A Manual for Water Resource Protection

Inspiring Action

for

Nonpoint Source Pollution Control

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Summary

Inspiring Action for Nonpoint Source Pollution Control: A Manual for Water Resource Protection

Most water resource professionals agree that while point source pollution control has been reasonably successful, nonpoint source (NPS) pollution control lags significantly behind. In fact, the U.S. Environmental Protection Agency estimates that at the historic funding rates, it will take longer than 1,000 years to restore all the water bodies currently impaired by NPS pollution. The authors of *Inspiring Action for Nonpoint Source Pollution Control: A Manual for Water Resource Protection* argue that much of the shortcoming stems from trying to use a similar approach to manage NPS and point source pollution. NPS pollution control is considerably more complex, involving social systems in addition to biophysical and hydrological systems. With NPS pollution control, being locally relevant, engaging local community members, building strong relationships and enduring partnerships, and learning and adapting quickly are just as important as technical rigor, financial assistance, and other more conventional tools. The authors contend that NPS control will be much more successful if resource professionals employ "systems" thinking instead of "reductive" thinking and concentrate on building individual and community capacity for sustainable water management, rather than relying on scientific and technological "fixes." In this manual, the authors make the case for a different approach and present a framework for building community norms, capacity, and conservation momentum. They also present practical examples and tips from their experience developing a robust NPS pollution control program in Scott County, Minnesota.

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Introduction

Reframing the Nonpoint Source Pollution Problem

Water systems traditionally have been viewed as being separate from social systems. As a result, water decisions have involved engineers and technical water experts while largely ignoring the worldviews of land users.

The best engineering and technology, the best biophysical and geochemical sciences alone cannot achieve clean water goals. Clean water depends on people, communities, and society putting science, technology, and engineering into practice. The missing piece of the nonpoint source pollution (NPS) puzzle is not identifying what to do but discovering how to do it.

In this manual, we consider a reframing of water problems as social problems and a "rehumanizing" of water planning and policy with strategies focused less on mechanical innovation and more on community engagement, relationship building, and building momentum from the bottom up.

In Minnesota about 40% of water bodies have been listed as impaired, and NPS pollution is the chief contributor, responsible for more than 85% of the state's impairments.

Nonpoint Source (NPS) Pollution Control Today

Most resource professionals agree that while point source (i.e., single-source "end-of-pipe") pollution control has been reasonably successful in Minnesota, nonpoint source (NPS) pollution control lags significantly behind. Monitoring data support this notion. In Minnesota, about 40% of water bodies have been listed as impaired (Minnesota Pollution Control Agency, Minnesota's Impaired Waters List, 2017), and NPS pollution is the chief contributor, responsible for more than 85% of the state's impairments.

For better and for worse, the quality of the water that collects in Minnesota's low-lying areas—its lakes and rivers—is determined by actions taken on the upland. The battle for clean water is won or lost through the day-to-day decisions of millions of land users, the public, private, and corporate entities whose actions can contribute to NPS pollution or help to prevent or reduce it.

Few of these decisions are regulated today, and for a multitude of factors ranging from the practical to the political, the notion that regulation would be the panacea for NPS pollution control is at best misguided. We acknowledge that not all problems will be solved by relying purely on the willingness of land users to "do the right thing," but we also submit that significantly greater gains in NPS pollution control could be achieved if this work were approached differently. (See more about the difference between point source and NPS pollution in Appendix D.)

The issue of point source pollution traditionally has been approached with a reductive thinking model that breaks problems into a few discrete elements and studies them in relative isolation. This approach has been fairly successful in producing answers to simple, well-defined, and bounded problems. It has not, however, yielded desired outcomes when applied to NPS pollution control.

Given the enormous scale of the problem and its impact across many watersheds, we contend that NPS pollution control is a significant undertaking that requires a different model—a "systems thinking" approach. This approach involves observation of NPS pollution problems as the consequence of an interconnected and dynamic collection of biophysical, human, social, and institutional elements

Given the enormous scale of the problem and its impact across many watersheds, we contend that NPS pollution control is a significant undertaking that requires a different model—a "systems thinking" approach.

and forces. It requires an assessment of the structure (e.g., agricultural markets, crop insurance programs, farm size, incentive programs) and behavior (e.g., risk management, cultural norms of conservation) of social and hydrologic systems and how these systems interact.

Though the desired outcomes for NPS pollution control may be individual behavior change, a systems thinking approach acknowledges the power of interactive elements and combined forces that inspire behavior change—what we refer to as conservation momentum. If the number of individual actions grows, and if these actions are connected and synchronized, then singular events come together to produce collective action or social change. The resulting momentum can be directed toward targeting specific problems and achieving system-wide solutions.

Because the social and ecological systems affecting NPS pollution management are complex, the task of working with them can initially seem daunting. However, Davenport and Seekamp (2013) developed a Multilevel Community Capacity Model for sustainable watershed management that provides a framework for assessing social systems and determining solutions using a systems approach. The model describes core capacity components for community members, social networks, organizations, and programs to achieve sustainable watershed management.

In the Minnesota River watershed, less than 20% of the watershed remains covered by perennial vegetation. Monumental changes are needed.

The Authors' Goal

Our goal in creating this manual is to help improve the overall effectiveness of NPS pollution control efforts and to establish what we believe to be the primary techniques for on-the-ground implementation, including building on success, developing positive relationships, and reinforcing feedback loops.

We believe that this approach enables water resource professionals and community leaders to move forward and make decisions, even when a complete understanding of problems and solutions is lacking. We observe that inspiring collective action is just as important as targeting singular problems. We also emphasize that inspiring collective action is just as important to successful NPS pollution control as using precision conservation to target specific locations.

Water resource professionals have been tasked with making public waters fishable and swimmable, but they face a steep challenge in getting a broad swath of society to do the "right thing" with respect to the land. With this manual we offer guidance to local water resource professionals and related practitioners as they navigate the complexities of and interactions between social and hydrologic systems in NPS pollution control efforts.

Through both research and anecdotal evidence from our own experiences, we're presenting an alternative approach to NPS pollution control. Over the past decade, this approach has driven implementation of more than 700 conservation practices and played a central role in allowing several water bodies to be removed from the Impaired Waters List for Scott County, Minnesota.

Our goal in creating this manual is to help improve the overall effectiveness of NPS control efforts and to establish what we believe to be the primary techniques for on-the-ground implementation, including building on success, developing positive relationships, and reinforcing feedback loops.

Delving Into the Issue

The manual consists of eight chapters. The first six chapters present a systematic framework and approach suggested by the authors.

Chapter 1 delves into the need for a new approach to NPS pollution control. Chapter 2 takes the concept of systems thinking, which is introduced in Chapter 1 as an alternative to the reductive thinking typically used to address point source pollution, and explores it in further detail.

Chapter 3 moves into the practical aspects of employing a systems-thinking approach to NPS pollution control, starting with understanding local communities. Chapter 4 builds on this idea with insights on how to engage meaningfully with community members. Chapter 5 brings these ideas together with a focus on building strong relationships and enduring partnerships.

In Chapter 6 we discuss the importance of staying focused by realizing that change takes time and by building programmatic capacity, and we offer advice on how to maintain or improve the organization's success through continued learning and adaptation.

Chapter 7 presents the contributions of the water resource professionals and practitioners interviewed for this project. The chapter includes some of their thoughts on the concept and originally proposed content of the manual, as well as their own success stories or lessons learned with respect to inspiring action for NPS pollution control.

Chapter 8 summarizes the changes needed to embrace a different approach, provides tips for getting started and maintaining momentum, and offers some parting thoughts regarding further improvement.

The Authors' Backgrounds and Perspectives

Authors Paul Nelson and Troy Kuphal offer examples and experiences drawn from the efforts of Scott County, Scott Soil and Water Conservation District (SWCD), and Scott Watershed Management organization (WMO)—the Scott local partners. Author Mae Davenport provides a science-based perspective on human behavior and community capacity to engage in watershed management inspired by social science theory and applied research she and colleagues have conducted at the University of Minnesota. Full biographies of the authors and further information about the Scott local partners are located at the end of the manual.

The manual draws upon decades of engagement in conservation management and years of applied research on conservation behavior. Its guiding principles for inspiring conservation action not only are backed by the latest social science, but also have been field-tested in Minnesota. Conservation resource professionals will find the statistics, stories, and strategies presented useful in project design and evaluation, as well as for leveraging support for conservation programming. The manual describes a new approach for water resource protection informed by systems thinking and a model of community capacity. It then offers real-world examples and success stories based on the authors' ongoing work in Minnesota.

Can NPS Pollution Control Be Successful?

Factors including difficulty of management, variability, land user complexity and geographic setting present nontrivial obstacles to addressing NPS pollution. Nevertheless, there have been some notable water quality successes.

The United States Environmental Protection Agency (USEPA) web page contains hundreds of success stories related to NPS control. Closer to home, information presented in the Minnesota Nonpoint Source Management Plan (Minnesota Pollution Control Agency, 2013) shows that pollutant trends at 80 Milestone stream monitoring sites for a number of water quality parameters (i.e., biochemical oxygen demand, total suspended solids, total phosphorus, unionized ammonia, and fecal coliform bacteria) are largely decreasing or "no trend" (i.e., stable). The exception is nitrates, for which increasing trends are documented at 75% of the sites. Of the 822 of lakes assessed for trends, 246 are improving, 530 were reported as stable, and only 46 are reported as degrading in quality.

It is difficult to tell whether the trends, or lack thereof, are caused by point source or NPS control efforts. Phosphorus reductions in streams and rivers are likely the result of phosphorus removal being recently added at wastewater treatment plants. However, some of the total phosphorus improvement, particularly for lakes, has been the result of NPS control efforts with an intentional focus on phosphorus. In Minnesota over the past 20 years, the state's strong focus, both point and nonpoint, on reducing phosphorus stems from its lake heritage and understanding that cultural eutrophication in freshwater systems is linked to phosphorus.

NPS pollution control efforts are significant contributors to the observed sediment and total suspended solids (TSS) reductions. The Natural Resource Conservation Service (NRCS) and Soil and Water Conservation Districts (SWCDs) have focused largely on controlling erosion and sediment for 75 years, and success in controlling field erosion is reported in research (Belmont, et al., 2011). However, the story on sediment and TSS is about more than field erosion; research links cropping patterns and drainage to increasing erosion and sediment rates from non-field erosion (Schottler et al., 2013).

Non-field erosion stems from streambanks and ravines eroding at accelerated rates as they adjust to increased runoff from changing precipitation levels, changing cropping patterns, and improved drainage efficiencies. The case of non-field erosion illustrates how one area can be affected by larger system changes, and it highlights the need for thinking more broadly. Solutions need to address not just field erosion, but also hydrology and aquatic habitat. Degraded habitat, which is not a pollutant, can also be a factor impairing fish and aquatic organisms.

The disturbing nitrate/nitrite trends present a similar story of a lack of focus and unintended consequences. Resource professionals only recently started to think about nitrates, as most of their attention was focused on phosphorus and unionized ammonia. To reduce un-ionized ammonia, regulatory agencies made point source dischargers put nitrification in their treatment process, converting ammonia to nitrate.

In short, there is evidence that intentional efforts can be successful, but it is important that resource professionals also be aware of the larger system.

The Credit River watershed and its story (see the EPA case study in Appendix E) of being removed from the impaired waters list is an example of capital projects, the market, regulation, and technical and financial assistance combining for a water quality success.

- Capital projects stabilized several severely eroding ravines.
- The market for urban and rural residential housing led to more perennial cover.
- Regulation of development mitigated the land use change.
- Technical and financial assistance enabled landowners to embrace conservation.

TSS concentrations in the river decreased by 60% over the past 20 years, even though this area of Scott County was among the fastest growing areas in the country (Metropolitan Council 2015).

Chapter 1

Why a Different Approach to NPS Pollution Control Is Needed

NPS pollution control requires a different overall approach than that used to address point source pollution. The need for a new approach is clear, given the failure of conventional approaches to achieve desired outcomes or to adequately address the scale and scope of NPS pollution.

From Fixing Problems to Building Capacity

Reduction of point source pollution has been successful in part because the problem is more easily identified, the methods and responsible agents addressing it are more organized, and the outcomes are more predictable and permanent than for NPS pollution control efforts. Point source pollution control also has had significantly more resources dedicated to it than has NPS. Still, NPS pollution control has seen substantial investments by federal, state, and local agencies, and we have observed a growing impatience for more meaningful return on investment.

We, the authors, contend that much of the difference in results between point source and NPS pollution control efforts stems from trying to approach them in much the same way. Efforts to control point sources are widely accepted as successful. We believe that NPS pollution control can share similar success by relying less on reductive thinking, which has worked well for point sources, and more on systems thinking. In practice this means understanding NPS pollution more as a social problem than a technological one.

We all know water quality is a direct reflection of the values and behaviors of hundreds or even thousands of land users—by which we mean both landowners and renters—within a watershed. More planning, prioritizing, targeting, and measuring of technological "fixes" from the top down without building capacity for sustainable water management from the bottom up is doomed or may have only modest success at best. To borrow the old proverb, "Give a person a fish, and that person eats for a day; teach a person to fish, and that person eats for a lifetime."

Millions of dollars can be invested over decades into traditional approaches, but if, in the end, land users aren't motivated or empowered to make sustained, conservation-minded choices in their day-to-day lives or businesses, any gains will be small and short-lived.

A new treatment plant that serves hundreds or thousands of people works perfectly for point source pollution control. With proper maintenance and operation by a few trained professionals, it functions reliably for decades, and the cost benefit works well. There is no equivalent scenario with NPS pollution control.

Ultimately, the values and behaviors of communities and their individual members will determine whether NPS goals are achieved. We have the resources and ability to help them; what we don't have is enough time or resources to do it for them. Back to the proverb! Each dollar spent on NPS pollution control should have the equivalent impact of teaching a person how to fish—or, in this case, a community how to manage water.

