National Water Quality Initiative Watershed Forum Report

Tenmile watershed – Whatcom County, Washington

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The Natural Resources Social Science Lab studies how human interactions with the environment impact natural resources. Our research, teaching, and engagement activities focus on how to best motivate farmers, stakeholders, and citizens of all kinds to participate in more environmentally friendly behaviors and practices. For more information, please go to https://www.purdue.edu/fnr/prokopy

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Acronyms

BMP	Best Management Practice
CD	Conservation District
CP	Consensus priority
CTIC	Conservation Technology Information Center
DP	Distinguishing priority
ECY	Washington Department of Ecology
EPA	United States Environmental Protection Agency
NRCS	Natural Resources Conservation Service
NRSS	Natural Resources Social Science
NWQI	National Water Quality Initiative
PN	Priority number
PV	Priority value
TCWP	Tenmile Clean Water Project

Executive Summary

The Conservation Technology Information Center contracted the Natural Resources Social Science (NRSS) Lab at Purdue University to inform improvements to Natural Resources Conservation Service's (NRCS) ability to implement small watershed projects and effectively communicate watershed related information. The NRSS team hosted a forum with local stakeholders from the Tenmile watershed in Whatcom County, Washington to gather input on watershed project design, marketing, delivery, and implementation associated with the National Water Quality Initiative (NWQI), an NRCS supported small watershed initiative. Additionally, the NRSS team interviewed representatives from state and federal agency partners working with NRCS to improve watershed health. The following document provides recommendations based on data gathered from the watershed forum and interviews with agency partners.

Forum

The Tenmile watershed forum included three activities that focused on 1) watershed priorities, 2) resource needs, and 3) elements of successful watershed outreach and education.

Watershed priorities

Participants ranked priorities related to successful watershed management and explained their rationale for priority decisions. Using factor analysis in PQMethod software (v. 2.35) and qualitative analysis in MS Excel, forum participants identified three distinct priority narratives, including 1) Stakeholder Inclusion and Concern, 2) Biological Integrity, and 3) Measurement and Flexibility.

Resource needs

Participants listed resources needed for successful watershed management, discussed their rationale for each need, and then assembled resources into broad categories of needs. Through analysis in NVivo (v. 12), the researchers identified six broad categories of resources needed for successful watershed management including 1) Community-wide trust, 2) Funding, 3) Flexible regulation and local solutions, 4) Local ownership and engagement, 5) Monitoring and evaluation, and 6) Coordination and leadership

Successful watershed outreach and education

Participants engaged in a facilitated discussion related to recipients, content, and delivery of watershed outreach and education. Through analysis in NVivo (v. 12), the researchers identified two key elements for successful watershed outreach and education including: *1) funded watershed leadership, and 2) coordinated and tailored messaging to their diverse watershed community*.

Interviews

An NRSS researcher conducted interviews with representatives from the Washington Department of Ecology (ECY) and the United States Environmental Protection Agency (EPA) Region 10 to gather information about the role of partnering agencies in the NWQI, strengths and challenges associated with the NWQI, and elements of successful watershed management and outreach. Both EPA Region 10 and ECY representatives suggested NRCS share criteria for priority watershed selection and consider their recommendations for priority watersheds.

Recommendations

Through a synthesis of data gathered from the three activities of the Tenmile watershed forum and interviews with agency partners, the NRSS research team developed the following agency-wide recommendations for NRCS and watershed specific recommendations for Whatcom Conservation District (CD). The following agency-wide and watershed specific recommendations aim to improve the successful design, marketing, delivery, and implementation of NRCS supported watershed projects:

<u>NRCS:</u>

1. Support watershed outreach and education programs with NWQI implementation funds.
2. Increase coordination with partnering entities to enable water quality monitoring and improve priority watershed selection.
3. Work with local communities to enable local solutions and increase flexibility of programmatic requirements.

<u>Whatcom CD:</u>

1. Continue working with stakeholder groups to recruit watershed champions.
2. Develop consistent tailored messaging for the watershed community.
3. Increase outreach to the non-agricultural community.

1 Introduction

1.1 Project overview

The Natural Resources Social Science (NRSS) Lab at Purdue University was contracted by the Conservation Technology Information Center (CTIC) to investigate how to improve the Natural Resources Conservation Service's (NRCS's) ability to 1) implement watershed management projects and 2) effectively communicate watershed related information. The NRSS team conducted a forum in Washington's Tenmile watershed to gather information from local stakeholders on watershed project design, marketing, delivery, and implementation associated with the NRCS's National Water Quality Initiative (NWQI). In addition to the forum, the NRSS research team gathered information from agency partners working with NRCS toward the common goal of improving watershed health.

The forum included three interactive activities with local stakeholders aimed to identify 1) watershed priorities, 2) resource needs, and 3) elements of a successful watershed outreach and education. Interviews investigated the regional perspective of agency collaborators regarding NWQI's strengths and weaknesses, as well as successful watershed management, outreach, and education strategies.

This report provides the following information:

- A brief overview of the NWQI,
- current conditions in the Tenmile watershed,
- methods and results from the Tenmile watershed forum conducted in Whatcom County, WA,
- methods and results from interviews conducted with representatives from the Washington Department of Ecology (ECY) and the United States Environmental Protection Agency (EPA), and
- recommendations to inform implementation and outreach efforts for NWQI and other NRCS supported watershed projects.

1.2 Background

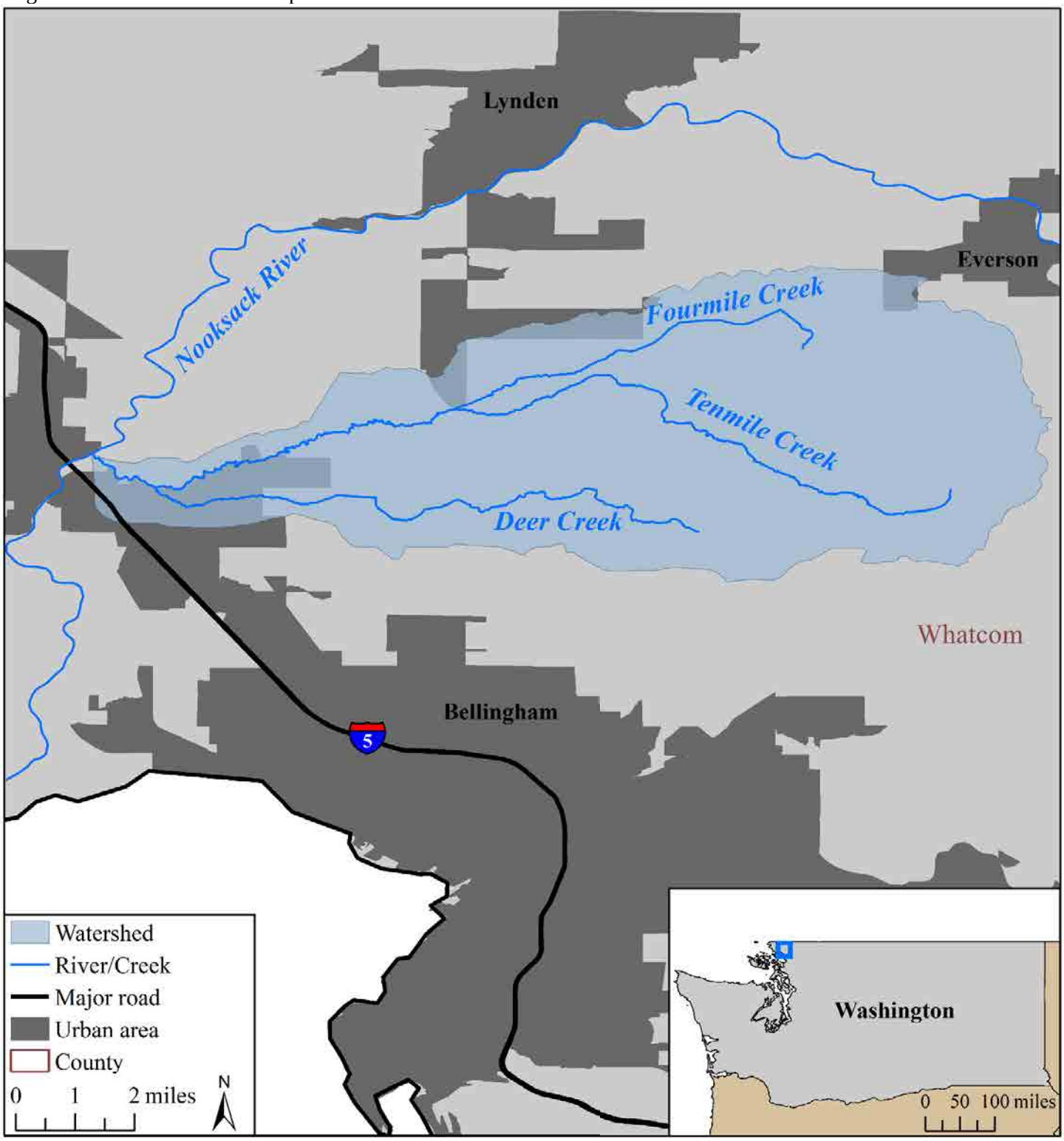
1.2.1 National Water Quality Initiative

Created to identify impaired watersheds and address water quality issues in targeted watersheds, the NWQI provides technical and financial assistance to accelerate voluntary adoption of best management practices (BMPs) on agricultural land. The NWQI uses a collaborative approach to watershed management and works with local resource managers, state water quality agencies, EPA, and other partners to improve impaired watersheds across the United States. Additionally, the initiative provides monitoring and assessment resources to track water quality improvement over time in targeted watersheds. To receive NWQI funding, resource managers in selected watersheds develop an area-wide conservation planning document, i.e., "watershed assessment." This document includes watershed characterization, water quality impairment assessment, identification of critical acres, and an outreach plan for agricultural producers in the identified critical acres. The NWQI also aims to enhance agricultural productivity by improving soil health and reducing erosion, nutrient runoff, and input costs.

1.2.2 Tenmile watershed

This report focuses on the Tenmile watershed, in Whatcom County, Washington (Figure 1). The Tenmile watershed includes 22,732 acres, covers 35.4 square miles of drainage and is part of the larger Nooksack River watershed. Currently, two of the four sub-watersheds included in the Tenmile watershed are on the 303 (d) list of impaired waterways due to elevated levels of fecal coliform, ammonia, low dissolved oxygen, and temperature. Due to Tenmile watershed's proximity to two rural communities (Ferndale, WA and Everson, WA) and one urban area (Bellingham, WA), the watershed has a diversity of land uses including crop land (50.3%), developed (24.8%), natural space (20.8%) and farmsteads (4.1%). As part of the larger Nooksack watershed, the Tenmile watershed has been identified as a contributor of bacterial contamination that resulted in conditional closure of approximately 800 acres of shellfish beds at the Nooksack's deposition point in Portage Bay, WA. The closure of Portage Bay shellfish beds directly impacts the Lummi Indian Nation who depend on the shellfish for ceremonial, subsistence and commercial harvest as well as recreational shellfish harvesters (NRCS National Water Quality Initiative Pilot Watershed Assessment: Tenmile watershed, Whatcom Conservation District, 2017). The Whatcom Conservation District (CD) is partnered with NRCS, who manages NWQI for the Tenmile watershed.

Figure 1. Tenmile watershed map



2 Methods

This section provides brief methods for forum and interviews conducted by the NRSS lab and approved by Purdue University Institutional Review Board. Further methods details can be found in Appendices A, B, C and D.

2.1 Stakeholder Forum

2.1.1 Development

The NRSS research team worked with Whatcom CD staff to gather a contextual understanding of the watershed and developed a list of diverse stakeholders to invite to the forum. Whatcom CD staff emailed forum invitations approximately one month before the forum, then sent a reminder two weeks before the forum. The reminder included information about the forum and a brief survey, developed by the NRSS team. The survey gathered insights on the respondents' stakeholder type (e.g., producer, landowner, community member, CD staff) as well as their awareness of and involvement in local watershed management. Survey recipients were also asked to describe their priorities for successful watershed management and identify resources needed for a successful watershed management project in four open-ended questions. Survey development methods and analysis conducted are included in Appendix A.

The Tenmile watershed forum was conducted on March 1st from 10:00 am to 3:00 pm (Table 1).

Table 1. Forum activities and objectives

Activity	Objective
Introduction	An NRSS facilitator oriented the participants to the project team, project objectives, forum goals, and the forum's agenda.
Identify watershed priorities	Participants ranked priority statements for watershed management then discussed the rationale for their ranking.
Lunch	Participants were provided food and an opportunity to network with fellow participants.
Identify resource needs	Participants listed resource needs for watershed management, then organized them into broad categories.
Identify elements of successful outreach and education	Participants discussed elements needed for successful outreach and education in their watershed.
Conclusion	An NRSS facilitator thanked participants for their attendance.

2.1.2 Data Collection

The following section describes the methods for forum activities where data was collected.

Introduction
The NRSS facilitator introduced participants to the project and the project team. The project team included two NRSS lab staff, two CTIC staff, three WaterComm staff, and one NRCS staff. The facilitator then provided an overview of the forum agenda and a broad summary of watershed management and NWQI. Contact information including, name, email/mailing address were collected but not used for any analysis.

Identify Watershed Priorities
Forum participants engaged in a ranking exercise based on Q Methodology (Brown 1993) to identify watershed priorities from 36 predetermined priority statements (see Appendix B, Table B-1 for list of statements). The 36 statements were developed to represent a wide range of watershed priorities. Facilitators instructed forum participants to record the order of their watershed priorities from most disagree (-5) to most agree (5) on a provided datasheet (Appendix B, Figure B-2). Participants also reported demographic information, including their primary role in the watershed (i.e., stakeholder type), conservation practices currently in use on their property, years of experience with watershed management, years lived in the Tenmile watershed as well as their birth year and gender. The datasheets were collected by the research team and were input into PQMethod software (v. 2.35) at a later date.

