



Evaluation of Plaster Creek Stewards

Results and Recommendations from Surveys,
Interviews, and Education Event Feedback Forms

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Executive Summary

The Plaster Creek Watershed occupies approximately 58 square miles. The creek itself is about 14 miles long, with headwaters south and east of Grand Rapids. By the time the creek enters the Grand River, it is considered one of the most impaired waterways in West Michigan.

In 2008, Calvin University organized a three-day summer workshop for local churches focusing on a theological foundation for creation care, the basics of watershed ecology, and practical strategies for watershed restoration. This first summer workshop marked the beginning of Plaster Creek Stewards (PCS).

PCS has been awarded several multi-year grants from the Michigan Department of Environment, Great Lakes, and Energy (EGLE). This evaluation was conducted in connection with EGLE grant #2020-0011. It is focused on PCS-involved individuals to gauge the impact of PCS on this group and to identify best practices by examining those who have become highly involved with PCS.

Surveys of PCS-involved individuals and general residents

The survey was designed to gauge understanding and opinions about water quality among people who have been involved with the PCS and compare this to data on the same questions gathered on other surveys in the past. Compared to general residents, people who have been involved with PCS reported greater responsibility for and ability to affect water quality; perceive greater severity of general, country-wide, and household-related water pollutants; and were more familiar with practices to improve water quality (see section starting on **page 10**).

Interviews with PCS-involved individuals

The goal of the interviews was to gather in-depth information from people who have been involved with PCS. Interviewees were remarkably optimistic about PCS. While each story was different, all interviewees pointed to other people as the reason they became involved with PCS. Interviewees had a strong understanding of water quality issues, shared ideas for increasing PCS's impact, and described what others would need to be propelled to take action (see section starting on **page 24**).

Education event pre/post feedback forms

The event feedback forms were designed to measure changes in knowledge from before to after the education event and to gather additional feedback about the education event.

People who attended PCS education events reported a significant increase in knowledge about several water quality topics. Moreover, most attendees said that information was clear and relevant to them and that they were motivated and equipped to put what they learned into practice (see section starting on **page 44**).

Recommendations

Given this robust evidence base, the question is no longer “Is PCS making a difference?” The question is now “How can PCS multiply the difference it makes?” Two avenues to expand PCS’s impact are expanding advocacy work for policy change and equipping current PCS supports to recruit new people to join in PCS’s vital work (see section starting on **page 50**).

Background

Note: This section is excerpted from the Plaster Creek Stewards [website](#).

The Plaster Creek Watershed occupies approximately 58 square miles, all in metropolitan Grand Rapids, Michigan. The creek itself is about 14 miles long. Its headwaters originate south and east of Grand Rapids, with many of the tributaries coming from agricultural areas around Dutton and Caledonia. The creek flows through commercial and residential areas of the city, and finally through industrial areas and low-income neighborhoods before emptying into the Grand River a mile south of the city center. By the time the creek enters the Grand River, it is considered one of the most impaired waterways in West Michigan.

History of the Plaster Creek Watershed

The Wisconsin ice sheet receded northward out of West Michigan for the last time around 16,000 years ago. As it did so, this mass of ice left a rolling landscape of mixed soils, sand, gravel, silt, and clay. The Great Lakes were formed at this time, along with the basins and sub-basins that drained into these lakes.

By the time the first European explorer, Samuel de Champlain, reached West Michigan in 1615, the Odaawaa Indians (today known as the Ottawa) occupied the Plaster Creek Watershed and called this stream Kee-No-Shay, which means "water of the walleye."

In the early 1800s, the local Odaawaa tribe's leader, Chief Blackbird, lived in an area today known as the Black Hills neighborhood, a prominent knob of land in the Grand River floodplain that overlooks the final reach of Plaster Creek before it joins the Grand River. A story recorded by Charles Belknap, one of the earliest mayors of Grand Rapids, recounts a disagreement between Chief Blackbird and a local missionary about the best place to encounter God. Chief Blackbird maintained his people worshipped the Great Spirit best outdoors and thought it odd that the missionary was trying to convince the Chief's people to come inside a building and look into a book to meet God.

On one particular day, Chief Blackbird coerced the missionary into a small boat, and the two of them travelled up Kee-No-Shay Creek until they reached a beautiful waterfall pouring over a large, colorful, and crystalline outcrop of gypsum. Chief Blackbird explained to the missionary that he and his people met their God in sacred spaces like this one.

This was also the first known encounter of European immigrants with gypsum in West Michigan, a rock quickly recognized as a resource to be mined throughout the Grand Rapids area. New settlers used ground up gypsum as both a fertilizer and as a base for making plaster for construction. In fact, the first plaster mill in West Michigan was set up at a location near Chief Blackbird's sacred spot in 1841. Soon after the creek was known as 'Plaster Creek,' a tragically more appropriate name because the extensive gypsum mining that ensued caused the creek to become so degraded it was no longer able to support walleye.

As the city of Grand Rapids developed and expanded, the quality of Plaster Creek progressively declined. Several of the creek's tributaries were put in underground pipes, including a 4-mile stretch of Silver Creek—one of Plaster Creek's two major tributaries. By the early 2000's, the creek was West Michigan's most polluted stream, often carrying bacterial loads so high it was unsafe for wading and swimming (partial human body contact); in other words, people could get sick from touching the water.

The state of the Plaster Creek

Over the years, the land in and around the watershed has been logged, farmed, and developed into residential areas, industries, parking lots, railroads, highways, and includes 9 different local governments. Today the landscape of the watershed is changed to the point that stormwater does not have enough places to soak into the ground but flows quickly off the surface, taking pollutants with it. The pollutants found in the stream come from a variety of sources: sediment from runoff and from in-stream erosion, excess nutrients from fertilizers, and *E. coli* bacteria from pet waste, agricultural runoff, and possible septic system failures. But there is one pollutant that is a trigger for all the others: stormwater. Like most cities, stormwater in Grand Rapids is guided into drains that empty directly into Plaster Creek. The rainwater that flows over our roads, fields, lawns, rooftops, and parking lots quickly finds its way into Plaster Creek, along with all the dirt, fertilizer, oil, heat, and debris that stormwater runoff carries with it.

Development of the Plaster Creek Stewards

In 2004, faculty at Calvin College began service-learning projects for students, collecting data on the state of the watershed and organizing stream cleanups in collaboration with other community partners. By 2008, a group of concerned organizations, including Calvin College, began meeting regularly to discuss steps that could be taken to improve the watershed. A staff member of the Michigan Department of Environmental Quality

approached Calvin specifically for help to reach the faith community in West Michigan. Calvin responded by organizing a three-day summer workshop for local churches focusing on a theological foundation for creation care, the basics of watershed ecology, and practical strategies for watershed restoration. From this first summer workshop, Plaster Creek Stewards was launched.

A three-fold approach

As the work of Plaster Creek Stewards unfolded, it developed three focus areas: research, education, and on-the-ground restoration. There is a growing interest among West Michigan residents to learn what they can do to care for their particular place. Everyone contributes to the problem, but everyone can also be part of the solution. As momentum continues to build, there is hope that one day the walleye will return, and the creek's name can be changed back to 'Kee-No-Shay.'

Purpose of this Evaluation

Plaster Creek Stewards (PCS) has been awarded several multi-year grants from the Michigan Department of Environment, Great Lakes, and Energy (EGLE). This evaluation was conducted in connection with EGLE grant #2020-0011; it assesses PCS's education and outreach work related to the grant. Whereas evaluation related to three prior EGLE grants to PCS collected data from random samples of residents living in target geographic areas, this evaluation is focused on learning from people who have been involved with PCS and its work. The goals of focusing on PCS-involved individuals are to gauge the impact of PCS on this group and to identify best practices by examining those who have become highly involved with PCS.

The evaluation had three parts:

1. **Surveys of PCS-Involved Individuals and General Residents** (see **page 10**)
This survey was designed to gauge the understanding and opinions about water quality among people who have been involved with the PCS and compare this to data on the same questions gathered on other surveys in the past.
2. **Interviews with PCS-Involved Individuals** (see **page 24**)
The goal of the interviews was to gather in-depth information from people who have been involved with PCS. We sought to gauge their understanding of water quality issues and their perception of Plaster Creek Stewards and its impact.
3. **Education Event Pre/Post Feedback Forms** (see **page 44**)
The event feedback forms were designed to measure changes in knowledge from before to after education event and to gather additional feedback about the education event.

Surveys of PCS-Involved Individuals and General Residents

Note: This section was authored by Taylor Hartson.

The primary goal of the surveys was to gauge the understanding and opinions about water quality among people who have been involved with the PCS and compare this to data on the same questions gathered on other surveys in the past. By comparing responses from PCS-involved individuals to responses from general residents, our aim was to assess differences in knowledge, opinions, and attitudes between these groups.

Method

Recruitment

Survey respondents were recruited using two methods. First, PCS provided email lists of people who have been involved with their programs and events. Lists were combined and de-duplicated. In total, there were 1517 unique contacts with email addresses. Of these, 218 email addresses bounced, were no longer active, or sent an auto-response indicating that the person no longer uses the email address. For example, some people had retired, no longer worked at an organization, or no longer used student email addresses. Of the remaining 1299 potential respondents, 272 people completed the survey. This yielded a response rate of 20.9%.

The second recruitment method involved social media posts and a newsletter announcement inviting people to take the survey and with a generic link to the survey. These posts and announcements yielded an additional 8 survey responses.

Participants

In all, 280 people who were involved with PCS completed the survey in 2022. Responses from these individuals were compared to 866 survey responses gathered during two previous EGLE grants to PCS. In these prior grants, paper surveys were sent via postal mail to randomly selected residential addresses within grant target areas. This led to a sample of general residents, many of whom may not have any awareness of PCS or its work. Demographic characteristics of survey respondents, broken down by PCS-involved individuals and general residents, are shown in **Table 1**.

Table 1 Demographic characteristics of survey respondents

Demographic Characteristics	PCS-Involved Individuals		General Residents		All Respondents	
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
Age						
18–30	66	23.6	62	7.2	128	11.2
31-40	41	14.6	141	16.3	182	15.9
41-50	51	18.2	123	14.2	174	15.2
51-60	36	12.9	117	13.5	153	13.4
61-70	44	15.7	214	24.7	258	22.5
71+	35	12.5	151	17.4	186	16.2
Education						
Some formal schooling	5	1.8	8	0.9	13	1.1
High school diploma or GED	8	2.9	56	6.5	64	5.6
Some college	43	15.4	120	13.9	163	14.2
2-year college degree	7	2.5	81	9.4	88	7.7
4-year college degree	92	32.9	288	33.3	380	33.2
Post-graduate degree	124	44.3	269	31.1	393	34.3
Gender						
Female	146	52.1	444	51.3	590	51.5
Male	123	43.9	382	44.1	505	44.1
Prefer to self-describe	5	1.8	0	0	5	0.4

Demographic Characteristics	PCS-Involved Individuals		General Residents		All Respondents	
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
Income						
Less than \$25,000	25	7.3	63	8.9	88	7.7
\$25,000 to \$49,999	19	15.7	136	6.8	155	13.5
\$50,000 to \$74,999	55	21.8	189	19.6	244	21.3
\$75,000 to \$99,999	53	14.1	122	18.9	175	15.3
\$100,000 or more	82	13.5	117	28.9	198	17.3

Procedure

We sent an email invitation and two email reminders to each email address on the final contact list. PCS posted social media posts and included a survey invitation in their email newsletter. The survey was open from July 26, 2022, until September 15, 2022. Responses were collected online through a survey built in Qualtrics. Most of the survey content consisted of selected questions from the SIDMA survey system. Other questions asked about involvement with PCS and interest in participating in an interview. See the survey instrument in **Appendix A: Survey on page 53**.

Incomplete responses were excluded from analysis. After the survey was closed, fifty respondents recruited through emails who wished to be entered into the drawing were randomly selected. These individuals received a \$25 Amazon gift card via email.

This project was reviewed and approved by the Calvin University Institutional Review Board (project 22-015).

Results

Comparisons of PCS-Involved Individuals and General Residents

Both general residents and PCS-involved individuals answered questions about their opinions regarding six topics: water quality, water impairments, sources of water pollution around the country, sources of water pollution in their area, consequences of poor water quality, and practices to improve water quality. Each set of questions was answered on a 4-point or 5-point response scale; most question sets also allowed *don't*

know and *not applicable* responses. We assigned each response option a value such that the lowest response option (e.g., *strongly disagree, not a problem, never heard of it*) had a value of 1, and each increasing response option's value increased by 1. Responses of *don't know, not applicable, not relevant*, and unanswered questions were treated as null. Then, we averaged the items in each question set.

Using a linear regression model, we examined whether the average rating for each question set differed between general residents and PCS-involved individuals. **Table 1** presents results of these analyses. The coefficient indicates the difference in the average ratings between general residents and PCS-involved individuals. For example, the average agreement rating for personal responsibility and efficacy for water quality of PCS-involved individuals was 4.53 of a 1-5 scale. The average agreement rating among general residents was 4.21. The difference of .319 scale-points was statistically significant, showing that people who have been involved with PCS feel more responsible for and capable of affecting water quality.