Point source versus NPS: Complicated and complex systems

Point source pollution control is fairly predictable and repeatable. It is a complicated system. NPS pollution control, on the other hand, is variable, with similar efforts producing different results in different watersheds. It is a complex system. Success with complex systems—including NPS pollution

VOLUNTARY NPS POLLUTION CONTROL

Any action taken to reduce NPS pollution that is not compulsory, whether by law or threat thereof.

It includes actions by individuals, social groups, businesses, non-government organizations, or units of government.

It also encompasses actions enabled through financial incentives and technical assistance.

LAND USER

Any landowner, or a farmer or tenant who rents the land

Table 1
Simple, Complicated, and Complex Problems
(adapted from *Getting to Maybe: How the World Is Changed* by Westley, Zimmerman, & Patton, 2007)

Simple	Complicated	Complex
~~**Baking a cake**~~ ***Maintaining a vegetated buffer***	~~**Sending a rocket to the moon**~~ ***Building a wastewater treatment plant***	~~**Raising a child**~~ ***Managing nonpoint source pollution***
The recipe is essential	Rigid protocols or formulas needed	Rigid protocols have a limited application or are counterproductive
Recipes are tested to ensure easy replication	~~Sending one rocket~~ ***Building one treatment plant*** increases the likelihood that the next will also be a success	~~Raising one child~~ ***Watershed management*** in one community provides experience but is no guarantee of success with the next
No particular expertise is required, but experience increases success rate	High levels of expertise and training in a variety of fields are necessary for success	Expertise helps but only when balanced with responsiveness to the particular ~~child~~ ***watershed***
A good recipe produces nearly the same ~~cake~~ ***buffer*** result every time	Key elements of each ~~rocket~~ ***treatment plant*** MUST be identical to succeed	Every ~~child~~ ***watershed*** is unique and must be understood as ~~an individual~~ ***a distinct watershed***
The best recipes give good results every time	There is a high degree of certainty of outcome	Uncertainty of outcome remains
A good recipe notes the quantity and nature of the "parts" needed and specifies the order in which to combine them, but there is room for experimentation	Success depends on a blueprint that directs both the development of separate parts and specifies the exact relationship in which to assemble them	Can't separate the parts from the whole: Essence exists in the relationship between different people, difference experiences, different moments in time

Analogies presented by Westley and others (Table 1) can be extended to show that there is no single best way to manage complex systems such as NPS pollution.

control—is elusive when those systems are managed as if they are complicated systems. Complexity theory, however, does provide some hope. Westley, Zimmerman, and Patton (2007) state that complex systems are generally governed by only a few rules (Table 1). If these rules can be understood, complex systems can be successfully managed.

Point source pollution control is successful in part because it's a complicated system for which reductive thinking—breaking things down into a few individual elements and studying them—can lead to discrete, repeatable answers to well-defined problems. Influenced by complex social and ecological phenomena, nonpoint sources cannot be fully understood through the study of singular events.

Going Beyond Traditional Approaches to NPS Pollution Control

Resource professionals traditionally have relied upon five tools for NPS pollution control:

1. Providing technical and financial assistance to help land users change behaviors and implement practices
2. Encouraging and informing behavior change and adoption of practices through education and communication programs
3. Building capital projects to collect and treat NPS runoff, or stabilize streambanks
4. Enacting regulation to coerce behavior change and practice implementation
5. Taking advantage of market forces through personal buying choices, creating incentive programs or lobbying to promote alternative crops

The five traditional approaches to NPS pollution control are not mutually exclusive. Each has its strengths and weaknesses.

We want to start a conversation about working with all five more effectively.

Contribute to the conversation at the Freshwater Society: www.freshwater.org/inspiring-action/

While these conventional methods have their merits and remain useful, we believe they are an artifact of reductive thinking, or looking for the "right answer," which has been reasonably successful for controlling point source pollution but inadequate for NPS pollution control. Resource professionals working in the field need a comprehensive approach that goes beyond these methods to achieve the level of change needed.

The approach that we put forward in this manual is based on our experience, which utilizes the first four of the aforementioned methods. That said, we believe that an intentional systems thinking approach that builds community capacity across all five tools is essential, given the scale of change needed to address NPS pollution impairments successfully.

We propose that these methods should be considered together as part of an overall system rather than individually. The complex nature of NPS pollution requires an intentional systems-thinking approach, whether the method used is regulatory, voluntary, market, or a mix of methods.

A review of each method, as well as its strengths and weaknesses, makes it clear that the methods must be coordinated and considered within a more holistic understanding of individual and community capacity to reduce NPS pollution.

Tool 1: Provide technical and financial assistance

The traditional NPS pollution control method used by the Natural Resources Conservation Service (NRCS) and Soil and Water Conservation Districts (SWCDs) is the provision of technical and financial assistance. These organizations have some capacity to deliver programs locally and without the regulatory ties that tend to put off land users. Working at the field scale and with individual land users, such agencies can promote diverse solutions and practices that are custom-fit to small-scale problems.

Despite the benefits of financial and technical assistance, this is a voluntary method of NPS pollution control, and not all land users will participate. Lack of participation can make it difficult for a watershed to reach the cumulative volume of practices needed to create a measurable change.

Lack of focus also can be a problem for voluntary approaches. Without targeting and outreach, agencies often must react to land user interests and needs rather than be proactive in addressing resource needs. Because most land users need to believe that their voluntary effort and investment will make a difference, an outreach effort can be vital to the success of this method.

Tool 2: Encourage and inform

Informing and educating people does not necessarily lead to behavior change. On the other hand, failing to keep people informed can be problematic for a program or capital project. To be effective, messaging needs to be strategically developed and relevant to the targeted audience. Fortunately, a great deal of recent research focuses on land user values and motivations. (We'll delve further into this research in Chapter 3.)

By providing encouragement and information to land users, agencies can foster a sense of accomplishment in support of voluntary action, or promote regulatory acceptance. We know from both surveys and research that land users are open to conservation on their land, but they don't always know how to get started or don't feel they have the ability to implement conservation. This highlights the need for technical assistance to complement outreach efforts. Educating or encouraging land users to act doesn't mean that they also have the ability to design, survey, and construct conservation practices.

Tool 3: Building capital projects

The Scott WMO typically completes one or two capital projects per year to benefit water quality. Such projects are attractive because they can be very focused, treating a considerable amount of runoff all in one place, stabilizing a great deal of erosion from bluffs or ravines, or inactivating hundreds to thousands of pounds of legacy phosphorus in lake sediments. Cost estimates and the degree of

Before (above) and after images from the Picha Creek Channel Restoration capital project in Scott County. Photos: Inter-Fluve

pollutant removal indicate that these are frequently the Scott WMO's most efficient projects with respect to cost-per-pound of pollutant removed. At the same time, however, they require extensive planning and engineering, more cash up front, and ongoing maintenance.

Capital projects are not always viable; they may be too costly, impractical, or simply not feasible. Our experience is that for every water quality capital project completed, another potential project either was not found feasible or was not capable of delivering benefits that would justify the cost.

Capital projects are far easier to complete on public land than on private land, as working with increasing numbers of land users makes the task of permissions exponentially more difficult. Though land can be acquired, this expense can add significantly to the overall project cost.

Finally, though it makes sense to undertake capital projects for treating runoff in areas where water congregates and collects, these very locations tend to be public waters or wetlands that are prohibited from being used as treatment facilities. The bottom line is that capital projects are valuable, but all the other methods of NPS pollution control will be needed, as well.

Tool 4: Regulation

The recently passed buffer requirements in Minnesota are an example of a regulation on land use activities that is understandable, measurable, and enforceable. Although additional regulation could be put in place to reduce NPS pollution, a number of factors complicate this approach. Perhaps most apparent is that agriculture currently is largely exempt from regulation under the Clean Water Act. This simple fact alone means that the other methods of NPS pollution control are a must.

The diffuse nature of NPS pollution also makes a regulatory approach difficult. Millions of permits or compliance points would be needed. The complexity of identifying issues and their sources also makes regulation challenging. In many cases the NPS pollution source, such as stream-bank erosion, is caused by upstream actions rather than by the owner of the land on which the erosion is occurring. In addition to creating site-specific issues of fairness, this method can lead to negative social outcomes.

When farmers are compelled by threats of civil penalties, compliance will—for the most part—be achieved, but little more will be accomplished. Unintended consequences can include increased contempt and perhaps even aversion towards resource protection. Land users may be less willing to do more than the minimum. At this point, the opportunity to guide individual and community values towards environmental stewardship, bound by a sense of common ownership and sustained responsibility, can be greatly diminished.

When the basis of behavioral change is dependence on the authority of government rather than on relationships and trust, there is little ownership or acceptance by the land user. Moreover, sustaining desired behaviors and outcomes becomes a constant struggle requiring endless inputs of time, energy and resources. The same holds true for a community that has been compelled to improve its environmental stewardship without first realizing a sense of ownership or responsibility for it.

Tool 5: Take Advantage of Market Forces

Market-based solutions that promote alternative cropping patterns, greater crop diversity, and especially perennial crops need to be part of the NPS pollution control solution. This method is supported by the Minnesota River Basin data (Table 7, Appendix D), which shows the large landscape-wide changes needed to meet water quality goals.

Economically driven behavioral changes can have their own momentum and will likely be sustained as long as the change is profitable. The old adage that "it's all about money" has quite a bit of truth to it. Right now, corn and beans have a lot of traction, and there is nothing on the immediate horizon to change that. Surveys show that though many farmers would like to grow other crops, they don't feel as if they have much of a choice.

> USEPA estimates that at the historic funding levels and water body restoration rates, it would take longer than 1,000 years to restore all the water bodies that are now impaired by NPS pollution.
>
> (United States Government Accountability Office, 2013)

The good news is that universities and seed companies are continually working on alternative crops, and there is increasing interest by producers in using cover crops to improve the health and productivity of soils. There is also ever-growing demand for organic produce.

For example, the 2014 U.S. Department of Agriculture Organic Survey found that an additional 51,000 acres of land have been converted to organic production since 2008 (Young, 2015). While organic production does not necessarily equate to NPS pollution control, it does reflect individual and community values and concerns for environmental quality. Despite these positive advances, other approaches to NPS pollution control are essential. Intentional efforts will be needed to strategically accelerate this method for water quality purposes versus just letting it develop where markets direct.

Water quality improvements to the Credit River in Scott County are another example of taking advantage of a market-based change. Over the past 20 years, the Credit River watershed converted from rural and agriculture to urban uses. This change, in combination with water quality-related development standards, enabled an improvement. This option, however, is not available in other watersheds where the market is not driving a land use change.

Imagine a perennial grain crop with a market demand – say, perennial wheat. After all, wheat is a grass, and many grasses are perennials.

Well, it's in the works!

The University of Minnesota has a perennial grains project and breeders working on intermediate wheat grass. It's a cool-season grass with good winter hardiness and a grain size that is currently about a quarter to a third of domesticated wheat.

(Willette, 2015)

What an Intentional Systems-Thinking Approach Means

NPS pollution problems are the consequence of an interconnected and dynamic collection of biophysical, human, social, and institutional elements and forces. Thus, we contend that a "systems thinking" approach is more appropriate for NPS pollution control.

We submit that NPS pollution control programs are successful when they:

1. Apply systems thinking
2. Are locally relevant
3. Engage local community members
4. Build strong relationships and enduring partnerships
5. Stay focused, learn, and adapt

Taylor, et al. (2012), in *Empowerment on an Unstable Planet: From Seeds of Human Energy to a Scale of Global Change*, argue that the focus of societal intervention efforts should be on behavior change. They write, "Intuitively, we know that behavior change is central; nothing happens unless someone does it …. Societies are grand conglomerations of behaviors; thus social change is first and foremost behavior change" (p. 106).

We agree that our foremost outcome with respect to embracing and implementing conservation is individual behavior change. Though the desired outcomes of NPS pollution control may be individual behavior change, a systems-thinking approach acknowledges the power of interactive and collective forces that inspire behavior change—what we refer to as conservation momentum.

If these actions are connected and synchronized, individual changes come together to produce collective action or social change. The resulting momentum can then be directed toward specific problems and system-wide solutions. If accompanied with capacity building, not only are the immediate changes we seek going to be more permanent, but individuals and communities will be empowered to create and expand positive changes on their own over the long term. Maintaining water quality is not just a five- or 10-year proposition. Whether it is for a single project or a change in behavior, the change must ultimately be self-directed, accepted, and endure indefinitely. In other words, it must be sustainable.

The importance of momentum has been recognized for building business and social sector success. We liken it to the flywheel concept in Jim Collins' book *Good to Great and the Social Sectors*, in which he observes, "This is the power of the flywheel. Success breeds support and commitment, which breeds even greater success, which breeds more support and commitment—round and around the flywheel goes. People like to support winners" (p. 24).

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>
> Jim Collins in *Good to Great and the Social Sectors*

A Profile of Two Watersheds: Credit River and Sand Creek

Throughout the manual we draw on our experience working in two watersheds, Credit River and Sand Creek, located on the southwest side of the Twin Cities Metropolitan Area. The Credit River watershed is 48 square miles, and the Sand Creek watershed is 272 square miles.

There are three Municipal Storm Water National Pollution Discharge Elimination System (NPDES) permits in the Credit River watershed, and three small community wastewater plants with NPDES permits in the Sand Creek watershed. As shown in the following table, land use is quite different between the two watersheds, with the Credit River watershed being urban transition, while the Sand Creek watershed is dominated by agriculture.