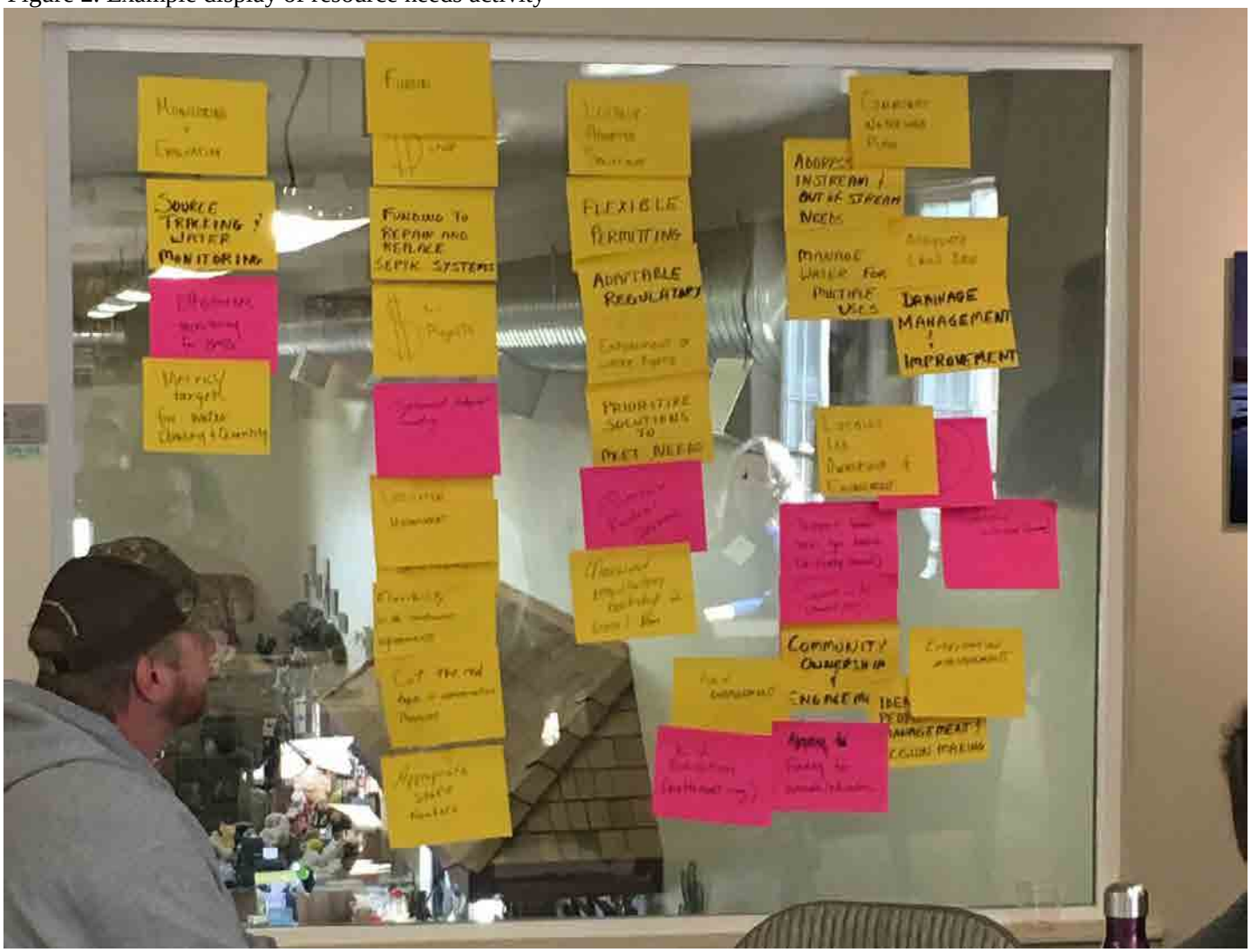
Then, in an open discussion with all forum participants lasting approximately 15 minutes, the facilitator asked volunteers to share their rationale for selecting their top watershed priorities. Participants were then assigned to three

small groups. NRSS researchers assigned predetermined groups to integrate different stakeholder types within each group. In the small groups, participants shared their highest and lowest watershed priorities and their ranking rationale. Members of CTIC facilitated two small group discussions, an NRSS researcher facilitated one, and WaterComm staff took notes on each discussion. Large and small group discussions were noted and recorded. TranscribeMe, an audio transcription service, was used to transcribe audio recordings.

Identify Resource Needs

Forum participants listed resources needed to achieve successful watershed management. Researchers provided each group with 10 examples of resource needs derived from the survey (Appendix A). Participants wrote resources needed for successful watershed management on 5x7 inch sticky notes. Participants displayed each written resource need (including the 10 provided by the facilitators) in front of their small group. The small group facilitator prompted participants (see Appendix C for facilitator guide) to explain their rationale for resource needs they contributed, then collectively assembled resource needs into broad categories. The facilitator then documented the broad categories and displayed them on a different colored sticky note (Figure 2). After the forum, NRSS team collected all 5x7 sticky notes from each group. Group discussions were noted and recorded. Audio recordings were transcribed by TranscribeMe, an audio transcription service.

Figure 2. Example display of resource needs activity



Identify Elements of Successful Outreach and Education

In the same small groups, participants engaged in a facilitated discussion on elements of effective outreach and education. Small group facilitators provided each group six examples of elements needed for a successful watershed outreach and

education derived from the survey (Appendix A) then documented the discussion on a flip chart. Facilitators guided (Appendix C) participants to gather further information related to recipients, content, and delivery of watershed outreach and education. The discussions were noted and recorded. Audio recordings were transcribed by TranscribeMe, an audio transcription service.

2.1.3 Analysis

The following section describes the analysis methods for the forum activities where data was collected.

Identify Watershed Priorities
This activity used both quantitative and qualitative analyses, described below.

Quantitative
An NRSS researcher conducted a factor analysis using principal component method with varimax rotation on the participants' ranked priorities via PQMethod software (v. 2.35). The software aggregated participants by similarly ranked priorities and identified the following:

- Priority family: participants with similar priority rankings.
- Priority framework: output that provides priority values (PV), distinguishing priorities (DP), and consensus priorities (CP) for each priority family.
    - Priority value (PV): Value assigned to each watershed priority based on priority rankings within each priority family. These values reflect family attitudes toward each priority. PVs range from -5, (low priority), to 5 (high priority).
    - Distinguishing priorities (DP): Uniquely ranked priorities from each priority framework. These priorities highlight distinct viewpoints that differentiate priority families from each other.
    - Consensus priorities (CP): Similarly ranked priorities across all priority frameworks. These priorities highlight broad agreement across all priority families.

Qualitative analysis
An NRSS researcher then developed a priority narrative to describe priorities and compare differences and similarities for each priority family. Narratives were created by organizing participants' rationale from the discussion transcriptions by priority and priority rank (MS Excel) as well as the priority framework, analyzed through PQMethod (v. 2.35). Participants' comments were not identified on the transcription relative to their datasheet; therefore, the comments could not be attributed to a specific priority family. Finally, the researcher developed a name describing each narrative based on high-ranked priorities (see Appendix B, Table B-1 for additional detail).

Identify Resource Needs
The broad categories and resource needs identified by participants were used as codes and subcodes, respectively, to organize the discussion. An NRSS researcher reviewed all transcriptions and assigned codes in NVivo (v. 12). Then, for each discussion group, the NRSS researcher developed a conceptual diagram (i.e., mind map) of the resources needed for successful watershed management based on the transcribed small group discussions. The mind maps were then synthesized by identifying reoccurring themes across all three discussion groups.

Identify Elements of Successful Outreach and Education
An NRSS researcher developed codes in NVivo (v. 12) based on reoccurring themes for each of the facilitated discussion topics: recipients, content, and delivery.

2.2 Interagency Partner Interviews

The following section describes data collection and analysis methods used to investigate the perspective of federal and state agency partners (EPA and ECY) relative to their role within the NWQI, the strengths and challenges associated with the NWQI, and elements of successful watershed management and outreach.

2.2.1 Data Collection

An NRSS researcher interviewed representatives from ECY and EPA Region 10. The interviewees were identified through a conversation with an EPA employee who recommended appropriate representatives. A request to participate

was emailed to potential interviewees. Both interviews were conducted over telephone, recorded, and transcribed in February 2018. The interview guide developed for these interviews can be found in Appendix D.

2.2.2 Analysis

The transcripts and notes were summarized by three topics:

- Agency role in the NWQI,
- strength and challenges associated with the NWQI,
- key elements for successful watershed management and outreach.

3 Results

3.1 Stakeholder Forum

3.1.1 Demographics

A total of 23 stakeholders participated in the forum. Most participants identified as NRCS Staff (Table 2) and male (Table 3). Participants reported a mean age of 52.7 years old (Table 4) and 34% of forum participants reported living in the watershed (Table 5).

Table 2. Stakeholder type

Stakeholder Type*	Frequency (n)	%
NRCS staff	6	24.0
CD Staff	5	20.0
Producer or Landowner	4	16.0
Community member	3	12.0
NGO	2	8.0
Researcher	1	4.0
Local government staff	1	4.0
Other*	3	12.0

**If participants identified as multiple stakeholder type both responses were included in the table.*
***Other responses included: local citizen organization members and a consulting company employee*

Table 3. Gender

Gender	Frequency (n)	%
Male	14	60.9
Female	8	34.8
No answer	1	4.3

Table 4. Participant age

Mean age *(SD)*	Median	n
52.7 (*11.8*)	54	22

Table 5. Watershed resident

Resident	n	%	Years Mean *(SD)*
Yes	8	34.8	32.6 *(20.0)*
No	15	65.2	

3.1.2 Watershed Priorities

A total of 22 participants' ranked priorities were considered complete for analysis (Appendix B). Two participants were not included in any priority family because their ranked priorities were dissimilar to the three priority families and each other's; therefore, they were not considered their own priority family. The remaining 20 participants' ranked priorities are presented in the following three narratives:

1) Priority Family 1: Stakeholder Inclusion and Concern (nine participants)
2) Priority Family 2: Biological Integrity (five participants)
3) Priority Family 3: Local Knowledge and Priorities (six participants)

Each priority given to participants were numbered (Appendix B, Table B-1). These priority numbers (PNs) are added to the following section for reference in parentheses, for example "(PN4)" refers to priority number 4, "A watershed plan is necessary".

The priority family narratives are described below by the priorities with high and low PVs and DPs (Table 6 – Table 8). CPs are discussed and the priority framework for each family is summarized in Table 9.

Priority Family 1: Stakeholder Inclusion and Concern

This priority family included a total of nine participants who identified as NRCS staff, CD staff, community members, researchers, and non-governmental organization staff. This family highlighted stakeholder inclusion and concerns (PN18, PN31), outreach (PN15, PN16, PN25), and agency collaboration (PN28) for successful watershed management (Table 6).

Table 6. Priority Family 1 Framework: Stakeholder Inclusion and Concern

Priority Narrative 1: Stakeholder Inclusion and Concern				
PN	**Priority**	**PV**	**DP**	**CP**
High				
31	Watershed management should benefit my community and communities downstream of my watershed.	5	x	
15	A strong working relationship between producers/landowners and watershed managers is important.	4		
25	Watershed managers should seek out and respect local knowledge, perspective and experience.	4		
18	The watershed planning process should include diverse groups of people working towards a common goal.	3	x	
16	One-on-one interactions between resource managers and producers/landowners is necessary.	3	x	
28	Resources and information between local, regional, state and federal agencies should be coordinated.	3	x	
Low				
6	Management should be done at a small geographic scale.	-3	x	
20	Communicating about soil health is more effective than communicating about water quality.	-3		x
29	Watershed managers should focus on water quality issues over water quantity issues.	-3		x
35	Producers/landowners/businesses should be required to adopt best management practices.	-4		
36	The watershed needs to be in an impaired or degraded state.	-4		x
9	Only local organizations should be involved.	-5		x
Additional DPs				
22	Achievable water quality goals and targets should be set to show water quality improvements.	0	x	
4	A watershed plan is necessary.	-2	x	

Notes: Priorities are ordered by PV. The priority categories are provided in Appendix B Table B-1. The "x" indicates the DP and CPs identified by the PQMethod software.
PN=Priority number
PV=Priority value
DP=Distinguishing priority
CP=Consensus priority

Stakeholder Inclusion and Concern

This family described a holistic approach to watershed management as a key element to successful watershed management. A holistic approach considers the needs of diverse groups of people (PN18) and benefits communities in the watershed as well as up and downstream communities with interests in the watershed (PN31).

> *"…It talks about community…You can think about it as an ecological community as well as the human communities involved... it's bringing the human element to it. If water quality improvements aren't benefiting both [ecological and human] communities, then inherently we're not focusing on the right issues. If a community is failing or is having issues, then that needs to also be worked on as part of the plan. It just seemed kind of fundamental."*

This family's opposition to watershed management on a small geographic scale (PN6) is also aligned with their holistic attitude towards watershed management. Recalling a conversation with a producer, a CD staff described the importance of understanding downstream impacts:

> *"The biggest anger area was 'well yeah, you did this up there and now that's causing me problems.'…we weren't looking at longer stretches, we were looking at landowner by landowner. That puts other people at a great disadvantage. So then [producers] start out angry when you talk to them instead of understanding the whole thing."*

Community Outreach

This family highlighted the importance of one-on-one interactions and strong working relationships between producers, landowners and watershed coordinators and believe such relationships are vital to successful watershed management (PN16, PN15). Establishing strong personal relationships builds trust and helps maintain open lines of communication for producers, landowners, and resource managers.

