2017-2018

Rouge Education Project: Survey Results

Friends of the Rouge

Plymouth, Michigan

www.therouge.org

Published January 2019

Contents

Introduction 3
How Data are Used 3
Fall 2017 and Spring 2018 Results 4
All Grades 4
Pollution in the Rouge 5
Technical scientific questions (grades 7th-12th) 6
Feelings regarding the Rouge Education Project 7
4th-6th grade responses 7
7th-12th grade responses 7
Open-ended Responses 13
Notable Results & Discussion 21
Fall 2017 and Spring 2018 Monitoring 21
Teacher Evaluation Results 23
Overall Summary & Conclusion 26

Introduction

Pre- and post-Rouge Education Project (REP) student evaluations, designed to reflect the program's impact, are distributed to each participating teacher and are written for different grade level groups: 4-6, and 7-12. Schools in the program that have numerous grade levels participating are given the appropriate mix so that each student has the ability to take the proper survey. Pre-REP surveys that do not have a matching post-REP survey (and vice-versa) are not included in overall calculations. This ensures that the assessments are balanced and accurate, though it also can mean some schools' data reflect more/less students who actually participated in the program than in the surveys because they missed either the sampling day or the survey distribution. Below is the compiled assessment of the survey for both fall and spring monitoring.

As of fall 2013, REP pre- and post-sampling surveys have been modified and are adapted (with permission) from similar surveys created and distributed by Friends of the Chicago River.

How Data are Used

Survey results are used in program development and grant writing to estimate a measurable impact from those students that participate. Quantitatively, the program will be considered a success for 2017-2018 if the following are observed from student pre- and post- surveys:

- An increase in the percentage of students correctly answering multiple choice questions based on general watershed science and/or the Rouge River specifically
- An increase in the percentage of students who can identify specific water quality issues in the Rouge River
- An increase in the percentage of students who can correctly identify potential solutions to local and/or regional water quality issues

Fall 2017 and Spring 2018 Results

All Grades

Sample Size	
4th	1
5th	202
6th	175
subtotal	**378**
7th	158
8th	64
9th	37
10th	145
11th	41
12th	87
subtotal	**532**
TOTAL	**910**

Have you ever been on a Rouge River field trip?

	4th-6th		7th-12th	
No. of times to the Rouge River	Pre	Post	Pre	Post
Never	261	73	338	176
Once before	80	217	113	181
Twice before	30	71	65	105
Three times before	3	10	7	42
Four times before	0	0	2	11
Five times before	3	1	2	4
More than five times before	0	2	6	13
Blanks	0	3	0	1

66% of participants had never been on a Rouge River field trip before.

Interest in science

There was a 0.30% increase in the number of students *not* interested in science.

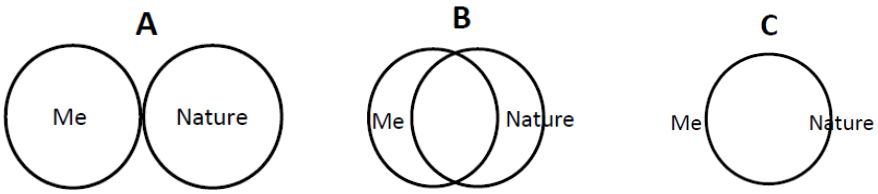
Interest in nature

There was a 1.34% increase in the number of students *not* interested in nature.

Interest in school

There was a 2.26% increase in the number of students interested in school.

Relationship with nature



There was a 1.71% decrease in the number of students that chose "A", a 1.43% increase in the number of students that chose "B" and a 0.27% increase in the number of students that chose "C" to represent their connection to nature.

Q: All macoinvertebrates are equally tolerant of pollution

There was a 4.95% increase in the number of students indicating the correct answer (*false*).

Number of students correctly identifying ALL macroinvetebrates from list (i.e., insects, mammals, **crustaceans, molluscs (snails, clams, etc.),** birds, fish**)**

There was a 16.48% increase in the number of students able to correctly identify these macroinvetebrates (from 168 students to 318 students).

Pollution in the Rouge

Number of students (4th-6th) able to list a source of pollution in the Rouge

There was a 16.31% increase.

Number of students (7th-12th) able to list a problem affecting the Rouge

There was a 9.87% increase.

Number of students able to list a corrective action to limit pollution

There was a 6.14% increase (768 students to 842 students).

Number of students (4th-6th) that know where to look to find out more about the pollution problem they listed

There was an 8.42% increase in the number of students able to find out more about the pollution problem they listed.

Number of students (7th-12th) that know where to look to find resources to fix the problem

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Pre	46	128	215	98	40
Post	95	162	168	83	23

There was a 9.16% increase in the number of students that "strongly agreed" with this statement, and a 6.22% increase in the number of students that "agreed."

Students (7th-12th) able to research the problem listed

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Pre	114	209	138	47	21
Post	136	199	132	48	16

There was a 4.06% increase in students that "strongly agreed" with this statement.

Students (7th-12th) able to explain the problem listed

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Pre	123	171	138	67	30
Post	146	184	126	53	23

There was a 4.19% increase in students that "strongly agreed" with this statement, and a 2.26% increase in students that "agreed".

Technical scientific questions (grades 7th-12th)

Q: Imagine you are at the river testing for the presence of dissolved oxygen in the water. If you want to get the most accurate result, you should repeat the test more than once.

97.55% of students answered this question correctly in the pre-survey (*true)*, and 95.54% of students answered correctly in the post-survey.

Students able to list a source of high nitrates in the Rouge

There was a 41.37% increase in the number of students able to list a source of high nitrates in the Rouge (73 students to 288 students).

Students able to list a corrective action to limit nitrates

There was a 54.74% increase in the number of students able to list a corrective action to limit nitrates (34 students to 309 students).

Feelings regarding the Rouge Education Project

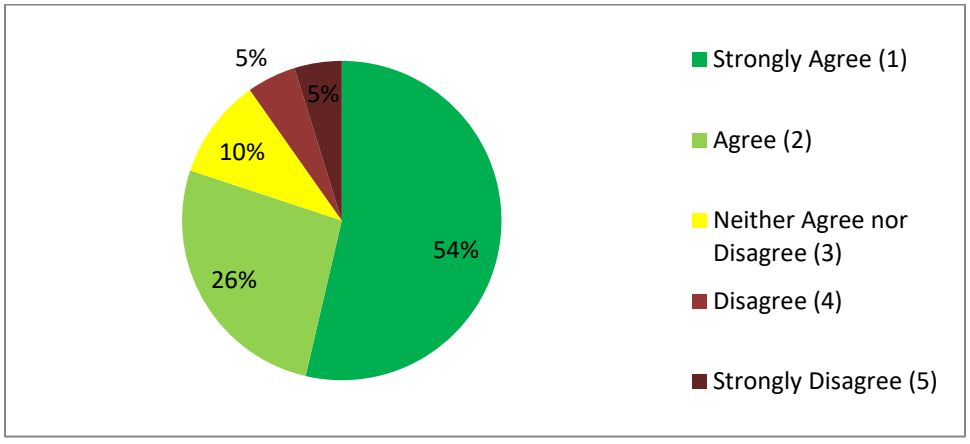
94.93% of all students were able to list a way participating in the Rouge Education Project helps the Rouge River.