Minnesota's Credit River. Photo: Tim Kiser via Wikipedia Commons

Surface water quality between the two watersheds is also quite different. A number of reaches of Sand Creek and its tributaries are listed as water quality impaired by the U.S. Environmental Protection Agency (USEPA) for aquatic life due to turbidity, chlorides, and Fish Index of Biological Integrity. There are also a couple of reaches listed as impaired for body contact recreation due to bacteria, and most lakes in the watershed are listed as impaired for recreation due to excessive nutrients.

The Credit River is currently not listed as impaired. One lake in the watershed is listed as impaired due to excessive nutrients. The river was listed as impaired for aquatic life due to turbidity, but the listing was removed in 2012 after much of the upper watershed was converted to low-density rural residential (i.e., lots 2 acres or greater) with perennial vegetation, and the lower part of the watershed to urban with current stormwater management and wetland preservation standards. A number of capital projects stabilizing ravines were also completed, as well as several cost share projects with land users.

Table 2
Land Use in the Credit River and Sand Creek Watersheds

Land Use	**Credit River, Acres (2002)**	**Sand Creek, Acres (2001)**
Agriculture	8,240 (27%)	88,421 (51%)
Forest	6,780 (22%)	15,201 (9%)
Urban	5,120 (17%)	1,140 (1%)
Rural Residential	4,000 (13%)	9,609 (6%)
Pasture/Grassland	2,120 (7%)	48,366 (28%)
Water	940 (3%)	4,409 (3%)
Wetland	3,240 (11%)	7,028 (4%)
Other (Mining)	180 (1%)	--
Total	30,620	174,174

Applied to NPS pollution control, this notion of momentum suggests that there must be sufficient program activity that land users see progress being made, that this visible progress can fuel conversation between neighbors and at the local coffee shop, and that such dialog in turn reinforces the belief that action will make a difference, that conservation is valued by the community, and that conservation is a "normal" behavior.

According to Taylor et al. (2012), internally driven initiatives are critical: "[They] must be implemented with the people actively participating, rather than imposed or designed and delivered from the outside."

The slow progress of NPS pollution control efforts and new understanding of social systems indicate that it's time for a significant change in how resources are invested relative to NPS pollution. There is a role for reductive thinking, but we contend that systems thinking and building community capacity should become a central focus. Water systems should not be viewed as separate from social systems.

Even if biophysical scientists were to find the perfect conservation practice, the practice would need to get broadly implemented. And, if state or federal agencies were to develop the ultimate water management plan, they still would face the challenge of implementation. The current conservation delivery system does not build capacity for individual or collective implementation, and ongoing investment in great plans makes no sense if lack of capacity precludes their implementation.

Because the social and ecological systems affecting NPS pollution control are complex, the task of adopting a new approach can seem daunting. However, Davenport and Seekamp (2013) have developed a Multilevel Community Capacity Model for Sustainable Watershed Management (Figure 1) that offers a science-based yet practical framework for assessing capacity and designing a systems approach to NPS pollution control.

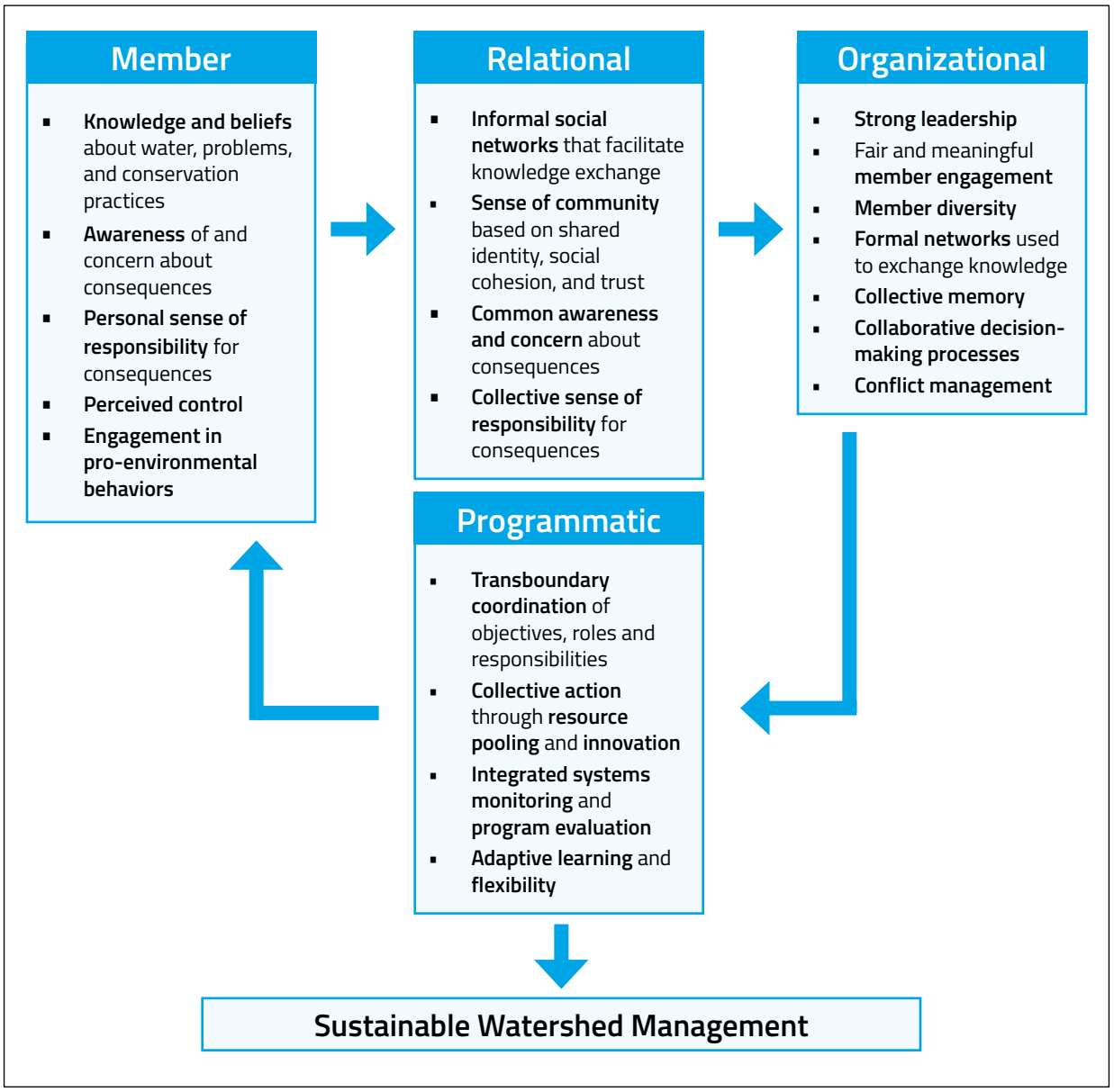


Figure 1. Multilevel Community Capacity Model
(Davenport & Seekamp, 2013)

The model illustrates how resourcing, relationship building, organizing, and coordinating are fundamental to a community's capacity to get things done. Thus, resource professionals who interact and engage at multiple levels of a community—with its members, social networks, organizations, and programs—are more likely to understand, tap into, and build community capacity for NPS pollution control.

The proposed approach helps water resource professionals broaden their focus, diversify their portfolio of interventions, and expand their definition of success. The proposed approach shifts the focal point from changing an individual land user's behavior to building community and developing partnerships and programs that support conservation for the long term. In the following chapters of this manual, we establish what we believe to be the primarily principles and methods for intentionally and strategically designing, implementing, and evaluating NPS pollution control programs.

With a systems thinking approach and an eye toward local relevance, resource professionals will more meaningfully engage community members, develop stronger relationships, and create more enduring partnerships. Conservation momentum comes from building on successes, staying focused despite setbacks, and learning and adapting.

Chapter 2

How to Think Like a Watershed: A Primer on Systems Thinking

In Chapter 1 we explain why a different approach is needed if NPS pollution control is to be successful. We also suggest that this approach must apply systems thinking. Here, in Chapter 2, we provide a primer on systems thinking and discuss why it is important to watershed management.

Integrating Systems Thinking Into Watershed Management

Systems thinking, a process of contemplating systems and subsystems and their interrelationships, is a response to the shortcomings of reductive thinking, or reducing problems into various isolated components. The individual, social, and institutional change required for NPS pollution control is far too complex to be addressed by reductive thinking. In our experience, reductive thinking has led to deficient monitoring, outdated solutions, inefficient implementation, or poor outcomes. In the worst cases, reductive thinking has actually aggravated problems.

The origin of systems thinking across disciplines

Systems thinking comes from the co-mingling of two seemingly distinct disciplines: psychology and biology. Gestalt psychology, first introduced in the late 1800s by Christian von Ehrenfels, examines how the human mind perceives and makes sense of a chaotic world. Rather than study individual elements of the thought process, von Ehrenfels grew intrigued by the way multiple senses merge to create global thoughts, as well as by how these thoughts are organized and how they are applied in various situations.

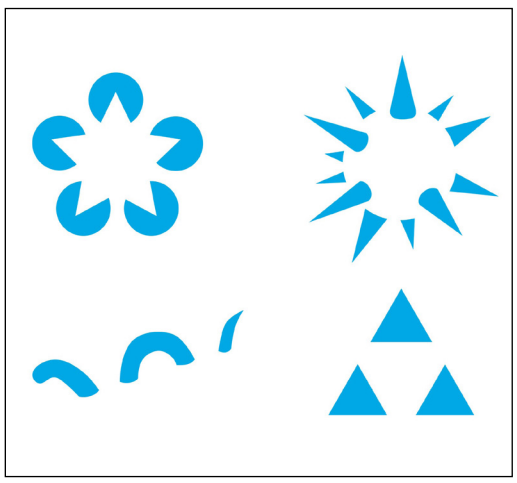


Figure 2. Visual example of Gestalt effect (adapted from Erlbaum, 2003)

The "Gestalt effect," crudely summarized in the popular phrase "the whole is greater than the sum of its parts," refers to the human brain's ability to recognize whole forms from a grouping of seemingly unrelated individual elements (Figure 2).

About six decades after the introduction of Gestalt psychology, Austrian biologist Ludwig von Bertalanffy developed "open" or general systems theory after determining that a reductionist view of an organism fails to explain its behavior. Bertalanffy's holistic perspective and models of organismal interactions and growth were soon adopted by biologists around the world and applied as "systems thinking" in studies of individual organisms, whole communities, and entire ecosystems.

Building on von Ehrenfels' and von Bertalanffy's work, social and natural scientists since have applied systems thinking to better understand individual actions and interactions in very complex and at times chaotic social and ecological worlds.

Social-hydrologic systems thinking for NPS pollution

The application of systems thinking to NPS pollution is novel because the conventional decision-making structure in water management has been top-down, leading to reductionism and a

In our experience, reductive thinking has led to deficient monitoring, outdated solutions, inefficient implementation, or poor outcomes. In the worst cases, reductive thinking has actually aggravated problems.

problem-by-problem or stream-segment-by-stream-segment approach (Sabatier, Weible, & Ficker, 2005). Water systems have been viewed as being separate from social systems. Thus, dialogue and decision-making have involved land use planners and water engineers while largely excluding landowners and resource users.

Before going further, we should clarify our use of the term "systems." In *Thinking in Systems*, Meadows (2008) defines a system as "a set of elements or parts that is coherently organized and interconnected in a pattern or structure that produces a characteristic set of behaviors, often classified as its 'function' or 'purpose'" (p. 11). In natural resource management, there are all sorts of systems of influence, ranging from biological to hydrological to geomorphological to climatic. In a watershed management context, the term is commonly used to describe the relationship between upland land uses, drainage patterns, and water quality.

As land is converted from meadow and forest to cropland and streets, for example, we know the rate and volume of runoff will increase. This system alteration in turn will exacerbate streambank erosion and scouring downstream. In this example, a social-hydrologic systems thinking approach would acknowledge complex land use-water connections and multiple interactions throughout the watershed. It would consider historical and contemporary human and natural system disturbances and responses. This expanded view brings into focus the "big picture" and enables a longer view in problem-solving. Indeed, systems thinking encompasses not only physical and natural phenomena, but also their interrelationships with society—individuals, social groups, cultures, and governance structures.

Systems thinking, when combined with adaptive management, results in a 'learn-and-adapt-as-you-go' style of integrated information-gathering and organized problem-solving.

A leading systems thinker, Peter Checkland (2000), further distinguishes "soft" systems thinking from "hard" systems thinking (Figure 3).

