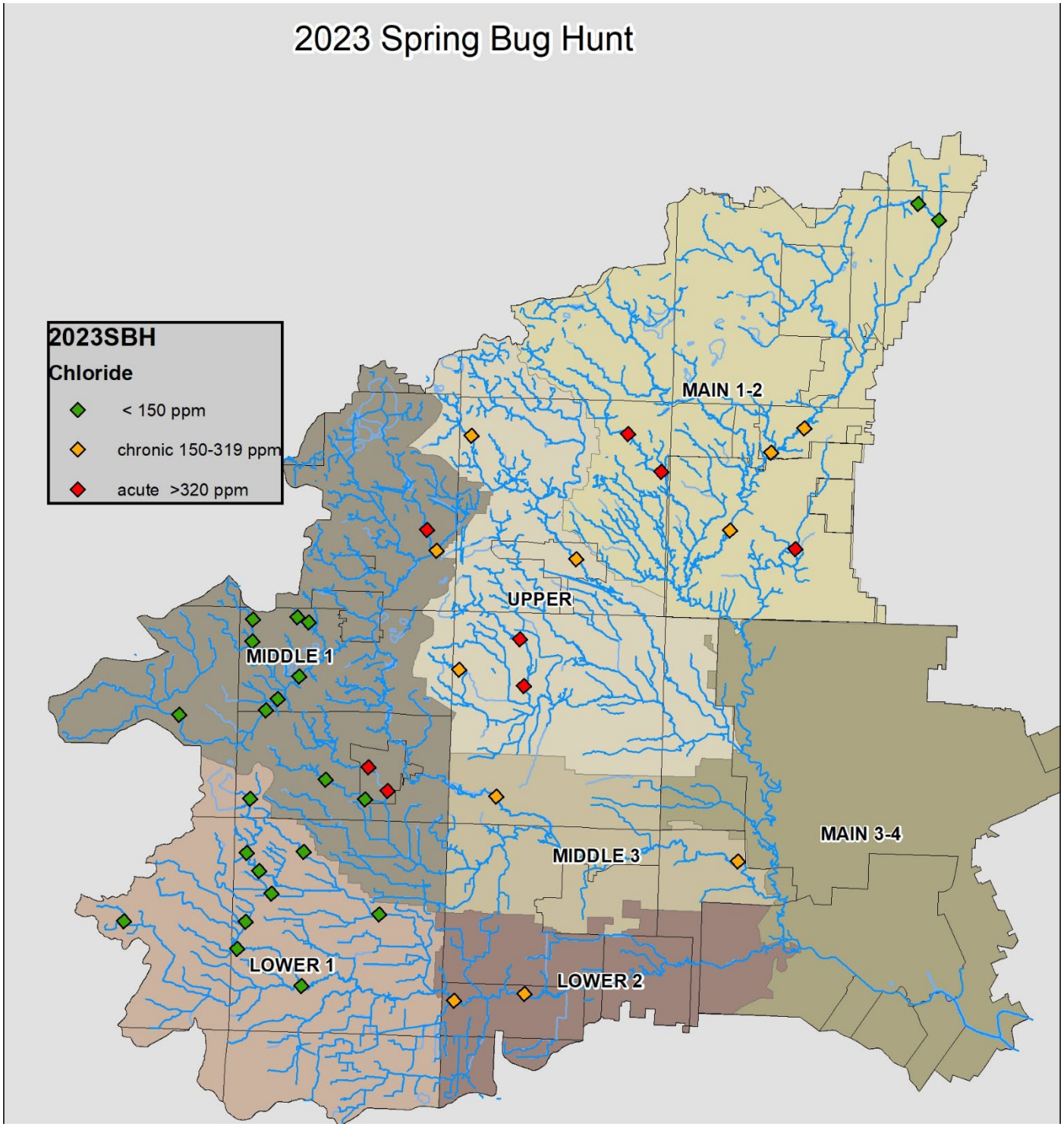

2023 Spring Bug Hunt
2023SBH
Chloride
< 150 ppm
chronic 150-319 ppm
acute >320 ppm
MAIN 1-2
UPPER
MIDDLE 1
MIDDLE 3
MAIN 3-4
LOWER 1
LOWER 2

Table 3: Sampling Sites										
Lower Branch										
Stream Name	**FIELDID**	**Site Description**	**WQR Rating**	**WQR**	**SQI**	**SQI Rating**	**Taxa**	**EPT**	**Chloride**	**Chloride Rating**
Fellows Creek	Fel1	Top of Hill Ct	FAIR	5.61	31	FAIR	16	2	50	OK
Fellows Creek	Fel5	Warren Ridge	GOOD	5.43	26	FAIR	9	1	68	OK
Fellows Creek	Fel6	Hanford	GOOD	5.45	29	FAIR	13	2	85	OK
Fellows Creek	Fel2	Vintage Valley	FAIR	5.99	37	GOOD	15	2	70	OK
Fellows Creek	LR-9	Fellows Beck Warren	FAIRLY POOR	7.00	20	FAIR	9	0	127	OK
Fellows Creek	Fel4	Flodin Pk	FAIR	6.17	23	FAIR	12	1	131	OK
Fowler Creek	Fowl1	Prospect	GOOD	4.58	50	EXCELLENT	17	5	30	OK
Fowler Creek	Fowl2	Fowler Beck	FAIR	6.07	31	FAIR	15	2	44	OK
Lower Rouge	Low2	Cherry Hill	FAIRLY POOR	6.51	40	GOOD	17	2	44	OK
Lower Rouge	LR-8	Ridge Proctor	GOOD	5.37	36	GOOD	13	2	50	OK
Lower Rouge	LR-1	Commerce Ct	FAIR	5.99	23	FAIR	9	2	157	chronic
Lower Rouge	LR-3	Goudy Park	FAIR	6.30	19	FAIR	8	2	172	chronic
		Average	**FAIR**	**5.87**	**30**	**FAIR**	**13**	**2**	**86**	**OK**
Main Branch										
Stream Name	**FIELDID**	**Site Description**	**WQR Rating**	**WQR**	**SQI**	**SQI Rating**	**Taxa**	**EPT**	**Chloride**	**Chloride Rating**
Evans Creek	Evan2	LTU	FAIR	5.76	17	POOR	9	1	637	acute
Nottingham Creek	Nott	Country Day	FAIRLY POOR	6.99	27	FAIR	10	1	230	chronic
Pebble Creek	Peb2	Pebble 13 Mile	FAIR	6.23	31	FAIR	13	1	479	acute
Pebble Creek	Peb3	Pebble d/s Dam	GOOD	5.19	35	GOOD	12	2	479	acute
Sprague Creek	Sprag	Main Lloyd Stage	GOOD	5.10	32	FAIR	14	3	95	OK
Main Rouge	Main1	FF Pk	FAIRLY POOR	6.55	37	GOOD	14	3	95	OK
Main Rouge	Main5	Douglas Evans	FAIR	6.23	43	GOOD	17	1	230	chronic
Main Rouge	Main6	Sfld Civic Ctr	FAIR	6.14	41	GOOD	18	3	238	chronic
		Average	**FAIR**	**6.02**	**33**	**FAIR**	**13**	**2**	**310**	**chronic**
Middle Branch SQI										
Stream Name	**FIELDID**	**Site Description**	**WQR Rating**	**WQR**	**SQI**	**SQI Rating**	**Taxa**	**EPT**	**Chloride**	**Chloride Rating**
Bishop Creek	Bish2	Bishop Scarborough	FAIR	5.62	30	FAIR	14	1	631	acute
Ingersoll Creek	Ing1	Brookfarm Park	FAIR	5.81	24	FAIR	15	0	290	chronic
Johnson Creek	John1	5M Salem	FAIR	5.77	45	GOOD	18	5	50	OK
Johnson Creek	John2	5M NV	GOOD	5.28	29	FAIR	23	7	62	OK
Johnson Creek	John7	Arcadia	FAIR	6.09	31	FAIR	14	5	66	OK
Johnson Creek	John3	6M NV	FAIR	5.75	40	GOOD	18	4	85	OK
Johnson Creek	MR-22	Maybury south	GOOD	5.24	46	GOOD	17	4	37	OK
Johnson Creek	MR-23	Maybury north	FAIR	5.60	26	FAIR	13	2	85	OK
Johnson Creek	MR-25	Maybury East	GOOD	5.18	34	GOOD	19	3	95	OK
Johnson Creek	John8	Maybury Angell	GOOD	5.23	55	EXCELLENT	25	7	85	OK
Tonquish Creek	Ton1	Plym Twp Pk	FAIRLY POOR	7.00	26	FAIR	12	3	130	OK
Tonquish Creek	Nton	S Evergreen St	FAIRLY POOR	7.00	30	FAIR	11	2	448	acute
Tonquish Creek	MR-14	Smith Elem	FAIR	6.37	18	POOR	9	1	143	OK
Tonquish Creek	MR-24	Lion's Pk	FAIRLY POOR	7.00	8	POOR	5	0	479	acute
Middle Rouge	MR-4	Levan Knoll	FAIRLY POOR	6.65	28	FAIR	11	2	157	chronic
Middle Rouge	MR-13	Warrendale	GOOD	5.34	18	POOR	9	1	297	chronic
		Average	**FAIR**	**5.93**	**30**	**FAIR**	**15**	**3**	**196**	**chronic**
Upper Branch										
Stream Name	**FIELDID**	**Site Description**	**WQR Rating**	**WQR**	**SQI**	**SQI Rating**	**Taxa**	**EPT**	**Chloride**	**Chloride Rating**
Bell Branch	Bell1	Bicentennial Park	FAIR	5.82	38	GOOD	11	1	365	acute
Bell Branch	Bell2	Schoolcraft College	FAIRLY POOR	7.01	15	POOR	8	0	257	chronic
Bell Branch	Bell3	Livonia 6 Mile	FAIRLY POOR	6.81	19	FAIR	9	1	341	acute
Seeley Creek	See3	Kennedy Ct	GOOD	4.63	24	FAIR	11	1	318	chronic
Upper Rouge	Up2	Shiawasee Park	GOOD	5.18	23	FAIR	10	1	318	chronic
		Average		**5.89**	**24**	**FAIR**	**10**	**1**	**320**	acute

Thank you to all the **volunteers, Wayne County** and **Sue Thompson** for sampling additional sites, identifiying difficult specimens and doing the trend analysis, and **Deirdre Devlin** and **Schoolcraft College** students for sampling one site.

This program is supported by the Erb Family Foundation, EGLE, Washtenaw County, the City of Southfield, the City of Troy, the Village of Beverly Hills, Northville Township, the City of Plymouth, Plymouth Township, the City of Novi, the City of Livonia, Canton Township and the City of Farmington.

Fall Bug Hunt
Oct. 14, 2023 9 am-4pm
Sign up online today (deadline Sept. 29, 2023 at www.therouge.org)

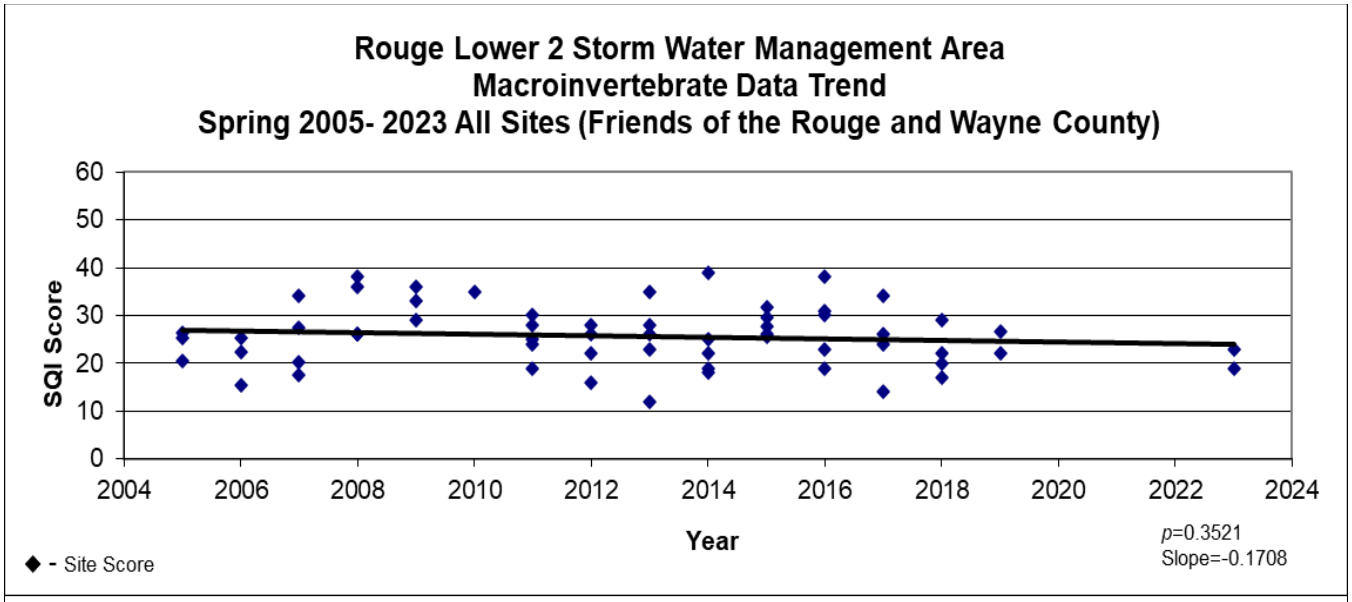
This fall, we made the decision to return to a central gathering to start the Bug Hunts like we did prior to Covid. Rather than meeting out in the field, volunteers will come to the Plymouth Cultural Center, meet their team, enjoy refreshments and an introduction to the hunt, and head out from there. Holding it this way means people can meet all of the rest of the volunteers and it makes it easier for us to make adjustments so that each team has enough volunteers. For those who would rather meet in the field, that can still be arranged.

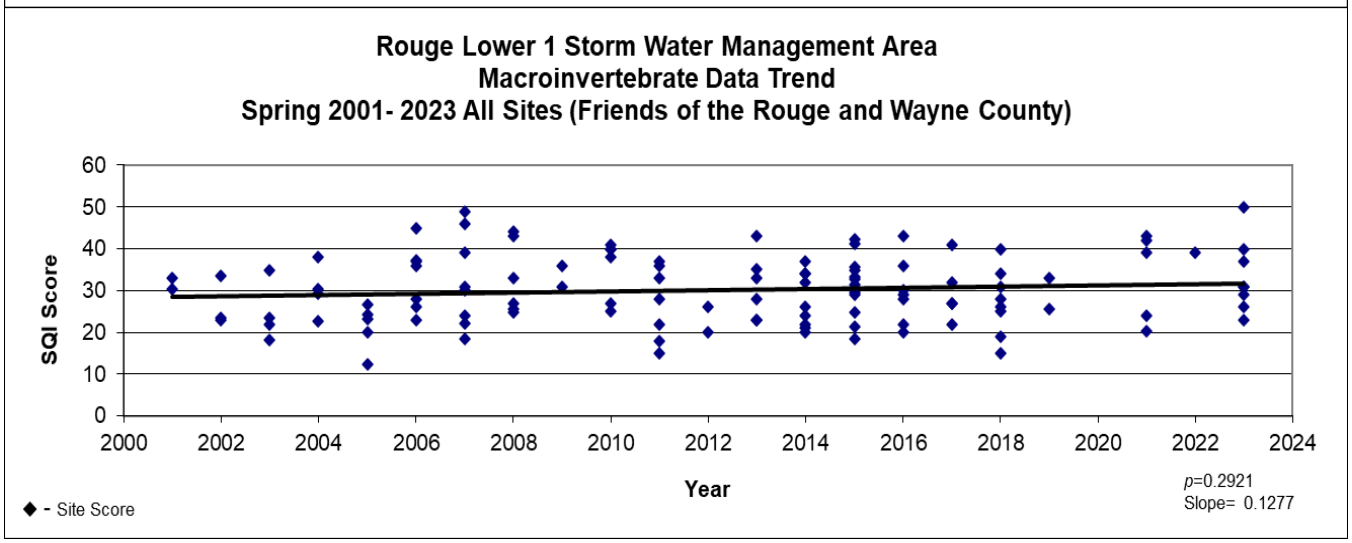
Team Leader Training – Sat. Sept. 30, 2023 9am-3pm (must have participated in a previous event)

We are always in need of people willing to train and act as Team Teaders for Bug Hunts and Stonefly Searches. If you have attended an event before and would like to train to become a team leader, please sign up for the fall training.

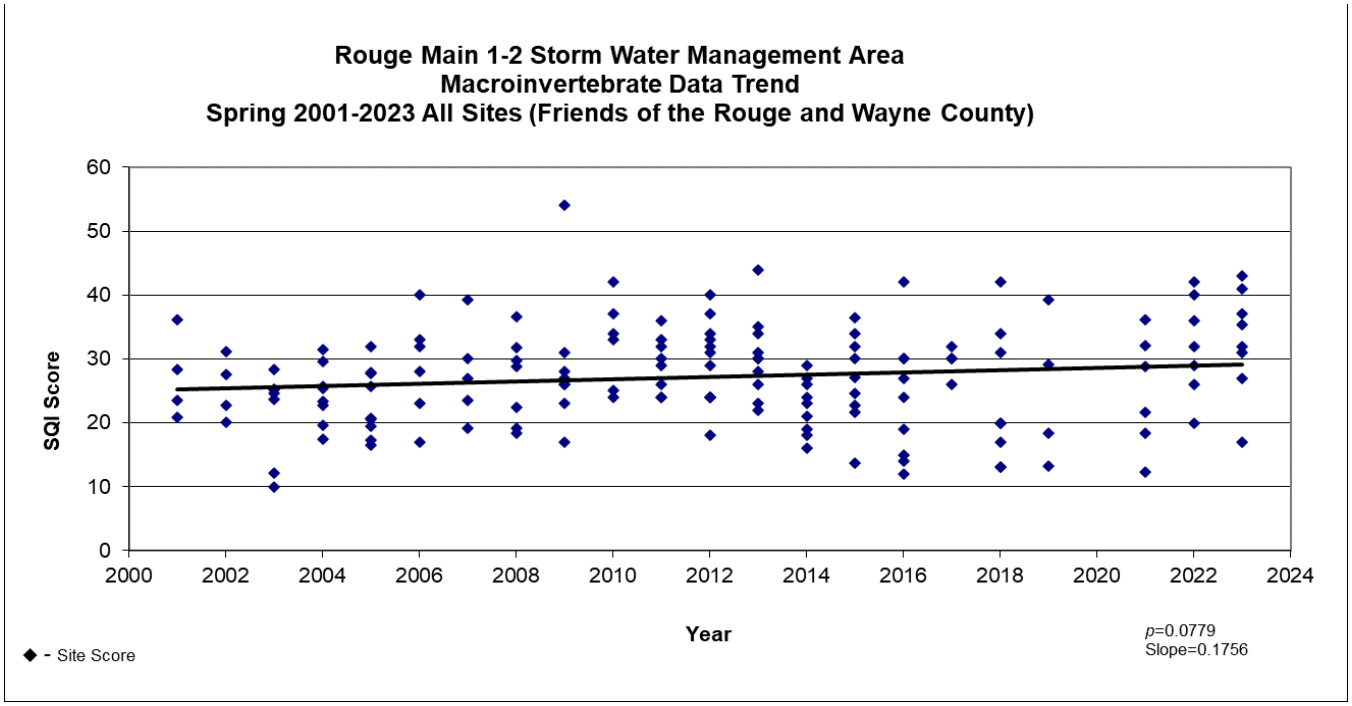
Trend Graphs

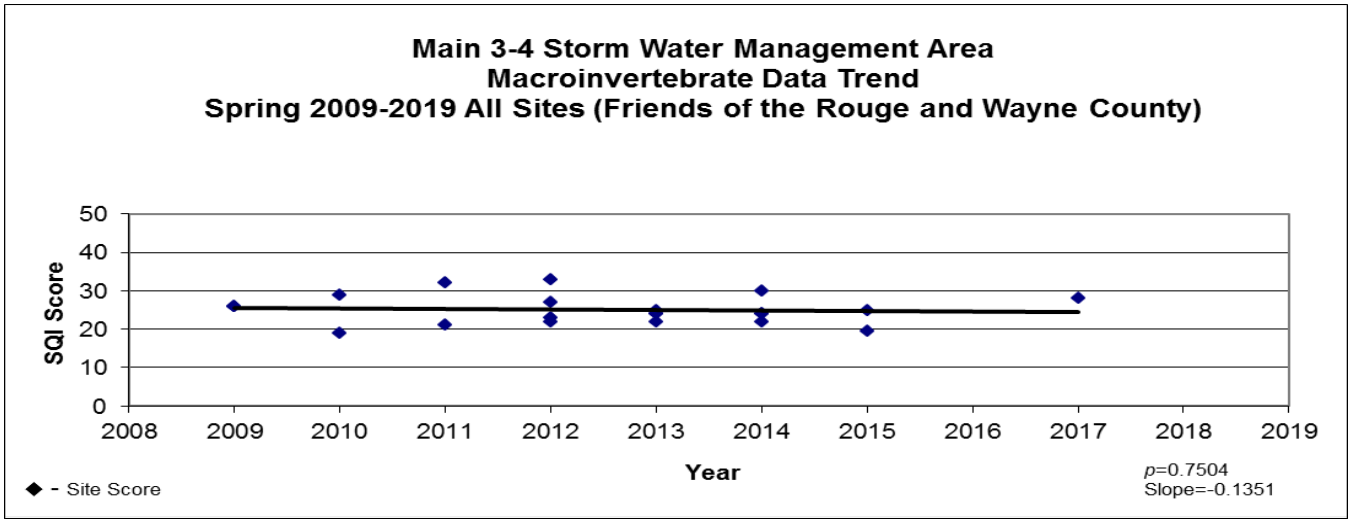
Lower Branch



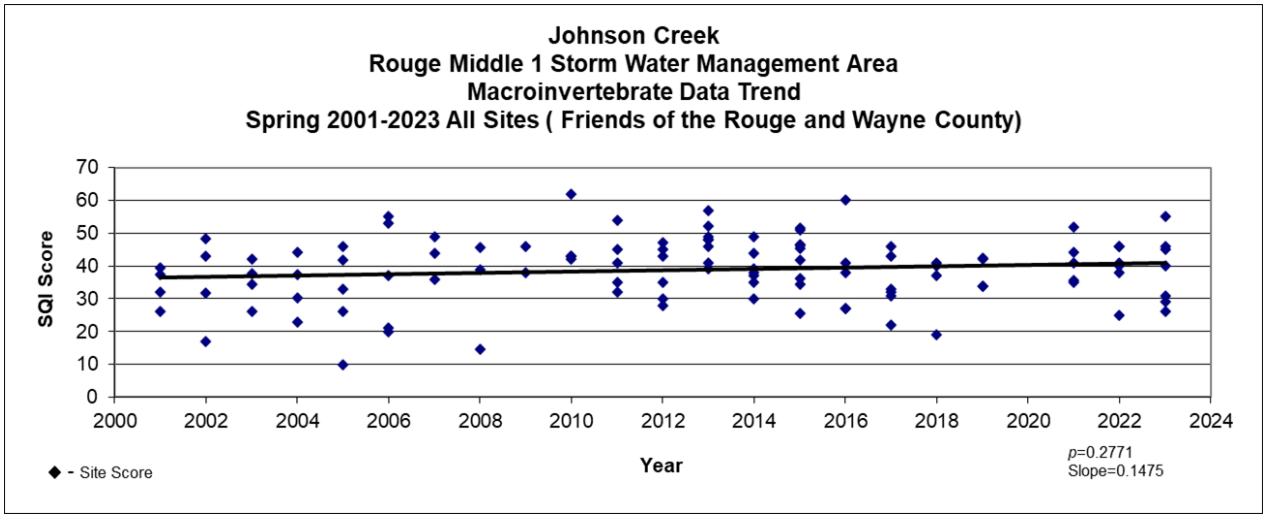


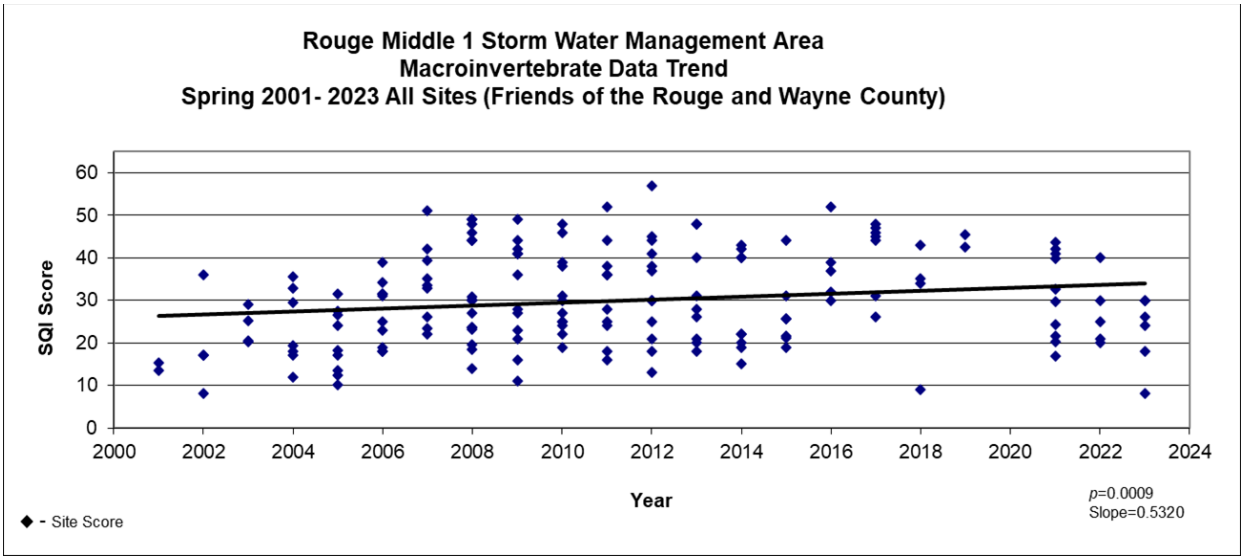
Main Branch

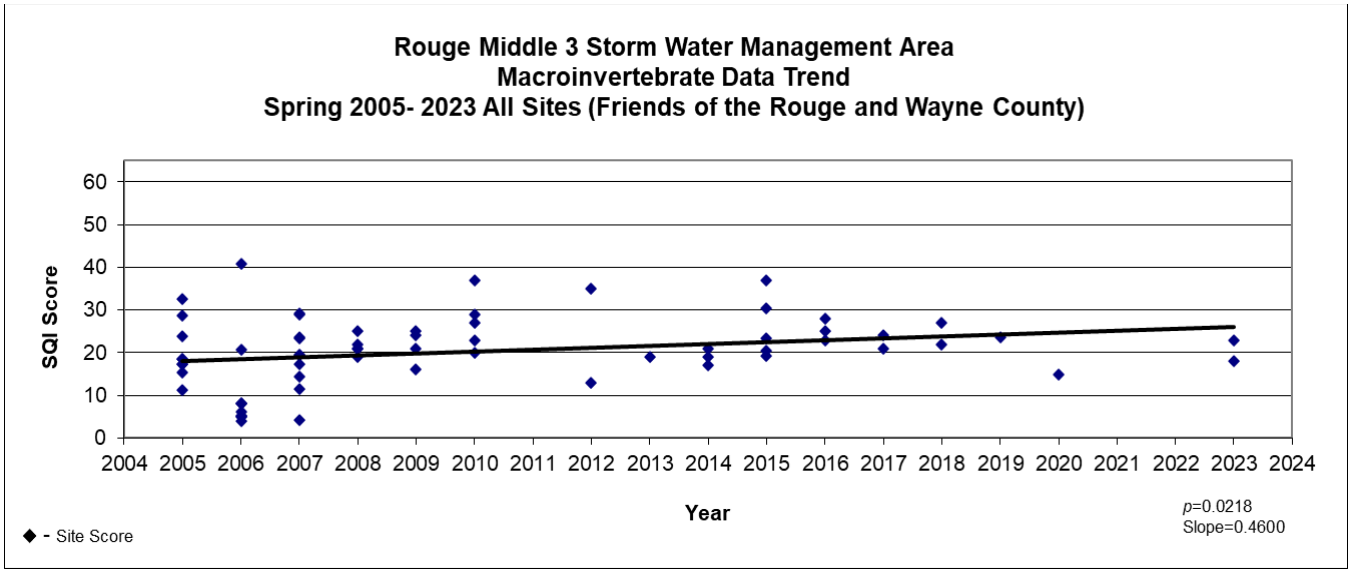

Rouge Main 1-2 Storm Water Management Area
Macroinvertebrate Data Trend
Spring 2001-2023 All Sites (Friends of the Rouge and Wayne County)
SQI Score
Year
◆ - Site Score
p=0.0779
Slope=0.1756


Main 3-4 Storm Water Management Area
Macroinvertebrate Data Trend
Spring 2009-2019 All Sites (Friends of the Rouge and Wayne County)
SQI Score
Year
◆ - Site Score
p=0.7504
Slope=-0.1351

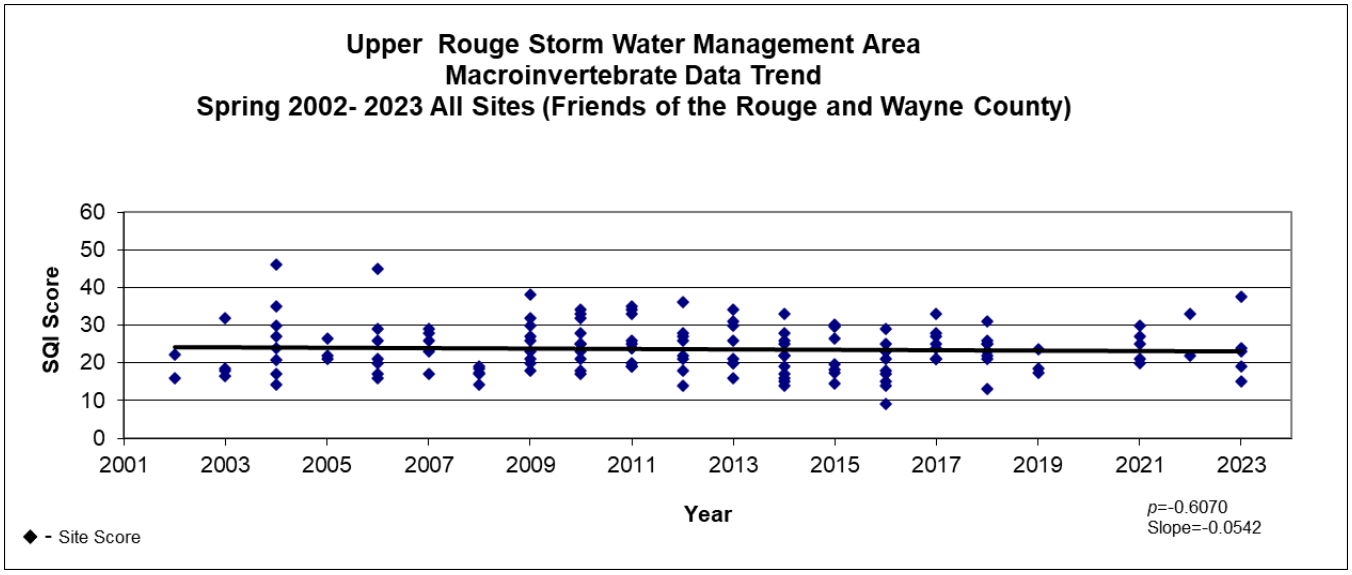
Middle Branch







Upper Branch



Rouge River Watershed
2023 Winter Stonefly Search

www.therouge.org

Ninety-nine people participated in Friends of the Rouge (FOTR)'s 2023 Winter Stonefly Search on January 21, 2023. To prepare participants, a virtual "Stonefly Primer" was held on Jan. 12 with 30 participants. The weather on January 21 was warm for winter (high 34). No ice picks were needed to crack through ice like in past years but over an inch of rain the day before led FOTR to move some of the teams to sites upstream to avoid fast high water.

Stoneflies are sensitive indicators of healthy streams. Unlike other insects, winter stoneflies develop into adult flies in the winter. The Winter Stonefly Search is part of Friends of the Rouge volunteer benthic macroinvertebrate monitoring program.

This report contains data for 41 sites (See Table 1 and map 1). Twenty-nine sites were sampled by 15 teams during the Stonefly Search on January 21. Twelve additional sites were sampled by teams of volunteers, Wayne County Department of Public Services staff, FOTR staff and Sue Thompson. Two additional sites were tested for salt but not searched for stoneflies.

Stoneflies were found at fifteen of the forty-one sites (37%) (map 1 and Table 1). All were found on the Lower, Middle and Upper branches. All but three of the sites had slender winter stoneflies (Capnids-family Capniidae). Two sites had Perlodids (family Perlodidae) and one site had the family broadback stoneflies (family Taeniopterygidae).

Lower Branch



Team 12 at Fowler Creek

Twelve sites were sampled on the Lower Branch: six on Fellows Creek, four on Fowler Creek and two on the main branch of the Lower. Six of the twelve (50%) sites had stoneflies, and all were slender winter stoneflies (Capnids). This included two on the Fellows branch (LR-9, Fel6), three on Fowler Creek (Fowl1, Fowl4, Fowl5) and one on the Lower branch (LR-8). Fowl1 had a record number of stoneflies at 123!





Team 2 at Fowler Creek

Middle Branch

Twenty sites were sampled on the Middle Branch: eleven on Johnson Creek, four on Tonquish Creek, one on Bishop Creek, one on the Walled Lake Branch and three on the Middle branch. Eight (40%) of the sites had stoneflies and ALL were on the Johnson Creek.


Team 13 at Johnson Creek


Team 3 at Johnson Creek

All but three sites had slender winter stoneflies (Capnids). John8 and MR-22 had a Perlodid and John1 had Taeniopterygidae All of the stoneflies in the Middle were in the Johnson Creek and all were upstream of or at Six Mile Road.

Upper Branch

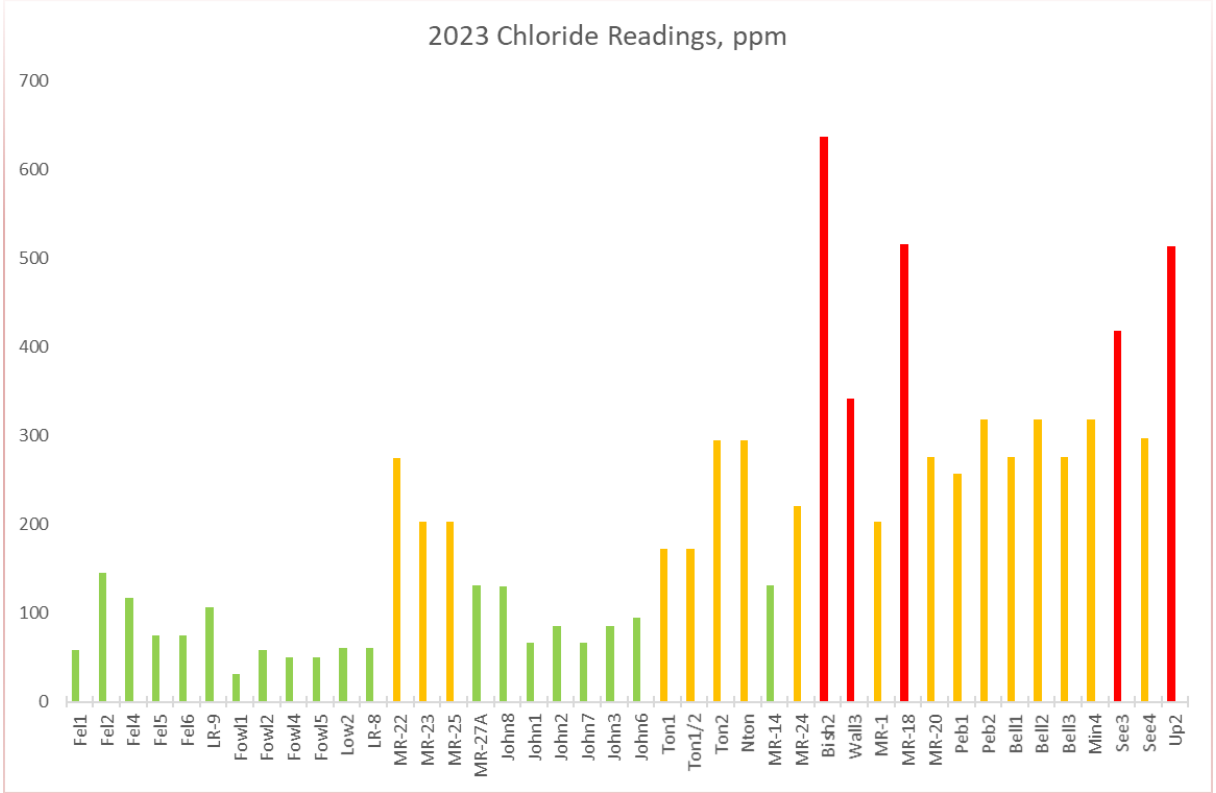
Seven Upper Branch sites were sampled including one site on Minnow Pond Creek, three sites on Bell Creek, two sites on Seeley Creek and one on the main Upper branch. Stoneflies were found at one site (14%) - Min4- and all were slender winter stoneflies (Capnids). Stoneflies are very rarely found in the Upper Branch.

Main Branch

Two Main branch tributary sites were sampled this year: Peb1 and Peb2. Neither had stoneflies.


Team 11 at Pebble Creek

FOTR Stonefly Search teams have been testing sites for road salt (chloride) since 2020 through the Izaak Walton League's Salt Watch program. Chloride is measured in parts per million (ppm). Levels above150 ppm cause long-term impacts to aquatic life in the stream. Levels above 320 ppm are toxic (cause acute or short-term impacts) to aquatic life.



The 2023 chloride levels (see Chart above, Table 1 and map 2) varied by the branch. The Lower branch which, includes Fellows and Fowler Creeks, were all below 150 ppm. The Middle branch had levels above 150 ppm in the Sump Drain, a tributary of Johnson Creek (MR-22 to MR-27A), and the Tonquish Creek (Ton1. Ton1/2, Ton2, Nton). The Walled Lake branch tributaries were extremely high with Bishop Creek over 600 ppm and Walled Lake at 341 ppm. Further downstream on the Middle branch, levels were all above 150 ppm and above 320 ppm (515 ppm) at MR-18. On the Main branch, only Pebble Creek was tested and both sites were above 150 ppm, in the range that causes long term impacts. All of the Upper branch sites were above 150 ppm and See3 and Up2 (Shiawassee Park) were both above 400 ppm, at the toxic level.

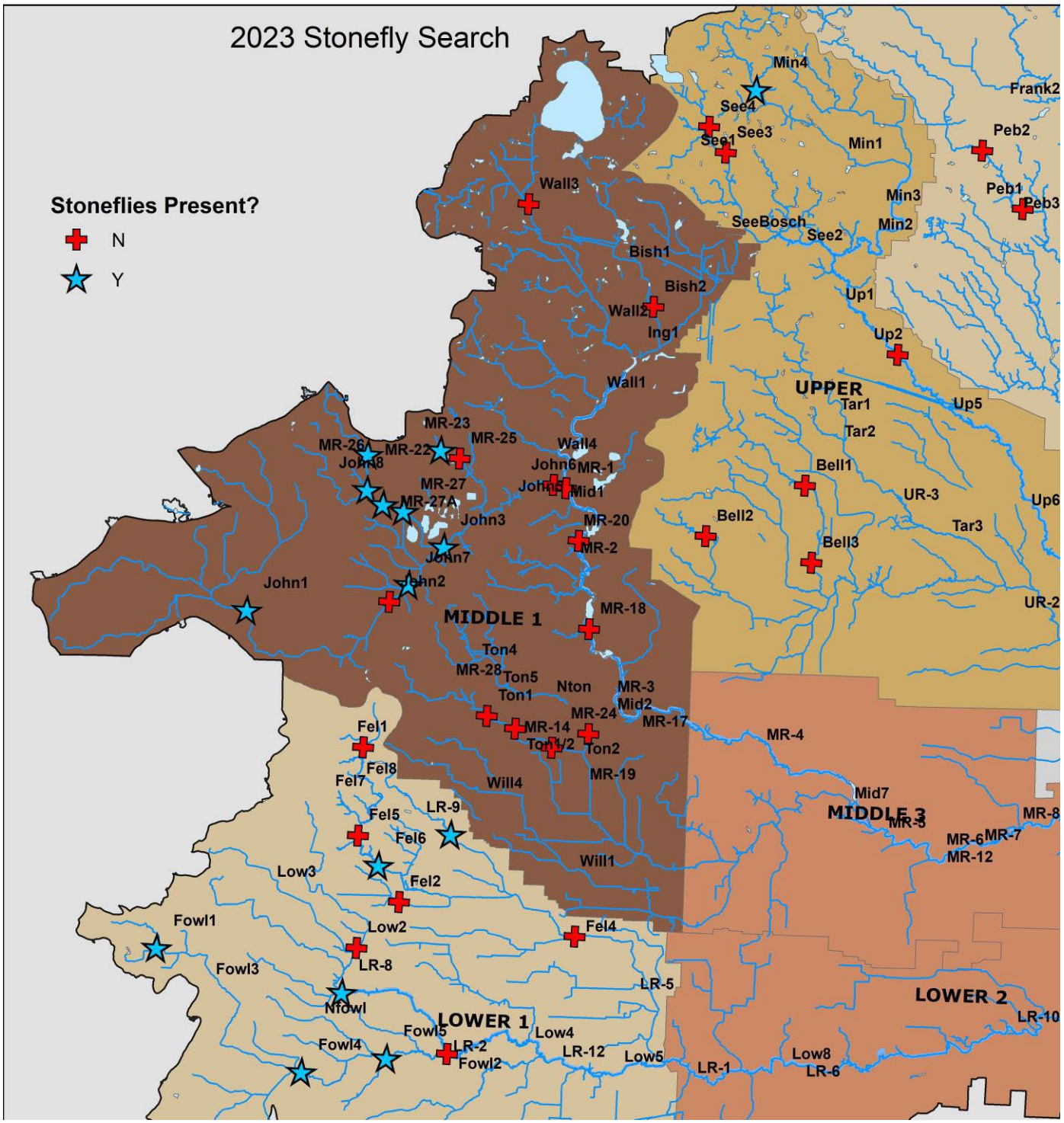
The state of Michigan Department of Great Lakes and Energy (EGLE) only recently developed guidelines for chloride and last year they identified two Rouge streams that exceeded the guidelines: Bishop Creek and the Upper branch. FOTR shares our data with the state and expect that the Middle branch will also be added to their "action" list. Once identified, a plan to reduce chloride will be developed but there is no timeline established as of yet.

You can sign up for the Winter Salt Walt program and receive free test strips to test stream sites during the winter on your own and are encouraged to do so. Check out their map of the results

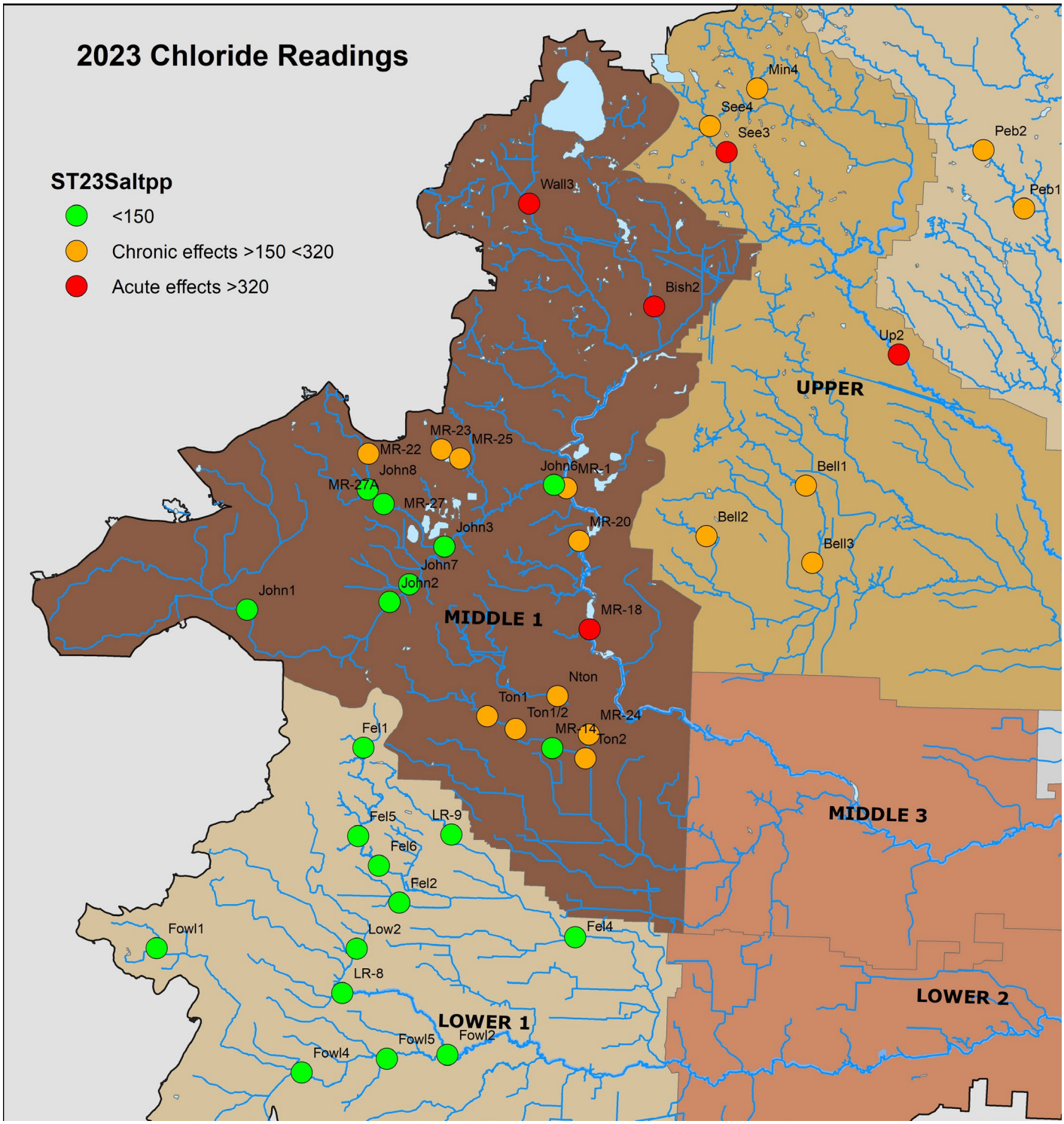
and see how the Rouge compares to other areas. The Izaak Walton League also recently added testing for nitrates, which FOTR will be participating in this winter.

Thank you to all the volunteers, Team Leaders, Wayne County, and Sue Thompson for additional sampling. The Winter Stonefly Search is part of the Friends of the Rouge long-term volunteer monitoring program and is funded through the Alliance of Rouge Communities, Washtenaw County Water Resources Commission, the Erb Family Foundation, and individual donations.

Table 1: 2023 Stonefly and Chloride Findings						
BRANCH	Stream Name	FIELDID	Site Description	ST23	ST23Family	Salt, ppm
Lower	Fellows Creek	Fel1	Top of Hill Ct	N		58
Lower	Fellows Creek	Fel2	Vintage Valley	N		145
Lower	Fellows Creek	Fel4	Flodin Pk	N		117
Lower	Fellows Creek	Fel5	Warren Ridge	N		75
Lower	Fellows Creek	Fel6	Hanford	Y	Capniidae	75
Lower	Fellows Creek	LR-9	Fellows Beck Warren	Y	Capniidae	106
Lower	Fowler Creek	Fowl1	Prospect	Y	Capniidae	31
Lower	Fowler Creek	Fowl2	Fowler Beck	N		58
Lower	Fowler Creek	Fowl4	Ridge Rd S of Geddes	Y	Capniidae	50
Lower	Fowler Creek	Fowl5	Fowler Denton	Y	Capniidae	50
Lower	Lower Rouge	Low2	Cherry Hill	N		60
Lower	Lower Rouge	LR-8	Ridge Proctor	Y	Capniidae	60
Main	Pebble Creek	Peb1	Danvers Ct	N		257
Main	Pebble Creek	Peb2	Pebble 13 Mile	N		318
Middle	Bishop Creek	Bish2	Bishop Scarborough	N		637
Middle	Johnson Creek	John1	5M Salem	Y	Taeniopterygidae	66
Middle	Johnson Creek	John2	5M NV	N		85
Middle	Johnson Creek	John3	6M NV	Y	Capniidae	85
Middle	Johnson Creek	John6	Hines	N		95
Middle	Johnson Creek	John7	Arcadia	Y	Capniidae	66
Middle	Johnson Creek	John8	Maybury Angell	Y	Perlodidae	130
Middle	Johnson Creek	MR-22	Maybury south	Y	Capniidae, Perlodida	275
Middle	Johnson Creek	MR-23	Maybury north	Y	Capniidae	203
Middle	Johnson Creek	MR-25	Maybury East	N		203
Middle	Johnson Creek	MR-27	Ridge	Y	Capniidae	
Middle	Johnson Creek	MR-27A	Florissant Dr.	Y	Capniidae	131
Middle	Middle Rouge	MR-1	Northville Rec W	N		203
Middle	Middle Rouge	MR-18	Springbrook Rec	N		515
Middle	Middle Rouge	MR-20	Waterford Bd	N		276
Middle	Tonquish Creek	MR-14	Smith Elem	N		131
Middle	Tonquish Creek	MR-24	Lion's Pk	N		220
Middle	Tonquish Creek	Nton	S Evergreen St	N/S		295
Middle	Tonquish Creek	Ton1	Plym Twp Pk	N		172
Middle	Tonquish Creek	Ton1/2	Canton Ctr Rd	N		172
Middle	Tonquish Creek	Ton2	Ann Arbor Rd	N/S		295
Middle	Walled Lk Drainag	Wall3	WL 12 M	N		341
Upper	Bell Branch	Bell1	Bicentennial Park	N		276
Upper	Bell Branch	Bell2	Schoolcraft College	N		318
Upper	Bell Branch	Bell3	Livonia 6 Mile	N		276
Upper	Minnow Pond	Min4	14 Mile	Y	Capniidae	318
Upper	Seeley Creek	See3	Kennedy Ct	N		418
Upper	Seeley Creek	See4	Haggerty Rd	N		297
Upper	Upper Rouge	Up2	Shiawasee Park	N		513


2023 Stonefly Search
Stoneflies Present?
N
Y
Min4
Frank2
See4
See1
See3
Min1
Peb2
Peb1
Peb3
Min3
Min2
SeeBosch
See2
Wall3
Bish1
Bish2
Wall2
Ing1
Up1
Up2
Wall1
UPPER
Tar1
Up5
Tar2
MR-23
MR-25
MR-26
MR-22
John8
Wall4
John6
MR-1
MR-27
John5
Mid1
MR-27A
Bell1
UR-3
Up6
Bell2
Tar3
John3
MR-20
MR-2
Bell3
John7
John1
John2
UR-2
MIDDLE 1
MR-18
Ton4
MR-28
Ton5
Nton
MR-3
Ton1
Mid2
MR-24
MR-17
MR-14
Fel1
Ton1/2
Ton2
MR-4
Fel8
Fel7
MR-19
Will4
Mid7
LR-9
MIDDLE 3
MR-8
Fel5
MR-5
MR-7
Fel6
MR-6
MR-12
Will1
Low3
Fel2
Fowl1
Low2
Fel4
LR-8
Fowl3
LR-5
LOWER 2
Nfowl
LR-10
LOWER 1
Fowl5
Low4
Fowl4
LR-2
LR-12
Low5
Low8
LR-1
Fowl2
LR-6

Map 2: 2023 Chloride Readings





We need you!

