

Volunteer Water Monitoring Survey

Combined 2021 and 2022 Volunteer Statewide Survey Report

Prepared November 2023 by:

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1. Introduction

Volunteer monitoring is widely recognized as a tool for engaging the public in science and enhancing stewardship outcomes across resource types and scientific disciplines. Volunteer water monitoring programs (VWMP) have been active in Montana for at least 20 years and there are more than 30 active programs across the state. The State of Montana relies on volunteer collected water quality data for many aspects of water management. Because of this reliance, VWMP managers need to understand what motivates their volunteers to participate in VWMPs and the efficacy of their monitoring trainings. Information on volunteers has traditionally been collected through exit surveys. Our team partnered with VWMPs in Montana to develop a standardized statewide online volunteer monitor survey, designed to be administered by Montana VWMPs repeatedly over time. Our initial survey, which was developed and implemented in 2021, includes questions to understand the following: motivations for volunteering; program-specific training efficacy; learning outcomes; general perceptions of watershed knowledge; whether and with whom respondents talk with about volunteering; and trust in scientists. The survey was re-administered in 2022 using the same questions. This report summarizes the findings of the 2021 and 2022 surveys.

2. Data collection and analysis

We developed this survey in collaboration with three Montana volunteer water monitoring program managers. We adapted many volunteer-specific questions from Church et al. (2019), the trust in scientists questions from Funk et al. (2019) and developed our own questions as a team. The volunteer water monitoring program managers informed the questions related to monitoring training. The surveys discussed in this report were deployed for the 2021 and 2022 volunteer years. We generated an anonymous survey link, which was distributed to volunteers through each volunteer water monitoring program manager.

This survey received approval from Montana State University's Institutional Review Board (SC033122-EX). Survey data was analyzed using R. In the following sections, we use descriptive statistics to report survey data.

3. Results

Volunteer water monitoring program managers distributed the anonymous survey link, thus we do not know the total number of volunteers who received the survey. Between the 2021 and 2022 surveys, we had a total of 86 respondents who identified VWMP they volunteered with in 2021 and/or 2022.

3.1. All volunteer water monitoring program results

3.1.1. Program information and demographics

TABLE 1 VOLUNTEER WATER MONITORING PROGRAM RESPONDENTS

“Please select which Montana-based volunteer water monitoring program for which you plan to complete this survey.” (n=86)			
Volunteer Water Monitoring Program	2021 Frequency (n)	2022 Frequency (n)	Total Frequency (n)
Clarks Fork Yellowstone Partnership	0	3	3
Gallatin Stream Teams	5	10	15
Madison Stream Team	7	4	11
Missoula Valley Water Quality District	2	3	5
Musselshell River Salinity Monitoring Project	1	0	1
Northwest Montana Lakes Network	15	0	15
Stillwater-Rosebud Water Quality Initiative	0	1	1
Sun River Watershed Group	1	0	1
Watershed Education Network	0	34	34

Race

- 88.9% respondents are white (n=72).