> *"One-on-one interactions are critical. You can't have things that are just dictated from afar. I mean, [NRCS] has to work with people directly to get through that stuff. It feeds back into being able to answer those questions and knowing what the best practices to do is. Frankly, its answering the why questions. People don't like to be mushrooms. They don't want to be fed the BS and kept in the dark. You want to know what's appropriate and why that works."*

Another reported benefit of one-on-one interactions is the ability to incorporate local knowledge and experience into watershed planning and management (PN25). For example:

> *"People [need to] feel respected with their experience and not feel like it's less than what some science or technical manual says. It needs both. You need to inform them and respect and honor [their individual experiences] while working with and listening to them."*

Related to maintaining strong working relationships, this family believed voluntary adoption of BMPs is necessary for a strong working relationship between producers, landowners, and resource managers (PN35). One participant explained:

> *"To the public it's important to be voluntary, work cooperatively, and get the conservation on the ground…When things are mandated, people resist…You can write the best plan, but if the person's going to resist, you're not there when they're doing that actual work and the management."*

Agency Coordination

While this family emphasized the need for locally led watershed management, they recognized the value of coordinated support from local, state and federal agencies (PN28). Citing important technical and financial resources, a participant explained how agency coordination can work towards successful watershed management, for example:

> *"While I think it should be locally led…you need the support of broader federal and state level in order to be successful at this point. You have to have the bigger picture involved in other organizations…In addition to financial support, technical and informational assistance that comes from other places is always beneficial. Research and the science of data that goes into it. You have to have regional and state universities doing that."*

Other Priorities

Other distinguishing perspectives from this family is their low priority to develop a watershed plan (PN4) and their neutral attitude towards setting achievable water quality goals to show improvement (PN22).

Priority Family 2: Biological Integrity

This priority family included a total of five participants who identified as CD staff, producer or landowners, community members, and consultants. This family suggested watershed planning focused on water quality improvement (PN21, PN22, PN34, PN4) as well as outreach and stakeholder knowledge (PN1, PN15) as key elements of successful watershed management (Table 7).

Table 7. Priority Family 2 Framework: Biological Integrity

Priority Narrative 2: Biological Integrity				
PN	**Priority**	**PV**	**DP**	**CP**
High				
34	Measurably cleaner water should be an outcome.	5	x	
1	Landowners/producers should know what best management practices are and why they should be used.	4		
4	A watershed plan is necessary.	4		
21	Water monitoring is necessary.	3		
22	Achievable water quality goals and targets should be set to show water quality improvements.	3		
15	A strong working relationship between producers/ landowners and watershed managers is important.	3		
Low				
20	Communicating about soil health is more effective than communicating about water quality.	-3		x
2	Addressing concerns of local watershed stakeholders should be the highest priority for resource managers.	-3	x	
10	No stakeholders' livelihoods should be jeopardized due to watershed management activities.	-3	x	
9	Only local organizations should be involved.	-4		x
29	Watershed managers should focus on water quality issues over water quantity issues.	-4		x
36	The watershed needs to be in an impaired or degraded state.	-5		x
Additional DPs				
13	Funding should be budgeted specifically for outreach and communication.	1	x	
25	Watershed managers should seek out and respect local knowledge, perspective and experience.	1	x	
23	The public should be aware of the range of resource issues associated with their watershed.	-2	x	

Notes: Priorities are ordered by PV. The priority categories are provided in Appendix B Table B-1. The "x" indicates the DP and CPs identified by the PQMethod software.
PN=Priority number
PV=Priority value
DP=Distinguishing priority
CP=Consensus priority

Biological Integrity and Watershed Planning

This family highlighted the need to develop a watershed plan, the importance of water quality monitoring, and incorporating measurably cleaner water as an outcome of successful watershed management (PN4, PN21, PN22, PN34). One participant explains:

> *"Are we improving the health of our creeks and our rivers?...That's the bottom line…We could have the most fun we've ever had, but if we don't see improvement it's not going to make a difference. It's got to be the science with monitoring to prove that what we're doing is effective. If it's not effective, we need to change what we're doing."*

While this family valued water quality improvements, they recognized challenges associated with achieving these goals. Providing insight, one participant discussed managing expectations related to monitoring and improving water quality.

> *"Water quality improvements can be a long-term goal [that includes] short-term objectives…but it's very hard to see immediate water quality improvement and takes a lot of time."*

Outreach and Stakeholder Knowledge

Emphasizing the importance of outreach and communication, participants in this family saw a need to fund watershed related outreach and communication (PN13). They believed outreach plays a critical, yet often overlooked role in the success of watershed management. For example:

> *"The communication piece is [always] kind of an afterthought. There's so much information coming at people all the time, it just gets lost…A big part of the human element is being able to really reach somebody when you're trying to communicate with them and know that you've reached them…I think that's an important piece that should be funded specifically."*

Although they valued outreach and education, participants also recognized that successful watershed management is multifaceted. Outreach and education are an important part of the equation, but not the single solution. One participant described an important balance:

> *"I don't want this illusion that somebody could educate people to do what needs to be done. You've got to have technical assistance, financial assistance, education, and accountability. If they're not all balanced and working together, change won't happen. Education is sometimes counted too highly in terms of its ability to create change. But it has to be part of that equation."*

This family agreed that strong working relationships are important to promoting awareness of BMPs and an understanding of their use (PN15, PN1).

> *"Implementation is going to happen at the landowner level. Everything else is just talking and paper. If your landowners understand what they should do and why you want them to do it, that will help move beyond planning to implementation."*

Stakeholder Concerns

This family did not believe local concerns should be the top priority for resource managers and accepted that watershed management may impact livelihoods (PN2, PN10). Explaining their rationale, one participant cited the interconnected nature of the watershed and discussed the importance of balancing the needs of the watershed and watershed communities:

> *"This watershed is not entirely isolated. It's part of an ecosystem, which is part of a larger, regional ecosystem. So there's always going to be a balance with other stakeholders' communities as well as this one."*

Other Priorities

Other distinct perspectives from this family included their neutral attitude towards seeking out local knowledge and experience (PN25), and low priority for the public to be aware of resource issues in the watershed (PN23).

Priority Family 3: Local Knowledge and Priorities

This priority family included a total of six participants who identified as producers or landowners, NRCS staff, CD staff, community members, and local government staff. This family emphasized addressing stakeholder concerns (PN2, PN10), outreach (PN25), watershed planning (PN4, PN26), and stakeholder education (PN1) as top priorities for successful watershed management (Table 8).

Table 8. Priority Family 3 Framework: Local Knowledge and Priorities

Priority Narrative 3: Local Knowledge and Priorities				
PN	**Priority**	**PV**	**DP**	**CP**
High priorities				
25	Watershed managers should seek out and respect local knowledge, perspective and experience.	5		
2	Addressing concerns of local watershed stakeholders should be the highest priority for resource managers.	4	x	
1	Landowners/producers should know what best management practices are and why they should be used.	4		
4	A watershed plan is necessary.	3		
10	No stakeholders' livelihoods should be jeopardized due to watershed management activities.	3	x	
26	There should be a flexible plan that allows for changes in management over time.	3		x
Low priorities				
35	Producers/landowners/businesses should be required to adopt best management practices.	-3		
9	Only local organizations should be involved.	-3		x
36	The watershed needs to be in an impaired or degraded state.	-3		x
5	Land and water should have species diversity.	-4	x	
20	Communicating about soil health is more effective than communicating about water quality.	-4		x
29	Watershed managers should focus on water quality issues over water quantity issues.	-5		x
Additional distinguishing priorities				
7	Students (elementary through college) should understand the importance of soil and water conservation.	-2	x	

Notes: Priorities are ordered by PV. The priority categories are provided in Appendix B Table B-1. The "x" indicates the DP and CPs identified by the PQMethod software.
PN=Priority number
PV=Priority value
DP=Distinguishing priority
CP=Consensus priority

Stakeholder Concern and Outreach

This family highlighted the need for managers to seek out local knowledge and prioritize concerns of local stakeholders (PN25, PN2). One participant emphasized the importance of respecting concerns of local stakeholders and addressing issues that may be difficult to identify. For example:

> *"…What you see during the 8:00 to 5:00 work day isn't the flooding that's happening at midnight and gone by Monday…There's no sense of responsibility for the destruction or the flooding that happens…they totally discount the flooding and when you talk to the landowners, that's what they're most upset about. They feel like they're being ignored."*

One CD staff mentioned their efforts to incorporate local knowledge as a strength of their current watershed effort and explained the benefits of an outreach program they use to share producers' experiences:

> *"In our speaker series we bring in landowners to share their stories [and say] 'This is what I did on my property to manage manure'. I can see it builds them up and makes them feel good to share little snippets about their farm. It seems to be a successful way to let people feel heard and respected as local landowners. Instead of just hearing conservation district and technical folks speaking. There is value in a local landowner."*

This family prioritized livelihoods in the watershed and believed they should not be impacted by watershed management or related regulations (PN10). Emphasizing the importance of considering farming community needs when making watershed management decisions, a participant used the example of rigid buffer guidelines to show potential impacts to agricultural operations:

> *"…We would lose ten percent of the agriculture if we buffered everything the way they said to do. Ten percent out of the farm base and impact on the bottom line. Again, farmers have to be here. You can't put them in a box and think they're going to just stay there."*

Watershed Planning

This family highlighted the importance of developing a watershed management plan and identified flexibility as a key component for an effective and long-lasting plan (PN4, PN26). Participants also believed that a watershed plan should clearly articulate BMPs that need to be adopted and explain how BMP adoption can improve watershed health (PN1), one participant emphasized this and explained its benefits:

> *"…If we really want results from this plan, I think you need to know what you're supposed to do and why you're doing it so people will continue to do it with the land and the management practices that happen…You can do everything else, you can plan everything and you can get community buy-in, but if it's not being implemented and used on the farm or other agriculture lands, it really is all for naught."*

Other Priorities

This family believed that species diversity on land and water was not a high priority for successful watershed management and that adoption of BMPs should remain voluntary and never be required by law (PN5, PN35). Although participants support voluntary adoption of BMPs, they stress that mandatory adoption should be avoided:

> *"Now I'm not trying to say that best management practices aren't good. I'm just never going to get anything done by dictating."*

Consensus Priorities

Agency Collaboration

Each narrative family indicated agreement that federal and state agencies should support local organizations with technical and financial assistance (PN9) and stressed the importance for local and regional decisions makers to be a part of the watershed management solution. Emphasizing the importance for decision makers to understand the challenges associated with watershed management, one participant explained:

> *"We need to have state and federal organizations be part of this so they understand what's going on and they're not sitting at a desk somewhere. They need to hear from us and be part of the solution. If we don't want things coming down over our heads, we need to make sure they understand, walk our land with us and meet our landowners so they know who they represent."*

Priority families also suggested local organizations partner with federal and state agencies and underscored the importance of technical and financial assistance for BMP adoption. One participant explained the benefits of those partnerships:

> *"[NRCS has] brought a lot of resources into these watersheds to facilitate these BMPs that would be cost prohibitive to most operations. So being open to dealing with that is an important thing to be keeping in mind."*

Communication

The families agreed that framing communication to emphasize soil health is not more effective than emphasizing water quality as a whole (20). One participant expressed their belief:

> *"…Sometimes we communicate things that are relevant or relatable to someone in effort to get something else in the back door. However, soil health is not one of them…Talking to people about water quality in this community will go a lot farther than focusing on the current hot topic [soil health]. We don't have a huge soil health problem here, so it doesn't work…"*

Biological Integrity

Each family also acknowledged the importance of both water quality and water quantity issues (PN29) due to the impact they both have in agricultural settings. One participant explained:

> *"…Agriculture has a huge impact on our county and we need to keep it a healthy agriculture environment…Without water management on our property, it's really detrimental to agriculture. Both having the water to keep the crops growing, but also keeping the water off the ground to be able to put crops in. It's just critical. You can't just look at the quality without looking at the quantity. They're both critical."*

Furthermore, each priority family emphasized the benefits of managing water quality and quantity for agricultural and non-agricultural communities.

> *"…It all has to go together and it's all important. Water quality, water quantity, watershed health. Watershed health includes economic health. Are our landowners able to maintain their farm? Residential people too, are they able to use their land the way they intended? Again, with watershed health always in mind."*

All three families believed that a watershed does not need to be impaired to receive technical or financial assistance (PN36). One participant provided an anecdote to stress the importance of protecting investments made to improve water quality:

> *"The local example is the Portage Bay shellfish beds. They were closed in the nineties, re-opened in the early aughts, and then closed again. We took our eye off the ball. How do we keep our eye on the ball? It's easier to maintain than to re-start."*

Priority Families Compared

Comparison of priority values assigned to each priority narrative.