Table 2 Comparison of general residents and PCS-involved individuals

Scale Topic	# items	α	Scale	General residents average	PCS-involved average	Coef-ficient	p
Perceived responsibility and efficacy for water quality	7	0.90	1-5	4.21	4.52	.319	0.000
Perceived impact of general water impairments	7	0.86	1-4	3.02	3.25	.230	0.000
Perceived impact of country-wide sources of water pollution	6	0.78	1-4	2.99	3.18	.194	0.000
Perceived impact of household-related sources of water pollution	5	0.81	1-4	2.63	2.92	.294	0.000
Awareness of consequences of poor water quality	7	0.88	1-4	2.62	2.61	-.016	0.808
Familiarity with water quality improvement practices	6	0.70	1-4	2.81	3.25	.439	0.000

Perceived responsibility and efficacy for water quality

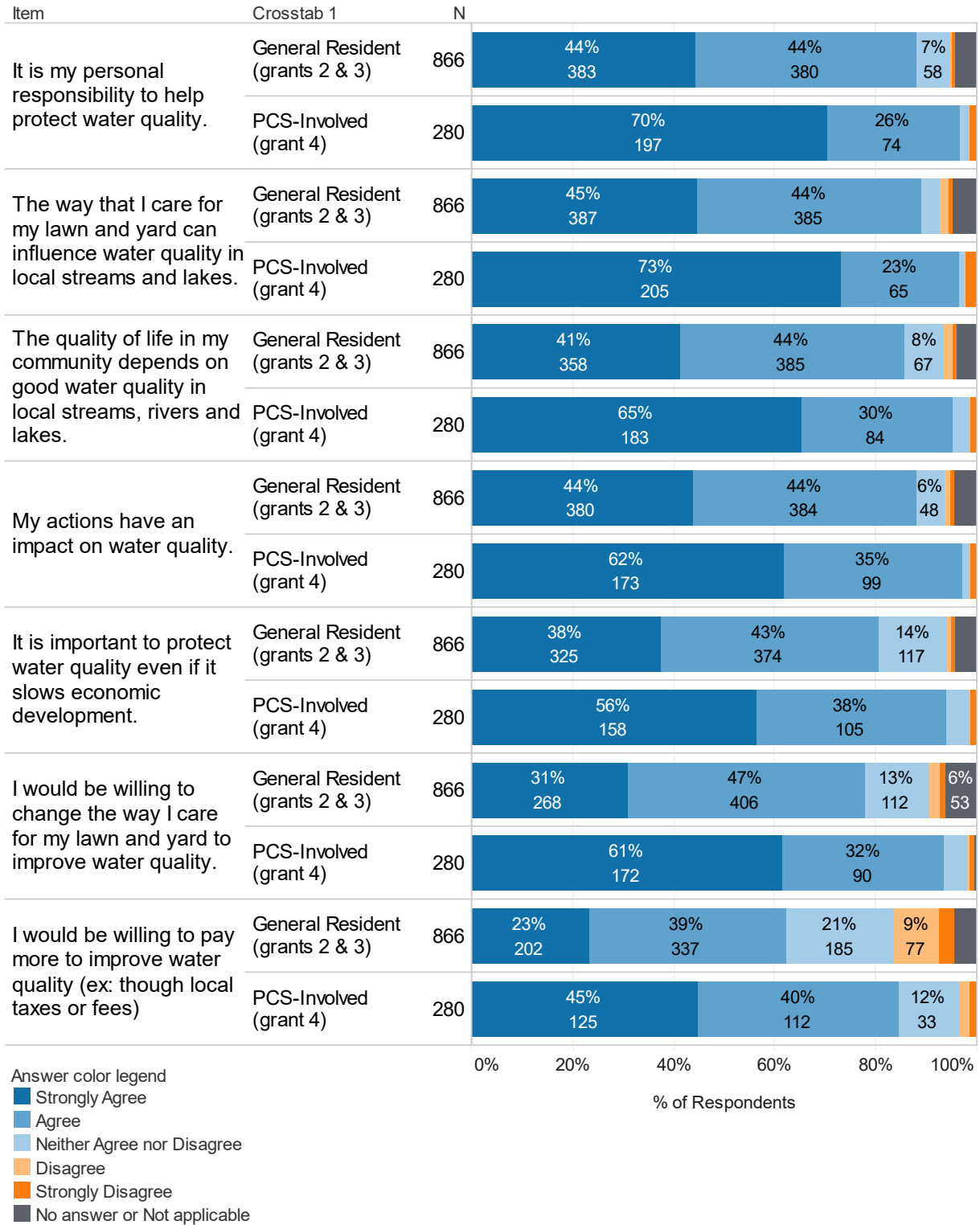
Respondents answered several items assessing the extent to which they feel responsible for water quality and are able to impact water quality through their own behavior (**Figure**

1). The majority of respondents from both groups agreed or strongly agreed with each of these statements. Yet, over half of PCS-involved individuals strongly agreed with all but one statement. About 20-25% more PCS-involved respondents strongly agreed with each of the statements than did general residents; this pattern produces the zig-zag pattern of dark blue bars in **Figure 1**.

When averaging across items in this question set, PCS-involved respondents averaged 4.52 on the 1-5 response scale. General residents averaged 4.21. Based on regression analyses, the difference of .319 between the groups was statistically significant ($p < .001$). People who have been involved with PCS reported a greater sense of responsibility for and ability to impact water quality than did general residents.

Figure 1 Perceived responsibility for water quality by respondent group

Please indicate your level of agreement or disagreement with the statements below.



Perceived impact of water impairments

Respondents also rated their how problematic several types of water impairments are. These impairments were divided into three categories: general pollutants, countrywide sources of water pollution, and household-related sources of water pollution (see **Figure 2**, **Figure 3**, and **Figure 4**).

Across all items in these three categories, a substantial percentage of general resident respondents (12-43%) indicated that they do not know how much of a problem various pollutants and sources of pollutants are. In comparison, fewer PCS-involved respondents reported not knowing how much of a problem these pollutants are. This pattern of results creates the zig zag pattern in the grey bars in the figures. It suggests that those who have been involved with PCS have learned about pollutants through PCS activities, and additional sustained public education efforts could be effective in educating general resident populations about pollutants that threaten water quality.

After dropping *don't know* and *not applicable* responses, the average rating for general pollutants among PCS-involved respondents was 3.25 on the 1-4 response scale. General residents averaged 3.02. Based on regression analyses, the difference of .230 between the groups was statistically significant ($p < .001$). People who have been involved with PCS reported a larger impact of general pollutants than did general residents. Results for country-wide and household-related sources of water pollution were similar ($ps < .001$).

Respondents rated lawn fertilizers and pesticides as the most problematic pollutants in general. They indicated that excessive use of lawn fertilizers is the biggest household source of water pollution. They also indicated that urban stormwater runoff and drainage or filling of wetlands and were the biggest countrywide sources of water pollution.

Figure 2 Perceived water impairments, general pollutants by respondent group

In your opinion, how much of a problem are the following water impairments in your area?

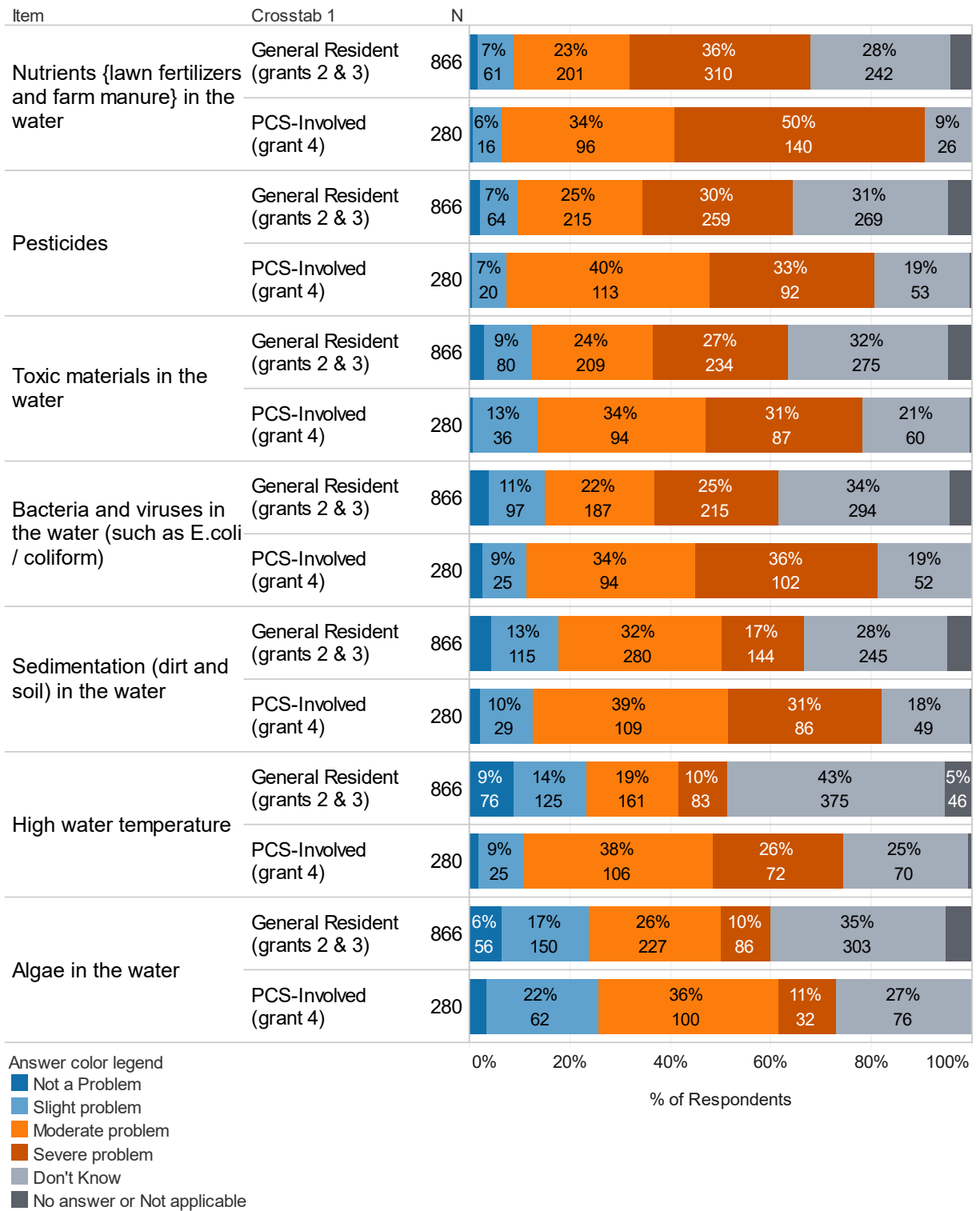


Figure 3 Perceived water impairments, country-wide sources of water pollution by respondent group

The items listed below are sources of water quality pollution across the country. In your opinion, how much of a problem are the following sources in your area?