Spring Bug Hunt: Sat. April 15 10 am-4 pm
Volunteers needed to help look for bugs in Rouge streams

Want to get more involved? Train to be a Team Leader – bank person or collector
Team Leader Training: **virtual session followed by field training**
Field Training Sat. April 1, 2023 9am-12pm

Register for both at therouge.org/bug-hunt-events-and-trainings

More info: spetrella@therouge.org or call 734 927-4904

Friends of the ROUGE

www.therouge.org
650 Church Street, Suite 209
Plymouth, MI 48170

Rouge River Benthic Macroinvertebrate Monitoring Program Fall 2023 Report

This report contains benthic macroinvertebrate sampling results from 44 Rouge tributary and river sites. The Fall Bug Hunt on October 14, 2023 had 68 attendees that sampled 22 sites, which was a great turn out given that it poured rain on the volunteers for most of the day. Groups that participated included the Detroit Zoo's Conservation Interns; Schoolcraft College; and participants in the Wayne County Conservation Stewards Program. Additional sites were sampled during the Team Leader Training, with FOTR staff and volunteers, and by Wayne County for a total of 44 sites. Funding for the monitoring was provided by the communities of Beverly Hills, Canton Township, Farmington, Livonia, Northville Township, Novi, Plymouth, Plymouth Township, Southfield, Troy, Birmingham, Washtenaw County Water Resources, Michigan Department of Environment, Great Lakes, and Energy and the United States Environmental Protection Agency's Great Lakes Restoration Initiative, and the Michigan Clean Water Corps.

Overall Scores

The average Stream Quality Index (SQI) for sites was FAIR (30) (map p.6-8, Table 1 & 5). One site rated EXCELLENT (John8); fourteen sites rated GOOD; twenty five sites were FAIR; four sites scored POOR. The average Water Quality Rating (WQR) was FAIR (6.00) with one site rated very good, nineteen good, 12 fair, 8 fairly poor, and 4 very poor. Sites averaged 13 taxa, 8 Aquatic Insect Taxa, and 2 EPT. SQI was highest at John8 (50) and Main3 (47), and Sprag (45); WQR highest at Nton (4.13). The number of taxa found at sites was highest at Main4.5 (21) and lowest at Bish2 (5). Insect taxa which includes the more sensitive groups, was highest at Main4.5, Main 11 and Fel6 (14) and lowest at Evan1 (1). Some mayfly, stonefly and caddisfly families (EPT) were found at all but four sites with an average of 2 of these families per site. John1 had the highest number of EPT (5).

Table 1: Averages

	Average SQI	Average WQR	Average # of taxa	Average # Insect Taxa	Average EPT
2023	30 fair	6.00 fair	13	8	2
2022	26 fair	6.00 fair	12	8	2
2021	30 fair	6.25 fair	13		2

Understanding Benthic Scores

Stream Quality Index (**SQI**)- determined by weighting each type and number of organisms found by their sensitivity ratings. SQI a measure of the degree of organic pollution that is calculated by rating and scoring organisms based on their sensitivity (sensitive, somewhat sensitive and tolerant) and frequency in the sample (rare or common). 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**. Higher scores reflect better quality sites.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.

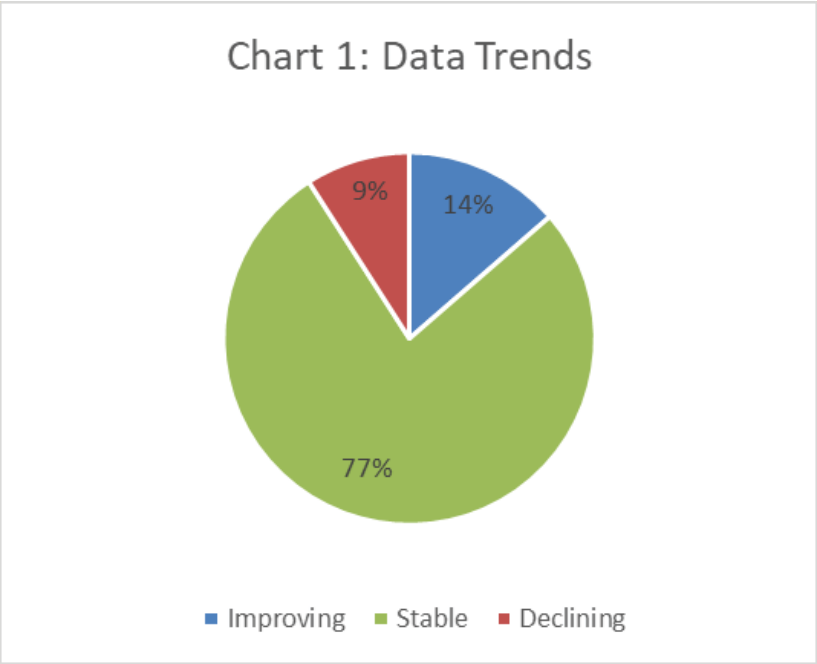
EPT refers to the number of mayfly, caddisfly and stonefly families found; these three orders contain some of the most sensitive organisms.

NEW in Fall 2021

WQR – Water Quality Rating is a measure of the degree of organic pollution similar to SQI. Organisms are rated based on the Hilsenhoff Index of Biotic Integrity and scores are weighted by the number of individuals found. Unlike SQI, a LOWER score is indicative of less pollution. There are seven categories rather than four. 0.0-3.50=**Excellent**, 3.51-4.50=**Very Good**, 4.51-5.50=**Good**, 5.51-6.50=**Fair**, 6.51-7.50=**Fairly Poor**, 7.51-8-50=**Poor**, 8.51-10.0=**Very Poor**. WQR is calculated based on family level identification.

Data Trends

In comparison to past years, 77% of sites were stable, 14% of the sites improving and 9% declining.



To compare change over time, we analyzed the trends by subwatershed, with Johnson Creek analyzed separately as it is a coldwater tributary (Table 2 and graphs p. 14-22). The Middle 3 subwatershed had significant positive trends. The Main 1-2, the Upper and the Lower 1 subwatersheds had significant negative trends. These trends are similar to last year.

Table 2: Fall Bug Hunt Trend Summary All Sites 2001-2023

Subwatershed	slope	*p*-value	True Trend	Subwatershed SQI average score	Water Quality Rating
Main 1-2	-0.3553	0.0019	yes, negative	29	Fair
Upper	-0.2110	0.0185	yes, negative	24	Fair
Johnson Creek	0.1915	0.1132	no trend	35	Good
Middle 1	-0.0057	0.2197	no trend	31	Fair
Middle 3*	0.4760	0.00002	yes, positive	23	Fair
Lower 1	-0.2610	0.0199	yes, negative	28	Fair
Lower 2**	-0.1512	0.3285	no trend	26	Fair
Main3-4**	-0.4411	0.2203	no trend	27	Fair

* no sites sampled in Fall 2020-2021 **no sites sampled in Fall 2019-2023

The data was further analyzed for trends by tributaries and subareas. Table 3 contains a summary of this analysis; the graphs are on p. 13-21. When the upper and lower sections of the Main, Middle and Lower subwatersheds were combined, the trends stood – negative for the Main and Lower and positive for the Middle. When all the sites were combined, there was no significant trend.

Table 3: Fall Bug Hunt Trend Summary Branches/Tributaries 2001-2023

Branch	Slope	*p* -value	True Trend	Branch Average SQI Score	Water Quality Rating
Rouge All Subwatersheds combined	-0.0071	0.1037	no trend	28	Fair
Main (Main 1/2 and Main 3/4)	-0.3564	0.0009	yes, negative	29	Fair
Bell Creek only	-0.0725	0.6240	no trend	23	Fair
Upper only	-0.1330	0.4354	no trend	27	Fair
Middle (Middle 1 and Middle 3)	-0.0064	0.1554	yes, positive	28	Fair
Tonquish Creek only	0.0648	0.7327	no trend	31	Fair
Johnson Creek and Middle	-0.0048	0.3034	no trend	30	Fair
Sump Creek (Johnson Creek tributary)	-0.0962	0.8361	no trend	37	Good
Middle without Tonquish Creek	0.0926	0.4222	no trend	29	Fair
Lower 1 and Lower 2	-0.2365	0.0098	yes, negative	27	Fair

Individual sites were examined for long term trends (Table 4). Of the sites sampled in fall 2023, three had a significant trends: two negative and one positive.

Table 4: Friends of the Rouge and Wayne County Fall Bug Hunt Data Trend 2001-2023 by site

Site	Slope	*p* -value	Statistically significant trend	Site Average SQI Score	Water Quality Rating
Nott	-0.5100	0.0124	yes, negative	26	Fair
MR-4	0.5917	0.0336	yes, positive	28	Fair
LR-3	-0.5813	0.0204	yes, negative	27	Fair

Since 2020, we have been testing sites for road salt (chloride) through the Izaak Walton League's Salt Watch program during the Stonefly Search and Bug Hunts. Salt we apply to our roads and sidewalks for snow and ice removal washes into our streams and is toxic to aquatic life when it reaches high levels. Recognizing this, the State of Michigan Department of Environment, Great Lakes and Energy (EGLE) set water quality values aiming to protect surface water from chloride, based on parts per million (ppm) concentrations.
These are:
150 ppm and above - causes long term effects to aquatic life (chronic)
320 ppm and above - causes acute effects to aquatic life (toxic)

This fall, one site had toxic levels of chloride (table 5, map p. 11). This is particularly concerning as one would expect road salt applied last winter to be washed out of the system by October. EGLE has already listed Bishop Creek as "impaired" due to high salt levels. Evans Creek also need further examination due to elevated concentrations.

Table 5: Sites with Toxic Levels of Chloride

BRANCH	Stream Name	FIELDID	Site Description	Cl ppm
Main	Evans Creek	Evan1	Evans Green Spruce	391

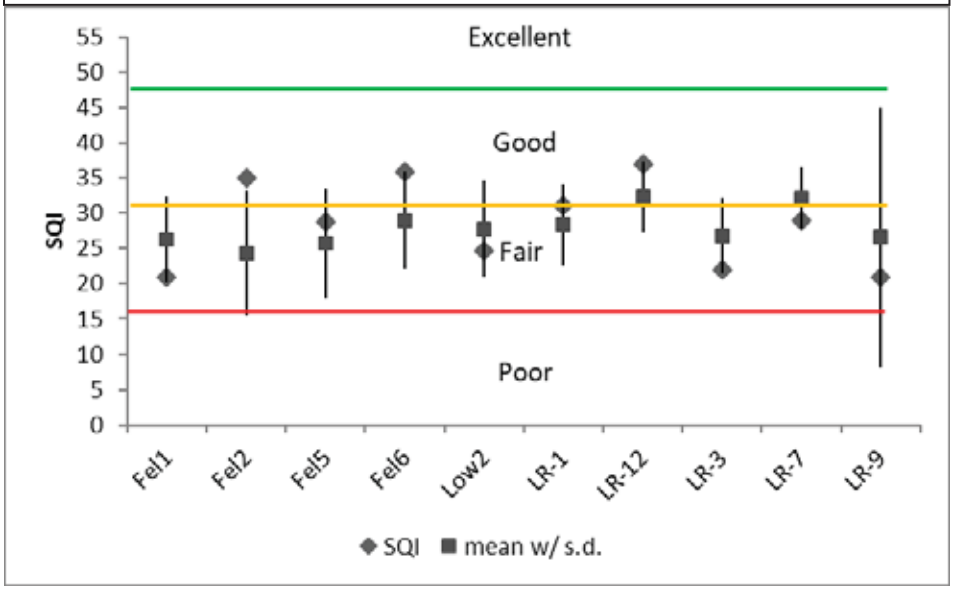
This fall, we also began testing for nitrate and nitrite throughout the watershed. High levels of nitrate in the water can be due to human impacts such as fertilizer application on the land or sewage outfalls/discharge. Too much nitrate in the water can also encourage the growth of algae which could result in algal blooms. In the 1990s, the Environmental Protection Agency created a drinking water standard for nitrate which is nitrogen is 10 mg/L (equivalent to 10 parts per million), research suggests that prolonged exposure to nitrate levels below 10 mg/L can still lead to increased health risks. There were two sites with elevated levels of nitrate this fall (table 6).

Table 6: Sites with Elevated Levels of Nitrate

BRANCH	Stream Name	FIELDID	Site Description	Nitrate ppm
Lower	Lower Rouge	LR-1	Commerce Ct	20
Lower	Lower Rouge	LR-3	Goudy Park	10

Lower Branch

Chart 2: Lower Branch Fall 2023 SQIs and means



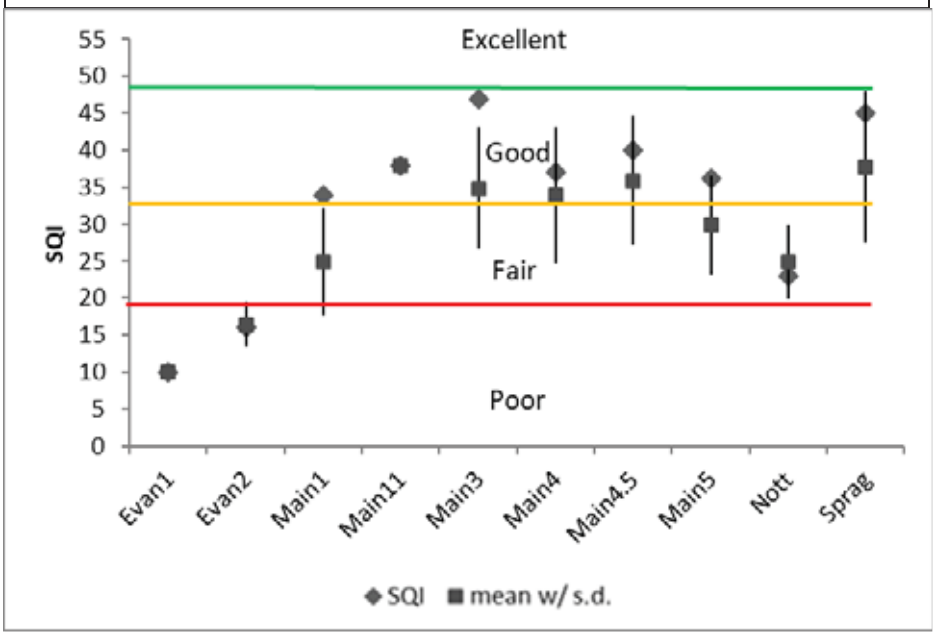
Ten sites were sampled on the Lower Branch (Table 7, p. 13), including one tributary: Fellows Creek. SQIs averaged FAIR (28). Three sites had GOOD SQIs, and seven had FAIR SQIs. In the new WQR system, sites averaged fair (6.45). Sites had an average of 13 taxa, 8 insect taxa and 2 EPT.
Chloride levels ranged from a low of 31 ppm at Fel6 to a high of 195 ppm at LR-3; three sites had chronic levels (LR-9, LR-1, and LR-3) with no sites at the toxic level (Table 7, p. 13). Two sites in the Lower had elevated levels of nitrate, LR-1 (20 ppm) and LR-3 (10 ppm). According to the Izaak Walton League of America's Nitrate Watch, nitrate levels above 10 ppm in surface waters could be a cause for concern. Further monitoring at these sites could be required.

SQI scores were compared with past data (Chart 2). Nine were within a standard deviation of the average for the site and one was above.

Long term trend analysis showed a significant negative trend for the Lower 1 and for all of the Lower when the subwatersheds are combined (Table 2-3 above, graphs p. 21). LR-3 had a significant negative trends (Table 4).

Main Branch

Chart 3: Main Branch Fall 2023 SQIs and means



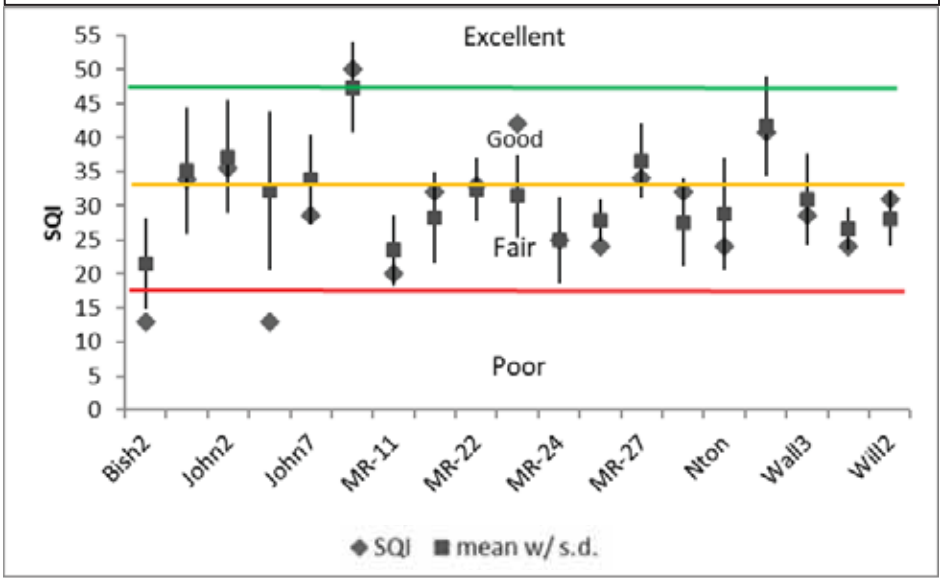
Ten sites on the Main Branch were sampled, including the following tributaries: Evans, Nottingham, and Sprague Creek. SQIs averaged FAIR (33). Seven rated GOOD, one rated FAIR, and two rated POOR. WQRs averaged fairly poor (6.57). Taxa averaged 15, 9 Insect taxa, and 2 EPT. Chloride levels averaged 167 ppm, and most sites were at the chronic effects level (>150 ppm), with one site at the toxic level (Evan1) (Table 7, p. 12).

SQI scores were compared with past data (Chart 3). Eight were within a standard deviation of the average for the site and two were above.

Long term trend analysis shows a significant negative trend for the Main 1-2 subwatershed as well as for all of the Main when the subwatersheds are combined (Table 2-3 above, graphs p. 14-15). Nott had a significant negative trend when considered separately (Table 4).

Middle Branch

Chart 4: Middle Branch Fall 2023 SQIs and means



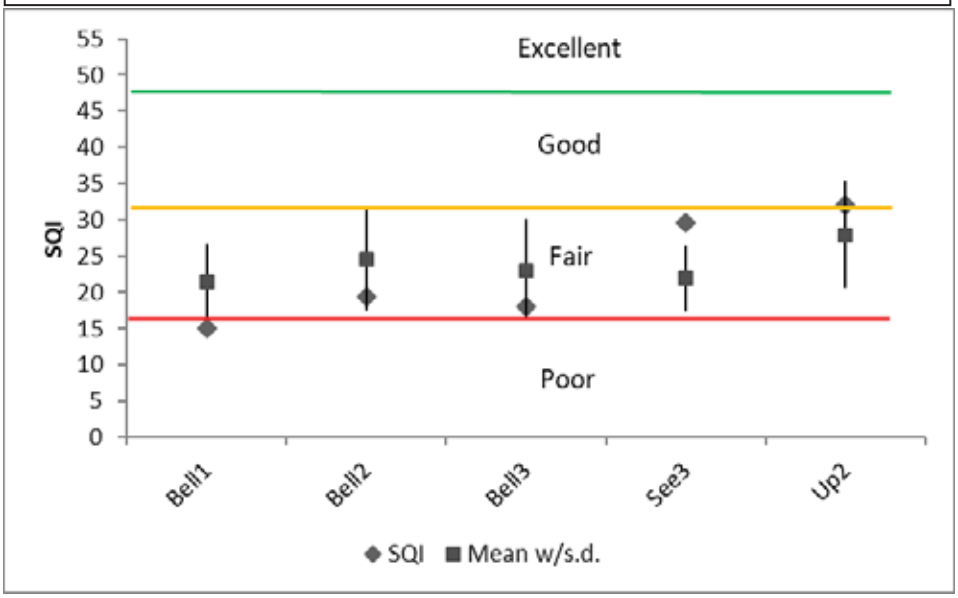
Nineteen sites were sampled on the Middle Branch; Johnson Creek had 9 sites, Bishop Creek had 1 site, Tonquish Creek had 4 sites, Willow Creek had 2 sites, the Walled Lake Drainage had one site, and the final two sites were in the Middle Rouge. SQI scores averaged FAIR (30), with one EXCELLENT (John8), four GOOD, twelve FAIR and two POOR SQIs. WQRs averaged fair (6). Taxa averaged 13, 8 insect taxa and 2 EPT.

In comparing averages and past data (Chart 4), the majority of sites (14) were within a standard deviation of the average for the sites. Two sites were above (MR-23 & Will2) and two sites were below (Bish2 and John3). Chloride levels averaged 116 ppm and five sites were at the chronic level (Table 7, p. 1).

In long term trend analysis, the Middle 3 had a positive trend (Table 2 above). When the Middle 1 and Middle 3 subwatersheds were combined, there a significant positive trend (Table 3 above, graphs p. 17-20). MR-4 had a positive trend when considered by site (Table 4).

Upper Branch

Chart 5: Upper Branch Fall 2023 SQIs and means



Five Upper branch sites were sampled including Bell and Seeley Creeks, as well as the Upper Rouge at Shiawasee Park. SQIs averaged FAIR (25). All five sites were FAIR. WQR averaged fair (6.48). Taxa averaged 11, 6 insect taxa and 1 EPT.

In comparing averages and past data (Chart 5), one site was above a standard deviation of the average (See3), the rest were within the standard deviation of the average for a given site.

Long term trend analysis shows a significant decline in scores for the Upper Branch but not for Bell Creek or the Upper considered without Bell Creek (Table 2 & 3, graphs p. 15-16).

THANK YOU!!!!!

Thank you to all the **volunteers** and **Team Leaders, Sue Thompson** for sampling additional sites, helping with identification, analyzing trends and reviewing the report, and funding for the event provided by the communities of Beverly Hills, Canton Township, Farmington, Livonia, Northville Township, Novi, Plymouth, Plymouth Township, Southfield, Troy, Birmingham, Washtenaw County Water Resources, Michigan Department of Environment, Great Lakes, and Energy and the United States Environmental Protection Agency's Great Lakes Restoration Initiative, and the Michigan Clean Water Corps.

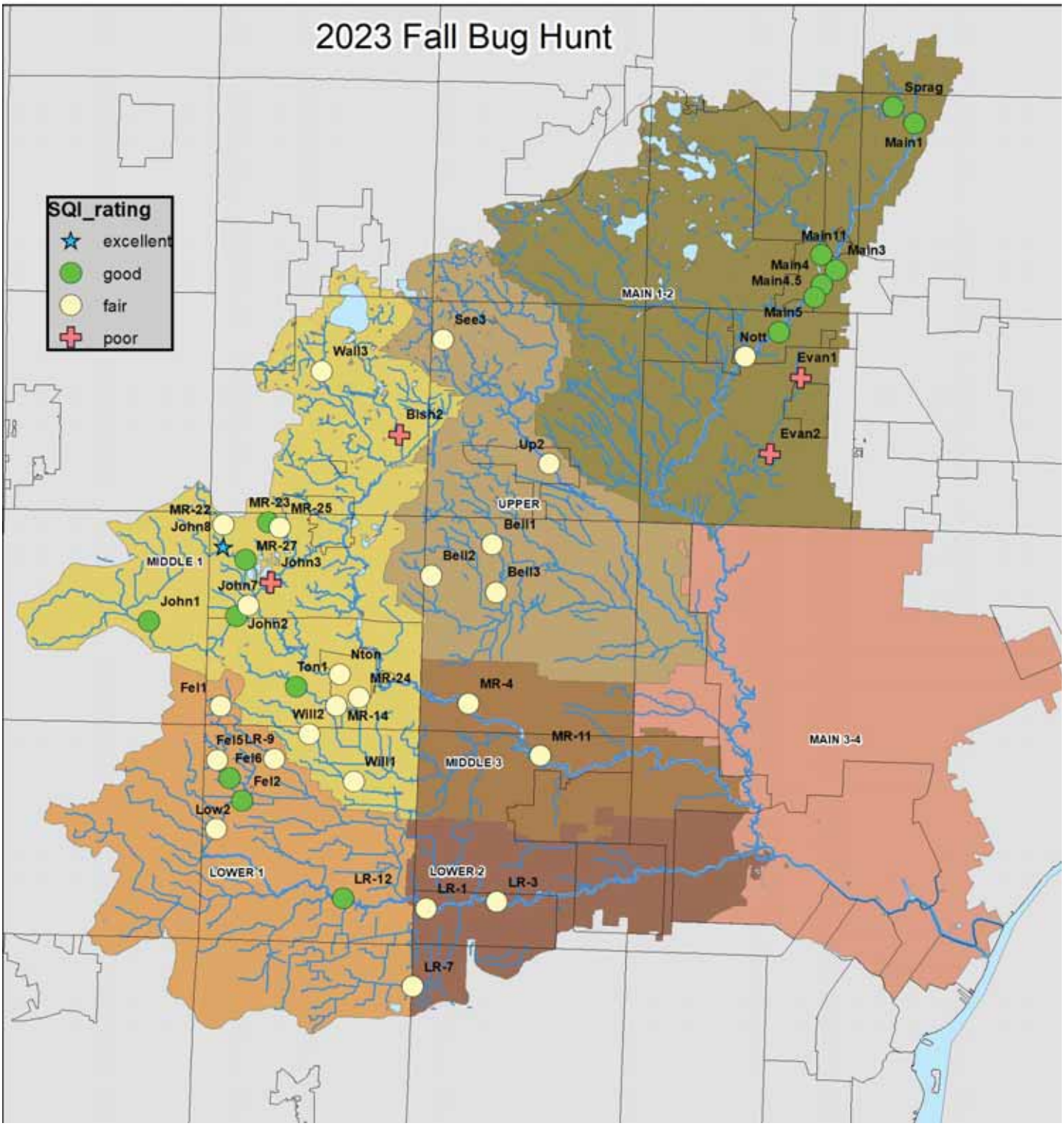


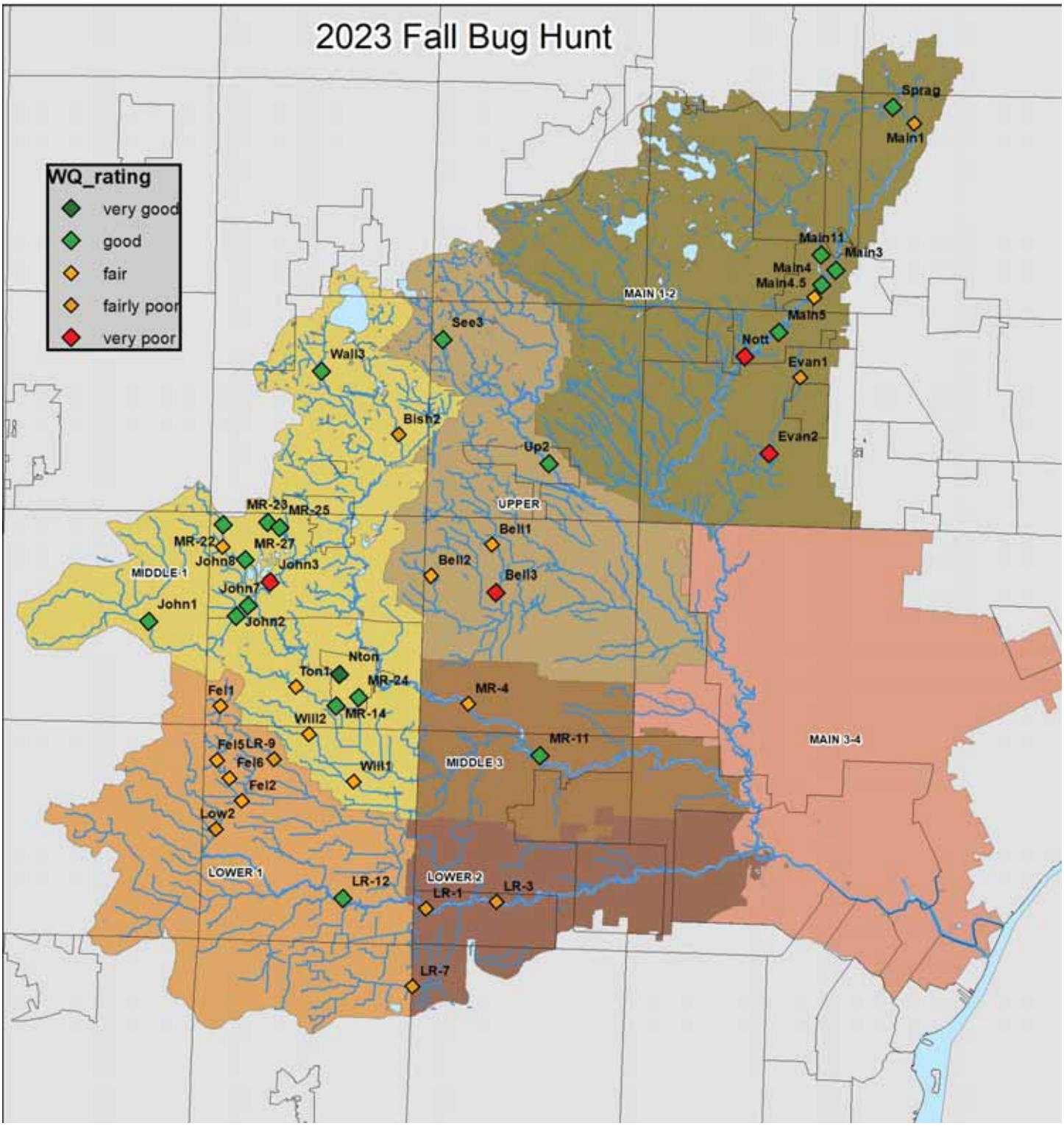
Join us for the Winter Stonefly Search

Sat. Jan. 20th, 2024 10 am – 4 pm

Register at www.therouge.org by Jan. 12th

Stonefly Refresher (for Team Leaders) Sat. Jan. 13th 9am-11am at the FOTR Office (650 Church St. Suite 209, Plymouth, MI)


2023 Fall Bug Hunt
SQI_rating
excellent
good
fair
poor
Sprag
Main1
Main11
Main3
Main4
Main4.5
Main5
MAIN 1-2
Nott
Evan1
Evan2
See3
Wall3
Blsh2
Up2
UPPER
Bell1
Bell2
Bell3
MR-22
John8
MR-23
MR-25
MR-27
John3
MIDDLE 1
John7
John1
John2
Nton
Ton1
MR-24
MR-4
Fel1
Will2
MR-14
MR-11
MAIN 3-4
Fel5
LR-9
Fel6
Will1
MIDDLE 3
Fel2
Low2
LOWER 1
LR-12
LOWER 2
LR-1
LR-3
LR-7


2023 Fall Bug Hunt
WQ_rating
very good
good
fair
fairly poor
very poor
Sprag
Main1
Main11
Main3
Main4
Main4.5
Main5
MAIN 1-2
Nott
Evan1
Evan2
See3
Wall3
Bish2
Up2
UPPER
MR-23
MR-25
MR-22
MR-27
John8
John3
MIDDLE 1
John7
John1
John2
Bell1
Bell2
Bell3
Nton
Ton1
MR-24
MR-14
Fel1
Will2
MR-4
MR-11
MIDDLE 3
MAIN 3-4
Fel5
LR-9
Fel6
Fel2
Will1
Low2
LOWER 1
LR-12
LOWER 2
LR-1
LR-3
LR-7

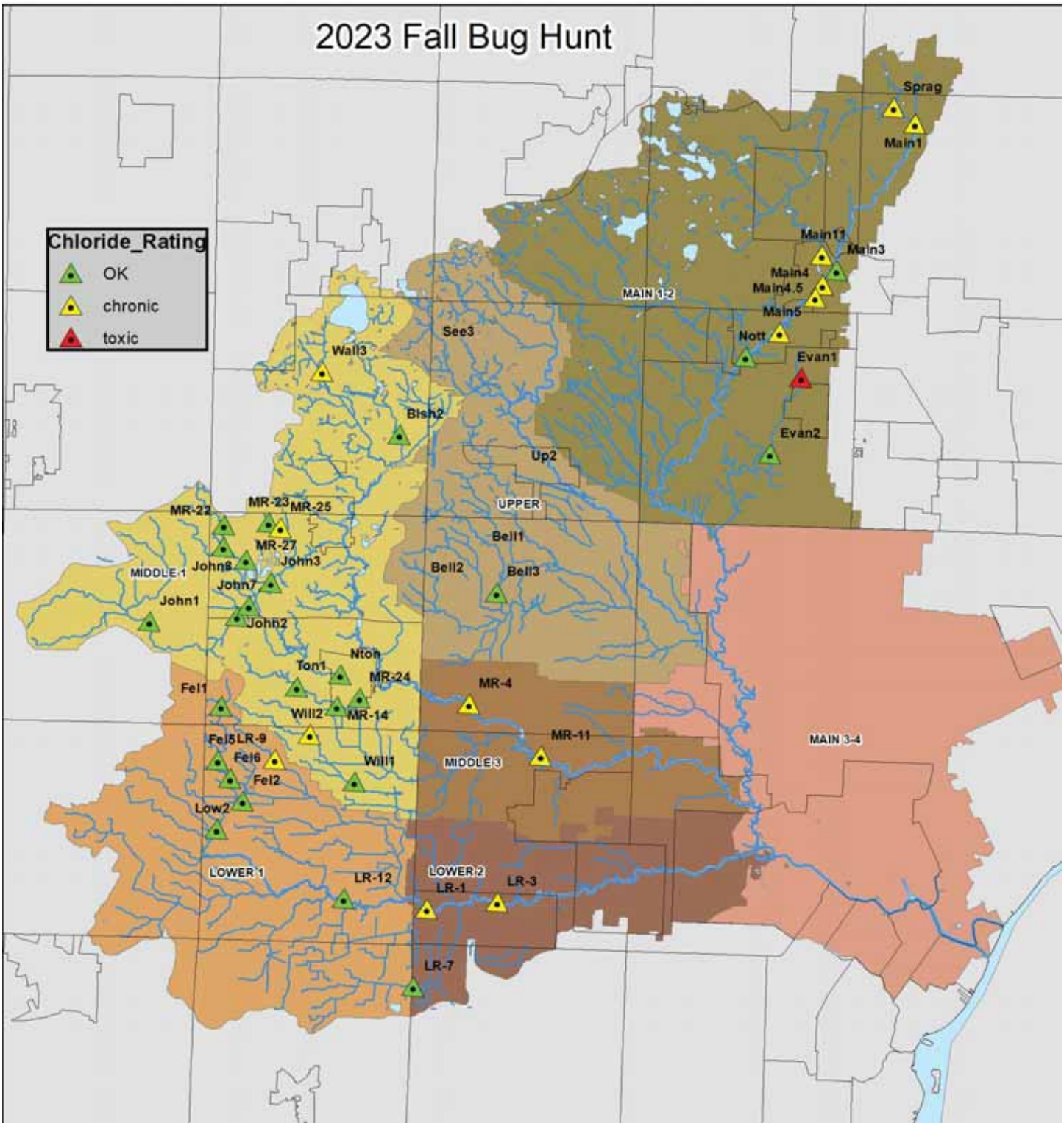
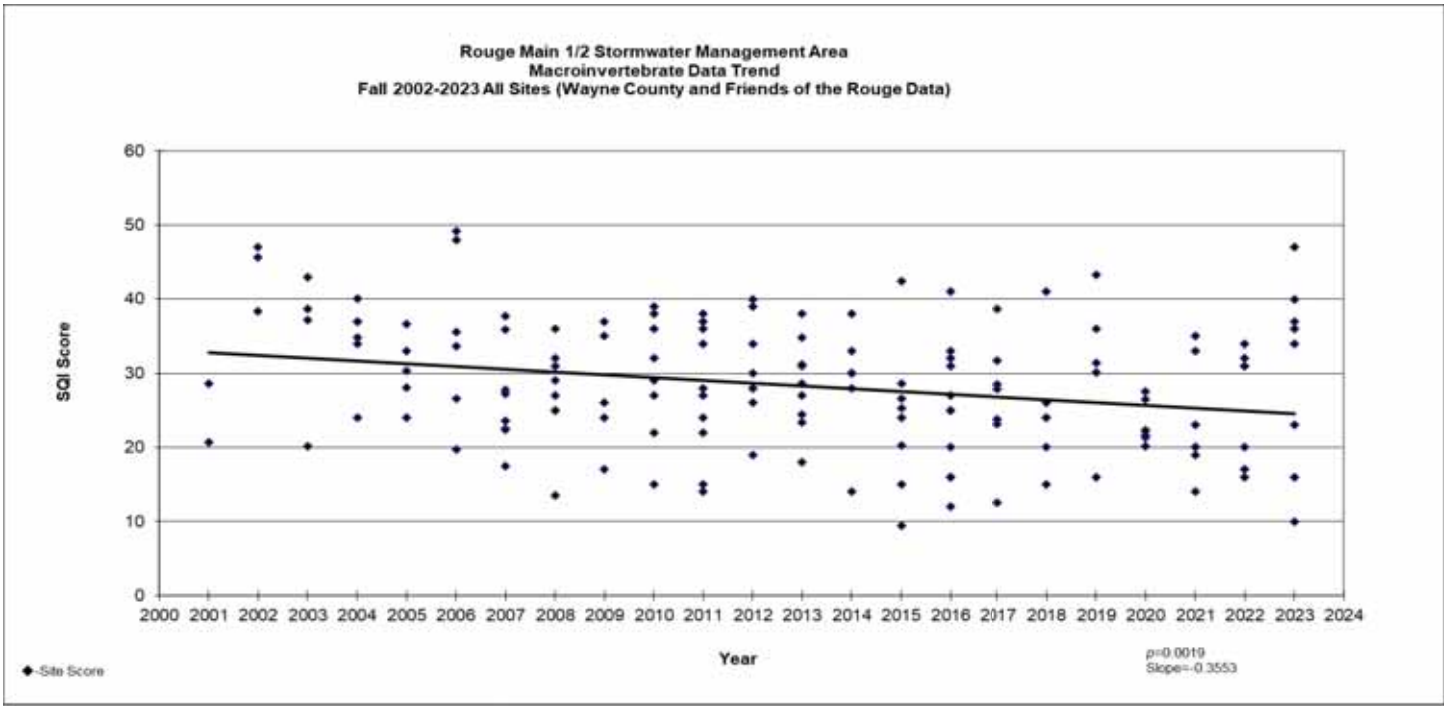
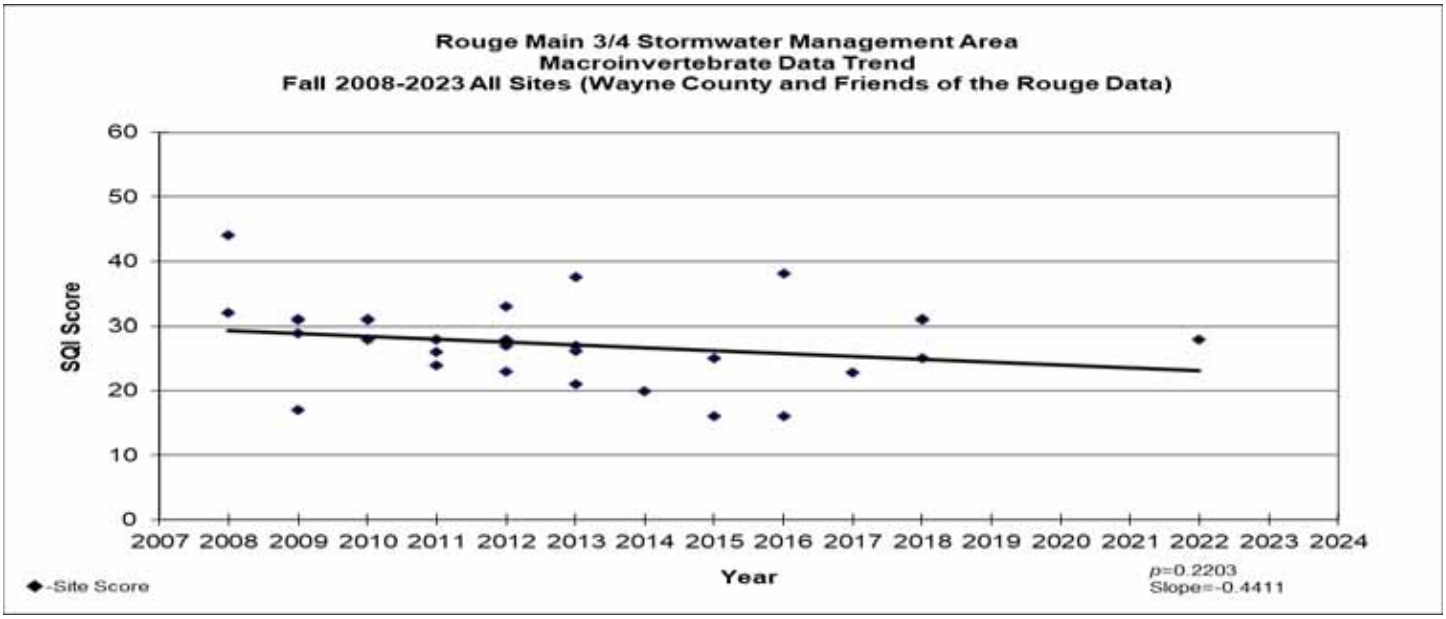

2023 Fall Bug Hunt
Chloride_Rating
OK
chronic
toxic
Sprag
Main1
Main11
Main3
Main4
Main4.5
Main5
MAIN 1-2
Nott
Evan1
Evan2
See3
Wall3
Bish2
Up2
UPPER
MR-22
MR-23
MR-25
MR-27
John3
John8
John7
John1
John2
MIDDLE 1
Bell1
Bell2
Bell3
Nton
Ton1
MR-24
MR-4
Fel1
Will2
MR-14
MR-11
MAIN 3-4
Fel5
LR-9
Fel6
Fel2
Will1
MIDDLE 3
Low2
LOWER 1
LR-12
LOWER 2
LR-1
LR-3
LR-7

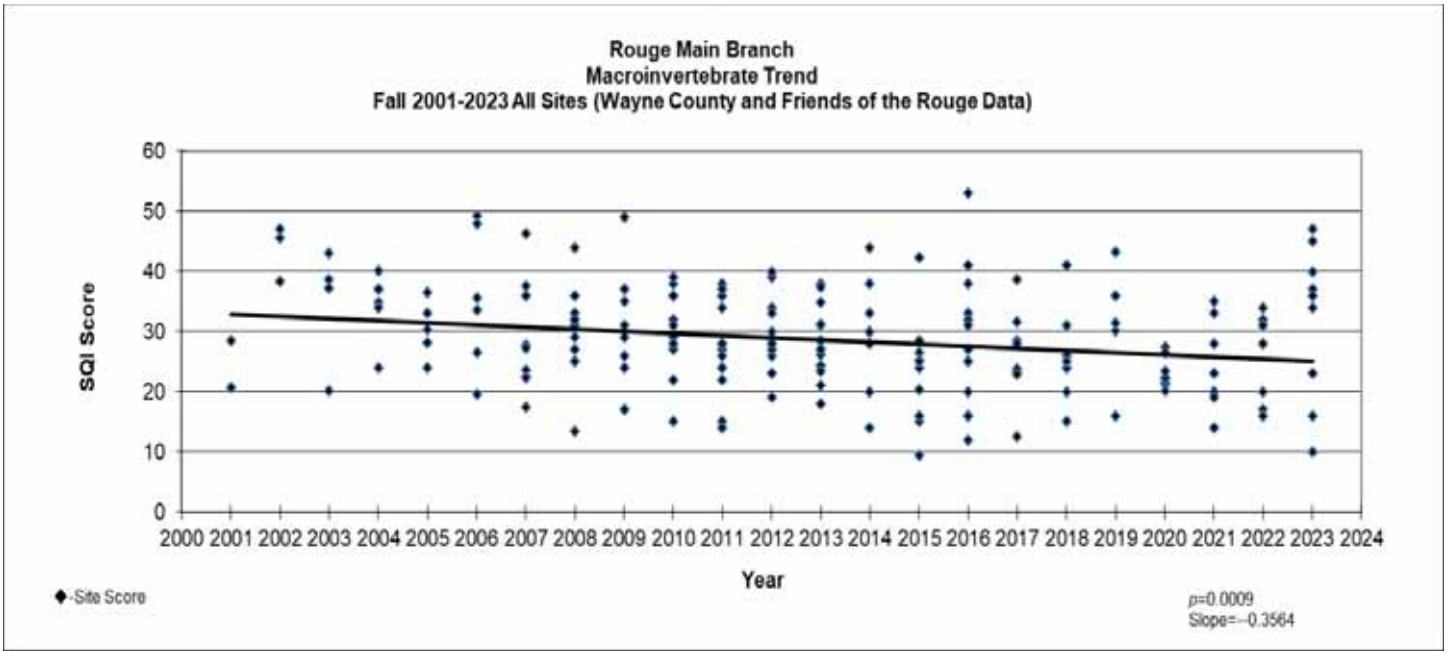
Table 7: Fall 2023 Data															
BRANCH	Stream Name	FIELDID	Site Description	SQI	SQI Rating	Taxa	Insect Taxa	EPT	WQR	WQR Score	Cl ppm	Cl Rating	Nitrate ppm	Nitrite ppm
Lower	Fellows Creek	Fel6	Hanford	35.9	Good	19	14	3	6.24	Fair	31	ok	2	1.5
Lower	Fellows Creek	Fel2	Vintage Valley	35	Good	16	8	1	5.78	Fair	37	ok	1	0.15
Lower	Lower Rouge	Low2	Cherry Hill	27.7	Fair	12	8	1	7.42	Fairly Poor	50	ok	0	
Lower	Fellows Creek	Fel1	Top of Hill Ct	21	Fair	11	8	1	5.59	Fair	75	ok	1	0.15
Lower	Fellows Creek	Fel5	Warren Ridge	28.8	Fair	14	10	2	5.94	Fair	85	ok	1	0.15
Lower	Lower Rouge	LR-12	Morton Taylor	37	Good	13	8	2	5.04	Good	119	ok	5	0
Lower	Lower Rouge	LR-7	McClaugherty Creek	29	Fair	13	6	2	7.24	Fairly Poor	145	ok	0	0
Lower	Fellows Creek	LR-9	Fellows Beck Warren	21	Fair	13	7	0	7.2	Fairly Poor	157	chonic	0	
Lower	Lower Rouge	LR-1	Commerce Ct	31	Fair	13	8	2	7	Fairly Poor	167	chonic	20	0
Lower	Lower Rouge	LR-3	Goudy Park	22	Fair	9	7	2	7	Fairly Poor	195	chonic	10	0
Main	Evans Creek	Evan2	LTU	16	Poor	6	2	0	10	Very Poor	31	ok	1	0.15
Main	Nottingham Creek	Nott	Country Day	23	Fair	9	6	2	10	Very Poor	117	ok	0	
Main	Main Rouge	Main3	Booth Park	47	Good	18	10	3	5.47	Good	143	ok	1	0
Main	Sprague Creek	Sprag	Main Lloyd Stage	45	Good	14	10	3	5.12	Good	157	chonic	1	0.15
Main	Main Rouge	Main4	Linden Park	37	Good	18	9	2	5.17	Good	157	chonic	1	0
Main	Main Rouge	Main1	FF Pk	34	Good	19	10	2	6.76	Fairly Poor	157	chonic	1	0.15
Main	Main Rouge	Main11	Quarton at Lakeside	37.9	Good	19	14	4	4.92	Good	172	chonic		
Main	Main Rouge	Main5	Douglas Evans	36.1	Good	16	9	1	5.49	Good	172	chonic	2	0
Main	Main Rouge	Main4.5	Fairway Park	40	Good	21	14	3	5.76	Fair	172	chonic	1	0
Main	Evans Creek	Evan1	Evans Green Spruce	10	Poor	7	1	0	7	Fairly Poor	391	acute	1	0.15
Middle	Johnson Creek	MR-22	Maybury south	33	Fair	13	8	2	4.64	Good	75	ok	1	0
Middle	Johnson Creek	John7	Arcadia	28.6	Fair	11	10	3	5.08	Good	75	ok	1	0.15
Middle	Bishop Creek	Bish2	Bishop Scarborough	13	Poor	5	4	1	7	Fairly Poor	75	ok	0	0
Middle	Johnson Creek	John3	6M NV	13	Poor	6	6	3	10	Very Poor	75	ok	1	0.15
Middle	Johnson Creek	John2	5M NV	35.6	Good	15	11	4	5.06	Good	85	ok		
Middle	Tonquish Creek	MR-14	Smith Elem	32	Fair	17	8	2	5.35	Good	85	ok	0	0
Middle	Johnson Creek	John1	5M Salem	33.8	Fair	13	9	5	5.46	Good	85	ok	2	
Middle	Johnson Creek	John8	Maybury Angell	50	Excellent	20	12	3	5.53	Fair	85	ok	0	0
Middle	Tonquish Creek	Ton1	Plym Twp Pk	40.8	Good	18	11	3	5.93	Fair	95	ok	1	0
Middle	Willow Creek	Will1	Willow Barchester Pk	24	Fair	10	5	1	6.34	Fair	95	ok	0	0.15
Middle	Johnson Creek	MR-27	Ridge	34	Good	15	9	1	4.78	Good	96	ok	1	0.3
Middle	Tonquish Creek	MR-24	Lion's Pk	25	Fair	8	5	3	4.78	Good	106	ok	0	0
Middle	Tonquish Creek	Nton	S Evergreen St	24	Fair	14	8	3	4.13	Very Good	130	ok	1	0.15
Middle	Johnson Creek	MR-23	Maybury North	42	Good	17	11	4	4.85	Good	131	ok	0	0
Middle	Johnson Creek	MR-25	Maybury East	24	Fair	13	9	1	4.89	Good	159	chonic	0	0
Middle	Middle Rouge	MR-4	Levan Knoll	33	Fair	16	9	2	6.41	Fair	167	chonic	2	0
Middle	Middle Rouge	MR-11	Elm Grove	20	Fair	11	6	2	4.98	Good	172	chonic	0	0
Middle	Walled Lake Drainage	Wall3	WL 12 M	28.7	Fair	11	7	1	5.22	Good	203	chonic	5	0.15
Middle	Willow Creek	Will2	Canton High School	31	Fair	19	11	2	6	Fair	203	chonic	0	0
Upper	Bell Branch	Bell3	Livonia 6 Mile	20	Fair	8	3	0	10	Very Poor	130	ok	1	0.15
Upper	Seeley Creek	See3	Kennedy Ct	25	Fair	10	6	1	4.66	Good				
Upper	Upper Rouge	Up2	Shiawasee Park	21	Fair	10	7	1	5.41	Good				
Upper	Bell Branch	Bell2	Schoolcraft College	29	Fair	11	8	1	5.99	Fair				
Upper	Bell Branch	Bell1	Bicentennial Park	31	Fair	14	8	2	6.35	Fair				