Table 9. PVs compared across priority narratives

PN	Priority	Priority Family (PVs)		
		1	2	3
1	Landowners/producers should know what best management practices are and why they should be used.	2	4	4
2	Addressing concerns of local watershed stakeholders should be the highest priority for resource managers.	-1	-3[D]	4[D]
3	Technical and/or financial assistance for those who qualify is necessary.	0	2	0
4	A watershed plan is necessary.	-2[D]	4	3
5	Land and water should have species diversity.	-1	-1[D]	-4[D]
6	Management should be done at a small geographic scale.	-3[D]	-1	-1
7	Students (elementary through college) should understand the importance of soil and water conservation.	1	1	-2[D]
8	Conservation practices should be adopted on more acres.	-1	-1	0
9	Only local organizations should be involved.	-5[C]	-4[C]	-3[C]
10	No stakeholders' livelihoods should be jeopardized due to watershed management activities.	-1	-3[D]	3[D]
11	Watershed managers should actively engage with the community.	1	1	-1
12	The public needs to understand how a healthy and balanced watershed can benefit them.	1	0	1
13	Funding should be budgeted specifically for outreach and communication.	-2	1[D]	-2
14	Watershed information should be communicated using diverse methods and reach a broad public audience.	0	-2	-1
15	A strong working relationship between producers/landowners and watershed managers is important.	4	3	2
16	One-on-one interactions between resource managers and producers/landowners is necessary.	3[D]	0	0
17	Watershed stakeholders need to understand the sources of water resource issues.	2	0	0
18	The watershed planning process should include diverse groups of people working towards a common goal.	3[D]	-2[D]	-1
19	A management plan should support activities that include recreation, economic and environmental benefits.	1	0	0
20	Communicating about soil health is more effective than communicating about water quality.	-3[C]	-3[C]	-4[C]
21	Water monitoring is necessary.	0	3	1
22	Achievable water quality goals and targets should be set to show water quality improvements.	0[D]	3	2
23	The public should be aware of the range of resource issues associated with their watershed.	0	-2[D]	1
24	A clear plan for public involvement/engagement should be included in a watershed management plan.	-1	0	1
25	Watershed managers should seek out and respect local knowledge, perspective, and experience.	4	1	5
26	There should be a flexible plan that allows for changes in management over time.	2	2	3
27	Negative effects of watershed management on downstream stakeholders should be minimized.	1	1	2
28	Resources and information between local, regional, state, and federal agencies should be coordinated.	3	0	1
29	Watershed managers should focus on water quality issues over water quantity issues.	-3[C]	-4[C]	-5[C]
30	The watershed should have a user-friendly website that contains watershed information.	-2	-1	-2
31	Watershed management should benefit my community and communities downstream of my watershed.	5[D]	2	2
32	Watershed management should include an evaluation of the impact of climate change on future quality and quantity in my watershed.	-2	-1	-2
33	Community members should take an active role in watershed management.	2	2	0
34	Measurably cleaner water should be an outcome.	0	5[D]	-1
35	Producers/landowners/businesses should be required to adopt best management practices.	-4	-2	-3
36	The watershed needs to be in an impaired or degraded state.	-4[C]	-5[C]	-3[C]

[D]=Distinguishing priority
[C]=Consensus priority
PN=Priority number
PV=Priority value
Priority Family 1: Stakeholder Inclusion and Concern
Priority Family 2: Communication and Engagement
Priority Family 3: Measurement and Flexibility

PV Color Key

5	
4	
3	
-3	
-4	
-5	

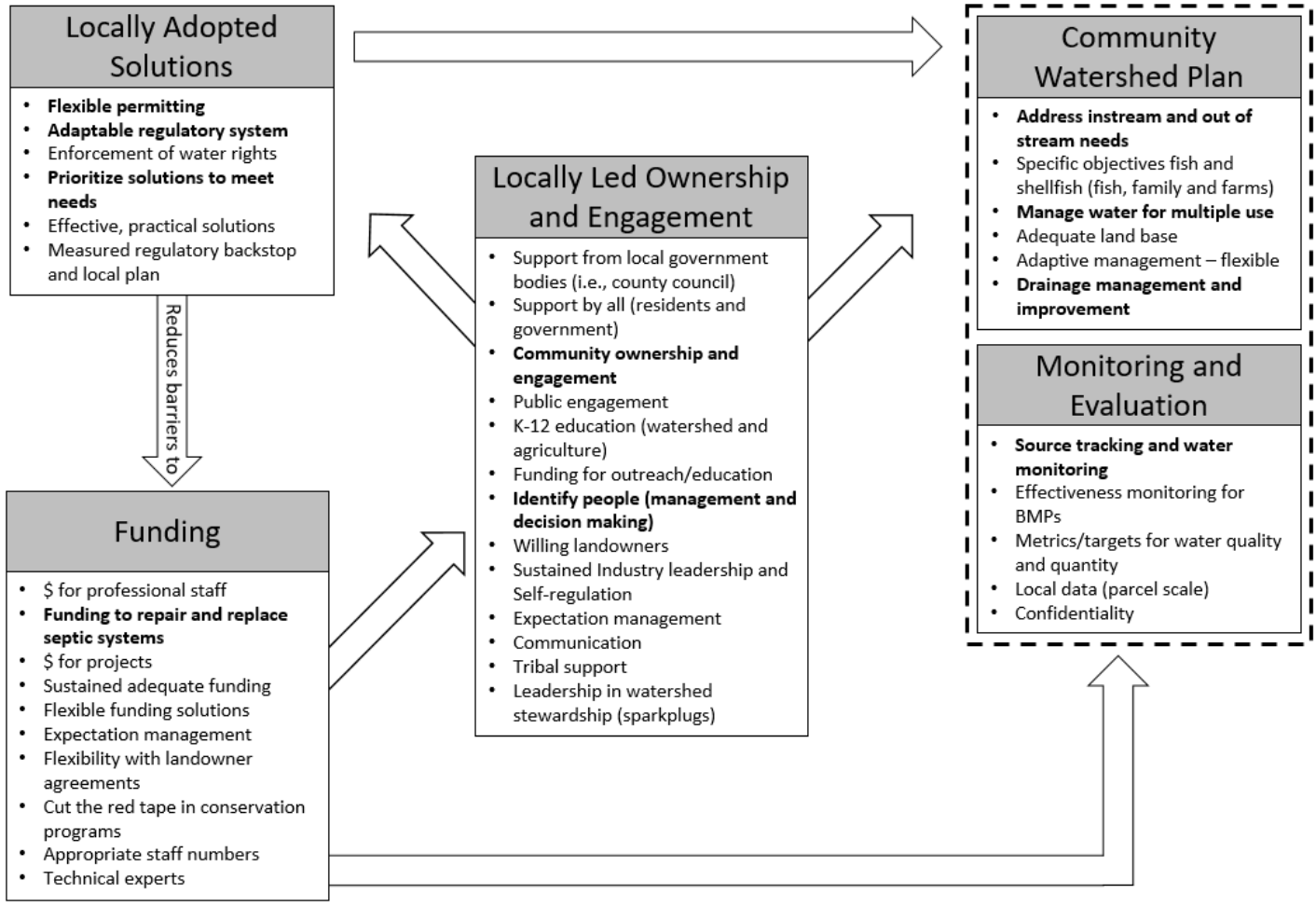
3.1.3 Resource Needs

Discussion Group 1

Group 1 developed five broad categories and identified 40 resources needed for successful watershed management (Figure 3). The five broad categories described below include: 1) Locally Led Ownership and Engagement, 2) Locally Adopted Solutions, 3) Funding, 4) Community Watershed Plan, and 5) Monitoring and Evaluation.

From the perspective of this group, locally led sense of watershed ownership and engagement is an essential component for successful watershed management. The group articulated that with locally led ownership and engagement, the watershed community can develop solutions that can address specific needs and reduce barriers to federal and state funding. In addition, they believed that local ownership and engagement is needed to implement a watershed plan that incorporates specific goals and monitors progress. This group discussed the need for balance between local autonomy in the watershed community, and federal, and state government support.

Figure 3. Mind map for Discussion Group 1



Bolded resource needs were provided by survey respondents

Locally Led Ownership and Engagement

This group identified local ownership and engagement as an essential resource for successful watershed management. They believed local sense of watershed ownership gives the community an opportunity to influence long-term success with local knowledge and experience. By establishing a local sense of ownership, the watershed community can reclaim responsibility for their resources and manage the watershed to provide benefits for their community. This group welcomed technical and financial support from state and federal agencies but reiterated that watershed planning should come from within the watershed community to achieve success. One participant explained:

> *"There isn't anybody around here that doesn't the have common values of clean water. The Clean Water Act took that value that we have here and it gave it to the federal government, who then gave it down to the state government, who manages it independently. They're the external ones coming in to tell us what we should be doing. But that's our bad, we're reclaiming what we gave away for somebody else to do. We need [the state and federal government] to support it, not to plan it…When they go away, we're still here. This is ours."*

This group believes watershed management needs a supportive and engaged local community. Responding to a recent uptick of anti-agriculture attitudes, they emphasized the importance for the public to understand the positive impact of agriculture in their community and recognize the agricultural sector's contribution to water quality improvement. Without broad support from the local community, a watershed plan will not be feasible:

> *"There has to be a public license and public acceptance of agricultural practices that have some negative effects, some positive effects, but the net effect is beneficial. Somehow there has to be a community [understanding] that there's a net benefit. Essentially, the public gives us the right to do what we're doing. And that's being eroded."*

Additionally, participants in this group highlighted the importance of engaging upstream and downstream communities who are impacted by activities in their watershed:

> *"You're not going to have harmony in your community unless all the parties [are considered]- even though we're a watershed, our watershed affects other people. So, what's important to them should be important to us."*

Locally Adopted Solutions

This group suggested incorporating a more adaptable and flexible permitting process to encourage the development of local solutions and reduce barriers to accessing state and federal funding. This group believed the existing regulatory framework is rigid and does not support effective or practical solutions for watershed management. They recommended federal and state regulations that support local solutions, but that do not dictate solutions. One participant explained:

> *"We could embrace locally adopted solutions, opposed to those that are impressed upon us. That's what is limiting about [regulations]. When [regulatory agencies] decide what you have to do, opposed to when [the local community] identifies the solutions and takes the responsibility… there has to be some authority within the local body to move within the regulations"*

Funding

Funding was also identified as a central component for successful watershed management. This group emphasized the importance of funding dedicated professional staff who have the technical skills and expertise to increase voluntary participation and address watershed needs:

> *"You could only get so far with volunteers and contributions. Funding is really important for the trained professionals to help support participation. We have to have adequate funding for all those things."*

Community Watershed Plan with Monitoring and Evaluation

This group believed a community developed watershed plan that includes monitoring and evaluation is another component to successful watershed management. Moreover, this group explained that it is important for the watershed plan to address diverse needs in the watershed and be respected by state and federal agencies:

> *"It's about balancing different uses or needs…Our community of participants in this watershed have identified our goals and objectives with our watershed plan, and it needs to address the things that are of value to us…it can't be undercut by these other agencies. There's got to be some deference and support. At the core, the locals own it, and the others support it and don't undercut it to be effective."*

This group believed a community developed watershed plan should be flexible enough to accommodate change over time and include comprehensive monitoring and evaluation of water quality and BMP effectiveness. This key part of success allows the watershed plan to set specific goals, monitor progress, and inform adaptation of the plan over time:

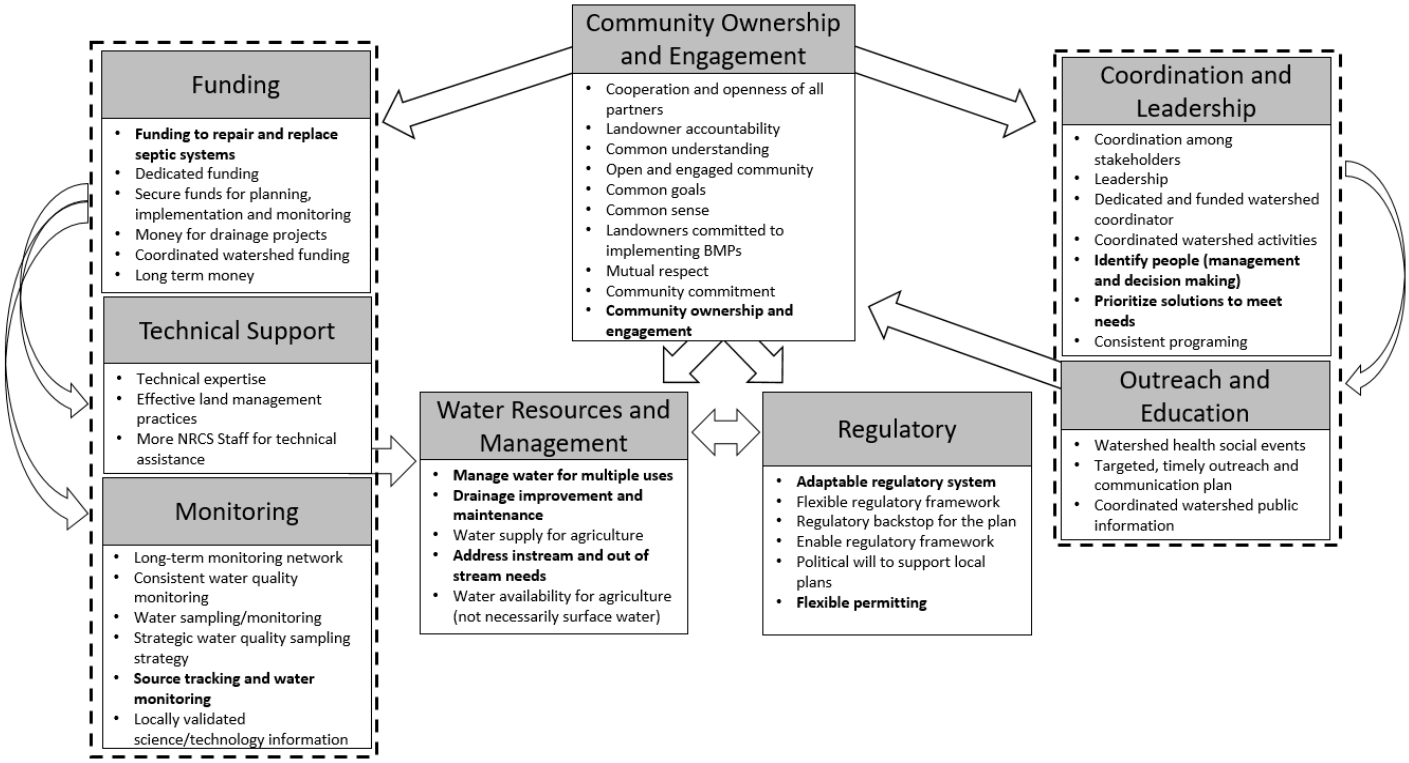
"There ought to be something in there about the dynamics of needing to have the flexibility to adjust over time with your plan. As things change, as you make improvements, as you learn more about what your needs might be, and they adjust and whatnot… as we're crafting the local solutions, we may not get it right the first time."

Discussion Group 2

Group 2 developed eight broad categories of needs and 46 individual needs for successful watershed management (Figure 4). The eight categories described below include: 1) Community ownership and engagement, 2) Funding, 3) Technical support, 4) Monitoring, 5) Regulatory, 6) Water resources and management, 7) Coordination and leadership, and 8) Outreach and education.

This group identified community ownership and engagement as a key component for successful watershed management. Group participants agreed that with cooperation, accountability, and commitment from the watershed community, a foundation of public support can influence available funding and technical resources for watershed management. This group's framework also included effective leadership paired with community outreach and education to bolster community support and a flexible regulatory environment to accomplish watershed goals.