4th-6th grade responses

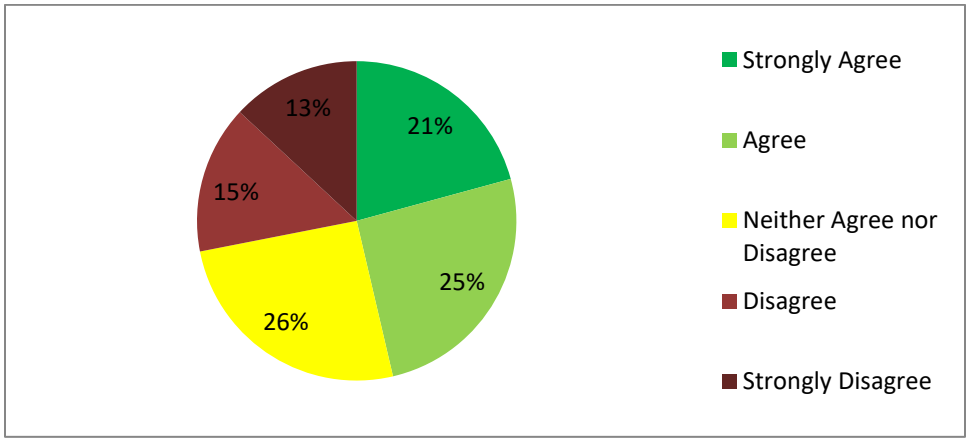
Question	Percent of students
Learned something new about the Rouge	97%
Learned how to make the Rouge healthier	96%
Participating in the REP made me feel like I could make a difference in protecting the environment	93%
Participating in the REP helped me to think like a scientist	86%
Participating in the REP helped me understand classroom material better	80%
Plan to talk to family/friends about the REP	78%

7th-12th grade responses

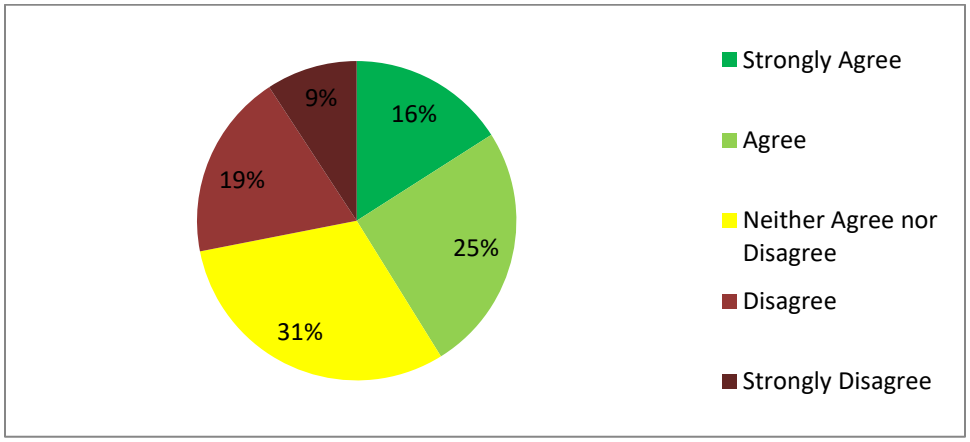
I learned something new about the Rouge River.



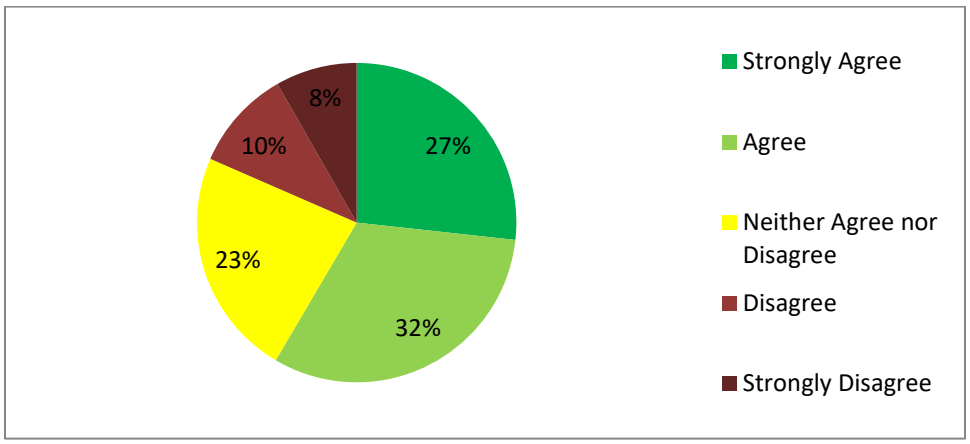
I plan to talk to family and/or friends about the information I learned.



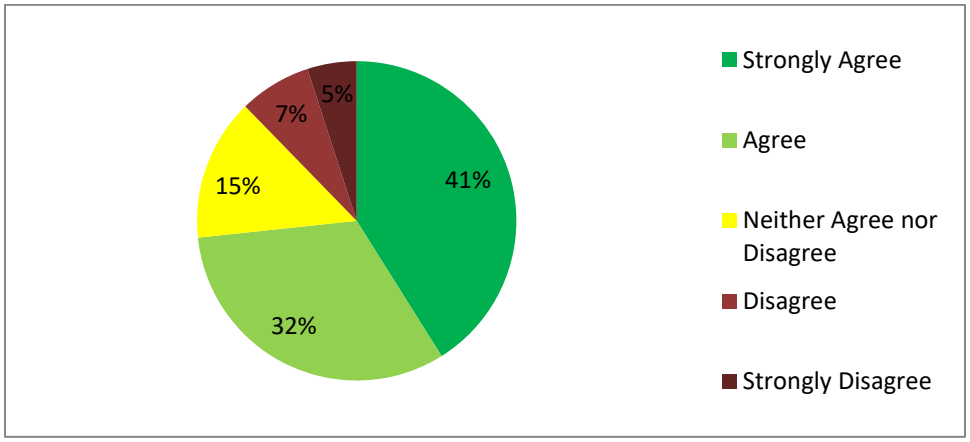
I experienced a feeling of connectedness to the Rouge River.