Data Trend Tables

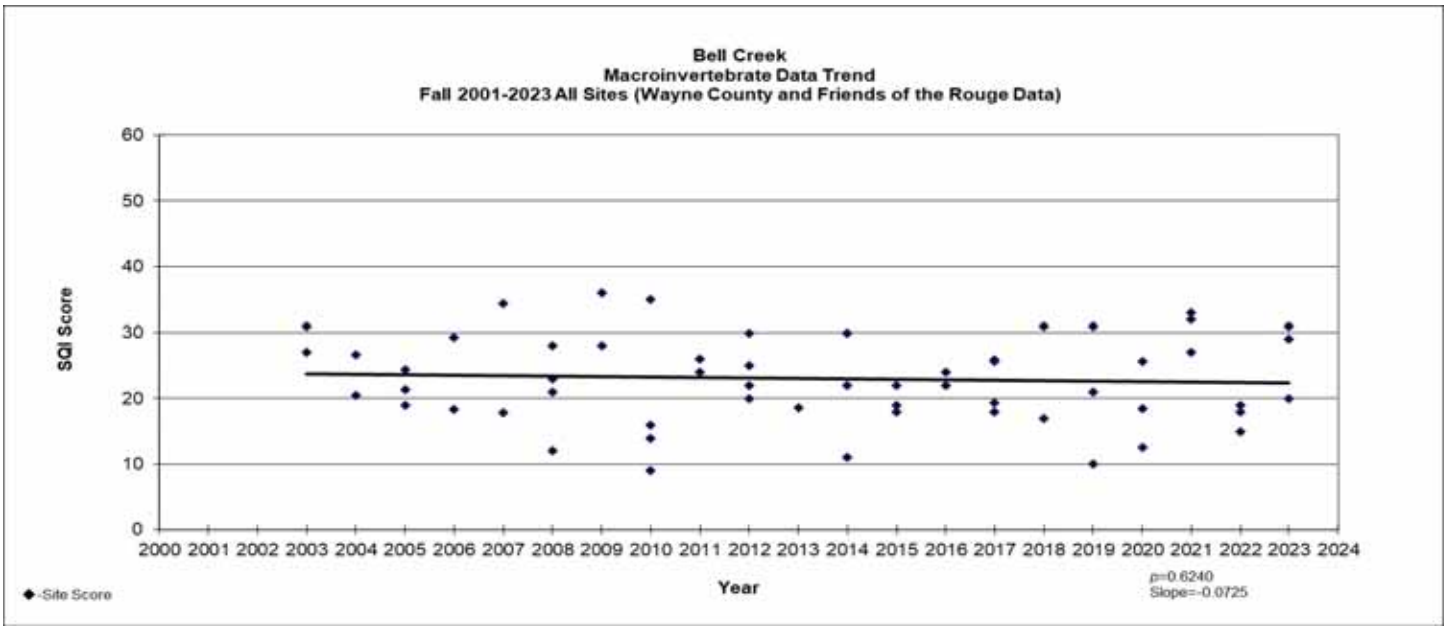
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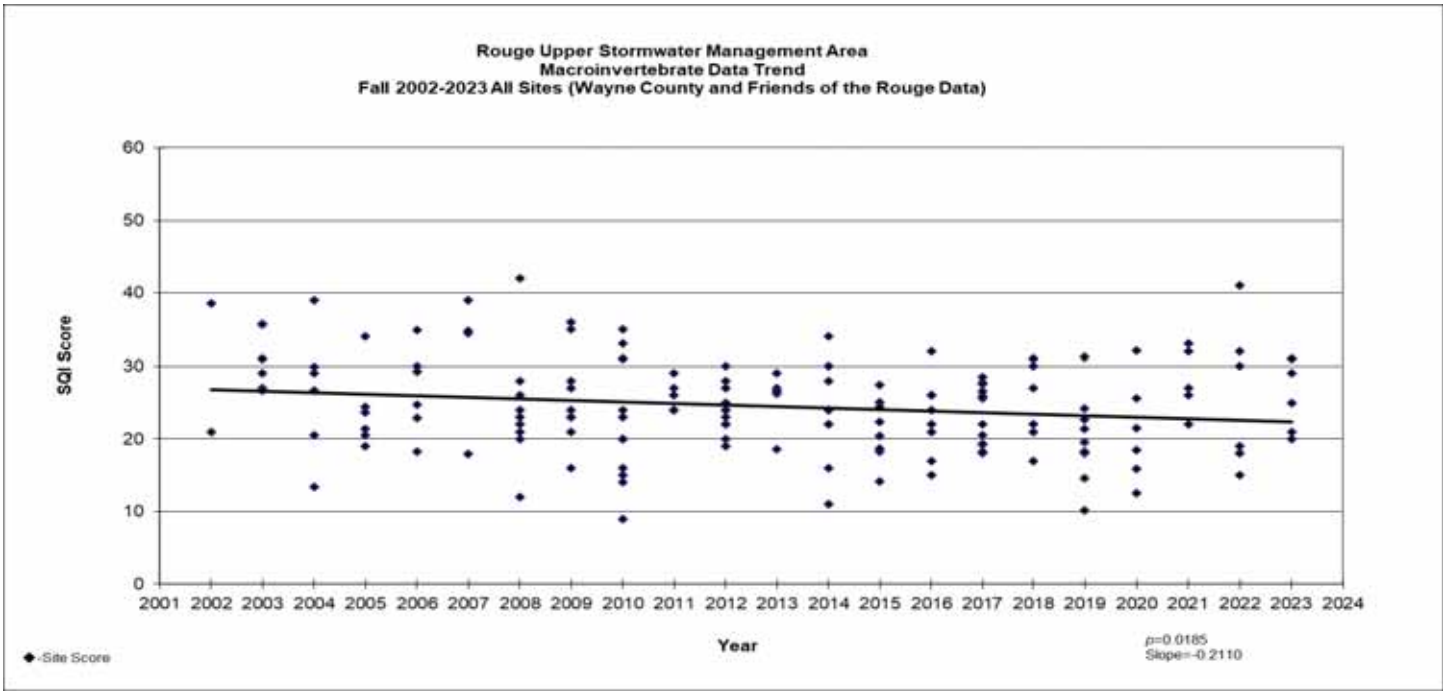




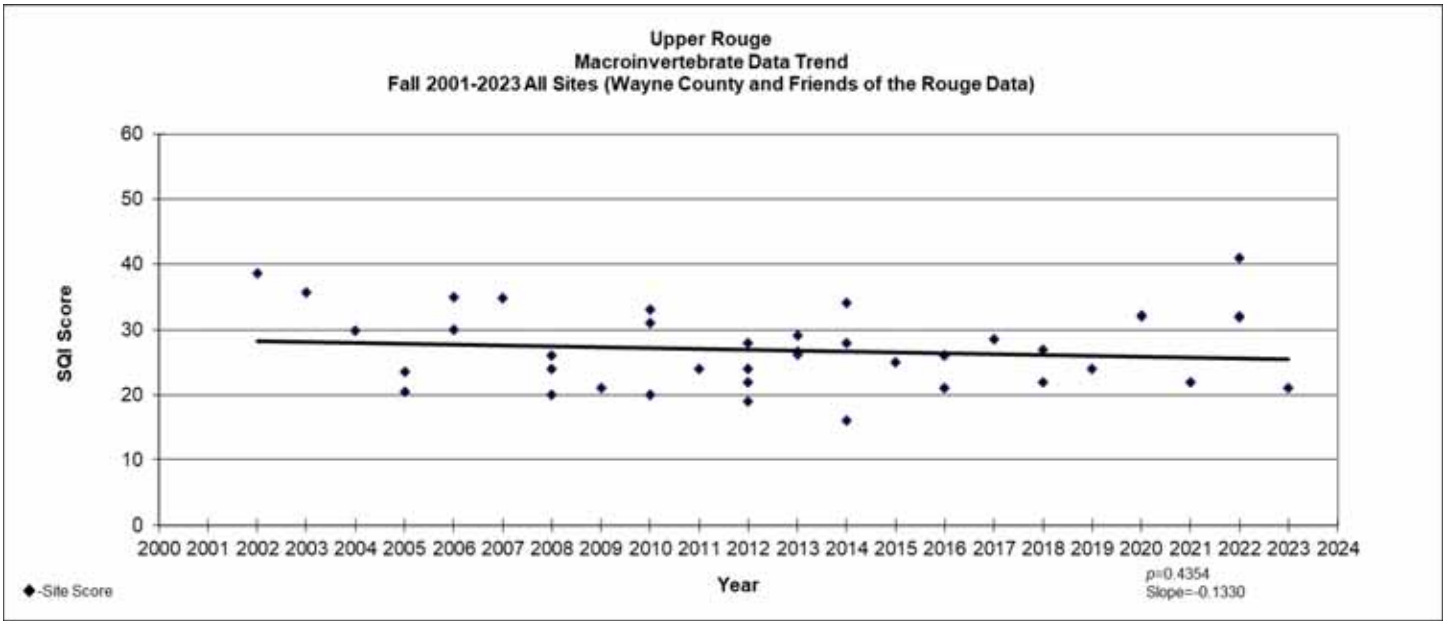

Rouge Main Branch
Macroinvertebrate Trend
Fall 2001-2023 All Sites (Wayne County and Friends of the Rouge Data)
SQI Score
Year
Site Score
p=0.0009
Slope=-0.3564

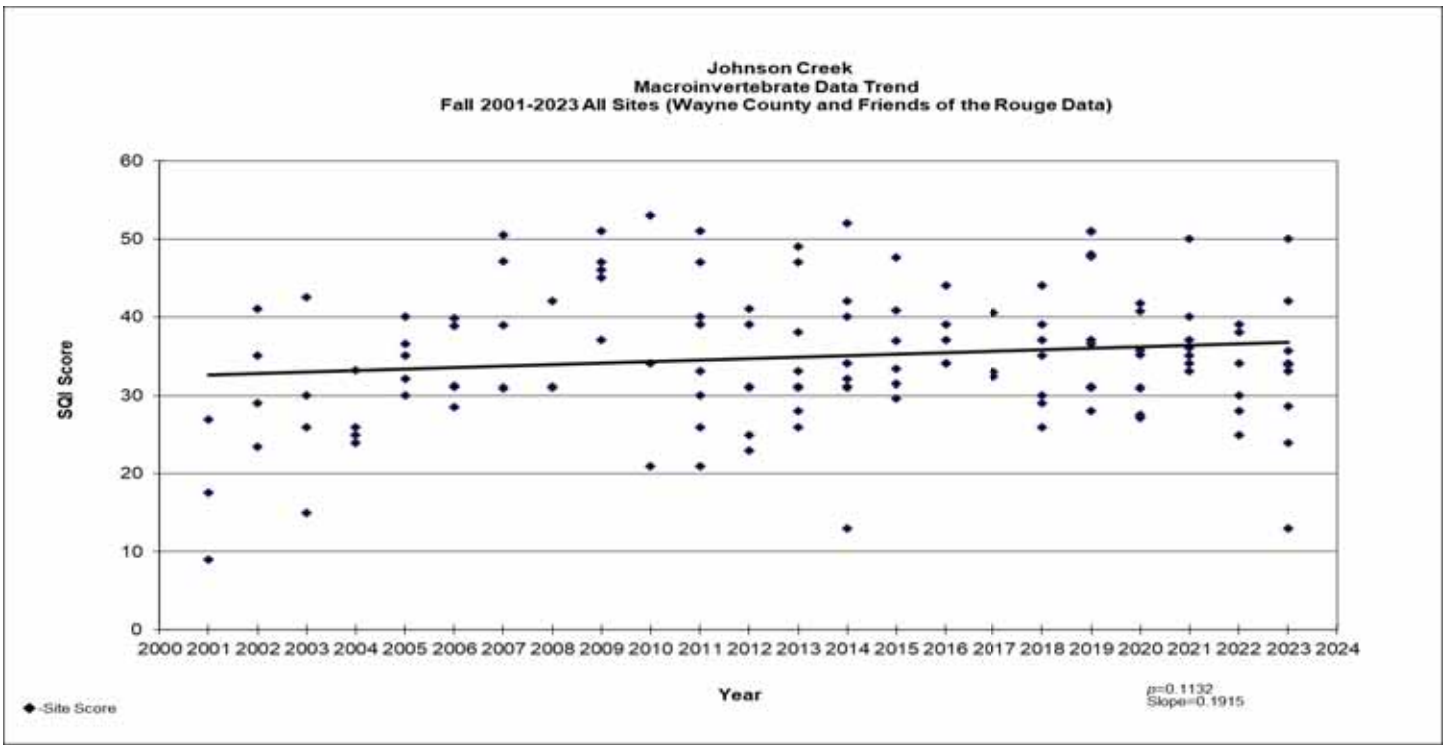
Upper

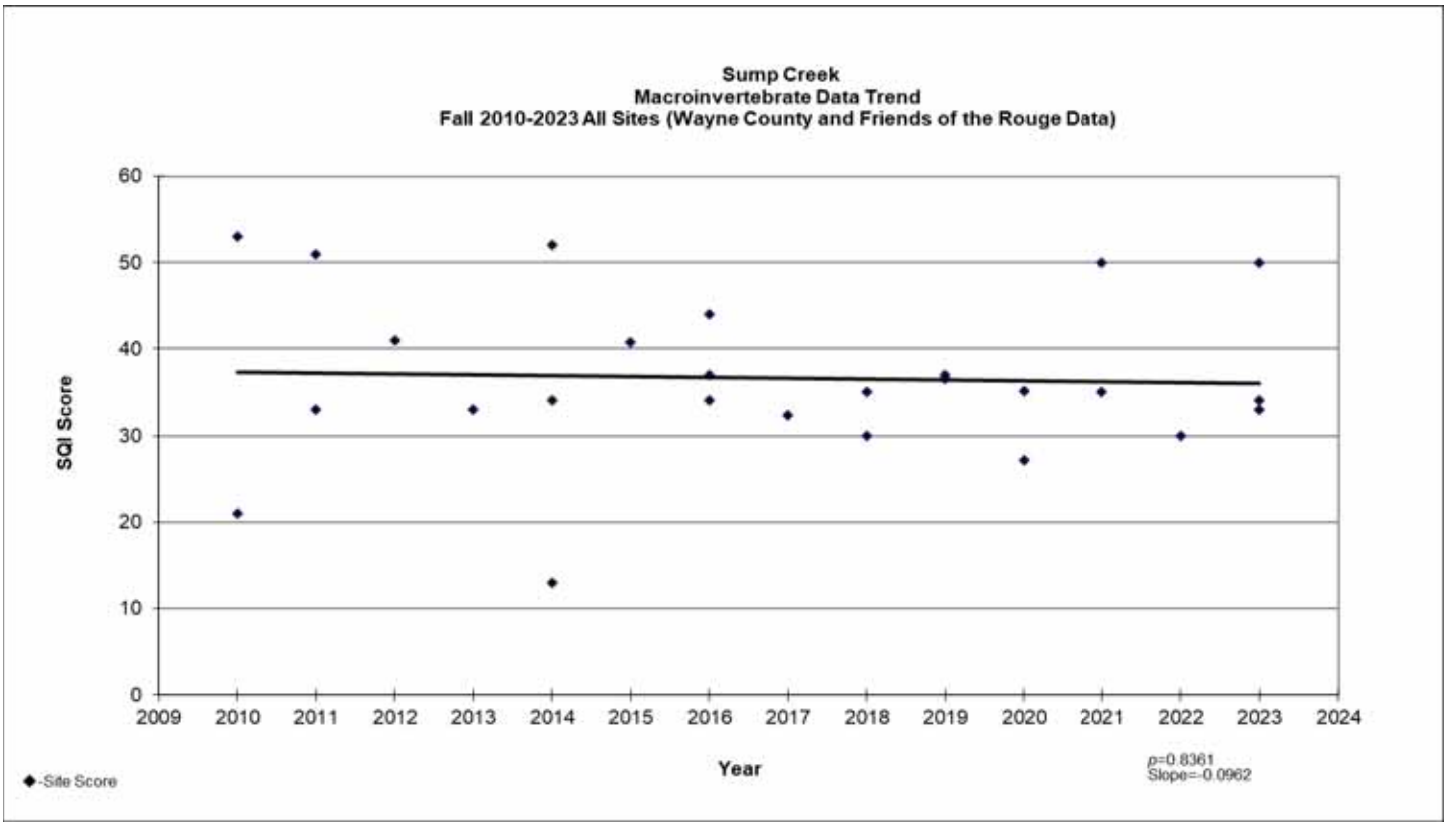

Bell Creek
Macroinvertebrate Data Trend
Fall 2001-2023 All Sites (Wayne County and Friends of the Rouge Data)
SQI Score
Year
Site Score
p=0.6240
Slope=-0.0725

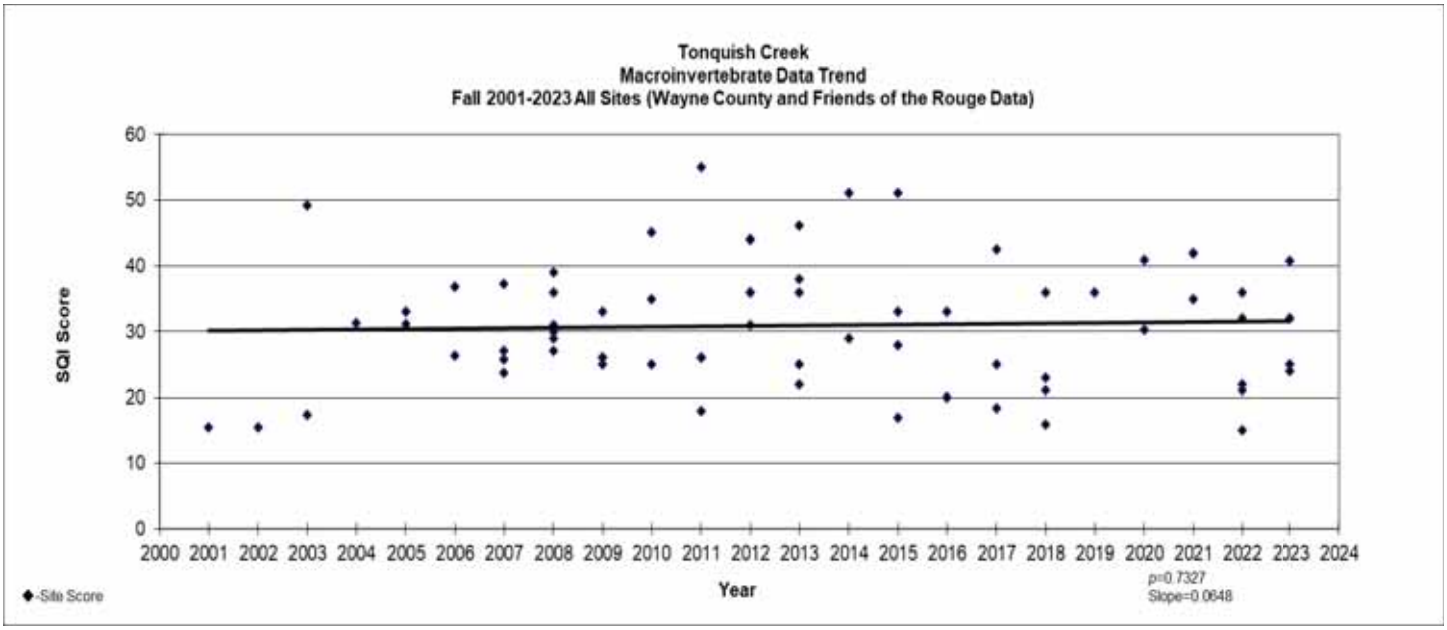


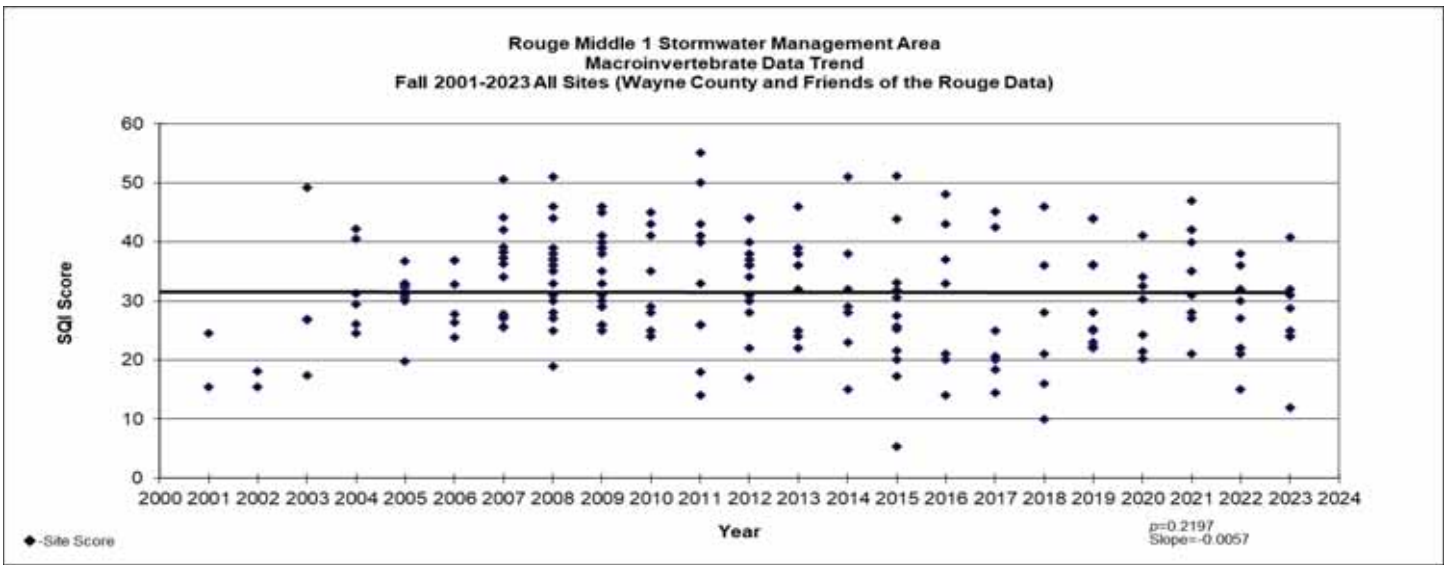
Upper with no tributaries

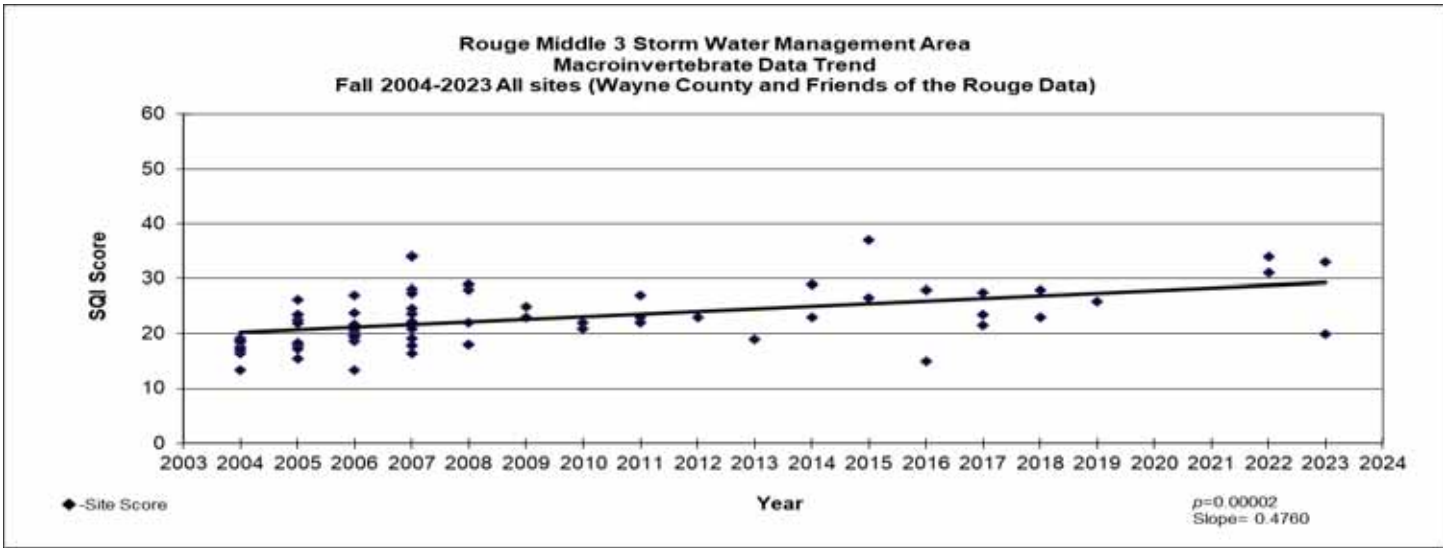


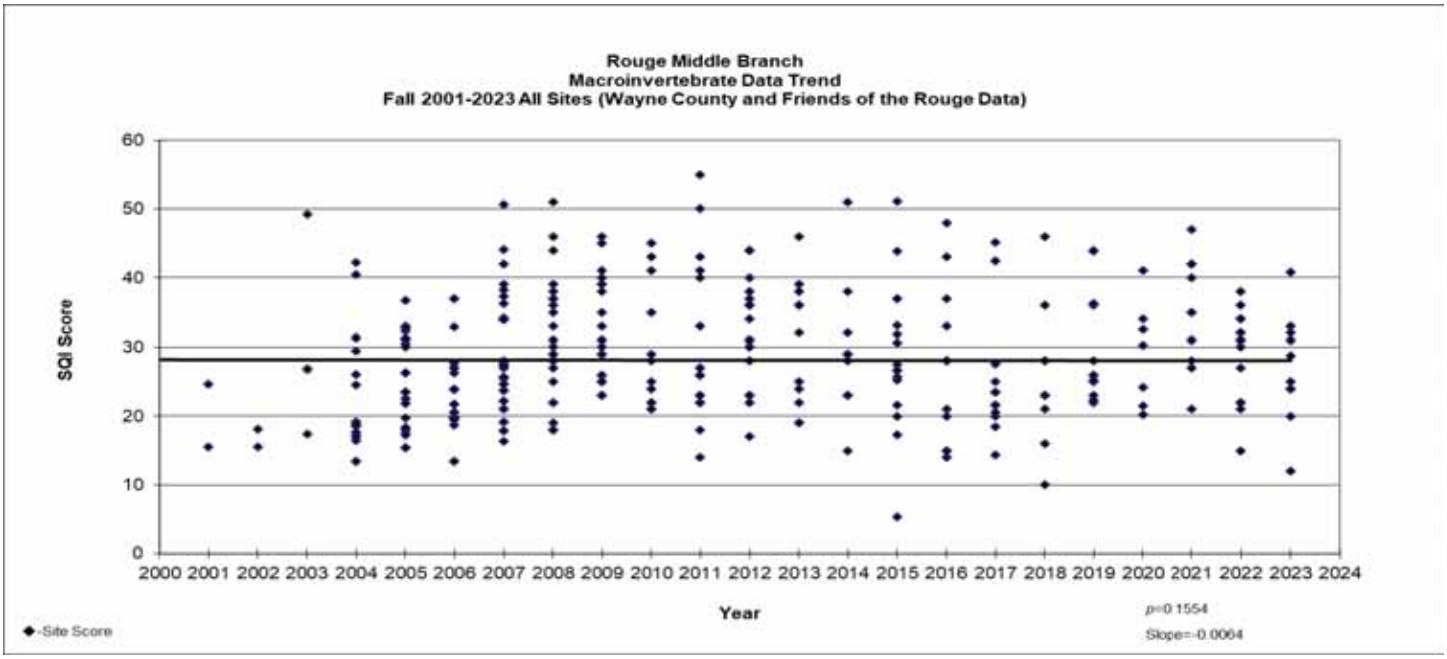

Johnson Creek
Macroinvertebrate Data Trend
Fall 2001-2023 All Sites (Wayne County and Friends of the Rouge Data)
SQI Score
Year
-Site Score
p=0.1132
Slope=0.1915

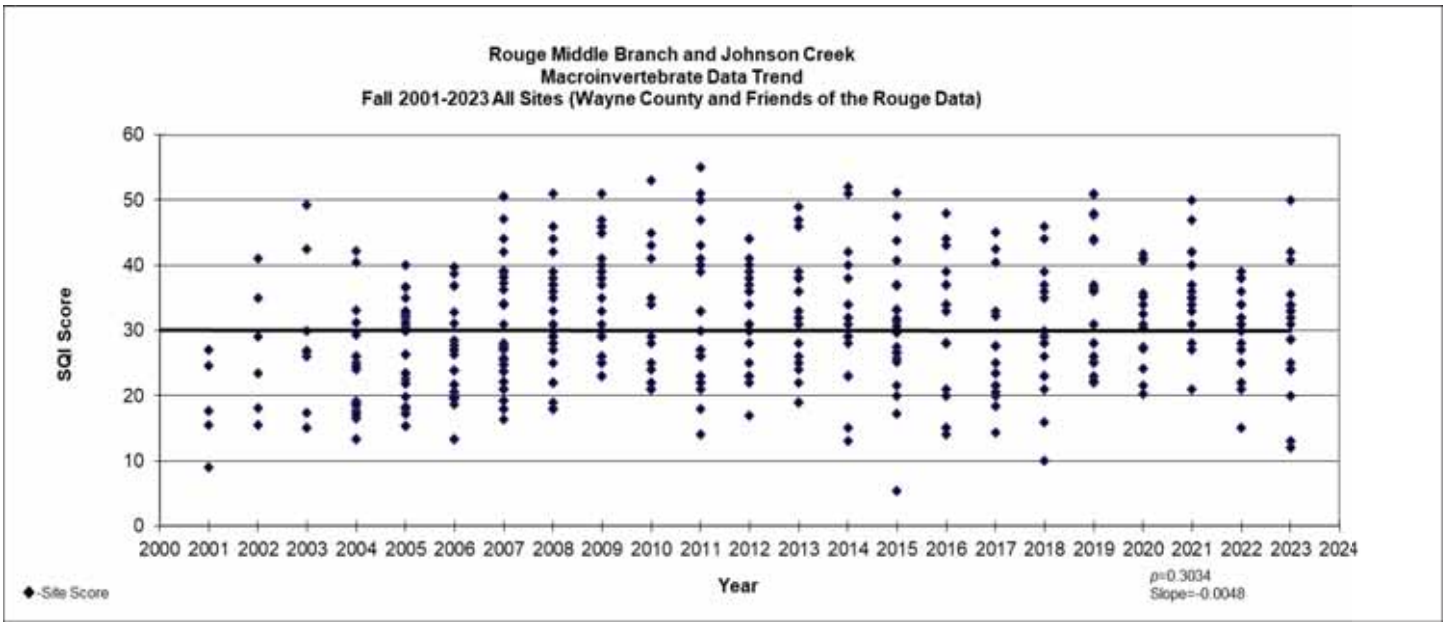

Sump Creek
Macroinvertebrate Data Trend
Fall 2010-2023 All Sites (Wayne County and Friends of the Rouge Data)
SQI Score
Year
-Site Score
p=0.8361
Slope=-0.0962

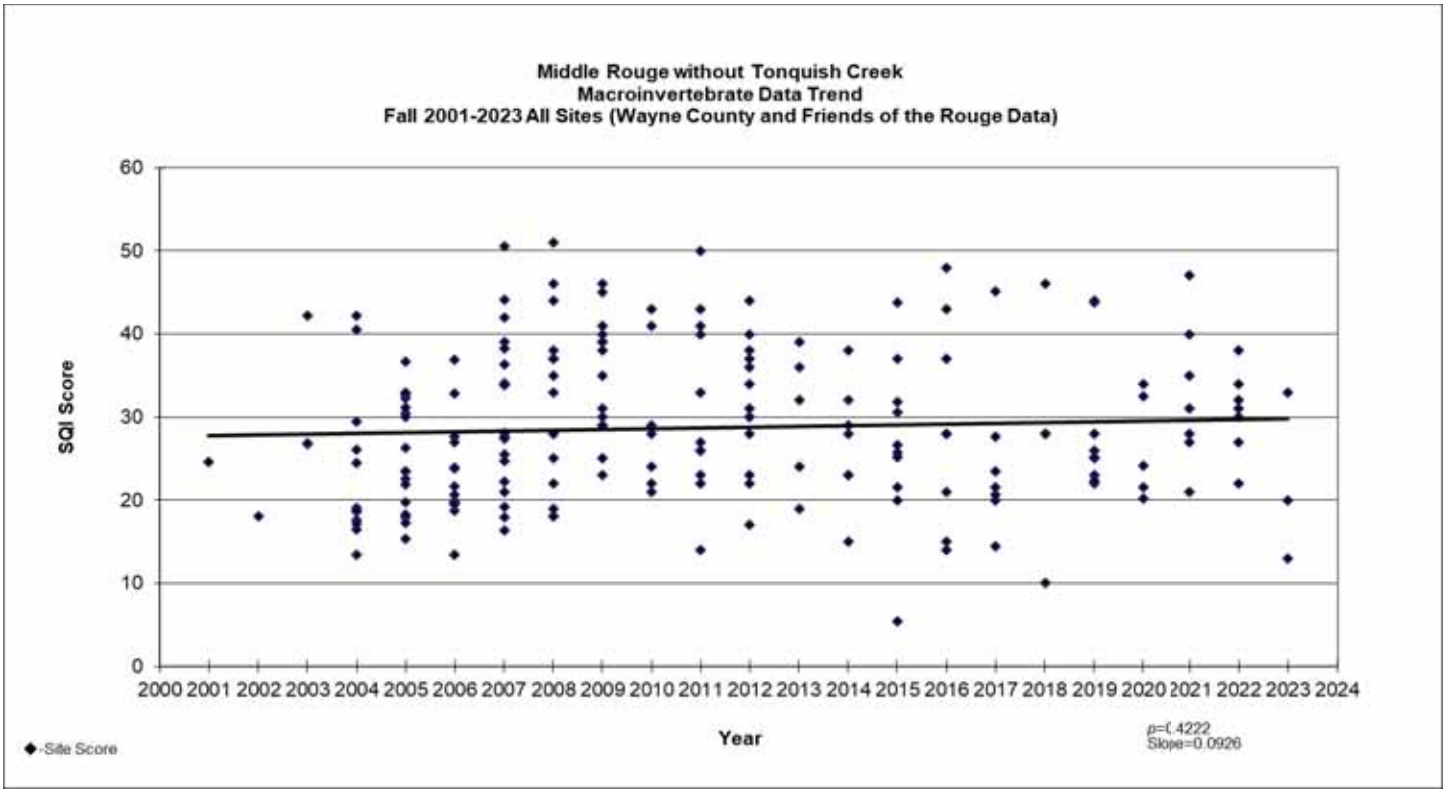

Tonquish Creek
Macroinvertebrate Data Trend
Fall 2001-2023 All Sites (Wayne County and Friends of the Rouge Data)
SQI Score
Year
-Site Score
p=0.7327
Slope=0.0648


Rouge Middle 1 Stormwater Management Area
Macroinvertebrate Data Trend
Fall 2001-2023 All Sites (Wayne County and Friends of the Rouge Data)
SQI Score
Year
-Site Score
p=0.2197
Slope=-0.0057

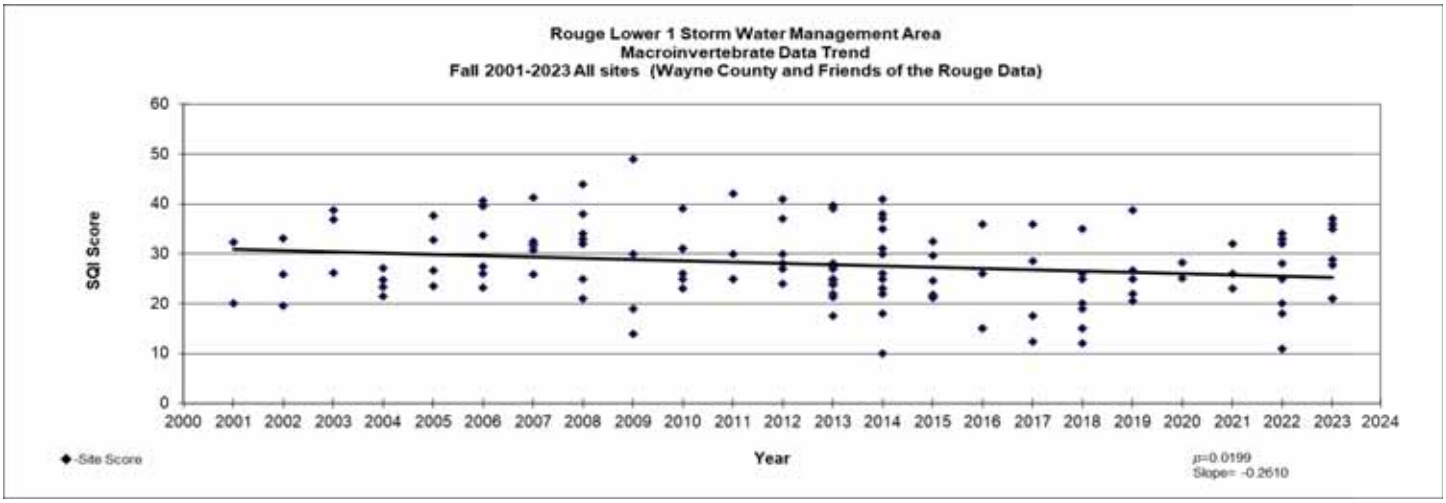

Rouge Middle 3 Storm Water Management Area
Macroinvertebrate Data Trend
Fall 2004-2023 All sites (Wayne County and Friends of the Rouge Data)
SQI Score
Year
-Site Score
p=0.00002
Slope= 0.4760

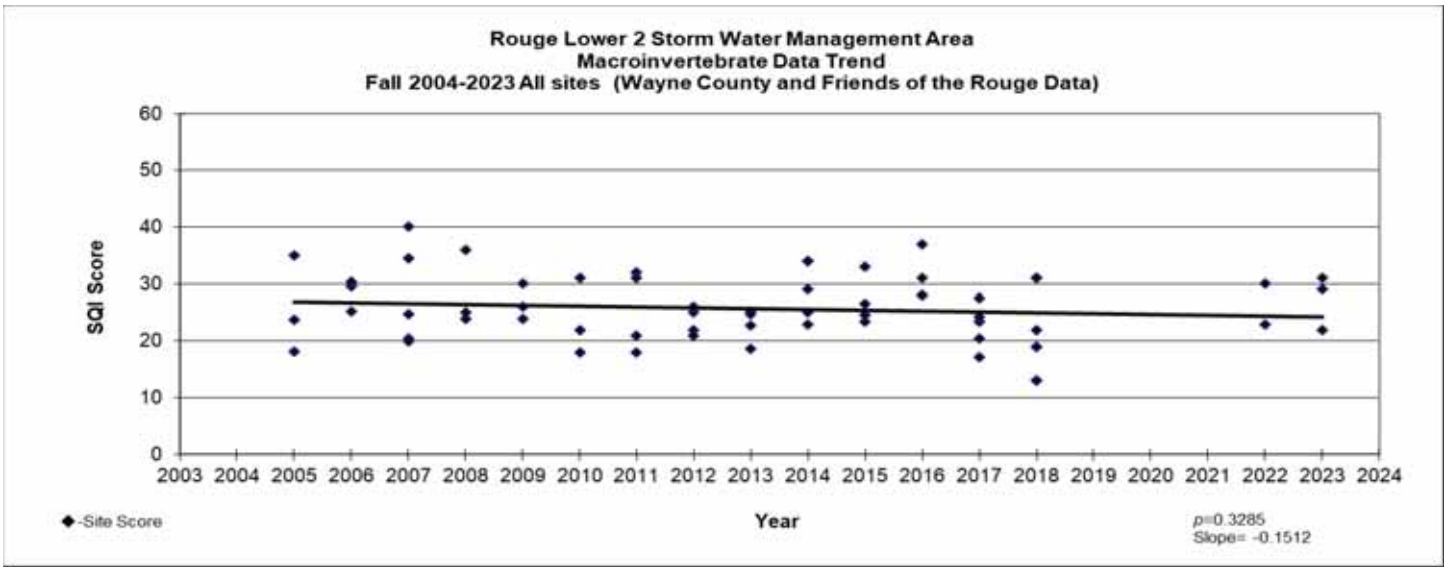

Rouge Middle Branch
Macroinvertebrate Data Trend
Fall 2001-2023 All Sites (Wayne County and Friends of the Rouge Data)
SQI Score
Year
-Site Score
p=0.1554
Slope=-0.0064

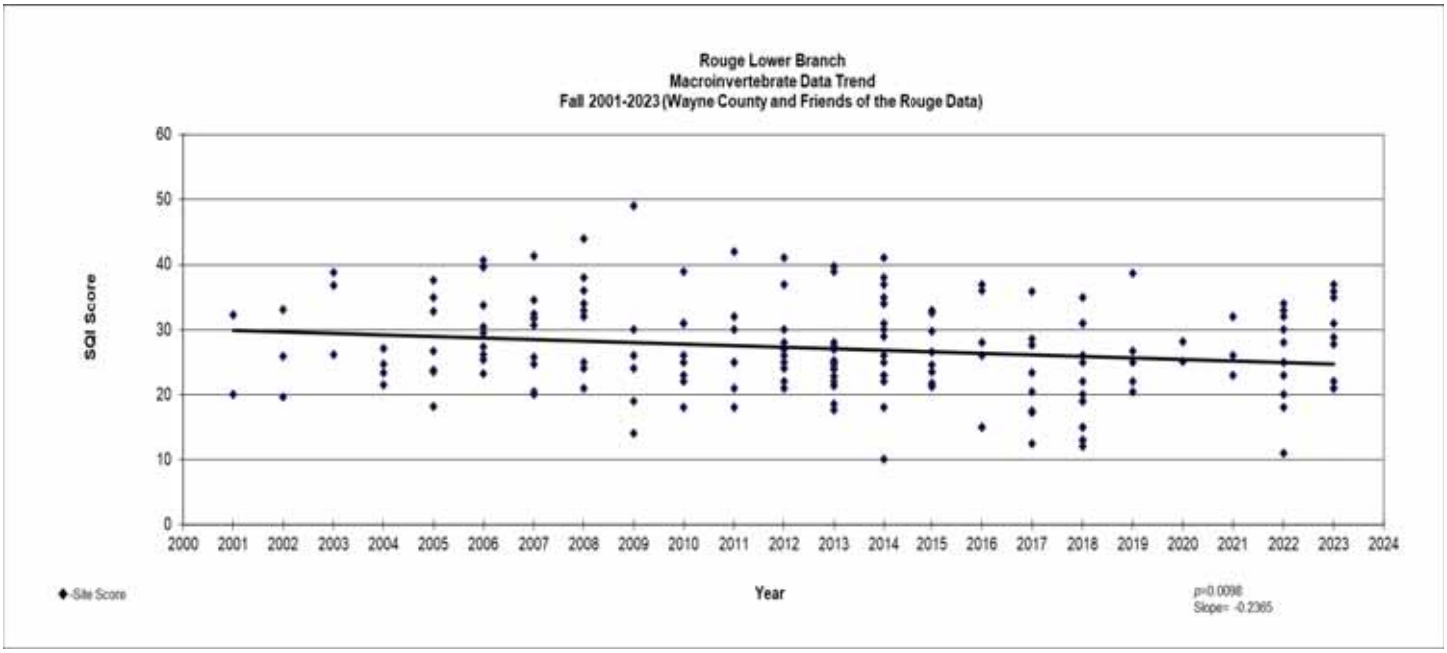

Rouge Middle Branch and Johnson Creek
Macroinvertebrate Data Trend
Fall 2001-2023 All Sites (Wayne County and Friends of the Rouge Data)
SQI Score
Year
-Site Score
p=0.3034
Slope=-0.0048


Middle Rouge without Tonquish Creek
Macroinvertebrate Data Trend
Fall 2001-2023 All Sites (Wayne County and Friends of the Rouge Data)
SQI Score
60
50
40
30
20
10
0
2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024
Year
p=(.4222
Slope=0.0926
-Site Score

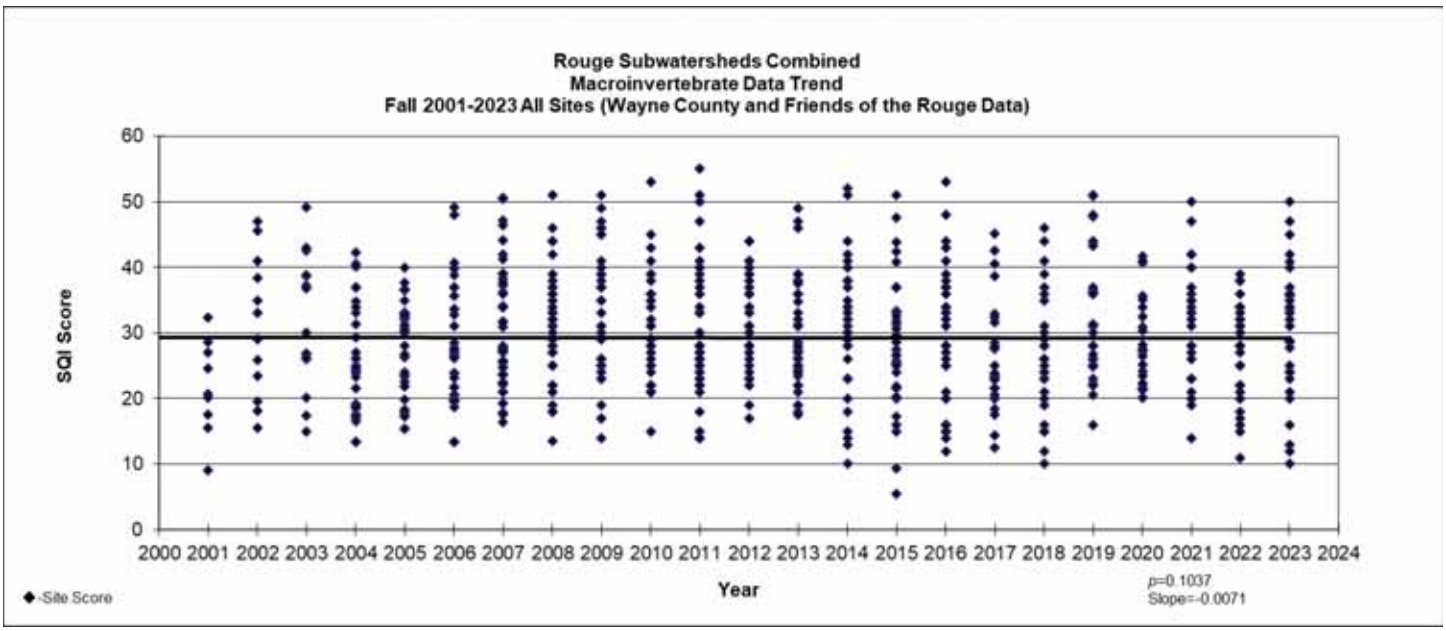
Lower


Rouge Lower 1 Storm Water Management Area
Macroinvertebrate Data Trend
Fall 2001-2023 All sites (Wayne County and Friends of the Rouge Data)
SQI Score
Year
-Site Score
p=0.0199
Slope= -0.2610


Rouge Lower 2 Storm Water Management Area
Macroinvertebrate Data Trend
Fall 2004-2023 All sites (Wayne County and Friends of the Rouge Data)
SQI Score
Year
-Site Score
p=0.3285
Slope= -0.1512