Age

- Total count (n): 64
- Mean: 52.7
- Median: 57
- Standard Deviation: 20.1

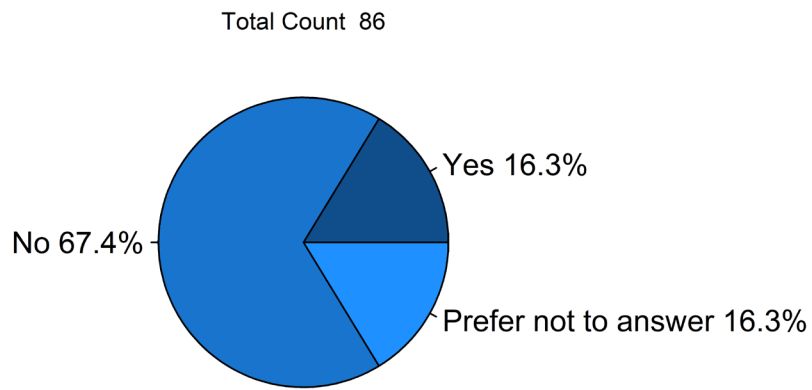


FIGURE 1 RESPONDENT VETERAN STATUS

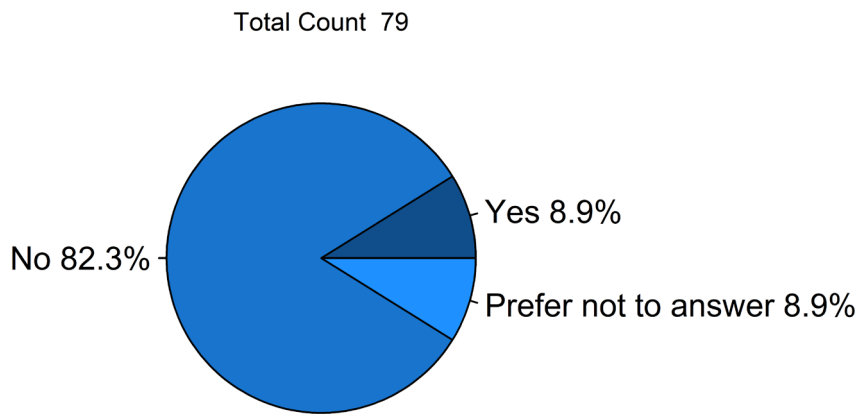


FIGURE 2 RESPONDENT ACTIVE DUTY STATUS

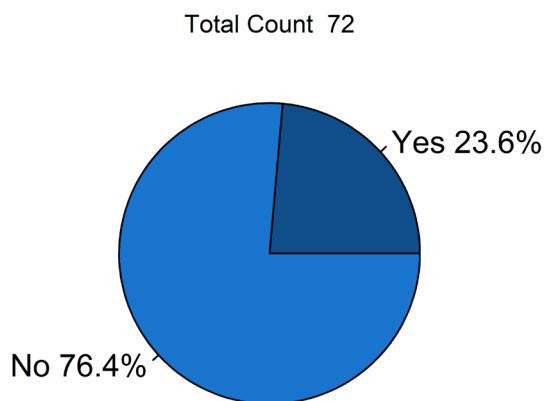


FIGURE 3 RESPONDENT STUDENT STATUS

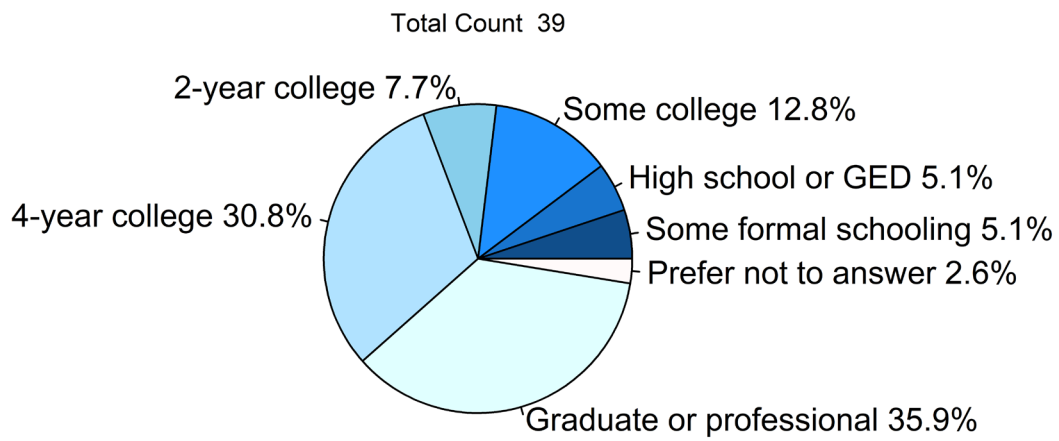


FIGURE 4 RESPONDENT EDUCATION STATUS

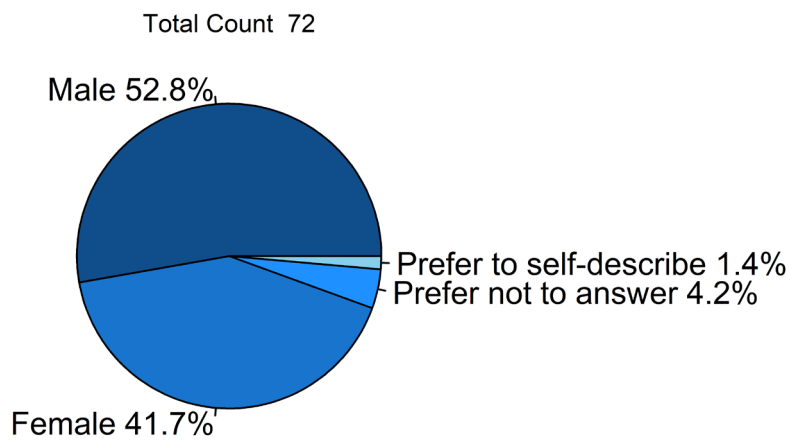


FIGURE 5 RESPONDENT GENDER

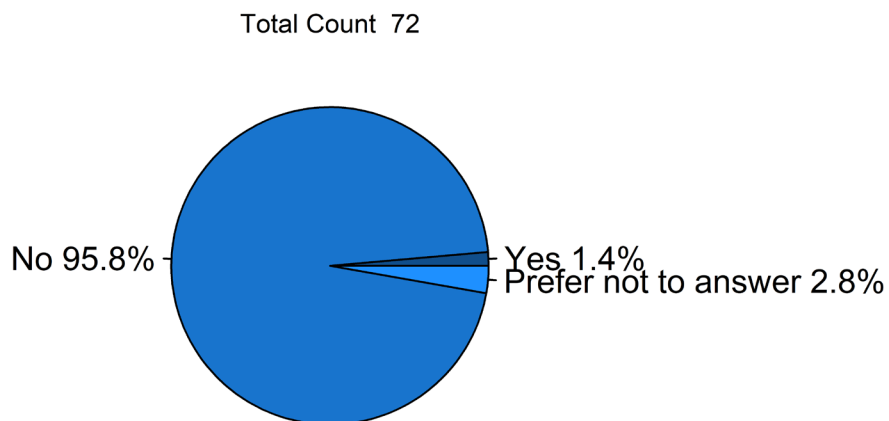


FIGURE 6 RESPONDENT HISPANIC /LATINE IDENTITY

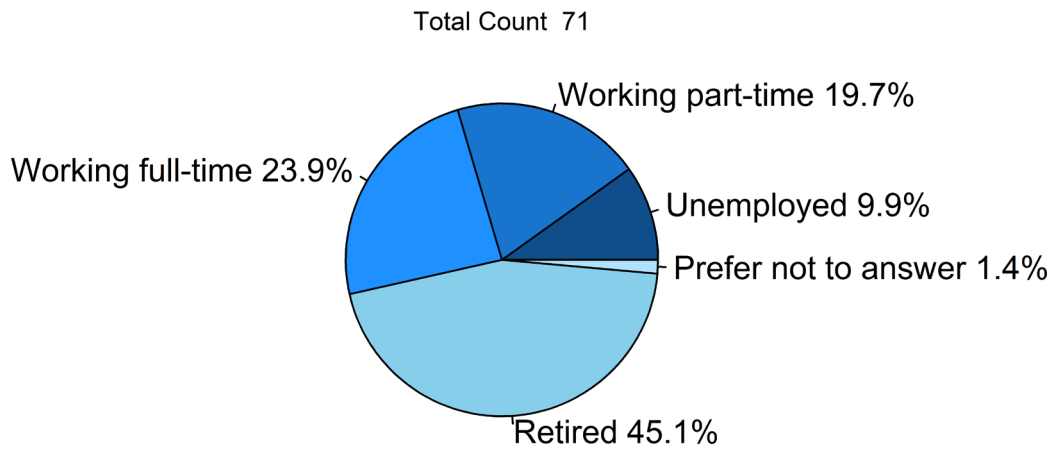


FIGURE 7 RESPONDENT EMPLOYMENT STATUS

3.1.2. Overall results

1. “How many seasons have you volunteered with the [specific VWMP]? (please enter a number rounded to the nearest year)”

- Total count (n): 82
- Mean: 3.4
- Median: 2
- Standard Deviation: 4.4

2. “Are you planning to volunteer with the [specific VWMP] in the future?”

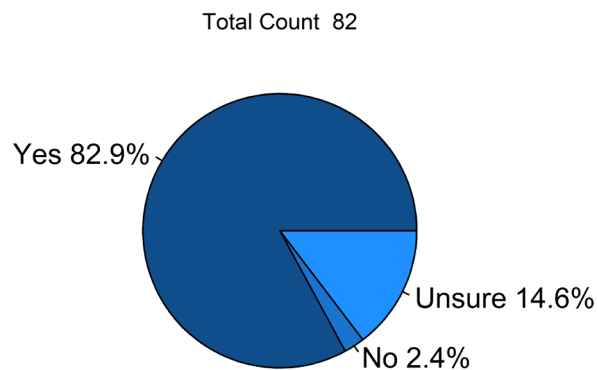


FIGURE 8 FUTURE VOLUNTEER PLANS

3. “Please indicate if you recruited someone from the following categories to volunteer with the [specific VWMP] in 2021/2022.”