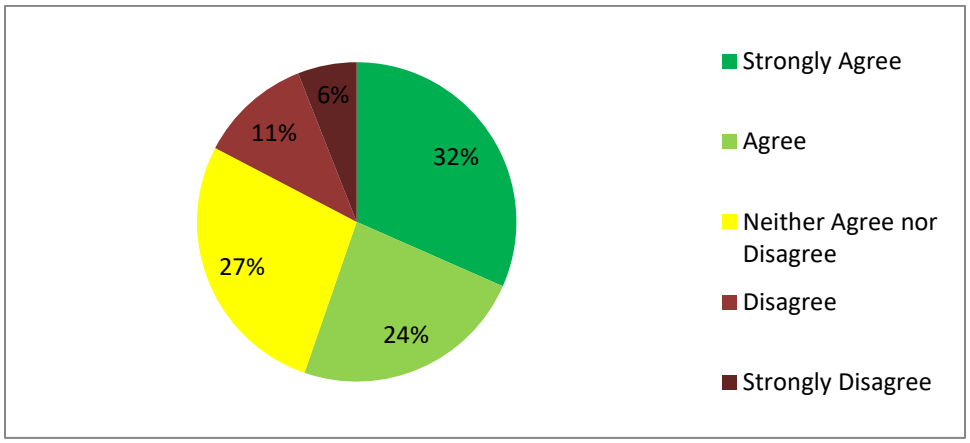
I found myself reflecting on new ideas about how my actions affect the river.



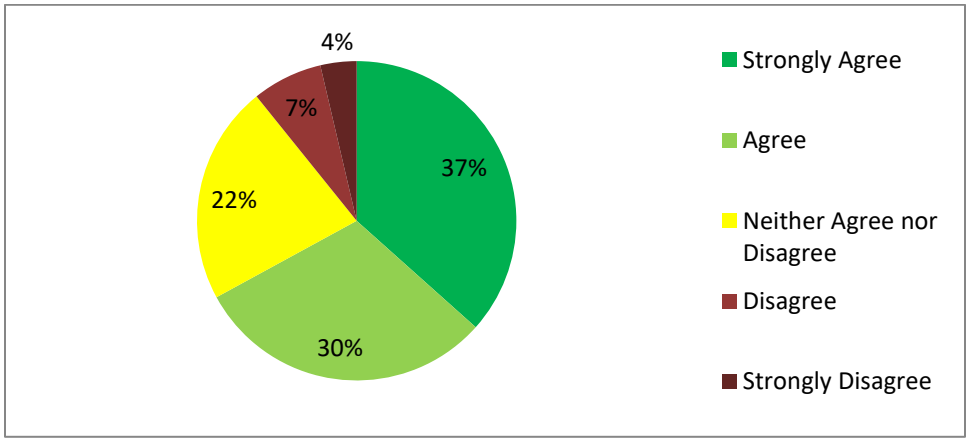
I learned about actions I could take to make the Rouge River healthier.



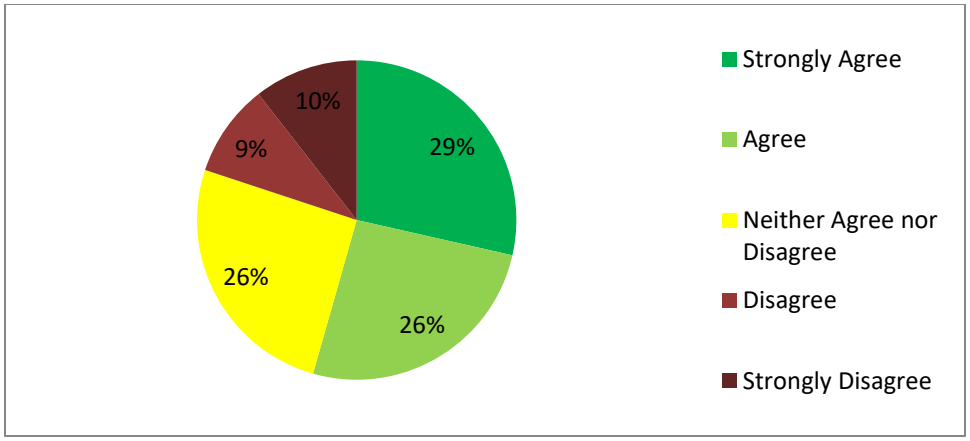
If given the opportunity, I would choose to participate in more projects that would help the Rouge River.



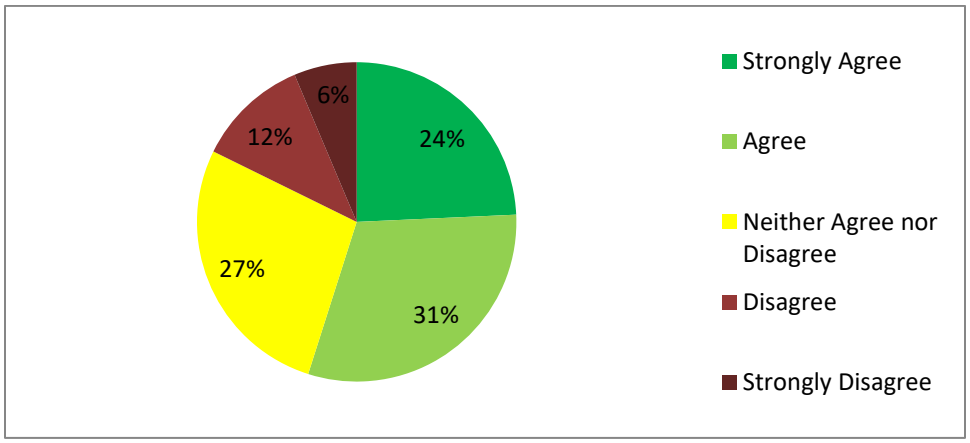
Our class' REP river monitoring made (or could make) a difference in the health of the Rouge River.



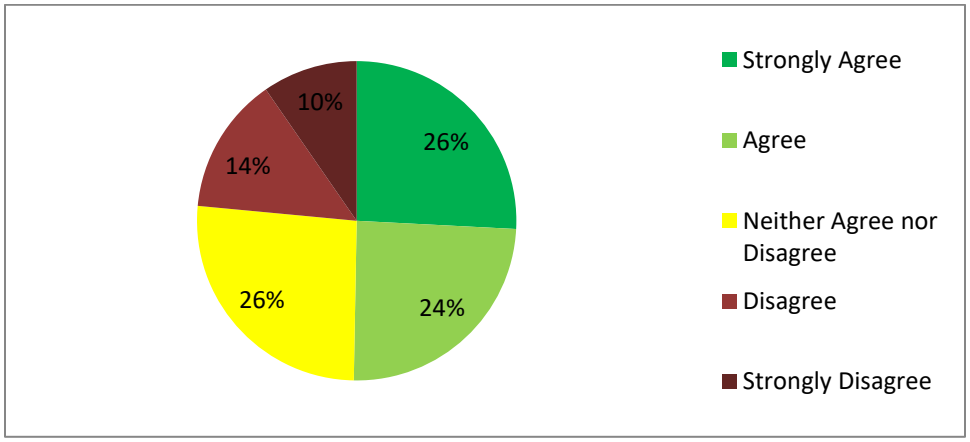
Our class' REP river monitoring involved people and/or organizations from the community (other than school staff/faculty.)