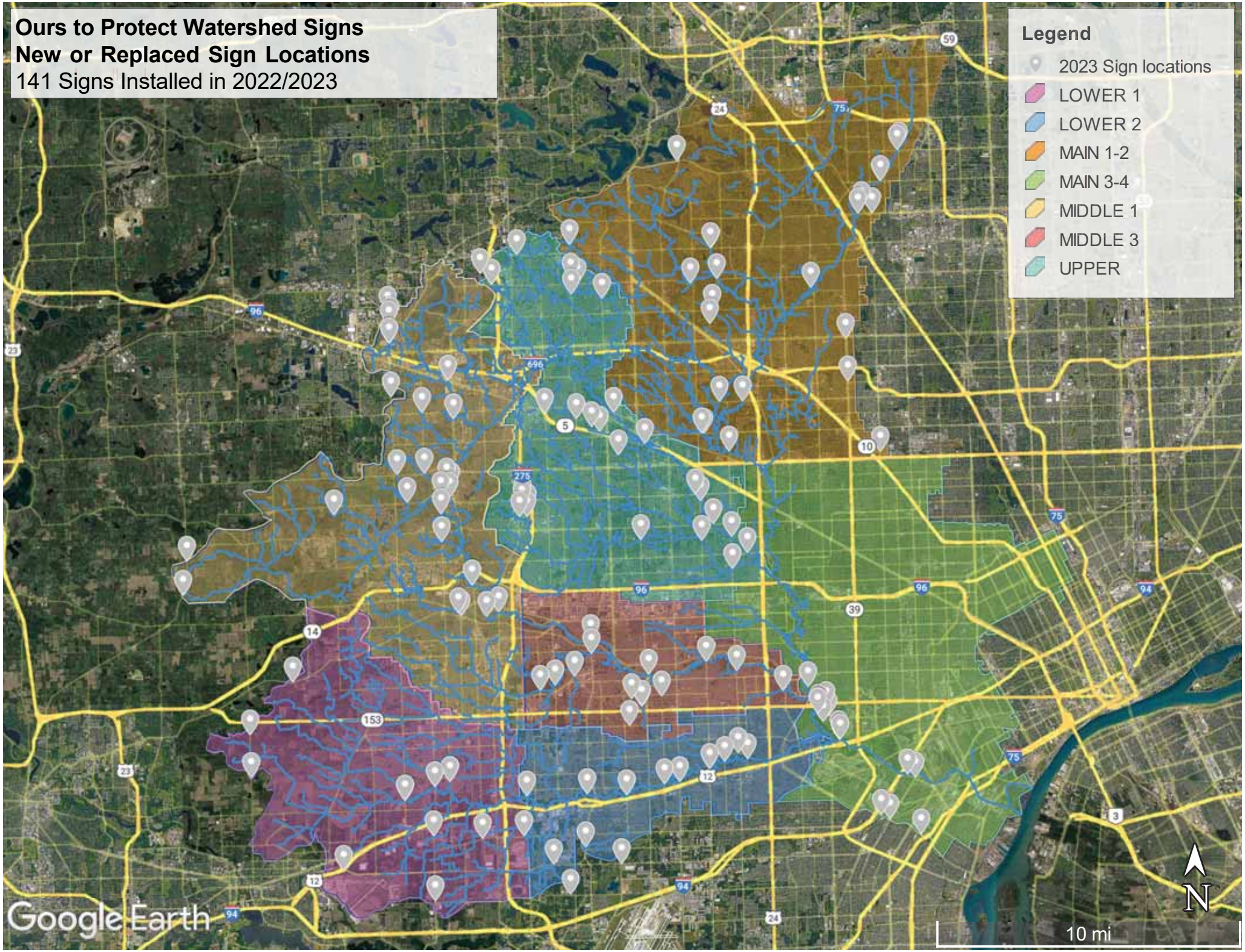

Rouge Lower Branch
Macroinvertebrate Data Trend
Fall 2001-2023 (Wayne County and Friends of the Rouge Data)
SQI Score
Year
-Site Score
p=0.0098
Slope= -0.2365

All Sites


Rouge Subwatersheds Combined
Macroinvertebrate Data Trend
Fall 2001-2023 All Sites (Wayne County and Friends of the Rouge Data)
SQI Score
60
50
40
30
20
10
0
2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024
Year
Site Score
p=0.1037
Slope=-0.0071

Appendix F

Rouge River Watershed Signage Map


Ours to Protect Watershed Signs
New or Replaced Sign Locations
141 Signs Installed in 2022/2023
Legend
2023 Sign locations
LOWER 1
LOWER 2
MAIN 1-2
MAIN 3-4
MIDDLE 1
MIDDLE 3
UPPER
Google Earth
N
10 mi

Appendix G

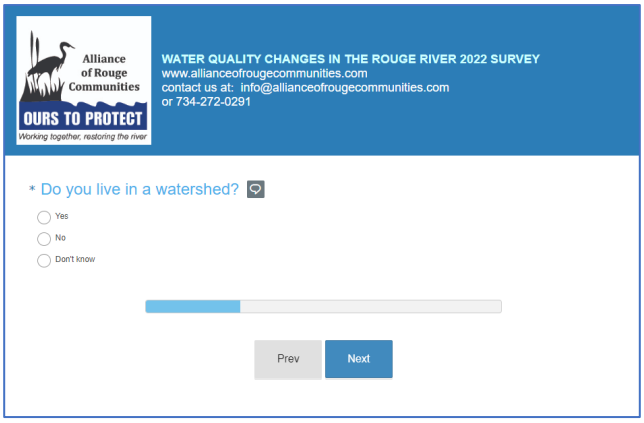
2022 ARC Public Awareness Survey Results

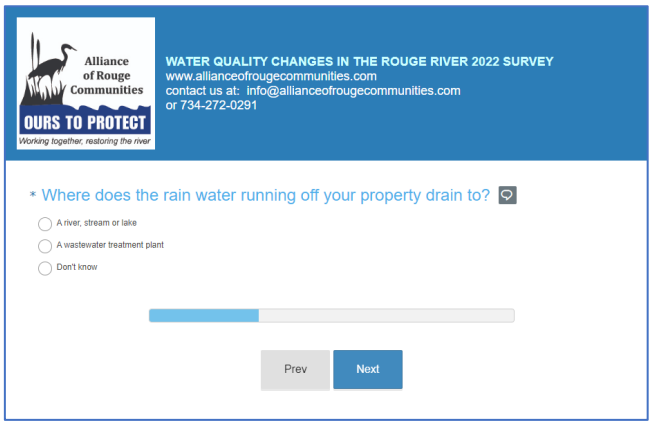
Alliance of Rouge Communities

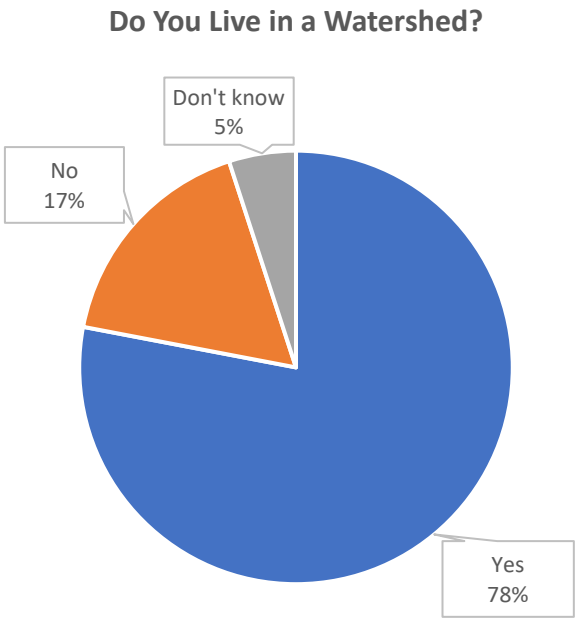
OURS TO PROTECT

Working together, restoring the river

RESULTS OF THE 2022 WATER QUALITY CHANGES IN THE ROUGE RIVER SURVEY







March 2023

Alliance of Rouge Communities
OURS TO PROTECT
Working together, restoring the river

RESULTS OF THE 2022 WATER QUALITY CHANGES IN THE ROUGE RIVER SURVEY

INTRODUCTION

The Alliance of Rouge Communities (ARC), a 501(c)(3) organization, is a voluntary public watershed entity currently comprised of 35 municipal governments (i.e. cities, townships and villages), three counties (Wayne, Oakland and Washtenaw), Henry Ford College, University of Michigan-Dearborn, Schoolcraft College and cooperating partners (i.e. other organizations) as authorized by Part 312 (Watershed Alliances) of the Michigan Natural Resources and Environmental Protection Act (MCL 324.101 to 324.90106) as amended by Act No. 517, Public Acts of 2004.

The purpose of the ARC is to provide an institutional mechanism to encourage watershed-wide cooperation and mutual support to meet water quality permit requirements and to restore beneficial uses of the Rouge River to the area residents.

The ARC members' NPDES permits for stormwater discharges from municipal separate storm sewer systems (MS4) included a Collaborative Public Education Plan (PEP). As part of the Collaborative PEP the ARC conducted a public awareness survey from May 31, 2022, until August 31, 2022, to evaluate changes in public awareness and behavior as it relates to the Rouge River. This report summarizes the results of that survey and compares some of the responses to similar questions in surveys done in 1993 by the Rouge River National Wet Weather Demonstration Project, 1999 by the University of Michigan and most recently 2017 by the ARC.

METHODOLOGY

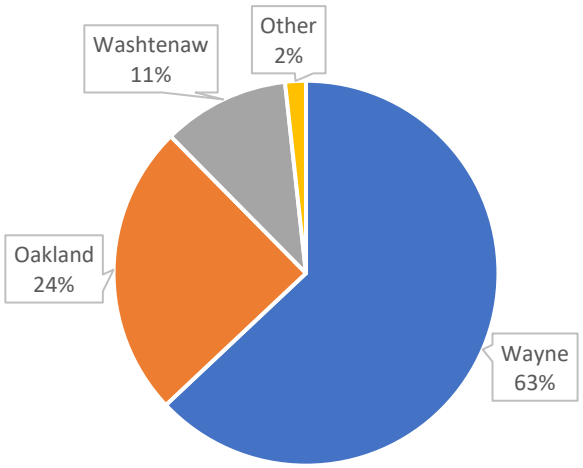
In May 2022, ARC Staff developed an online survey using SurveyMonkey which received 3,096 responses to a 28-question survey. The intent of the survey was to 1) ascertain residents' current attitudes and knowledge about the Rouge River and its watershed, 2) explore changes in attitudes and knowledge that have occurred since similar surveys conducted in 1993, 1999, and 2017 and 3) determine if any modifications should be made to the Collaborative PEP to address ineffective implementation.

The average time required to complete the survey was 9 minutes. The ARC promoted the survey on the ARC website and boosted it on Facebook where it had a reach of 11,300. The ARC also shared the link at stewardship workshops in 2022 which focused on public awareness of the Rouge River and water quality issues and encouraged participants to take the ARC's survey.

Appendix A presents the survey questions and the responses, by percentage of total responses to each. Appendix B shows the comparison between the 2017 and 2022 surveys which were both completed through SurveyMonkey.

The comparisons presented in this report are based on the 3,096 responses with 63% of responses from Wayne County, 24% from Oakland County, 11% from Washtenaw County (see Figure 1) and 2% outside the Rouge River Watershed with 55% of them living at their current residence for 4-6 years and 19% at their current residence for 10 or more years.

Figure 1: Survey Participation by County

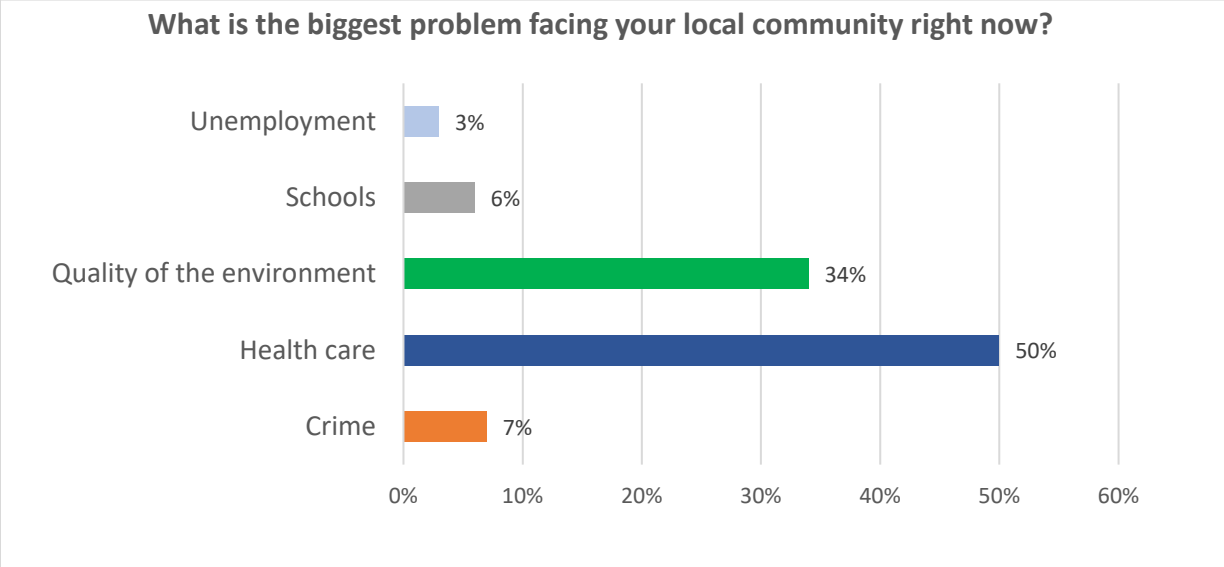


FINDINGS

Issues of Concern

Survey respondents were asked which of five ***issues (crime, health care, quality of the environment, schools and unemployment) they view as the biggest problem facing their local community right now***. Overall health care was the biggest problem expressed most often, followed by quality of the environment and crime. Figure 2 presents the overall results. Quality of the environment was the issue of concern for both Washtenaw and Oakland County and for Wayne County health care was the biggest issue of concern with quality of the environment second.

Figure 2: Overall Issues of Concern



River: Knowledge and Use

Knowledge

Several questions were asked on the public's general knowledge of watershed concepts.

Overall, when asked d***o you live in a watershed?*** 78% of respondents said yes, 17% said no, and 5% did not know as shown in Figure 3. The County breakdown is shown in Table 1.

Figure 3: Do You Live in a Watershed?

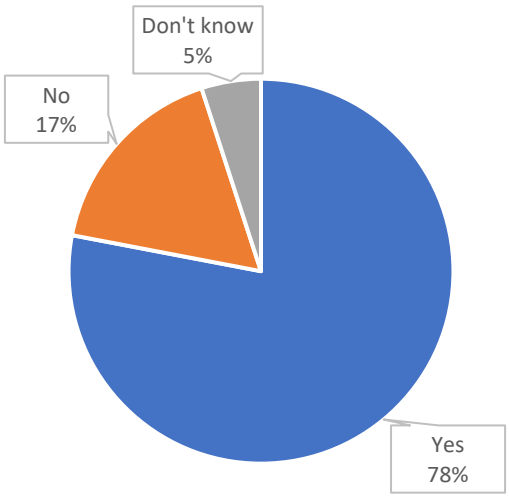


Table 1: County Breakdown for Do You Live in a Watershed?

County	YES	NO	DON'T KNOW
OVERALL	**78%**	**17%**	**5%**
Wayne	81%	16%	3%
Oakland	73%	19%	8%
Washtenaw	69%	18%	13%

The survey asked ***where does the rainwater running off your property drain to?*** Since some of the watershed is served by combined sewers which drain to wastewater treatment plants, those responses from combined sewer areas (Detroit, Redford Twp, Birmingham and Dearborn) were filtered out for this question. However, it should be noted that this resulted in a less than 1% change in the results. 50% of the overall respondents said the rainwater drained to a wastewater treatment plant. 45% said the water drains to a river, stream or lake. 5% said they didn't know where the rainwater drained to. The County breakdown is shown in Table 2.

Table 2: County Breakdown for Where Does the Rainwater Running off Your Property Drain To?

County	RIVER/STREAM/LAKE	WASTEWATER TREATMENT PLANT	DON'T KNOW
OVERALL	**45%**	**50%**	**5%**
Wayne	42%	55%	3%
Oakland	51%	40%	9%
Washtenaw	51%	40%	9%

The survey asked ***how familiar are you with the Rouge River Watershed and its network of rivers and streams running throughout southeast Michigan***. The majority of respondents, 66%, stated they were somewhat familiar with the Rouge River with 24% stating they were very familiar and 9% reporting that they were not very familiar with the Rouge River watershed and its tributaries.

Use

The survey also gauged respondents use of public areas that included a river or stream. Most respondents (96%) reported ***using or visiting a park or other place with a river or stream running through it***. Biking and walking/running/jogging are the number one and two uses respectively, with

canoeing, boating or tubing in the river a close third. Other activities that were not answer options but were written in were invasive species removal and community volunteer and monitoring activities.

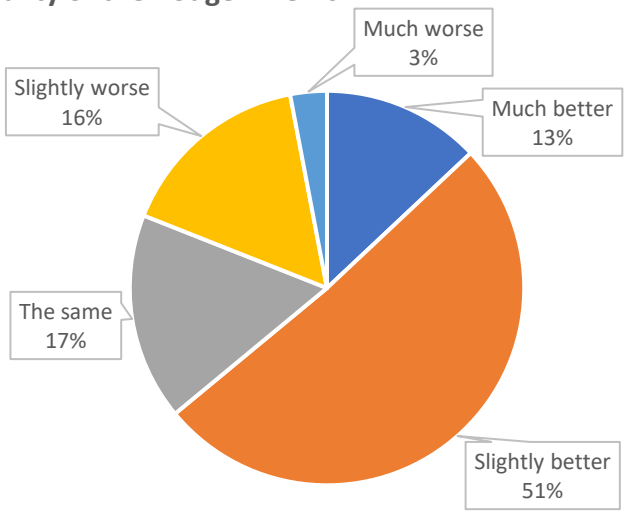
Flooding, Water Quality and Pollution Sources

Flooding

When asked ***to rate the significance of the damage related to high flows including flooding of property or stream bank erosion in the Rouge River in the area where they live*** most respondents, 51% felt that high flows cause somewhat significant damage while 23% felt that the damage from high flows in the Rouge River was not very significant. The remainder of the respondents felt it was very significant (14%), not a problem (9%) and 4% did not know if the damage was significant where they live.

The majority of respondents (39%) felt the flooding of the Rouge River and the related problems are the same as five years ago.

Figure 4: Over the Past 15 Years the Water Quality of the Rouge River is



Water Quality

The majority (64%) of respondents believe that ***over the past fifteen (15) years the water quality of the Rouge River is*** either ***much better*** (13%) or ***slightly better*** (51%) as seen in Figure 4. 17% of the respondents felt the water quality is ***the same*** and 16% of the respondents felt the water quality in the Rouge River was ***slightly worse*** and 3% felt it was ***much worse***.

When asked if poor water quality caused polluted swimming areas, contaminated fish, loss of desirable fish species, reduced beauty of lakes or streams, reduced quality/availability of water recreation activities or lower property values respondents top three causes were:

1. Loss of desirable fish species
2. Reduced beauty of lakes or streams
3. Contaminated fish

These top three were followed by:

4. Reduced quality/availability of water recreation activities
5. Polluted swimming areas
6. Lower property values

Respondents were asked ***how they rate the water quality of the Rouge River*** overall and for various activities. 48% of respondents felt that the overall water quality of the Rouge River was fair with 39% rating it as good and 13% rating it as poor. Table 3 shows the results for the other activities.

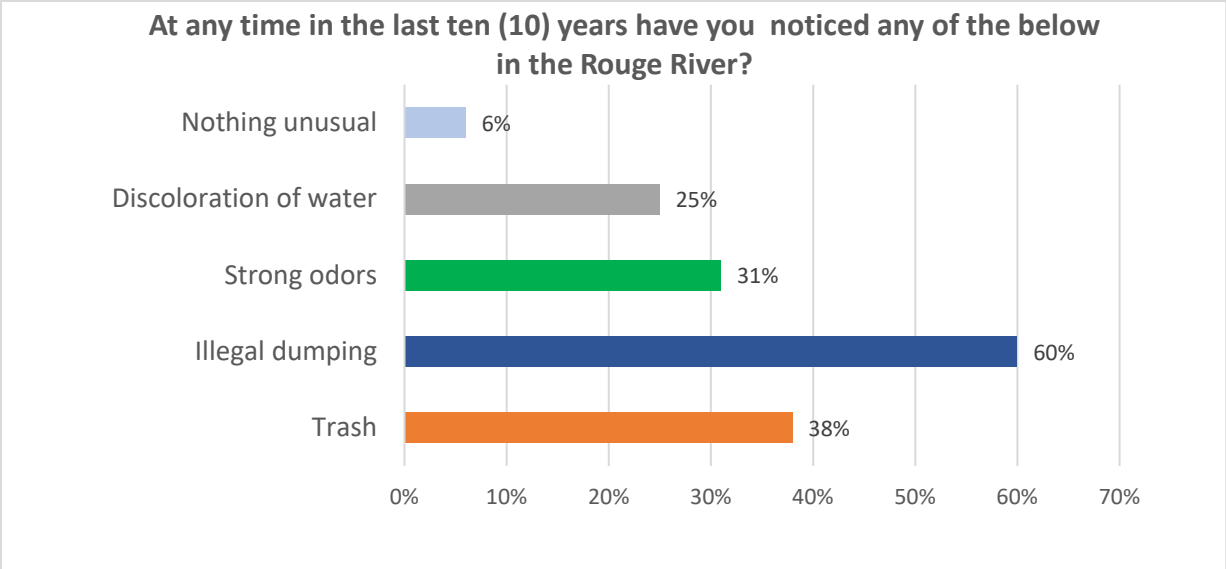
Table 3: How Would You Rate the Water Quality of the Rouge River?

WATER QUALITY FOR	GOOD	FAIR	POOR
Overall	**39%**	**48%**	**13%**
Canoeing/kayaking/boating	36%	46%	18%
Eating locally caught fish	30%	43%	28%
Swimming	29%	43%	28%
Picnicking and family activities	33%	47%	19%
Fish habitat	32%	45%	23%
Scenic beauty	34%	47%	18%

Pollution Sources

When asked if ***at any time in the last ten (10) years you have noticed trash, illegal dumping, strong odors or discoloration in the Rouge River*** the majority of respondents reported that they noticed illegal dumping in the river (see Figure 5).

Figure 5: Pollution of the Rouge River



When asked to ***compare the problems in their area to the sources of water quality pollution across the country*** respondents top two problems were:

1. Droppings from geese, ducks and other waterfowl
2. Chemicals, oils, fertilizers and other polluting materials that are found on the surface of parking lots, streets, farms and lawns washed into the river by rain

The ***problems caused by stormwater runoff (rain events & snow/ice melt) in the Rouge River*** were rated by the respondents as somewhat significant (58% of respondents), followed by not very significant

(17% of respondents). In addition, 14% considered stormwater runoff very significant, 7% considered it not a problem and 4% responded that they did not know if stormwater runoff was a significant problem.

Public Involvement and Information

Individual Actions

Respondents were asked ***if they have changed their actions affecting the Rouge River***. Half or more than half of respondents reported that they changed the type, amounts or application of lawn and garden fertilizers, pesticides or other chemicals; that they take used motor oil, antifreeze, batteries or other household hazardous materials to recycling facilities; that they reduced the use of detergents or other chemicals for home car washings; that they pick up pet waste and dispose of it properly; that they stopped disposing of any waste material into catch basins and storm drains; that they have installed a rain barrel; disconnected downspouts from storm drains to allow roof runoff to seep into the ground; and that they have installed a rain garden.

Education and Information

The survey presented several phrases encouraging stewardship of the Rouge River and asked respondents if they have seen or heard any of them. The top three phases seen or heard were:

1. Help keep our rivers clean
2. Storm drains aren't garbage cans
3. Rouge River, ours to protect

When asked ***what you consider the most important things to educate the public on*** the overall respondents top five were:

1. How to apply and dispose of pesticides/herbicides/fertilizers
2. Impacts of businesses and industries on stormwater runoff
3. How to handle pet waste
4. Connection of the storm sewer system to local waterbodies
5. How to report illegal dumping

The majority of Wayne, Oakland and Washtenaw County responders (59%) ranked how to apply and dispose of pesticides/herbicides/fertilizers as the most important thing to educate the public on. The second most important thing to educate the public on in Wayne County was how to handle pet waste. In Oakland County the second most important thing to educate the public on was the connection of the storm sewer system to local waterbodies. Finally in Washtenaw County the second most important thing to educate the public on was the impacts of businesses and industries on stormwater runoff.

When seeking information about water quality respondents stated the below top five avenues:

1. Internet (59%)
2. Television (31.7%)
3. Newspapers/magazines/newsletters (31.6%)
4. Billboards (30%)
5. Brochure/fact sheet (26%)

Priorities

The ARC survey asked respondents **how much they would spend to improve the water quality in the Rouge River annually through local taxes or fees**. Overall, 98% of respondents said they were willing to pay something to improve water quality in the Rouge River. 46% of respondents said they would be willing to pay $5-$10 a month, 41% said they would be willing to spend $10-$20 a month, 11% said $1-$4 a month and 2% said they did not want to pay.

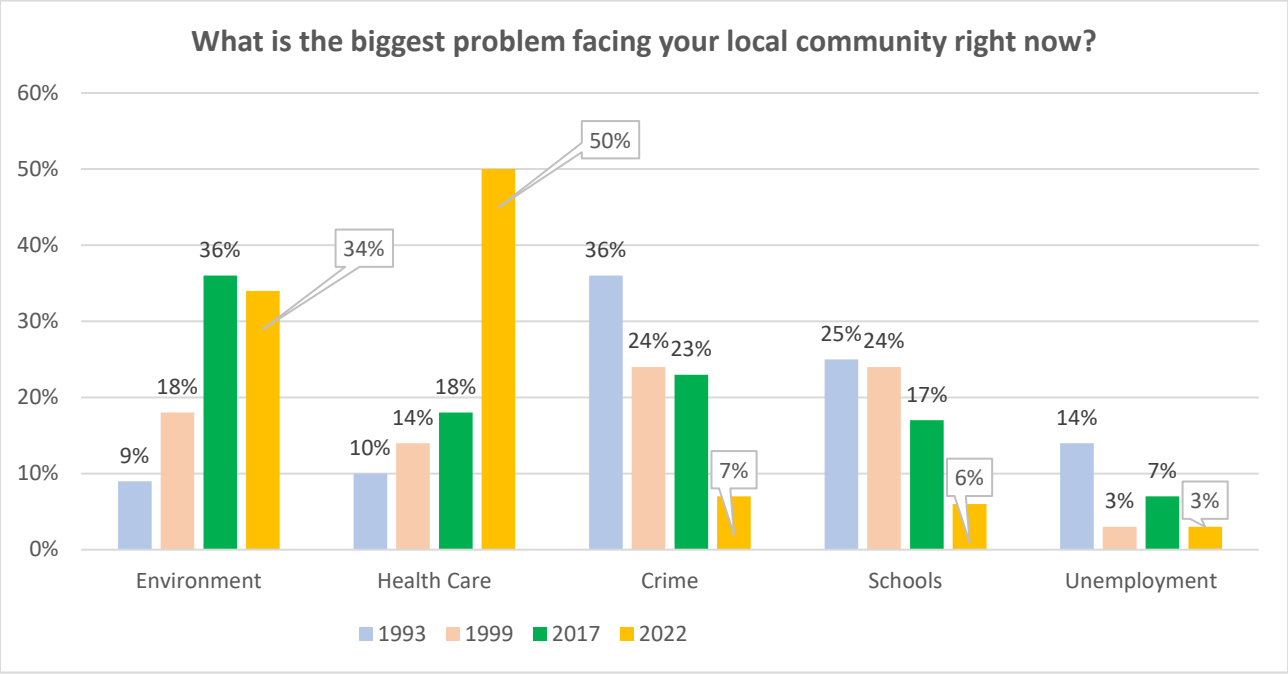
COMPARISONS WITH FINDINGS FROM OTHER SURVEYS

Issues of Concern

The 2017 and 2022 ARC surveys were structured to show trends in similar questions in relationship to both the 1993 Rouge Project public opinion telephone survey, and the 1999 University of Michigan mail survey. The average age of the 1999 survey respondent was 30-60 and the average age of the 2017 respondent was similar with 36% aged 30-45 and 27% aged 46-59. The ARC's 2022 survey's average age was 30-45 with 55% of respondents. However, 29% of the 2022 survey respondents were age 19-29.

Since the 1993 and 1999 surveys, there continues to be an overall decline in concern for crime, schools and unemployment. Health care and the environment continue to be a concern for the majority of those that responded to the 2022 survey as shown in Figure 6.

Figure 6: Issues of Concern



River: Knowledge and Use

Knowledge of the Rouge River watershed and its network of rivers and streams did not change much from 1993 to 1999 but use of nearby parks with rivers or streams running through them had risen. This suggested that despite park use being up, not all residents associated the streams and rivers running

through them with the Rouge River Watershed. Like the 1999 and 2017 survey, the 2022 survey showed an increase with 24% of respondents were very familiar with the Rouge River Watershed. The 2017 survey showed that 56% of respondents were either very or somewhat familiar with the watershed and its network of rivers. The 2022 survey showed a vast increase from this with 90% of the respondents being very or somewhat familiar with the watershed and its network of rivers.

In addition, the results of the 2022 survey show a similar pattern with 96%, an increase from 85% in 2017 and 69% in 1999, of respondents saying they had visited a park with rivers or streams running through them. In 1993 and 1999 picnicking was ranked highest with walking/running/jogging ranked second. In 2017 walking/running/jogging is ranked highest with picnicking second and biking a close third which supports the continued development and use of trails running along the Rouge River. The 2022 survey shows the continued use and benefit of the trails being developed along the Rouge River with biking and walking, running or jogging the top two uses of the river or parks. In 2022 canoeing, boating or tubing in the river was a close third which shows removing log jams and dams along the Rouge River is a benefit to both the habitat and humans.

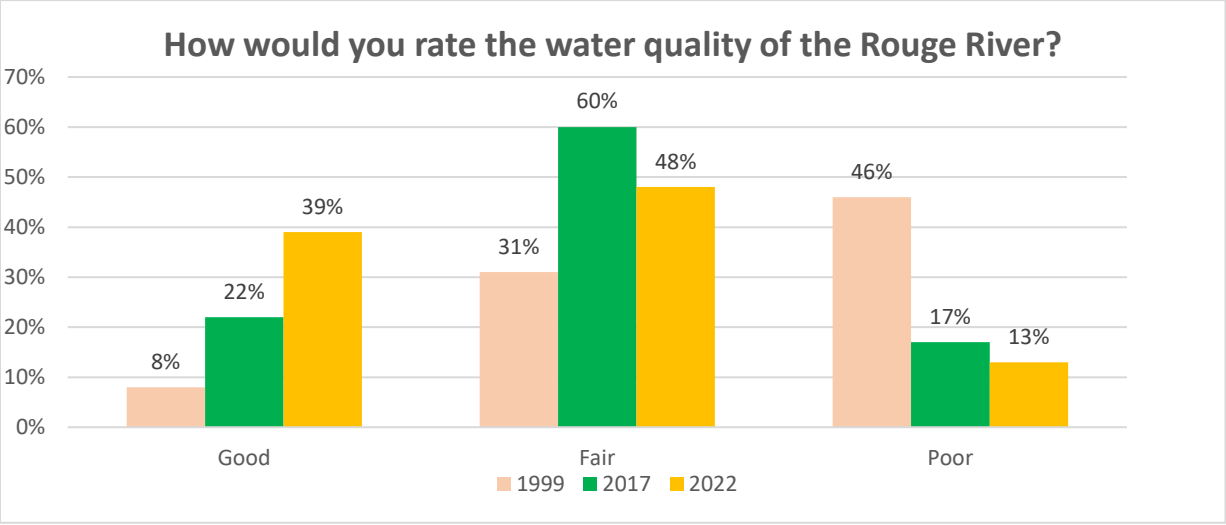
In 1999 18% and in 2017 37% of respondents felt the damage related to high flows was somewhat or very significant. This trend continued in the results from the 2022 survey with 65% of respondents feeling that the damage related to high flows was somewhat or very significant.

16% of respondents in 1999 and 32% of respondents in 2017 felt that over the past five years the flooding of the Rouge River and the related problems are slightly or much better. The 2022 survey showed that 41% of respondents felt that over the past five years the flooding of the Rouge River and the related problems are slightly or much better.

Water Quality and Pollution Sources

In 1999 respondents rated the overall water quality of the Rouge River as poor, in 2017 respondent's opinion of water quality in the Rouge River improved with the majority rating the water quality fair as shown in Figure 7. The results from the 2022 survey show that even though the majority of respondents still are rating the water quality fair the number of people rating it as good is increasing.

Figure 7: Overall Rating of Water Quality in the Rouge River



The majority of the 1999 and 2017 survey respondent's perception of the water quality of the Rouge River is that it has stayed the same over the last 15 years (the 1999 survey asked over the last 5 years). The 2022 survey shows that the majority (56%) of respondents felt that the water quality of the Rouge River over the last 15 years is slightly better and 10% felt that it was much better. This continues to support the overall water quality rating improvement from poor (1999) to fair (2017 and 2022). It also supports that people are seeing the improvements in the watershed with the continued increase in those rating the overall water quality as good. As shown in Figure 7.

Table 4 shows the survey results for the top three major pollution sources from the 1993, 1999, 2017 and 2022 surveys. As stated in the 1999 survey comparisons to the 1993 survey, stormwater was not cited as a major problem. The trend shows stormwater continues to be a concern.

Table 4: Which sources of water quality pollution are a problem in your area?

1993	1999	2017	2022
1. Business and industry	1. Business and industry 2. CSOs 3. Stormwater	1. Stormwater 2. Illegal dumping 3. Bird droppings	1. Bird droppings 2. Stormwater 3. Soil erosion

In 1999 74% and in 2017 61% of respondents rated the significance of problems caused by stormwater runoff as either somewhat or very significant. In 2022 72% rated the significance of problems caused by stormwater runoff as either somewhat or very significant.

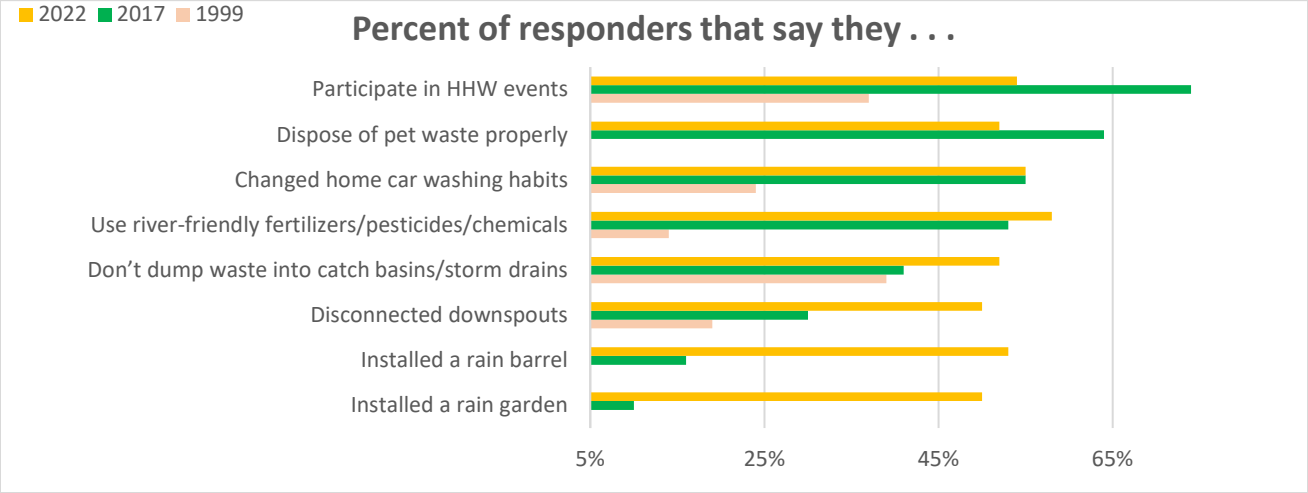
Public Involvement

When comparing the 1999 and 2017 results to the 2022 results for the top three phrases seen or heard by survey respondents encouraging stewardship of the Rouge River the responses correspond to the educational messages being promoted during those years. In 1999 the top three phrases included "our actions affect the Rouge River", "storm drains aren't garbage cans" and "use your head, you live in a watershed". The 2017 top three phrases included "help keep our rivers clean", Rouge River, ours to protect" and "drains to river (painted message on storm drains)". The top three phrases seen or heard from the 2022 survey were "Help keep our river clean", "storm drains aren't garbage cans", and "Rouge River, ours to protect".

In 1999 the top three ways survey respondents were likely to seek information about water quality were television, radio and newspapers/magazines/newsletters (note that in the 1999 survey internet was not an option.) In the 2017 survey respondents stated that the top three ways were the internet, brochure/fact sheet and newspapers/magazines/newsletters respectively. The 2022 survey may reflect the fact that our audience has grown younger with more respondents aged 19-29. The top three ways to receive information were the internet, television, and newspapers/magazines/newsletters in that order.

Figure 8 shows the 1999, 2017 and 2022 activities that responders reported doing at home that improve water quality and benefit the environment. The results show that more than 50% of respondents report doing many of the activities with an overall increase in most activities.

Figure 8: Citizen Activities Supporting Water Quality Increased from 1999 to 2017

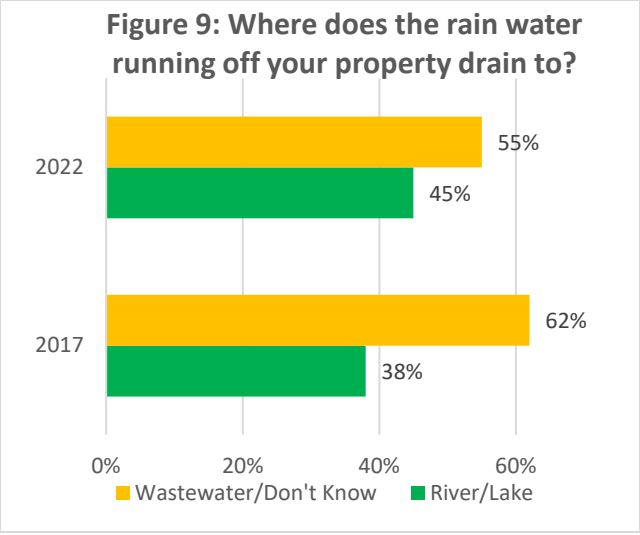


CONCLUSIONS

The overall results of the 2022 survey suggest that the ARC's focus should be to continue to educate the public on watershed and stormwater concepts and what they mean, encouraging activities the public can do to help protect the Rouge River, and promoting restoration projects and the continued improvement of water quality in the Rouge River.

The review of the data from the 2022 public opinion survey and comparisons with the 1993, 1999 and 2017 surveys lead to several additional conclusions detailed below.

- The ARC audience has grown younger with the majority of respondents being between the age of 19 and 45. This supports the positive effect of the ARC's expansion of its website and Facebook.
- Even though the percentage of people that know they live in a watershed has increased from 32% in 2017 to 78% in 2022, the confusion remains on where the rainwater running off their property goes. With 55% in 2022 saying it goes to a wastewater treatment plant or that they don't know and 45% saying it goes to a river, stream or lake (see Figure 9).
- The number of people that believe that the water quality of the Rouge River is good has increased. This was also consistent when the majority of respondents felt that over the past 15 years the water quality of the Rouge River was either much better or slightly better. With



continued messaging the next survey could show the majority of people rate the water quality good!

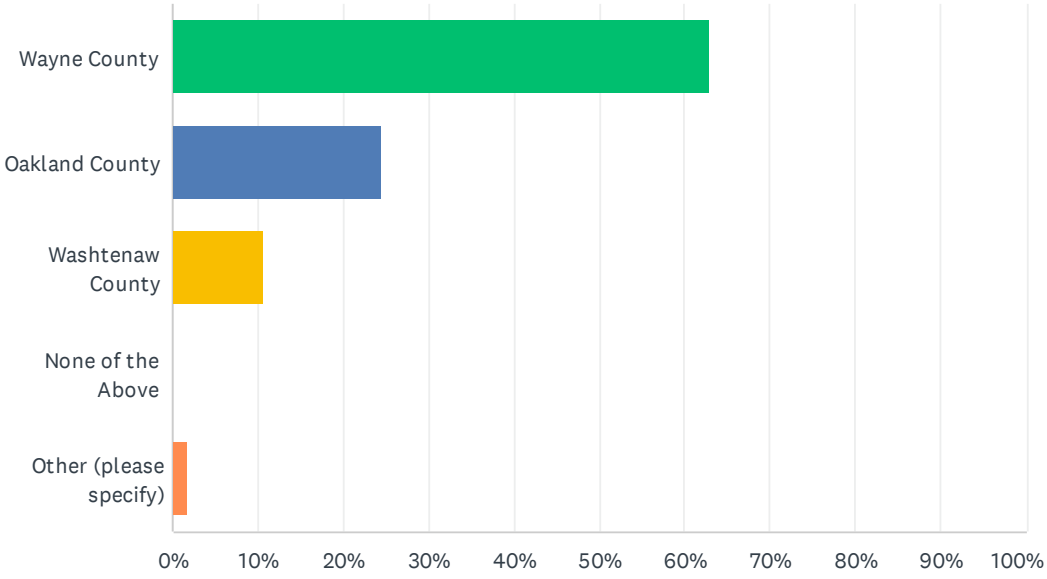
- The number of people that are taking active measures to improve water quality has increased dramatically from 2017 to 2022. More people are focusing on what they can do at home to protect water quality including not disposing of any waste material into a catch basin or storm drain, disconnecting downspouts. In addition people continue to install rain gardens and rain barrels which were not items surveyed in the 1999 survey.
- In the 2022 survey, the number of people very familiar with the Rouge River and its tributaries increased from the 2017 survey.
- 2022 respondents ranked stormwater as the #2 major source of water quality pollution. In 2017 respondents ranked stormwater as #1 and in 1999 it was #3. The question choice was stated as "chemicals, oils, fertilizers, and other polluting materials that are found on the surface of parking lots, streets, farms and lawns washed into the river by rain" (the word stormwater not used). Then when asked "How significant would you rate the problems caused by stormwater runoff (rain events & snow/ice melt) in the Rouge River?" 74% of 1999 respondents felt the problems where somewhat or very significant (who ranked stormwater #3) and in 2017 when respondents ranked stormwater #1, only 61% felt the problems caused by stormwater where somewhat or very significant. 2022 results showed that 72% felt the problems caused by stormwater were somewhat or very significant. In addition, when respondents were asked "Where does the rainwater running off your property drain to?" (the word stormwater not used again) most respondents in 2017 and 2022 didn't know (see Figure 9). Educating the public on what the different words mean should continue to be an important focus moving forward along with the connection between rainwater and the river. 2022 data shows that the ARC's message is making progress; more people knew rainwater goes to a river, stream, or lake.
- The 2022 survey shows that respondents felt that water quality of the Rouge River improved in specific areas including: for canoeing/kayaking/boating; for eating locally caught fish; for swimming; for fish habitat; and for scenic beauty. This is a good indicator that the sharing of the restoration activities being completed through EPA GLRI funding on the ARC's website and Facebook are having a positive effect. This was also an increase from the 2017 survey results.
- The 2022 survey supports that citizens understand more now, compared to 2017, about the significance of the damage related to high flows in the Rouge River and feel that improvements are being made to control the high flows.
- When comparing the 2017 and 2022 top three phrases seen or heard by survey respondents encouraging stewardship of the Rouge River it becomes clear that citizens are retaining the educational messages. The top messages in the 2022 survey are consistent with the ARC's current public education campaigns.
- Continued internet and social media efforts are important as 59% of the people surveyed in 2022 said they use the internet when seeking information about water quality. The survey also showed that 30% feel billboards are a good way to learn about water quality. This supports the ARC's planned billboard campaign which begins in 2024.
- The 2022 survey continues the trend from 2017 that the respondents support spending money through local taxes or fees to improve the water quality in the Rouge River.

APPENDIX A

2022 DETAILED SURVEY QUESTIONS AND RESULTS
WATER QUALITY CHANGES IN THE ROUGE RIVER

Q1 Where do you live?

Answered: 3,096 Skipped: 0



ANSWER CHOICES	RESPONSES	
Wayne County	62.98%	1,950
Oakland County	24.61%	762
Washtenaw County	10.66%	330
None of the Above	0.00%	0
Other (please specify)	1.74%	54
TOTAL		3,096

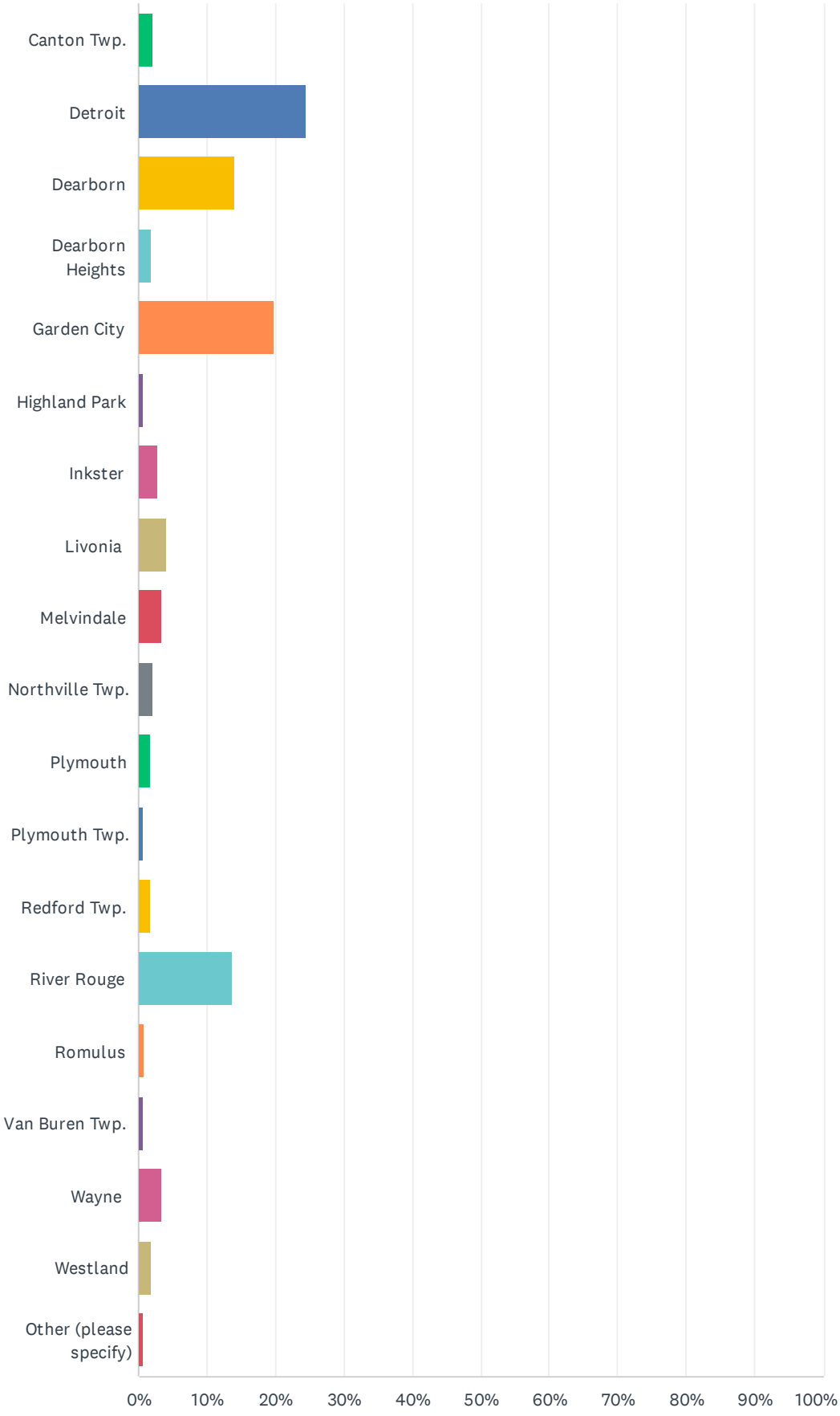
#	OTHER (PLEASE SPECIFY)	DATE
1	United States, Montana, Great Falls	8/31/2022 6:24 PM
2	Lapeer County	8/11/2022 11:45 AM
3	Sterling Heights	8/10/2022 10:29 AM
4	Oshawa	7/14/2022 7:08 PM
5	US MA Chicopee	7/10/2022 10:20 PM
6	oregon	7/9/2022 2:31 AM
7	oregon	7/9/2022 2:30 AM
8	oregon	7/9/2022 2:29 AM
9	oregon	7/9/2022 2:27 AM
10	oregon	7/9/2022 2:23 AM
11	Alaska	6/28/2022 2:44 AM

12	mead	6/27/2022 9:30 PM
13	Macomb	6/27/2022 6:26 AM
14	Southfield	6/20/2022 9:32 PM
15	New York	6/20/2022 5:04 AM
16	Milwaukee	6/18/2022 10:09 PM
17	maple valley	6/18/2022 8:41 AM
18	Warrington	6/18/2022 5:58 AM
19	Daly City	6/18/2022 5:58 AM
20	Gadsden	6/18/2022 5:58 AM
21	Edmond	6/18/2022 5:58 AM
22	Crystal City	6/18/2022 5:58 AM
23	santa clara	6/18/2022 5:57 AM
24	Chesapeake	6/18/2022 3:54 AM
25	Spartanburg	6/18/2022 3:54 AM
26	Cherokee	6/18/2022 3:53 AM
27	Knox county	6/17/2022 11:00 PM
28	missouri city	6/17/2022 2:28 PM
29	ashland	6/16/2022 3:03 AM
30	Oakland	6/14/2022 10:05 PM
31	Illinois	6/13/2022 8:07 AM
32	STOCKTON	6/12/2022 9:23 PM
33	New York	6/11/2022 4:36 AM
34	San Diego	6/11/2022 4:17 AM
35	San Diego	6/11/2022 4:07 AM
36	Marina	6/11/2022 3:59 AM
37	Santa Rosa	6/11/2022 3:47 AM
38	Santa Rosa	6/11/2022 3:31 AM
39	Los Angeles	6/11/2022 2:55 AM
40	Los Angeles	6/11/2022 2:25 AM
41	Los Angeles	6/11/2022 2:06 AM
42	Los Angeles	6/11/2022 1:44 AM
43	Spokane	6/11/2022 12:39 AM
44	New York	6/10/2022 11:37 PM
45	cortland	6/10/2022 11:32 PM
46	mount vernon	6/10/2022 11:30 PM
47	staten Island	6/10/2022 11:28 PM
48	brooklyn	6/10/2022 11:24 PM
49	Westborough	6/9/2022 11:54 AM

50	Westborough	6/9/2022 11:48 AM
51	Can Diego	6/8/2022 11:31 PM
52	us	6/2/2022 8:49 PM
53	USA	6/2/2022 5:54 PM
54	Loudoun	6/2/2022 12:20 PM

Q2 In Wayne County, which city, township or village do you live in?