Figure 4. Mind map for Discussion Group 2



Bolded resource needs were provided by survey respondents

Community Ownership and Engagement

This group believed a sense of community ownership and engagement in the watershed is a foundational component for successful watershed management, which in turn influences other components. This group believed that an engaged community with a sense of watershed ownership can create the public support and the political will needed for successful watershed management, for example:

> *"I would say that it's community [ownership and engagement] that is most important because, without it, you won't get anything [done]... it'll make or break the whole thing."*

> *"[Community ownership and engagement] relates to the political will which relates to funding… [It's] a precursor to the money."*

Funding for Technical Support and Monitoring

This group suggested long-term funding for technical support and monitoring resources as another important factor for successful watershed management. Furthermore, they emphasized the need for NRCS to fund positions that strengthen technical expertise in the watershed. Additionally, this group believed sustained water quality monitoring is necessary to evaluate watershed progress and highlighted the need for technical coordination and data management. For example:

> *"There's a difference between kind of the moral leadership, someone who says, 'Come on, get around the table. Let's get this happening.' And then, the more technical coordination, which is someone who's there day after day putting the data together, doing the work."*

Regulatory

This group identified a flexible and enabling regulatory environment as another major component of successful watershed management:

> *"If the question is 'what is needed for successful watershed management?', the answer is an enabling regulatory framework that allows you to implement your plan. Here is an example – If you wanted to do something like a water exchange to be able to have more flexibility in moving water about, getting it in the stream, getting it to farms. You may need enabling local regulations for innovative solutions. That's the flexible part of it."*

Paired with an enabling regulatory environment, this group agreed that a regulatory backstop is another important component of successful watershed management. While an enabling regulatory environment allows for flexibility, a regulatory backstop can be put in place to manage those who may be doing damage to the watershed. One participant explained:

> *"There are two ways. One is the enabling [framework], the other is a regulatory backstop...You've got to have the stick out there at some point because there are some people who do not exert peer pressure on those who are clearly creating problems."*

Water Resources and Management

This group described the water resources and management category as practical needs that are essential to farming operations. In addition, they believe technical assistance should support these needs. For example:

> *"Farmers need drainage improvement and farmers need water. Drainage permitting is regulatory, but actually getting your drainage in place is a practical need [technical assistance]*."

Coordination and Leadership, Outreach and Education

This group considered coordination and leadership another necessary factor for successful watershed management. They recognized the relationship between effective leadership and public support, and believed the watershed coordination and leadership directly impacts the community engagement and their sense of watershed ownership. One participant explained:

> *"Leadership, and [community ownership and engagement] are integrated because you need leadership to get [ownership and engagement]. Then you have to have a plan to coordinate. You don't have a plan until you get all those folks [on board]."*

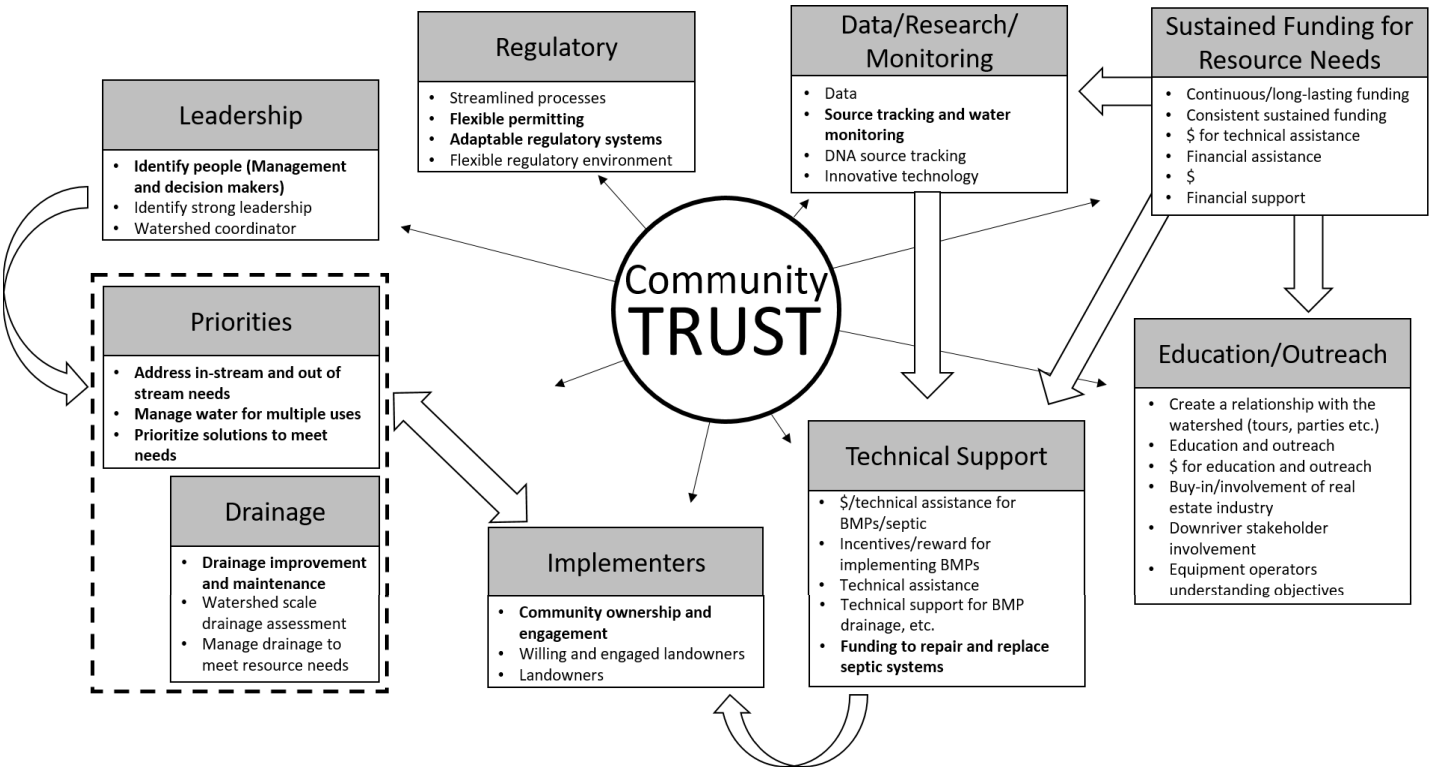
Additionally, this group believed that outreach and education play an essential role in gathering public support and can increase community ownership and engagement in the agricultural and broader non-agricultural community.

Discussion Group 3

Group 3 developed nine broad categories, 37 specific needs and one underlying component to describe resources needed for successful watershed management (Figure 5). The underlying component described by this group is Community Trust, and the eight broad categories include: 1) Leadership, 2) Implementers, 3) Priorities and Drainage, 4) Regulatory, 5) Sustained funding for resource needs, 6) Data, research, and monitoring, 7) Technical support, and 8) Outreach and Education.

This group developed an interconnected framework for successful watershed management that included a foundation of community trust, which incorporated the need for flexible regulations and sustained funding for various resource watershed management needs. The framework described by this group also emphasized the importance of strong leadership with clear priorities, while supporting outreach and education for the broader watershed community.

Figure 5. Mind map for Discussion Group 3



Bolded resource needs were provided by survey respondents

Community Trust

This group identified community trust as a critical component needed for successful watershed management that should be central to all other elements, one participant simply states:

> *"Trust fits everywhere…It's the middle of the spoke, the hub of the wheel."*

Leadership

This group believed effective, on the ground leadership plays a significant role in developing community trust. They believe this vital role is needed to maintain relationships within the watershed community and to incorporate the community's diverse needs into watershed management.

> *"On the ground leadership, for me it all comes down to having people, someone or a group of people on the ground talking with the owners, keeping it all connected and building that relationship."*

This group also acknowledged that watershed leaders play a key role in coordinating information and providing resources that encourage landowners to implement practices. Another desired skill for watershed leaders is the ability to coordinate multiple groups with similar goals and objectives:

> *"There needs to be a centralized leader, a responsible party. I don't want that to be lost in the [strong leadership piece]. We're kind of seeing that. So many groups are doing so many different things."*

Implementers

This group defined implementers as landowners and producers who can adopt conservation practices on their property. The group believes implementers are important components of successful watershed management. As on the ground improvements only occur with voluntary adoption, this group stressed the importance of strong working relationships between watershed managers and implementers to increase the likelihood of practice adoption:

> *"The landowners are the implementers. They're the ones who can implement. Those leadership roles can't implement anything. They can suggest and they can coordinate, but it's the landowners that can implement…they're the ones who are going to make the changes that make improvements."*

In addition to willing implementers, this group believes that success also includes recognizing implementers' needs and maintaining their involvement in the planning and implementation phase of watershed management:

> *"Twenty-five years ago, everything was from the top down, and nobody took the landowners' concerns or made them a part of it. I think we have now come to the realization that landowners are the number one, and we've got to get them engaged before we can start getting them to take advantage of everything else. So to me, if we're going to have a plan, it better be a big plan to include landowners and keep them involved."*

Priorities and Drainage

This group stressed that successful watershed management should incorporate watershed priorities to account for the needs of their local community. They described this priority category as an essential link between leaders and implementers, then suggested "Drainage" as a sub-category that serves as an example of a locally relevant watershed priority. From the perspective of this group, leaders need to work with implementers to understand their objectives, develop priorities and include implementers' needs in the planning process:

> *"[Priorities] are components to consider when developing a plan…Leaders need to have those concepts"*

> *"The community implements and the leadership leads, but the thing that connects them is [the priorities]."*

Regulatory

This group identified a streamlined process and flexibility as important regulatory components for successful watershed management. They agreed that regulations are necessary, but believe that watershed management could benefit from a more efficient and less rigid permitting process.

Sustained funding for resource needs

This group discussed two distinct types of sustained funding necessary for successful watershed management. The first is project-specific funding, and the second is funding dedicated to outreach and education:

> *"They need to see funding as two things. They need to see funding as project-oriented so that if you have a big project like five landowners and you need a grant for that, that's one thing. But then there's sustainable funding for continued education and continued outreach. You don't get grants for outreach, you get grants for getting specific stuff done."*

The group felt as though projects are often pieced together with multiple funding sources, and described problems associated with unpredictable funding:

> *"So often we get a grant for a specific thing and just we piecemeal it…[we need] enough to have something that's consistent year after year."*

This group also highlighted the need to fund outreach and education programs to build relationships and develop trust within the community. Additionally, the group believed providing resources to organize and plan effective outreach and education programs would be beneficial to the watershed and is often not included in project budgets.

> *"We need additional funding for outreach, community building…You need money for thinking, organizing and planning how you're going to do this all. There's no money for that."*

Data, research, and monitoring

From the perspective of this group, data, research and monitoring efforts are essential for successful watershed management because these activities can assist in problem identification and be used to direct on-the-ground technical support:

> *"The research piece then feeds into the [on the ground] technical assistance piece".*

Technical Support

This group described two types of technical assistance as crucial components for successful watershed management. First is technical assistance to support implementing conservation practices, and second is to support the various operational needs of the watershed. Technical support related to implementing conservation practices is valuable to producers and landowners who need assistance or advice. One participant explained the benefits of available technical assistance:

> *"Technical assistance to me meant somebody who gives you advice or tells you how to do something. Like if you want to put a drainage system in, they can make a design for you…We need the people and the money to be the practitioners of science-based information one-on-one to a landowner. I see technical assistance as one-on-one with a landowner."*

Another participant described the need for technical support to address the operational needs of an organization as well.

> *"When I was [working with the watershed group], [I needed technical assistance from] you guys [NRCS], but also my education guys that helped me put the letter out, the website guy and it was also the guys with the maps. So technical support includes everything to me. It includes data monitoring and data management -- how to put it on a spreadsheet."*

Outreach and Education

This group highlighted the importance of outreach and education that focused on the non-farming community in the watershed. They believe education can motivate behavioral change and suggested promoting the public benefits of a healthy watershed to increase engagement from agricultural and non-agricultural communities.

> *"You're not going to get people to make changes on the ground until they have a relationship with the stream, or the river, or the land. A lot of farmers have a relationship with their land. They know how to take care of it. What we need to do is get that relationship [to the non-farming community] within the watershed. That's the first thing."*

Group participants described another important component for effective education and outreach as working with upstream and downstream communities who may be impacted by watershed management:

> *"It's another party out there that is going to be impacted by the decisions made in the watershed. They certainly are somebody that we need to stay in touch with and need to always communicate with. [Education and outreach] doesn't necessarily mean just to the people in the watershed. That could mean [outside the watershed] as well...It's kind of like the tribes, too. Everything we do is going to impact them. So we certainly want them to be as branches to us."*

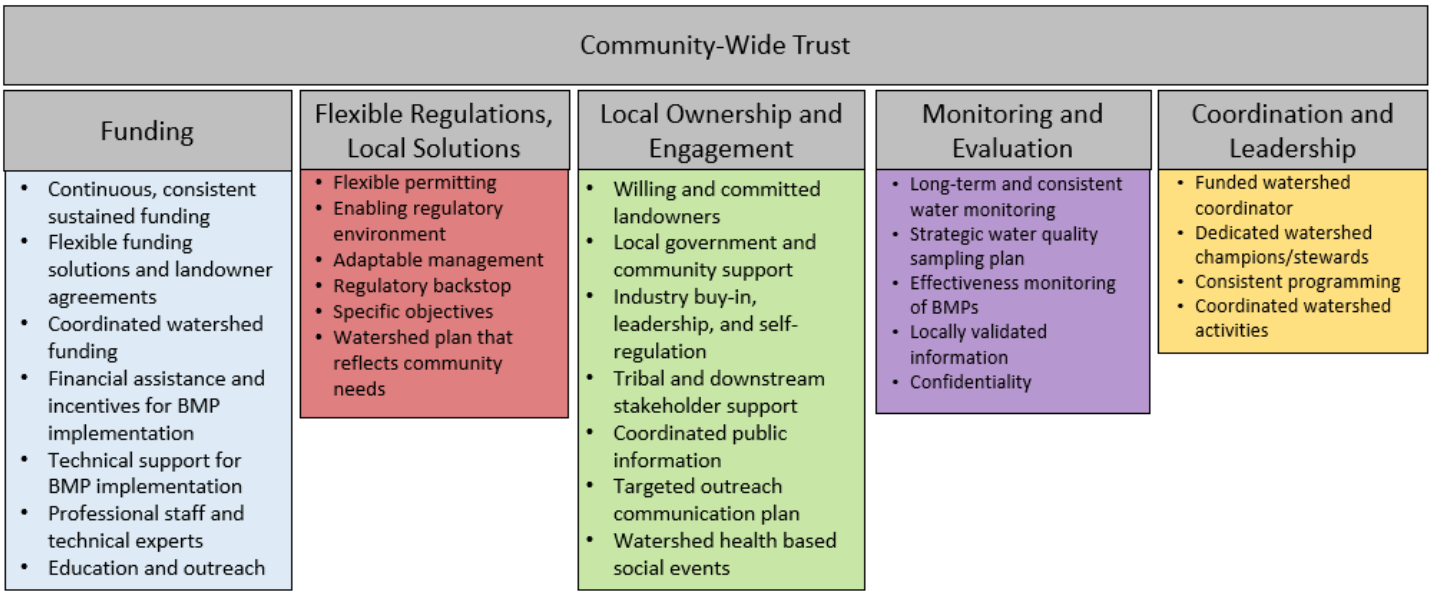
Finally, the group discussed the need to involve other sectors that impact the watershed and play a role in community development. One participant suggested the real estate industry as an example:

> *"They could be conduits of information. They give people advice, but they don't know what they're talking about. They want money, you know what I mean?"*

Combined Groups
The following section details overall resource needs that participants identified across each discussion group.