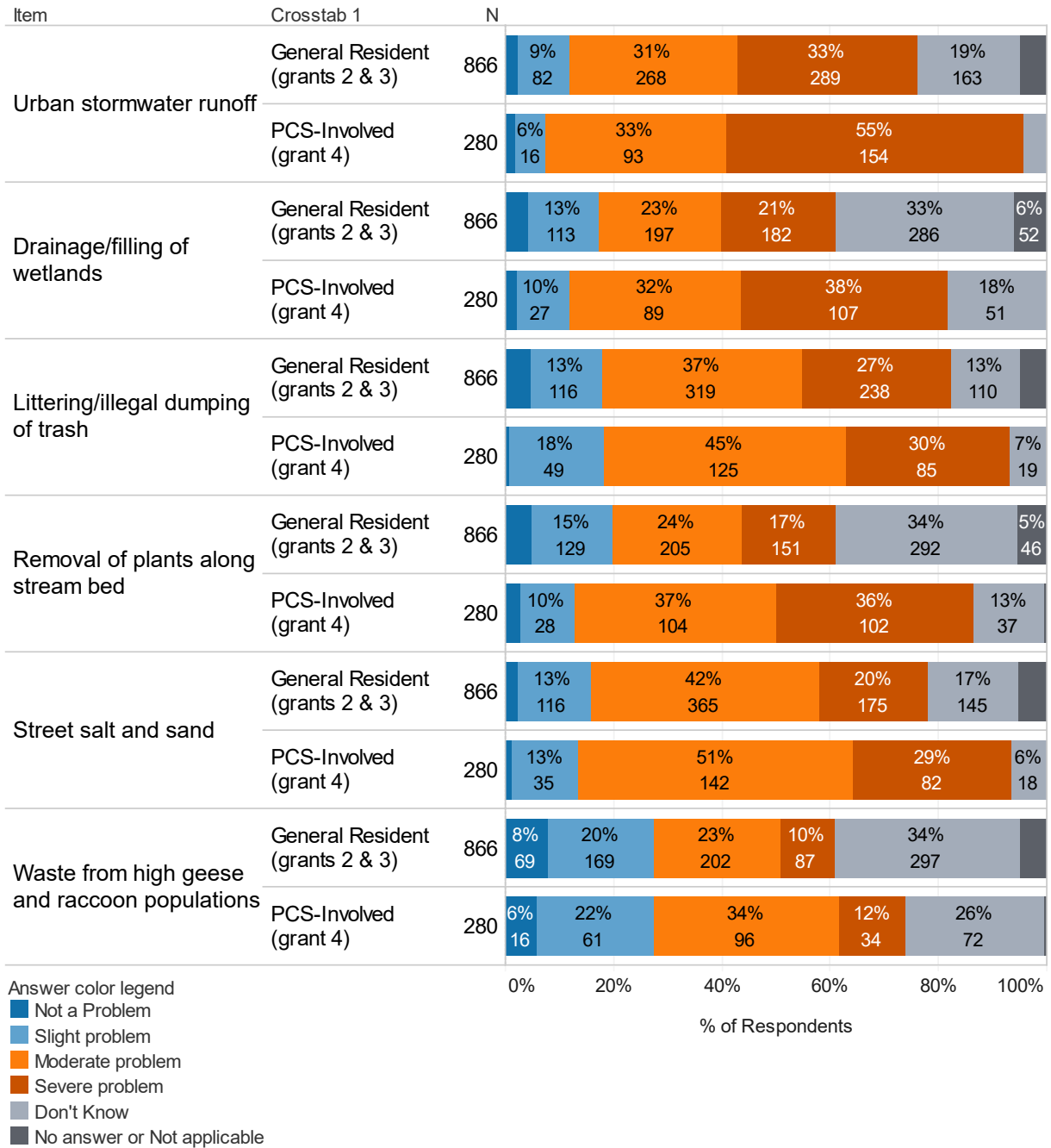
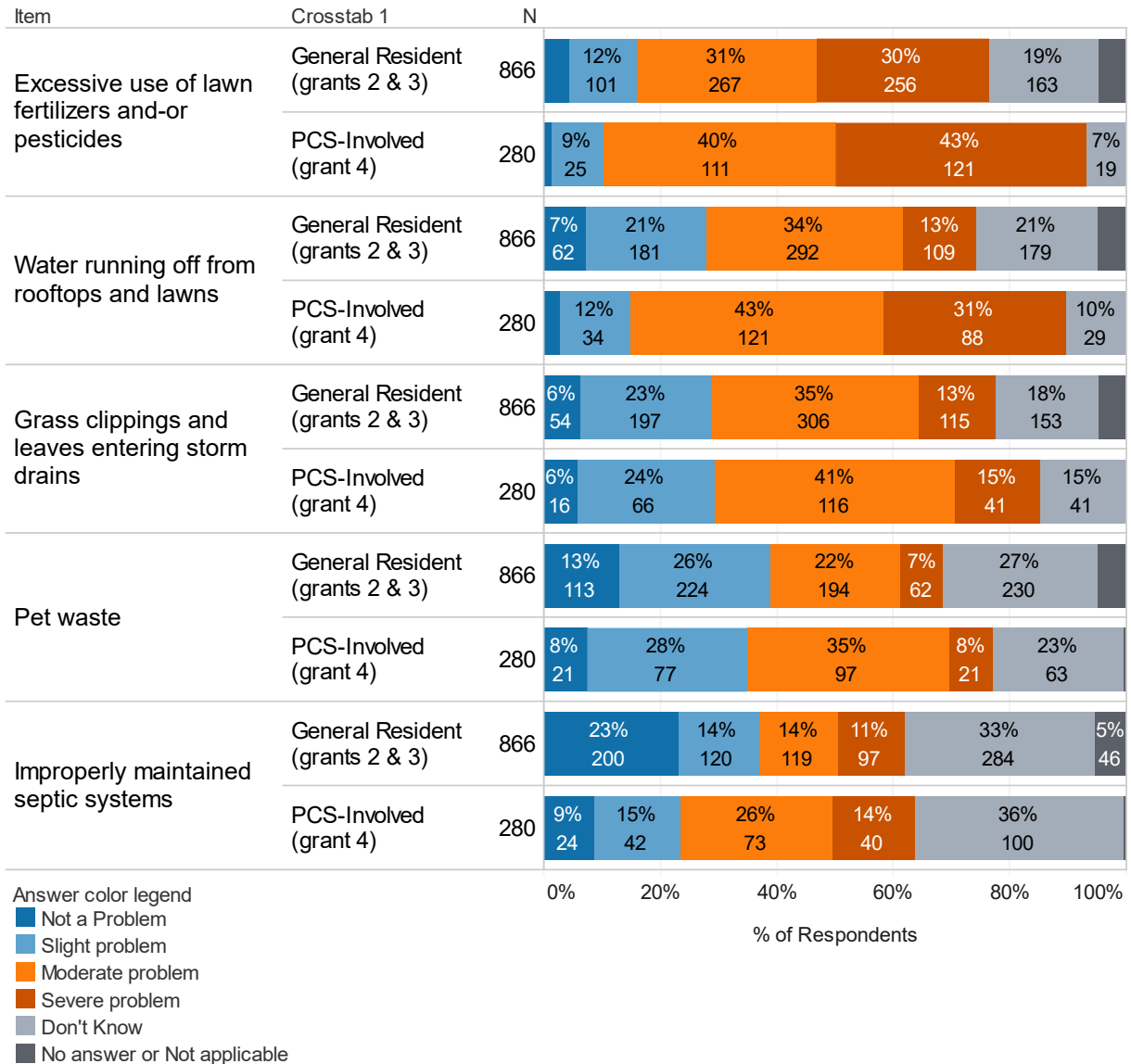


Figure 4 Perceived water impairments, household sources of water pollution by respondent group

The items listed below are common household-related sources of water pollution. In your opinion, how much of a problem are the following in your area?

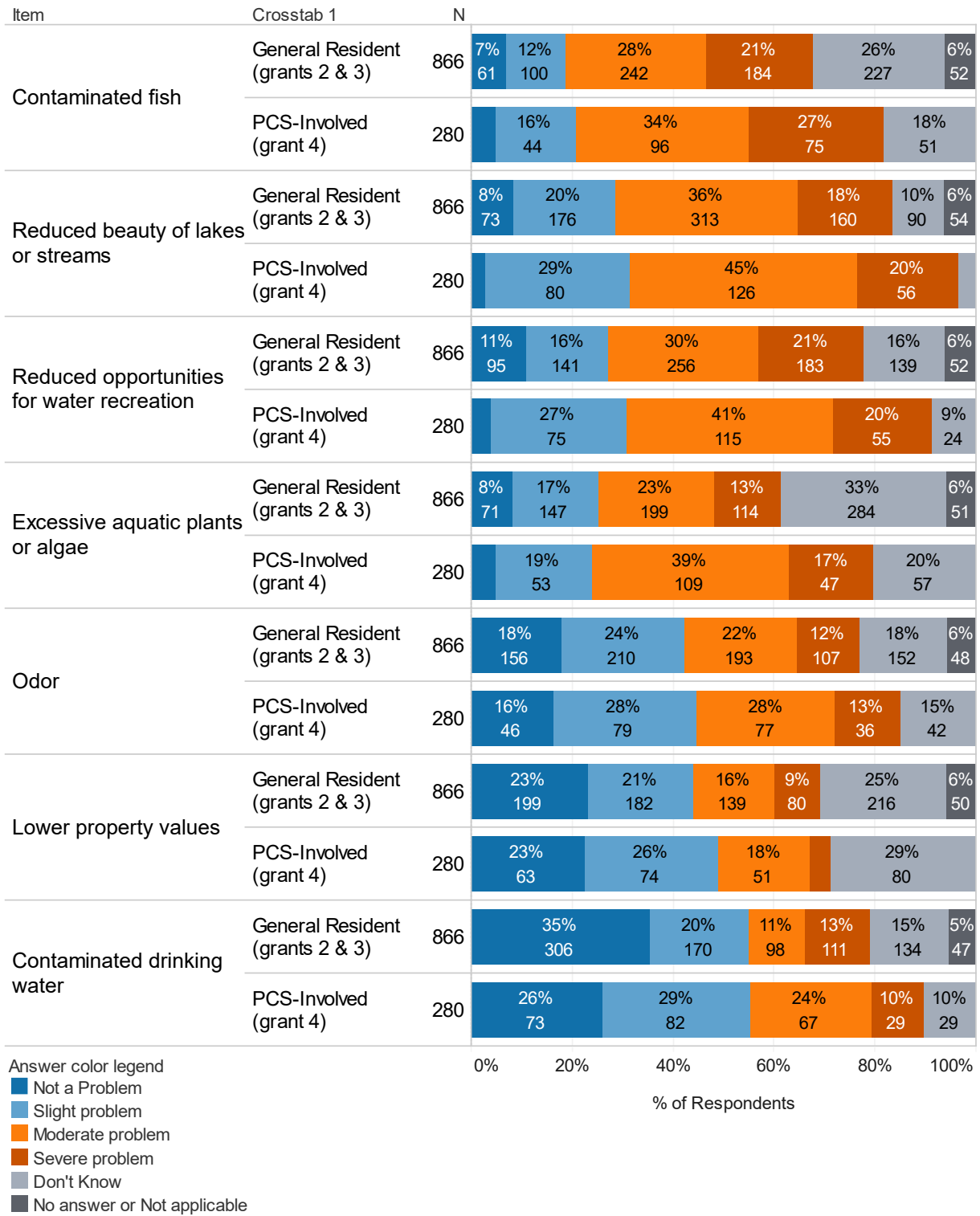


Awareness of consequences of poor water quality

Respondents rated the extent to which water quality has affected specific issues in their area (see **Figure 5**). Across both groups, respondents were most likely to report that water quality has negatively affected fish, reduced beauty of lakes and rivers, and has reduced opportunities for water recreation. They were less concerned about lower property values, odor, and contaminated drinking water. Based on regression analyses, the difference between respondent groups was not statistically significant ($p = .808$).

Figure 5 Perceived consequences of poor water quality by respondent group

Poor water quality can lead to a variety of consequences for communities. In your opinion, how much of a problem are the following issues in your area?



Familiarity with water quality improvement practices

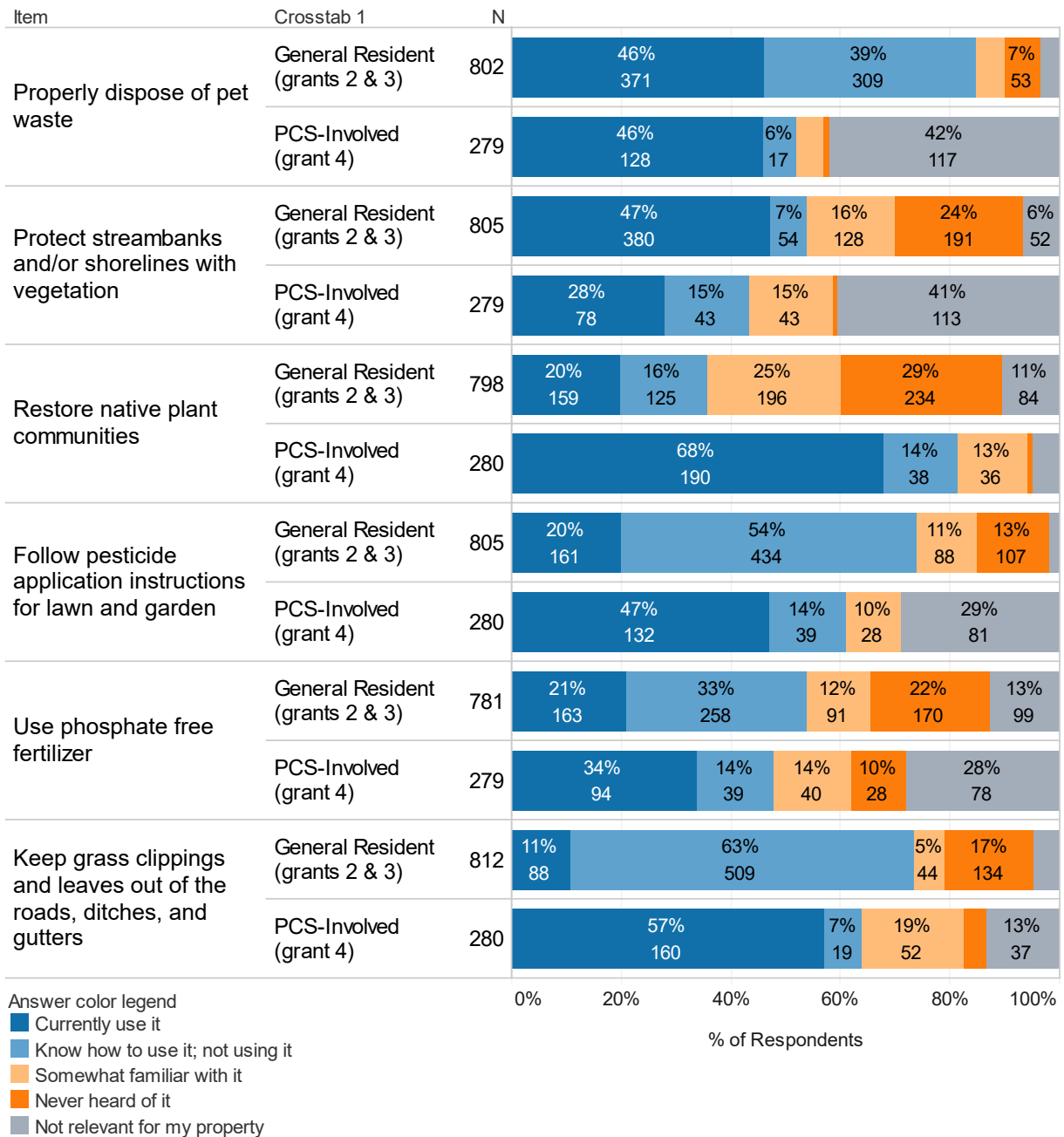
Respondents rated their familiarity with seven practices people can use to improve water quality (see **Figure 6**). Overall, many general resident respondents reported that these practices were not relevant to them or that they had never heard of the practice. This may indicate that residents should be educated about the relevance of most of the practices to the majority of people.