TABLE 2 WHO VOLUNTEERS RECRUITED

Recruitment Category	Total Count (n)	Yes (%)	No (%)	Unsure (%)
<i>Friend(s)</i>	74	16.2	78.4	5.4
<i>Coworkers/Classmates</i>	74	16.2	78.4	5.4
<i>Spouse/significant other</i>	74	12.2	85.1	2.7
<i>Children</i>	72	4.2	94.4	1.4
<i>Other</i>	56	8.9	85.7	5.4

4. “How did you hear about opportunities to volunteer with the [specific VWMP]? (select all that apply)” (includes all volunteers regardless of how many seasons they had volunteered)

TABLE 3 HOW VOLUNTEERS HEARD ABOUT OPPORTUNITIES TO VOLUNTEER

Sources	Count (n)	Yes (%)	No (%)
<i>Word of mouth</i>	55	43.6	56.4
<i>Tabling or other outreach event</i>	55	12.7	87.3
<i>Meeting</i>	47	10.6	89.4
<i>Social media</i>	55	9.1	90.9
<i>E-mail campaign</i>	55	3.6	96.4
<i>Print news media</i>	55	1.8	98.2
<i>News broadcasting</i>	55	0.0	100.0
<i>Other</i>	55	27.3	72.7

5. “Please indicate how much each of the following statements motivated you to volunteer with the [specific VWMP] in 2021/2022:” (includes all volunteers regardless of how many seasons they had volunteered)

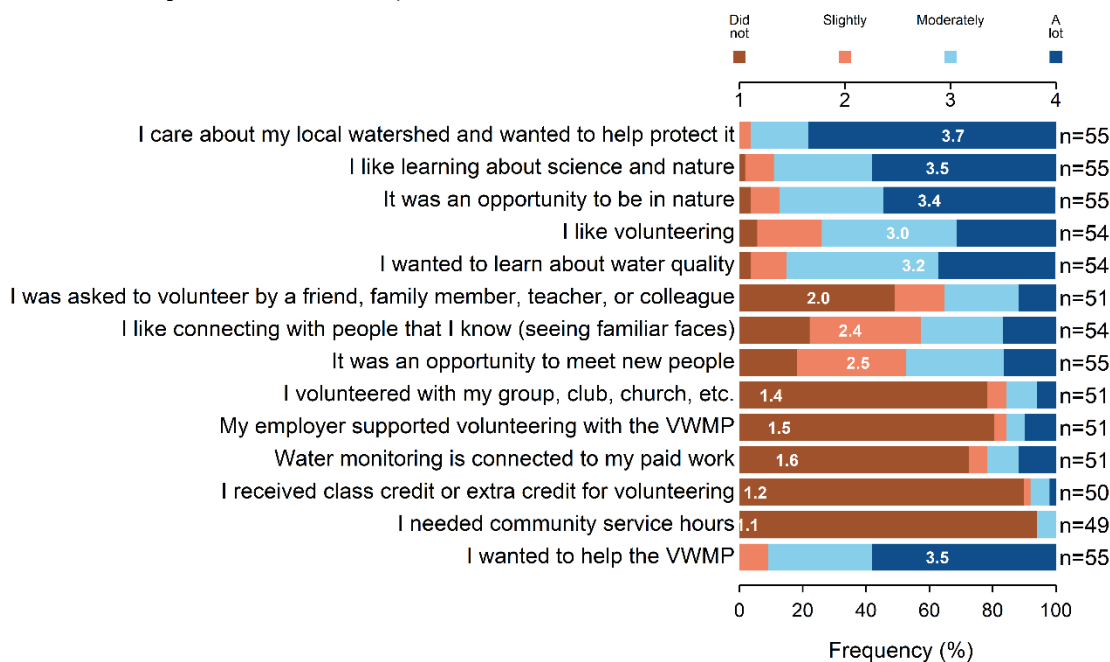


FIGURE 9 MOTIVATIONS TO VOLUNTEER

1=did not motivate me at all; 2= motivated me slightly, 3= motivated me moderately, 4 motivated me a lot

6. “You indicated that you are not planning on volunteering with the [specific VWMP] in the future. Why have you decided not to volunteer with this program in the future? (select all that apply)”

- “I moved away from the watershed” n=2
- “I had other volunteer commitments” n=1
- “I only wanted to volunteer for a limited amount of time” n=2
- “Other” n=6

7. **“Do you have any suggestions to improve the volunteer experience with the [specific VWMP]?”** *Answers below are verbatim (names have been removed).*

2021 Survey

- "Better communication with volunteers encourage them to keep my ring the water"
- "Engage other Organizations and NonProfits as well as schools."
- "Give more notice of upcoming site visits so scheduling can be changed/rearranged. Add a couple more streams to geographically diversify the experience"
- "I believe they have a great program, great leadership, and a wiliness to come out in the field to help train and answer questions"
- "i have been monitoring my [water body] for almost 30 years, I believe that water is one of the most critical natural resource challenges the world faces and yet when there have been issues with my lake I wonder if it makes a difference."
- "I think [VWMP] does a great job with the volunteer experience, keep up the good work!"
- "It is all going well, why change?"
- "It was occasionally hard to devote a whole day to monitoring during the work week. "
- "It would be helpful to have more indoor conversation and briefing about expectations and benefits."
- "No"
- "No. It is working out great. [redacted] is great to work with. The new website they added is easy to work with. I will volunteer as long as they want me too. I have learned a lot over the past years. I really do not want any AIS in our beautiful [redacted]"
- "No. It works well, is predictable and rewarding."
- "None"
- "Not at this time"
- "Pay [redacted] more"
- "Sponsor more parties."
- "The [redacted] has gone through great changes since I started. It used to have lots of people monitoring lots of streams. From the acquired data many streams were removed from the program because their were no negative human caused impacts to their quality. Like everything else in life it has not stayed the same. The experience now is different but still good."
- "Very well organized as it is. A bit more training in all phases of the monitoring might be useful for some of the first year volunteers. However, that comes with numerous logistical and time constraints. Overall, the program does a good job of meeting project objectives. Few improvements are needed--good diversity of interests in the program."

2022 Survey

- "A follow up training Zoom after the first round of sampling would be good. That would be used to double check sites, inventory forms, and sample collection methods. Not only could the volunteers ask questions, the DEQ staff could look at the records and photos to see that they are what they expected."
- "I may have missed it in the description, but if it actually is not there, you might add a statement about what time commitment is expected on a typical day's outing. The first day I went I did not know to bring my lunch. I managed ok, but this might be an issue for some. Also, any advice for a first time wader user? I'd like to get myself a pair of my own :). Maybe a list of people willing to sell a used pair? Thanks!"
- "I think it would be good if at the training sessions the volunteers are told what the time commitment will be. I didn't realize it would take most of the day. The timing worked out for me, but it caught me by surprise that it was an all day enterprise."
- "I think they have been doing a fantastic job and always enjoy monitoring with [redacted]! I do not have any suggestions for improvement at this time."
- "More snacks?"
- "More time should be spent on what some of the outcomes of the work might be. Seems like a lot of data gathering and not so much use made of the data."
- "More volunteers are needed."
- "No"
- "None"
- "Nothing comes to mind"
- "Nothing I can think of"
- "No suggestions. The group in [redacted] is friendly, helpful, patient, and appreciative. Couldn't ask for a better experience!"
- "No, overall I think it was a very fun and enjoyable experience! The staff was very knowledgeable and the program was well organized."
- "No, the experiences working with them have been great!"
- "No, was a great program and hope to do it again in the future!"
- "Perhaps hold a few sessions for educated and vital elders"
- "Team members should bring waders and be prepared to get in the water."
- "The group in [redacted] are fabulous! They are appreciating and accepting and so informative."
- "The start of my internship was delayed and the communication with me was poor in the beginning - I could have spent a lot more time working on it in early June when the river was pleasant to be around, but couldn't get started until after the mosquitos were out."
- "They do a really great job on all aspects that I have experienced; organized, friendly, casual yet serious, educational yet fun, snacks, etc."
- "While I know it is difficult giving volunteers as much advance notice as possible would be helpful"

8. “Have you ever participated in a training related to the [specific VWMP]?”