Resources needed for successful watershed management identified by each of the three discussion groups include the following major themes (Figure 6): 1) Community-wide trust, 2) Funding, 3) Flexible regulation and local solutions, 4) Local ownership and engagement, 5) Monitoring and Evaluation, and 6) Coordination and leadership.

Figure 6. Combined group resource needs



Community-wide Trust
This element of successful watershed management influences all other components and was identified as a foundational need that influences all other resource needs.

Funding
Participants highlighted the need for consistent, coordinated and flexible funding. They report that funding plays an essential role in providing technical and financial assistance to landowners and producers in the watershed. They also expressed a need to fund watershed education and outreach programs and suggested that effective watershed education and outreach programming can benefit the entire watershed.

Flexible Regulations, Local Solutions
Forum participants believed that successful watershed management should include objectives that reflect the needs of the community. It is important to maintain a flexible and enabling regulatory environment, in order for watershed managers to incorporate local solutions and adapt to future change.

Local Ownership and Engagement
Local sense of ownership of the watershed as well as targeted engagement strategies were identified as important components to successful watershed management. These needs highlight the importance of landowner buy-in, local government and community support, as well as support from industry and stakeholder groups outside of the watershed. Participants also suggested coordinating public information for targeted watershed outreach.

Monitoring and Evaluation
A key resource need described by participants is long-term and consistent water quality monitoring. They also suggested evaluating BMP effectiveness and stressed the need for locally sourced data that also maintained confidentiality for producers and landowners.

Coordination and Leadership

Finally, participants underscored the importance of coordinated leadership in the watershed. They described two types of watershed leaders: One is a funded watershed coordinator and the other include dedicated watershed champions. The watershed coordinator is responsible for managing watershed activities, while watershed champions serve as a trusted liaison to various stakeholder groups in the watershed.

3.1.4 Elements of Successful Outreach and Education

The following section describes key elements described by participants for successful outreach and education (funding and watershed leadership), then identifies effective content and methods of delivery for watershed related outreach and education.

Funding

Participants reiterated that funding is essential for successful watershed outreach and education. One participant believed that investing in outreach and education can have major impacts on the long-term success of watershed, for example:

> *"A rule of thumb is one-third of your budget should go to outreach and education…When it happens, it's a much more successful program that gets anchored in for the long-term. When it doesn't happen, you go into this endless planning cycle, and there's never any implementation. If you want something that's going to last for our generation and the next one, the balance you need is one-third outreach, one-third long-term monitoring, one-third implementation."*

Although NRCS requires an outreach and education component in the watershed assessment document, implementation funds are not allocated for outreach and education programs.

> *"The implementation funds that come from the NWQI program have no allotment for education and outreach. We've identified through the pilot process that [outreach and education] is an extremely important part, for even letting people know there's funding available. If these programs come [with] a chunk of funding for that activity it would be [helpful]."*

Watershed Leadership

Participants highlighted two major components for successful outreach and education: A funded watershed coordinator, and volunteer watershed champions. The watershed coordinator manages watershed operations and works with local leaders in the watershed (i.e., watershed champions), while the watershed champions work with the watershed coordinator to address watershed needs of their community. Participants described their cooperative relationship between the two positions:

> *"I think the coordinator is a paid position, the one who's making sure [progress is] happening. But [the watershed champion is] a voluntary person who tries to bring their community together because they're passionate about it, and they want to see it happen. You have to hire someone to coordinate the entire watershed effort…to make sure the [watershed champion's] efforts are not for nothing."*

Watershed Coordinator

Participants viewed a watershed coordinator as a funded position that manages daily operations of a watershed, works with watershed champions to understand and address their needs, and is a resource for coordinated watershed information:

> *"We have a tendency to make [the watershed coordinator] an overly technocratic position, but it doesn't have to be. What's more important is someone who gets out and goes around listening."*

> *"You can have a motivated constituency, but if you don't have someone to get the work done, they'll be motivated, and they'll sit around and talk a lot. That's about as far as it will go. It's just in my experience, it's been really important that you have a dedicated staff person who handles the coordination."*

This group also noted the benefits a watershed coordinator who is active and invested in the watershed community. This can establish trust and helps build important relationships within the broad watershed community, for example:

> *"[It helps to] be part of the community. Your kids would be in school with their kids, go to their churches, and go to the ballgames and just be part of the community. Pretty soon, people are trusting you and you've got a buy-in with it all. You don't see that much anymore."*

Watershed Champions

Watershed champion were described as a position for trusted members of the diverse stakeholder groups in the watershed community. They work closely with the watershed coordinator and other watershed champions to develop targeted messaging to addresses cultural diversity and watershed needs of their stakeholder groups. For example, with an increasing population of Sikh producers in the watershed, one participant suggested:

> *"We have a big Sikh community. Maybe we should have a Sikh member working in the watershed, really trying to reach out to that group."*

This liaison position between stakeholder groups and a watershed coordinator can build trust within individual communities, assist in the delivery of coordinated information and represent the needs of their community to the watershed coordinator:

> *"I think the [champion] would bring more people to [the Conservation District]. When you have a small farms events, [the champion] would know which people in our watershed should go and have the experience and relationship with them to say, 'Hey, the Conservation District is doing this. Let's carpool, I'll pick you all up and we'll go'…The technical people have so many things that you're already doing, they don't always have time to go out and talk with somebody, and that's what you need to connect [with people]."*

Content

Consistency

While participants believe that a tailored message is important, they emphasized the need to communicate a consistent message. With multiple organizations interested in watershed health, participants described challenges of contradictory messages:

> *"We have a lot of different groups who are putting information out. You want to make sure it's all the same, that one group isn't saying something different than another and so on because the second that counters itself, you've completely just alienated somebody and/or screwed someone's hard work up. So really making sure it's the same, coordinated, consistent message [is important]."*

Participants also highlighted the importance of using reliable data sources. The data needs to be geographically applicable and locally validated to avoid sharing inaccurate information:

> *"It's not my science versus somebody else's science. [We need a] credible data source."*

> *"If we want to look at the effect on this of a practice, let's say grass buffers, you can't take data from Iowa and apply it to [our] County."*

Progress Updates

Participants recommended reporting the progress of water quality improvements in the watershed. They believe that it is important to acknowledge water quality improvements when goals have been met, or communicate adaptations to the plan to encourage further improvement.

> *"Are we actually seeing a change? You want to have milestones so that wherever you hit them, you can [say you've accomplished something]…And if we miss, why do we miss? How do we change course? [We need to communicate] that we're adjusting to get back on track."*

Promote Agriculture Benefits to the Broad Community

Forum participants discussed that the non-agricultural public needs to understand the social and environmental benefits of agriculture. To establish a supportive base from the broader community, watershed outreach should promote the environmental services provided by agriculture, as well as the social and economic benefits of agriculture.

> *"I think we should explore the value of a well-stewarded agricultural land basin and why it's important to the community. I think there's an assumption that, by virtue, that there's 400 cows on the average dairy that something's wrong with it. Well, if our premise is that we want to see agriculture persist with the environmental services it provides, we need to communicate the value of agriculture to the community and to the environment."*

Participants also emphasized the importance of addressing controversial topics and facilitating conflict resolution in a safe and constructive environment:

"Having a mechanism to bring folks together and form their issues, in a safe place to have those conversations and facilitating discussions in a safe place so they can have those conversations and get rid of some of the misunderstandings that are being projected."

Delivery

Tailored Messaging

Participants emphasized that diverse audiences require diverse solutions. Thereby, participants believed that outreach and education efforts will be most effective if watershed coordinators work with their watershed champions to develop a strategy to address salient topics in their community. They stressed the importance of understanding the audience for effective watershed and conservation messaging, for example:

"[Its important to] define the different audiences and understand where people are getting their sources of information [from], both in terms of media type and trusted messengers. From there, you can build more targeted messaging [that address] specific things about that audience that might be different than other audiences."

One-on-One Interactions

Participants believed peer to peer information sharing is the most effective method for recruiting landowners to participate in NRCS programs. An NRCS staff person explained how the value of those interactions can increase as information diffuses through the community:

"Neighbors, friends, and family. Those people talking to those people. It goes back [to the question] 'more acres or more customers?'. More customers is desirable because that's more customers that will talk to other potential customers. We [NRCS] can talk all day about how cool we are. Nobody's going to believe us until one of you vouch for us, either the district or a landowner or the tribes."

Informational Events

Forum participants suggested face-to-face contact and interactive learning events to share information and promote the importance of agriculture in the community. They stressed the need to increase the general public's understanding of watershed health and the agriculture community's improvement efforts. Additionally, participants believe it is important to have a space for potential BMP adopters to learn about watershed management in their community:

"Have an actual demonstration to show the public and other farmers, something where you can walk up and see, this [practice] is in place and this is how it works. Having people willing to openly share that means a lot. Not just to talk about something but to see it firsthand. Something that's been working for a number of years."

"Have field days, expos or monthly meetings where people can come and get information. That's the thing that [we need], that face-to-face contact."

Time Frame

Participants prioritized immediate problems facing their watershed, but acknowledged that outreach and education can support long-term watershed goals by influencing stakeholder attitudes toward soil and water conservation. They also suggested developing intergenerational relationships by maintaining contact with landowners who may be reluctant or slower to adopt:

"It's important to [maintain] a good relationship with that [non-adopter], because maybe his son would want to do it, or maybe after he sees that one planting is working, it may not be so bad. That's what we need to do. All this here, we're talking real specific messages to different groups, which is great, and it's needed, but there's a bigger picture that is getting missed"

3.2 Interagency Partner Interviews

In February and April of 2018, representatives from Washington Department of Ecology (ECY) and US Environmental Protection Agency (EPA) Region 10 were interviewed by an NRSS lab researcher about their role in NWQI, NRCS' role as a local partner in watershed management, and resources needed for successful watershed management and outreach. Interviews with ECY and the EPA were conducted over the telephone and both conversations were recorded and transcribed. The following sub-sections are a summary of the conversations. (see Appendix D for interview guide).

3.2.1 Washington Department of Ecology

ECY receives federal funding from the EPA to support water quality improvement programs and reduce non-point source water pollution in Washington State. The ECY representative commended NWQI's targeted watershed approach and acknowledged the value of developing a watershed assessment and outreach strategy for each priority watershed. Although ECY recognized the NWQI's potential to improve water quality, they believe increasing interagency communication and transparency regarding NWQI priority watershed selection criteria would increase success of the NWQI.

At the onset of the NWQI, the EPA directed ECY to coordinate with Washington State NRCS in selecting watersheds for the NWQI that would subsequently be eligible to receive resources from both agencies. The guidance objective was to facilitate a coordinated watershed effort that included resources from both agencies (EPA and NRCS) to improve water quality in the selected watersheds. ECY reported they were not consulted for the selection of NWQI priority watersheds and that NRCS did not grant requests to share their selection criteria for priority watersheds. Although NRCS has not yet used ECY watershed recommendations or shared their selection criteria for priority watersheds, ECY reports improved communication with NRCS. In addition, ECY continues to recommend priority watersheds for the NWQI based on their available resources.

ECY believes successful watershed management includes funded BMP implementation to incentivize adoption and off-set landowner costs as well as water quality trend monitoring to document progress and direct program adaptation. They emphasized the importance of sharing BMP location data with partnering agencies and communicating monitoring results to the public. ECY stressed the need for an engaged staff that understands the concerns of the watershed community and suggested a targeted approach to outreach and education that reaches landowners who may not show an active interest in adopting BMPs.

3.2.2 EPA Region 10

EPA Region 10 reported their main role in NWQI is to administer funding and guidance to ECY and contribute to reducing non-point source pollution. The EPA works with NRCS and ECY to increase project capacity and to reduce non-point source pollution on a regional scale through collaboration and program support.

While EPA Region 10 believes that the NWQI provides a framework for NRCS and ECY to work towards a common goal, they report a lack of transparency regarding selection criteria for NWQI watersheds. This lack of transparency is seen as a barrier to effective interagency collaboration. EPA Region 10 recommended NRCS to communicate the criteria used to select priority watersheds.

Regarding successful watershed management and outreach, the EPA believes a flexible approach that motivates landowners to adopt conservation practices is needed. EPA interviewees stated that watershed managers should engage with the public to address diverse needs of the watershed community and stressed the importance of one-on-one interactions to increase landowner engagement and overall success.