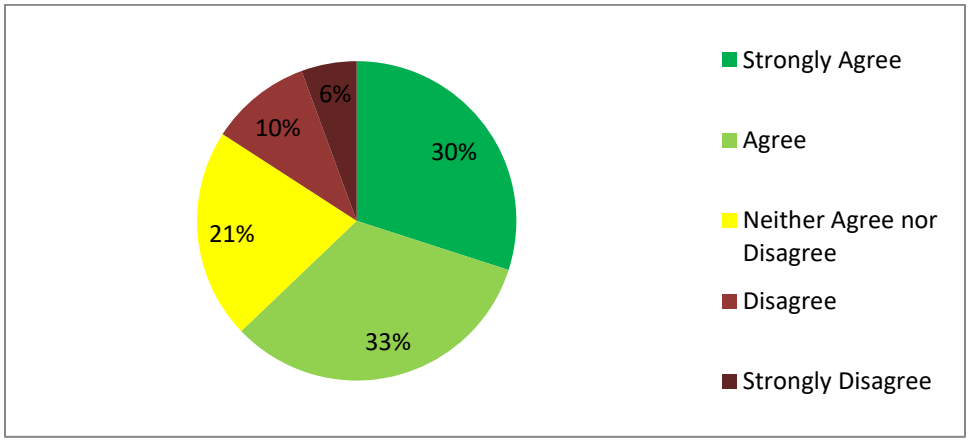
The REP helped me feel that I could make a difference in society.



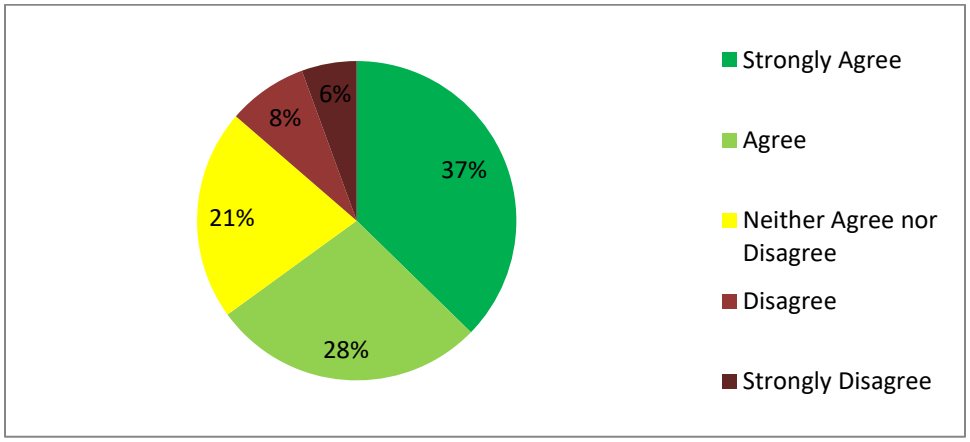
I met people/encountered things I normally wouldn't have during the REP.



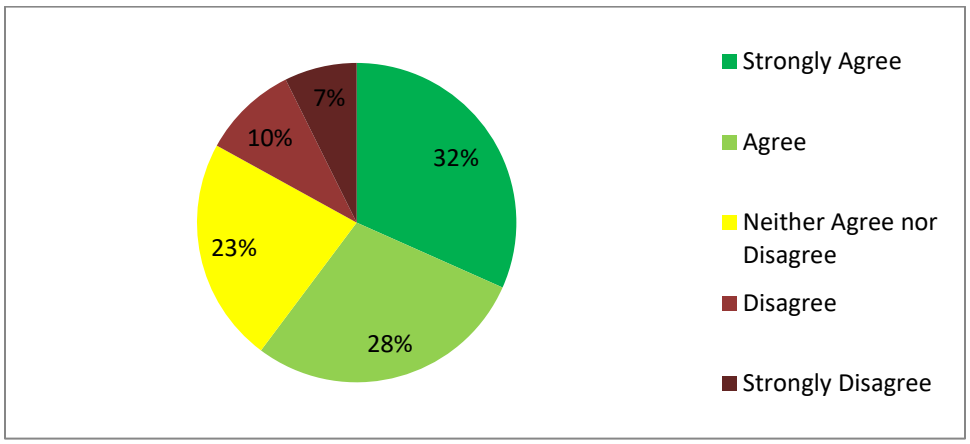
The REP challenged me to think like a scientist.



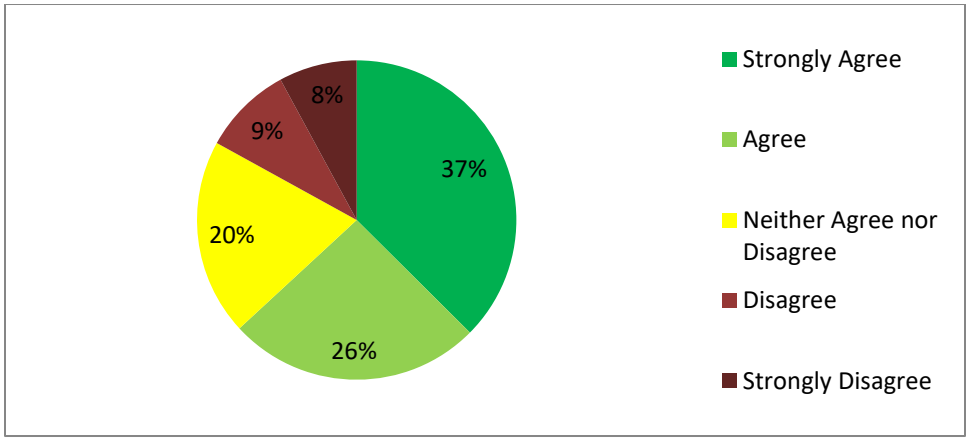
The REP was directly related to my classroom work.



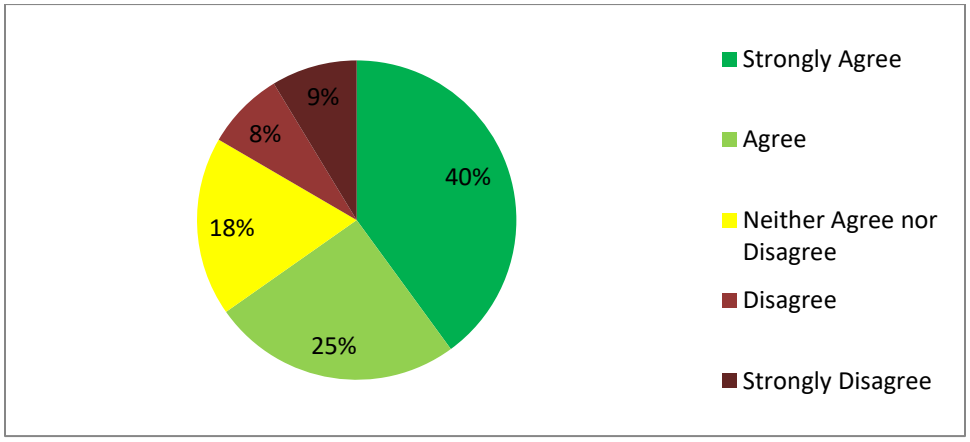
The REP helped me understand the classroom material better.