PCS-involved individuals, on the other hand, indicated much more familiarity with practices such as following pesticide application instructions, keeping grass clippings and leaves off roads, and restoring native plant communities.

After dropping *not relevant for my property* responses, the average rating for general pollutants among PCS-involved respondents was 3.25 on the 1-4 response scale. General residents averaged 2.81. Based on regression analyses, the difference of .439 between the groups was statistically significant ($p < .001$). People who have been involved with PCS reported greater familiarity and use of water quality improvement practices than did general residents.

Figure 6 Familiarity with water quality improvement practices by respondent group

Please indicate which statement most accurately describes your level of experience with each practice listed below.



Discussion

Analysis of survey responses indicates strong evidence for differences between general residents and PCS-involved individuals. Compared to general residents, people who have been involved with PCS reported greater responsibility for and ability to affect

water quality; perceive greater severity of general, country-wide, and household-related water pollutants; and were more familiar with practices to improve water quality.

The one area that did not show significant differences between general residents and people who have been involved with PCS is the consequences of water impairments. Among respondents who rated the severity of consequences, ratings were similar for PCS-involved individuals and general residents. However, it is instructive to note that general residents were less likely to provide a rating for all 7 items about consequences than were PCS-involved individuals. In other words, general residents were much more likely to say that they did not know how much of a problem things were. Thus, despite a lack of differences among those who rated severity of consequences, PCS-involved individuals seemed more knowledgeable and able to provide a rating.

In sum, results of analyses comparing survey responses of PCS-involved individuals and general residents documents the positive effects PCS has. Being involved with PCS is related to increased awareness, knowledge, and implementation of various water quality issues and practices.

Interviews with PCS-Involved Individuals

Note: This section was authored by Jax Heil.

The goal of the interviews was to gather in-depth information from people who have been involved with PCS. We sought to gauge their understanding of water quality issues and their perception of Plaster Creek Stewards and its impact. By learning from people who have been particularly involved with PCS, our aim was to identify best practices for future work.

Method

Recruitment

Potential interview participants were recruited among PCS-involved individuals who had completed the survey described in the previous section. At the end of the survey, respondents could indicate their interest in participating in an interview. 53 survey respondents said they were interested. Because our goal was to learn from people who had been highly involved with PCS, we selected 32 people whose survey responses indicated a high level of engagement with PCS. We emailed these people with an invitation to sign up for an interview.

Participants

People from diverse backgrounds participated in interviews (see **Table 3**). 32 individuals were invited to participate in an interview, with 21 scheduling a conversation with the interviewer. Of these 21 individuals, 18 completed an interview.

Table 3 Demographic characteristics of interview participants

Demographic Characteristics	N	%
Years of Involvement with PCS		
0-3 years	3	16.7%
4-7 years	8	44.4%
8-11 years	3	16.7%
12+ years	4	22.2%

Demographic Characteristics	N	%
Role (check all that apply; total > 100%)		
Sustainability professional	3	16.7%
Community participant only	7	38.9%
Donor	3	16.7%
High school / college student	3	16.7%
Community organizer	4	22.2%

Procedure

Interviews took place in-person or virtually, depending on participants' availability and preference. At the start of the interview, the interviewer gave a brief description of the project, and the participant had the opportunity to ask questions. The interviewer asked the participant to read and sign the consent form. Then, the interviewer started an audio or video recording and began the interview (see **Appendix B** for the interview questions). Interviews took 45-60 minutes. At the end of the interview, the participant was thanked for their time and received a \$50 gift card via email in appreciation for their feedback.

Recordings were transcribed by an AI transcription service. Then, transcriptions were edited by DataWise Research Assistants. After reviewing notes taken during interviews and the transcriptions, the interviewer identified recurring themes. Research Assistants coded the transcriptions for instances of these themes and identified illustrative quotations to exemplify the themes.

This project was reviewed and approved by the Calvin University Institutional Review Board (project 22-014).

Results

Interviews with people who have been involved with PCS sought to explore a few key areas of interest. This section will break down the themes that emerged from each of these areas, including:

- 1) How individuals first heard about PCS
- 2) How perceptions of PCS have changed from participants' first interaction with the program to the present
- 3) What would happen to the Plaster Creek watershed if PCS no longer existed

- 4) Participants' general knowledge of watersheds
- 5) The biggest presenting problems in the Plaster Creek watershed
- 6) Changes in the watershed observed over time
- 7) What would motivate and equip people who have not been involved with PCS to take action
- 8) What motivates participants to care about the watershed

Each area is summarized below. Verbatim interviewee quotes are included in *italics* as a means of capturing the voice of interviewees.

How People first heard about PCS

Participants heard about PCS from a wide variety of sources. Many younger participants first discovered the program through their respective schools, such as Grand Rapids Christian High School or Calvin University. Older participants heard about the program through word-of-mouth from current participants, community connections, and their churches. Others heard about the program through PCS signs planted in yards or in publications such as the *Spark*.

One younger interviewee recalled how they first heard of the program from the morning announcements at their high school:

"So it was probably three years ago, almost. But in the morning announcements at school, there was a little blurb, a little paragraph about it. Hey, here's this cool summer opportunity ... that was the first time I heard about [Plaster Creek Stewards] ... I applied for [the Green Team] and got accepted my first summer doing it. So, that was the summer after sophomore year."

For college students, first interactions with PCS most often stemmed from interactions with the Calvin University Biology department. One Calvin student said they first heard about PCS in this way:

"I met Dave Warners in a BIO 160 class and stayed in contact with him for another year until I took plant taxonomy with him. And from plant taxonomy, I decided I was going to apply to one of the positions that Plaster Creek has available."

In fact, Calvin staff such as Dave Warners invited more than just students into active PCS participation. Many accounts of invitations from Calvin staff were present in the narrative of interviewees:

"Well, let's see, how did I hear about it. I probably got an email or something from Calvin at some point. But I also know Gail [Heffner]; I go to church with her, and she was very involved [in PCS]."

"I owned a farm on the south side of Grand Rapids ... back in 2011, Plaster Creek Stewards came and did a planting for us ... but I was already somewhat aware of them. I had known Gail Heffner back at Calvin, and she was quite involved in Plaster Creek Stewards."

"The Warners family and I sort of grew up together. At one point in time, I lived in Alger Heights and there was a pop-up market. Dave's son was there with a clipboard and said, 'hey, you want a curb-cut rain garden?' Anything that resulted in less grass I was all in favor of!"

Many other names of PCS staff and active participants inviting interviewees into the fold emerged from interviews. The primary driver of participant involvement was clear: A connection was built with participants from somebody—or something—touched by the PCS program. Other ways people first heard about PCS, such as seeing a PCS sign in a yard or hearing about familial involvement, are shown as follows:

"I think it was the signs I would see in other people's rain gardens. Then I started following them on social media, and so we had [a rain garden] put in."

"Maybe four years ago, our granddaughter ... was a member of the Plaster Creek Stewards during the summer. She was heavily involved in that, and now she's working on a degree ... in environmental studies and stewardship."

Perceptions of PCS over time

Participants shared that their perception of PCS over time has not markedly changed. Initial perceptions of the program were high and have remained high. Some people's perceptions of PCS have become even more positive over the years.

Rather than note how PCS has changed programmatically over the years, interviewees instead noted how their initial perception of the program had underestimated PCS's reach. One participant, a teacher who partners with PCS, shared:

"I kind of went into the initial invite from Andrea sort of thinking about it as a first- or second-year teacher back then, just kind of like, 'oh, this is a cool curricular connection that could work out for maybe a month or two.' But at this point, I love collaborating with Plaster Creek Stewards for almost anything. I think it's just—I've

admired and also appreciated over the years their focus and investment in our young students in raising awareness, and not just raising awareness, but really trying to provide meaningful hands-on engagements for students to be outside the classroom to interact with Plaster Creek."

Similarly, other participants said that their perception of PCS has not changed over time, but they have been impressed at how the program has grown to achieve their goals. On this topic, one participant shared:

"My perception hasn't changed. Like, I know the work they're doing, and I know the end goal. I think it's been really impressive to see how the program has expanded from early on."

Recognizing how PCS has expanded, some participants point out that the rapid growth of the program constitutes the need for even more staff:

"I think, yes, [PCS] seems to have gotten much more prominent, but with the staff shifts that we've had, it seems like we don't have enough people to throw everywhere they need to go. And that's okay. You know, we're in a transition stage."

One interviewee shared that they have been involved with PCS since "the first few meetings." They painted the picture for how the program has changed over time:

"I think they've grown a lot. I remember in those first few meetings there were—I don't know—maybe eight or ten of us ... probably three or four of them were from Calvin, as part of maybe their work, maybe ... So the rest of us were outsiders, if you will ... So to see them go from that tiny little group [with just] Dave Warners and Gail to now [when they have] four or five different people on staff, that's pretty cool. And then just to see the way that they've expanded to reach out, to more churches, more places of worship even outside of the Christian community, just trying to get other people involved. Teaching farmers and inner-city people all at the same time about how it's important to care for our watershed. You go to a fall event, and you're at one of the Calvin auditoriums, and the place has got a couple hundred people in it. Like wow, we've come a long way..."

Though the interviewees began their interactions with PCS at different points in the program's existence, they are nearly unanimous in their feedback on how the program has changed: only for the better. The baseline perception of PCS was high for all the

participants. With the program's growth over time, perceptions of the program have only improved from an already high strong start.

If PCS ceased to exist

In response to a hypothetical question regarding the disappearance of the PCS program, participants responded in unison: a massive hole would be left where PCS once existed. Some individuals said that the Plaster Creek watershed would revert to a dirtier, more negative state. Others expressed optimism that the efforts of PCS would live on through their already completed long-lasting actions and the broad base of community advocates developed in the last ten years.

Participant responses can be categorized into one of two groups when asked what would happen to the Plaster Creek watershed should PCS cease to exist. The first of these groups focused on the negative effect this would have on watershed restoration progress. Participants thought that much of the good work done to make Plaster Creek healthier would be for naught:

"I think any progress that has been made since Plaster Creek Stewards has been around, I think it would rather quickly go in the opposite direction. One of the unfortunate things with most watersheds and urban areas is there aren't enough people that are doing good work to make significant long-term improvements."

"The pollution would increase ... things that have been achieved will revert to worse state."

Some participants in the "things will get worse" category hoped that PCS has made enough progress to at least slow the deterioration of the watershed if PCS disappeared. Such quotes are as follows:

"The average person probably wouldn't notice it until the pollution level went back up in the creek ... I think that the legacy of gardens they put in already would probably stall that regression a long time. Yeah. And I suspect there would be some people who would step up and say, 'No, we're going to make a new [program].'"

"It would maybe remain in its healthy state, healthier state as it is currently because of what they've done so far. But more than likely it would decline. Because I think people without support will just let things go. People who have curb-cut rain gardens, I think are committed to them. But I think a number of them, you know, if

they sell their house, who's going to take care of that? 'Who wants this dumb thing?' Fill it in, put some grass down."

The second group of responses focused on how watershed restoration efforts would continue on a grassroots basis. They remarked that a large enough coalition has been built by PCS to where their efforts would not disappear but would be conducted by people or organizations other than PCS. One individual shared that efforts would continue but a void would be left without an organizing program:

"I don't think the volunteer efforts would ever quite dissipate all the way. But you know, the power that they have is just without the official group; that power is just so much less."

Two respondents painted a narrative describing what they would personally do to combat the disappearing of PCS:

"I think at first, not much would happen. I think the work that they've done thus far [is] done in a way that it's going to last ... it's done in a way that you're not going to notice it right away when they're pulled out of the community ... I would start networking people, I think I'd start connecting names to names. ... we have these other organizations that are in existence, saying, 'hey, how can you pick up the slack here?' ... So I'm going to take charge. Obviously, we're all responsible. But someone's got to kind of take that lead, at least step to help forward a program."

"There's a lot of people I think that would probably step up and say, what's gone wrong? We need to keep this organization around ... I think that would definitely be a loss. One burr under my saddle has always been the lack of coordination between all these various organizations. We've got Plaster Creek Stewards, we've got the Friends of Grand Rapids Parks, we got WMEAC, we've got the Nature Conservancy of West Michigan, you know, just on and on ... But it would seem like there would be more willingness to work together. But a lot of people get in 'this is my territory' kind of [mentality]."

Hidden amongst long responses to the question of how the watershed would be affected by PCS's disappearance is a prevailing undertone in nearly all the respondents' answers. The overall response to this scenario can be summed up in one interviewee's succinct answer:

"Well, I hope it never happens. And if it does, I'll have to go find people to start another organization. Just call it Plaster Creek Stewards 2.0."