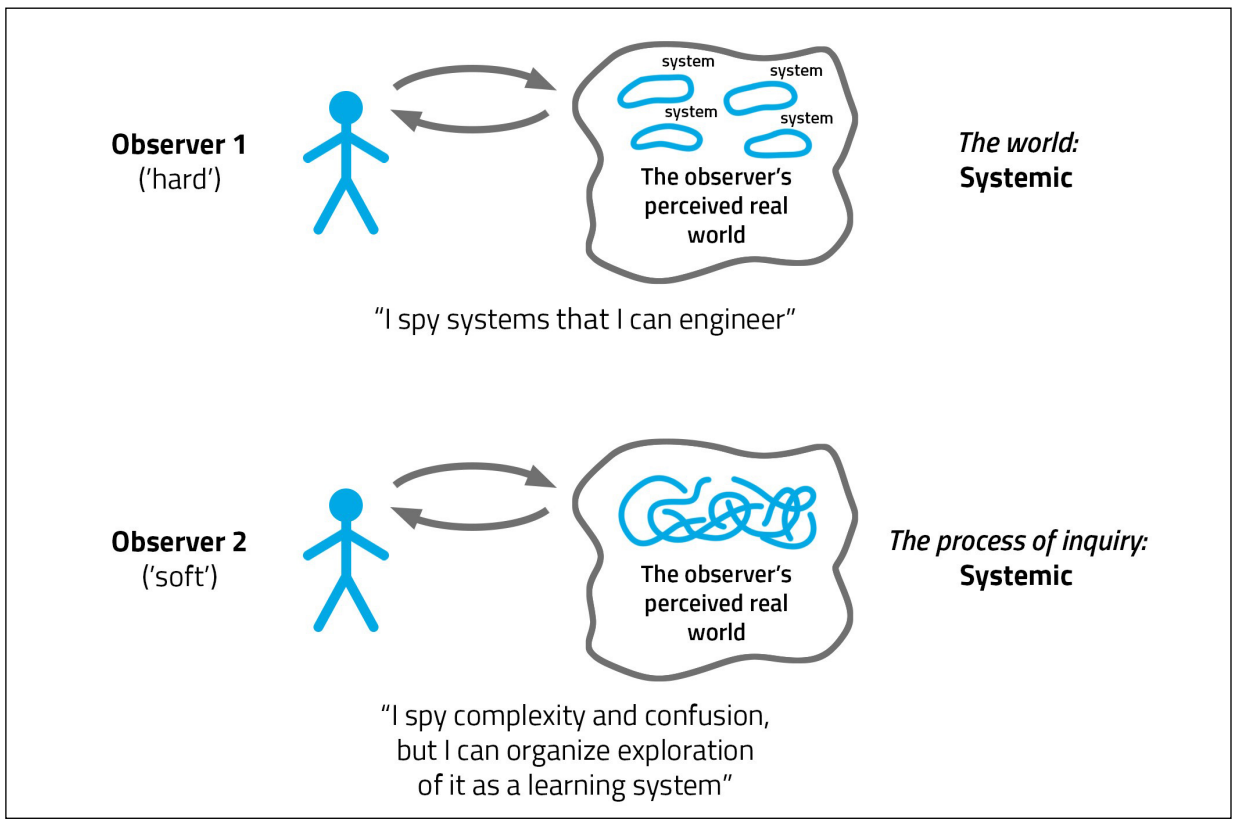


Figure 3. Hard and soft systems thinking
(adapted from Checkland, 2000, p. 18)

Hard systems thinking assumes systems exist out in the world, a world in which observers (e.g., water resource professionals) solve problems through engineering. In contrast, soft systems thinking assumes systems include the process of human inquiry and purposeful action. Thus, observers view "complexity and confusion" (p. 18). Problems are solved through organized exploration and learning.

Systems thinking, when combined with adaptive management, results in a "learn-and-adapt-as-you-go" style of integrated information gathering and organized problem-solving. In the watershed context, adaptive management is an iterative process of monitoring social and natural system structures, processes, and outcomes, as well as evaluating and adjusting actions, with an aim to continue what appears to work and abandon what does not.

Understanding More Than the Hydrologic System

Like much of Minnesota, Scott County experienced devastating hay field losses from winterkill in the harsh 2012-2013 winter. This created a short-term increase in row crop acreage at a time producers could take advantage of record-high commodity prices. By 2014 corn prices had begun their descent to near break-even levels while shortages drove up the demand and prices of local hay. By 2015 commodity prices had tanked, and alfalfa acreage returned to pre-2013 levels.

From a management perspective, intervention may not be necessary where there is a self-correcting loop that will address a problem on its own over time. A negative self-reinforcing loop, on the other hand, might suggest that it is time to act. Consider, for example, declining farm income, or flat or decreasing commodity prices, both of which reinforce the perception that more land must be put into production in order to maximize profits. If increased production drives prices lower, it reinforces the perception that more land should be in production. If increased production leads to a higher return, then it reinforces the perception that putting more land in production is a good choice.

One consequence of this particular feedback loop is a decline in the amount of land being enrolled or re-enrolled into the Conservation Reserve Program (CRP). Given the considerable threat this poses to water quality, intervention may be appropriate. Though perhaps not in direct response, Minnesota's adoption of a statewide buffer law did just that.

Aerial view of filter strips. Source: NRCS

Our response locally was to increase the incentive rates we offer for filter strips, including those where harvesting for forage is allowed. Though we can't always compete financially with production, we've been able to maintain relatively high levels of new enrollment in our local program, as well as encourage many farmers who were considering pulling out of CRP to maintain at least 30 feet of vegetative along streams, which is also the most critical.

We'll continue to build on this example regarding riparian property owners in subsequent chapters. However, we learned from this experience, and this is when we started working with Dr. Davenport. We learned that it's not enough to just understand the hydrologic system. We also need to understand systems affecting our partners—the land users —and how they make choices. This gets pretty complicated and cumbersome. In hindsight we were fortunate to have frameworks or existing models to work with: one for individual behavior and one for community.

The individual behavior model, the Moral Obligation Model (Pradhananga et al., 2017), is covered in detail in Chapter 4 (Figure 7). The community capacity model, Multilevel Community Capacity Model for Sustainable Watershed Management (Davenport & Seekamp, 2013), is introduced in Chapter 1 and discussed in detail in Chapter 3.

— Paul Nelson

A systems-thinking approach makes it easier for water resource professionals to identify the most efficient and effective leverage points for interventions, which in turn allows them to be more confident that their actions are informed and supported by a broader understanding of systems.

At the most fundamental level, systems thinking requires a redrawing of the old boundaries around NPS pollution. According to Donnela Meadows (2008, pg. 97), "There are no separate systems. The world is a continuum. Where to draw a boundary around a system depends on the purpose of the discussion—the questions we want to ask."

Systems thinking also requires a more careful examination of how systems maintain and self-organize, or in times of stress, reorganize themselves through positive and negative feedback loops (i.e., system resilience). Systems are dynamic, often changing more quickly than a person can understand or react to that change, and it is important to pay particular attention to reinforcing feedback loops and balancing feedback loops. These loops can lead to self-corrections, or they can be self-reinforcing, gaining power and driving systems behavior in one direction (either positive or negative).

Social-hydrologic systems thinking requires visualizing the relationships between seemingly discrete social phenomena (e.g., consumer choice) and hydrologic phenomena (e.g., eutrophication) in a manner similar to gestaltism and general systems theory.

Systems thinking views the social-hydrologic relationship not merely in terms of a human's singular influence (e.g., nitrogen fertilizer over-application on lawns) on water chemistry (e.g., low levels of dissolved oxygen), but also in terms of a phenomenon's emergent (e.g., normative influences in a neighborhood toward lush green turfgrass) and interacting properties (e.g., algal blooms, loss of scenic quality, and decline of property values, Flood 2010). These properties cannot be fully understood in isolation or through study of their individual elements (e.g., nutrient loading or fertilizer use).

As von Ehrenfels, von Bertalanffy, and many systems thinkers today have argued, social and hydrologic phenomena originate in the continuous flow of energy and information and are maintained by positive and negative feedback loops.

Resolution of the social dilemma of NPS pollution requires that individuals have a sense of personal obligation or ethical responsibility to act, as well as a belief that they are able to act and make a difference.

Acknowledging That NPS Pollution Is a Social Problem

As Meadows suggests, we believe it is essential to redraw the boundaries around the problem of NPS pollution. Historically, NPS pollution has been defined rather narrowly, as a technical problem requiring engineering solutions. In this manual, we encourage expanding those boundaries and refocusing solutions. To do so, we must accept the premise that fundamentally, NPS pollution is a social problem—or, more precisely, a social dilemma of environmental decision-making (Nordlund & Garvill, 2003; Pradhananga, Davenport, & Olson, 2015; Thøgersen, 1996).

Like other social dilemmas, the problem of NPS pollution can only be resolved by people making a difference in their communities. This happens in two basic ways: (1) through individual moral imperatives and (2) through the collective and coordinated actions of individuals and social groups. From a social-hydrologic systems perspective, NPS pollution gets its start in broad landscape-level planning and policies. It is maintained through individual-level land use and household and business practices.

For example, land use policies (or lack of policies) around urban growth, agricultural runoff, urban stormwater management, and habitat protection drive NPS pollution, as do landowner, resident, and resource user practices such as riparian buffer adoption, fertilizer application, sidewalk salting, and landscaping.

Social dilemmas are situations in which group interests (e.g., clean water) compete with individual interests (e.g., agricultural production or green lawns). In a social dilemma, when individuals prioritize self-interests, the interests of the social group (e.g., organization, community, or society) suffer (Dawes, 1980; Dawes & Messick, 2000).

Resolution of the social dilemma of NPS pollution requires that individuals have a sense of personal obligation or ethical responsibility to act, as well as a belief that they are able to act and make a difference. It also requires community-level capacity and commitment to solutions. In turn, individual and community engagement in water—including water discourse, deliberation, decision-making, and implementation—becomes critical.

COMMUNITY CAPACITY

The interaction of human capital, organizational resources, and social capital existing within a given community that can be leveraged to solve collective problems and improve or maintain the well-being of that community.

Systems thinking for NPS pollution control requires some basic understanding of the community as a primary field of influence in social systems. The Multilevel Community Capacity Model for sustainable watershed management (Davenport & Seekamp, 2013) provides a framework for understanding community capacities (or in some cases, incapacities) to engage in NPS pollution control.

The model highlights four primary levels of community capacity (Foster-Fishman et al., 2001):

1. Member decisions and actions (individual capacity)
2. Relationships, networks, and exchanges (relational capacity)
3. Organizations, partnerships, and influence (organizational capacity)
4. Programs, coordination, and effectiveness (programmatic capacity)

As the Multilevel Community Capacity Model demonstrates, community members neither make decisions nor take action in a vacuum. Their perceptions, decisions, and actions are influenced by a multitude of internal and external forces or feedback loops.

Recent research highlights the importance of trust, legitimacy, and equity in water resource management. The community field is also important because it is how people develop and express their cultural identity. Culture shapes the way people interact and engage in water resource management. Gender, age, race, ethnicity, and other social characteristics can influence how people value water and their interest and ability to engage in water resource projects and planning.

Creating a Systems Learning and Adapting Environment

Despite the constraints put upon water resource professionals by geopolitical and hydrologic boundaries, systems thinking enables us to learn and act at scales and within boundaries that are relevant and meaningful to communities.

Systems thinkers will engage in the social structures and processes that matter to community members (e.g., informal social networks, community-based organizations) to identify and learn about community assets and needs, priority issues or stressors, and capacities (and constraints) to manage problems or adapt to change.

In practical terms, this means being more intentional and systematic about day-to-day conversations with community members and engagements with community-based organizations. It means prioritizing listening and gathering information ahead of talking and disseminating information.

At times it might mean seeking out and engaging historically excluded groups in the community to validate and include underrepresented viewpoints in decision-making. At other times it might mean accepting uncertainty, inviting conflict, and accepting chaos.

Chapter 3

How to Be Locally Relevant: Know Your Community

Chapter 3 explores the importance of getting to know the community and how the interactions and influences of individuals within it affect the broader community and watershed. It provides insight into how a community capacity assessment can contribute to behavior change, community building, and NPS pollution control.

Getting to Know the Community

Individual behavior change is central to NPS pollution control on a single parcel of land. However, collective behavior change, at a community level, is necessary for water resource improvements at the watershed scale.

The manner in which people individually and collectively use and manage land determines the extent to which land contributes to problems or solutions downstream. Degraded water within a watershed won't improve until the multiple contributors (i.e., land users) to the problem change the way they value, use, and manage water, soil, and other natural resources.

Conservation behaviors include implementing physical practices such as waterways, terraces, and filter strips, as well as making annual management decisions about things, such as manure and fertilizer use, tillage, and cover crops, that take into account environmental threats and benefits. Therefore, understanding what inhibits and what motivates land users—individually and collectively—is critical for sustainable watershed management.

NPS pollution is particularly challenging because it is a collective problem, requiring continued, collective action. A city can reduce nutrient discharge from wastewater by upgrading its treatment plant. People living in the city contribute to the system, but they're typically not required to do anything in particular or different for that reduction to occur.

Pollution runoff from a farm field, on the other hand, depends entirely on decisions a farmer or farmland owner makes each year. For example, tillage equipment and direction relative to slope will determine how much soil erosion occurs, just as the type, amount, and timing of fertilizer application will determine nutrient concentration in runoff. If a farmer doesn't change his or her management practices, conditions downstream will not improve.

Why Is Knowing Your Community Important?

With an understanding of the community, it is possible to:

- Target specific audiences for behavior change interventions
- Monitor and evaluate the social outcomes of projects and planning
- Build community capacity and readiness for planning and implementation

Targeting Land Users and Communities in Scott County

The population in Scott County is approximately 130,000. Land ownership, however, is not evenly distributed. In fact, most of the land (60% to 70%) consists of larger parcels owned by a relatively small percentage of the population who use it primarily for agricultural purposes. Obviously, we can't develop in-depth relationships with every individual in the county. Thus, we need a process for understanding local social phenomena and recognizing opportunities for more effective community engagement.

Even though there are several hundred farms in the county, there are only 30 to 40 that one might consider to be large operations. Thus, we've made a conscious decision to invest significant time and resources into building individual relationships with the large farm operators because of the amount of land potentially affected, and to engage with other, non-farm community members at a more aggregated scale by using workshops and other community education programs.

— Troy Kuphal

Sand Creek Riparian Land User Attitudes

We wanted to learn more about the community so that we could better understand landowner motivations with respect to conservation and, in turn, improve our outreach and promotion of buffers and riparian improvements. This is when we started working with Dr. Davenport to complete a survey of riparian landowners along Sand Creek.

Table 3 provides a summary of the Sand Creek riparian landowners survey results and program implications. Complete results are published in Davenport & Pradhananga, 2012. The questions in Table 3 are designed to get at a better understanding of activators.