I had the opportunity to participate in river-related discussions and/or activities before our river field trip.



I had the opportunity to participate in river-related discussions and/or activities after our river field trip.



Open-ended Responses

When you think about the Rouge River, what is the first word that comes to mind?

4th - 6th Pre-		4th - 6th Post-		7th - 12th Pre-		7th - 12th Post-	
Word(s)	**#**	**Word(s)**	**#**	**Word(s)**	**#**	**Word(s)**	**#**
Water	72	water	83	Water	161	Water	119
river	50	river	37	River	45	river	33
Nature	17	nature	20	Dirty	24	Dirty	29
Red	13	pollution	17	Red	16	watershed	27
Pollution	12	Polluted	9	Nature	12	Red	14
red river	9	dirty	8	Pollution	11	Nature	12
fun	8	fun	7	Watershed	11	pollution	12
Fish	6	Animals	6	Detroit	10	polluted	9
Ford	6	Red	6	Rogue	8	Recovering	9
cool	5	red river	5	Fish	7	Rogue	9
dirty	5	Bugs	4	Polluted	7	Detriot	7
I don´t know	5	Fish	4	Michigan	6	Fish	6
adventure	4	watershed	4	red river	5	home	4
life	4	Beautiful	3	I dont know	4	Muddy	4
Polluted	4	Benthic Macro Invertibrates	3	Pretty	4	Recovery	4
Animals	3	BMI	3	Beautiful	3	school	4
Big	3	COOL!	3	Dirty water	3	Turbid	4
bugs	3	interesting	3	Fire	3	AP environmental science	3
Creek	3	Rouge	3	School	3	biodiversity	3
Rouge	3	Urban	3	Water Shed	3	Contaminated	3
beutiful	2	water and nature	3	Animals	2	Fecal coliforms	3
Exciting	2	Amazing	2	Contamination	2	Geese	3
interesting	2	creek	2	Ford	2	Macroinvertebrates	3
long river	2	Detroit	2	Garbage	2	Michigan	3
polluted River	2	dirty water	2	Insects	2	Science	3
Pretty	2	Ford	2	Life	2	Turbidity	3
rivers	2	Henry Ford	2	Local	2	Wildlife	3
trash	2	Insects	2	Muddy	2	Agricultural runoff	2
Wildlife	2	large	2	not clean	2	animals	2
amazing	1	Life	2	Organisms	2	Beautiful	2
Amazing time	1	long	2	Star Wars: Rogue One	2	boring	2
Art	1	Mud	2	Water testing	2	brown	2
awesome	1	Natural	2	127-mile river	1	Bugs	2

4th - 6th Pre-		4th - 6th Post-		7th - 12th Pre-		7th - 12th Post-	
AWESOME	1	Rouge River	2	a lot of naturing things	1	Clean	2
Backyard	1	urbanized	2	Animals and organisms	1	Contamination	2
Beautiful	1	dirty river	1	animals in and around the water.	1	Detroit River	2
Big River	1	amazing cool	1	bad	1	Dirt	2
big river maybe that is red?	1	animals that live in the water	1	Bad Water	1	Erosion	2
big river.	1	Art	1	beach road	1	Filth	2
Biking	1	awesome river in a forest.	1	Beautiful nature	1	Fire	2
Blood filled river	1	Awsome	1	Big	1	Flooding	2
Blue	1	beautiful, rocky stream	1	Body of water	1	Ford	2
Boat	1	Benthics	1	boring	1	Fun	2
boats	1	Big river	1	brown	1	Habitat	2
bodies of water	1	Biodiversity	1	calm	1	Hines Drive	2
bridge to chicago	1	blue	1	Calming	1	improving	2
bugs and water	1	Brilliant	1	Car factory	1	Large	2
butiful	1	bugs , fish , water	1	Clay	1	Lively	2
Cars	1	c00l	1	Cleaning	1	Oxygen	2
Chemicals	1	calm colorful	1	color red in français. Maybe the river has a red tint...	1	Species	2
contest for the picture for the Rouge River	1	Cars	1	color red.	1	aid because rivers like the rouge and certainly many others need help.	1
Crane	1	Chemicals	1	Community	1	Aquatic ecosystem	1
crazy	1	Clean	1	Crayfish	1	Aquatic organisms	1
Creatures	1	cleaning	1	creek	1	beautiful river	1
Detroit	1	Cleaning up	1	Cycle	1	Beautiful, but it needs help	1
Detroit river	1	Clear	1	Damaged	1	Big/widely spread out	1
dierty	1	COCNUT (water)	1	DCDS (because it passes through DCDS)	1	breath catching	1
Dirt doctors	1	Crayfish	1	Dearborn	1	Calm	1

4th - 6th Pre-		4th - 6th Post-		7th - 12th Pre-		7th - 12th Post-	
Dirty Water, Water Spiders, falling into water	1	Dirt	1	Dearborne	1	Calming	1
drawing	1	ecosystems	1	Detroit River	1	Canoeing	1
Duck	1	ew	1	dont know	1	cars	1
Ecosystems	1	Explore	1	Ducks	1	Cement	1
Experiment	1	Fantastic	1	eminem. (He made a song called River.)	1	clean neighborhood river.	1
field trip on the river	1	Ford Factory	1	Endangered animals	1	clear	1
Fish,frog's,lily pad's,deer	1	Ford plant pollution	1	environment	1	Comeback	1
fishing	1	forest with a stream running through it and it is a park	1	Erosion	1	Community	1
Flowing River	1	Fresh	1	Expansive	1	Crawfish	1
Flowing water	1	Friends of The Rouge	1	Filthy	1	damselfly	1
Flying Nucular Tacos That Look Like Cheeto Puffs	1	garbage	1	Fish and water	1	Desperate	1
Ford Rouge Factory Tour	1	green	1	Fishing	1	Developing	1
France	1	Help!	1	flood	1	Dirty and muddy waters.	1
French	1	helpful	1	floods	1	Dirty River	1
French River	1	Henry Ford Polluting	1	Flow	1	Dissolved Oxygen	1
Frogs	1	Historic	1	Flowing	1	Diverse	1
gaming	1	huge river	1	Ford Plant	1	Do and BOD	1
going on a boat.	1	Important	1	Ford rouge	1	Do, Bod	1
Helping Rivers Maybe.	1	improvement	1	Forest at my school	1	Dog poop	1
Henry Ford	1	Incredible	1	Fragmented	1	Duck	1
improvement	1	interesting and life	1	Fresh	1	Ecosystem	1
Infected.	1	It going to be fun	1	Fun	1	Eminem	1
It has a road and a lake where we can go fishing	1	lake	1	Garbage/ Pollution	1	Environment	1