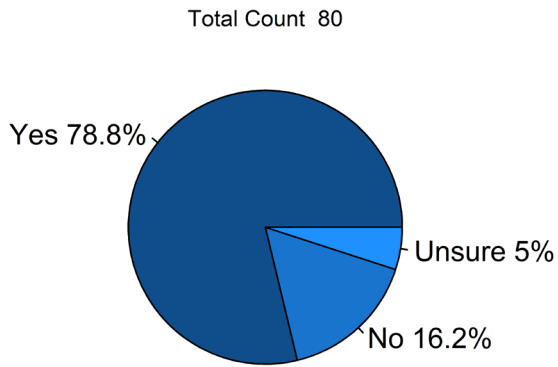


FIGURE 10 PARTICIPATION IN PAST TRAINING

9. “Did you participate in a training related to the [specific VWMP] in 2021/2022?”

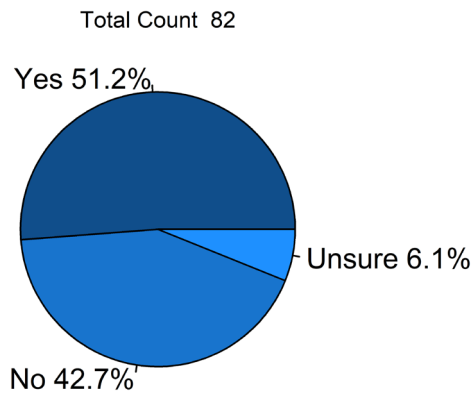


FIGURE 11 PARTICIPATION IN 2021/2022 TRAINING

10. “How much do you disagree or agree with the following statements about the training(s) you had with the [specific VWMP] in 2021/2022?”

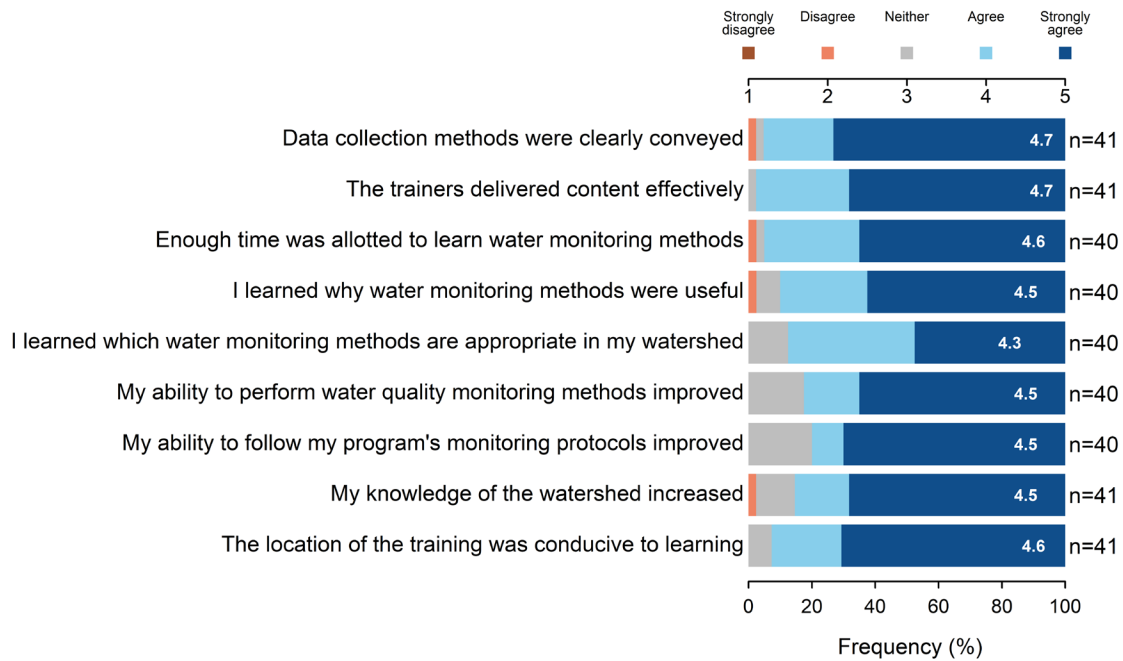


FIGURE 12 EFFICACY OF TRAINING

1=strongly disagree, 2=somewhat disagree, 3=neither agree nor disagree, 4=somewhat agree, 5=strongly agree

11. “Do you have any suggestions to make the [specific VWMP] trainings better?” *Answers below are verbatim (names have been removed).*

2021 survey

- "I have received many training sessions in the past years. The training I had last year was for a specific type of sampling that we had not done before. I really don't think a need more training unless it's something new."
- "I like the group/round robin training sections with experts. I would like to hear more about the big picture- where the information goes, why it is important, how the program started. [redacted] is awesome and so knowledgeable, but it's not really her style to convey enthusiasm/importance of the program. Maybe someone else could frame that part. It is useful to learn the methods again each year, even though [redacted] is always there to ensure quality. "
- "I liked the smaller training sessions and timing options of last year's training. Overall I think the training is a good balance of information for new folks and a good refresher for returning volunteers and/or folks who are more familiar with hydrology."
- "Keep up the good work!"
- "More focused time needed- especially with regard to what impact if any will monitoring have on stream health."
- "Nope. [redacted] is doing great job."
- "Overall thought the training was quite helpful. Perhaps a little more time or opportunity to fill out demo forms directly as a form of practice."
- "Substantial amount of material is presented in a relatively short amount of time. Reviews of procedures at monitoring sites are always useful, but some on-the- job learning is expected within the time constraints that the program operates under. "
- "[redacted] has trained me very well. They have classes and on the boat training. I feel very well trained."

2022 Survey

- "As a returning volunteer, and working professionally in the natural sciences / water rights, I have found the current training method of online videos / review paired with a shorter field session ideal, particularly to fit in with my busy schedule. However, this does require more self-guiding/initiative to make sure you are getting the proper training. I could see an option for a more intensive day training session, more like was done prior to COVID, being beneficial for first time volunteers. However, this would put a larger burden on the organizers, and I do not think is necessary to obtain a well-trained volunteer pool."
- "I have been to training every year. They are good as an introduction for new people. Hands on experience in the field is where you learn and get experience."
- "I know it would require more time from the staff, but I think two training sessions would be better, to allow for reinforcement and development of new skills. My first outing as a trained volunteer was almost two months after my training day, and by that time I felt I had not retained as much from the training as I would have liked."
- "It would be helpful to understand why stream monitoring is important and what past monitoring has achieved."
- "No"
- "Nope"
- "On site would have been helpful."
- "see previous comment about their excellent work and organization"
- "Stage closer to when we're then in the field; forgot some of the training in the four weeks."
- "Team continuity from year to year will be the biggest benefit/obstacle. If we keep the 2022 team as a core, then 2023 will be in good shape. We plan to work hard to bring in additional team members so we have extra people with experience in future years. Besides, being out on the river, collecting data, builds confidence and interest in the project. Great for getting local support for future goals."