General knowledge of watersheds

From preservation professionals to recently matriculated program participants, interviewees had a strong grasp on general watershed knowledge. Most participants pointed to their time in PCS's orbit as the biggest contributor to personal knowledge of the Plaster Creek watershed and how watersheds work in general.

A quote from Wendell Berry was repeated by multiple interviewees when they summed up their personal knowledge and philosophy about the Plaster Creek Watershed:

"Wendell Berry is the author that [PCS] quotes a lot. It's something along the lines of 'do unto others downstream as you would have done to you' or something like that. Anything you do upstream from somebody, it's going to affect people downstream. Regardless of what it is that you're doing, if it affects the water, it goes downstream."

A plethora of examples were provided by participants as to how a watershed is connected. A few participants focused on how infrastructure upstream can negatively affect the totality of the creek:

"So you have a huge asphalt parking lot that's black, you're sitting in the hot summer heat, it gets very hot ... then it rains the next the next day or whatever, that's thermal pollution. That water heats up before it gets to the stream. So that along with the regular trash, pesticides, fertilizers, salt, who knows what else. But I think that temperature is a good one, because that warm water gets to the creek, starts traveling downstream, and then that changes the chemistry of the river."

Aside from how infrastructure affects a watershed, participants described how a large amount of rainfall can produce negative outcomes on the stream itself:

"Because they've got all the street drains [that] go right into the creek, if we do have a heavy rain, immediately we've got a flood."

Most participants followed Berry's quote as they described their understanding of how watersheds work, sharing how what happens upstream affects those downstream:

"The first law of geology is that it all flows downhill. So, whatever happens upstream is going to propagate all the way down. If it gets polluted at the start, everything below is going to be polluted. If you get started clean, maybe it'll stay clean."

The biggest takeaway from this section is that not a single participant struggled to explain how watersheds function.

Biggest problems in the Plaster Creek watershed

Three problems in the Plaster Creek watershed were mentioned throughout interviews. The first problem participants focused on is that of runoff. Most of the discussion around runoff affecting the watershed centered around the farms that exist upstream of Plaster Creek. Not only is there a problem with runoff, but there is a general lack of awareness that the runoff issue even exists:

"[I'm] watching guys fish, pulling fish out of the creek, maybe not even knowing—I'm assuming—not even knowing how all that runoff from the farms is negatively affecting them."

"I think anything we can do to increase people's awareness to use their lawn fertilizers and toxic chemicals and things like that wisely. I don't think we're going to stop our neighbors from fertilizing their lawn, but hopefully they put it on very lightly and that it has a minimal effect on the creek."

"I still see some of my neighbors dumping tons of chemicals on their lawns and things like that. I don't know if they're just not aware or they don't care, but maybe more education would be helpful."

The second problem interviewees mentioned is that there seems to be extensive work occurring downstream and not enough upstream. Participants share an appreciation for the rain gardens, park cleanup, and church involvement downstream, but share that more work needs to be done to tackle the source of issues in the watershed:

"I think the first one would be reducing pollution upstream and focusing on that before you focus on things downstream ... But you know, you have people who are up at the top who say, well, we don't have an issue up here. So why do we need to worry about all this when the people downstream are the most heavily impacted?"

"All these areas of Plaster Creek upstream that are cutting straight through grass that is on a golf course, or in somebody's yard, or you know, next to somebody's cows ... there's only so much you can do about that downstream. You can put in

curb-cut rain gardens downstream, but that really only helps mitigate what's coming off of the streets there. I think just like generally more projects upstream, that focus on the stabilization of the banks would be really beneficial."

Tangentially connected to the issue of there being more work downstream than upstream is the lack of integration of watershed restoration efforts with new industrial developments. Participants mentioned that no matter how much effort is put into watershed restoration on PCS's part, new developments upstream will continue to hamper the health of the overall watershed if something does not change:

"I don't want to get overly cynical about this. But I think the main issue is more people need to understand the concept of where water goes ... If more municipalities—looking at you, Kentwood—would integrate more sustainable development policy [such as] reducing impervious surfaces. The city of Grand Rapids has parking standards for new developments. They've also implemented green infrastructure requirements. And it would be great to see other municipalities moving in that direction anytime a new parking lot goes up ... in the Plaster Creek watershed south of Gaines Township, Caledonia ... what was once forested area, now it's agricultural land, but pretty soon, it's all going to be suburbs, or sprawl. That's just going to further impact the stream's water quality. Having some sort of policy implemented that would help to protect it would be great. Municipalities don't always have a watershed mentality when they're thinking about those things."

"What does strike me when I read the articles and releases that come from Plaster Creek [Stewards] or in Spark ... I wonder if they're [fighting a losing battle] even though they cooperate with industry, residential development, so on ... because Kent County, Western Michigan is growing, and when you have the kind of growth with concrete, you will damage the watersheds no matter how many rain gardens you have and you decrease biodiversity."

Along with these three areas that need improvement, participants were quick to point out that one of the biggest problems in the watershed is a lack of awareness that the watershed requires action to maintain its health—or that the Plaster Creek watershed exists at all. More information on this idea can be found in the **Information for action** section on **page 37**.

Changes in the watershed over time

Interviewees younger than 25, those who had not lived in Grand Rapids for long, or those unaware of Plaster Creek until recently were unable to sketch a picture of how the watershed has changed over time. There were, however, a few participants who had been involved in watershed issues for many years, and they were observed changes in the watershed over time. These participants shared stories of how the creek itself has changed, how norms around using the water have shifted, and how the stream has gotten healthier in recent years.

This section will firstly focus on sharing verbatim stories from interviewees. While most of them did not connect to each other to form an overarching narrative, these stories can be seen as an extension of PCS's *Oral History* project. A short summary of stories will be provided afterward.

One interviewee on the history of the Garfield Park area in relation to Plaster Creek:

"Charles Garfield is who owned all that land. He and his family donated the property for [Garfield Park]. He donated the property for the nature center. His mother donated the money to build the neighborhood association offices right there on Burton. He was very involved agriculturally. He was a state legislator. If you go on Google Books and look him up, you can find the stuff that he wrote. One of the things he talks about, which I always found fascinating, was that he played in Plaster Creek when he was young. They'd spend all our time down there. You know, fishing and everything. That was the other thing. He talked to people who lived here longer than he and they talked about the fish that used to be here. And you know what Plaster Creek is supposed to be name? Ken-O-Sha—I'm probably mispronouncing it—water of the walleye. Now, when's the last time we got a walleye? Anyway, what he writes about is the fact that there's a big thunderstorm. He said the water level of the creek wouldn't change a bit because we didn't have all these paved streets, all the storm drains dumping into there. And so that's when I say it's going to be a difficult thing to tackle that. Because that runoff has got to go someplace."

Following up on the story about Charles Garfield, this interviewee shared how his children—and himself—played in the stream when they were kids, something he cannot imagine doing nowadays:

"Our boys hung out down [by the creek] all the time. They've done this before the Kroc Center was built. There was a big, wide open expanse ... because there was an old concrete plant down there. But they just had a lot of fun. [The interviewee's child] used to fish in there. They used to catch salmon. I don't know. It's cooling off, we may still have a few salmon coming up upstream. When I was a kid, I mean, we walked down 28th Street with our BB guns going down to the creek, [to have fun]."

Another interviewee with adult children said it was common practice to take one's kids down to the creek at one point. Despite this, he never felt right letting his kids play in the creek:

"The nature center over here, by 28th Street. Yep. Little preserve that walks through [by the creek]. Used to take our kids through there, but we wouldn't let them play in it at that time. When we've taken our grandkids there, now, we can let them put their feet in the water. It's changed ... [it used to] not smell right ... [it smells] better now."

There were numerous stories of parents that once did not feel comfortable letting their children play in the stream. While most still do not, they are becoming more open to the idea, as the participant above did.

One participant shared how his family used to use the creek and how the creek has evolved as he grew older:

"Yeah, well, when I was a kid, I really did not get right down into Plaster Creek very often. One of the things at that time, I grew up in what's the city of Kentwood today. Just to the east of us over that horizon was the township dump, which was kind of at a ravine near the highest point but was not that far above Plaster Creek. Everybody just went there and dumped their trash in. I often think about that today. What's leaching down to the creek now, 60 years later? I mean, we would—my dad had a pickup truck—he was a small businessman—and some Saturdays we'd load that thing up, drive to the dump and back up to the edge of the ravine and just push all that stuff out you know, it was the early 60s or late 50s. Yeah, and then it was kind of like oh, you know, don't worry there's plenty of space, we'll never run out of fresh water, and there will always be a place to dump stuff. And now you look at it and think wow, that was so untrue ..."

... I know that when the salmon were first introduced into Lake Michigan, they would swim up these creeks. When I was in high school, which was the early 60s, mid 60s, other kids in school would be talking about going out spearing salmon. You don't see any fish like that in Plaster Creek today. No, you don't. And there's a lot of reasons for that I realize, but that just tells you what's taking place. I also remember being outside at Shadyside Park and playing in Plaster Creek out there. It's very near its source. Over the years, riding around through that community and seeing how the farm cattle were walking down into the creek to drink. It's kind of nice to see nice grassy borders along there today. And I guess for a lot of reasons [there are] not that many cows anymore on small plots of land ...

... I think today [the water is] probably a little less murky than it was. But I think what's most noticeable is the difference between just a normal flow day and post rain event ... that's always what shocks me the most actually. Because of our vehicle situation, I often walk from our home here to a greenhouse that's on the other side of the creek. Especially in the spring part of the year, almost daily, when I walk after a rain and look, I always cross Plaster Creek and Eastern and look down into the stream. It's always kind of sharp, shocking, the chocolate milk flowing down after a rain."

While the next story did not come from the participant himself, he shared the story of a farmer who lived upstream and was skeptical of a project relating to the watershed:

"There was a really old, really old farmer there who was here 50 years ago. When they came in, they told us we need to straighten all of the ditches in order to reduce flooding. Now, you're here telling me we're going to have to make all the ditches curvy in order to reduce flooding. He had a lot of skepticism and it was interesting to hear like, okay, there's someone here who was present the last time a project like this happened. [You could hear] that skepticism that was in a voice."

While not explicitly relating to PCS, this interviewee was unique in that he knew many farmers upstream in the Plaster Creek watershed. He described how this skepticism for environmental change is common for farmers, especially those who have long-standing roots to the area.

For those who have been around the creek for a short period of time, their short stories revolved around the erosion they have seen along the creek and the murkiness of the water. While the water clarity may not have improved in the short time they have been

around the watershed, they certainly see an improvement in bank erosion in the last few years. These participants said they are excited to continue their involvement in the Plaster Creek watershed.

Information for action

A pervasive theme throughout every interview was that the primary way PCS can improve the watershed moving forward is to equip people in the watershed community with information to take action. Sometimes, this “information for action” looks like helping others understand what a watershed is and how it functions. Other times, this is helping people understand that their actions have consequences that affect others. For some interviewees, this “information for action” seems nearly impossible, because others need motivation to care for those around them, not just information, and some people just don’t seem to care.

The statements in this section investigate what interviewees’ neighbors need to increase engagement in watershed restoration efforts. The first quote comes from a participant who states that their neighbors are unaware of the existence of watersheds at all, or do not comprehend what it means to live in one:

“I think it’s also the fact that people don’t understand or have the knowledge that they live in a watershed. They move from a big perspective, like oh yeah, I’ve heard that term before. But what does that mean?”

Along with not understanding the practical concepts of living in a watershed, interviewees’ neighbors do not understand how the future of watersheds are impacted by what is—or is not—done in the present. One interviewee shares her idea around holding her neighbors accountable to act:

“I think people just understood what it meant for our future. It’s simple, but to get them to want to learn more and care. An idea could be picking a block or a few blocks and saying these dates, these neighbors are going to go clean up the creek, or these neighbors are going to do some plantings here with people you know. You might feel guilty if you don’t.”

No matter what event is hosted or how one describes what it means to live in a watershed, some people just seem unable or unwilling to grasp the concept of an interconnected watershed in which actions have consequences. One interviewee shared how an educational opportunity exposed one individual’s lack of care, and the ensuing thought process that followed:

"I think the biggest thing is to help people see the importance of why caring for our watershed makes a difference. I remember one of the events that we did; we had to go around and label all the storm drains in a particular neighborhood to say, 'don't dump stuff down here. This is a storm drain. Not good.' I had one guy say something like, 'why does it make a difference? I don't care. My water's fresh out of the tap.' I think it's combating that type of mentality. That is the biggest challenge. Because a lot of people—especially, I think, non-Christians—just don't care. What's the big deal? Why? Why not just throw my trash on the curb? There's so much more to that. It's not just about creation care. The area that we were in was a more impoverished area ... how do you get them to see the importance of caring for creation, their neighborhood environmentally, when they're having a hard time putting food on the table?"