— Paul Nelson

Table 3
Sand Creek Riparian Landowner Survey Results
(Davenport, Pradhananga, & Nelson, 2013; Davenport & Pradhananga, 2012)

	Agree (%)	Disagree (%)	Neutral/ Don't Know (%)	Program Implications
Awareness of consequences (n=428) ▪ Water resources in my community are adequately protected	41.6	22.7	35.7	Increase efforts to make information available to land users and staff.
Concern for consequences (n=429) ▪ I am concerned about the consequences of water pollution for future generations	92.5	2.8	4.7	Focus communications on social/ecological and economic benefits of conservation relative to targeted audiences.
Sense of personal responsibility (n=425) ▪ It is my personal responsibility to help protect water quality	87.0	3.5	9.5	Show appreciation and publically reinforce that conservation practices are a community norm.
Perceived ability (n=424) ▪ I have the knowledge and skills I need to take care of my land ▪ My community has the leadership it needs to protect water resources	60.1 22.1	12.7 30.1	27.2 47.9	Provide technical assistance, highlight "success" at both the individual practice and water body scale, and train existing decision makers and develop new leaders.
Personal norms (n=426) ▪ I feel personally obligated to use conservation practices on my land ▪ I feel personally obligated to work with community members to protect the environment	84.3 52.0	0.9 10.7	14.8 37.3	Reinforce that conservation is a community norm, and provide opportunities to work together on community conservation projects to build sense of community conservation.

There are several reasons water resource professionals would want to learn more about their communities. In many cases, resource professionals are interested in targeting specific audiences for behavior change interventions. For example, in an urban watershed, a resource professional might want to find out what business owners know about stormwater management or why they are not participating in rain garden cost share programs.

A 2016 statewide survey of SWCD staff (Pradhananga, Davenport, & Perry, 2015) confirmed that staff recognize the value and need for local community member engagement. Respondents rated

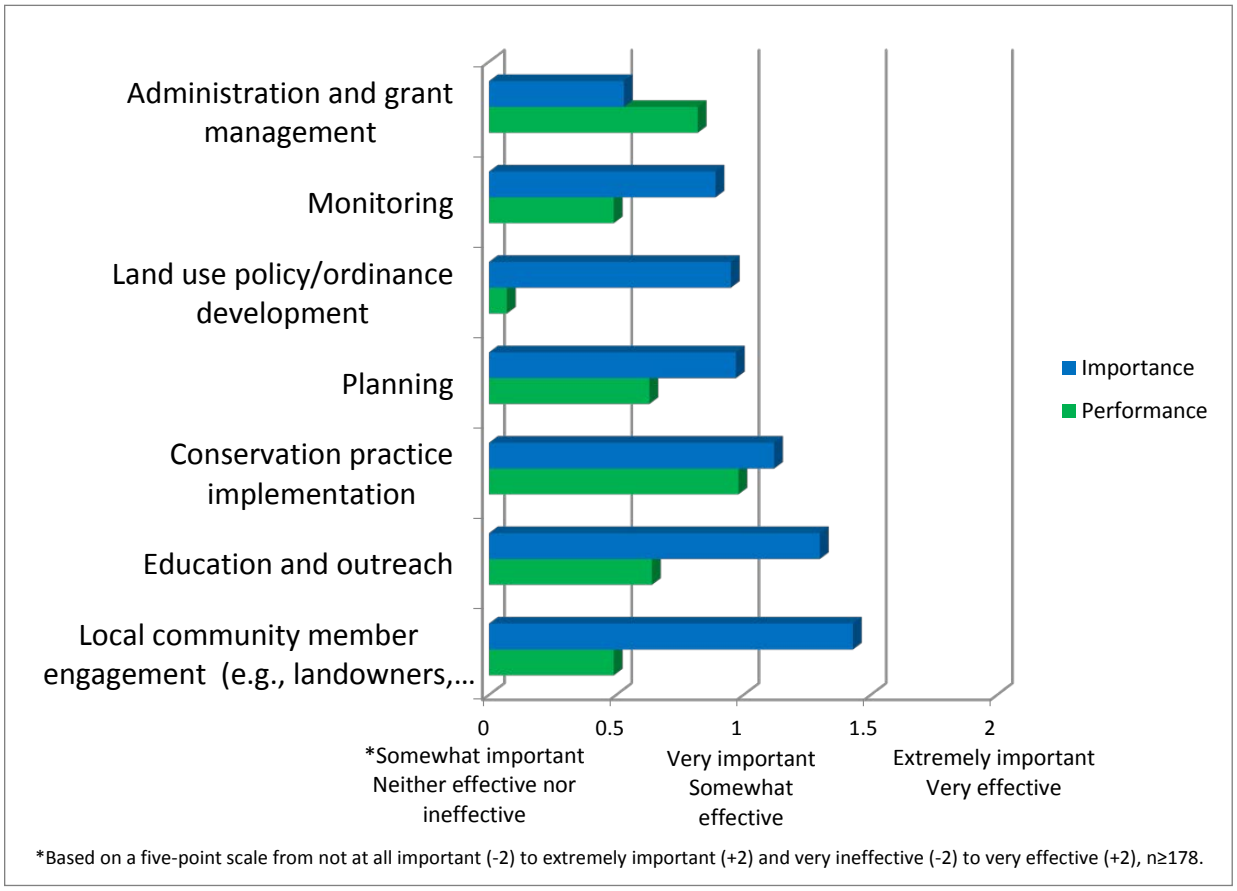


Figure 4. Minnesota SWCD staff ratings of groundwater protection activities on importance and effectiveness (Pradhananga, Davenport, & Perry, 2015)

community engagement as the most important activity to address groundwater issues (Figure 4). The study also suggests that despite its high importance, staff generally believe they are not very effective in this activity.

Understanding and addressing the drivers and consequences of land and water use requires gathering biophysical and social data. While resource professionals are likely very familiar with the water quality monitoring techniques used to assess the impacts of conservation practices, it is important that they also evaluate the social impacts of projects and planning. How has a project increased awareness of local water resource problems? How has a project built long-term commitment to water resources?

By monitoring community capacity trends over time, or before and after initiatives have been undertaken, resource professionals, community leaders, and others with a stake in land and water use can assess the social impacts of their efforts. By learning about the target community, the resource professional and conservation organizations/institutions can help to build its readiness for planning and implementation.

Knowledge of the community's capacities and constraints will enable the resource professional to build capacity for community engagement in initiatives and planning. Less vulnerable to stressors and problems, high-capacity communities are better able to plan, act, and adapt in the midst of uncertainty.

A definition of community

As the intersection of people, places, interests, and social interactions, the concept of community can be difficult to define. Kenneth Wilkinson (1991), a renowned rural sociologist who studied human-environment interactions, described a community as the combination of three elements (Figure 5): the "local society" (or the community of interest), the "locality" (or the community of place), and the "community field" (or the community of social interaction).

Under this definition a community might be a municipality or township, but it can also be a grouping of lakeshore landowners or farmers within a watershed. Resource professionals could even define their communities of interest as being the formal decision-makers who have authority in land and water use decisions.

> While community capital encompasses a variety of foundational resources or assets (e.g., physical, financial, technological) upon which a community can draw in times of need, community capacity is the interaction, mobilization and activation of these assets toward social or institutional change.
>
> Stated differently, a community may possess a broad range of capitals needed to cope with problems … but lack the capacity to establish common goals, make decisions based on mutual learning, and act collectively.
>
> Davenport & Seekamp, 2013, p. 1104

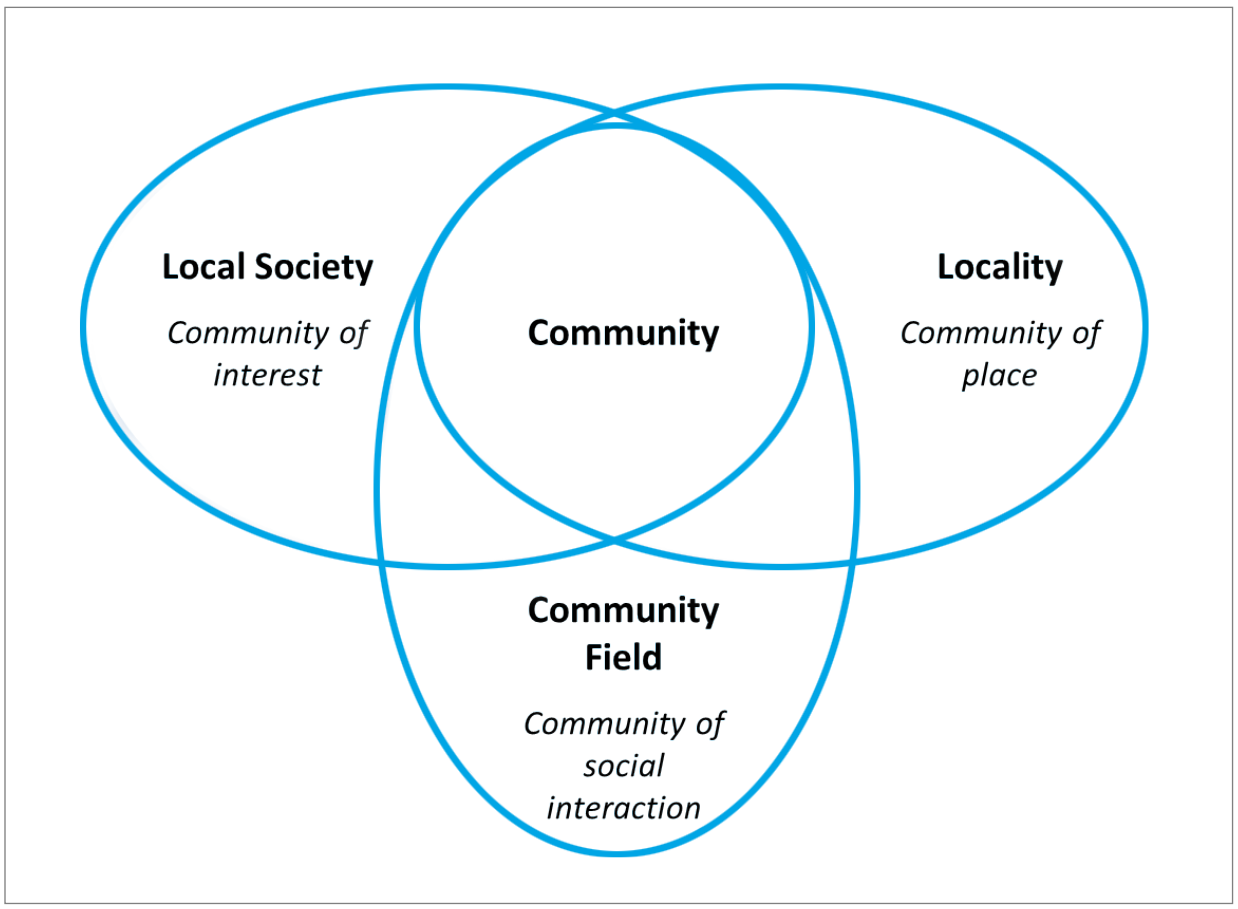


Figure 5. What Is a Community?
(adapted from Wilkinson, 1991)

It's important to think about community as being more than residents in an area defined by political boundaries or even watershed boundaries. Resource professionals must consider all three aspects of community when designing or convening a civic engagement process or when planning a community assessment.

When resource professionals consider the community with which they work and how they might engage that community in water resource management, they might first think about the basic resources or capitals it has (or doesn't have) to address a specific water resource problem or opportunity. They might think about the community's financial resources or economic capital and to what extent the community could fund a capital improvement project or an information campaign. They might think of its existing built infrastructure, such as a stormwater management system, or if they are interested in youth education, they might think about school systems.

Resource professionals might also consider community information and technology—such as GIS data or public comments from a town meeting—that could contribute to a project's goals. They might think of the human resources within the community, or even about existing levels of social capital that have been built though through interactions between community members. These are all foundational assets that provide the basic resources on which the water resource professional can draw. When these foundational assets are leveraged in managing natural capital—or, in this case, water resource projects and planning—they become mobilizing assets or capacities.

Understanding community capacity to act

Community capacity has been defined as the "interaction of human capital, organizational resources, and social capital existing within a given community that can be leveraged to solve collective problems and improve or maintain the well-being of that community" (Chaskin et al., 2001, pg. 7). This definition comes from researchers in community health who have long studied how communities respond to health epidemics and social problems. As this definition demonstrates, community capacity is more than individual member behavior; it includes relationships, organizations, and problem-solving.