12. “Please indicate how much you disagree or agree with the following statements. Because of participating in [specific VWMP], I have a better understanding of the following:”

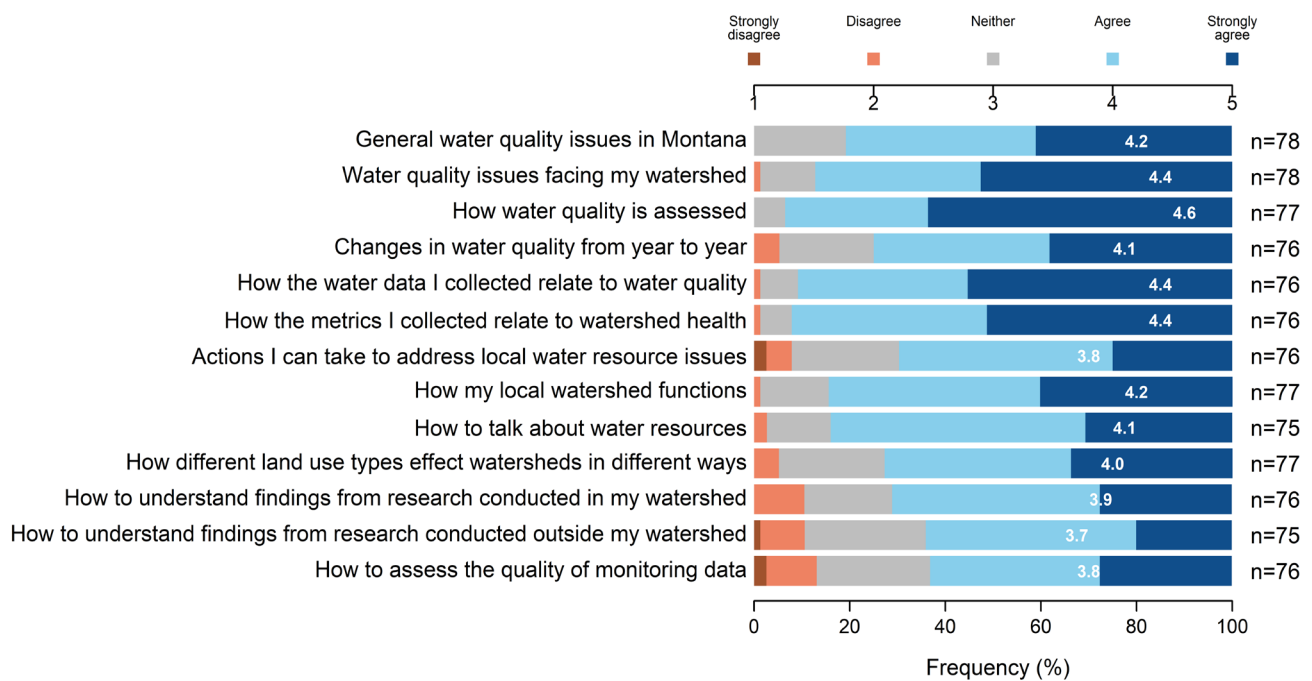


FIGURE 13 INFLUENCE OF VOLUNTEERING ON INCREASED UNDERSTANDING

1=strongly disagree, 2=somewhat disagree, 3=neither agree nor disagree, 4=somewhat agree, 5=strongly agree

13. “Did you talk with anyone about your participation with the [specific VWMP] in 2021/2022?”

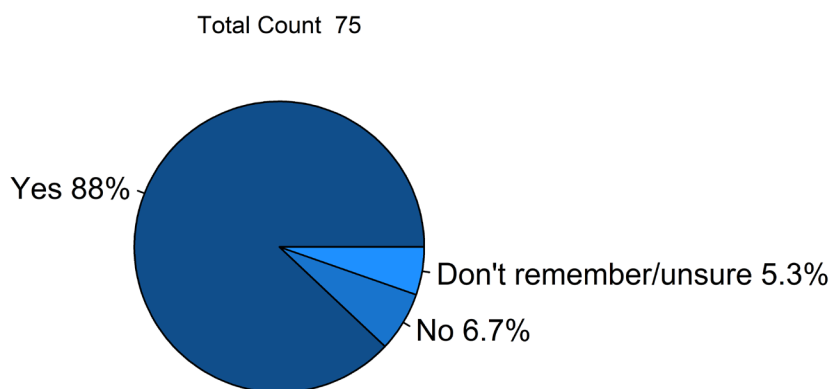


FIGURE 14 DISCUSSION OF VWMP PARTICIPATION

14. With whom did you talk about volunteering? (select all that apply)” (includes respondents who selected “yes” for “Did you talk with anyone about your participation with the [specific VWMP]”)