Answered: 1,913 Skipped: 1,183

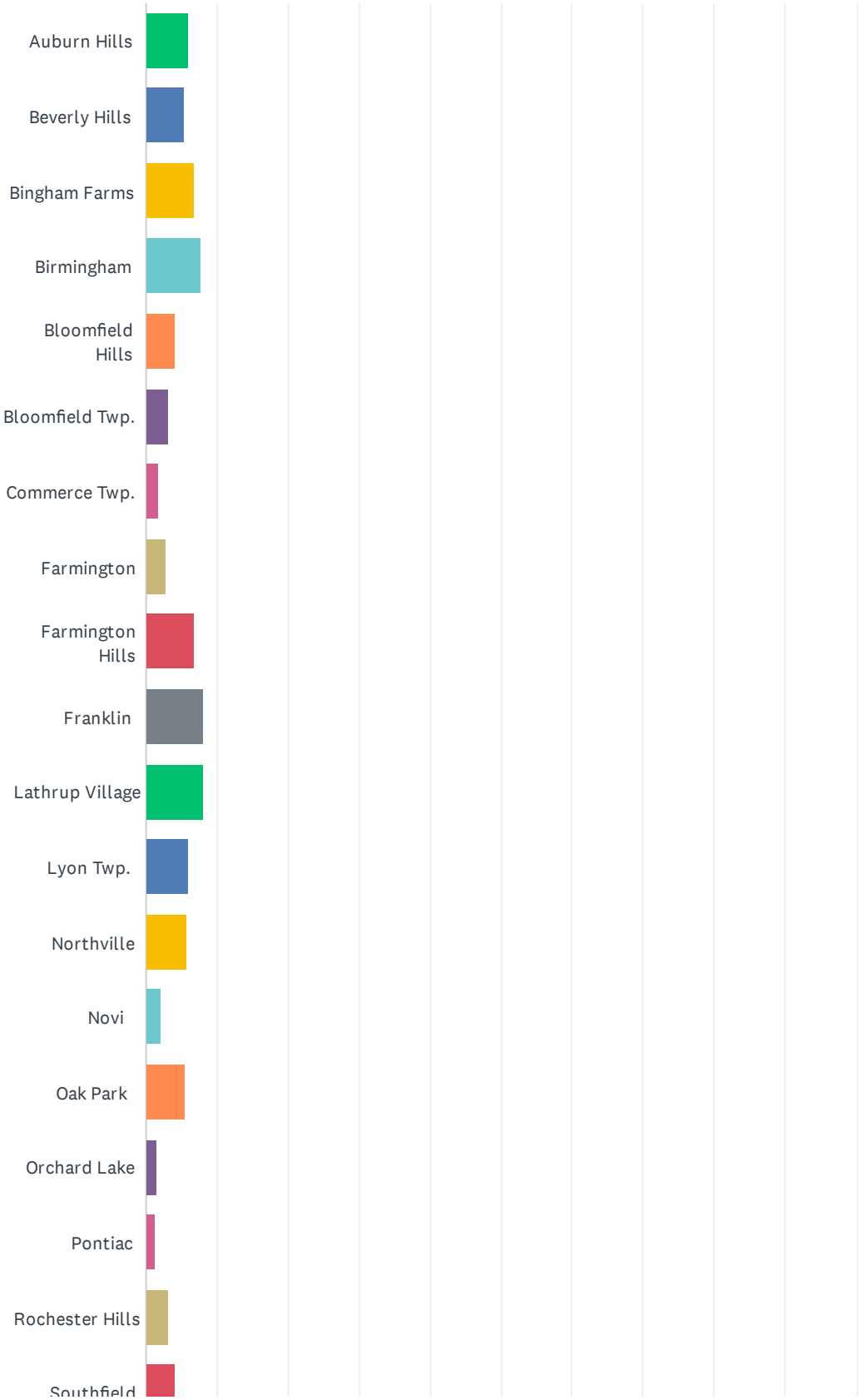

Canton Twp.
Detroit
Dearborn
Dearborn Heights
Garden City
Highland Park
Inkster
Livonia
Melvindale
Northville Twp.
Plymouth
Plymouth Twp.
Redford Twp.
River Rouge
Romulus
Van Buren Twp.
Wayne
Westland
Other (please specify)
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%

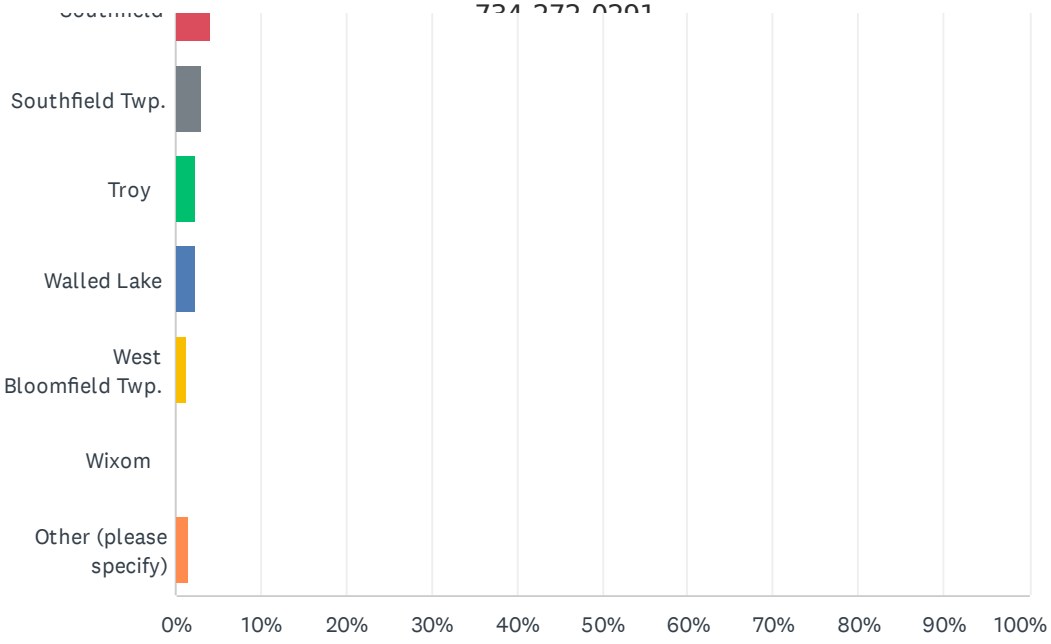
ANSWER CHOICES	RESPONSES	
Canton Twp.	2.04%	39
Detroit	24.46%	468
Dearborn	14.01%	268
Dearborn Heights	1.99%	38
Garden City	19.76%	378
Highland Park	0.63%	12
Inkster	2.67%	51
Livonia	4.03%	77
Melvindale	3.35%	64
Northville Twp.	2.14%	41
Plymouth	1.62%	31
Plymouth Twp.	0.63%	12
Redford Twp.	1.67%	32
River Rouge	13.70%	262
Romulus	0.78%	15
Van Buren Twp.	0.68%	13
Wayne	3.35%	64
Westland	1.83%	35
Other (please specify)	0.68%	13
TOTAL		1,913

#	OTHER (PLEASE SPECIFY)	DATE
1	Southgate	8/26/2022 10:09 AM
2	Grosse Pointe Park	8/24/2022 8:02 PM
3	Taylor, grew up in River Rouge.	7/31/2022 7:39 AM
4	Hamtramck	7/30/2022 5:29 PM
5	Southgate	7/21/2022 10:59 PM
6	Taylor	7/10/2022 11:13 PM
7	Lincoln Park	7/4/2022 5:26 AM
8	Trenton	6/30/2022 11:24 AM
9	Lincoln Park	6/30/2022 11:18 AM
10	Southgate	6/20/2022 8:26 PM
11	Woodhaven	6/11/2022 3:23 PM
12	Wyandotte	6/10/2022 2:11 PM
13	I	6/6/2022 3:52 AM

Q3 In Oakland County, which city, township or village do you live in?

Answered: 733 Skipped: 2,363




Southfield
Southfield Twp.
Troy
Walled Lake
West Bloomfield Twp.
Wixom
Other (please specify)
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%

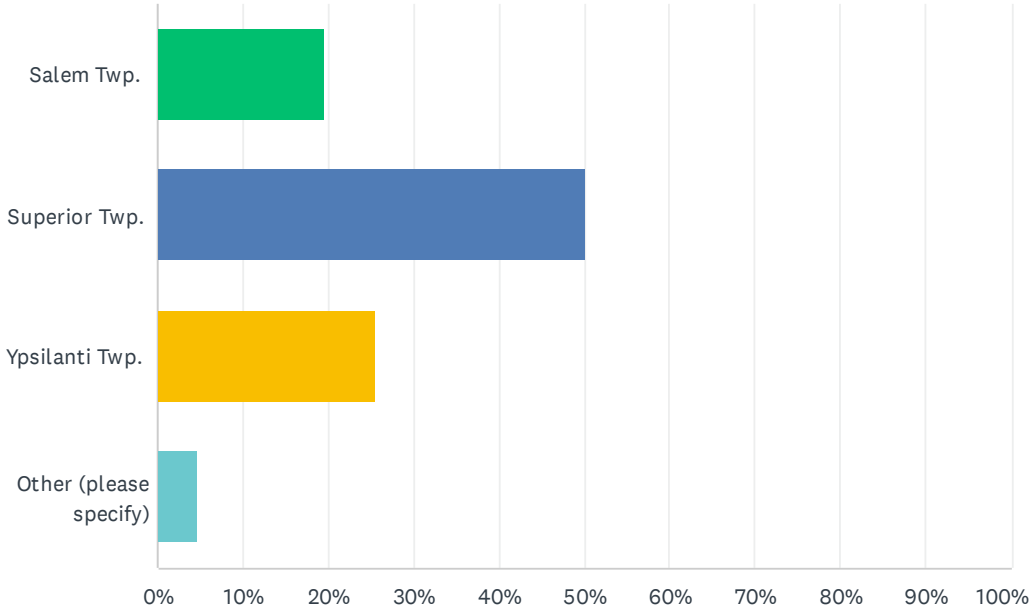
ANSWER CHOICES	RESPONSES	
Auburn Hills	5.87%	43
Beverly Hills	5.32%	39
Bingham Farms	6.82%	50
Birmingham	7.64%	56
Bloomfield Hills	3.96%	29
Bloomfield Twp.	3.14%	23
Commerce Twp.	1.64%	12
Farmington	2.73%	20
Farmington Hills	6.82%	50
Franklin	8.05%	59
Lathrup Village	8.19%	60
Lyon Twp.	6.00%	44
Northville	5.73%	42
Novi	2.05%	15
Oak Park	5.59%	41
Orchard Lake	1.50%	11
Pontiac	1.23%	9
Rochester Hills	3.27%	24
Southfield	3.96%	29
Southfield Twp.	3.00%	22
Troy	2.32%	17
Walled Lake	2.32%	17
West Bloomfield Twp.	1.36%	10
Wixom	0.00%	0
Other (please specify)	1.50%	11
TOTAL		733

#	OTHER (PLEASE SPECIFY)	DATE
1	Royal Oak	8/25/2022 8:31 PM
2	Hazel Park	7/23/2022 12:12 PM
3	Royal Oak	7/6/2022 10:18 AM
4	Ferndale	7/5/2022 5:51 AM
5	Royal Oak	6/29/2022 2:46 PM
6	Waterford	6/20/2022 11:59 AM

7	Royal Oak	6/19/2022 10:08 AM
8	Ferndale	6/17/2022 5:42 PM
9	Hazel Park	6/17/2022 5:13 PM
10	Royal Oak	6/13/2022 10:41 AM
11	Waterford	6/2/2022 11:42 AM

Q4 In Washtenaw County, which city, township or village do you live in?

Answered: 327 Skipped: 2,769



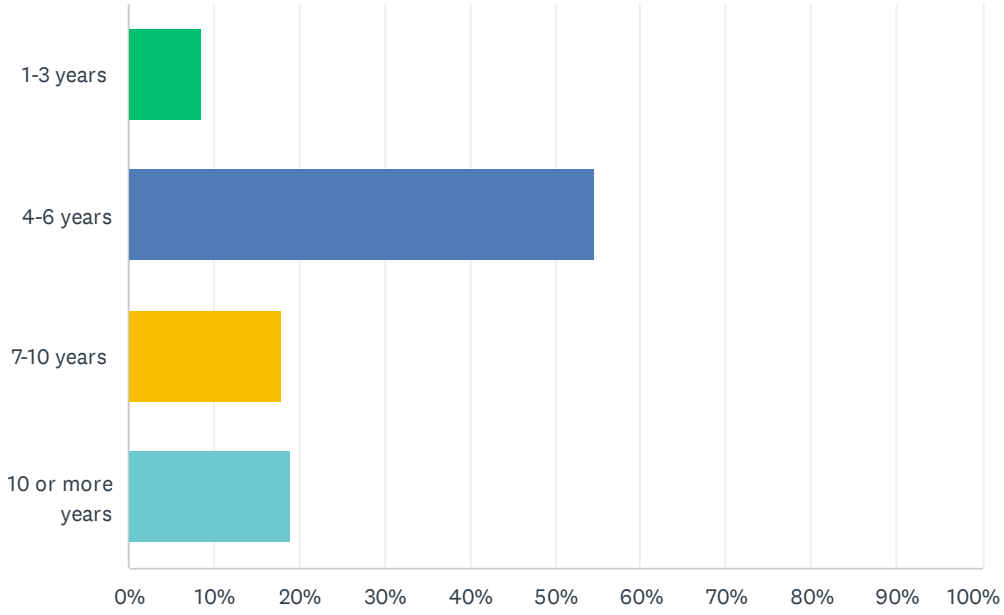
ANSWER CHOICES	RESPONSES	
Salem Twp.	19.57%	64
Superior Twp.	50.15%	164
Ypsilanti Twp.	25.69%	84
Other (please specify)	4.59%	15
TOTAL		327

#	OTHER (PLEASE SPECIFY)	DATE
1	Scio Township	7/27/2022 2:20 PM
2	Ann Arbor	6/12/2022 6:56 AM
3	Ann arbor	6/11/2022 3:49 AM
4	Twp of Lima	6/8/2022 9:10 PM
5	Dexter	6/8/2022 6:35 PM
6	Lima Twp	6/8/2022 4:44 PM
7	Pittsfield township	6/8/2022 9:22 AM
8	Northfield	6/7/2022 10:49 PM
9	Ann Arbor	6/7/2022 7:57 PM
10	Manchester	6/7/2022 6:02 AM
11	Ann Arbor	6/6/2022 6:16 PM

12	Ann Arbor	6/6/2022 6:14 PM
13	Ann Arbor	6/6/2022 5:59 PM
14	Idk	6/6/2022 4:12 PM
15	Ann Arbor	6/6/2022 3:37 PM

Q5 How long have you lived at your current residence?

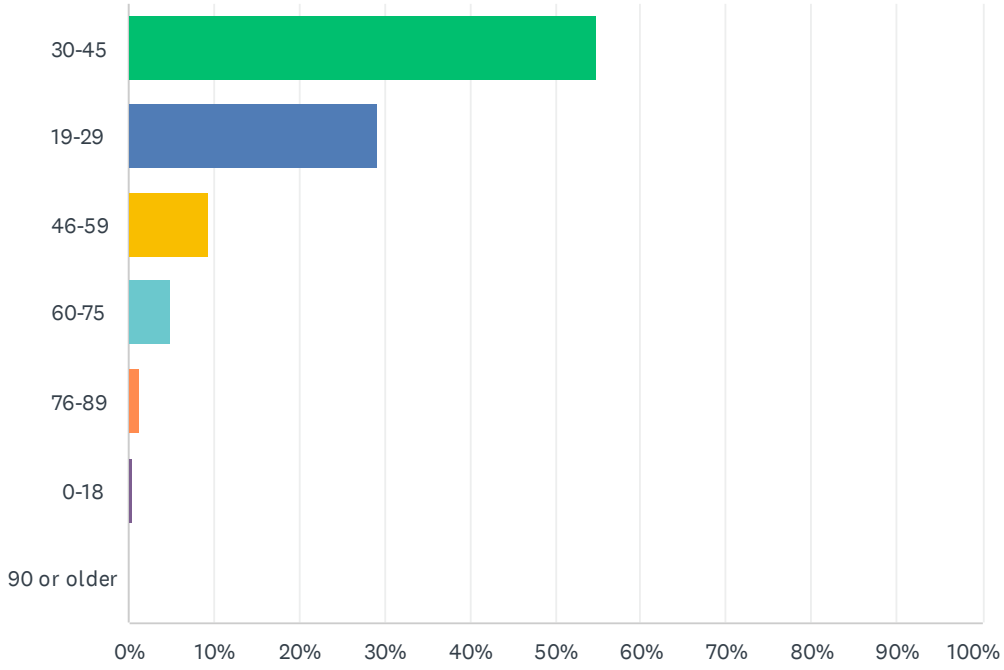
Answered: 2,957 Skipped: 139



ANSWER CHOICES	RESPONSES	
1-3 years	8.49%	251
4-6 years	54.68%	1,617
7-10 years	17.86%	528
10 or more years	18.97%	561
TOTAL		2,957

Q6 How old are you?

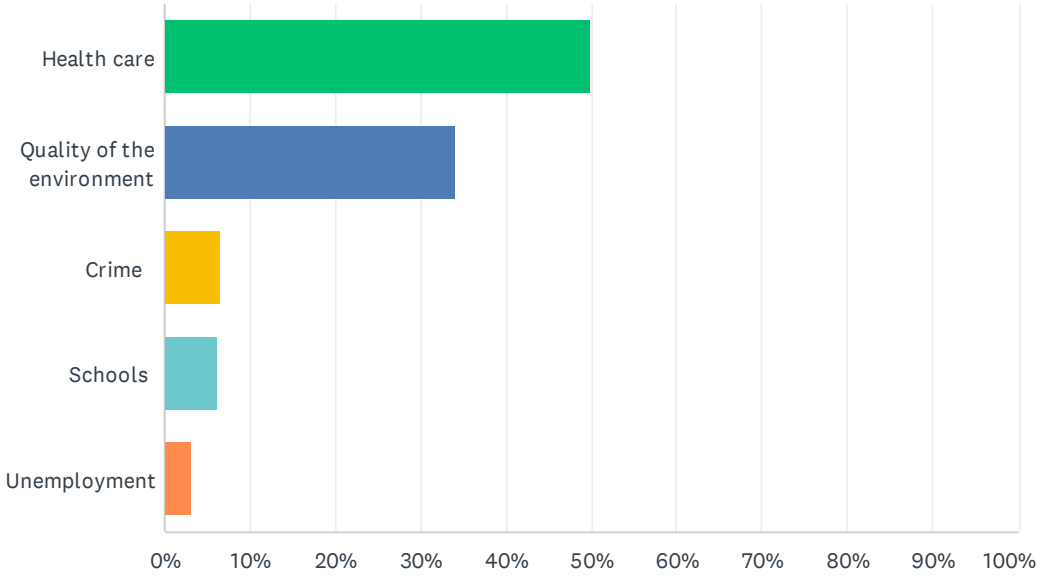
Answered: 2,947 Skipped: 149



ANSWER CHOICES	RESPONSES	
30-45	54.77%	1,614
19-29	29.25%	862
46-59	9.33%	275
60-75	4.82%	142
76-89	1.32%	39
0-18	0.48%	14
90 or older	0.03%	1
TOTAL		2,947

Q7 What is the biggest problem facing your local community right now?

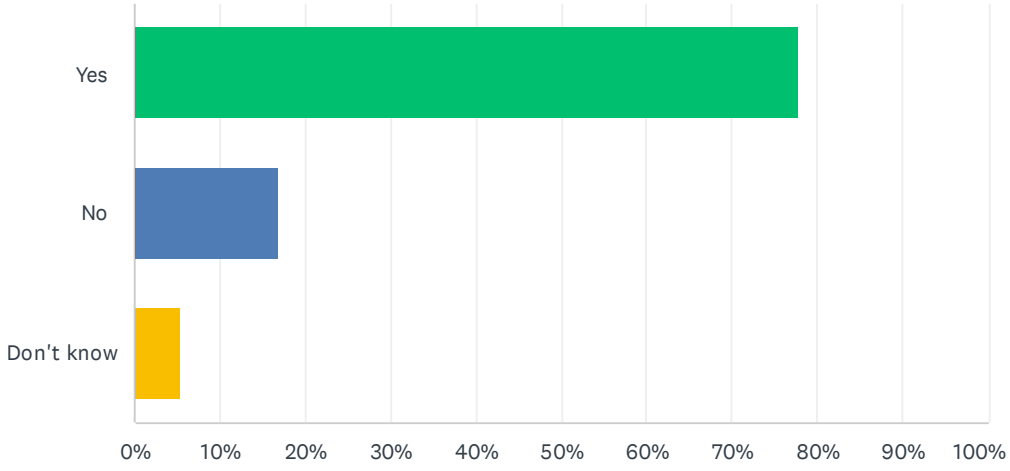
Answered: 2,929 Skipped: 167



ANSWER CHOICES	RESPONSES	
Health care	49.95%	1,463
Quality of the environment	34.04%	997
Crime	6.56%	192
Schools	6.28%	184
Unemployment	3.18%	93
TOTAL		2,929

Q8 Do you live in a watershed?

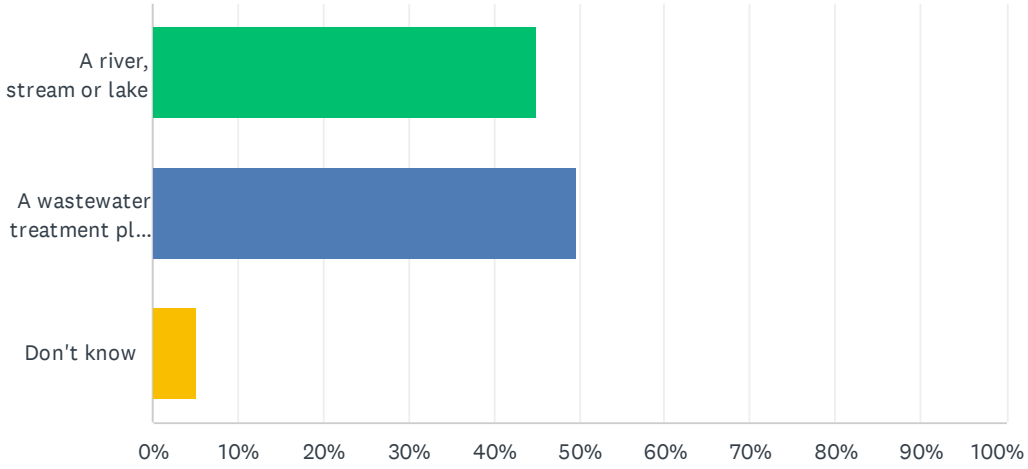
Answered: 2,917 Skipped: 179



ANSWER CHOICES	RESPONSES	
Yes	77.89%	2,272
No	16.83%	491
Don't know	5.28%	154
TOTAL		2,917

Q9 Where does the rain water running off your property drain to?

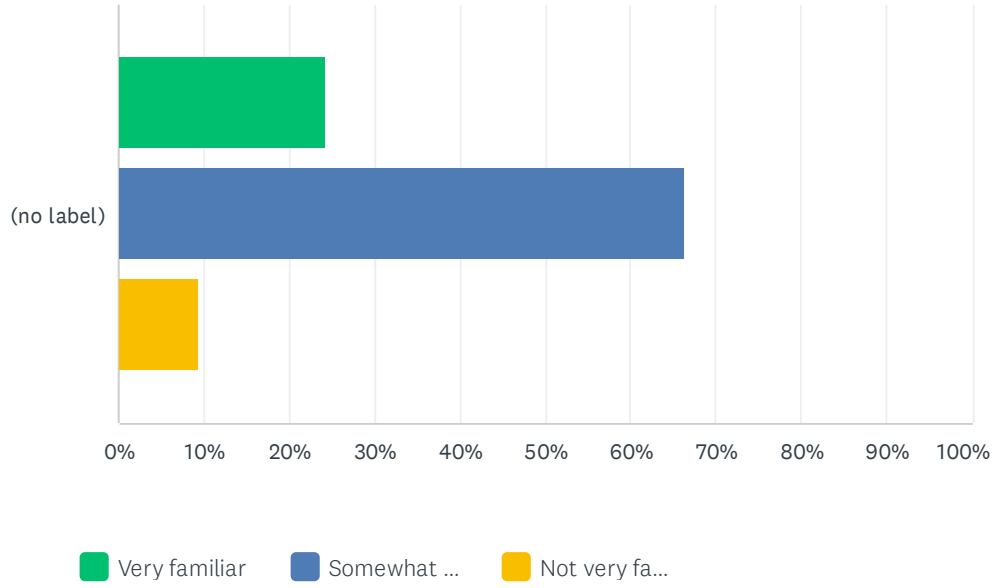
Answered: 2,908 Skipped: 188



ANSWER CHOICES	RESPONSES	
A river, stream or lake	45.08%	1,311
A wastewater treatment plant	49.72%	1,446
Don't know	5.19%	151
TOTAL		2,908

Q10 How familiar are you with the Rouge River Watershed and its network of rivers and streams running throughout southeast Michigan?

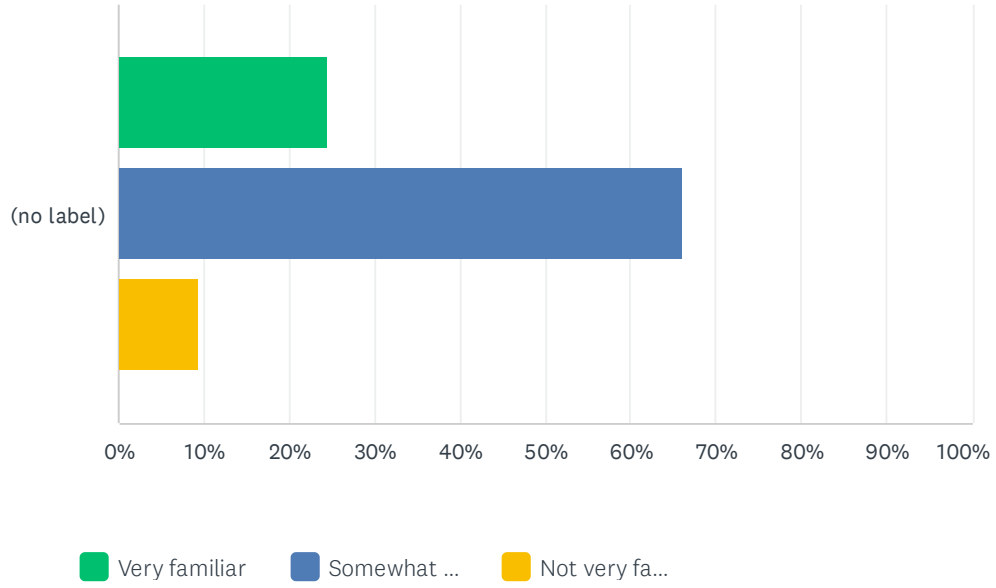
Answered: 2,898 Skipped: 198



	VERY FAMILIAR	SOMEWHAT FAMILIAR	NOT VERY FAMILIAR	TOTAL	WEIGHTED AVERAGE
(no label)	24.22% 702	66.32% 1,922	9.45% 274	2,898	1.00

Q11 How familiar are you with the Rouge River Watershed and its network of rivers and streams running throughout southeast Michigan?

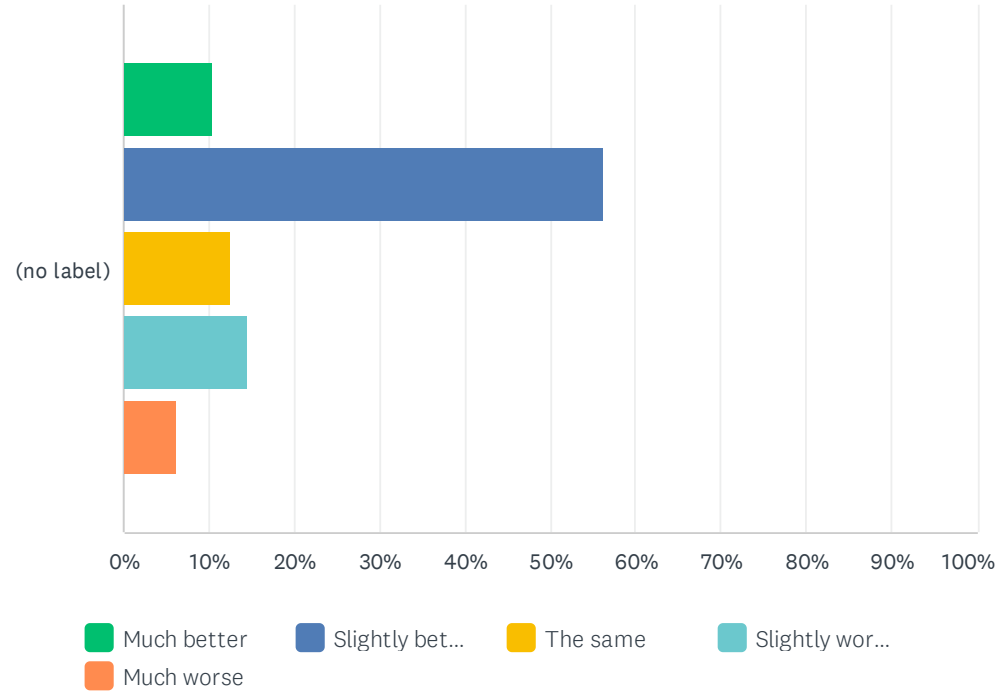
Answered: 53 Skipped: 3,043



	VERY FAMILIAR	SOMEWHAT FAMILIAR	NOT VERY FAMILIAR	TOTAL	WEIGHTED AVERAGE
(no label)	24.53% 13	66.04% 35	9.43% 5	53	1.00

Q12 In your opinion, over the past fifteen (15) years the water quality of the Rouge River is. . .

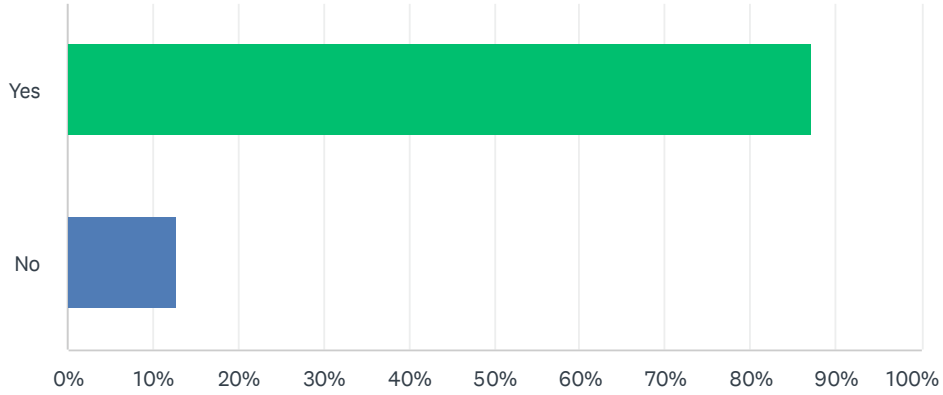
Answered: 48 Skipped: 3,048



	MUCH BETTER	SLIGHTLY BETTER	THE SAME	SLIGHTLY WORSE	MUCH WORSE	TOTAL	WEIGHTED AVERAGE
(no label)	10.42% 5	56.25% 27	12.50% 6	14.58% 7	6.25% 3	48	2.50

Q13 Is your home located along the Rouge River or creek?

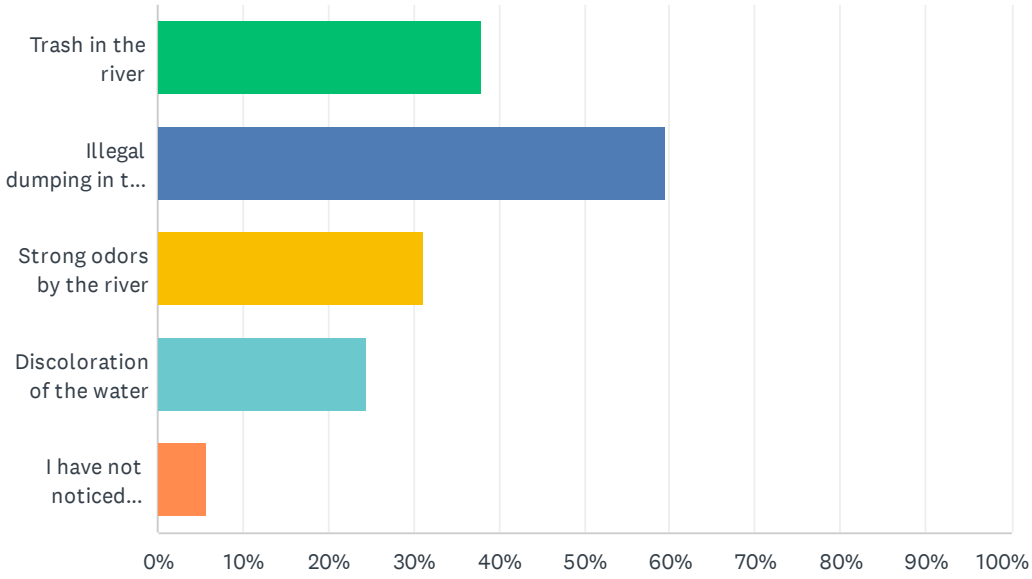
Answered: 2,895 Skipped: 201



ANSWER CHOICES	RESPONSES	
Yes	87.18%	2,524
No	12.82%	371
TOTAL		2,895

Q14 At any time in the last ten (10) years have you noticed any of the below in the Rouge River?

Answered: 2,881 Skipped: 215



ANSWER CHOICES	RESPONSES	
Trash in the river	37.87%	1,091
Illegal dumping in the river	59.53%	1,715
Strong odors by the river	31.14%	897
Discoloration of the water	24.57%	708
I have not noticed anything unusual	5.69%	164
Total Respondents: 2,881		

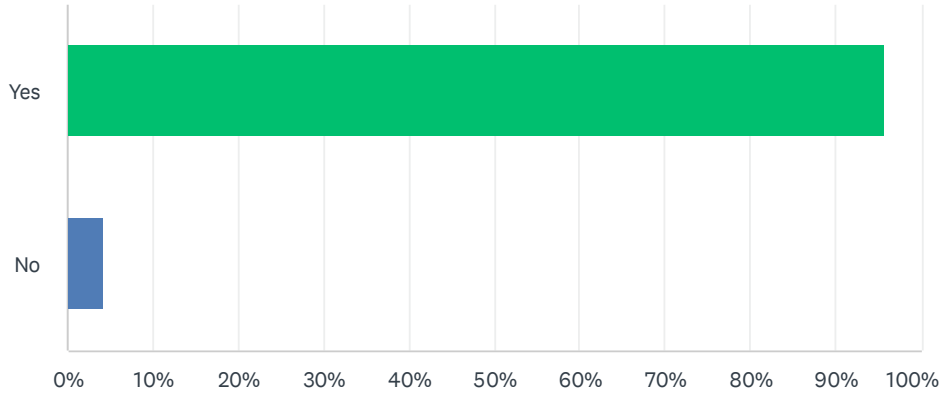
#	PLEASE DESCRIBE IN MORE DETAIL IF NECESSARY OR IF YOU HAVE SEEN SOMETHING THAT IS NOT LISTED ABOVE (INCLUDE CROSS STREETS IF POSSIBLE)	DATE
1	The death of the water plants along the shore	9/29/2022 12:42 PM
2	I feel the river is fine. Nothing unusual	9/28/2022 12:17 PM
3	I've seen a lot of dead animals and some household garbage	9/28/2022 3:05 AM
4	Extreme erosion, log jamming- Lots Rd/ Mich.Ave	9/27/2022 12:59 PM
5	Woody debris	9/8/2022 8:51 PM
6	Erosion due to trees stuck under bridges	8/29/2022 11:03 PM
7	9211 STARK RD Fallen trees are more numerous than needed for fish habitat	8/24/2022 6:41 PM
8	Warren and Inkster where the Red Run Drain exits from an u underground culvert to an open stream. On Father's Day this year smelled a strong solvent type odor with a milky blue discoloration of the water. I called the 800 number for EGLE and gave a report. I also shared pictures of the stream discoloration. No one responded until 5 days later when our local DPW	8/24/2022 5:04 PM

	came.to follow up. Of course by that time, the odor and discoloration were gone. I was expecting a more timely response.	
9	Lola Dr & Puritan. I was bitten by an Asian Zebra Mosquito while sitting on my front porch. Bank damage causes ponding in the bottom of the park in front of my house These ponds need to be treated with biologicals to kill off the mosquito larvae	8/16/2022 10:03 PM
10	Erosion	8/16/2022 8:58 AM
11	Plastic Water Bottles and Plastic Bags	8/10/2022 6:05 PM
12	I walk and bird watch near the Rouge and its tributaries	7/27/2022 2:21 PM
13	Lots of snags and huge amounts of litter and tree blockages near Civic Center and Telegraph. Unbelievable amounts of trash in the river under I-696/M/-10/Telegraph.	7/22/2022 12:13 PM
14	More flashy runoff from more impervious surfaces.	7/18/2022 5:09 PM
15	Abundant lilly pads	7/18/2022 8:19 AM
16	Warren/Inkster: where red run drain exits from below salvation army. EGLE was notified (it was Father's Day sunday) but only took report; DH DPW did f/u about 5 days later.	7/13/2022 5:01 PM
17	Crossing the impoundment dam at Nankin Mills (Ann Arbor Trail).	6/30/2022 2:39 PM
18	The bridge on Ridge road just south of McNichols is frequently flooded and cars are swept away. There is frequent illegal dumping. Fallen trees create logjams that collect even more debris.	6/29/2022 3:09 PM
19	I live on a lake, not the river. Crazy algae blooms near the city storm drain.	6/28/2022 8:13 AM
20	My sister has the Rouge River running through her property. She is on Tuck Road across the street from the entrance to Beaumont Commons. Too much debris from the Road ends up in the river. I've seen dumping of yard waste adjacent to the river that eventually gets rained or blown into the river. A terrible amount of debris gets washed over to my sister's property faming the river & changing it's course. The river in the next year or two is going to cause their pumphouse &/ or barn the collapse into the river. They could use some help! Please! 🙏	6/26/2022 7:52 PM
21	Near Lola Valley Yard	6/23/2022 10:14 PM
22	Grass clippings	6/21/2022 9:16 PM
23	River overrun with fallen trees and vegetation.	6/21/2022 9:22 AM
24	During fish and mussel surveys. Small amounts of trash and a car. Smells when near a waste water treatment plant	6/20/2022 12:01 PM
25	Discharge industrial waste water into the river	6/19/2022 4:20 AM
26	Where I am in W Bloomfield there are lots of logs obstructing the flow of the water in the headwater stream. Sometimes there’s trash and there’s a private dam downstream, I live in Franklin Corners sun.	6/17/2022 10:12 PM
27	log jams, 'milky' sediment river water	6/17/2022 5:30 PM
28	Extremely high nitrate concentrations (>15 mg N) at the YCUA outfall, turbidity after storms, increases chloride concentrations during winter	6/17/2022 1:45 PM
29	In 2020/2021 There was a new development that had some kind of natural gas issue and I noticed a sheen and odor on the rock creek in my backyard	6/13/2022 7:28 PM
30	more frequent flooding	6/13/2022 1:36 PM
31	This is part of my job, lol	6/13/2022 10:44 AM
32	Dead deer @ Tireman in Rouge Pk	6/13/2022 6:42 AM
33	Foam	6/12/2022 6:57 AM
34	dxfgds	6/10/2022 10:11 PM
35	Bank erosion	6/10/2022 2:34 PM

36	I've not been around it	6/4/2022 8:26 PM
37	After heavy rains - Trash. From the bridge on Merriman by Warren over the creek / river.	6/4/2022 11:58 AM
38	Do not live near river so I cannot answer this question!	6/4/2022 9:23 AM
39	I'm not on the River so not applicable	6/2/2022 11:43 AM
40	Can't remember / haven't been	6/2/2022 8:35 AM
41	Dead fish	6/1/2022 3:27 PM
42	Debri trees	6/1/2022 1:17 PM

Q15 In the past five (5) years, have you or members of your family used or visited a park or other place with a river or stream running through it?

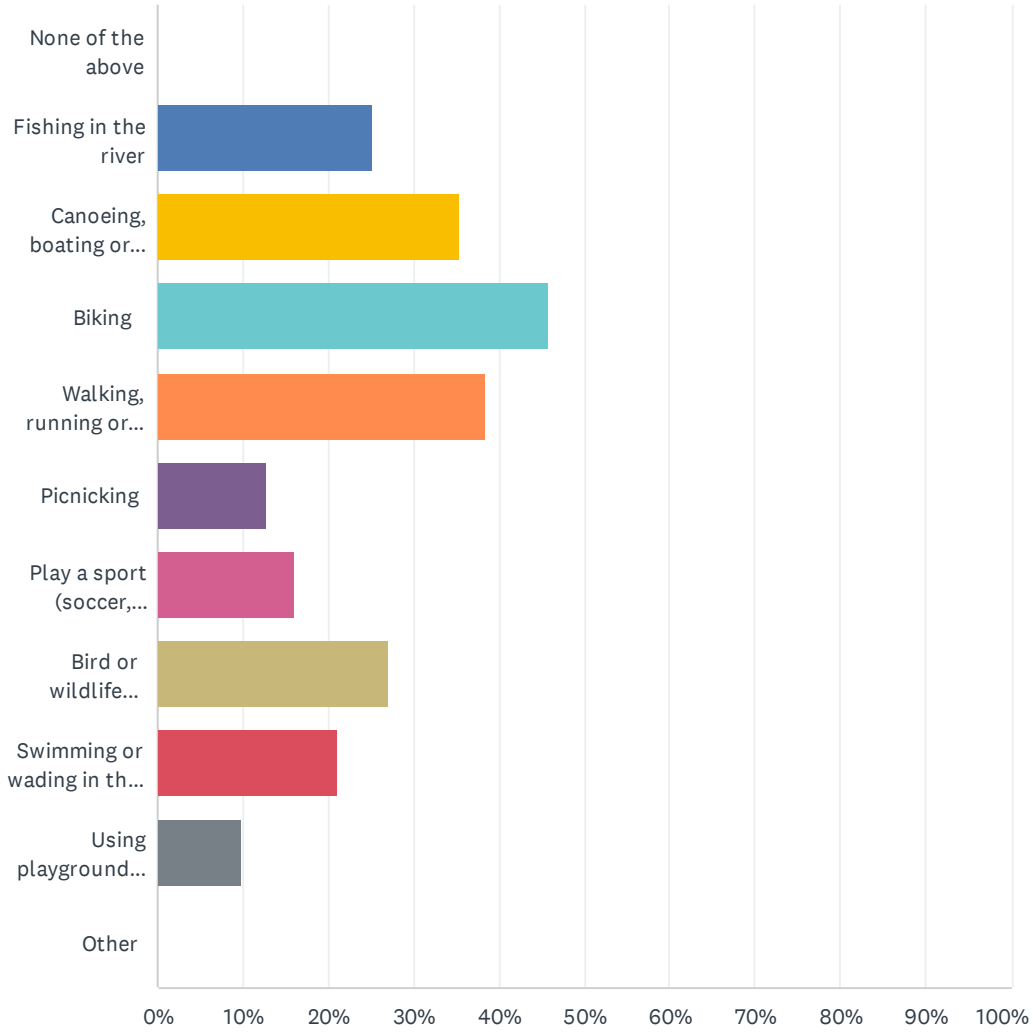
Answered: 2,875 Skipped: 221



ANSWER CHOICES	RESPONSES	
Yes	95.76%	2,753
No	4.24%	122
TOTAL		2,875

Q16 What activities have you or members of your family used the river or parks for during the past five years? (Check all that apply)

Answered: 2,735 Skipped: 361

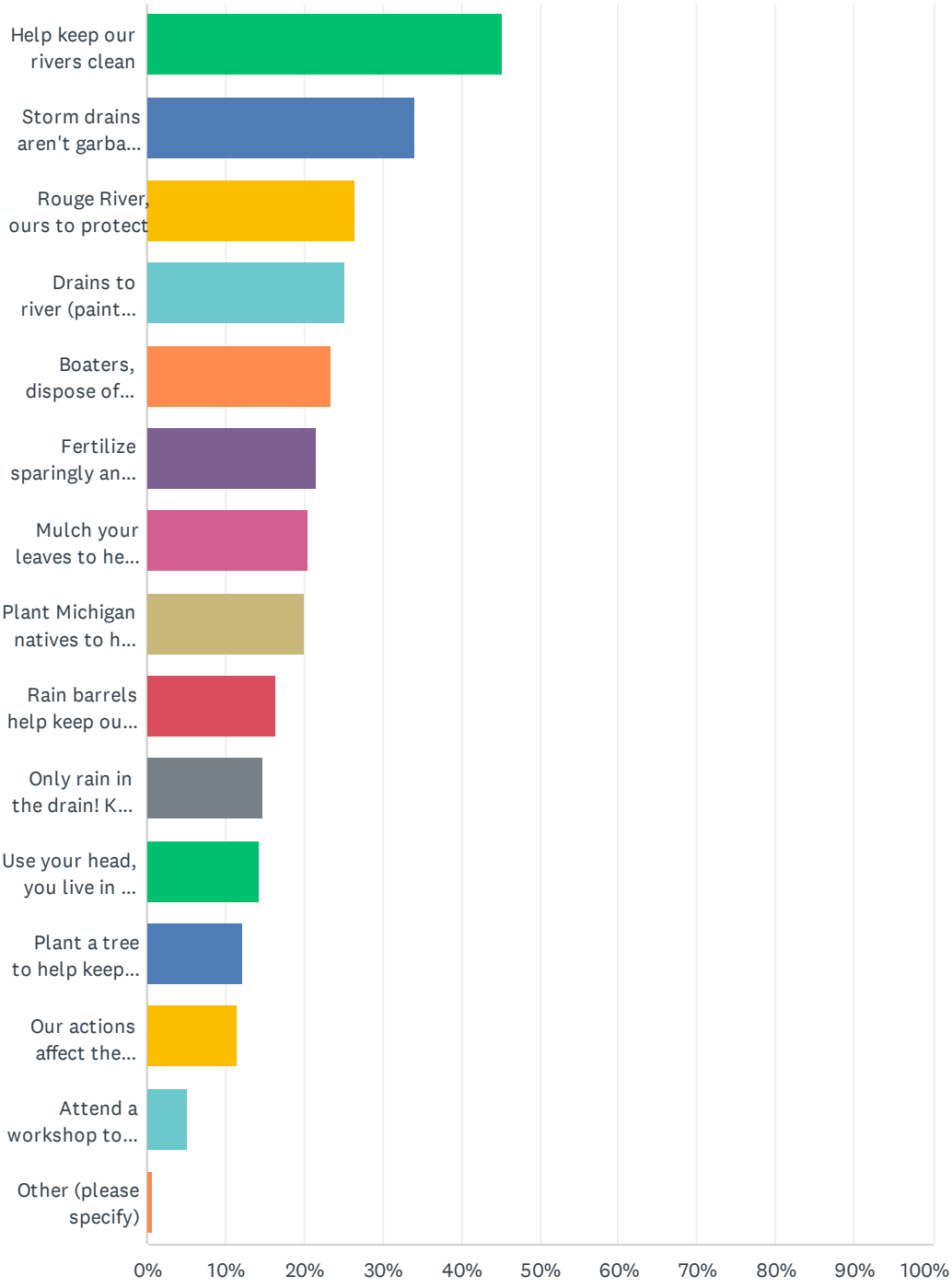


ANSWER CHOICES	RESPONSES	
None of the above	0.00%	0
Fishing in the river	25.23%	690
Canoeing, boating or tubing in the river	35.43%	969
Biking	45.85%	1,254
Walking, running or jogging	38.46%	1,052
Picnicking	12.72%	348
Play a sport (soccer, sledding, baseball)	15.90%	435
Bird or wildlife watching	27.02%	739
Swimming or wading in the river	21.17%	579
Using playground equipment	9.84%	269
Other	0.00%	0
Total Respondents: 2,735		

#	OTHER (PLEASE SPECIFY)	DATE
1	Being outside in nature	9/27/2022 1:00 PM
2	Rouge Rescue Bug Hunts	8/24/2022 6:42 PM
3	Hiking	7/31/2022 7:42 AM
4	Wedding	7/23/2022 4:02 PM
5	invasive species removal	7/15/2022 10:01 AM
6	Walking dog	7/3/2022 10:42 PM
7	Frog & Toad surveys for Friends of the Rouge.	6/30/2022 2:40 PM
8	Canoeing on the Huron River. Boating in Cass Lake & on the Detroit River. Walking along the Rouge River, & bird & animal watched there too.	6/26/2022 7:54 PM
9	Removing trash from creeks and rouge river	6/20/2022 12:22 PM
10	go sightseeing	6/19/2022 4:27 AM
11	I miss biking on Hines Drive.	6/17/2022 10:19 PM
12	But none of these in the rouge river. That’s disgusting. I’ll never let my children swim in that water	6/1/2022 3:28 PM

Q17 Which of the following phrases encouraging stewardship of the Rouge River have you seen or heard? (Check all that apply)

Answered: 2,855 Skipped: 241



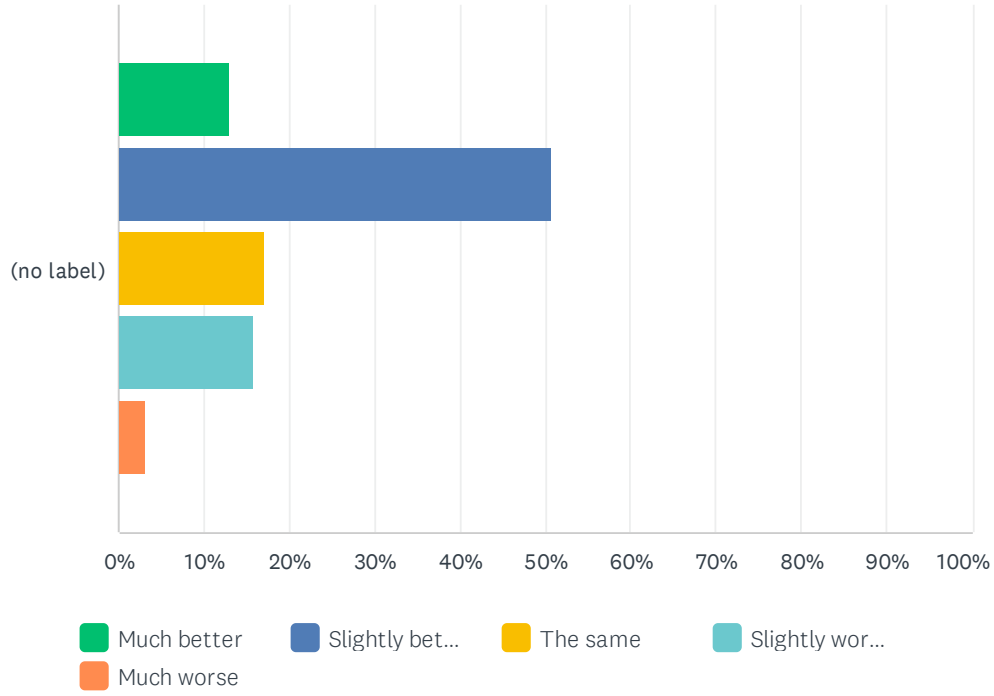
ANSWER CHOICES	RESPONSES	
Help keep our rivers clean	45.11%	1,288
Storm drains aren't garbage cans	34.08%	973
Rouge River, ours to protect	26.48%	756
Drains to river (painted message on storm drain)	25.11%	717
Boaters, dispose of waste properly; keep our rivers clean	23.47%	670
Fertilize sparingly and caringly	21.47%	613
Mulch your leaves to help keep our rivers clean	20.39%	582
Plant Michigan natives to help keep our river clean	20.07%	573
Rain barrels help keep our rivers clean	16.39%	468
Only rain in the drain! Keep our rivers clean	14.78%	422
Use your head, you live in a watershed	14.36%	410
Plant a tree to help keep our river clean	12.08%	345
Our actions affect the Rouge River	11.42%	326
Attend a workshop to help keep our rivers clean	5.04%	144
Other (please specify)	0.70%	20
Total Respondents: 2,855		

#	OTHER (PLEASE SPECIFY)	DATE
1	Help keep our rivers clean	9/28/2022 3:47 AM
2	Only rain in the drain! Keep our rivers clean	9/28/2022 3:30 AM
3	Use your head, you live in a watershed	9/28/2022 3:16 AM
4	Rouge River, ours to protect	9/28/2022 2:44 AM
5	Start from me to protect the Rouge river	9/27/2022 10:55 PM
6	Improve stormwater management requirements for developementsl	9/13/2022 3:12 PM
7	help reduce erosion, provide habitat for fish and Maintain water quality, with emphasis on producing potable water	9/5/2022 3:51 PM
8	None	8/24/2022 4:04 PM
9	V	7/7/2022 9:08 PM
10	None	7/2/2022 11:57 AM
11	I haven’t heard of any of these slogans. I completed MSU intro to lakes and cisma zoom, mich lakes and streams assoc	6/28/2022 8:15 AM
12	Only rup roasts litter	6/20/2022 12:24 PM
13	I haven't	6/20/2022 10:17 AM
14	Protecting the river is everyone's responsibility	6/19/2022 4:30 AM
15	clean, drain, dry (to prevent invasive species)	6/17/2022 5:32 PM
16	None of the above	6/5/2022 11:40 PM

17	None	6/2/2022 8:36 AM
18	Haven't seen any of these	6/1/2022 4:40 PM
19	Never heard any of these	6/1/2022 3:28 PM
20	clear the drains	6/1/2022 1:18 PM

Q18 In your opinion, over the past fifteen (15) years the water quality of the Rouge River is. . .