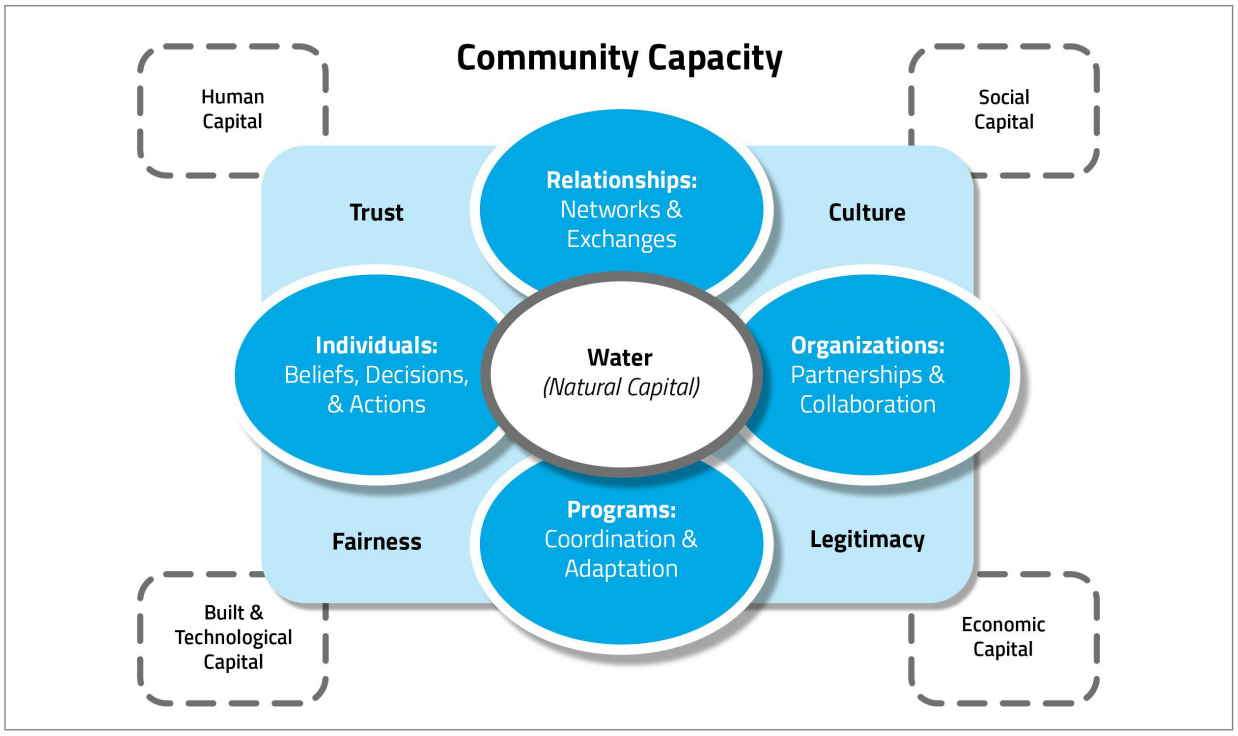


Figure 6. Relationship between community capitals and community capacity (adapted from Davenport & Seekamp, 2013)

The Multilevel Community Capacity Model (Davenport & Seekamp, 2013) provides a framework for understanding the **mobilizing assets** or **community capacities** that a community must have at some level to effectively engage in sustainable water resource management.

The model highlights four main levels of community capacity (Foster-Fishman et al., 2001):

1. Member decisions and actions (individual capacity)
2. Relationships, networks, and exchanges (relational capacity)
3. Organizations, partnerships, and influence (organizational capacity)
4. Programs, coordination, and effectiveness (programmatic capacity)

Recent research also has underscored the importance of community perceptions of water resource management, particularly with respect to interpersonal trust, legitimacy of organizations, and equitable program outcomes. In addition, it is extremely important to understand how culture shapes the way people interact and engage in water resource management. Gender, age, race, ethnicity, and other social characteristics influence how people value water and how they engage in water resource projects and planning.

It can be useful to think of community capacity in a hierarchy in which all levels of capacity are needed to build trust between members, to develop and support legitimate organizations, and to create programs that are equitable and just.

Planting native vegetation in a rain garden. Photo: Scott SWCD

Member decisions and actions

The basic building block of a community is its members and the decisions they make. Individuals bring skills, knowledge, and attitudes to bear on important community issues. Understanding how and why a community member makes certain decisions and takes action is critical to water resource management, especially because the way that individual land users and resource users consume, alter, and conserve natural resources has profound impacts on water resources.

Most researchers agree that education programs targeting community members' knowledge are important but that they don't necessarily address what really "motivates" people to act. Behaviors themselves are driven by values, beliefs, social norms, a sense of moral obligation to do what is right, and, of course, having access to the appropriate resources needed to act.

While knowledge is important, people often do things based on their morals or a sense of obligation to take responsibility for the consequences of their own actions. These are personal norms. They also might act on what they learn from others or see others do, or what important people in their lives think is important. These are social norms. That leads to the next level of community capacity: relational exchanges.

Relationships, networks, and exchanges

Relationships drive information flow, build trust, and power cooperation and collaboration. Informal relationships and social networks spur communication and information exchange. Some researchers refer to these types of relationships as "knowledge networks."

As individuals develop relationships with one another through repeated positive interactions, they exchange information about important experiences, about problems they face, and maybe even about broader community issues. This exchange of values, beliefs, and attitudes leads to increased member awareness and better access to community assets, and it can even serve to establish social norms by maintaining social pressures on member behavior.

For example, one community member might tell a neighbor about recently attending a workshop about the benefits of rain gardens and is planning to install one in the front yard. She may talk about how she feels responsible for keeping rainwater on site and how she hopes to attract songbirds and butterflies. She may tell her neighbor about a local nursery that specializes in rain gardens or point her neighbor to a website on constructing a rain garden.

Informal relationships like this are important to understand when planning civic engagement programs. Recent community assessments have indicated that many individuals are more likely to be influenced by family, neighbors, and other people in their community than by their local governments or environmental organizations. Informal relationships can also enhance a shared sense of identity within a community leading to mutual respect and social cohesion.

Organizations, partnerships, and influence

Organizations are critical to the long-term viability of a community and the survival of community initiatives. Organizations bring community members together by formalizing relationships. Organizations enhance leadership development, maintain a community's collective memory, and facilitate social learning.

A typical community has many organizations, ranging from very structured long-term organizations, such as municipal governance, to very unstructured short-term organizations, such as a citizens' advisory committee or a book or bicycling club.

Organizations come in many shapes and sizes. They might be public institutions such as government agencies, schools, hospitals, fire departments, or libraries. They might be clubs or associations, such as service clubs (e.g., Lions, Elks, Rotary), parent-teacher associations, and youth groups (Boys and Girls Club, soccer leagues, 4-H).

They might be community-supported centers such as senior centers or environmental learning centers. They might be religious or faith-based organizations, arts councils, and cultural organizations. They might be volunteer or charitable organizations such as Red Cross or "Friends of" groups. They might be business entities such as chambers of commerce or tourism bureaus. They might be event-related committees or groups such as county fair committees.

Of course, most resource professionals already work with natural resource or environment-related groups such as outdoor sports or snowmobiling clubs, environmental groups, and watershed councils or partnerships. Organizations often have representatives, such as board members or staff, who are trusted by community members or certain types of community members. Thus, organizations can serve as important liaisons between the work of resource professionals and the broader community.

When Should an Assessment Be Done?

- Pre-initiative for baseline understanding to inform action.
- During the initiative for engaging diverse stakeholders, checking in, and sharing knowledge.
- Post-initiative for more effective project implementation, monitoring and evaluation.
- During preparation of watershed management plans.

Organization leaders may be "gatekeepers" into community groups—such as ethnic and racial minority groups—that are disadvantaged or traditionally unrepresented in community decision-making. What's more, when organizations partner together, they can pool resources and cooperate in ways that individual organizations cannot.

Programs, coordination, and effectiveness

Community and water resource programs bring individuals, relationships, and organizations together to take action aimed at improving community and water resource conditions. Programs might include policies, information campaigns, outreach and support, and research and monitoring. In some cases, a program is sponsored and administered by one organization. More commonly, however, programs involve partnerships between organizations and require collaboration and coordination to be effective.

Acting Without Understanding the Community Limits Implementation

A good example of reductive thinking and not addressing social considerations comes from Scott County and the Sand Creek Stressor Identification Study completed in 2010 (Scott WMO, 2010).

Because aquatic life in Sand Creek is impaired from high turbidity, we intensely studied Sand Creek from 2007 to 2009 with an emphasis on understanding issues with sediment sources and loading. This effort culminated in a detailed report, which presented numerous concept models illustrating stressors on aquatic life. The sediment concept model included more than 30 boxes of various shapes, with arrows going in numerous directions to show how several sediment source areas were affected by different anthropogenic practices and natural characteristics, stressors, and the resulting biotic response.

We gained a great deal of valuable information over the course of these studies. In particular, we learned that most of the sediment was coming from one particular subwatershed, and that it was coming from stream bank and ravine erosion. With this knowledge, we developed a three-part strategy that included:

- Working upstream to moderate flows that were contributing to stream bank and ravine erosion
- Promoting riparian vegetation improvements to improve the resiliency of the stream banks to resist erosion
- Constructing stream bank and ravine erosion capital improvements where the erosion was acute and not likely to heal itself or where the erosion threatened infrastructure

With this direction we set forth to implement. One of our first efforts was to send out about 125 letters to riparian land users, all on land we had identified for potential riparian projects, to meet with a conservationist. More than 50 land users accepted the invitation, which we felt was a phenomenal response. Although most invitations were directed toward properties on which recommended improvements merely involved restoring the quality of vegetation, the land users who had accepted our invitation were those who had more visual problems, such as stream bank or ravine erosion, requiring an engineered and constructed solution.

The meetings that we did have worked well and resulted in a number of conservation projects, but we missed one important area. We did a great job of detailing the sediment source and delivery system, but we did not prepare ourselves for the social system.

Erosion was visible and was seen by land users as something damaging and worth fixing; improving riparian vegetation was not. We learned that it's not enough to just understand the hydrologic system. We also needed to understand the systems affecting our partners—the land users—and how those partners make conservation choices.

— Paul Nelson

For the resource professional considering how to coordinate programs for water resource restoration and protection, it is valuable to think about how water resources might be tied to existing community assets or needs, such as parks and recreation, health and well-being, tourism, and community pride. Can water be an important resource to these other aspects of quality of life?

With a greater understanding of the individual community member and of the community itself, the resource professional can move into the process of building personal relationships and trust. We describe it as a long, slow process, and we don't apologize for that.

Adoption of NPS pollution controls depends on these relationships. Most landowners consider their property their biggest asset and have an emotional attachment to it, with great hopes and dreams for it. Only when they know and trust the local resource professional will they be willing to consider managing that land differently based on that person's encouragement or recommendation.

Community capacity assessment

The Community Assessment Worksheet (Appendix A) identifies some questions water resource professionals might have about their communities and how to engage them in water resource protection and restoration. They may also guide an informal or more formal (i.e., social science data collection) community assessment.

The primary questions listed in bold are some of the practical questions water resource professionals in Minnesota and throughout the Midwest have shared. How can I better engage community members? How can I tap existing social networks or encourage community members to work together? The secondary questions below each primary question are research questions that might guide a community assessment.

The answers to these research questions should provide clear insight and guidance to resource professionals in each of these areas. For example, to answer the practical question of how better to engage community members in water resource protection and restoration, the resource professional must first know who community members are, their level of awareness and concern about a water resource problem or threat, the likelihood that they will take action, and what drives and constrains their actions.

Community assessments can be done at any point in a project or in a watershed planning cycle. They are effective before a project, as they provide a baseline understanding that can inform the design of civic engagement processes, outreach, education, and other capacity-building activities, as well as to identify target audiences/areas for action.

During the project, community assessments that use participatory methods such as interviews and focus groups can help resource professionals engage diverse stakeholders, check in with stakeholders on key issues, and share knowledge about important challenges or opportunities. Post-project assessments can inform project implementation and enable more effective monitoring and evaluation of projects and planning.

Methods for a community assessment are wide-ranging and may include a variety of interventions from a more practical issue-scoping information gathering process to more rigorous data collection using social science research methodologies. Social assessment tools include participatory scoping, secondary data analysis, observation, interviews, focus groups, and surveys. More detail on social data collection can be found in the Social Measures Monitoring System Overview prepared for Clean Water Fund Tracking in Minnesota (Davenport, 2013).

Cultural understanding

When we refer to culture, we're not talking about knowing whether or not the land user is a Swedish bachelor farmer. We mean understanding cultural connections to water, including traditional practices (i.e., uses), values, beliefs, and norms, as well as cultural constraints to conservation.

Cultural understanding requires listening to, learning from, and empowering local leaders in design, decision-making, and implementation around water. It is relationship-based, and it takes time to develop. For conservation organizations with the ability to retain staff over time, this understanding grows and evolves. Organizations also can be intentional about building this understanding through surveys and interviews, and by training staff to listen and seek understanding.

Understanding the local culture with respect to water and conservation will help the organization build and maintain better conservation programs. For example, in some counties, land set-aside programs involving the acquisition of perpetual easements do not have much appeal. In some cases, the landowner's land-rights belief is contrary to the idea of a perpetual easement. In other instances, often on the urban edge, landowners view their land as an investment pending sale for development and don't want encumbrances that might affect the sale value. Whatever the reason, an understanding of local culture can help the organization determine when a particular path, such as promotion of perpetual easements, is unlikely to be popular and instead offer alternatives.

It is improbable that everyone within a watershed will have the same cultural perspectives with respect to water and conservation, except at general levels. For example, a survey (Davenport & Pradhananga, 2012) of riparian landowners along Sand Creek found that 87.6% of respondents agreed that it was very or somewhat likely that they would use conservation practices on their land. This is a high level of agreement, and it is fair to say that it demonstrates a strong culture of conservation. From personal experience, however, staff within the SWCD know that older production farmers who have spent their lives improving drainage are less likely to be open to restoring wetlands or otherwise slowing down runoff. Younger family members may be more open to these practices.

A recent Twin Cities Metro resident survey (Davenport et al., 2016) found that relationships with water and civic engagement in watershed initiatives are highly influenced by culture. The researchers recommended that water resource professionals in culturally diverse communities "strive to learn more about how diverse cultures want to connect with water for leisure and recreation (e.g., as gathering places, for fishing), provide safe and welcoming discovery opportunities for new immigrants to experience water, [and] hire multilingual and culturally diverse staff" (pg. 51).

With an understanding of land users' and communities' cultural perspectives, it is possible to craft and promote more effective programs.

Common 'Cultural' Observations in a Rural Community

Here are some of the local "cultural" observations we've made over the years. Some will be common with the culture in your area; some are unique to our local setting.