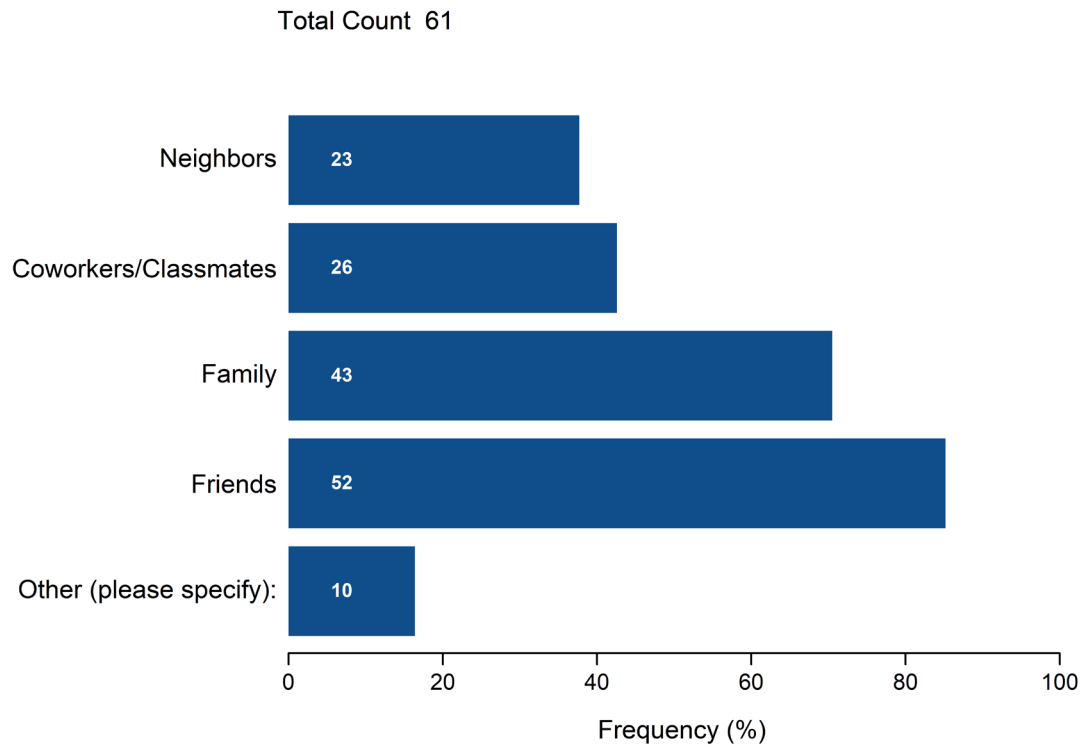


FIGURE 15 WHO VOLUNTEERS TALKED WITH ABOUT VOLUNTEERING

15. “When discussing the [specific VWMP], what topics did you talk about? (select all that apply)” (includes respondents who selected “yes” for “Did you talk with anyone about your participation with the [specific VWMP]”)

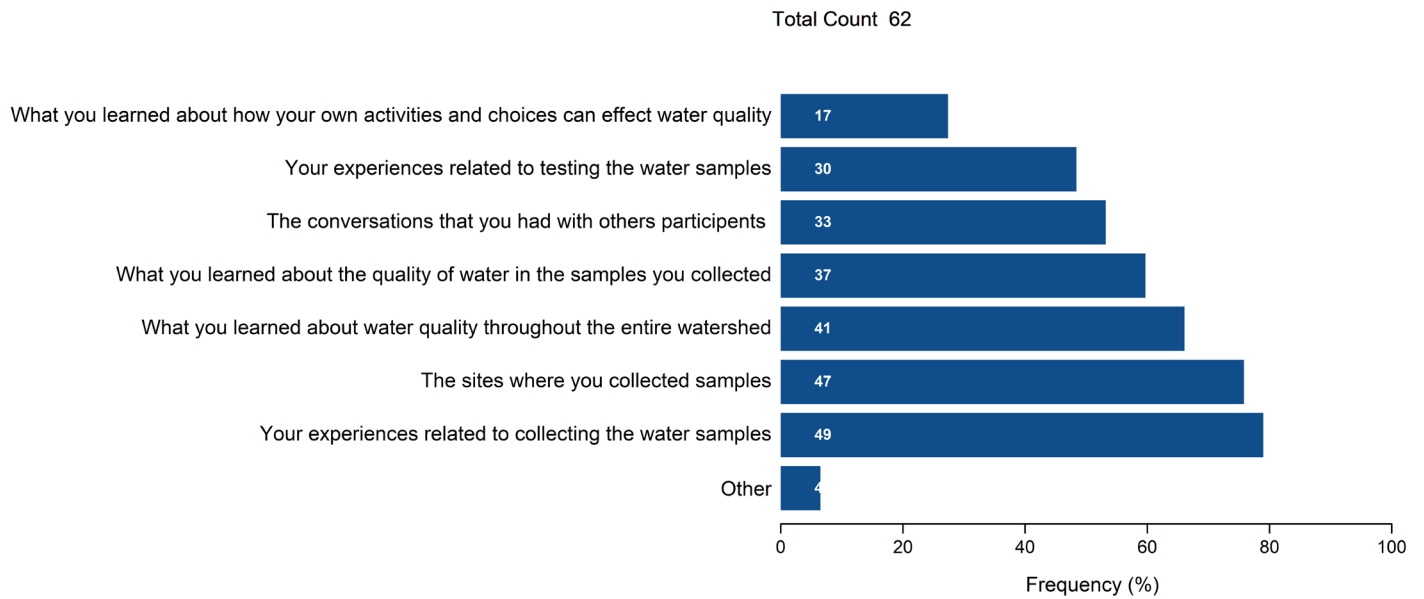


FIGURE 16 TOPICS SPOKEN ABOUT RELATED TO THEIR VWMP

16. “Please indicate how much you disagree or agree with the following broad statements about scientists:”

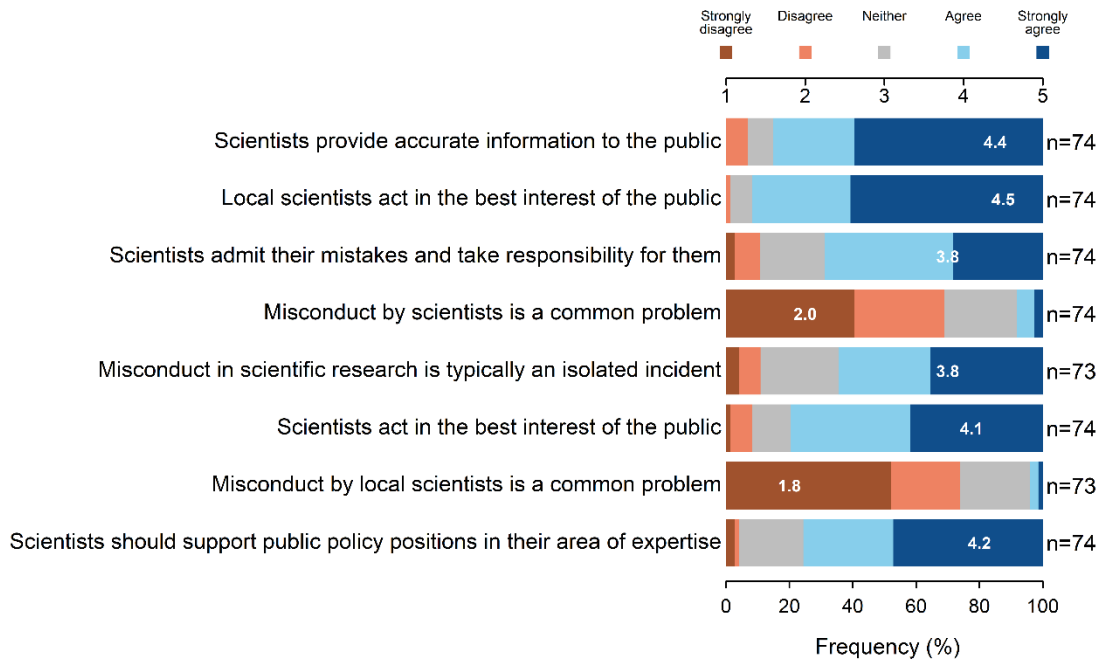


FIGURE 17 PERCEPTIONS OF SCIENTISTS

1=strongly disagree, 2=somewhat disagree, 3=neither agree nor disagree, 4=somewhat agree, 5=strongly agree

17. “In 2021/2022, how frequently did you use the following sources to learn about issues impacting your local watershed?”