This participant highlighted a theme that was touched on in many interviews. There is a need to engage lower-income neighborhoods in the work of PCS. Yet, this work is not the priority for individuals living in these neighborhoods. It is difficult to address environmental issues when one is focused on surviving. A different interviewee shared a similar thought:

"I'd like to say that if [people] only knew how their actions affected others, that they would like to get involved. But clearly, that's not a motivator. I mean, people don't care about things that don't directly affect them in one way, shape, or form. I get that much more if you're on the way bottom end of the economic scale, right? You know, we hear all the time about the continued decrease in the rain forest. I'm thinking man, if I was a sustenance farmer and I was just trying to feed my family and I needed more crops and these trees were in the way, I'd cut it down, right? I mean, because you don't have the opportunity to worry about the future, you're just so focused on the present, but that's not the case with a lot of what's going on ... [People] think about the future a lot, and that they're very proud about how their IRA has increased 24% and how they're generating wealth for generations to come. But then also provide a world for them for generations to come. Don't set them up so that they can do whatever three generations down; give them a great habitat three generations away. [That's] just not how America [thinks]. A lot of our thought process is in, in a society based on, what I can see. I kind of lost the question, but I think the difference is you got to get people to care more about other people. And again, good luck with that."

Moving from a continuation of the economic discussion to a general commentary on American attitude, the above participant is hesitant about the ability to motivate others to action. The bottom line: to improve our watershed's health, we just teach those around us to care about others more.

Participant motivation

Each interview participant—without fail—was able to articulate a story or reason for their motivation to care for the Plaster Creek watershed. Many participants pointed to their Christian faith, citing creation care as a mandate for action. Others shared stories of their childhood, pointing to their upbringing for why they care.

This section will share the stories or reasons interviewees shared for why they care about the Plaster Creek watershed, grouped with others with similar motivation. The first reason for motivation was the way individuals grew up. The interviewees below share stories of how their upbringing influences their motivation for stewardship today:

"[In Iowa growing up] we had a huge garden or in our backyard ... it had to have been like a 50 feet by 20 feet garden. It was huge. And it was with that rich, Iowa soil. I think that probably gave me the first experiences of just being in the land more than just on top of the land, if that makes any sense. To be involved or dependent on ... to be incorporated with the land ... I have to imagine that was definitely related and a good starting point."

"I've been collecting rocks and minerals since I was a little kid. I joined my first rock club when I was eight years old. Took classes at the public museum. ... I went as a boy scout—I was an Eagle Scout—to Philmont Scout Ranch and attended their Conservation Camp. So, my interest in conservation goes back a long way. We did our summer vacations tent camping. We went back into the National Forest. And it was a good trip when we didn't see anybody. So, being in tune with nature helps."

"I like to claim that I come from the water. I grew up in northern Michigan, by the Straits of Mackinac, in the inland waterways of Michigan. I was two blocks away from the Cheboygan River and four blocks away from Lake Huron. I spent more days than I can count ... in, on, or by the water. So, water has always been one of the most important things in my life, since I can remember. I had been, I guess trained and indoctrinated ... It wasn't a formal training or indoctrination by any means. But most of the people that I grew up with—grandparents, aunts, uncles, whoever. We did a lot of water management as just our way of life ... we always

knew that water was important, and that it was something that should be respected and cared for. So, it's just always been important to me."

"When I was younger, I was definitely like a bleeding heart for the planet kid. I cared so very much about animals and bugs. And that's definitely been a staple, as I've gotten older, that hasn't really gone away. But it's definitely changed in how that's expressed. So like, the more I learn in school here, the more astounded I am at all the different systems and relationships and things that occur in nature, and you know, there's still so much that we don't know."

"Yeah, isn't so much the way I was raised; we were raised fairly conservative. The company that my dad worked at was on Lake Macatawa, and we were not environmentalists. But we ice fished on the lake. In the summertime, Dad would drive across the bridge, look across and see this big sheen of stuff on the surface of the water that came from his plant. And he was uncomfortable with that. Not being an environmentalist, but maybe from a more hardcore, practical [point of view]. This is where I get my perch, you know, little things like that."

A second group of responses comes from interviewees who cite that their faith is the primary influence on their care for the environment:

"I think my answer might be kind of Calvin-ish. I think, you know, my faith is a big part of it. And as human beings, we were given something beautiful to take care of. And I think that's the part that I would love for our students to see, right? That there's even beauty in something that has been made unbeautiful. And for us to restore that, we have the responsibility to do that. Some of our failed work, that needs to be restored and healed together."

"Yeah. I think a big part of it actually started when I worked at a summer camp in New York, back in 1993. They were very big on taking care of creation. It just really stuck with, stuck with me since then, you know, it really is important for us as believers to care for this world. For those who are coming after us, one, but more importantly, brings glory to God. So why wouldn't we do that?"

"Well first off, I never sing in 'This World is Not My Home, I'm Just Passing Through.' I refuse to sing it. Because this world is my home. I might be passing through, but I'm going to stay organically here for a number of years ... When I had just graduated from seminary in 1977 ... I just had this crazy, idealistic vision that I could change the world. And I preached on Genesis 2 verse 15, about not dominating, but

caring for, I believe the Hebrew word for that is actually to serve the earth, like a servant, you know. And I did that in my home church ... which no longer exists. And then I went on holidays, and two weeks later came back on holidays, and the clerk and Chair of counsel called me and said, 'boy, there are a lot of people who are worried about you preaching, not the gospel, but the environment.' So that was one of my wake-up calls about how this sort of thing could be controversial and divisive."

"Well I mean, I think it's a just an eternal appreciation of this great habitat that we're given. I mean, I think God created a good world. It should exist to benefit all of us, right? So there's some internal responsibility of those that have a direct impact on it to do so in a way that's a positive impact."

Some older interviewees shared that their family is the primary influence for their care of the environment. It is not that their family explicitly told them to care for the world around them; rather, that they look at the effects of climate change and worry for their grandchildren.

"Well, I think I've always been a person who enjoy being outdoors and being in creation and nature ... A part of it is I guess looking to the future I want to preserve for my children and my grandchildren. I looked at the world and what I believe climate change is doing to it and I just think 'wow, what is there going to be for my great-grandchildren?' I don't see them having some of the same wonderful opportunities I've had ... as a Christian, I think it's my responsibility treat the world [well], but I just think as a human being, for future human beings. That's my responsibility. Take an interest in those things."

"My four grandchildren who are sitting in Germany right now. What the heck am I leaving them? They come back and say, what the heck was grandpa doing? People could have done something about this [ecological crisis]. So that's kind of the simple answer. You know, you get some churches and they say, well, says in the Bible, God gave us control of recreation. But I don't think that was what He had in mind. Strip mining the earth, polluting the water, cutting down all the trees..."

Discussion

Interviewees were remarkably optimistic about PCS. This optimism was not limited by religiosity, age, geographic location, or length of involvement with PCS. This wide-

reaching, promotive attitude of PCS bodes well for future initiatives launched by the organization.

While people became involved with PCS in different ways, participants all pointed to other people as the reason they are involved in PCS today. PCS staff members—both former and present—were mentioned by name as being integral to their involvement and continued engagement in PCS initiatives. Beyond PCS staff members, family members, neighbors, and church members were key connectors and encouragers of involvement.

Several interviewees shared that the person who motivated them to get involved with PCS was from a different generation. Some people learned from their parents. Others felt responsible to leave a healthy world for their children and grandchildren. This intergenerational transmission of motivation to promote water quality is a key strength for PCS. Other research has shown that younger Americans (Funk, 2021), especially among evangelicals (Lowe et al., 2022), care more about the environment than do their older counterparts. PCS seems to unite generations in pursuit of a common goal.

As evident in the stories of older interviewees, attitudes around the conservation of a watershed *can* change for *anyone* over time. Whereas one participant once dumped trash into Plaster Creek, they now are a prominent supporter for the cleanup and preservation of the watershed. One participant grew up in a “conservative, non-environmentally focused” family, only to find themselves with an interest in stewardship kindled as they enter their 70s.

Thus, it seems that PCS occupies a unique position among organizations that care for stewardship of the environment. Their constituency is not limited by generation or occupation. Despite being part of a religious institution, they can bridge the gap and invite in non-religious members of the Grand Rapids community (in one interviewee’s words, “[Reformed Christians] are not my preferred group of people to interact with ... but I understand the environmental side of it”). Program participants have demonstrated an ability to change their attitudes around stewardship over time, thanks in part to PCS’s work in the community.

Considering PCS’s ability to unite and educate, it seems plausible that they can meet the lofty expectations of interviewees to further educate the public about the importance of watershed preservation—and motivate them to care enough to act. In various moments throughout the interviews, participants shared a desire for PCS to be “louder” with their work. They see PCS as a humble organization that needs to share its efforts more

broadly. The hope is that this sharing invites more individuals into the conversation around watershed restoration, building a coalition that can affect policies and procedures at a higher-level (such as city-wide, county-wide).

It goes without saying that the possibilities for PCS moving forward are many. No matter what path is taken by the organization, it is important to build upon the key strengths of the organization. Interviews with PCS constituents make it clear that those involved in the program are PCS's biggest strength. Interviewees are hungry for opportunities to get involved in the work of PCS and collaborate in meaningful ways. They see the program as a beacon of hope for watershed restoration and are quick to share that opinion with others they encounter.

This section will conclude with the words of one participant. With this one quote, this individual encapsulates what most interviewees said in response to the interview's concluding question of "is there anything else you'd like to share with PCS?" This interviewee said:

"I'm grateful that people are willing to get involved in [PCS], either voluntarily or as a paid position. Try to encourage them not to lose faith; it's very easy to do. Again, like I said, in the current political climate in some respects our laws get changed every four years. Try to keep faith and realize you're doing good work."

Education Event Pre/Post Feedback Forms

Note: This section was authored by Laura Luchies.

There were two goals for the education event feedback forms. The first goal was to examine changes in knowledge from before to after the event. The second goal was to gather additional feedback about the education event, including what people liked most and what could be improved.

Method

People who attended two educational events hosted by PCS were invited to participate. The first event took place at Leisure Creek Condominiums in September 2021. The second event took place at Calvin University in May 2022, at the beginning of PCS's annual spring project day.

As people arrived, researchers handed out clipboards with a paper copy of the survey and pen. Attendees were invited to complete the first page of the survey as they waited for the event to begin. Participants were asked to wait to complete the rest of the survey until instructed to do so. At the close of the education event, participants were asked to complete the remainder of the survey. When they were finished, participants returned the completed survey and clipboard.

Forty-nine people completed the feedback form, including 17 from the first event and 32 from the second event. The researchers completed data entry of the surveys. See the feedback form in **Appendix C: Event Feedback Form** on **page 66**. Responses were anonymous and no demographic information was collected.

This project was reviewed and approved by the Calvin University Institutional Review Board (project 21-009).

Results

Changes in Knowledge from Pre to Post Event

Participants rated their knowledge of six topics on a 5-point scale (1 = *not at all knowledgeable* to 5 = *extremely knowledgeable*). We averaged the six items assessing knowledge to create a knowledge scale ($\alpha = .96$). The average self-rated knowledge score before the event was 2.64 ($SD = .90$); the average after the event was 3.74 ($SD = .74$) for an average increase of 1.10 scale points. Then, we conducted a time-series

regression analysis to determine whether this increase in knowledge was statistically reliable. The increase in knowledge was statistically significant, $z = 13.55, p < .001$.

We further explored changes in knowledge by examining each of the six items individually. As shown in **Table 4**, participants' self-rated knowledge increased significantly on all six individual items. Furthermore, when examining changes in knowledge separately for each of the two educational events, all results were similar.

Table 4 Time-series regression results by scale/item and education event

	Pre-Event		Post-Event		Pre-Post Change		
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	Δ	<i>z</i>	<i>p</i>
Both events (Ns = 48-49)							
Knowledge scale	2.64	0.90	3.74	0.74	1.10	13.55	<.001
1. Watersheds	2.78	1.10	3.67	0.86	0.88	9.08	<.001
2. Stormwater	2.65	1.04	3.56	0.85	0.90	8.86	<.001
3. Problems in Plaster Creek	2.67	1.05	3.79	0.77	1.13	10.15	<.001
4. Impacts of waterway pollution	2.65	1.03	3.65	0.81	1.00	8.16	<.001
5. Solutions for Plaster Creek restoration	2.51	1.04	3.77	0.81	1.27	10.35	<.001
6. Benefits of projects described today	2.60	1.09	3.98	0.79	1.39	9.83	<.001
September 2021 event at Leisure Creek (Ns = 16-17)							
Knowledge scale	2.37	0.77	3.55	0.70	1.19	8.67	<.001
1. Watersheds	2.36	0.86	3.50	0.73	1.13	7.42	<.001
2. Stormwater	2.34	0.87	3.38	0.62	1.03	6.11	<.001
3. Problems in Plaster Creek	2.54	1.06	3.63	0.72	1.10	5.95	<.001
4. Impacts of waterway pollution	2.04	0.90	3.50	0.82	1.47	6.55	<.001
5. Solutions for Plaster Creek restoration	2.37	1.12	3.63	0.81	1.27	5.66	<.001
6. Benefits of projects described today	2.59	0.87	3.69	0.79	1.11	5.60	<.001