4th - 6th Pre-		4th - 6th Post-		7th - 12th Pre-		7th - 12th Post-	
it was big	1	Large~ Benthic Macroinvertibrate	1	Geese	1	Eye-catching	1
its long	1	Litter	1	Green	1	fertilizler pollution in the muddy water.	1
Life/Water	1	Lots of trees and water and lots of bugs and bugs	1	H2O	1	filthy	1
Long	1	macroinvertebrates	1	Harm	1	fixable	1
lot of water	1	messy	1	Harmful	1	flood	1
majestic	1	moist	1	Helpful	1	flow	1
messy	1	mud chemicals and oil spilles	1	Helping.	1	Flowing	1
Michigan	1	Muddy	1	Hines	1	Flowong water	1
mud	1	nasty	1	Hines Drive	1	Ford Plant	1
Muddy	1	nature and buity	1	Hines Park and the flooding	1	Garbage	1
Natural	1	Nature in a river	1	Huge	1	giant river that has some pollution in specific areas.	1
nature/water	1	Nature/Rivers	1	human	1	Good	1
Ocean or Animals	1	Nice	1	Human interaction	1	Green	1
Oh my Gosh	1	O my Gosh	1	i dont know what the rouge river is	1	heavy water pollution	1
Omg	1	OMG	1	i dont think	1	help	1
Omg that's nice	1	Organisms	1	Important	1	hidden	1
Omg that's wild	1	outside	1	interconnected	1	High turbidity from sediments clouding the water	1
Outdoors	1	People cleaning up the river	1	Invertabrae	1	Higher ph because of limestone	1
Paris	1	People working hard to clean it.	1	it is dirty	1	Hurt	1
polluted water	1	place that has some group 3 BMI'S	1	It's a lake	1	Importance of nature.	1
pollutiol	1	Place That Helps Rivers Stay Clean	1	It's not clear	1	Important	1
Probably polluted and maybe big.	1	Plastic Flamingo	1	Kayaking	1	Insects	1
program	1	polluted area	1	kind river that runs through my city	1	Isolated	1
pullution	1	polluted before	1	large body of water.	1	IT's Rawge dummy.	1

4th - 6th Pre-		4th - 6th Post-		7th - 12th Pre-		7th - 12th Post-	
Quiet	1	poop	1	Large water stream	1	Leeches	1
red and river	1	poopy river	1	Lead	1	Life	1
river and water	1	pouluted water	1	life	1	liquid	1
river land ??	1	Pullotion	1	Long	1	living species- many animals live in the rouge river	1
river stream	1	Red or Raj	1	Long lake	1	Local	1
river that has a unbelievably beautiful background and animals.	1	river or something that has water	1	Mucky.	1	long	1
river that has diffrent types if bacteria	1	River or Stream	1	Murky	1	Main section of the rouge River	1
river that is big and interesting	1	river that is full of BMI's	1	My walk home	1	marine animals	1
river that is pretty large.	1	River that needs are help	1	Nasty	1	micro organisms	1
River water	1	river to help	1	Nature Center	1	mindblowing	1
river with a lot of plants.	1	River with fish	1	Near	1	mrs. johns	1
river/nature	1	river,water	1	never been there or seen it so im good	1	mud	1
rode trip	1	rivers	1	nice and clean	1	murky and muddy	1
Rouge- Red in french	1	Rogue One	1	not a very clean river	1	Murky river	1
rouge river	1	Rouge river watershed.	1	not fun	1	Natural	1
Rouge=red	1	rough	1	nothing	1	nature and animals	1
rushing	1	Salmon	1	organization	1	no	1
Salmon	1	Scary animals	1	peaceful	1	organisms	1
science	1	Skinny River That Flows Fast	1	Peaceful	1	park	1
Scientific	1	Skinny, long	1	Polluted water.	1	Parks in the area and all the animals	1
sience	1	source	1	pollution, water	1	Peaceful and relaxing whenever I cross over the bridge in Hines Park.	1
Something based on water	1	Stable	1	poluted river that needs to be cleaned.	1	pH	1

4th - 6th Pre-		4th - 6th Post-		7th - 12th Pre-		7th - 12th Post-	
Star Wars	1	stinky water	1	Problematic	1	Plants	1
Subhanallah	1	stream	1	pulloted river.	1	Pollition	1
Swimming	1	testing	1	Rat	1	Polluted (but could get better)	1
that its a big river	1	Detroit River	1	Recreation	1	polluted because all while I was learning about the Rouge River in science, we were being told about how we have a lot of tests to make sure the water is safe to drink because at one point in time the river was so polluted that you could light it on fire.	1
things about nature.	1	trash	1	recycle	1	Polluted Nature	1
thirst	1	Unclean	1	Red as Rouge means red in French	1	Polluted RIver.	1
tour of nature	1	Urban, and used to be polluted	1	red because rouge is another word for red.	1	Polluted water and Disease	1
Tranquility	1	water animals	1	red idk	1	Pollution and Bacteria	1
type of River	1	water or wet.	1	Red RIver because rouge means red in French	1	Pollution and water	1
unhealthy	1	water shead	1	Red, because Rouge means red in french.	1	Pollution/Organic Waste	1
very bumpy and rocky river	1	water shed	1	red.	1	Pools	1
very dirty river	1	Water, nature	1	Red?	1	popcorn chicken	1
very rapid river	1	watershed and macroinvertebrates	1	redford	1	Potential	1
Water and bugs	1	Watersheds	1	Researched	1	pretty	1
water and dirty	1	why	1	river for boating	1	Pretty polluted	1
water and wildlife	1	Wild life	1	River in Michigan	1	Problematic	1