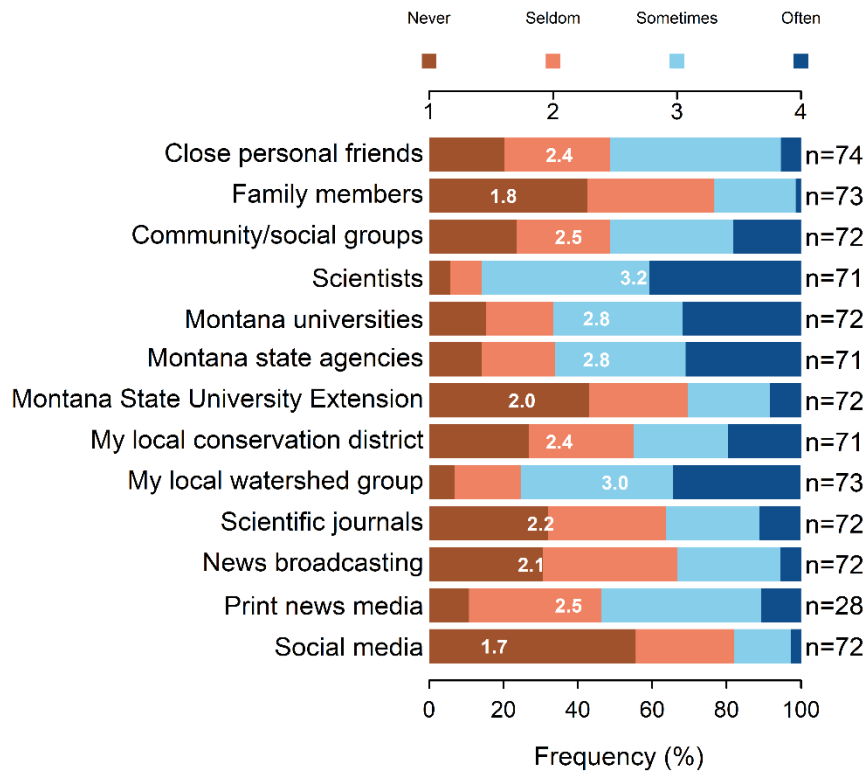


FIGURE 18 FREQUENCY OF INFORMATION USED

1=never, 2=seldom, 3=sometimes, 4=often

18. “Please indicate how much you trust the following sources to accurately communicate scientific information in general.”

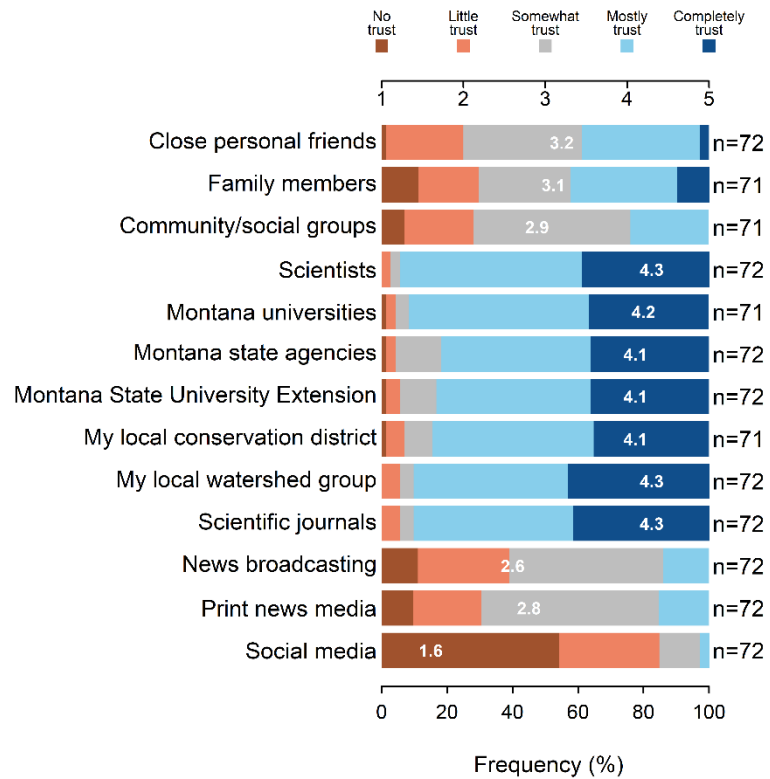


FIGURE 19 TRUST IN INFORMATION

1=I do not trust this source at all, 2=I trust this source a little bit, 3=I somewhat trust this source, 4=I mostly trust this source, 5=I completely trust this source

19. "In 2-3 sentences, please summarize the largest water quality issue facing your local watershed." Answers below are verbatim (names have been removed).

2021 Survey

- "1 climate change, 2 population (rapid, unmanaged growth)"
- "[redacted] and [redacted] will not give [redacted] grant money to help our [redacted] Program. We have filled out 2 grants and it is always another excuse why they will not give our volunteers money to sit at the 2 boat launches summer months. We have been doing this now for 3 yrs. We feel we are doing the government job of talking to boaters about AIS. It makes us very sad the government will not help us volunteers out."
- "Draught which may be caused by climate change. Impacts of irrigation use and livestock. Rapid residential development and the resulting wells and septic systems."
- "Growth, a bit of a blanket statement, but the massive growth the [redacted] is experiencing is a huge challenge for water quality in the watershed. Development removes natural components of the ecosystem and has a large effect on storm water runoff, which in turn affects water quality in streams. The change in land use and development of previously natural areas also has a large effect on erosion, nutrient flows and loads, and the flows and quality of streams."
- "Impact from the increasing human population. More people typically means more fertilizer use, more resource use, more building (which can impact sediment). Also, the seemingly warming climate and long term drought impact water temperatures which can directly impact everything and everyone who relies on the water for survival."
- "Impacts from global warming and AIS."
- "Increased algae and weed growth, mostly due to increasing temperatures and the lack of an outlet stream on [redacted]."
- "Increased population growth and inadequate protections for watershed"
- "Invasive species. Human pollution. Drought"
- "Invasive species"
- " It varies. In some it is sedimentation e.g. [redacted]. In some it is ag/grazing impacts and in at least one other, pathogen"
- "It's not a single issue: volume and timing of water, human population growth, and pollution all must be addressed for example."
- "Lack of water"
- "Mis use and over consumption, Needs to be more focus on a collaborative approach to resource management"
- "Our growing dependence on a finite resource as we see increased development (landscaping, lawns, gardening, golf courses, etc.). Altering a dry, semi-arid ecosystem with the addition of water-dependent plants."
- "Political and economic concerns have relegated scientific data to a secondary consideration. Uninhibited pro-growth policies, concerted efforts to ignore environmental protections, and accelerated usage of the limited water resources leave the watershed highly vulnerable to increased pollution inputs, degraded riparian habitat, and subsequent degradation of a suite of critical water quality parameters. Physical changes in temperature and stream hydraulics depress aquatic populations, facilitate invasive species expansion, and diminish our appreciation of an irreplaceable resource. "