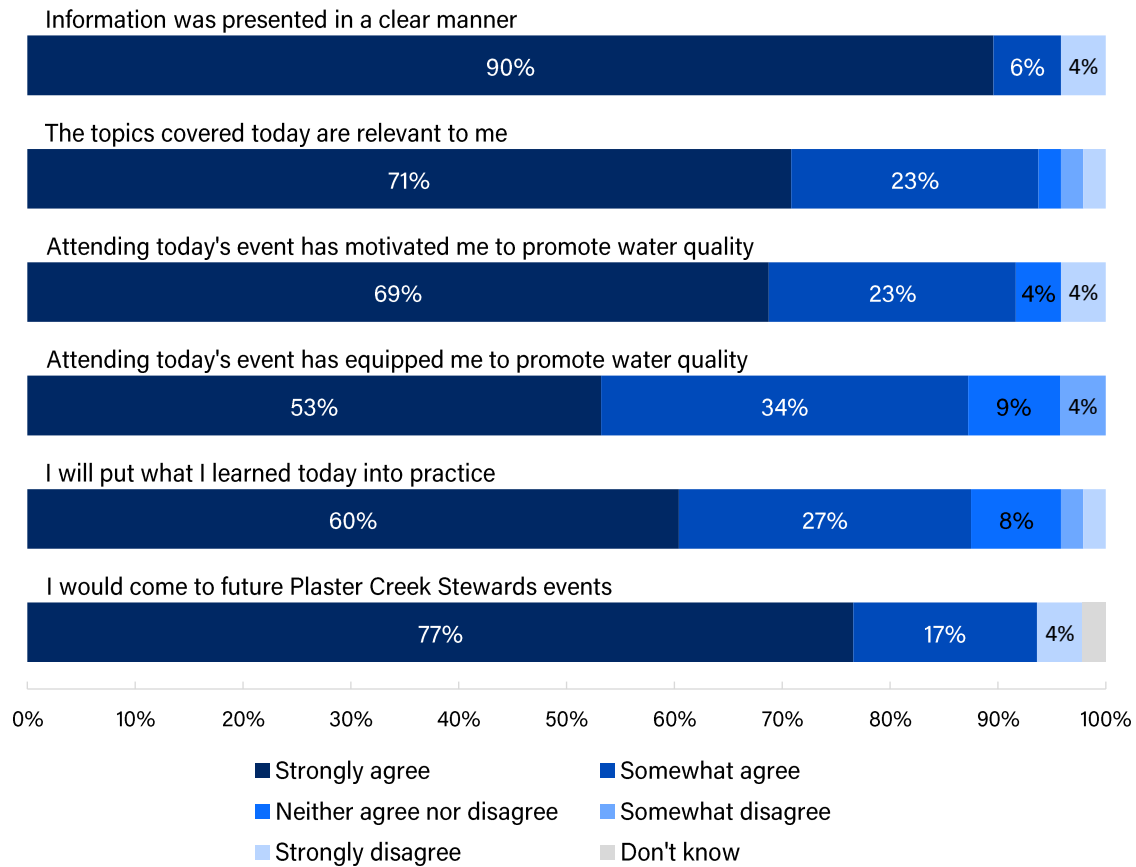
	Pre-Event		Post-Event		Pre-Post Change		
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	Δ	<i>z</i>	<i>p</i>
May 2022 event at Calvin University (N = 32)							
Knowledge scale	2.78	0.94	3.83	0.76	1.05	10.38	<.001
1. Watersheds	3.00	1.16	3.75	0.92	0.75	6.31	<.001
2. Stormwater	2.81	1.09	3.65	0.94	0.84	6.60	<.001
3. Problems in Plaster Creek	2.72	1.05	3.88	0.79	1.16	8.10	<.001
4. Impacts of waterway pollution	2.97	0.97	3.72	0.81	0.75	5.91	<.001
5. Solutions for Plaster Creek restoration	2.56	1.01	3.84	0.81	1.28	8.51	<.001
6. Benefits of projects described today	2.61	1.20	4.13	0.75	1.53	8.27	<.001

Additional Feedback

The post-event portion of the form included additional questions. The first set of questions asked participants to rate six statements about their experience of the event on a 5-point scale (1 = *strongly disagree* to 5 = *strongly agree*). As shown in **Figure 7**, participants were enthusiastic about their experience. At least 85% of participants agreed or strongly agreed with each statement.

96% of participants said that information was presented clearly. More than 90% of participants said that the topics that were covered were relevant to them and that attending *motivated* them to promote water quality. Nearly as many said that attending *equipped* them to promote water quality and that they planned to put what they learned into practice. At the same time, the percentage of participants who *strongly agreed* with the two items about future behavior was somewhat lower than it was for other items. This suggests that some participants may foresee barriers that may keep them from acting on what they learned. Finally, more than 9-in-10 participants said they would attend future PCS events.

Figure 7 Ratings of education event



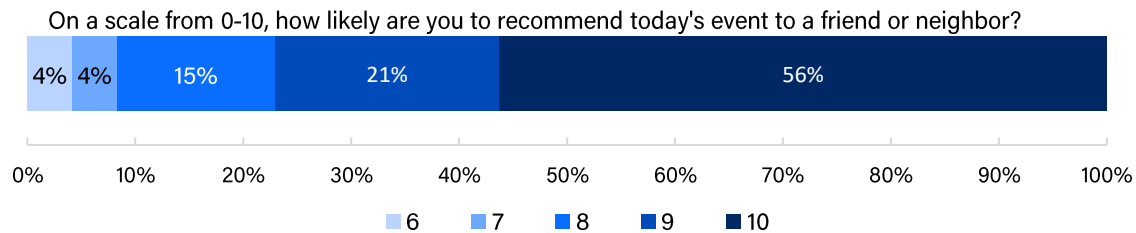
The next question asked participants “On a scale from 0-10, how likely are you to recommend today’s event to a friend or neighbor?” This question is used to calculate a Net Promoter Score (NPS), a widely-used metric developed by the consulting firm [Bain & Company](#). People who give an organization, product, or service a rating of 9 or 10 are “promoters” who are likely to make public endorsements and encourage others to try or join. People who give a rating of 7 or 8 are “passive”; they are satisfied but are unlikely to recruit others. People who give a rating of 0-6 are “detractors” who are likely to tell others about their negative experiences or deter others from trying or joining.

An NPS score is calculated by subtracting the percent of detractors from the percent of promoters; theoretically, NPS scores could range from -100 (everyone is a detractor) to +100 (everyone is a promoter). Bain & Company’s guidelines state that an NPS score that is positive (more promoters than detractors) is considered good. An NPS score of +50 or higher is considered excellent.

As illustrated in **Figure 8**, 77% of participants were promoters, 19% were passive, and 4% (2 individuals) were detractors, yielding an NPS score of +73. This places PCS in the

excellent range, at least when based on participants who returned feedback forms at these two education events.

Figure 8 Net Promoter Score (NPS)



Comments

Finally, there were three open-ended questions. The first asked what participants will do differently because of what they learned at the event. Twenty-three people responded to this question. These comments indicated that attendees planned to:

- Continue to learn about water quality issues.
- Be more involved with PCS.
- Install rain barrels.
- Plant more native plants and create rain gardens.
- Look at home buying and landscaping decisions differently.
- Teach others about water quality.

The second open-ended question asked participants how their experience with PCS has affected the way they think about or act on their relationship to Plaster Creek. Twenty-one attendees responded to this question. Attendees shared that they:

- Heard of and learned about Plaster Creek for the first time. For example, one participant said, *"I had never heard of Plaster Creek. Now I know its importance to the greater GR community and how it impacts low-income people."*
- Will pay more attention to their personal effects on pollution.
- Are more aware of the effects of practices such as lawn fertilizing.
- Want to learn about the chemicals applied by groundskeepers at Leisure Creek.
- Feel connected to the watershed. For example, one attendee stated, *"I feel much more connected to the flood plan around me. I want to do all I can to reconcile the broken relationship between urban and green spaces."*

The final open-ended question allowed participants to share anything else about their experience with PCS. Eleven people responded, most with a "thank you." Other comments included:

- *"What an inspiring organization. Really helps to serve as an addition to a Calvin civil/environmental engineering or environmental science education."*
- *"You all do a great job making the biology stuffs easy to access as a layperson."*

Discussion

In summary, analysis of the pre/post event feedback forms provided several encouraging findings. First, over the course of about an hour, people who attended PCS education events reported a significant increase in knowledge about several water quality topics. Second, most attendees said that information was clear and relevant to them and that they were motivated and equipped to put what they learned into practice. Third, open-ended comments documented several ways in which attendees learned about the Plaster Creek watershed and planned to change their behavior to promote water quality. Finally, attendees had very positive impressions of PCS and expressed appreciation and support for its work.

Recommendations & Conclusion

This multi-component evaluation of the social impact of Plaster Creek Stewards provided strong evidence of PCS's effectiveness. Shorter-term impact of PCS was measured through **Education Event Pre/Post Feedback Forms (page 44 and following)**. People who attended PCS education events exhibited significant gains in knowledge about water quality issues.

Longer-term impact of PCS was highlighted by the **Surveys of PCS-Involved Individuals and General Residents (page 3 and following)**. Survey results indicated that people who have been involved with PCS report greater responsibility for and ability to affect water quality; perceive greater severity of general, country-wide, and household-related water pollutants; and were more familiar with practices to improve water quality.

Given this robust evidence base, the question is no longer "Is PCS making a difference?" The question is now "How can PCS multiply the difference it makes?" As evaluators, we identify two avenues to expand PCS's impact.

The first avenue to expand PCS's impact is through continued advocacy for policy change, especially in upstream areas. As one interviewee noted, "*municipalities don't always have a watershed mentality.*" PCS has a large support base. In addition to engaging people in education and restoration work, PCS could also engage people in advocacy work. This might include providing people with example letters to send to policy makers, scripts for making phone calls, and public meetings to attend. By leveraging its supporters and partnering with other organizations, PCS could drive policy changes that would help protect and restore the Plaster Creek and its watershed.

The second avenue to expand PCS's impact is by reaching new people and turning people who are already involved with PCS to active promoters of its work. Imagine a pipeline that includes several stages:

- People who haven't heard of PCS.
- People who have heard of but haven't been involved with PCS.
- People who become involved with PCS for the first time.
- People who have regular involvement with PCS.
- People who are active promoters of PCS by inviting others, making financial donations, etc.

PCS can consider ways to increase the conversion rate from each stage to the next. For example, PCS could reach out to individuals who have participated in only one or a few events and personally invite them to an upcoming event. PCS could train people with high involvement how to have conversations with neighbors who are not following best practices for water quality.

Perhaps most importantly, PCS could equip its supporters to explain the importance of PCS's work and invite other people to take part in it. Many interviewees shared that they became involved with PCS because a particular person—a PCS staff member, neighbor, or family member—had reached out to them. In this way, the pipeline is cyclical: active promoters introduce new people to PCS, and some of these newly recruited people will become active promoters themselves.

References

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Appendix A: Survey

Welcome

Welcome to the Plaster Creek Stewards survey! Your responses will help the Plaster Creek Stewards and the Michigan Department of Environment, Great Lakes, and Energy (EGLE) better understand what people like you know and think about water quality. Survey data will be used to gauge the impact of Plaster Creek Stewards and identify areas for improvement.

We appreciate your participation. Thank you!

About the Survey

What is this survey about?

This survey is about your understanding of and opinions about water quality in the Plaster Creek watershed and the impact of the Plaster Creek Stewards.

What will I be asked to do?

You are invited to take a 10-minute online survey.

How will my identity be protected?

Your answers will be kept confidential. Your identity will be protected by using assigned code numbers to track responses. The code list will be destroyed at the conclusion of this study.

What are the risks and benefits?

There are no anticipated risks or direct benefits to you. Your response will help the Plaster Creek Stewards to better serve its community, and you can choose to share your contact information to be entered into a drawing for one of fifty \$25 gift cards.

Is my participation voluntary?

Yes, your participation is voluntary. You may choose not to participate, skip questions that you do not want to answer, or stop participating at any time. There will be no negative consequences if you choose not to participate.

How can I ask questions?

- Send questions about this survey to Laura Luchies, PhD, Principal Consultant of DataWise Consulting, by emailing laura.luchies@wearedatawise.com.

- Send questions about your rights as a research participant to the Chair of the Calvin University Institutional Review Board by emailing irb@calvin.edu.
- Send questions about Plaster Creek Stewards to Andrea Lubberts, Program Manager of Plaster Creek Stewards, by emailing aclark47@calvin.edu or calling 616-526-7024.

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By clicking "NEXT," you indicate that you are at least 18 years old and that you are willing to participate in this survey.

Rating of Water Quality

Rating of Water Quality

Overall, how would you rate the quality of the water in your area?

Poor

Okay

Good

Don't know

	Poor	Okay	Good	Don't know
For canoeing, kayaking, or other boating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
For eating locally caught fish	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
For swimming	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
For picnicking and family activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
For fish habitat	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
For scenic beauty	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Of these activities, which are the most important to you?

Check all that apply.

- For canoeing, kayaking or other boating
- For eating locally caught fish
- For swimming
- For picnicking and family activities
- For fish habitat
- For scenic beauty

Your Water Resources

Are you familiar with the term "watershed"?

- No
- Yes

Do you know where the rain water goes when it runs off your property?

- No
- Yes

Where does your rain water drain to?

Where does Plaster Creek **start**?

- Grandville
- Kentwood
- Dutton
- East Grand Rapids

Where does Plaster Creek **end**?

- Riverside Park
- Fish Ladder in downtown Grand Rapids
- Near the waste water treatment plant on Market Ave
- Reeds Lake

Which of the following is **true**?