4 Recommendations

The NRSS research team developed the following recommendations through the synthesis of the stakeholder forum conducted in Whatcom County on March 1st, 2018 and the interagency partner interviews conducted in early 2018. This section provides recommendations to NRCS and Whatcom County CD.

4.1 NRCS

1. Support watershed outreach and education programs with NWQI implementation funds.

We recommend NRCS include technical assistance funding to support outreach and education programming in NWQI watersheds.

Throughout the forum, participants stressed the importance of effective outreach and education. They believe allocating funding for staff at the local level to conduct one-on-one outreach and education can increase program capacity and long-term potential for successful watershed management. Although participants understand outreach and education is not the only necessary component for success, they emphasized its impact on establishing trust within the watershed community and community ownership of the watershed.

2. *Increase coordination with partnering entities to enable water quality monitoring and improve priority watershed selection.*

We recommend NRCS increase coordination with ECY regarding site selection criteria for priority watersheds and increase coordination with partnering entities to accommodate water quality monitoring needs.

Representatives from ECY and EPA Region 10 indicated that a better understanding of the site selection criteria NRCS uses to select NWQI priority watersheds can increase access to state and federal resource contributions (319 funds). With transparent site selection criteria, NWQI priority watershed recommendations could be tailored to suit the needs of both NRCS and ECY, and result in increased resource contributions. ECY also described a need for more specific BMP location data to guide placement of BMP effectiveness monitoring. This recommendation also suggests improving communication between NRCS and ECY in efforts to leverage resources and work together towards common goals.

3. Work with local communities to enable local solutions and increase flexibility of programmatic requirements.

We recommend NRCS to incorporate locally derived solutions and increase flexibility of programmatic requirements.

Forum participants reiterated the importance of NRCS to work with watershed communities and incorporate their unique needs into watershed management plans. They described the need for increased flexibility of both programmatic structure and requirements to enable local contributions to successful watershed management.

4.2 Whatcom County Conservation District

1. Continue working with stakeholder groups to recruit watershed champions.

We recommend Whatcom CD engage trusted leaders in agricultural communities to identify and work with watershed champions to addresses specific concerns of communities inside and outside of the Tenmile watershed.

Forum participants believed that the diverse stakeholders in their watershed community need diverse leadership. Working with trusted leaders from stakeholder groups inside and outside of the Tenmile watershed community ensures watershed concerns are acknowledged and addressed through the larger watershed region. Participants indicated that this type of outreach helps develop the collective sense of watershed ownership needed for successful watershed management.

2. Develop consistent and tailored messaging for the watershed communities.

We recommend Whatcom CD work with watershed champions to develop effective messaging to address specific concerns of various communities in and outside of the watershed.

Participants highlighted the importance of creating consistent, yet tailored outreach materials that resonate with those who impact water quality, those who are impacted by watershed management, and diverse stakeholder groups interested in watershed health.

3. Increase outreach to the broad, non-agricultural community.

We recommend Whatcom CD work with the non-agricultural community to promote benefits and value of agriculture and a healthy watershed.

Forum participants emphasized the need for the non-agricultural community to develop a relationship with the entire watershed to communicate and build understanding for the value a healthy watershed brings to the community. Participants suggested increasing outreach to the general public can reduce misunderstanding in the watershed as well as increase public trust and community support of watershed management.

5 Updates: Tenmile Creek watershed

In April, 2019, an NRSS researcher returned to Whatcom County to present results of the Tenmile watershed forum outlined in this report. The researcher met with local conservation staff (Whatcom CD and local NRCS field office) to discuss forum results and project progress, then presented results and solicited feedback from the Tenmile Clean Water Project (TCWP), a citizen-led watershed group. The following is a summary of information discussed during the return visit.

Interagency Coordination and Regulatory Uncertainty

Although conservation staff and members of the TCWP believe report results are an accurate representation of needs in the Tenmile watershed, they believe the report does not accurately capture challenges associated with ECY, and the subsequent regulatory environment in Washington. Whatcom CD, NRCS, and TCWP agree that coordination with ECY is challenging and different agency standards for water quality is a significant barrier to agency coordination across the state. Additionally, they believe ECY standards are unclear and subject to change, depending on interpretation. They suggested that different water quality standards between ECY and NRCS have a negative impact on practice adoption by causing confusion, uncertainty, and distrust from potential adopters. For conservation practices with no direct economic benefit to producers (e.g., manure management practices) avoiding current and/or future regulation is a major motivator for adoption. Due to regulatory uncertainty, producers cannot be assured that investing time and resources into conservation practices will hold up against future regulations. This was cited as a major challenge by both conservation staff and TCWP.

Water Quality Monitoring

While NRCS and Whatcom CD acknowledge the importance of water quality monitoring in targeted watersheds, they emphasized that ECY is not the only entity that can accomplish the task of BMP effectiveness monitoring in the Tenmile watershed. They believe existing partnerships with entities other than ECY can accomplish water quality monitoring tasks and would be a better fit to partner with NRCS in Whatcom County. Related to metrics of success in NWQI watersheds, conservation staff cited challenges with a single metric of improved water quality and believe that multiple metrics of success should be considered.

Conservation Practice Incentives and Maintenance

Conservation staff believes incentivizing behavioral change is more effective than regulatory enforcement and suggested exploring additional incentives beyond cost-share for adopting conservation practices, such as tax breaks. Additionally, they noted that many conservation practices require significant initial investments as well as maintenance over time. To increase adoption of these types of practices, they suggest NRCS funds the initial investment and provides assistance to address maintenance over time.

Watershed Assessment

Whatcom CD believes the watershed assessment helped identify sources of impairment and target areas in the watershed but could be more impactful if paired with a watershed plan to justify implementation funds in NWQI watersheds. As many parcels in the Tenmile are not eligible for the Environmental Quality Incentives Program, spending the allocated funds in the implementation phase may be a challenge. Conservation staff suggested including a feasibility assessment that ensures targeted funding is allocated at an appropriate level. Whatcom CD also requested additional guidance and feedback on the development of the watershed assessment and outreach plan. They believe an opportunity to share "lessons learned" or "best practices" from the development of other NWQI watershed assessments would benefit future assessments. Conservation staff also shared that many watershed plans have been developed for the Tenmile watershed before the NWQI watershed assessment. They believe funding to update/ground truth existing plans could benefit and accelerate the development of future watershed plans.

Funding for outreach and education

While NWQI provides targeted funding for the watershed assessment and practice implementation, there is no additional funding for programmatic support or outreach and education to promote targeted funding opportunities in the watershed. Whatcom CD underscored the importance of outreach and education and suggested adding a separate pool of targeted funding to address outreach and education needs and to promote the targeted funding opportunities in NWQI watersheds.

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Appendix A: Survey – Survey Methods

This appendix describes the development, data collection, analysis, and results of the Tenmile watershed survey (Figure A-1).

Development

The NRSS research team developed a survey to identify stakeholder priorities, suggestions for successful watershed management, and elements of successful watershed outreach and education (Figure A-1). The survey was designed to incorporate stakeholder responses into forum activities.

Data Collection

Whatcom CD invited stakeholders via email to participate in the watershed forum. Approximately two weeks before the forum the Whatcom CD sent a total of 19 surveys to invited participants. No survey reminders were sent to those who did not respond. Respondents were provided a link to take the online version of the survey, administered by Qualtrics, an online survey software (Qualtrics, Provo, UT).

Additional information collected from the survey include 1) involvement in Tenmile watershed planning, 2) who recipients receive watershed related information from, and 3) preferred method(s) to receive watershed management related information. This information was not used in the forum activities and therefore not included in this report.

Analysis

Survey response rate was calculated by dividing the total number of completed survey responses by the total number of surveys sent. Survey questions incorporated into the forum included four open ended questions (Table A-1). One NRSS researcher analyzed survey responses by identifying emerging themes in MS Excel.

Table A-1. Survey questions used in forum activities

Survey Question (Q#)	Survey Question (text)
Q4	In your opinion, what does successful watershed management look like?
Q5	In your opinion, what resources are needed for successful watershed management implementation?
Q6	In your opinion, what are key elements of successful watershed outreach and communication?
Q7	In your opinion, what resources are necessary for successful watershed outreach and communication?

Results

Of the 19 surveys sent, a total of 13 surveys were completed online, for a final response rate of 68.4% (Table A-2). Most respondents identified as a producer or landowner (Table A-3).

Table A-2. Response rate

Completed (n)	Sent (n)	Response Rate (%)
13	19	68.4

Table A-3. Respondent stakeholder type

Stakeholder type	Frequency (n)	%
Community member	1	7.7
Non-governmental organization staff	2	15.4
Producer or landowner	4	30.8
Research scientist	1	7.7
CD staff	3	23.0
*Other	2	15.4
**Other responses include: Tribal government and Water Improvement District board member*		

Survey responses to four open ended questions (Q4, Q5, Q6, and Q7) from a different watershed were incorporated into the watershed priority activity as individual priorities. Derived from Q4, Q5, Q6, Q7 emergent themes, five priorities were incorporated into the watershed priority activity including priority numbers 1, 5, 7, 14, and 30 (Appendix B, Table B-1). Researchers used survey responses from a different watershed to enable comparisons between different watersheds.

The researcher incorporated Tenmile watershed survey responses to Q4 and Q5 into the resource needs activity as examples. Derived from Q4 and Q5 emergent themes, 10 resource needs were provided to each group as examples, including:

- Flexible permitting
- Adaptable regulatory system
- Prioritize solutions to meet needs
- Funding to repair and replace septic systems
- Community ownership and engagement
- Identify people (management and decision making)
- Address instream and out of stream needs
- Manage water for multiple use
- Drainage management and improvement
- Source tracking and water monitoring

Survey responses to Q6 and Q7 from the Tenmile watershed were incorporated into the outreach and education activity as examples. Derived from Q6 and Q7 emergent themes, 6 elements of a successful outreach and education were provided to each group as examples, including:

- Education for hydrology, biology and flooding in community
- Pilot projects and demonstrations to show practice effectiveness
- Building community and trust around the watershed
- Adaptable funding
- Deep understanding of the area
- Inclusive communication and listening

Conclusion

Survey data incorporated into the forum from Tenmile watershed survey responses include 1) priorities for successful watershed management (Q4), 2) resource needs for successful watershed management (Q5), 3) elements of successful watershed outreach and education (Q6), and 4) resources needed for successful watershed outreach and communication (Q7).

The following open-ended survey questions were incorporated in the watershed forum activities:

Activity	Survey question(s)	Format in forum
Identify Resource Needs	Q4, Q5	Resource need on 5x7 sticky note
Identify Elements of Successful Watershed Outreach and Education	Q6, Q7	Examples on a pre-populated flip chart

Figure A-1. Tenmile watershed survey

Watershed Management Forum
Your Views on Watershed Management and Communication

Thank you again for helping us understand your perspective on watershed management and your opinions on how NRCS can be an effective local partner. The information you provide will help inform future watershed work as well as funding and technical assistance for local conservation efforts in Washington and across the US.

General Information

1. Please indicate your primary role in the Tenmile Creek watershed (check one):

- ☐ Community member
- ☐ Conservation District staff
- ☐ Local government staff
- ☐ Natural Resources Conservation Service staff (NRCS)
- ☐ Non-governmental organization staff
- ☐ Producer
- ☐ Research scientist
- ☐ Tribal Member
- ☐ Other: _____

2. Are you aware of watershed planning in the Tenmile Creek watershed?

- ☐ No, I am not aware of watershed planning in the Tenmile Creek watershed.
- ☐ Yes, I am aware of watershed planning in the Tenmile Creek watershed, but *I am not* currently involved.
- ☐ Yes, I am aware of watershed planning in the Tenmile Creek watershed, and *I am* currently involved.

3. If you are involved in watershed planning in the Tenmile Creek watershed, how are you involved?

Watershed Management

4. In your opinion, what does successful watershed management look like?

5. In your opinion, what resources are needed for successful watershed management implementation?

Watershed Communication

6. In your opinion, what are ***key elements*** of successful watershed outreach and communication?

7. In your opinion, what ***resources*** are necessary for successful watershed outreach and communication?

8. From whom do you receive information about watershed management in the Tenmile Creek watershed? (check all that apply)

- ☐ Extension agent
- ☐ NRCS (Natural Resources Conservation Service)
- ☐ Social media (Facebook, Twitter...)
- ☐ Tribal Resources
- ☐ WA Department of Ecology
- ☐ Whatcom Conservation District
- ☐ Your crop advisor
- ☐ Your peers
- ☐ Other: _____

9. Please indicate how you prefer to receive information about watershed management in the Tenmile Creek watershed (check all that apply):

- ☐ Email
- ☐ Letter
- ☐ Newspaper
- ☐ Personal conversation
- ☐ Phone call
- ☐ Public meeting
- ☐ Website
- ☐ Other: _____

Please feel free to let us know any other thoughts or comments you may have about watershed planning, management or communication below.

If you have any questions or concerns regarding this survey or the upcoming forum, please contact Linda Prokopy at (765) 496-0260 or LProkopy@purdue.edu

Watershed Management Forum
Your Views on Watershed Management and Communication

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Appendix B: Watershed Priorities - Detailed Methods

Development

The NRSS lab developed 36 priority statements to represent a wide range of watershed priorities for this watershed priority activity. Statement development was informed by two data sources, including: 1) current literature about successful watershed management and 2) input from stakeholders in a different NWQI watershed.

Researchers reviewed content that addressed successful planning, design, marketing, and delivery of watershed initiatives. To gather information from watershed stakeholders, researchers incorporated voices of watershed stakeholders in the different watershed by adapting survey responses to the question, "What does successful watershed management look like?" (see Appendix A for more detail). Each statement was assigned one of 11 priority categories, based on the subject of the priority (Table B-1).