- Production agricultural operators (farmers) who see conservation as a way to protect their investment and soil are very open to traditional erosion control practices such as grassed waterways, terraces, and water and sediment control basins.
- Landowners who rent their land, but also live in the community, are open to conservation if acceptable to their renter and if perceived as a community norm.
- Lakeshore owners with erosion and steep slopes are open to alternative natural solutions. However, those without visual erosion problems are less open to those solutions.
- Lakeshore owners who are engaged in, or aware of, water quality consequences are open to restoring natural shorelines.
- Landowners who rent their land and do not live in the area are not engaged unless the renter is interested.
- Small rural residential lot owners (i.e., 5- to 10-acre lots) are very receptive to planting native grasses/prairies, particularly if they're not raising horses or relying on rent for much of their income, and see it as an attractive alternative to mowing. In fact, in 2014 more than 250 people attended the Scott SWCD workshops on the installation and maintenance of prairies.

— Paul Nelson

Chapter 4

How to Engage Meaningfully With Community Members

In this chapter we examine the basic building block of any community—its members. We offer an integrated conceptual framework for understanding and influencing individual behavior, and we examine the drivers of and constraints to conservation action.

Individual and Collective Action Is Needed

Water resources will not and cannot improve until people and communities change their land use and management behaviors. At a micro-scale, this is the decision a farmer makes to leave a buffer between the field and a stream. At a macro-scale, it's an entire community of farmers in the watershed who together consider and adopt a comprehensive suite of practices that address soil erosion, soil health, and streamside buffers. In an urban environment, it is a group of homeowners who decide to reduce their impact on a nearby lake by installing rain gardens, rain barrels, and native landscaping.

An individual's decisions and actions in land use and conservation have an impact on overall watershed protection. However, individuals do not make decisions or take actions in a vacuum. People are motivated and inhibited by multiple psychological and social processes.

Commonly, it falls on the resource professional to understand why community members (including land users) may or may not implement conservation practices that are deemed by science and engineering to be "best management practices," or BMPs.

Most often land users do not come forward independently to solicit information or assistance with a conservation practice. Thus, the resource professional must intervene, and hopefully make a concerted effort to engage them in a meaningful and productive manner. Knowing something about what drives and constrains behavior will help the resource professional better understand the land user's perspective and engage the land user in programs or problem-solving that are better suited and acceptable to the land user.

Psychologists and social psychologists have examined human behavior in private and public spheres for decades. This work has revealed many things, including the fact that an individual's beliefs and attitudes are not always good predictors of behavior.

Even though we know that second helping of dessert isn't good for us and we generally prefer eating healthful foods, we may still dig into another piece of cake. In the case of NPS pollution, no one wants NPS pollution and no one wakes up in the morning aiming to cause NPS pollution. Still, people, social groups, and communities make a series of individual and collective decisions that cumulatively result in NPS pollution.

So, how can resource professionals motivate individuals to change their behavior?

Supporting Individual (Member) Capacity and Behavior Change

For resource professionals, the key to inspiring behavior change lies in making conservation adoption relevant and meaningful to the individual and building individual capacity to change. To do this effectively, resource professionals need to know something about an individual's core values and beliefs related to water and conservation action.

Knowing what motivates and constrains conservation action is fundamental to changing behavior. The more resource professionals know about an individual's environmental and cultural values, beliefs

about water problems, and perceptions of their own control or abilities to address the problem, the more success they are likely to have in engaging the individual in conservation action.

The Moral Obligation Model (Pradhananga et al., 2017) offers a framework for understanding what drives and constrains conservation behavior (Figure 7). What is especially appealing about this model is that it is based in social science research, it integrates elements of multiple psychological theories of behavior, and it has been validated and applied here in Minnesota.

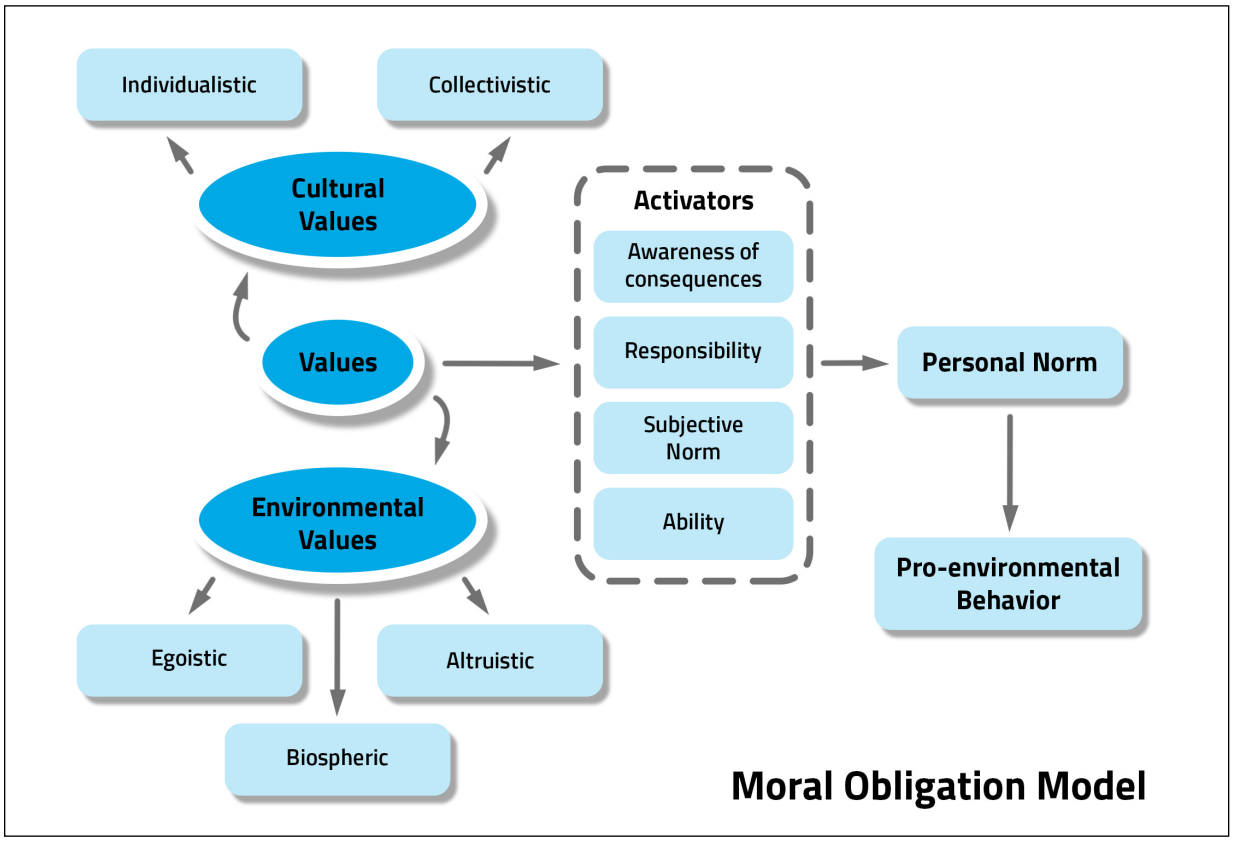


Figure 7. Moral Obligation Model adapted from Pradhananga et al., 2017

Understanding What Drives and Constrains Conservation Action

Conservation is rarely a rational act. Like helping behavior (e.g., holding a door open for a stranger), conservation behavior (e.g., recycling) is an expression of values and often has little tangible benefit to the actor, especially in the short term.

Instead, conservation is motivated by a personal norm of behavior, or a sense of moral obligation to do the right thing (e.g., reduce waste, protect the natural environment, take care of family, be a good community member, feed the world). Many people refer to a personal norm of conservation as a conservation ethic.

For example, maintaining a vegetative streamside buffer on a farm field may have limited perceived personal benefits (e.g., reduced erosion) and even some costs (e.g., loss of agricultural productive land) to the landowner, but these actions can have multiple benefits for riparian and stream ecosystem health, as well as for landowners and water users downstream in the form of improved water quality.

A sense of personal obligation (i.e., personal norms or ethics), which similarly guides individuals in pro-social (i.e., helping) behavior, is a particularly strong force in pro-environmental behavior because conservation is rarely rational. In many instances, individuals don't necessarily benefit directly from the practices they adopt.

A personal norm of conservation behavior requires an awareness of a problem, a feeling of being personally responsible for the problem, and a belief in one's own ability to contribute to its resolution (Schwartz, 1977). It requires individuals to act because "it's the right thing to do." The blueprint for individuals' personal norms is found in their cultural and environmental values. Personal norms are developed and calibrated through social learning and feedback.

> Adopting conservation is rarely rational. It is instead generally based on emotion.

Environmental and Cultural Values

Values are fundamental beliefs individuals have about proper relationships between people (i.e., cultural values) and between people and the natural environment (i.e., environmental values). Values are relatively few in number, when compared with attitudes or behaviors, and are much more stable or difficult to change. Values are guiding principles, or a moral compass, that direct human behavior.

It is easy for resource professionals to lose sight of the fact that the values that they and their agencies prioritize in water management may very well differ from the values a land user prioritizes. In some instances, the guiding principles that direct a land user's actions and those that direct a resource professional's actions may compete or conflict. This is true at a very basic level.

If the primary mission in the resource professional's work is to protect the natural environment and restore aquatic habitat, that person's values may conflict or compete with those of a land user who values the natural environment as a resource for economic gain or a resource for feeding the world. Often, though, basic values cluster along a few dimensions; researchers refer to them as value orientations, meaning that individuals tend to (though not always) align with certain groupings of values.

It is important to note that in some instances people's behaviors may not appear to be consistent with their basic values, depending on the situation or context. For example, even though an individual may value healthy living and likes to exercise, she may still choose to stay home and sleep in, rather than join a buddy for a morning run.

Basic values are important because they serve as a foundation for the information individuals seek, the relationships they develop with people and the natural environment, and the attitudes they develop and express. Values are the basic foundation for an individual's personal norms and, ultimately, an individual's behaviors. However, specific beliefs developed under certain situations or contexts will activate or trigger different personal norms of behavior.

A resource professional confronted by a landowner who has not adopted a conservation practice might ask, "How can anyone be against clean water?" Alternatively, a landowner confronted by a resource professional promoting an agricultural land retirement program might ask, "How can anyone be against feeding the world?" Fundamentally, neither individual is against clean water or feeding the world, so why are their attitudes and behaviors seemingly so different?

The answer lies in how and when an individual's basic values are expressed as personal norms. Values are expressed in different ways depending on more specific beliefs, or activators, about a particular behavior.

Activators: Beliefs that support conservation action

Individuals are more likely to engage in conservation action when their personal norms are activated, or triggered. Personal norms of conservation can be activated by multiple beliefs.

The Moral Obligation Model outlines four primary activators:

1. Awareness of a problem (e.g., over-fertilization) and its negative consequences (e.g., nutrient impairments, algal blooms, and loss of aquatic biodiversity)
2. A sense of personal responsibility to solve a problem or reduce its consequences (e.g., reduce fertilizer use)
3. The influence of important others (e.g., neighbors, agricultural advisors)
4. The perception of having an ability to act (e.g., equipment, skills, knowledge) and make a difference (e.g., use alternate cropping systems, reduce nutrient loads)

Depending on the individual and their values and experiences, different activators can trigger personal norms of conservation action. For example, for farmers who rely heavily on the advice of others or on seeing a conservation practice working out in the field, social norms are a primary activator.

Environmental Values

Biospheric
The environment is judged based on outcomes for non-human species and ecosystems.

Egoistic
The environment is evaluated based on outcomes for one's self.

Altruistic
The environment is judged based on outcomes for human groups, communities or all of humanity.

Stern & Dietz, 1994

Cultural Values

Individualistic
Self is defined as independent from others and personal goals are often prioritized over group goals.

Collectivistic
Self is defined as part of a group and group goals are often prioritized over personal goals.

Matsumoto et al., 1997

By promoting social models of success (e.g., demonstration farms, farmer testimonials, partnering with agricultural advisors), resource professionals can better engage and support farmers who are motivated by social norms.

For other agricultural community members, conservation action may be motivated by clear evidence that local, or even field-specific, agricultural practices are causing public health problems downstream and that practical solutions exist. In this instance resource professionals can use farmer outreach (e.g., site visits), localized water quality monitoring, and conservation practice trial programs to raise awareness of consequences, sense of personal responsibility, and perceived ability.

Constraints: Factors that limit conservation action

The problem of NPS pollution often fails to trigger the fundamental values or basic principles by which people live their lives. NPS pollution is an abstract and complex issue, and in many instances its impacts are invisible or far removed from the polluter in space and time. Moreover, NPS pollution and its consequences are unintended. Because no one begins the day with an end goal of polluting water, it can be easy to transfer blame to others or to shirk responsibility for it.

In addition, on some level, everyone may harbor a bit of guilt for its impacts, because in some ways everyone depends on land use practices (e.g., transportation infrastructure, agricultural production, road salting) that contribute to the problem.

Finally, some solutions to the problem may be perceived to be too costly or require too much effort with little or unclear benefit. In turn, individuals may tend to discount information about NPS pollution impacts or psychologically distance themselves from the problem. Altogether, these factors make NPS pollution a difficult problem for individuals to rally around.

Findings from Minnesota and Scott County specific research (Figure 8) suggest that land users and owners largely are concerned about the consequences of water pollution on future generations, wildlife, and aquatic life. On average, they also feel a sense of personal responsibility to protect water resources (Davenport & Pradhananga, 2012: Davenport, Pradhananga, & Olson, 2014; Pradhananga, Perry, & Davenport, 2014). The constraint, however, is that many land users and owners lack an awareness of the local consequences of water pollution.