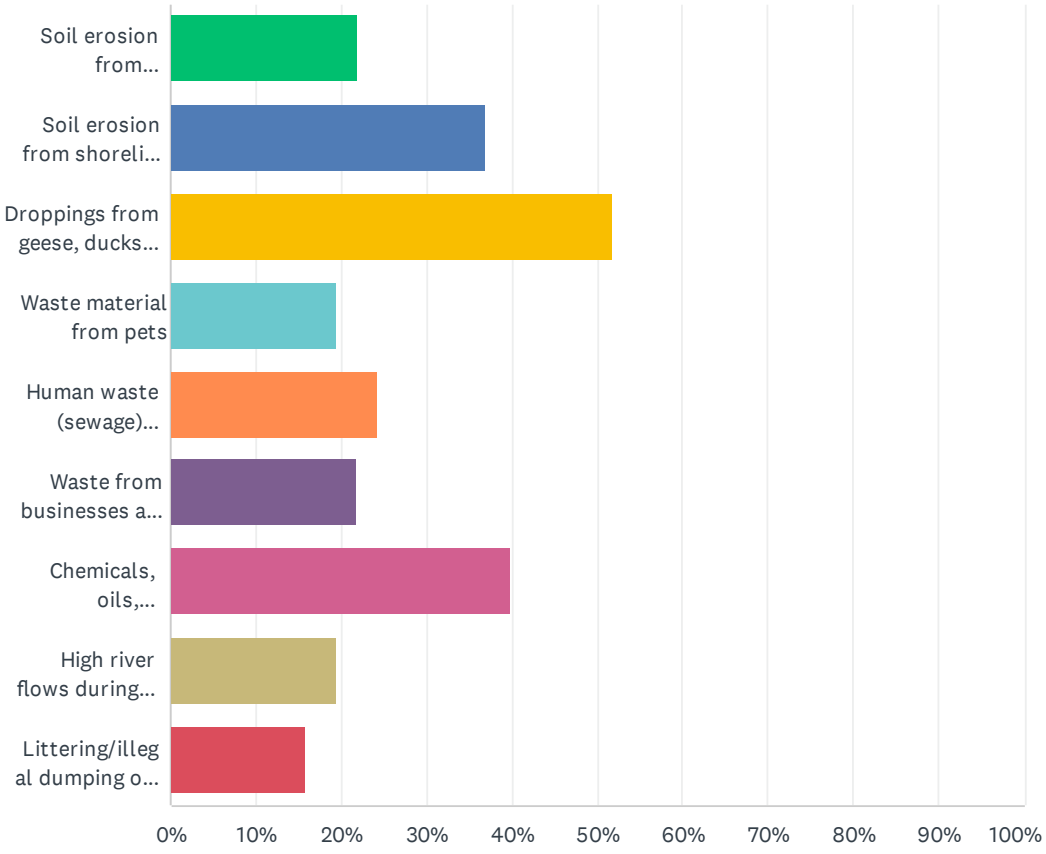
Answered: 2,851 Skipped: 245



	MUCH BETTER	SLIGHTLY BETTER	THE SAME	SLIGHTLY WORSE	MUCH WORSE	TOTAL	WEIGHTED AVERAGE
(no label)	13.05% 372	50.75% 1,447	17.15% 489	15.85% 452	3.19% 91	2,851	2.45

Q19 The items listed below are sources of water quality pollution across the country. In your opinion, which ones are a problem in your area? (Check all that apply)

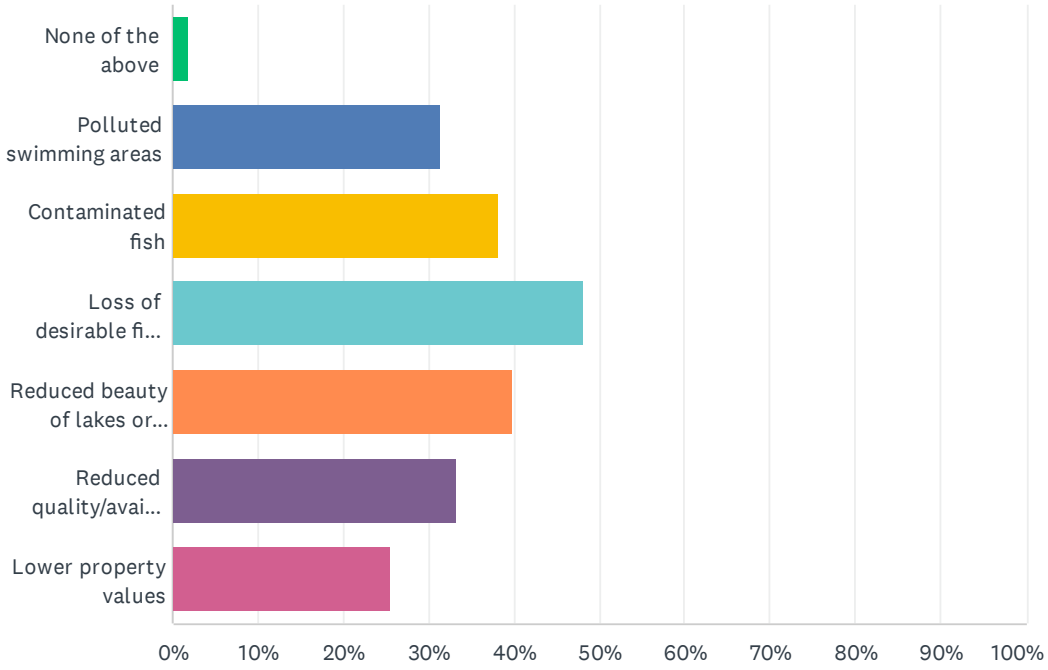
Answered: 2,845 Skipped: 251



ANSWER CHOICES	RESPONSES	
Soil erosion from construction sites	21.97%	625
Soil erosion from shoreline and/or streambanks	36.87%	1,049
Droppings from geese, ducks and other waterfowl	51.85%	1,475
Waste material from pets	19.51%	555
Human waste (sewage) discharges that occur during heavy rain storms from Combined Sewer Overflows or cross-connections between the sanitary and storm sewers	24.36%	693
Waste from businesses and industrial facilities	21.72%	618
Chemicals, oils, fertilizers, and other polluting materials that are found on the surface of parking lots, streets, farms, and lawns washed into the river by rain	39.89%	1,135
High river flows during rain events	19.33%	550
Littering/illegal dumping of trash	15.71%	447
Total Respondents: 2,845		

Q20 In your opinion has poor water quality caused any of the following? (Check all that apply)

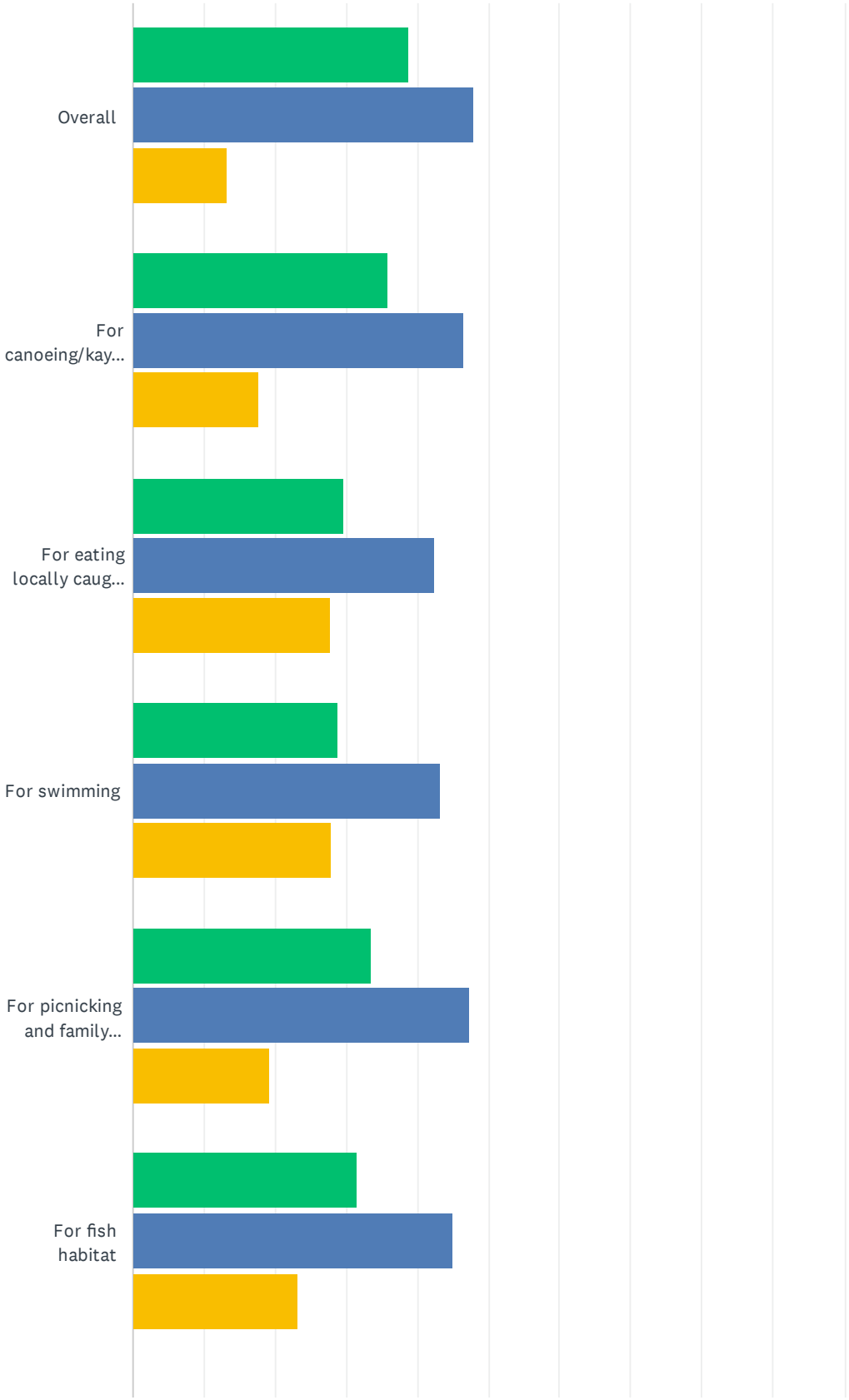
Answered: 2,838 Skipped: 258

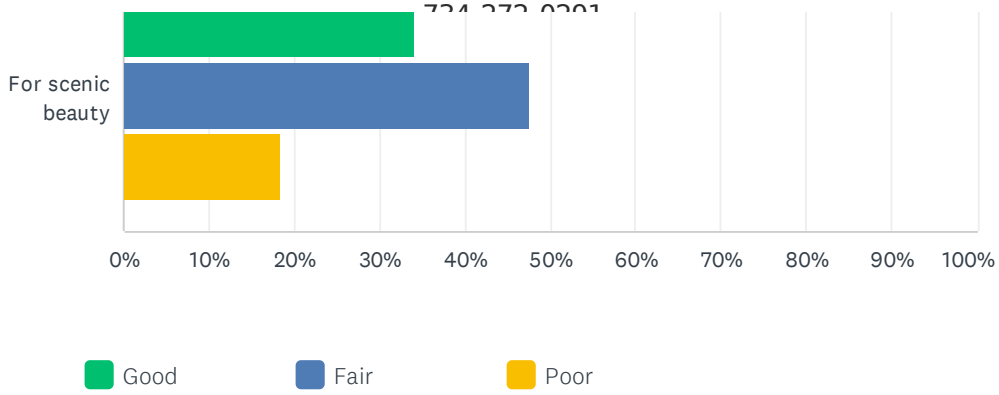


ANSWER CHOICES	RESPONSES	
None of the above	1.94%	55
Polluted swimming areas	31.32%	889
Contaminated fish	38.09%	1,081
Loss of desirable fish species	48.24%	1,369
Reduced beauty of lakes or streams	39.92%	1,133
Reduced quality/availability of water recreation activities	33.33%	946
Lower property values	25.62%	727
Total Respondents: 2,838		

Q21 How would you rate the water quality of the Rouge River?

Answered: 2,828 Skipped: 268

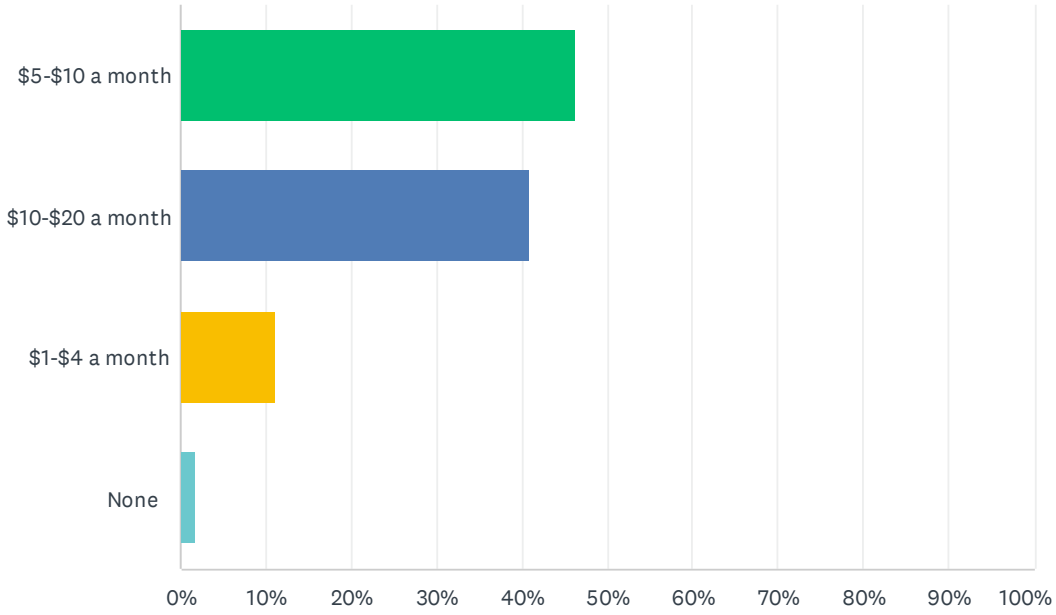




	GOOD	FAIR	POOR	TOTAL	WEIGHTED AVERAGE
Overall	38.77% 1,086	47.91% 1,342	13.32% 373	2,801	2.75
For canoeing/kayaking/boating	35.86% 1,004	46.43% 1,300	17.71% 496	2,800	2.82
For eating locally caught fish	29.70% 830	42.50% 1,188	27.80% 777	2,795	2.98
For swimming	28.81% 803	43.31% 1,207	27.88% 777	2,787	2.99
For picnicking and family activities	33.37% 934	47.34% 1,325	19.29% 540	2,799	2.86
For fish habitat	31.59% 884	45.07% 1,261	23.34% 653	2,798	2.92
For scenic beauty	34.19% 959	47.49% 1,332	18.32% 514	2,805	2.84

Q22 How much would you spend to improve the water quality in the Rouge River? (For example: through local taxes or fees)

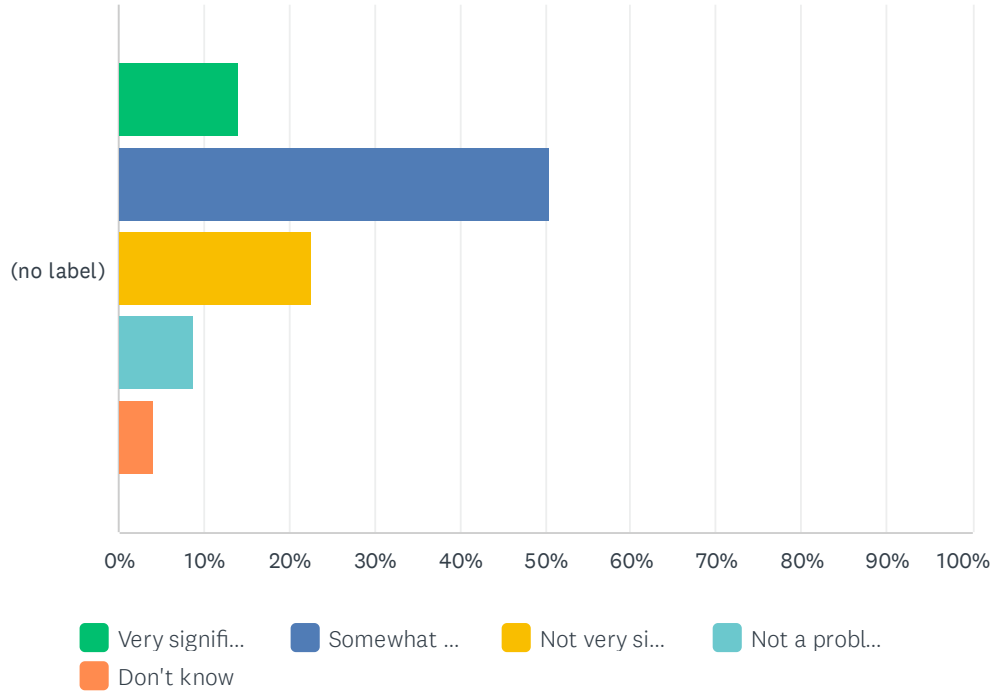
Answered: 2,823 Skipped: 273



ANSWER CHOICES	RESPONSES	
$5-$10 a month	46.19%	1,304
$10-$20 a month	41.02%	1,158
$1-$4 a month	11.02%	311
None	1.77%	50
TOTAL		2,823

Q23 How significant would you rate the damage related to high flows (flooding of property, stream bank erosion, etc.) in the Rouge River in the area where you live?

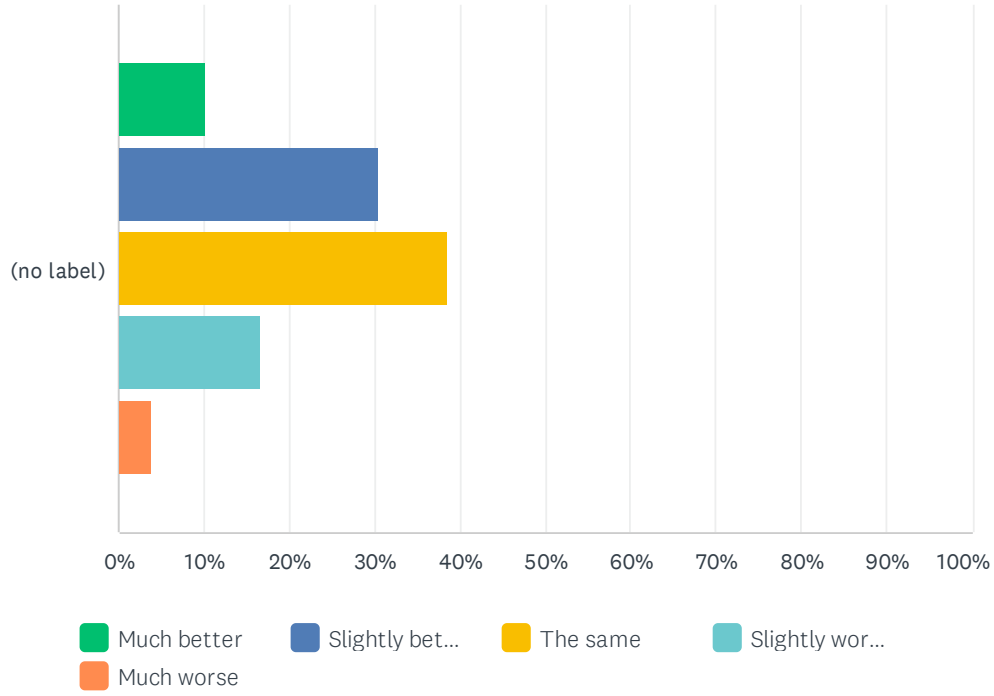
Answered: 2,818 Skipped: 278



	VERY SIGNIFICANT	SOMEWHAT SIGNIFICANT	NOT VERY SIGNIFICANT	NOT A PROBLEM	DON'T KNOW	TOTAL	WEIGHTED AVERAGE
(no label)	14.09% 397	50.50% 1,423	22.64% 638	8.80% 248	3.97% 112	2,818	2.38

Q24 In your opinion, over the past five (5) years, the flooding of the Rouge River and the related problems are . . .

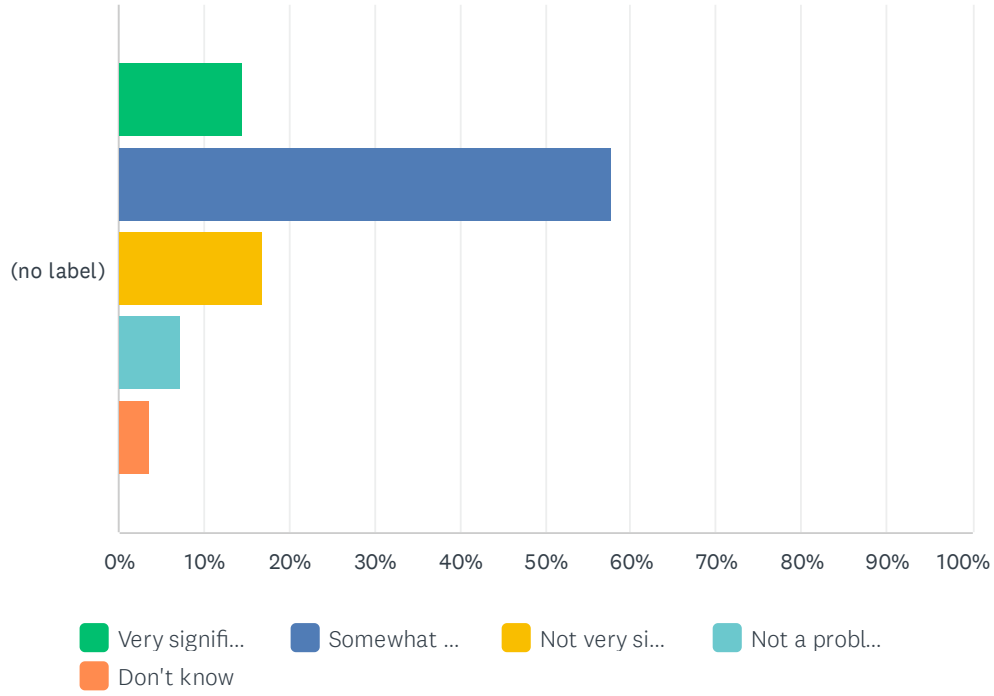
Answered: 2,811 Skipped: 285



	MUCH BETTER	SLIGHTLY BETTER	THE SAME	SLIGHTLY WORSE	MUCH WORSE	TOTAL	WEIGHTED AVERAGE
(no label)	10.32% 290	30.59% 860	38.67% 1,087	16.65% 468	3.77% 106	2,811	2.73

Q25 How significant would you rate the problems caused by stormwater runoff (rain events & snow/ice melt) in the Rouge River?

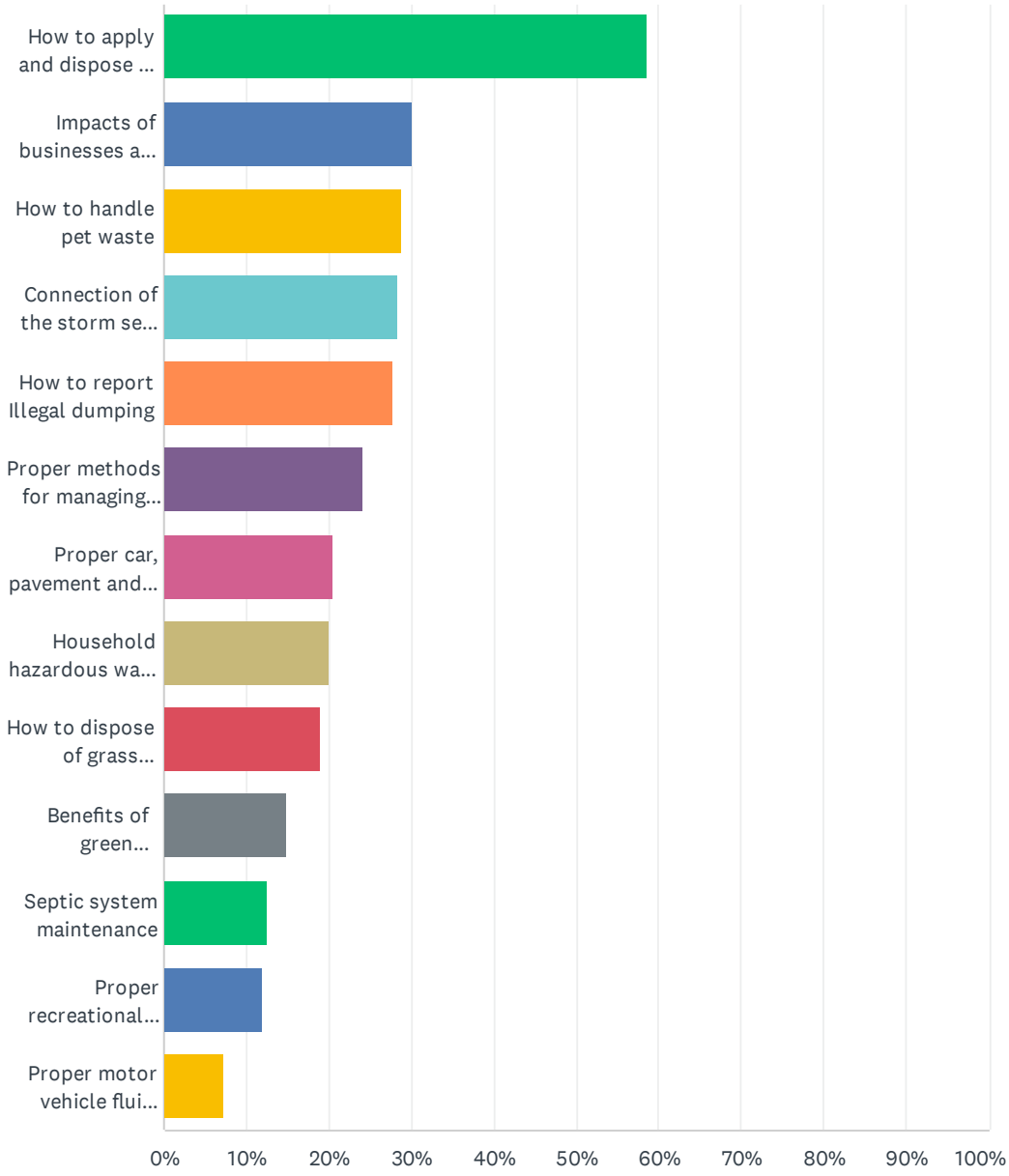
Answered: 2,808 Skipped: 288



	VERY SIGNIFICANT	SOMEWHAT SIGNIFICANT	NOT VERY SIGNIFICANT	NOT A PROBLEM	DON'T KNOW	TOTAL	WEIGHTED AVERAGE
(no label)	14.42% 405	57.83% 1,624	16.81% 472	7.23% 203	3.70% 104	2,808	2.28

Q26 What do you consider the most important things to educate the public on? (Choose up to 5)

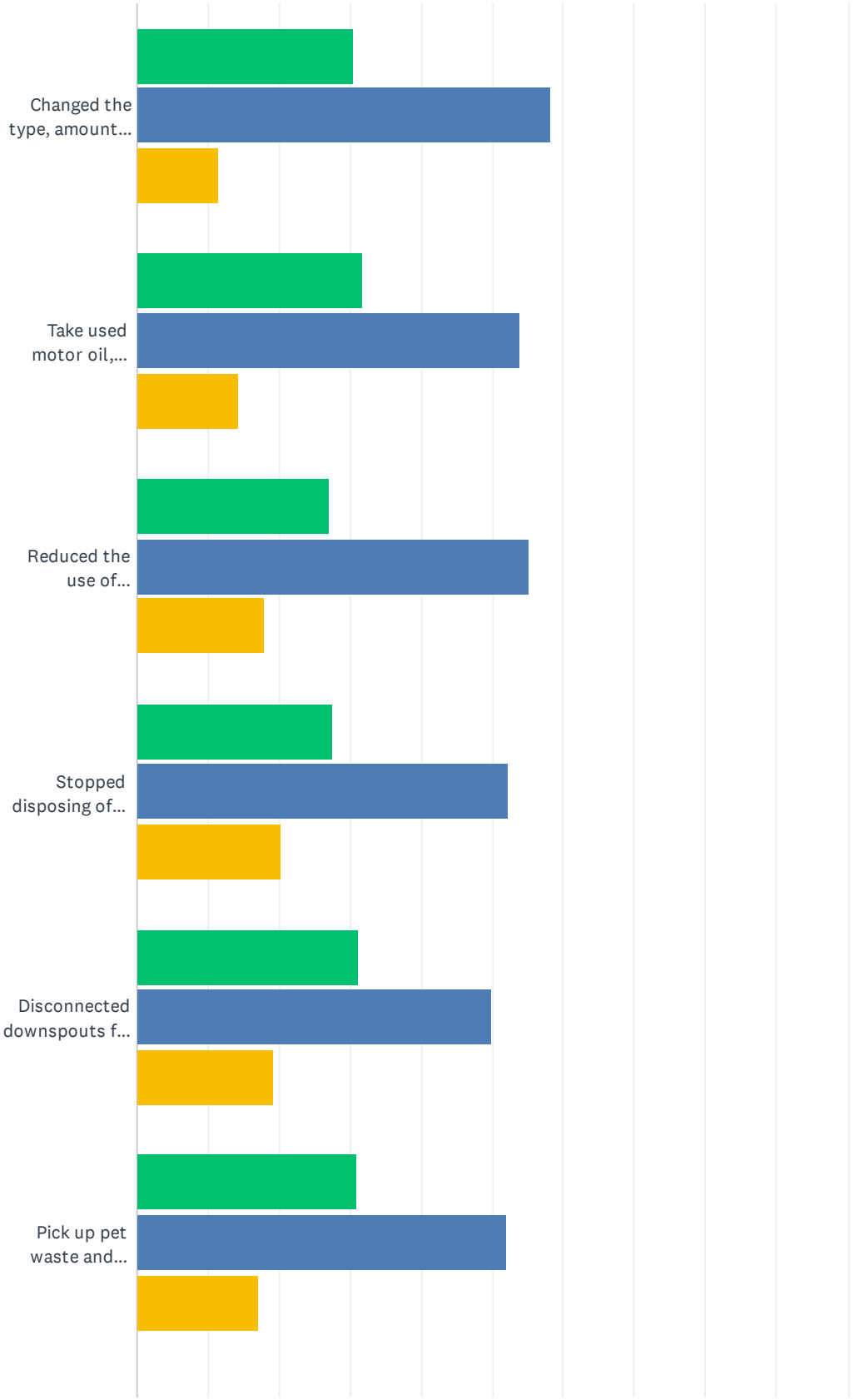
Answered: 2,800 Skipped: 296

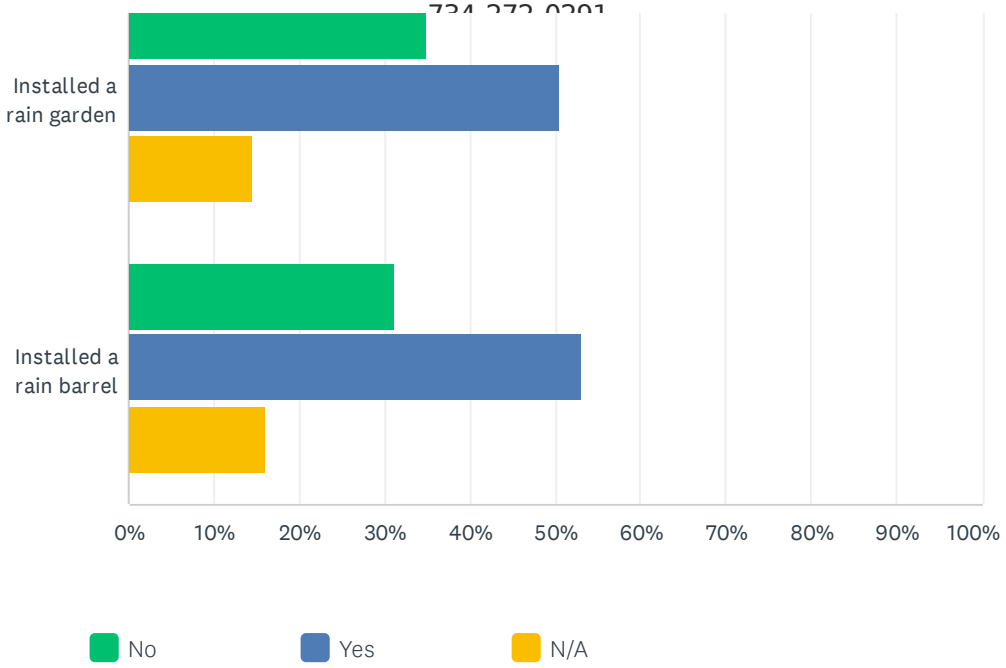


ANSWER CHOICES	RESPONSES	
How to apply and dispose of pesticides/herbicides/fertilizers	58.64%	1,642
Impacts of businesses and industries on stormwater runoff	29.96%	839
How to handle pet waste	28.75%	805
Connection of the storm sewer system to local waterbodies	28.46%	797
How to report Illegal dumping	27.71%	776
Proper methods for managing river/lake front properties	24.11%	675
Proper car, pavement and power washing practices	20.43%	572
Household hazardous waste disposal	20.00%	560
How to dispose of grass clippings and leaf litter	18.93%	530
Benefits of green infrastructure/low-impact development (like rain gardens/rain barrels or using native plants)	14.89%	417
Septic system maintenance	12.64%	354
Proper recreational vehicle waste disposal	11.93%	334
Proper motor vehicle fluid disposal	7.18%	201
Total Respondents: 2,800		

Q27 Have you done any of the following? (Choose all that apply)

Answered: 2,790 Skipped: 306

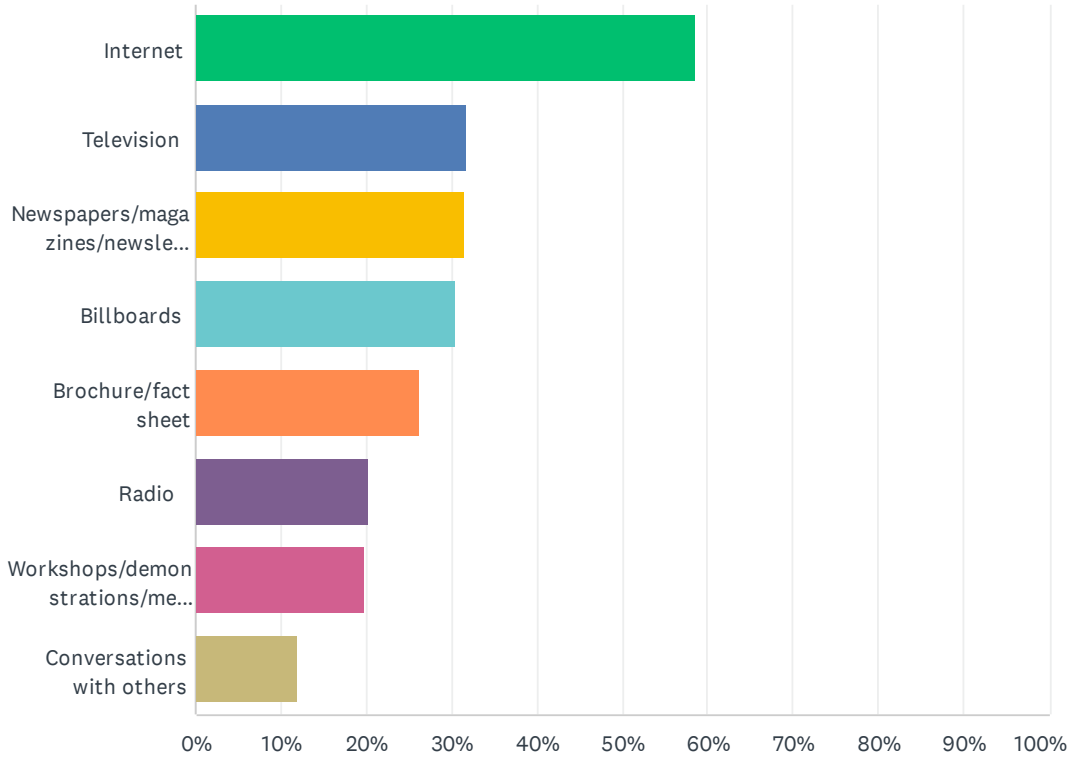




	NO	YES	N/A	TOTAL	WEIGHTED AVERAGE
Changed the type, amounts or application of lawn and garden fertilizers, pesticides or other chemicals	30.45% 841	58.11% 1,605	11.44% 316	2,762	2.31
Take used motor oil, antifreeze, batteries or other household hazardous materials to recycling facilities	31.76% 873	53.95% 1,483	14.30% 393	2,749	2.26
Reduced the use of detergents or other chemicals for home car washings	27.00% 744	55.19% 1,521	17.82% 491	2,756	2.34
Stopped disposing of any waste material into catch basins and storm drains	27.46% 753	52.33% 1,435	20.20% 554	2,742	2.31
Disconnected downspouts from storm drains to allow roof runoff to seep into the ground	31.03% 855	49.84% 1,373	19.13% 527	2,755	2.23
Pick up pet waste and dispose of properly	30.93% 851	52.09% 1,433	16.98% 467	2,751	2.25
Installed a rain garden	35.05% 962	50.49% 1,386	14.46% 397	2,745	2.18
Installed a rain barrel	31.07% 852	53.03% 1,454	15.90% 436	2,742	2.26

Q28 Where are you likely to seek information about water quality? (Choose all that apply)

Answered: 2,785 Skipped: 311



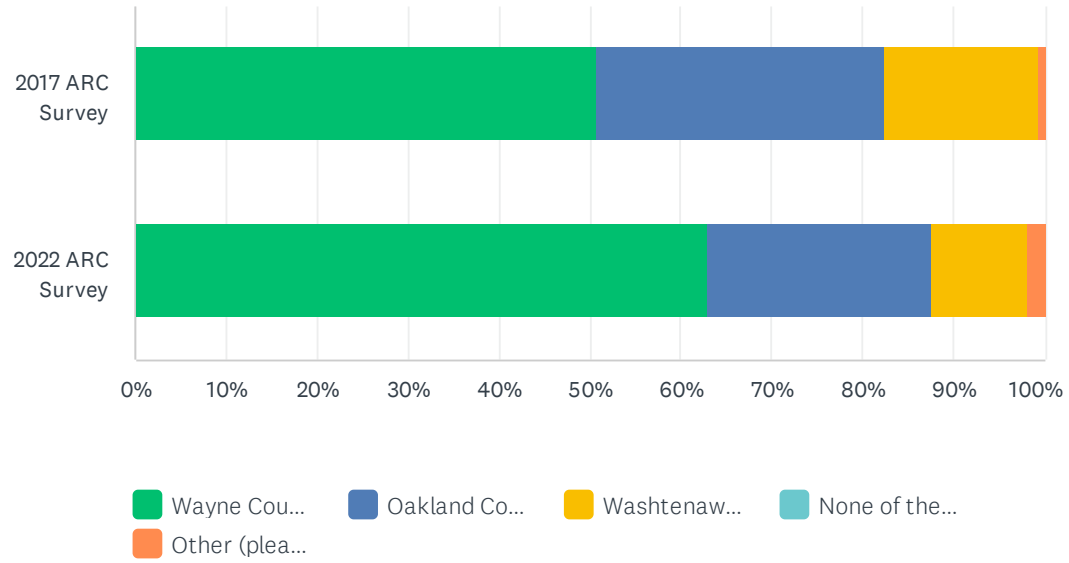
ANSWER CHOICES	RESPONSES	
Internet	58.64%	1,633
Television	31.71%	883
Newspapers/magazines/newsletters	31.63%	881
Billboards	30.41%	847
Brochure/fact sheet	26.32%	733
Radio	20.22%	563
Workshops/demonstrations/meetings	19.86%	553
Conversations with others	11.85%	330
Total Respondents: 2,785		

APPENDIX B

DETAILED COMPARISON FROM 2017/2022
SURVEY QUESTIONS AND RESULTS
WATER QUALITY CHANGES IN THE ROUGE RIVER

Q1 Where do you live?

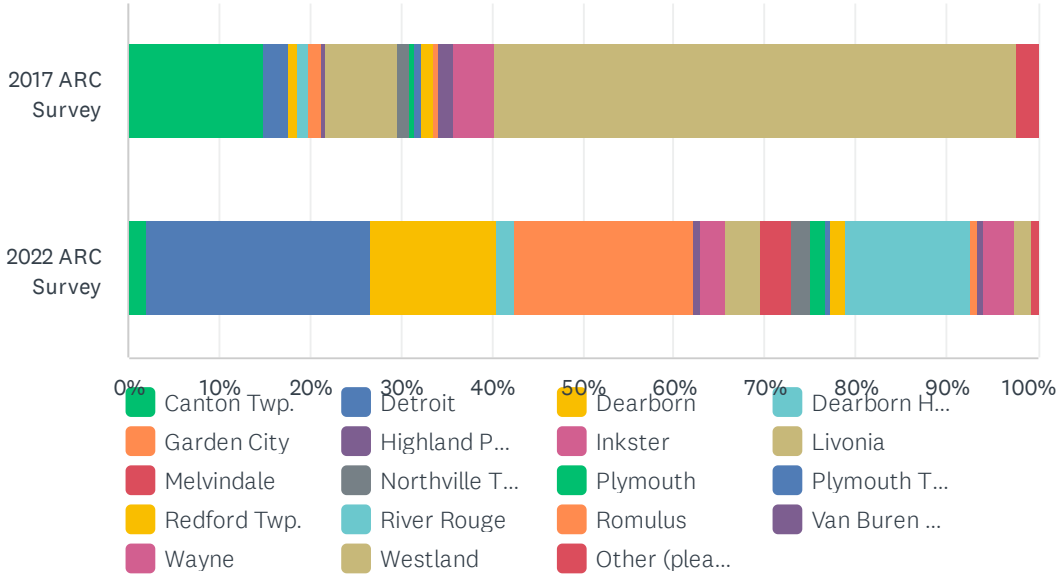
Answered: 3,626 Skipped: 0



	WAYNE COUNTY	OAKLAND COUNTY	WASHTENAW COUNTY	NONE OF THE ABOVE	OTHER (PLEASE SPECIFY)	TOTAL
2017 ARC Survey	50.75% 269	31.70% 168	16.98% 90	0.00% 0	0.57% 3	14.62% 530
2022 ARC Survey	62.98% 1,950	24.61% 762	10.66% 330	0.00% 0	1.74% 54	85.38% 3,096
Total Respondents	2,219	930	420	0	57	3,626

Q2 In Wayne County, which city, township or village do you live in?

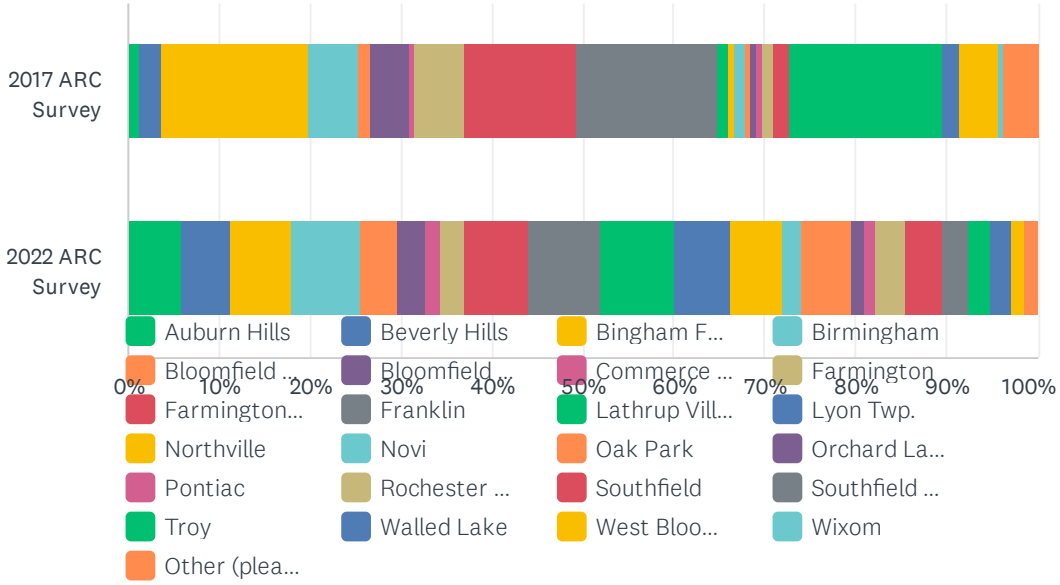
Answered: 2,176 Skipped: 1,450



	CANTON TWP.	DETROIT	DEARBORN	DEARBORN HEIGHTS	GARDEN CITY	HIGHLAND PARK	INKSTER	LIVONIA	MELVINDALE	NORTHVILLE TWP.	PLYMOUTH
2017 ARC Survey	14.83% 39	2.66% 7	1.14% 3	1.14% 3	1.52% 4	0.38% 1	0.00% 0	7.98% 21	0.00% 0	1.14% 3	0.76% 2
2022 ARC Survey	2.04% 39	24.46% 468	14.01% 268	1.99% 38	19.76% 378	0.63% 12	2.67% 51	4.03% 77	3.35% 64	2.14% 41	1.62% 31
Total Respondents	78	475	271	41	382	13	51	98	64	44	33

Q3 In Oakland County, which city, township or village do you live in?