4th - 6th Pre-		4th - 6th Post-		7th - 12th Pre-		7th - 12th Post-	
water or baby animals	1	Wilderness	1	river near my house	1	Pure	1
Water Pollution	1	WOW it is samll	1	River near school	1	Red cause rouge means red in French	1
water treetmint plant	1			river that needs help	1	Red River	1
what comes out is pollution	1			river that passes by my school.	1	Reinventing	1
when my lunch broke and my friends mom had to hold it	1			river with a strong current	1	Rescue	1
why rouge	1			Rouge One	1	resilient because of how far it has come.	1
Woah!	1			Rouge river	1	resillient	1
YAY!	1			Rouge River factory plant for Ford	1	Restoration	1
				rouge river ford factory.	1	river for rowing	1
				Rug...	1	River or Forest	1
				rushing water	1	river testing.	1
				Salmon eggs	1	river thats polluted	1
				Save	1	River, Polluted	1
				save it	1	Rouge River Factory	1
				scenic	1	Rouge River is a really neat river, not necessarily clean. Nature	1
				Science	1	Rouge River is calm	1
				seacreatures	1	Rug.	1
				Small	1	school backyard	1
				Small body of water	1	Sediment	1
				small river.	1	Serene	1
				Smells bad	1	Shallow	1
				smelly	1	slow moving	1
				Soccer (Detroit City Football Club)	1	Smell	1
				Stage Nature Center	1	Splash	1

4th - 6th Pre-		4th - 6th Post-		7th - 12th Pre-		7th - 12th Post-	
				Star wars	1	Steven	1
				street	1	Studying science	1
				supply	1	Swampy	1
				That I'm pretty sure it's in Michigan even thought I don't know much about Michigan	1	Tests	1
				To be cleaned	1	The color red or the water shed.	1
				Tonda (Elementary school)	1	trash that is produced by humans and is landing into the river than the ocean.	1
				Tourist	1	Troy	1
				trash river	1	turbid or watershed.	1
				turtle	1	Turbide	1
				unclean	1	Turtle	1
				Unknown	1	Turtles.	1
				Walking	1	Unclear and dirty due to the garbage being added to it	1
				Waste	1	Unhealthy	1
				water and animals	1	Water Index Quality	1
				Water park	1	water is kind of dirty	1
				Water sources	1	Water level	1
				water stream	1	Water pollution	1
				Water supply	1	water pollution in the Rouge River	1
				wet	1	Water testing	1
				Wet	1	Water testing	1
				Wetland	1	water, nature	1
				Where is it	1	Watershed and school	1
				Wildlife	1	Watersheds	1
				wildlife that lives in it	1	wildlife that lives there.	1
				Woods	1		

Notable Results & Discussion

Fall 2017 and Spring 2018 Monitoring

Matching pre- and post- surveys were found for 910 students.

Schools that submitted usable pre- and post- survey data: Achieve Charter Academy, Chandler Park Academy High School, Clippert Multicultural Honors Academy, Crescent Academy International, Crestwood High School, Detroit Country Day Middle School, Huron Valley Lutheran High School, Inter-City Baptist School, Lincoln Senior High School, MacArthur K-8 University Academy, Mary Helen Guest Elementary School, Plymouth High School, Power Middle School, Roosevelt High School, Smith Middle School, Steppingstone School, Tawheed Center School (Dearborn Heights), Thurston High School, Tonda Elementary School, Troy College & Career High School, Troy High School, and Tyrone Elementary School. Only one pre- and post- survey was included for each student, therefore some students may have completed both fall and spring sampling and were given the pre-survey before fall monitoring and the post- survey after spring monitoring. No matching pre- or post- surveys were received from the Academy of the Americas High School, Emerson Middle School, Medicine & Community Health Academy at Cody, Ronald Brown Academy, or Salem Elementary School. A few schools that submitted usable pre- and post- survey data did not have many entries from their class.

There was a large subsection of 7^{th} – 12^{th} grade students that indicated they had never been on a Rouge River field trip, even in the post-survey. This could be due to the large number of students that were from Crestwood High School's AP Environmental Science class that did not attend the field trip (only a smaller group of students from that school are able to visit the river), but went over the background information, procedure and results. The 4^{th} – 6^{th} grade students indicating they had 'never' been in the post- survey were largely from Detroit Country Day Middle School – whose creek runs on their property – meaning their students may not realize that their trip outside to the river is included as a "Rouge River field trip". Some other students from that age group were from a school that had to reschedule their monitoring event to a Saturday, meaning not everyone could attend.

While over half of the students had never been on a Rouge River field trip before, the large number of students that had attended a field trip previously were likely from Detroit Country Day Middle School, and Steppingstone School, where students participate through multiple grades.

Analyzing a student's interest in science, nature, and school, is to gauge the receptiveness of that student to a project like the REP. These results are not used for analysis currently, but may provide an interesting benchmark for comparison in the future, i.e. running analysis based on students that are and are not interested in science and nature, respectively. Students also felt closer to nature following the field trip.

Students saw an increase in correct answers for both scientific questions related to macroinvertebrates, listing sources of pollution and problems in the Rouge, as well as corrective action to limit pollution. Responses listing corrective actions to limit pollution became much more specific and action-oriented in

the post survey. More students knew where to look to find out more about the pollution problem they listed, where to find resources to fix the problem, and how to research and explain it.

The survey question referring to conducting multiple trials of the same test to get the most accurate result may be too simple for students in grades 7^{th}-12^{th}. This must be a concept covered heavily in science classes before students reach 7^{th} grade. There was an insignificant decrease in the percentage of students answering that question correctly from the pre- to post survey, further emphasizing that this question may not provide meaningful analysis.

There was a very large increase in the percentage of students able to list a source of high nitrates and a corrective action to limit nitrates – indicating this was not a concept they had covered in class prior to the watershed unit, and demonstrating they took specific scientific knowledge away with them upon completion.

Almost all students (94.93%) were able to list a way participating in the Rouge Education Project helps the Rouge River.

In general, most students (7^{th}-12^{th}) agreed with the statement that they learned something new about the Rouge River (80%). They learned actions to make the river healthier (73%), and felt like their monitoring could make a difference in the overall health of the river (67%). They participated in river discussions before and after their trip (63% / 65% respectively). The project was related to their classroom work (65%), and a little over half of students (60%) felt like it helped them understand their classroom material better.

Students felt like the project helped them to think like a scientist (63%). They reflected on new ideas about how their actions affect the river (59%), and (56%) would participate in projects that would help the Rouge River. A little over half (55%) of students recognized that their monitoring involved people and/or organizations from the community, and felt like their monitoring would make a difference in society (55%).

50% of students felt like they met people and encountered things they normally wouldn't. Most students did not plan to talk to family and friends about what they learned (46% did), and didn't experience a feeling of connectedness to the Rouge (41% did).

The 4^{th} – 6^{th} graders need improvement making the connection between what they are learning in the classroom and what they are doing on the field trip.

Open-ended questions such as "When you think about the Rouge River, what is the first word that comes to mind?" rendered these top responses: water, river, dirty, nature, and red in the pre-survey, and water, river, dirty, watershed, and red in the post- survey. The word "dirty" was more popular with the 7^{th} – 12^{th} grade bracket, while younger students seemed to have a more positive vision of the river overall.

Teacher Evaluation Results

Rouge Education Project teachers are also given a program evaluation at the end of the school year to give them the opportunity to share their feelings about project execution. Nine teachers responded.

Most teachers felt comfortable teaching the chemical, physical, and biological assessments of the river.