Table B-1. Priority statements and associated categories

PN	Priority	Priority Category
1	Landowners/producers should know what best management practices are and why they should be used.	Knowledge/Education
2	Addressing concerns of local watershed stakeholders should be the highest priority for resource managers.	Stakeholder Concerns
3	Technical and/or financial assistance for those who qualify is necessary.	Assistance
4	A watershed plan is necessary.	Watershed Planning
5	Land and water should have species diversity.	Biological Integrity
6	Management should be done at a small geographic scale.	Geographic Scale
7	Students (elementary through college) should understand the importance of soil and water conservation.	Knowledge/Education
8	Conservation practices should be adopted on more acres.	Assistance
9	Only local organizations should be involved.	Agency Collaboration
10	No stakeholders' livelihoods should be jeopardized due to watershed management activities.	Stakeholder Concerns
11	Watershed managers should actively engage with the community.	Outreach
12	The public needs to understand how a healthy and balanced watershed can benefit them.	Knowledge/Education
13	Funding should be budgeted specifically for outreach and communication.	Outreach
14	Watershed information should be communicated using diverse methods and reach a broad public audience.	Communication
15	A strong working relationship between producers/landowners and watershed managers is important.	Outreach
16	One-on-one interactions between resource managers and producers/landowners is necessary.	Outreach
17	Watershed stakeholders need to understand the sources of water resource issues.	Knowledge/Education
18	The watershed planning process should include diverse groups of people working towards a common goal.	Inclusion
19	A management plan should support activities that include recreation, economic and environmental benefits.	Watershed Planning
20	Communicating about soil health is more effective than communicating about water quality.	Communication
21	Water monitoring is necessary.	Biological Integrity
22	Achievable water quality goals and targets should be set to show water quality improvements.	Biological Integrity
23	The public should be aware of the range of resource issues associated with their watershed.	Knowledge/Education
24	A clear plan for public involvement/engagement should be included in a watershed management plan.	Watershed Planning
25	Watershed managers should seek out and respect local knowledge, perspective, and experience.	Outreach
26	There should be a flexible plan that allows for changes in management over time.	Watershed Planning
27	Negative effects of watershed management on downstream stakeholders should be minimized.	Stakeholder Concerns
28	Resources and information between local, regional, state, and federal agencies should be coordinated.	Agency Collaboration
29	Watershed managers should focus on water quality issues over water quantity issues.	Biological Integrity
30	The watershed should have a user-friendly website that contains watershed information.	Communication
31	Watershed management should benefit my community and communities downstream of my watershed.	Stakeholder Concerns
32	Watershed management should include an evaluation of the impact of climate change on future quality and quantity in my watershed.	Watershed Planning
33	Community members should take an active role in watershed management.	Inclusion
34	Measurably cleaner water should be an outcome.	Biological Integrity
35	Producers/landowners/businesses should be required to adopt best management practices.	Regulation
36	The watershed needs to be in an impaired or degraded state.	Biological Integrity

Data Collection

Upon arrival to the forum, NRSS facilitators explained the watershed priority activity and provided participants with additional written instructions (Figure B-1), 36 priority statement cards, a datasheet (Figure B-2), and a list of all 36 priorities for reference. The activity included three stages: 1) ranking, 2) open discussion, and 3) group discussion. Each stage is described below:

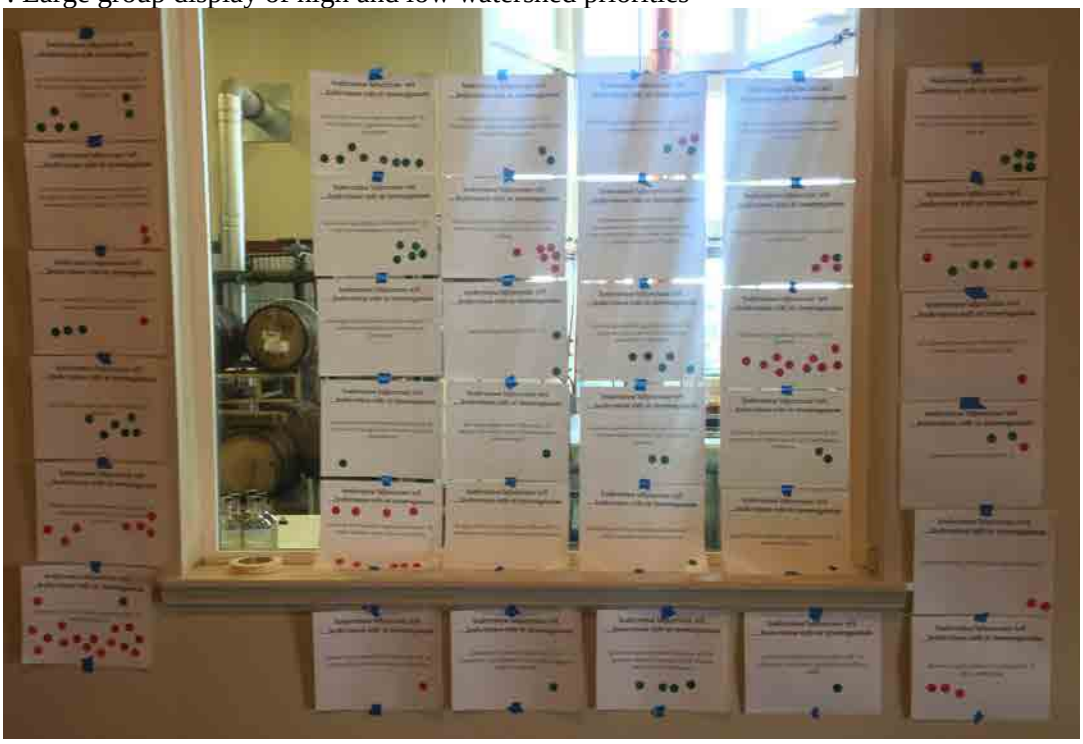
Stage 1: Priority ranking

Facilitators instructed participants to read and rank each priority according to how much they believed each statement was necessary for successful watershed management. Each priority statement included the phrase "For successful watershed management in this watershed…" and was then followed by one of the 36 priorities (e.g., "For successful watershed management in this watershed…a watershed plan is necessary"). Participants were given approximately 20 minutes to record their ranked priorities onto the datasheet. Participants ranked priorities on their data sheet by level of agreement with each priority (most disagree = -5 to most agree = 5). Facilitators were available to answer questions as needed.

Stage 2: Open discussion

Each of the 36 priorities were printed on an 8½ x 11 sheet of paper and displayed at the front of the room. After completing stage 1, participants were provided three green stickers and three red stickers, then asked to place green stickers on their top three priorities and red stickers on their lowest three priorities. As participants placed green and red stickers on the large priorities, similarities and differences of stakeholders' ranked priorities were visually displayed (Figure B-1). To initiate the open group discussion, the lead facilitator asked volunteers to share their top priority and explain their rationale to the group. After approximately 10 minutes of open discussion, participants moved into preassigned small groups.

Figure 7. Large group display of high and low watershed priorities



This photo displays high (green stickers) and low (red stickers) priorities and was used to visually display broad agreement and disagreement amongst forum participants and facilitated the open group discussion

Stage 3: Small group discussion

Small groups were predetermined by the research team to ensure diversity of stakeholder types in each group. Each group included seven to nine forum participants, a group facilitator (NRSS), and a note taker (WaterComm). For approximately 45 minutes, participants shared their high and low ranked priorities, then discussed rationale for their priority rankings.

At the conclusion of the small group discussion, the NRSS research team collected datasheets from each participant and input them into PQMethod software (v. 2.35) at a later date. Large and small group discussions were recorded and transcribed by TranscribeMe, an audio transcription service.

Analysis

Only completed priority ranking datasheets were included in analysis. Completed datasheets were defined as sheets with all 36 priorities ranked and only ranked once.

Family Selection

An NRSS researcher conducted a factor analysis using principal component method with Varimax rotation in the PQMethod software (v. 2.35) to identify similarities between participants' priority rankings. The NRSS researcher used the following criteria to identify priority families (i.e., factor groups).

- Eigenvalue >1 (according to the Kaiser criterion)
- Participants in each family ≥ 3

The PQMethod software then created a priority framework for each factor selected by the NRSS researcher. Each priority framework included the following:

  - Priority value (PV): Value assigned to each watershed priority based on priority rankings within each priority family. These values reflect the participants' attitude in that family toward each priority. PVs range from -5, indicating a low priority, to 5, indicating a high priority.
  - Distinguishing priorities (DP): Uniquely ranked priorities from each priority framework. These priorities highlight distinct viewpoints that differentiate the priority families from each other.
  - Consensus priorities (CP): Similarly ranked statements in all priority frameworks. These statements highlight broad agreement across all priority families.

Narrative Development

The NRSS researcher reviewed each priority framework and identified relevant DPs from each priority framework. If PQMethod identified a DP that was not a high (PV ≥3) or low priority (PV≤-3), the PV was compared across all priority families.

Additional DPs incorporated into priority narratives include:

- DPs identified in only one priority family,
- Only DPs with the highest and lowest PVs, if identified in all priority families,
- Only when the absolute value of PVs was ≥3 compared to other priority families.

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Figure B-1 Watershed priorities instruction sheet

Tenmile Creek Watershed Management Forum

Session One: What is Successful Watershed Management?

In this activity you will be asked to sort 36 cards in order of your agreement with each statement. Each card contains a statement from forum participants and current literature that describes necessary elements for successful watershed management. This activity should take approximately 30 minutes.

1. Read each of the 36 statement cards and consider to what extent you agree or disagree with the statement.

2. Organize the statement cards into 3 piles based on whether you agree, feel neutral or disagree with the statement.

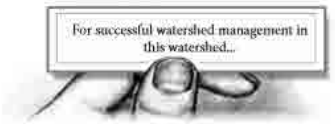
3. Examine the score sheet on the opposite page. Notice there are 36 boxes in 11 columns ranging from *Most Disagree* in column -5 to *Most Agree* in column 5. When complete, you will have sorted your statements into columns that exactly match those on the score sheet.

4. Re-read each statement in your "agree" pile and decide which 1 statement you most strongly agree with.

5. On the score sheet, write the number associated with your chosen statement in the furthest right column, labeled "Most Agree".

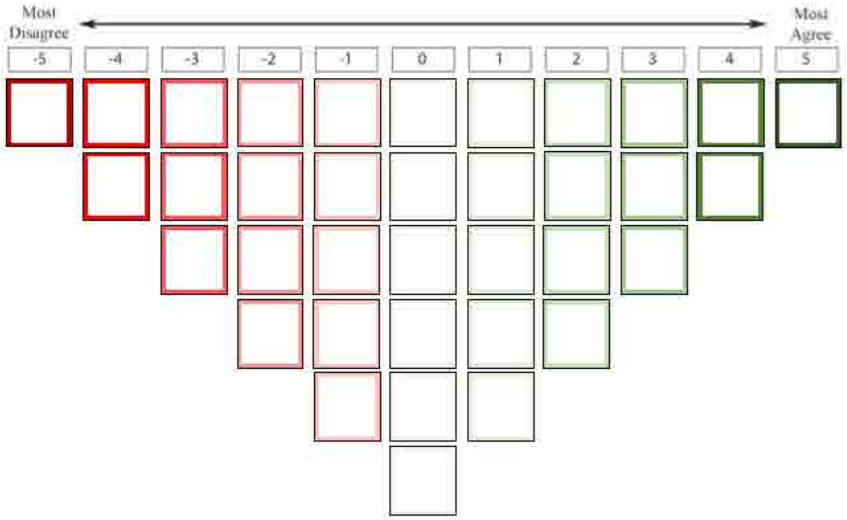
6. Continue ranking the remaining statements and transcribe the numbers on the blue score sheet.

Figure B-2. Watershed priority datasheet



The number on the statement card is the number you will write on the score sheet below.

Score Sheet



Once you have finalized your ranking, please fill out the questions on the back on the score sheet.

1. Please indicate your primary role in the Tenmile Creek watershed (check one):

- ☐ Community member
- ☐ Conservation District staff
- ☐ Local government staff
- ☐ Natural Resources Conservation Service staff (NRCS)
- ☐ Non-governmental organization staff
- ☐ Producer or landowner
- ☐ Research scientist
- ☐ Tribal member
- ☐ Other: _____

2. If applicable, please list any conservation practices you currently use on your property:

3. Years of experience with watershed management: .....

4. How many years have you lived in the Tenmile Creek watershed? .....

5. In what year were you born? .....

6. What is your gender? .....

Thank you for your time and participation.
Please write down any additional comments below:

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Appendix C: Facilitator's Guide

Activity 1: Identify Watershed Priorities

We will start with a full group activity and discussion. About half an hour before lunch, we will break into small groups. Probing questions to ask in the small groups. Note: some of these may already have been discussed in the open group:

- What is the role of planning in watershed management? Specifically, what is the role of the plan in this watershed?
- What is the best role for NRCS in small watersheds?
- What is the ideal scale for watershed management? (HUC 12, bigger?)
- What is success in watershed management? How can this be measured?
- What elements of successful watershed management were missing from the statements you sorted?

Activity 2: Identify Resource Needs

Lead facilitator will provide the directions for the activity.

- When people bring their post-it notes to your wall, ask them to arrange them with other similar post-its.
- Group the post-its and create labels for the categories.

Ask:

- Does everyone agree that these are necessary categories of resources?
- What resources are missing?
- Which resources are most important?

Activity 3: Identify elements of successful outreach and education

Facilitate a small group discussion using the following questions:

- Who should deliver education and outreach? Who are trusted partners?
- What should education and outreach look like?
- When should it happen?
- What is the role for NRCS in this?

In last 10 minutes

Ask the group to select the top 3 things they want to share with the entire group

Appendix D: Interview Guide

1. What is your role in EPA/ECY?
2. What role does EPA/ECY play in NWQI?
3. What role does EPA/ECY play in the Tenmile watershed?
4. What resources does EPA/ECY contribute to NWQI?
5. What resources does NRCS contribute?
    a. Is anything missing? If so, what additional resources would you like NRCS to contribute?
6. Does NWQI impact interagency collaboration?
7. What is the biggest challenge working with NWQI?
8. What makes NWQI a unique program?
9. What is successful watershed management and what resources are needed to achieve it?
10. What are key elements to a successful watershed outreach/communication plan and what resources are needed to achieve it?