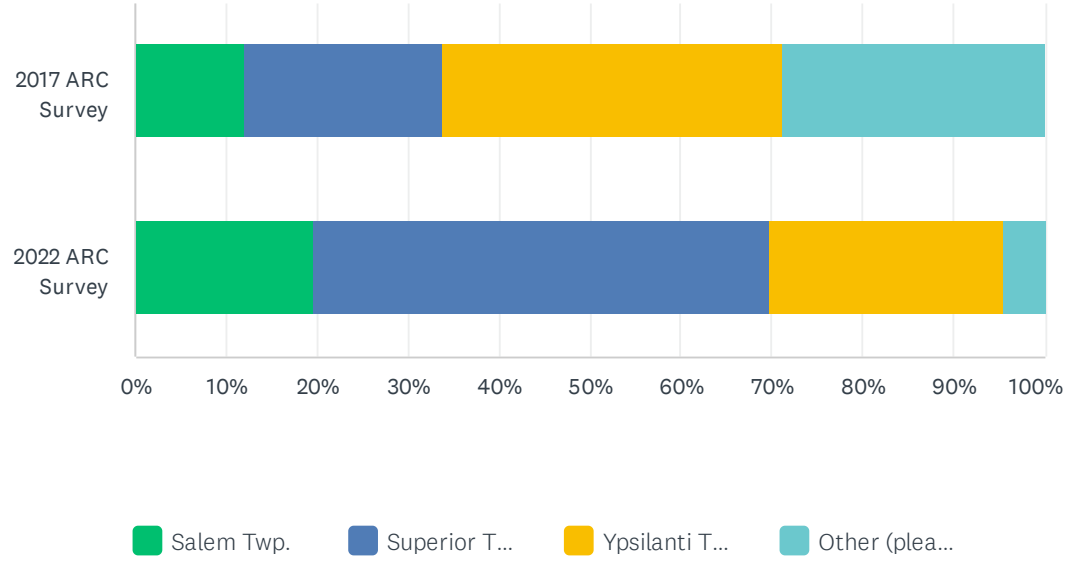
Answered: 895 Skipped: 2,731



	AUBURN HILLS	BEVERLY HILLS	BINGHAM FARMS	BIRMINGHAM	BLOOMFIELD HILLS	BLOOMFIELD TWP.	COMMERCE TWP.	FARMINGTON	FARMINGTON HILLS	FRANKLIN
2017 ARC Survey	1.23% 2	2.47% 4	16.05% 26	5.56% 9	1.23% 2	4.32% 7	0.62% 1	5.56% 9	12.35% 20	15.43% 25
2022 ARC Survey	5.87% 43	5.32% 39	6.82% 50	7.64% 56	3.96% 29	3.14% 23	1.64% 12	2.73% 20	6.82% 50	8.05% 59
Total Respondents	45	43	76	65	31	30	13	29	70	84

Q4 In Washtenaw County, which city, township or village do you live in?

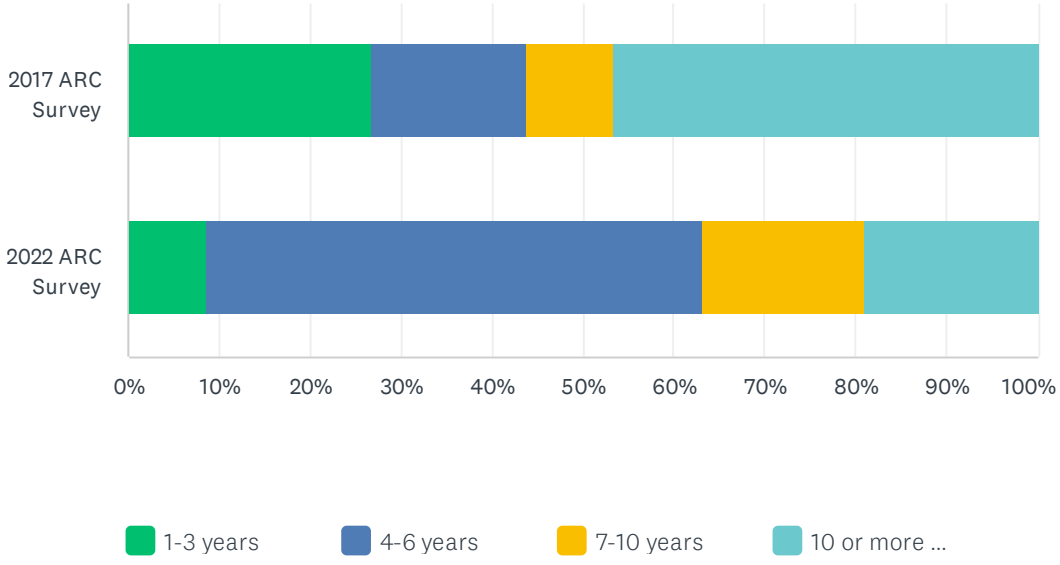
Answered: 410 Skipped: 3,216



	SALEM TWP.	SUPERIOR TWP.	YPSILANTI TWP.	OTHER (PLEASE SPECIFY)	TOTAL
2017 ARC Survey	12.05% 10	21.69% 18	37.35% 31	28.92% 24	20.24% 83
2022 ARC Survey	19.57% 64	50.15% 164	25.69% 84	4.59% 15	79.76% 327
Total Respondents	74	182	115	39	410

Q5 How long have you lived at your current residence?

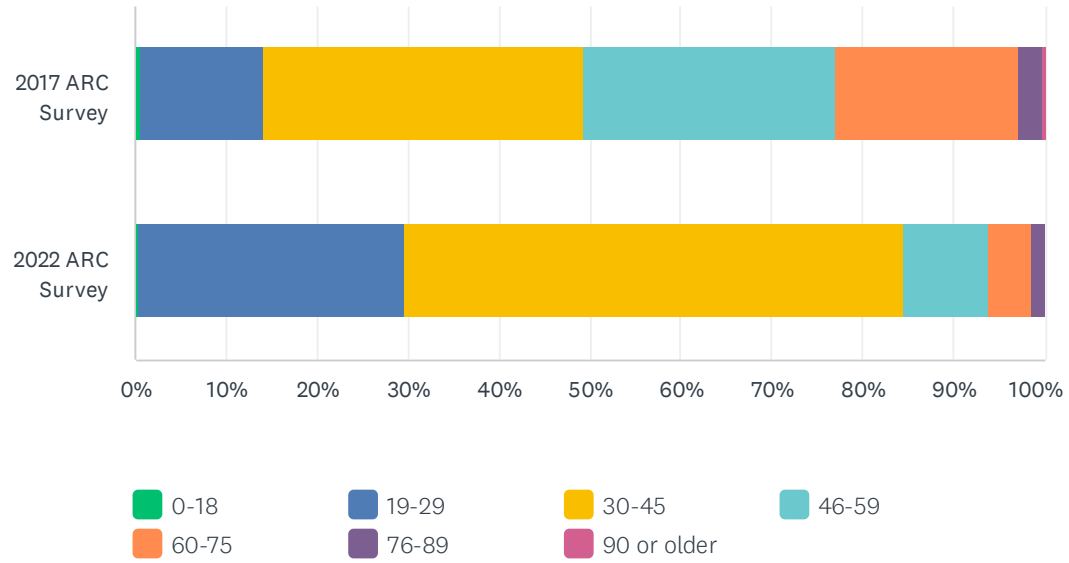
Answered: 3,456 Skipped: 170



	1-3 YEARS	4-6 YEARS	7-10 YEARS	10 OR MORE YEARS	TOTAL
2017 ARC Survey	26.85% 134	16.83% 84	9.62% 48	47.09% 235	14.50% 501
2022 ARC Survey	8.49% 251	54.68% 1,617	17.86% 528	18.97% 561	85.56% 2,957
Total Respondents	385	1,701	576	796	3,456

Q6 How old are you?

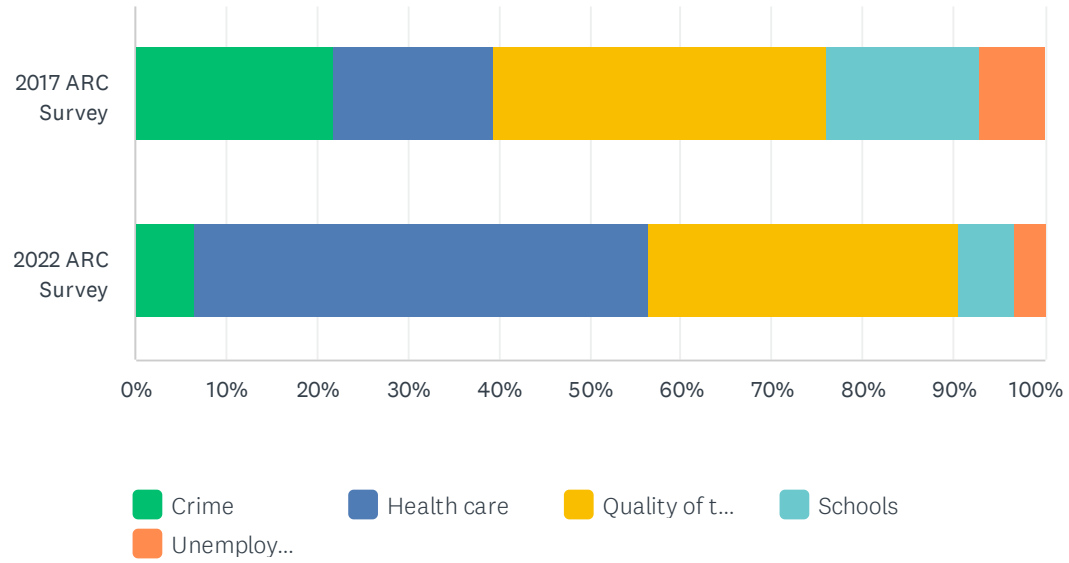
Answered: 3,443 Skipped: 183



	0-18	19-29	30-45	46-59	60-75	76-89	90 OR OLDER	TOTAL
2017 ARC Survey	0.60% 3	13.51% 67	35.08% 174	27.82% 138	20.16% 100	2.62% 13	0.20% 1	14.41% 496
2022 ARC Survey	0.48% 14	29.25% 862	54.77% 1,614	9.33% 275	4.82% 142	1.32% 39	0.03% 1	85.59% 2,947
Total Respondents	17	929	1,788	413	242	52	2	3,443

Q7 What is the biggest problem facing your local community right now?

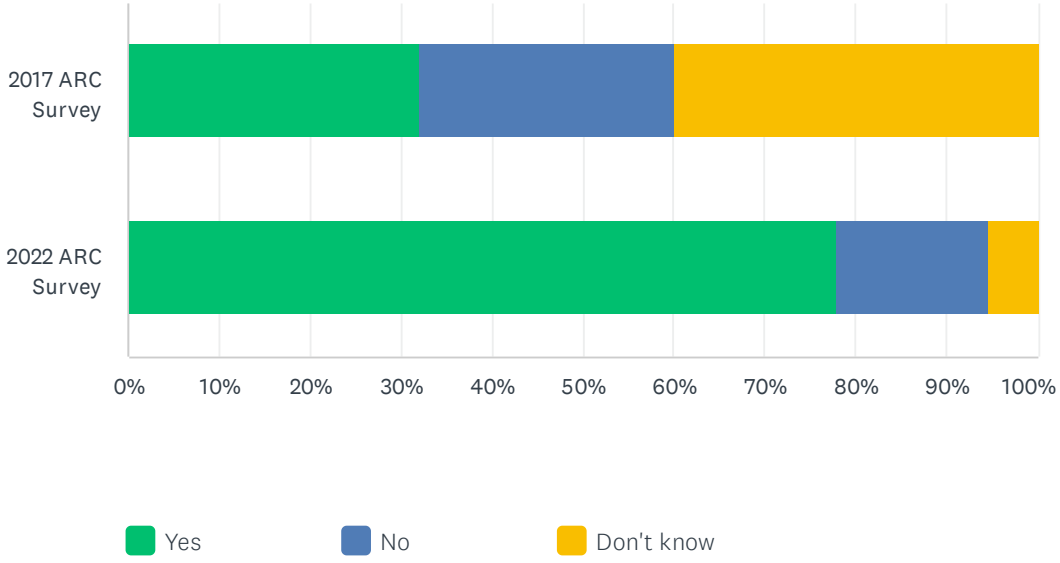
Answered: 3,417 Skipped: 209



	CRIME	HEALTH CARE	QUALITY OF THE ENVIRONMENT	SCHOOLS	UNEMPLOYMENT	TOTAL
2017 ARC Survey	21.93% 107	17.62% 86	36.48% 178	16.80% 82	7.17% 35	14.28% 488
2022 ARC Survey	6.56% 192	49.95% 1,463	34.04% 997	6.28% 184	3.18% 93	85.72% 2,929
Total Respondents	299	1,549	1,175	266	128	3,417

Q8 Do you live in a watershed?

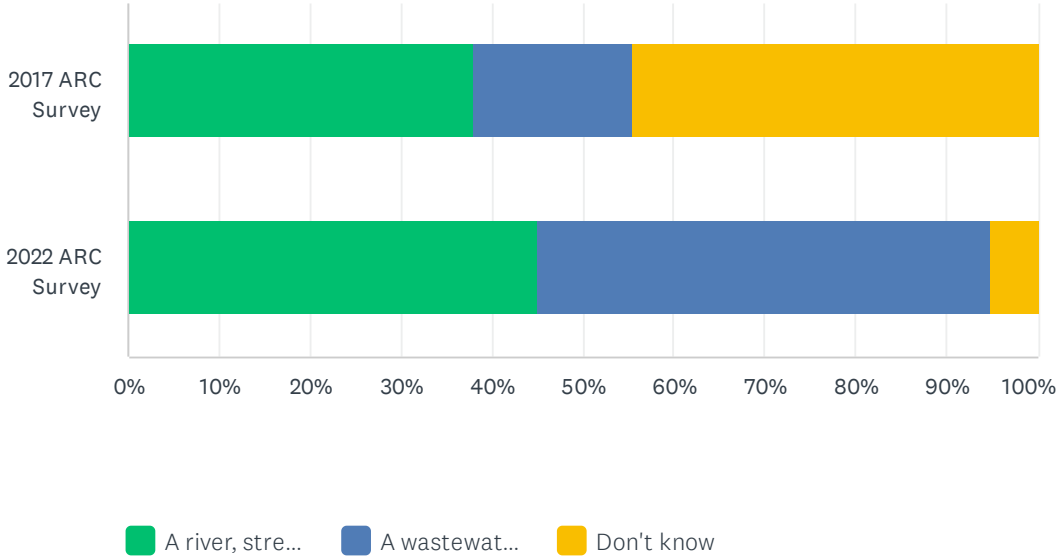
Answered: 3,405 Skipped: 221



	YES	NO	DON'T KNOW	TOTAL
2017 ARC Survey	32.17% 157	27.87% 136	39.96% 195	14.33% 488
2022 ARC Survey	77.89% 2,272	16.83% 491	5.28% 154	85.67% 2,917
Total Respondents	2,429	627	349	3,405

Q9 Where does the rain water running off your property drain to?

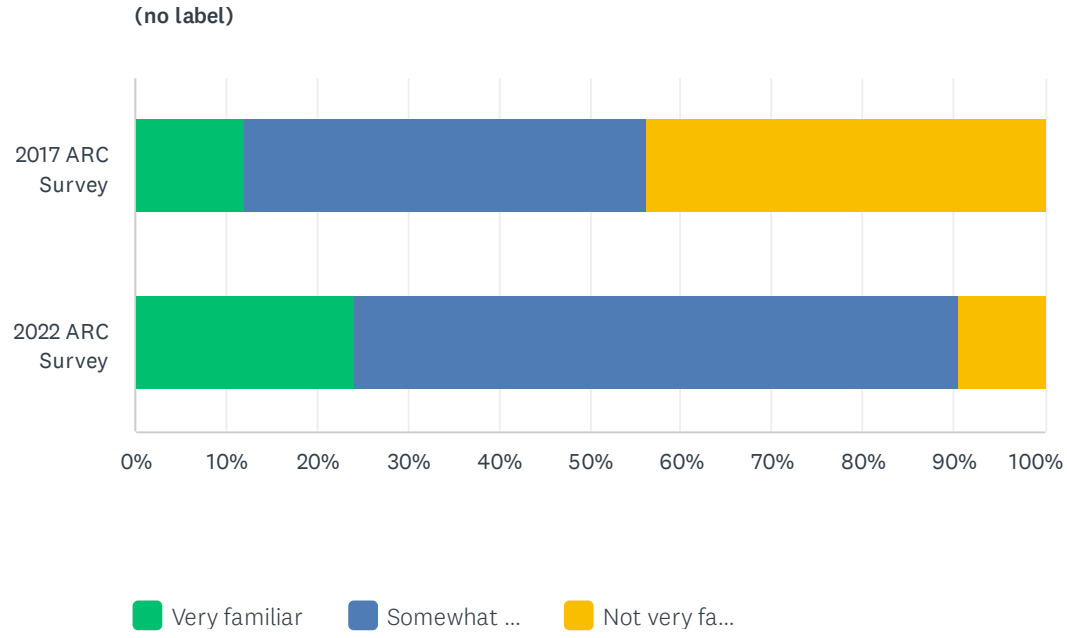
Answered: 3,391 Skipped: 235



	A RIVER, STREAM OR LAKE	A WASTEWATER TREATMENT PLANT	DON'T KNOW	TOTAL
2017 ARC Survey	38.10% 184	17.39% 84	44.51% 215	14.24% 483
2022 ARC Survey	45.08% 1,311	49.72% 1,446	5.19% 151	85.76% 2,908
Total Respondents	1,495	1,530	366	3,391

Q10 How familiar are you with the Rouge River Watershed and its network of rivers and streams running throughout southeast Michigan?

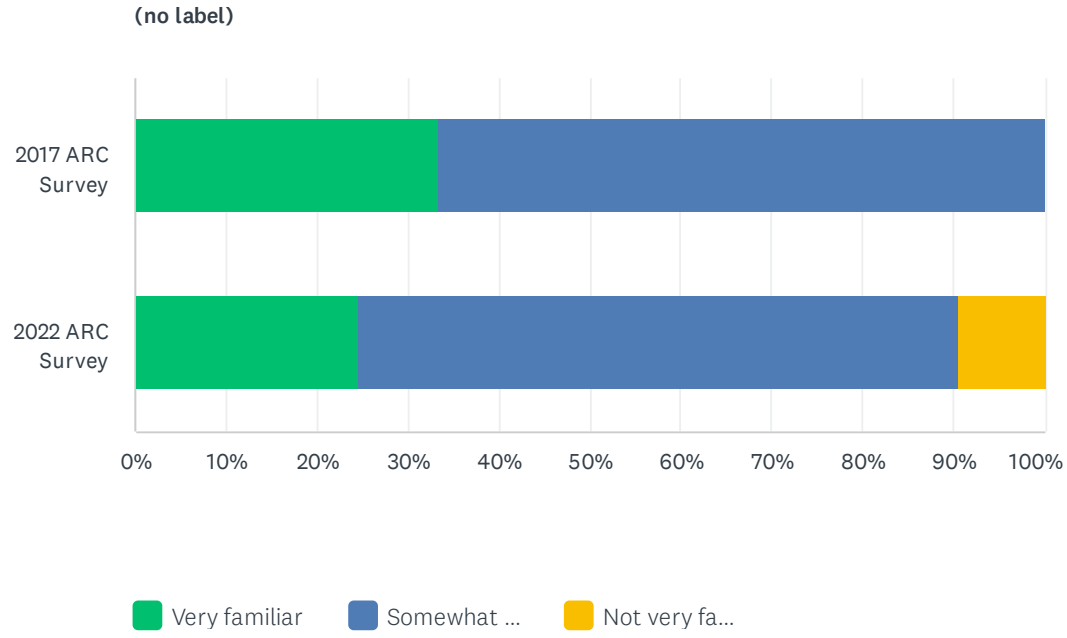
Answered: 3,377 Skipped: 249



(no label)	VERY FAMILIAR	SOMEWHAT FAMILIAR	NOT VERY FAMILIAR	TOTAL	WEIGHTED AVERAGE
2017 ARC Survey	12.11% 58	44.05% 211	43.84% 210	14.18% 479	1.00
2022 ARC Survey	24.22% 702	66.32% 1,922	9.45% 274	85.82% 2,898	1.00

Q11 How familiar are you with the Rouge River Watershed and its network of rivers and streams running throughout southeast Michigan?

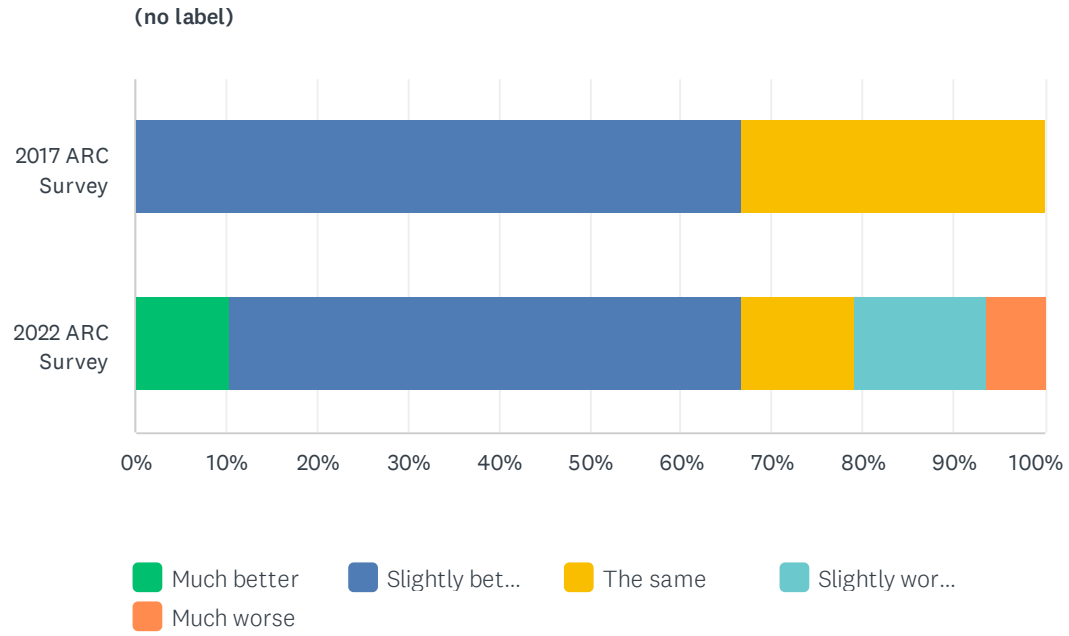
Answered: 56 Skipped: 3,570



(no label)	VERY FAMILIAR	SOMEWHAT FAMILIAR	NOT VERY FAMILIAR	TOTAL	WEIGHTED AVERAGE
2017 ARC Survey	33.33% 1	66.67% 2	0.00% 0	5.36% 3	1.00
2022 ARC Survey	24.53% 13	66.04% 35	9.43% 5	94.64% 53	1.00

Q12 In your opinion, over the past fifteen (15) years the water quality of the Rouge River is. . .

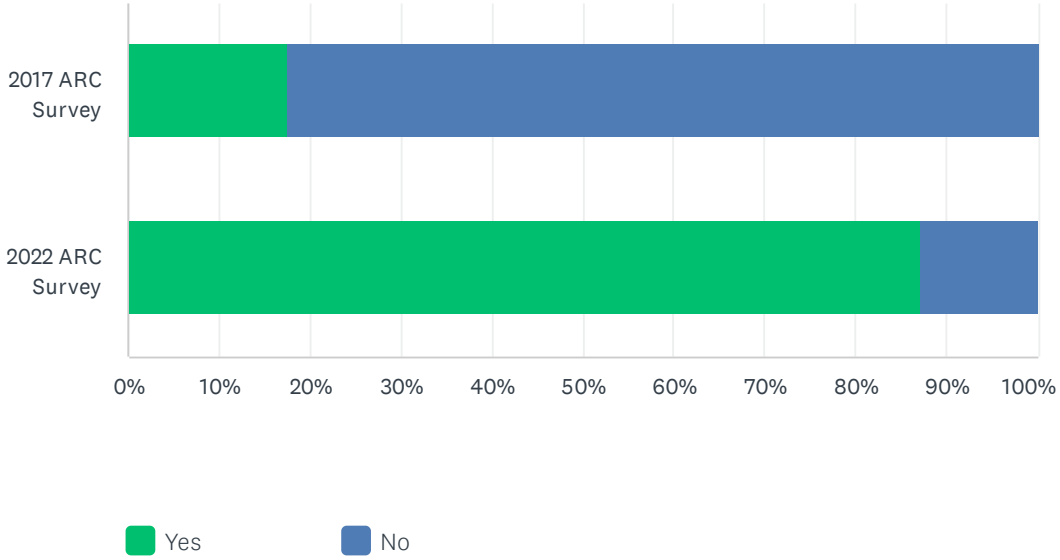
Answered: 51 Skipped: 3,575



(no label)	MUCH BETTER	SLIGHTLY BETTER	THE SAME	SLIGHTLY WORSE	MUCH WORSE	TOTAL	WEIGHTED AVERAGE
2017 ARC Survey	0.00% 0	66.67% 2	33.33% 1	0.00% 0	0.00% 0	5.88% 3	2.33
2022 ARC Survey	10.42% 5	56.25% 27	12.50% 6	14.58% 7	6.25% 3	94.12% 48	2.50

Q13 Is your home located along the Rouge River or creek?

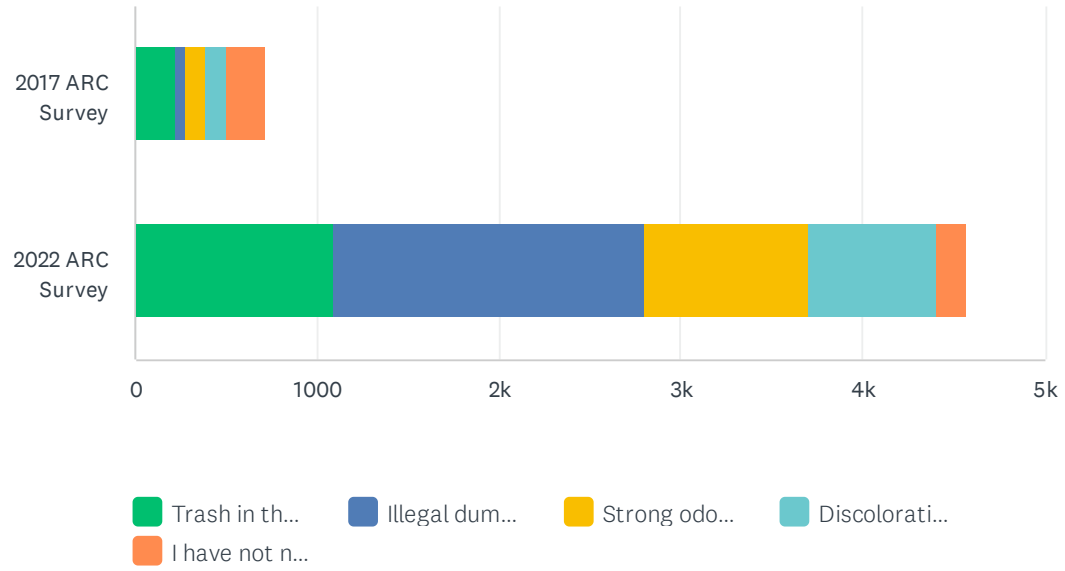
Answered: 3,372 Skipped: 254



	YES	NO	TOTAL
2017 ARC Survey	17.61% 84	82.39% 393	14.15% 477
2022 ARC Survey	87.18% 2,524	12.82% 371	85.85% 2,895
Total Respondents	2,608	764	3,372

Q14 At any time in the last ten (10) years have you noticed any of the below in the Rouge River?

Answered: 3,350 Skipped: 276

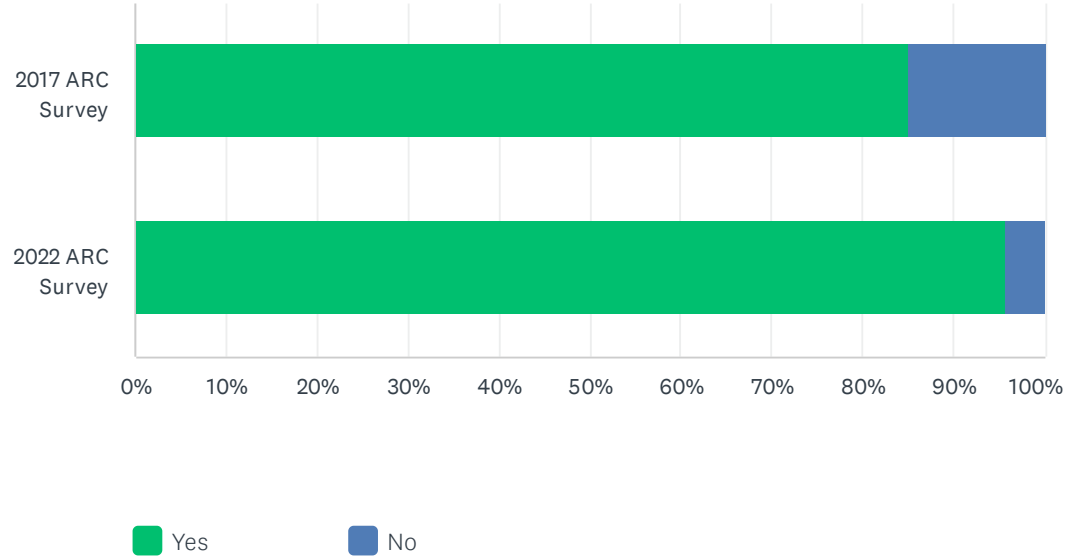


	TRASH IN THE RIVER	ILLEGAL DUMPING IN THE RIVER	STRONG ODORS BY THE RIVER	DISCOLORATION OF THE WATER	I HAVE NOT NOTICED ANYTHING UNUSUAL	TOTAL
2017 ARC Survey	47.55% 223	11.30% 53	23.88% 112	23.67% 111	45.42% 213	21.25% 712
2022 ARC Survey	37.87% 1,091	59.53% 1,715	31.14% 897	24.57% 708	5.69% 164	136.57% 4,575
Total Respondents	1,314	1,768	1,009	819	377	3,350

	PLEASE DESCRIBE IN MORE DETAIL IF NECESSARY OR IF YOU HAVE SEEN SOMETHING THAT IS NOT LISTED ABOVE (INCLUDE CROSS STREETS IF POSSIBLE)	TOTAL
2017 ARC Survey	38	38
2022 ARC Survey	42	42

Q15 In the past five (5) years, have you or members of your family used or visited a park or other place with a river or stream running through it?

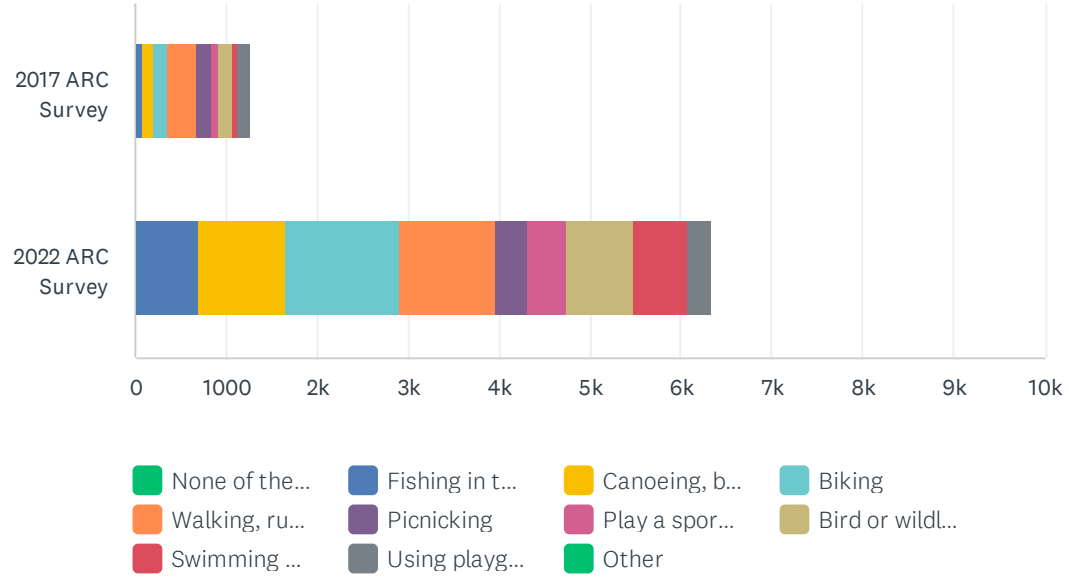
Answered: 3,342 Skipped: 284



	YES	NO	TOTAL
2017 ARC Survey	85.01% 397	14.99% 70	13.97% 467
2022 ARC Survey	95.76% 2,753	4.24% 122	86.03% 2,875
Total Respondents	3,150	192	3,342

Q16 What activities have you or members of your family used the river or parks for during the past five years? (Check all that apply)

Answered: 3,129 Skipped: 497

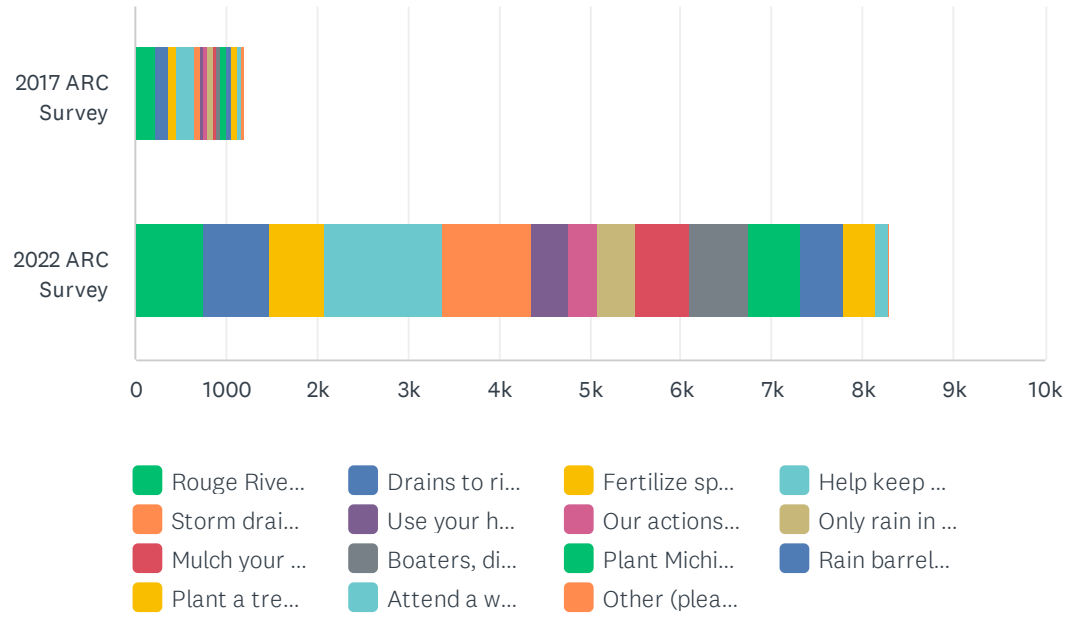


	NONE OF THE ABOVE	FISHING IN THE RIVER	CANOEING, BOATING OR TUBING IN THE RIVER	BIKING	WALKING, RUNNING OR JOGGING	PICNICKING	PLAY A SPORT (SOCCER, SLEDDING, BASEBALL)	BIRD OR WILDLIFE WATCHING	SWIMMING OR WADING IN THE RIVER	USING PLAYGROUND EQUIPMENT	OTHER	TO
2017 ARC Survey	0.00% 0	18.53% 73	32.99% 130	38.07% 150	82.99% 327	42.64% 168	20.81% 82	34.77% 137	17.01% 67	36.04% 142	0.00% 0	4
2022 ARC Survey	0.00% 0	25.23% 690	35.43% 969	45.85% 1,254	38.46% 1,052	12.72% 348	15.90% 435	27.02% 739	21.17% 579	9.84% 269	0.00% 0	20
Total Respondents	0	763	1,099	1,404	1,379	516	517	876	646	411	0	

	OTHER (PLEASE SPECIFY)	TOTAL
2017 ARC Survey	11	11
2022 ARC Survey	12	12

Q17 Which of the following phrases encouraging stewardship of the Rouge River have you seen or heard? (Check all that apply)

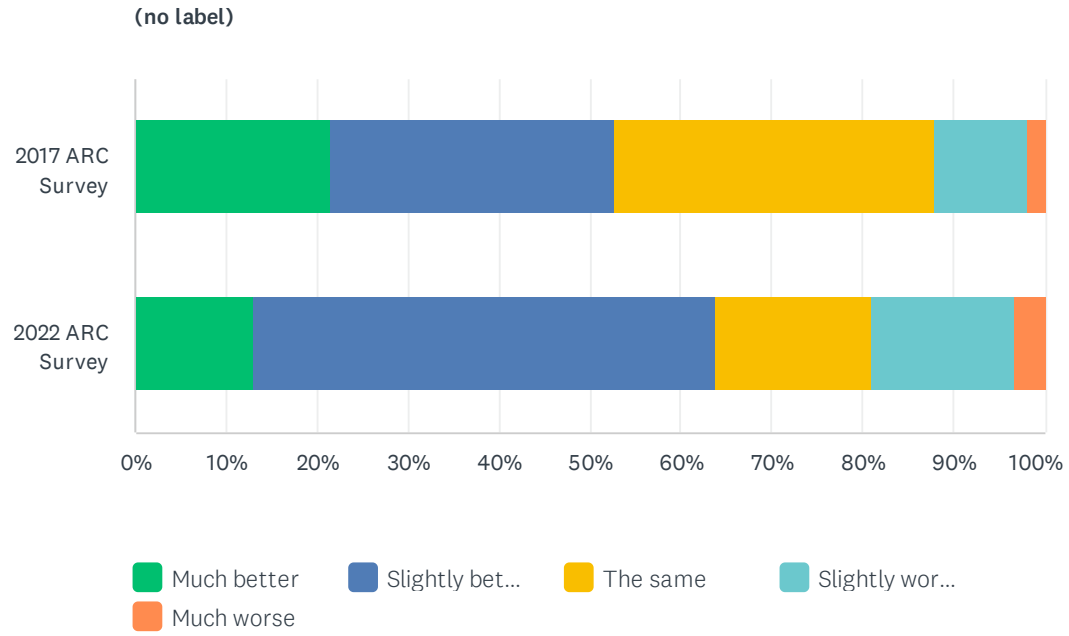
Answered: 3,306 Skipped: 320



	ROUGE RIVER, OURS TO PROTECT	DRAINS TO RIVER (PAINTED MESSAGE ON STORM DRAIN)	FERTILIZE SPARINGLY AND CARINGLY	HELP KEEP OUR RIVERS CLEAN	STORM DRAINS AREN'T GARBAGE CANS	USE YOUR HEAD, YOU LIVE IN A WATERSHED	OUR ACTIONS AFFECT THE ROUGE RIVER	ONLY RAIN IN THE DRAIN! KEEP OUR RIVERS CLEAN	MULCH YOUR LEAVES TO HELP KEEP OUR RIVERS CLEAN	BOATERS, DISPOSE OF WASTE PROPERLY; KEEP OUR RIVERS CLEAN	PLANT MICHIGAN NATIVES TO HELP KEEP OUR RIVER CLEAN	RAI BAF HEL KEE OUR RIV CLE
2017 ARC Survey	48.78% 220	31.26% 141	17.52% 79	49.45% 223	12.86% 58	6.43% 29	11.31% 51	13.97% 63	8.43% 38	10.64% 48	11.53% 52	1
2022 ARC Survey	26.48% 756	25.11% 717	21.47% 613	45.11% 1,288	34.08% 973	14.36% 410	11.42% 326	14.78% 422	20.39% 582	23.47% 670	20.07% 573	1
Total Respondents	976	858	692	1,511	1,031	439	377	485	620	718	625	523

Q18 In your opinion, over the past fifteen (15) years the water quality of the Rouge River is. . .

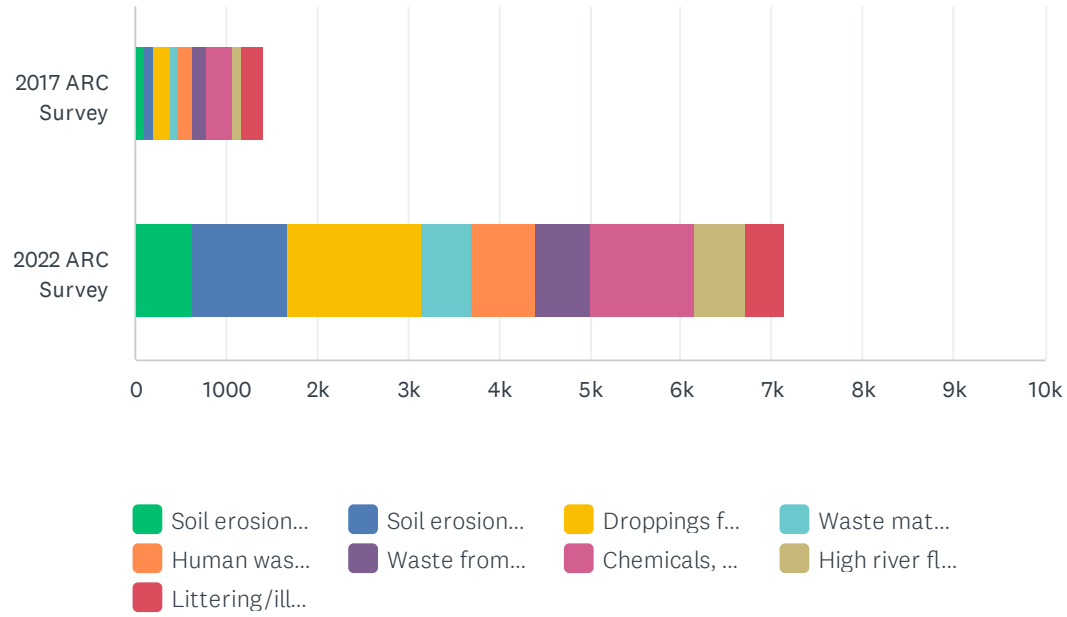
Answered: 3,300 Skipped: 326



(no label)	MUCH BETTER	SLIGHTLY BETTER	THE SAME	SLIGHTLY WORSE	MUCH WORSE	TOTAL	WEIGHTED AVERAGE
2017 ARC Survey	21.38% 96	31.40% 141	35.19% 158	10.24% 46	1.78% 8	13.61% 449	2.40
2022 ARC Survey	13.05% 372	50.75% 1,447	17.15% 489	15.85% 452	3.19% 91	86.39% 2,851	2.45

Q19 The items listed below are sources of water quality pollution across the country. In your opinion, which ones are a problem in your area? (Check all that apply)

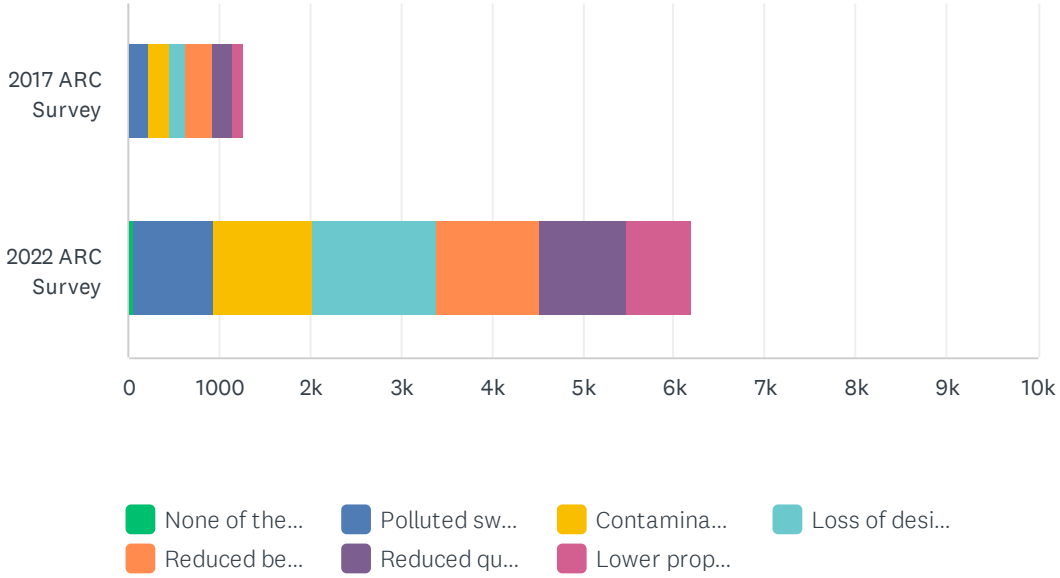
Answered: 3,285 Skipped: 341



	SOIL EROSION FROM CONSTRUCTION SITES	SOIL EROSION FROM SHORELINE AND/OR STREAMBANKS	DROPPINGS FROM GEESE, DUCKS AND OTHER WATERFOWL	WASTE MATERIAL FROM PETS	HUMAN WASTE (SEWAGE) DISCHARGES THAT OCCUR DURING HEAVY RAIN STORMS FROM COMBINED SEWER OVERFLOWS OR CROSS-CONNECTIONS BETWEEN THE SANITARY AND STORM SEWERS	WASTE FROM BUSINESSES AND INDUSTRIAL FACILITIES	CHEMICALS, OILS, FERTILIZERS, AND OTHER POLLUTING MATERIALS THAT ARE FOUND ON THE SURFACE OF PARKING LOTS, STREETS, FARMS, AND LAWNS WASHED INTO THE RIVER BY RAIN	HIGH RIVER FLOWS DURING RAIN EVENTS	LITTERING/ILLEG DUMPING OF TRASH
2017 ARC Survey	24.77% 109	19.55% 86	43.64% 192	20.45% 90	35.91% 158	33.41% 147	63.64% 280	25.45% 112	55.6
2022 ARC Survey	21.97% 625	36.87% 1,049	51.85% 1,475	19.51% 555	24.36% 693	21.72% 618	39.89% 1,135	19.33% 550	15.7
Total Respondents	734	1,135	1,667	645	851	765	1,415	662	692

Q20 In your opinion has poor water quality caused any of the following? (Check all that apply)

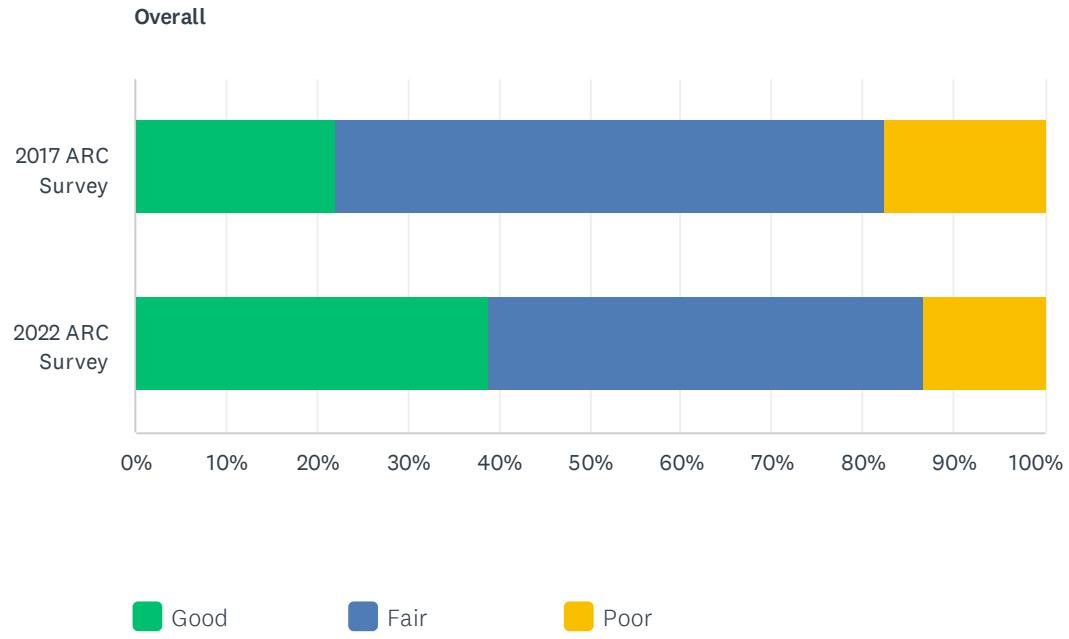
Answered: 3,276 Skipped: 350



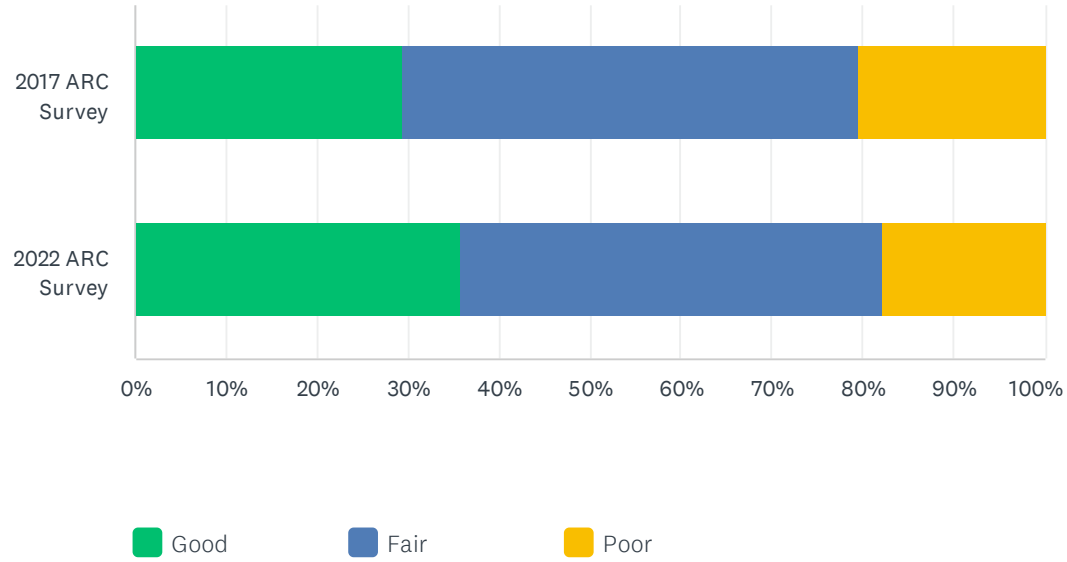
	NONE OF THE ABOVE	POLLUTED SWIMMING AREAS	CONTAMINATED FISH	LOSS OF DESIRABLE FISH SPECIES	REDUCED BEAUTY OF LAKES OR STREAMS	REDUCED QUALITY/AVAILABILITY OF WATER RECREATION ACTIVITIES	LOWER PROPERTY VALUES	TOTAL
2017 ARC Survey	0.00% 0	50.23% 220	50.68% 222	42.92% 188	67.12% 294	48.86% 214	31.05% 136	38.89% 1,274
2022 ARC Survey	1.94% 55	31.32% 889	38.09% 1,081	48.24% 1,369	39.92% 1,133	33.33% 946	25.62% 727	189.26% 6,200
Total Respondents	55	1,109	1,303	1,557	1,427	1,160	863	3,276

Q21 How would you rate the water quality of the Rouge River?