- 1. Capturing storm water at downstream locations will have positive impacts upstream
- 2. Any increase in pavement upstream could increase the risk of flooding downstream
- 3. Fertilizer that enters an upstream location will not affect downstream water quality
- 4. There is no significant connection between upstream and downstream
- 5. Both 1 and 3

Your Opinions

Your Opinions

Please indicate your level of agreement or disagreement with the statements below.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
The way I care for my lawn and yard can influence water quality in local streams and lakes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is my personal responsibility to help protect water quality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is important to protect water quality even if it slows economic development	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My actions have an impact on water quality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I would be willing to pay more to improve water quality (for example through local taxes or fees)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would be willing to change the way I care for my lawn and yard to improve water quality.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
The quality of life in my community depends on good water quality in local streams, rivers, and lakes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Water Impairments

Below is a list of water pollutants and conditions that are generally present in water bodies to some extent. The pollutants and conditions become a problem when present in excessive amounts.

In your opinion, how much of a problem are that following water impairments in your area?

	Not a problem	Slight problem	Moderate problem	Severe problem	<i>Don't know</i>
Sedimentation (dirt and soil) in the water	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bacteria and viruses in the water (such as E. coli/coliform)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Toxic materials in the water	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Algae in the water	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Not a problem	Slight problem	Moderate problem	Severe problem	<i>Don't know</i>
High water temperature	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pesticides	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Nutrients (lawn fertilizers and farm manure) in the water	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Sources of Water Pollution

The items listed below are sources of water quality pollution across the country.

In your opinion, how much of a problem are the following sources of pollution in your area?

	Not a problem	Slight problem	Moderate problem	Severe problem	<i>Don't know</i>
Street salt and sand	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Littering/illegal dumping of trash	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Urban storm water runoff	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Draining/filling of wetlands	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Not a problem	Slight problem	Moderate problem	Severe problem	<i>Don't know</i>
Removal of plants along stream banks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Waste from high geese and raccoon populations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The items listed below are common household-related sources of water pollution.

In your opinion, how much of a problem are the following sources of pollution in your area?

	Not a problem	Slight problem	Moderate problem	Severe problem	<i>Don't know</i>
Excessive use of lawn fertilizers and/or pesticides	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Grass clippings and leaves entering storm drains	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improperly maintained septic systems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Water running off from rooftops and lawns	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pet waste	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Consequences of Poor Water Quality

Poor water quality can lead to a variety of consequences for communities.

In your opinion, how much of a problem are the following issues in your area?

	Not a problem	Slight problem	Moderate problem	Severe problem	<i>Don't know</i>
Contaminated drinking water	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Contaminated fish	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reduced beauty of lakes or streams	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reduced opportunities for water recreation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Not a problem	Slight problem	Moderate problem	Severe problem	<i>Don't know</i>
Excessive aquatic plants or algae	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Odor	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lower property values	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Practices to Improve Water Quality

Please indicate which statement most accurately describes your level of experience with each practice listed below.

	Not relevant for my property	Never heard of it	Somewhat familiar with it	Know how to use it; not using it	Currently using it
Keep grass clippings and leaves out of roads, ditches, and gutters	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Follow pesticide application instructions for lawn and garden	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use phosphate free fertilizer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Properly dispose of pet waste	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Restore native plant communities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Protect stream banks and/or shorelines with vegetation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Rain Gardens

A **rain garden** is a garden that uses native plants to absorb and filter storm water collected off of a roof, parking lot, sidewalk, or driveway.

How familiar are you with **rain gardens**?

- Not relevant
- Never heard of it
- Somewhat familiar with it
- Know how to use it; not using it
- Currently using it

Please explain why a rain garden is not relevant for you.

Are you willing to try having a rain garden?

- Yes or already do
- Maybe
- No

How much do the following factors limit your ability to implement a rain garden?

	Not at all	A little	Some	A lot	Don't know
Don't know how to do it	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Time required	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The features of my property make it difficult	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Insufficient proof of water quality benefit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Not at all	A little	Some	A lot	Don't know
Desire to keep things the way they are	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Physical or health limitations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hard to use with my farming system	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of equipment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Native Plant Communities Restoration

Native plant communities restoration involves restoring plant species in a manner designed to produce communities comprised of native species.

How familiar are you with this **native plant communities restoration**?

- Not relevant
- Never heard of it
- Somewhat familiar with it
- Know how to use it; not using it
- Currently using it

Please explain why native plant communities restoration is not relevant for you.

Are you willing to try native plant communities restoration?

- Yes or already do
- Maybe
- No

How much do the following factors limit your ability to implement native plant communities restoration ?

	Not at all	A little	Some	A lot	Don't know
Don't know how to do it	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Not at all	A little	Some	A lot	Don't know
Time required	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The features of my property make it difficult	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Insufficient proof of water quality benefit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Not at all	A little	Some	A lot	Don't know
Desire to keep things the way they are	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Physical or health limitations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hard to use with my farming system	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of equipment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Making Decisions for Your Property

In general, how much does each issue limit your ability to change your management practices?

	Not at all	A little	Some	A lot	Don't know
Personal out of pocket expense	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My own physical abilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Not having access to the equipment that I need	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of available information about a practice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Not at all	A little	Some	A lot	Don't know
No one else I know is implementing the practice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Approval of my neighbors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Don't know where to get information and/or assistance about those practices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Environmental damage caused by practice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Not at all	A little	Some	A lot	Don't know
Legal restrictions on my property	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Concerns about resale value	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Not at all	A little	Some	A lot	<i>Don't know</i>
Not being able to see a demonstration of the practice before I decide	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The need to learn new skills or techniques	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Demographics

About You

Do you make the home and lawn care decisions in your household?

- Yes
- No

What is your gender?

- Male
- Female
- Non-binary
- Prefer to self-describe:
- Prefer not to say*

What is your age (in years)?

What is the highest grade in school you have completed?

- Some formal schooling
- High school diploma or GED
- Some college
- 2-year college degree
- 4-year college degree
- Post-graduate degree
- Prefer not to say*

Do you own or rent your home?

- Own
- Rent

How long have you lived at your current residence (in years)?

What was your total household income last year?

- Less than \$25,000
- \$25,000 to \$49,999
- \$50,000 to \$74,999
- \$75,000 to \$99,999
- \$100,000 or more
- Prefer not to say*

PCS

About Plaster Creek Stewards

How likely are you to recommend the Plaster Creek Stewards to a friend, family member, or neighbor?

- Not at all likely Extremely likely
- 0 1 2 3 4 5 6 7 8 9 10

How familiar would you say you are with the Plaster Creek Stewards and their work?

- Not familiar at all
- Slightly familiar
- Moderately familiar
- Very familiar
- Extremely familiar

How have you been involved with the Plaster Creek Stewards?

Check all that apply.

- Follow on social media
- Read newsletters
- Attend educational events or presentations
- Participate in spring or fall restoration work
- Work in the Calvin greenhouse
- Something else:
- None of the above*

Would you like to be added to the Plaster Creek Stewards email list to receive updates and newsletters?

Yes

No

Would you be interested in participating in a 45-minute interview about your involvement with the Plaster Creek Stewards and water restoration?

Yes

No

In a few sentences, please tell us about your involvement with the Plaster Creek Stewards and water restoration.

Would you like to be entered into a drawing for one of fifty \$25 gift cards?

Yes

No

Great! Please provide your name and email address so we can reach out to you.

First name

Last name

Email address

Final comments

Almost Done...

Please use the space below for any additional comments about this survey or water resources in your community.

If you would like to review your responses, click the "BACK" button.

If you are ready to submit your responses, click the "SUBMIT" button.

Appendix B: Interview Questions

Core Questions

1. How did you first hear about Plaster Creek Stewards (PCS)?
2. Think back to when you first heard about PCS and your perception of PCS then. Compare that to what you think about PCS now. How has your perception of PCS changed over time?
3. How have you been involved in PCS?
4. What are the most important things you have learned about watersheds?
5. What do you think needs to happen to restore Plaster Creek to make it a healthy stream?
6. Imagine that the PCS no longer existed. What do you think would happen if PCS stopped its restoration work?
7. Could you tell me about your favorite experiences or interactions with PCS?

Supplemental questions as time allows

1. How does what happens upstream in Plaster Creek affect what happens downstream?
2. What do you think are the biggest problems with Plaster Creek currently?
3. What changes have you seen or observed in Plaster Creek over time?
 - i. What contributed to these changes?
 - ii. How has Plaster Creek been damaged or threatened?
 - iii. How has Plaster Creek been improved?
4. Why do you care about the Plaster Creek watershed?
5. What information do people need to know about Plaster Creek to take action?
6. What concrete steps have you been able to take to help restore Plaster Creek?
7. What are some actions you'd like to take but have not been able to do so? How could PCS help?

Appendix C: Event Feedback Form

Plaster Creek Stewards Event Feedback Form

Welcome!

We are grateful for your participation in today's event. We are inviting you to complete a short, anonymous survey to help us understand how much people learn from this event.

- The **first part** of this survey will ask you about your current knowledge of the topics we will cover today. Please complete this first section at the beginning of the event.
- The **second part** of this survey will ask you about your knowledge of these same topics following the event, as well as give you an opportunity to provide feedback for the event. Please complete the second section when you are invited to do so later.

Completing these surveys is voluntary. By completing and returning the surveys, you are indicating that you are willing to participate in this research. If you rather not participate, simply do not return the survey or return a blank survey.

Part 1: Complete this section at the beginning of the event

Knowledge of Topics

How knowledgeable are you about each of the following topics right now?

	Not at all knowledgeable	Slightly knowledgeable	Moderately knowledgeable	Very knowledgeable	Extremely knowledgeable	<i>Don't know</i>
Watersheds	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> SS
Stormwater	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> SS
Problems in Plaster Creek	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> SS
Impacts of waterway pollution	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> SS
Solutions for Plaster Creek Restoration	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> SS
Benefits of projects described today	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> SS

Have you attended a Plaster Creek Stewards event before today?

- 1 Yes, I have attended a Plaster Creek Stewards event before
 2 No, this is my first Plaster Creek Stewards event

Please wait to complete the rest of the survey until later.

Part 2: Wait to complete this section until invited to do so later in the event

Knowledge of Topics

How knowledgeable are you about each of the following topics right now, after today's events?

	Not at all knowledgeable	Slightly knowledgeable	Moderately knowledgeable	Very knowledgeable	Extremely knowledgeable	Don't know
Watersheds	<input type="radio"/> ₁	<input type="radio"/> ₂	<input type="radio"/> ₃	<input type="radio"/> ₄	<input type="radio"/> ₅	<input type="radio"/> ₆
Stormwater	<input type="radio"/> ₁	<input type="radio"/> ₂	<input type="radio"/> ₃	<input type="radio"/> ₄	<input type="radio"/> ₅	<input type="radio"/> ₆
Problems in Plaster Creek	<input type="radio"/> ₁	<input type="radio"/> ₂	<input type="radio"/> ₃	<input type="radio"/> ₄	<input type="radio"/> ₅	<input type="radio"/> ₆
Impacts of waterway pollution	<input type="radio"/> ₁	<input type="radio"/> ₂	<input type="radio"/> ₃	<input type="radio"/> ₄	<input type="radio"/> ₅	<input type="radio"/> ₆
Solutions for Plaster Creek Restoration	<input type="radio"/> ₁	<input type="radio"/> ₂	<input type="radio"/> ₃	<input type="radio"/> ₄	<input type="radio"/> ₅	<input type="radio"/> ₆
Benefits of projects described today	<input type="radio"/> ₁	<input type="radio"/> ₂	<input type="radio"/> ₃	<input type="radio"/> ₄	<input type="radio"/> ₅	<input type="radio"/> ₆

Sometimes, when we learn about a topic, we realize that we had previously overestimated how much we knew about that topic.

For example, someone might have indicated they were *very knowledgeable* about watersheds at the beginning of today's event. After the event, however, they might realize that they were only slightly knowledgeable about watersheds before today's event.

How much, if at all, do you think you overestimated your knowledge when you completed the survey at the beginning of today's event?

	Did not over-estimate at all	Overestimated slightly	Overestimated somewhat	Overestimated quite a bit	Overestimated greatly	Don't know
Amount of overestimation	<input type="radio"/> ₁	<input type="radio"/> ₂	<input type="radio"/> ₃	<input type="radio"/> ₄	<input type="radio"/> ₅	<input type="radio"/> ₆

Please continue on the next page.

About Today's Event

How much do you agree or disagree with each of the following statements?

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Don't know
Information was presented in a clear manner.	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
The topics covered today are relevant to me.	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
Attending today's event has motivated me to promote water quality.	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
Attending today's event has equipped me to promote water quality.	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
I will put what I learned today into practice.	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
I would come to future Plaster Creek Stewards events.	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6

Overall Rating

On a scale from 0-10, how likely are you to recommend today's event to a friend or neighbor?

0
 1
 2
 3
 4
 5
 6
 7
 8
 9
 10
 Not at all likely Extremely likely

Please continue on the next page.

Comments

What, if anything, will you do differently because of what you learned today?

How has your experience with Plaster Creek Stewards affected the way you think about or act on your relationship to Plaster Creek? If possible, please give an example or two.

Is there anything else you'd like to share about your experience with Plaster Creek Stewards?

Please turn in your completed survey as directed.