- "Poor understanding of critical issues with regard the quality and quantity of surface water on the part of local town and county officials and the unwillingness to do anything about these issues such as better land use regulations and public education of these critical issues."
- "Potential invasive species issues"
- "septic leachate, recreational overuse"
- "Shoreline development, potential for nutrient and chemical leaching. Over-use of public access site. Potential for invasive species."
- "The largest impacts on our local watershed are sedimentation and temperature impairments within the rivers and streams. With drought becoming a severe problem, temperatures will likely rise in the waterways as there is limited water supply entering the river. "
- "The largest water quality issue facing the [redacted] watershed is rising temperature due to drought, water demand, and climate change, and nitrate contamination from septic systems and agricultural runoff. "
- "Today on [redacted] the water level keeps on going down. How can you fix that?"
- "too much demand for too little water"
- "Users impacting the channel with personal modifications creating turbidity."
- "water being diverted from streams and rivers for irrigation without considering the needs of aquatic life. Not zoning property to keep people from removing riparian vegetation and land improvement that deteriorates water quality."
- "We are concerned about invasive species getting a foothold in the area. We are also concerned about the impacts of wake boats."

2022 Survey

- "Climate change - snow melt is earlier, climate is drier"
- "Climate change coupled with pollution, stream degradation, and strain on water resources from overdevelopment"
- "Climate change is the biggest threat to the [redacted] as a trout fishery. "
- "Drought as a consequence of climate change"
- "Drought, land use practices, water storage"
- "Elevated nitrate levels, dewatering, elevated temperatures."
- "Encroaching urbanism"
- "For sure pollution. We have a very vulnerable aquifer and with a growing population the risk of contamination is going to continue to grow."
- "From what I have learned this season, it seems that runoff from home septic systems poses a serious problem to the local watershed."
- "Growing population and all that brings in terms of demands on water supplies and pollution (more cars, development, industry, agriculture, etc.). And climate change of course, since Montana is heating much faster than much of the country."
- "Heavy metal sediment"
- "High sediment and nutrient loading. Lack of data, funding and commitment to address these problems."
- "Human activity. The lack of oversight on sewerage and potential industrial waste."
- "Human and livestock impacts. Primarily regarding introduction of biological/pathogenic pollutants. Also, potential contamination of groundwater."

- "I do not recall specifically, but I imagine wildfires and increase in population which has been causing changes in land use."
- "I think development (clearing land, building, etc.) and non-point source pollution are the biggest threats to water quality in our local watershed. "
- "I think the development of the [redacted] is the biggest water quality issue we are facing and will face in the coming years. Changing land use patterns from ag to more residential / commercial uses will impact non-points source pollution and have the potential to alter both the physical and chemical nature of the watershed."
- "I think the largest water quality issues in my local watershed are likely related to agriculture and recreation. However, dwindling snowpack caused by global warming also threatens water levels."
- "In the [redacted] there isn't any large water quality issues. I found that it was a very healthy stream that has had restoration work done on it for years."
- "Increased population sprawl where septic systems and well water extraction is poorly regulated resulting in degradation of aquifer quantity and quality. There is little public education or regulation that governs new (or existing) built environment or agricultural practices that impact water quantity and quality. "
- "Land being developed and the resulting changes to the watershed. Increased runoff from removal of vegetation, use of fertilizers, etc. "
- "less water from lack of snow run off "
- "Nutrient loading. The challenge is getting buy in from the local community. More than once we were asked why we care about water quality in the river. Also, our nutrient loads may enhance the success of invasive species, a problem not yet being addressed."
- "Ongoing Superfund Cleanup of the [redacted] "
- "Overuse by people with dogs is an issue I have identified, and that concerns me a great deal. Although it may not be the biggest threat, it is increasing in significance.."
- "Pollution from industry and the associated cleanup."
- "Septic tanks , ranch and farm runoff"
- "Sustaining healthy, clean, abundant ground water. Land use changes and waste water treatment are two vital issues. "
- "The input of nutrients from agriculture, septic and waste water is the biggest issues facing the [redacted] right now. "
- "The largest water quality issue facing my local watershed is probably the invasive species of goldfish that are being dumped in lakes. This produces too much waste, and competes with native species for food and shelter. "
- "The largest water quality issue in my watershed is pollution from homes and businesses. Additionally, waters are warming due to climate change and cold water species are facing trials."
- "The monitoring of the changes in the in the watershed after the dam removal "
- "The plans for increased massive development on the headwaters of [redacted] who knowingly allow their livestock to degrade streams and could care less about water quality."
- "Too many individual septic systems, drought, increased population"
- "Ughhhhhh is the largest issue stormwater runoff (that is polluted) due to the rapidly growing population and construction and pavementization of the hillslopes here? Or, is it all the dog poop in "biodegradable" bags littering the trails adjacent to streams, inputting

organics? Or, is it "traditional" stuff like the [redacted] superfund residue? I'm not sure which. No matter what, it's due to humans being selfish, entitled, and probably also ignorant."

- "Very worried about overuse and pollution by people looking to toss fast food trash."
- "Volume and pollution"

20. “The following are examples of changes you could make at home, in your daily routines, or at work to try to help improve water quality in your community. Please indicate whether you have made any of the following changes (select all that apply).”
(n=69)

TABLE 4 ACTIONS TAKEN TO PROTECT WATER QUALITY

Practice	Total count (n)	I had already made this change		I made this change as a result of volunteering for the VWMP	
		Count	%	Count	%
<i>Implemented integrated pest management practices to reduce pesticide use</i>	69	46	66.7	1	1.4
<i>Reduced fertilizer use</i>	69	44	63.8	3	4.3
<i>Properly disposed of household waste (e.g. batteries, light bulbs, hazardous chemicals, oils and fats, etc.)</i>	69	59	85.5	2	2.9
<i>Attended a public meeting related to natural resource planning/management</i>	69	29	42.0	13	18.8
<i>Submitted a public comment related to natural resource planning/management</i>	69	30	43.5	8	11.6
<i>Properly disposed of pet waste</i>	69	46	66.7	2	2.9
<i>Properly disposed of used motor oil and antifreeze</i>	69	59	85.5	1	1.4
<i>Directed downspouts away from a paved surface</i>	69	44	63.8	2	2.9
<i>Decreased the amount of chemical products used in my house that go down the drain</i>	69	53	76.8	2	2.9
<i>Reduced storm water runoff from my property</i>	69	29	42.0	0	0.0
<i>Reduce run off of contaminants in storm water from my property (e.g., sediment, de-icer, etc.)</i>	69	35	50.7	2	2.9
<i>Volunteered for another water quality related project</i>	69	23	33.3	19	27.5

4. Citations

Church, S.P., Payne, L.B., Peel, S. and Prokopy, L.S., 2019. Beyond water data: benefits to volunteers and to local water from a citizen science program. *Journal of Environmental Planning and Management*, 62(2), pp.306-326.

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