Level of comfort	Chemical	Physical	Biological
Completely comfortable	4	2	4
Very comfortable	4	4	3
Moderately comfortable	1	2	1
Uncomfortable	0	0	1
Very uncomfortable	0	0	0
N/A	0	1	0
Blank	0	0	0

Some teachers that responded were able to attend training events, whereas others didn't feel they needed to because they had gone through training and were confident. Barriers to attending training events were that they did not fit into their busy schedules.

Eight teachers felt that they were completely satisfied with the level of support received from REP staff, one put N/A.

The REP is a good outlet for schools that may not be able to implement a water quality monitoring project on their own.

Likelihood of implementing water quality monitoring program if the REP did not exist	# respondents
Very unlikely	4
Unlikely	1
Doubtful	2
Likely	0
Very likely	1

Six teachers were completely satisfied with their participation in the REP this year, two teachers were very satisfied, and one teacher entered N/A.

Some suggestions for additional training events included being a part of any future research on the Rouge River, seeing how other experienced teachers teach the tests and information in the classroom to improve on how they prepare their own students for testing day, and online videos to show student techniques. Chemical instruction videos were produced last year; the teacher that suggested production of videos must have not been aware of the new videos – or would like videos showing other steps of the program.

Select teachers are able to take their program a step further, and **incorporate an environmental action component** following their participation in the REP. Additional projects included:

-Adopt-a-Road of the area near the sampling site
-Maintenance of a series of rain gardens in Dearborn Heights
-Analysis of data and composition of a paper related to water quality in our state
-Salmon in the Classroom
-Project SLIME to learn about invasive species

Some students are encouraged to take their project further and take **environmental action in their community**:

-Take far more ownership of their own yards and what gets applied to their lawn. Parents tell the teacher about this at conferences.
-Students started to talk about doing different things on their own, although the class did not have a specific project.

Barriers to action: An ancillary project set up for students to participate in would help, not sure what would inspire them to take action other than to be much more aware of the impacts we have on the ecosystem, students spend very little time outside and feel really disconnected from the environment and don't feel much agency in the community, so it would take a more extended experience to make them take action.

The only suggestion to **improve communication** was to ditch the online classroom and create a shared Google Drive or Google Forms that may be more helpful.

REP Strengths:

-"Staff and volunteers."
-"This program is the first action step my students have with testing water. The REP is valuable in that it makes it real life. It's not just something we look at and talk about."
-"Monitoring day assistance, organization, & communication."
-"We love participating in it."
-"Getting students out into the field to do relevant real life science work which they can actually do. How it fits into many different classes of different content. The way that it requires students to work together to gather the data and figure out the quality of the water."

-“Connecting science to their actual environment and "doing" science outside the classroom/lab is a strength for sure!”
-“Erin [the REP Program Manager] is great, she does a super job!”
-“Everything is organized very well. Great program!”
-“Your emails are great!”
-“I think you do a good job with this.”
-“I LOVE the Google Forms☺”
-“Communication has been great!”

REP Weaknesses:

-“Bus grants/sponsors.”
-“I just wish we had more time to do more with what we learned.”
-“Difficult to get volunteers.”

Additional Comments:

“I would love to figure out a way to skype, partner, or chat with other groups.”

All teachers planned to participate in the REP in the future.

Overall Summary & Conclusion

Previous survey evaluations were analyzed by grade level. In an attempt to conduct meaningful analysis of the project's impact overall (rather than by grade level), some questions included all student responses to provide a larger sample size. This method of analysis began in spring of 2015. Additionally, fall and spring survey results were combined as of spring 2017 to include those students that complete two monitoring events throughout the school year and to not duplicate pre- and post- monitoring efforts within a single school year.

All submitted surveys this year were electronic.

Pre- and post- survey analysis rendered the program a success based on the following criteria: an increase in the percentage of students correctly answering multiple choice questions based on general watershed science and/or the Rouge River specifically, an increase in the percentage of students who could identify specific water quality issues in the Rouge River, and an increase in the percentage of students who could identify potential solutions to local and/or regional water quality issues.

The REP did not receive a pre- and post- student survey from every student participating in the program. There were major issues with survey distribution this year, with students not completing the correct post- survey (completing the pre-survey again instead, leaving many of the post-survey questions blank), schools forgetting to have their students complete the post- survey before the end of the year, and leaving the students to conduct the surveys on their own (leading to a small sample size from the class). Spring monitoring events kept getting pushed to later and later in the year due to weather and testing schedules, and some schools simply ran out of time. More schools than usual did not submit usable pre- and post- survey data, which means more reminders and follow-up will be conducted henceforth. Even so, the sample size provided sufficient results.

In addition, students that have already participated in the REP may receive the survey multiple times. Ensuring the surveys are only given to those students that participate in the full program (including the field trip) and are not given repeat surveys would help give a more accurate picture of the student's first exposure to the Rouge Education Project and field science, if measuring that is a goal.

There needs to be an increase in engagement with older students to reach more than half of students on certain topics: to recognize that monitoring involved people and organizations from the community, to provide more opportunities for students to meet people and encounter things they normally wouldn't have, and to increase excitement and engagement so that students are interested in talking with their family and/or friends about the project. Many young students are not making the connection between the material they are learning in the classroom and the field trip – this could be because some teachers do not do an in-depth study of the river or present material beforehand. Those teachers use the REP as an exploratory trip out at the river for one day.

The survey reached students across many different demographics and backgrounds; some may already have environmental knowledge, and some may not have much of an interest due to lack of exposure. The open-ended responses may reflect the site along the Rouge that each school visits – some may be

considered “dirtier,” while other are more natural and scenic. Their impression of the local river can vary greatly due to the stretch of river in which they are exposed.

Service learning opportunities would increase with community involvement. Many schools did not request corporate or other trained volunteers to help with their project and worked completely independently. Establishing a greater connection to their collection of data and submission to Friends of the Rouge/the Rouge Education Project should be explored. The REP should also work with local communities to identify potential project areas (such as parks or city land) the students could restore, and plans to explore more service-learning project opportunities in the future through a partnership with the organization Earth Force.

Teacher evaluations were mostly very positive with some helpful constructive criticism. The teachers that responded felt comfortable, and many were able to help with additional action projects in their community. Updates to the online classroom as well as the paperwork and documentation required for the program are ongoing.

Evaluations clearly illustrated a positive impact on the students (and teachers) participating. Even schools new to the program this year were satisfied with their participation, and recognize that execution of the program will become more comfortable over time. This long withstanding program will continue to operate with the same program framework that has proved successful since 1987, although survey results help to shape modifications to the program moving forward. This will ensure that the Rouge Education Project remains relevant and meaningful to its participants.

The Rouge Education Project would like to extend a heartfelt thank you to all of the teachers and students that participated in 2017-2018. Thank you for your commitment to this program and your river.