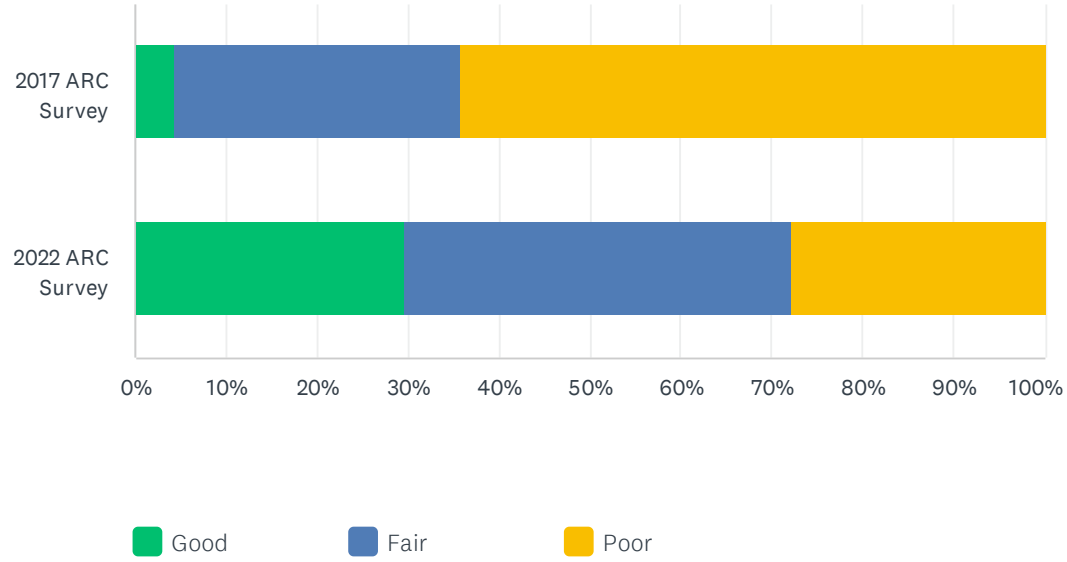
Answered: 3,255 Skipped: 371



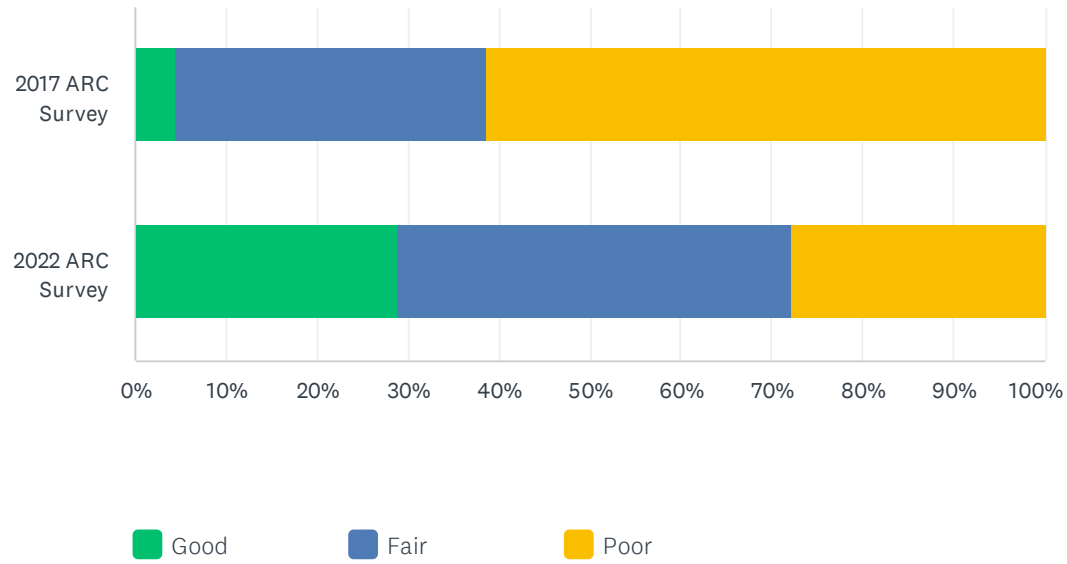
For canoeing/kayaking/boating



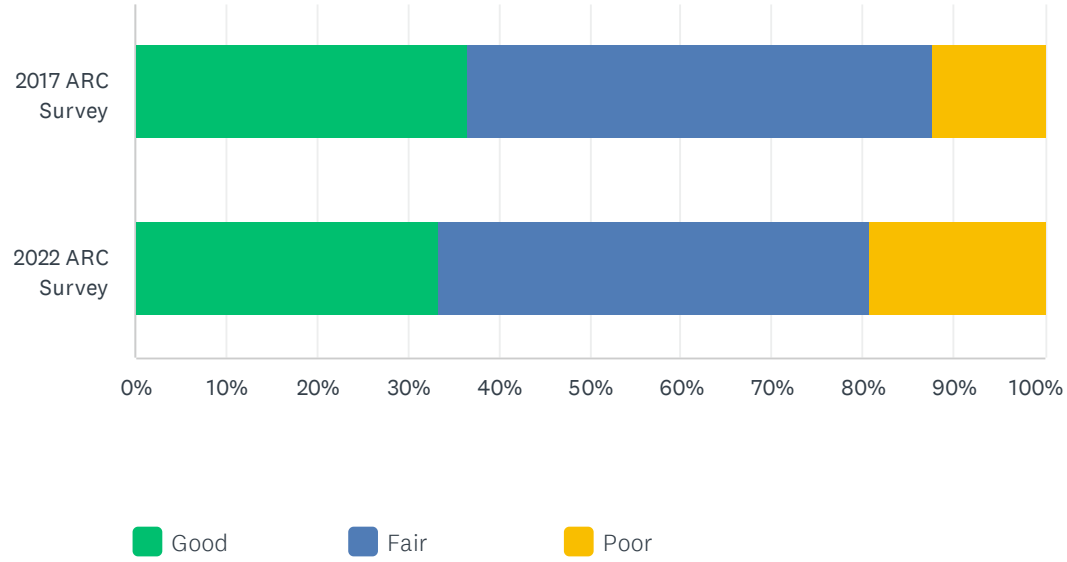
For eating locally caught fish



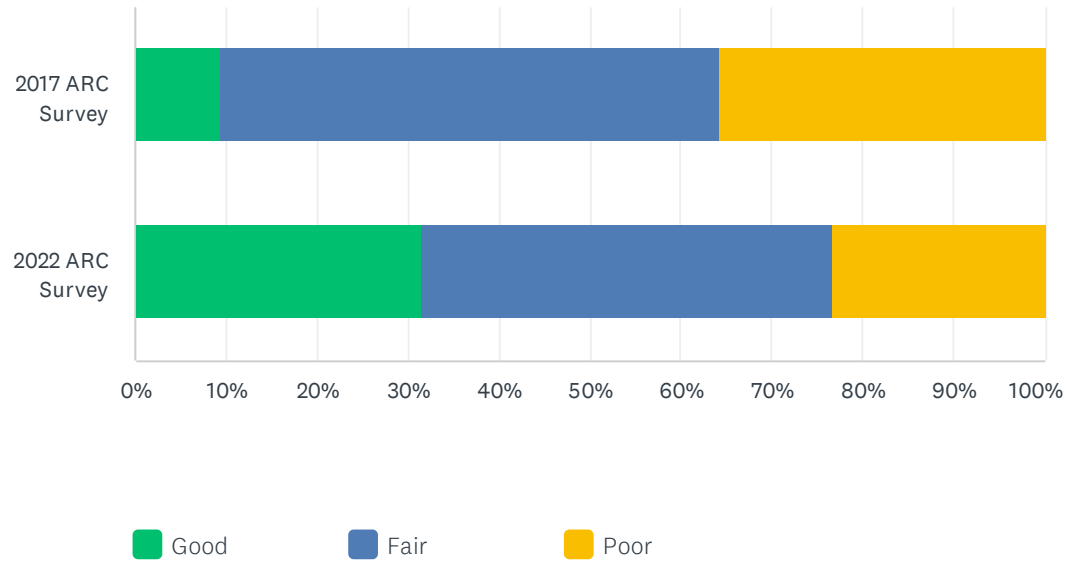
For swimming



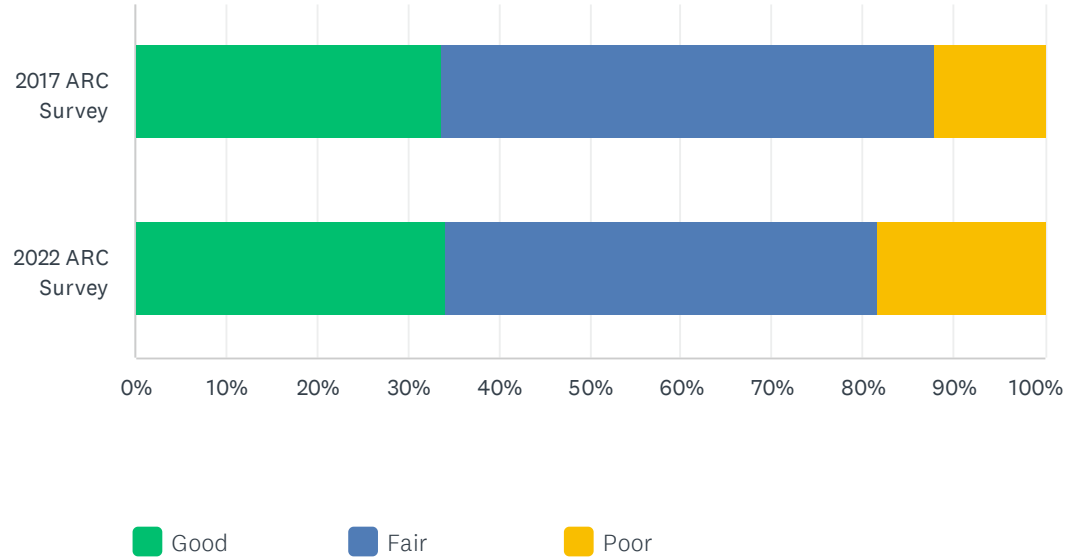
For picnicking and family activities



For fish habitat



For scenic beauty



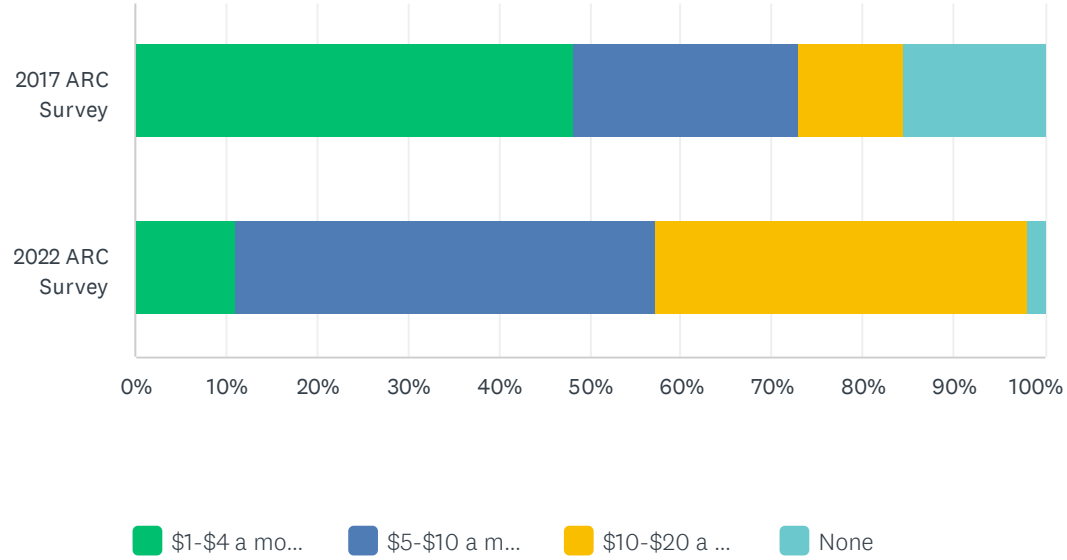
Overall					
	GOOD	**FAIR**	**POOR**	**TOTAL**	**WEIGHTED AVERAGE**
2017 ARC Survey	22.14% 93	60.24% 253	17.62% 74	12.90% 420	2.95
2022 ARC Survey	38.77% 1,086	47.91% 1,342	13.32% 373	86.05% 2,801	2.75
For canoeing/kayaking/boating					
	GOOD	**FAIR**	**POOR**	**TOTAL**	**WEIGHTED AVERAGE**
2017 ARC Survey	29.50% 123	50.12% 209	20.38% 85	12.81% 417	2.91
2022 ARC Survey	35.86% 1,004	46.43% 1,300	17.71% 496	86.02% 2,800	2.82
For eating locally caught fish					
	GOOD	**FAIR**	**POOR**	**TOTAL**	**WEIGHTED AVERAGE**
2017 ARC Survey	4.30% 18	31.50% 132	64.20% 269	12.87% 419	3.60
2022 ARC Survey	29.70% 830	42.50% 1,188	27.80% 777	85.87% 2,795	2.98
For swimming					
	GOOD	**FAIR**	**POOR**	**TOTAL**	**WEIGHTED AVERAGE**
2017 ARC Survey	4.53% 19	34.13% 143	61.34% 257	12.87% 419	3.57
2022 ARC Survey	28.81% 803	43.31% 1,207	27.88% 777	85.62% 2,787	2.99
For picnicking and family activities					
	GOOD	**FAIR**	**POOR**	**TOTAL**	**WEIGHTED AVERAGE**
2017 ARC Survey	36.58% 154	51.07% 215	12.35% 52	12.93% 421	2.76
2022 ARC Survey	33.37% 934	47.34% 1,325	19.29% 540	85.99% 2,799	2.86

For fish habitat					
	GOOD	**FAIR**	**POOR**	**TOTAL**	**WEIGHTED AVERAGE**
2017 ARC Survey	9.35% 39	54.92% 229	35.73% 149	12.81% 417	3.26
2022 ARC Survey	31.59% 884	45.07% 1,261	23.34% 653	85.96% 2,798	2.92

For scenic beauty					
	GOOD	**FAIR**	**POOR**	**TOTAL**	**WEIGHTED AVERAGE**
2017 ARC Survey	33.73% 142	54.16% 228	12.11% 51	12.93% 421	2.78
2022 ARC Survey	34.19% 959	47.49% 1,332	18.32% 514	86.18% 2,805	2.84

Q22 How much would you spend to improve the water quality in the Rouge River? (For example: through local taxes or fees)

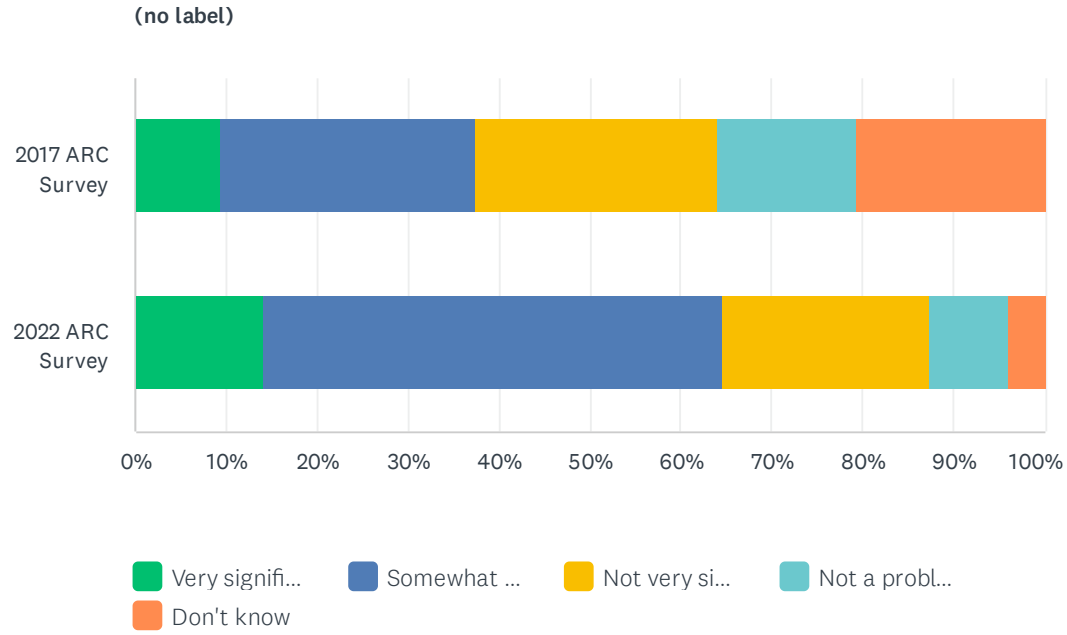
Answered: 3,242 Skipped: 384



	$1-$4 A MONTH	$5-$10 A MONTH	$10-$20 A MONTH	NONE	TOTAL
2017 ARC Survey	48.21% 202	24.82% 104	11.46% 48	15.51% 65	12.92% 419
2022 ARC Survey	11.02% 311	46.19% 1,304	41.02% 1,158	1.77% 50	87.08% 2,823
Total Respondents	513	1,408	1,206	115	3,242

Q23 How significant would you rate the damage related to high flows (flooding of property, stream bank erosion, etc.) in the Rouge River in the area where you live?

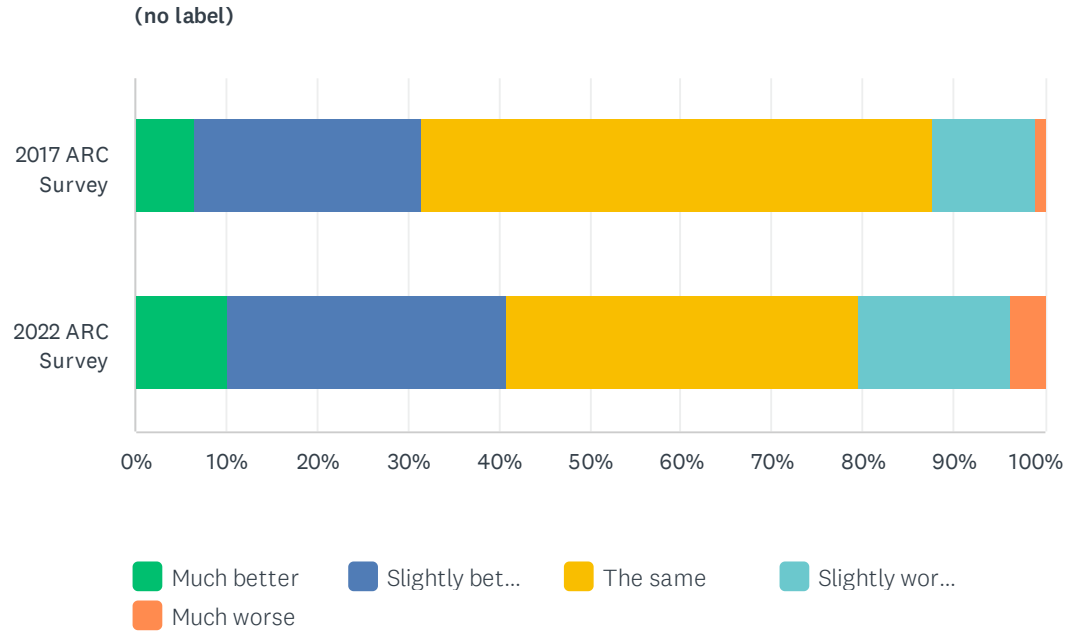
Answered: 3,235 Skipped: 391



(no label)	VERY SIGNIFICANT	SOMEWHAT SIGNIFICANT	NOT VERY SIGNIFICANT	NOT A PROBLEM	DON'T KNOW	TOTAL	WEIGHTED AVERAGE
2017 ARC Survey	9.35% 39	28.06% 117	26.62% 111	15.35% 64	20.62% 86	12.89% 417	3.10
2022 ARC Survey	14.09% 397	50.50% 1,423	22.64% 638	8.80% 248	3.97% 112	87.11% 2,818	2.38

Q24 In your opinion, over the past five (5) years, the flooding of the Rouge River and the related problems are . . .

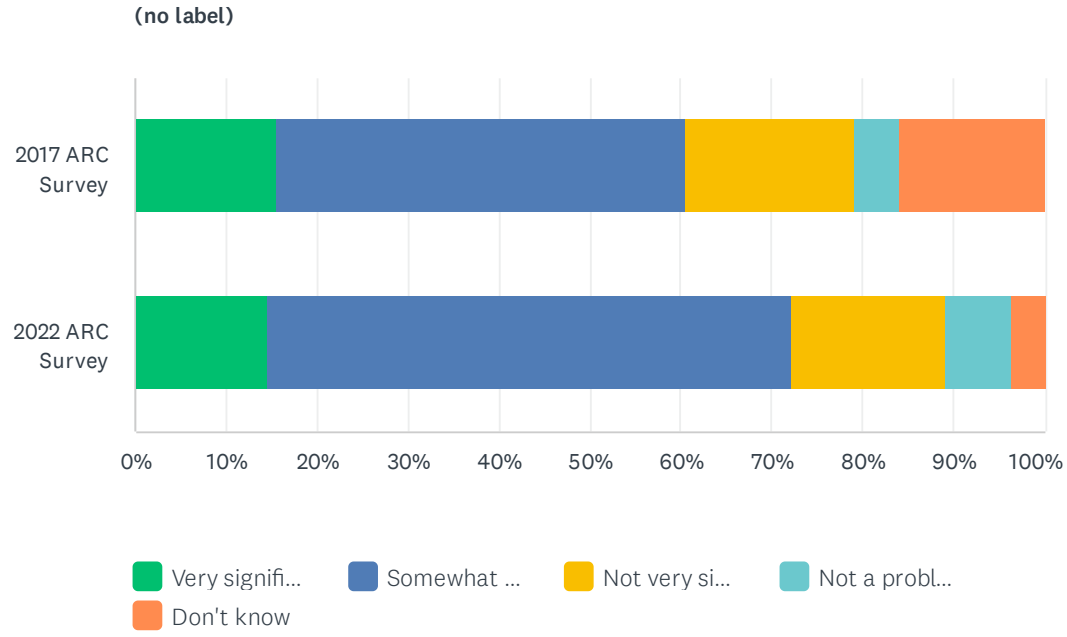
Answered: 3,227 Skipped: 399



(no label)	MUCH BETTER	SLIGHTLY BETTER	THE SAME	SLIGHTLY WORSE	MUCH WORSE	TOTAL	WEIGHTED AVERAGE
2017 ARC Survey	6.49% 27	25.00% 104	56.25% 234	11.30% 47	0.96% 4	12.89% 416	2.75
2022 ARC Survey	10.32% 290	30.59% 860	38.67% 1,087	16.65% 468	3.77% 106	87.11% 2,811	2.73

Q25 How significant would you rate the problems caused by stormwater runoff (rain events & snow/ice melt) in the Rouge River?

Answered: 3,222 Skipped: 404

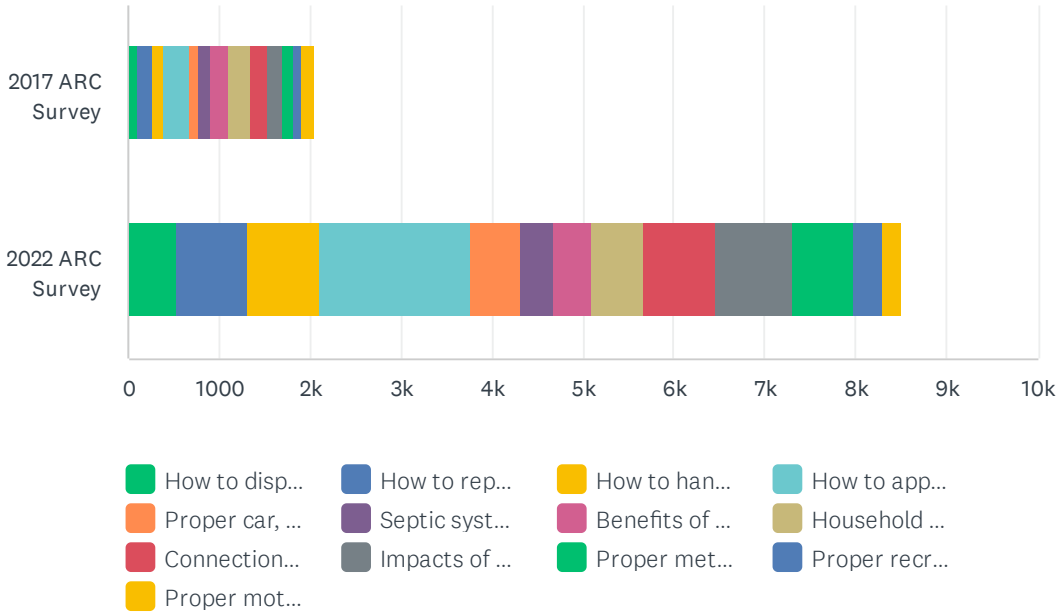


(no label)

	VERY SIGNIFICANT	SOMEWHAT SIGNIFICANT	NOT VERY SIGNIFICANT	NOT A PROBLEM	DON'T KNOW	TOTAL	WEIGHTED AVERAGE
2017 ARC Survey	15.46% 64	45.17% 187	18.60% 77	4.83% 20	15.94% 66	12.85% 414	2.61
2022 ARC Survey	14.42% 405	57.83% 1,624	16.81% 472	7.23% 203	3.70% 104	87.15% 2,808	2.28

Q26 What do you consider the most important things to educate the public on? (Choose up to 5)

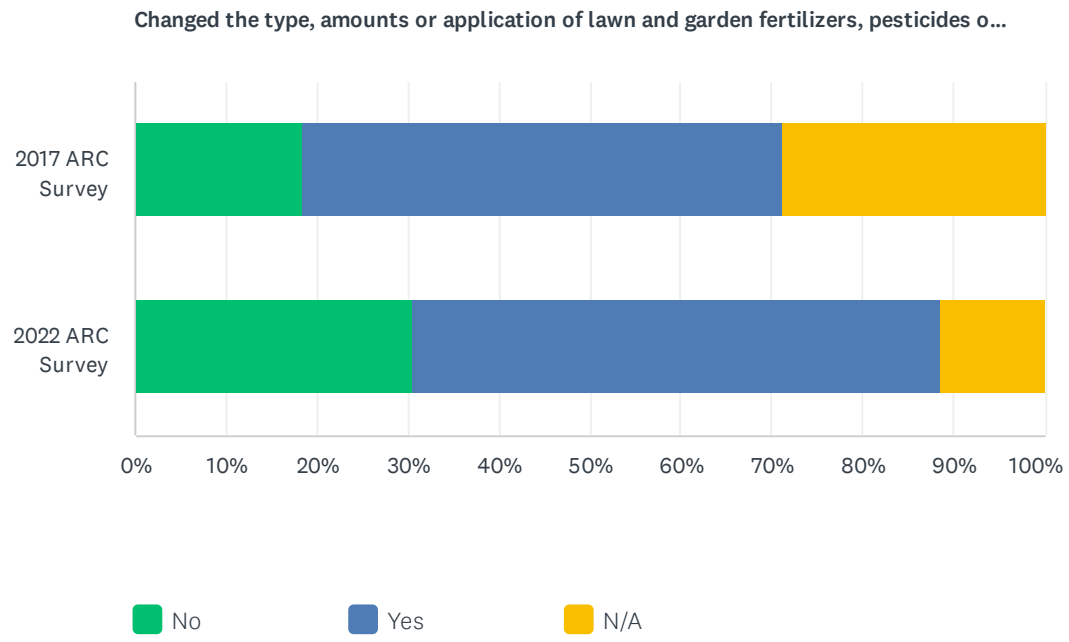
Answered: 3,210 Skipped: 416



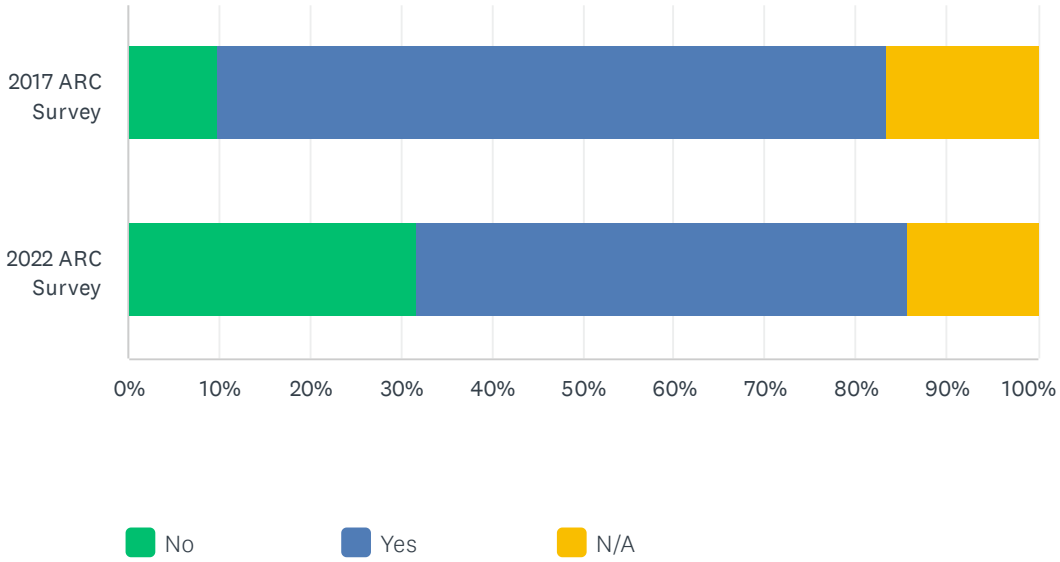
	HOW TO DISPOSE OF GRASS CLIPPINGS AND LEAF LITTER	HOW TO REPORT ILLEGAL DUMPING	HOW TO HANDLE PET WASTE	HOW TO APPLY AND DISPOSE OF PESTICIDES/HERBICIDES/FERTILIZERS	PROPER CAR, PAVEMENT AND POWER WASHING PRACTICES	SEPTIC SYSTEM MAINTENANCE	BENEFITS OF GREEN INFRASTRUCTURE/LOW-IMPACT DEVELOPMENT (LIKE RAIN GARDENS/RAIN BARRELS OR USING NATIVE PLANTS)
2017 ARC Survey	24.39% 100	40.00% 164	31.46% 129	69.27% 284	24.88% 102	28.05% 115	49.27% 202
2022 ARC Survey	18.93% 530	27.71% 776	28.75% 805	58.64% 1,642	20.43% 572	12.64% 354	14.89% 417
Total Respondents	630	940	934	1,926	674	469	619

Q27 Have you done any of the following? (Choose all that apply)

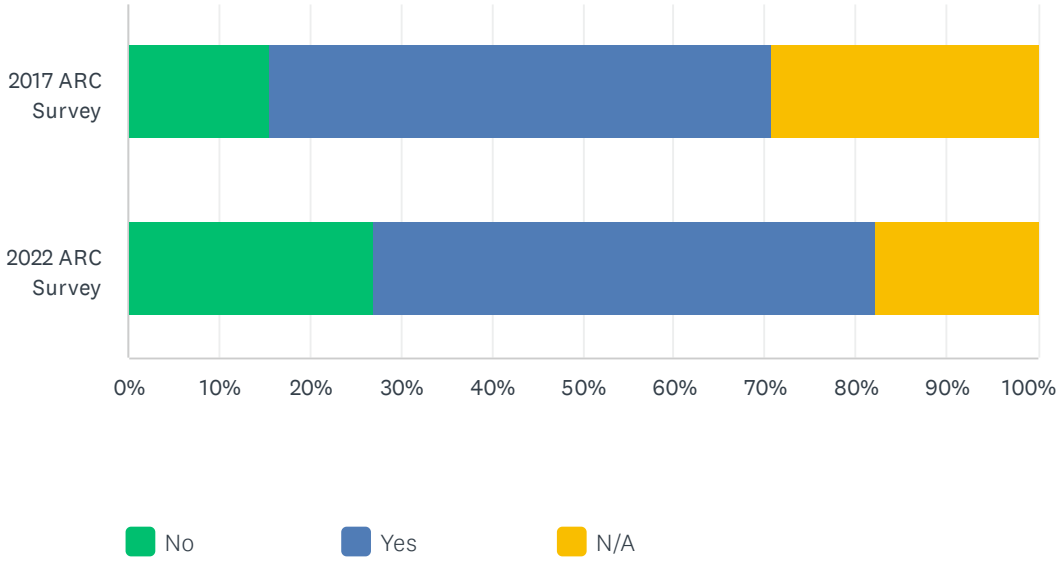
Answered: 3,196 Skipped: 430



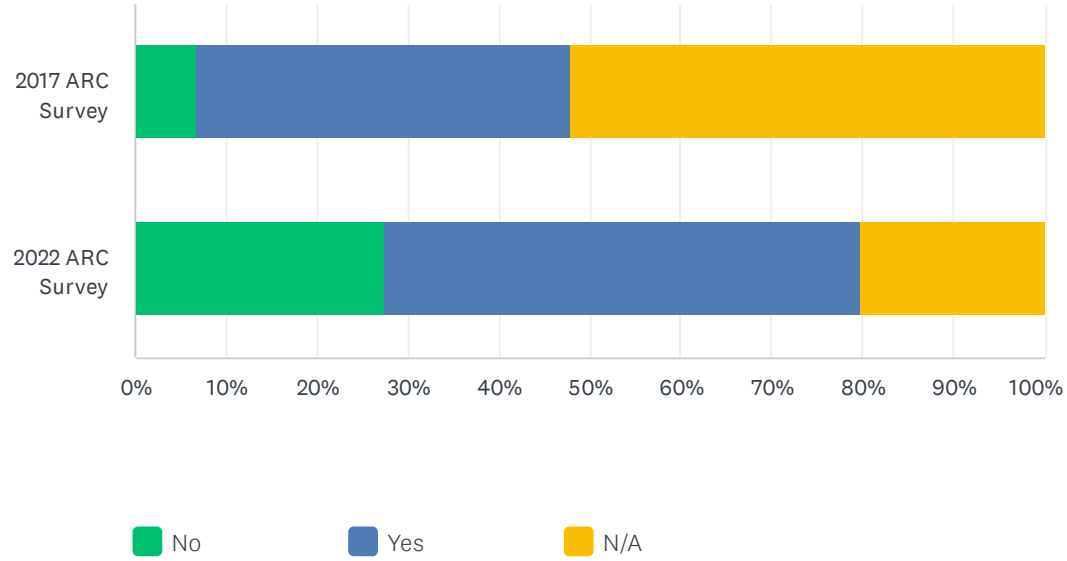
Take used motor oil, antifreeze, batteries or other household hazardous materials to ...



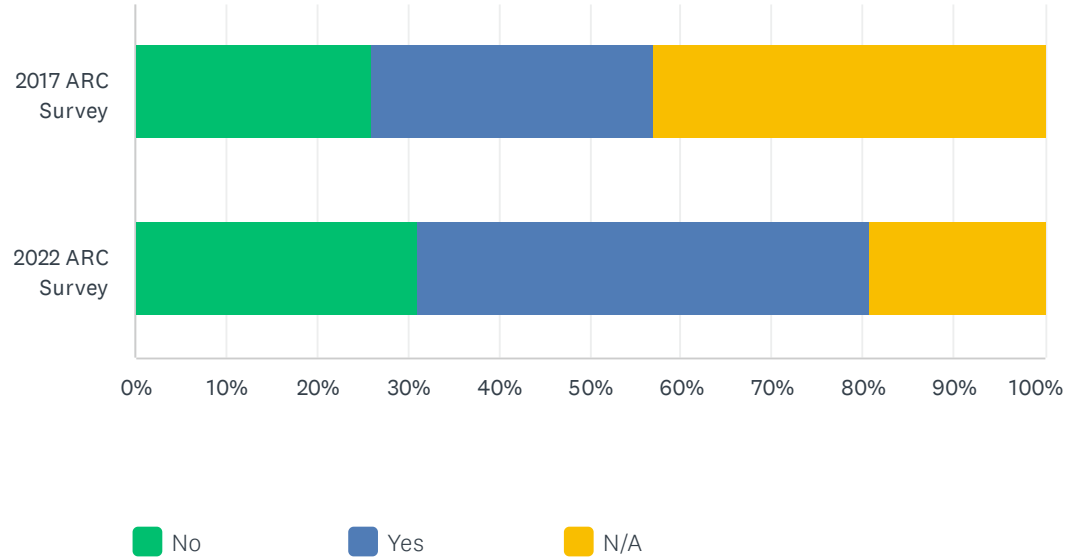
Reduced the use of detergents or other chemicals for home car washings



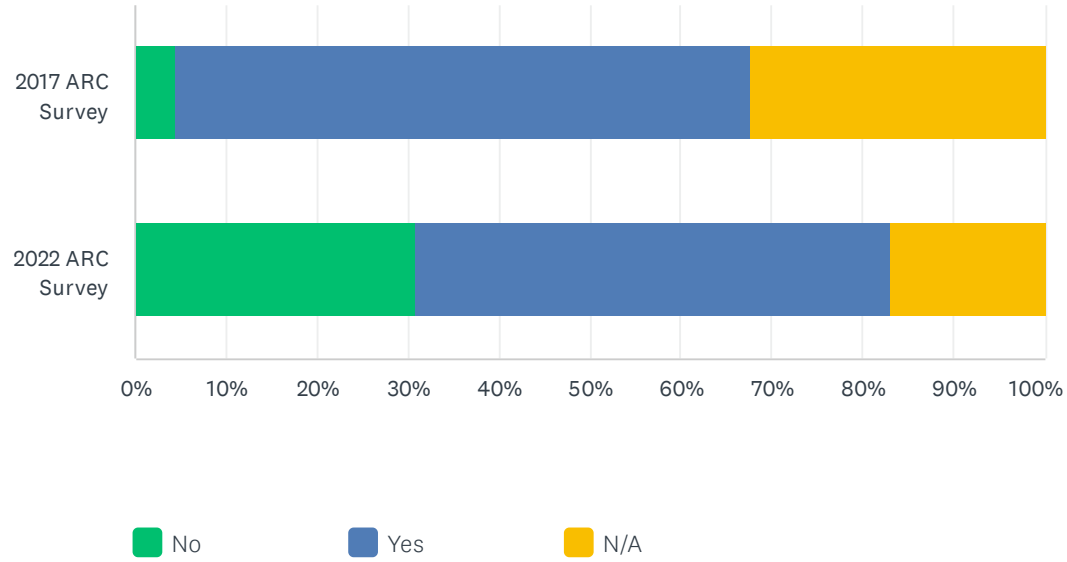
Stopped disposing of any waste material into catch basins and storm drains



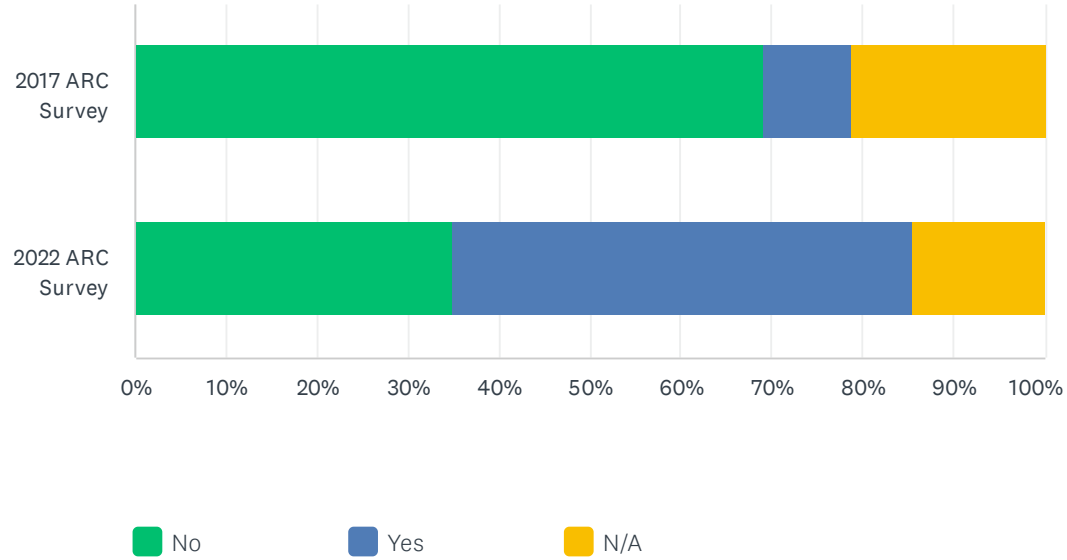
Disconnected downspouts from storm drains to allow roof runoff to seep into the groun...



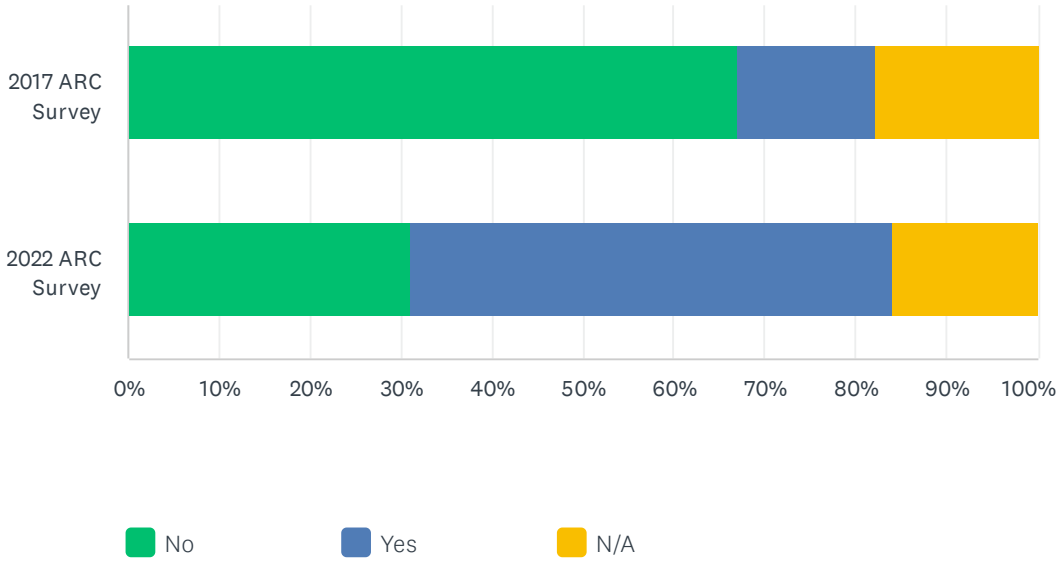
Pick up pet waste and dispose of properly



Installed a rain garden



Installed a rain barrel



Changed the type, amounts or application of lawn and garden fertilizers, pesticides or other chemicals					
	NO	**YES**	**N/A**	**TOTAL**	**WEIGHTED AVERAGE**
2017 ARC Survey	18.47% 75	52.71% 214	28.82% 117	12.70% 406	2.48
2022 ARC Survey	30.45% 841	58.11% 1,605	11.44% 316	86.42% 2,762	2.31

Take used motor oil, antifreeze, batteries or other household hazardous materials to recycling facilities					
	NO	**YES**	**N/A**	**TOTAL**	**WEIGHTED AVERAGE**
2017 ARC Survey	9.90% 40	73.51% 297	16.58% 67	12.64% 404	2.76
2022 ARC Survey	31.76% 873	53.95% 1,483	14.30% 393	86.01% 2,749	2.26

Reduced the use of detergents or other chemicals for home car washings

	NO	YES	N/A	TOTAL	WEIGHTED AVERAGE
2017 ARC Survey	15.63% 63	55.09% 222	29.28% 118	12.61% 403	2.56
2022 ARC Survey	27.00% 744	55.19% 1,521	17.82% 491	86.23% 2,756	2.34

Stopped disposing of any waste material into catch basins and storm drains

	NO	YES	N/A	TOTAL	WEIGHTED AVERAGE
2017 ARC Survey	6.73% 27	41.15% 165	52.12% 209	12.55% 401	2.72
2022 ARC Survey	27.46% 753	52.33% 1,435	20.20% 554	85.79% 2,742	2.31

Disconnected downspouts from storm drains to allow roof runoff to seep into the ground

	NO	YES	N/A	TOTAL	WEIGHTED AVERAGE
2017 ARC Survey	25.88% 103	31.16% 124	42.96% 171	12.45% 398	2.09
2022 ARC Survey	31.03% 855	49.84% 1,373	19.13% 527	86.20% 2,755	2.23

Pick up pet waste and dispose of properly

	NO	YES	N/A	TOTAL	WEIGHTED AVERAGE
2017 ARC Survey	4.50% 18	63.25% 253	32.25% 129	12.52% 400	2.87
2022 ARC Survey	30.93% 851	52.09% 1,433	16.98% 467	86.08% 2,751	2.25

Installed a rain garden

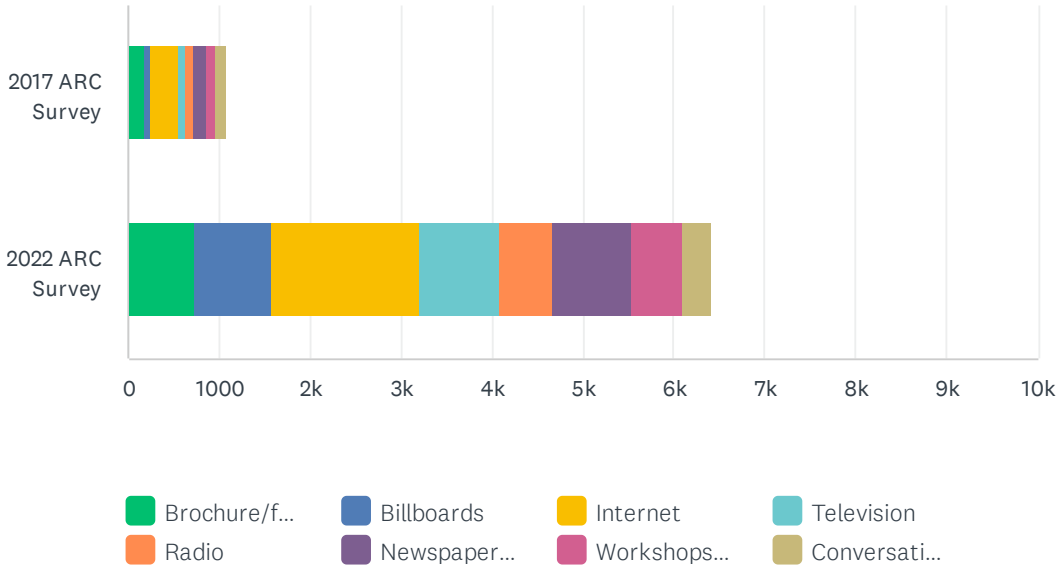
	NO	YES	N/A	TOTAL	WEIGHTED AVERAGE
2017 ARC Survey	69.19% 274	9.60% 38	21.21% 84	12.39% 396	1.24
2022 ARC Survey	35.05% 962	50.49% 1,386	14.46% 397	85.89% 2,745	2.18

Installed a rain barrel

	NO	YES	N/A	TOTAL	WEIGHTED AVERAGE
2017 ARC Survey	67.00% 266	15.11% 60	17.88% 71	12.42% 397	1.37
2022 ARC Survey	31.07% 852	53.03% 1,454	15.90% 436	85.79% 2,742	2.26

Q28 Where are you likely to seek information about water quality? (Choose all that apply)

Answered: 3,190 Skipped: 436



	BROCHURE/FACT SHEET	BILLBOARDS	INTERNET	TELEVISION	RADIO	NEWSPAPERS/MAGAZINES/NEWSLETTERS	WORKSHOPS/DEMONSTR
2017 ARC Survey	44.94% 182	14.07% 57	77.04% 312	20.99% 85	19.01% 77	34.07% 138	
2022 ARC Survey	26.32% 733	30.41% 847	58.64% 1,633	31.71% 883	20.22% 563	31.63% 881	
Total Respondents	915	904	1,945	968	640	1,019	654

Q29 To be eligible for the $100 visa gift card drawing that will be distributed in September, please provide your contact information. Your email will only be used to notify you if you are the winner. Thank you.

Answered: 2,706 Skipped: 920

	NAME	COMPANY	ADDRESS	ADDRESS 2	CITY/TOWN	STATE/PROVINCE	ZIP/POSTAL CODE	COUNTRY	EMAIL ADDRESS	PHONE NUMBER	TOTAL
2017 ARC Survey	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0
2022 ARC Survey	97.93% 2,650	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	99.89% 2,703	0.00% 0	197.82% 5,353
Total Respondents	2,650	0	0	0	0	0	0	0	2,703	0	2,706

Q30 Thank you for taking the Alliance of Rouge Communities' water quality survey. Please visit our website at www.allianceofrougecommunities.com or follow us on Facebook at @allianceofrougecommunities .

Answered: 362 Skipped: 3,264

	NAME	COMPANY	ADDRESS	ADDRESS 2	CITY/TOWN	STATE/PROVINCE	ZIP/POSTAL CODE	COUNTRY	EMAIL ADDRESS	PHONE NUMBER	TOTAL
2017 ARC Survey	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	100.00% 362	0.00% 0	100.00% 362
2022 ARC Survey	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0
Total Respondents	0	0	0	0	0	0	0	0	362	0	362