Individuals either are not getting or internalizing the message that NPS pollution has local consequences that matter. This research highlights the problem of broken feedback loops between

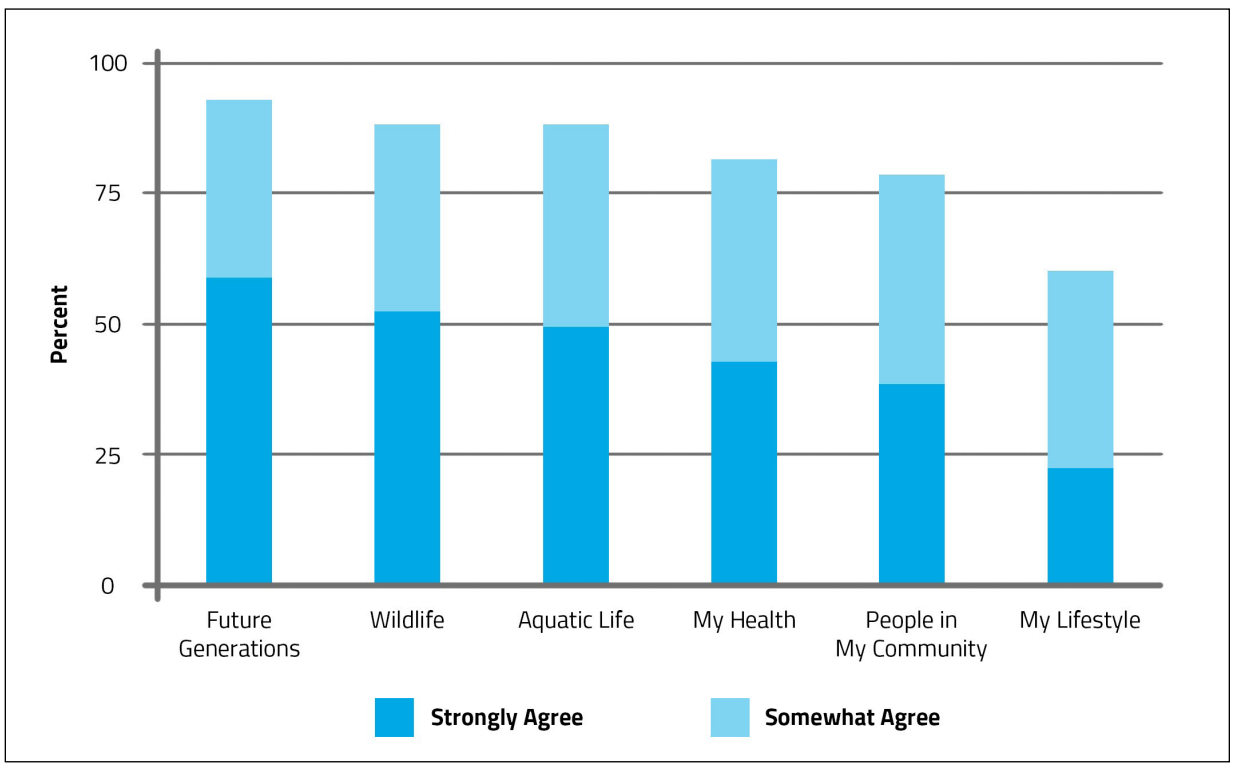


Figure 8. Percent of Sand Creek Watershed Respondents Who "Somewhat Agree or Strongly Agree" That "I am concerned about the consequences of water pollution for…"
(Davenport & Pradhananga, 2012)

Let's Get Practical

Resource professionals frequently hear from land users that they are open to conservation if it supports their business. Sometimes, it does not.

Access to the right equipment for conservation action is a common resource constraint. The business model that the land user is following may also result in practical limitations.

Take, for example, a situation in which a buffer is needed along a stream. A farmer whose business operation does not involve livestock is unlikely to have need for forage. Having no use for forage, this farmer consequently is not likely to have the equipment necessary to clip and properly maintain the buffer.

Without proper maintenance, the buffer becomes overgrown and eventually loses its ability to filter runoff, undermining the reason it was installed in the first place. Perhaps more important from the farmer's perspective are the loss of economic revenue from the land and the continued need to pay taxes on it.

Another situation might be ephemeral erosion in the farmer's fields. Being that the problem is something more tangible and that the need for a solution is more apparent, the resource professional might face less resistance proposing a grassed waterway. After all, the gully is a pain to cross, and the crop tends to yield rather poorly.

The practical issue with installing a waterway is more likely to be the angle it would run through the field and the size of the farmer's equipment. Any farmer will testify to the difficulty in crossing a waterway that runs at a 45-degree angle through a field with a 16-row corn planter, or a sprayer with a 60-foot boom.

— Troy Kuphal

biophysical and social systems. Commonly, NPS pollution problems identified by resource professionals are distant in time or space (e.g., downstream flooding, lake sedimentation, Gulf of Mexico hypoxia). Resource professionals may not be connecting to land users and owners on a personal and local level.

Localized water quality reporting, timely reporting on problems, and framing consequences in a way that strikes a chord with landowners (e.g., public health concerns, impacts to wildlife) will make NPS problems and conservation action more personal and urgent to landowners. If farmers are shown the problem on their own piece of land and can make the connection between that problem and their own actions, they are much more likely to act.

As we suggested earlier, a decision not to adopt a conservation practice may have nothing to do with a farmer's environmental or cultural values. The farmer may have very strong biocentric and collectivistic value orientations suggesting that she or he would adopt conservation practices throughout her or his operation. Instead, other barriers to action may exist associated with ability. For the resource professional, knowing the practical limitations a land user faces with any given solution prevents wasting of time, effort, and money on unworkable solutions. This holds true in both a voluntary and a regulatory framework.

Minnesota research reveals that what separates conservation practice adopters from non-adopters is a belief in their own abilities (Olson et al., in press; Davenport & Pradhananga, 2012; Pradhananga & Davenport, 2014; Pradhananga & Davenport, 2015; Pradhananga, Perry, & Davenport 2014). Adopters believe to a greater extent than non-adopters that they have the ability to change the way they use their land to protect water resources.

In contrast, non-adopters perceive limitations or challenges that get in the way of conservation action. For example, perhaps during the crop harvest last fall, a farmer's aging combine finally broke down, the commodity prices took a huge downturn, or both occurred at the same time.

> One very significant limitation for land users is that "they need to believe their investment of time and resources will make a difference."
>
> Elinore Ostrom at the Festival of the Commons Conference, Augsburg College, Oct. 8, 2011

Sweat the Small Stuff, but Focus on Capacity Building

In the late 1990s, I was working on a fairly large constructed wetland. The purpose of the project was to treat runoff from a large ditched agricultural watershed prior to discharge to a lake. Several landowners were involved, and easement negotiations look a couple of years.

The organization I worked for at the time had the power of eminent domain, but it also had a policy of working only with willing landowners. In order to get agreement from all the landowners involved, we settled for a smaller wetland than we would have preferred. However, during the permitting process, we were criticized by the review agency for not optimizing the wetland size for maximum pollutant removal. We argued with the agency, citing landowner limitations, and ultimately received the necessary permits and moved ahead with the project.

Within a few years, one of the landowner couples fell in love with the birds and wildlife attracted to the wetland. This couple decided to put the rest of their farm, except for a few acres around the homestead, into perpetual easements restoring prairie and wetlands as part of the Conservation Reserve Enhancement Program. This was a priority area located within a shoreland protection zone. The couple also became strong supporters of our organization, and of conservation.

— Paul Nelson

Either way, the result could have placed the farmer in significant financial strife and without much free capital. The grassed waterway recommended by the resource professional will not get installed if inadequate finances are available to pay a contractor. And, the needed filter strip will not be seeded if the farmer can't afford to lose productive cropland.

This situation represents a resource constraint to conservation action: The farmer believes that she or he does not have the financial resources to install and maintain the grassed waterway. Other resource constraints including technical knowledge, required equipment, time and labor, and mastery have emerged as primary constraints among agricultural producers (Pradhanagna, Perry, & Davenport, 2014).

An ability constraint to conservation action is related to perceptions of on- and off-farm efficacy, or perceptions that a conservation action will make a difference. Some psychologists refer to this concept as perceived self-efficacy—the ability to control events or outcomes in the environment (Bandura, 1990). While resource professionals may value hydrologic modeling and long-term monitoring of nutrient load reduction outcomes, farmers are more likely to value local, practical outcomes about on- and off-field efficacy (Olson et al. in press; Davenport & Pradhananga, 2012; Pradhananga & Davenport, 2014; Pradhananga & Davenport, 2015; Pradhananga, Perry, & Davenport, 2014).

A farmer evaluates a practice with a different set of criteria. How will a conservation practice affect productivity on my field? Will the practice reduce field erosion? How suitable is the practice for the land and the operation? Have others had success with this practice? Will adopting this particular practice on this field make a difference in local water quality? Though awareness of a problem is important, land users also must believe that their conservation actions will make a difference on and off their land.

Minnesota research shows that many landowners and land users recognize that water quality is everyone's responsibility. At the same time, research reveals that perceptions of increased uncertainty or risk around a conservation practice can inhibit action (Olson et al., in press; Pradhananga & Davenport, 2015; Pradhananga, Perry, & Davenport, 2014).

Land users, and farmers especially, are practical thinkers and actors. They value efficiency, problem-solving, and mastery. They are not inclined to spend time or resources on something they perceive as risky or without a high likelihood of a positive outcome.

As important as it is to recognize and understand practical limitations, there are many instances in which an even greater limiting force can be at play—namely, present personal circumstances. Resource

Local capacity building that provides technical assistance to land users is critical.

Most land users do not have the survey and design skills necessary to install conservation practices such as a grassed waterway.

As Table 3 in Chapter 3 illustrates, 40% of land owners surveyed in the Sand Creek watershed felt they did not have the knowledge and skills necessary to take care of their land.

professionals must understand that each time they knock on a land user's door, they bring with them a host of expectations. In fact, the mere presence of the resource professional at the door might signal the need for the land user to spend a significant amount of capital, to forfeit income, or both.

Viewed from the land users' perspective, an individual with no financial or personal stake in the land or operation is coming to talk to them about conservation and some distant or obscure water quality concern. Reading between the lines, they interpret this as a suggestion that they are part of the problem and need to make some changes. In many cases, these changes represent a departure from traditional tried-and-true practices they learned from earlier generations of relatives who worked the land, but are apparently no longer good enough.

These expectations are a heavy burden for the land user at the best of times. Difficult personal circumstances can make conservation-related change even more challenging. Perhaps the land user's spouse recently passed away, or the two went through a divorce. Or maybe the entire family is struggling with an aging grandparent suffering from a Alzheimer's or a child diagnosed with depression or alcoholism. These situations are more common than one might hope or expect.

The Reality of Other Life Circumstances

I recall working as a technician back in the early 1990s. I was responsible for contacting farmers and other land users identified as having significant amounts of runoff, from both fields and feedlots in a small but important subwatershed in southeast Wisconsin. This was shortly after the deadly cryptosporidium parvum outbreak, and all fingers were pointing upstream.

The farmers in this watershed were typical. Some held on to the traditional methods of farming practiced by their fathers and grandfathers. Others were on the cutting edge, using no-till and global positioning systems. One of the farmers on the top of my "need to visit" list was quite average, neither behind nor ahead of the times. What was noticeable was his reluctance to engage in a conversation.

There were times during my early visits to the farm that I would see him scurrying in the opposite direction as I drove up in the work truck. It was obvious he wanted to avoid me, but I understood why. I wasn't an overzealous environmentalist, but I was nevertheless bringing a set of expectations that he realized would require him to make changes—and spend a significant sum of capital. We eventually developed an affable relationship wherein we could at least have a productive conversation.

His feedlot was on the edge of a stream. The concrete literally ended where the bank of the stream began. With a moderate-sized dairy herd, it was a severe source of nutrient and bacterial pollution. This seemed obvious to everyone, although the owner never acknowledged it, perhaps because it had been that way for decades and he didn't think of it as anything out of the ordinary. One thing I did recall him saying, however, was, "In the old days, if you were able to build farmstead near a stream, it was a blessing. Now it's a curse."

In any event, it became clear after a while that even though this farmer began engaging in constructive dialogue and began to lean towards an agreeable possible solution, he remained noncommittal. Long story short, about a year after we agreed on a final solution the conservation office learned of some horrible news: This farmer had committed suicide.

Obviously, something was very wrong. Regardless of what led to this travesty, however, the fact is I never fully recognized the hardship he and his family were going through. It was no wonder they could not commit. They had much bigger issues to deal with in their lives.

Granted, this story represents a rather extreme situation, but it serves to make the point that we, as outsiders, never know what is going on inside the home of someone else. A farmer may have serious environmental issues, but as a priority it could pale in comparison to other issues, whether emotional, physical, financial, or otherwise.

— Troy Kuphal

Using Storytelling to Get Your Message Out

The book *Made to Stick* by Chip Heath and Dan Heath (2007) explains in a very useful way that getting ideas to stick invariably requires several key elements. In short, the book suggests conditions that help ideas to be heard and remembered.

- Simple sets the stage.
- Unexpected gets folks to listen.
- Concrete promotes believing and remembering.
- Emotional promotes caring.
- Stories promote action.

Scott WMO and Scott SWCD provide their staff with training in storytelling. In the storytelling training provided by Scott County, staff learn these elements and use them to share stories about landowner experiences.

For example, the article "Hillside erosion claims cow's life; owners respond" on page 16 in the Oct/Nov 2013 edition of the Scott County SCENE (Appendix B) uses both surprise and emotion to share the story of a local farmer and his cow. The story explains how he, like many others, struggled with the challenges of farming in the steep bluff and ravine landscape typical of the region. This made it relatable and believable.

Explaining the loss of a cow evokes emotion and a sense of caring. The story is engaging, and it is made credible with specifics and references the family's farming background.

For a resource professional who may show up at the farmstead once or twice a year, it's impossible to know what exactly is going on inside the home. The resource professional who understands the factors and concerns that motivate individual land users is better prepared to encourage individual behavior change. An assessment of the surrounding community is necessary, however, if resource professionals are to get a complete picture of the challenges and opportunities they will face in trying to foster adoption of NPS pollution controls.

The Sand Creek Watershed landowner survey (Davenport & Pradhananga, 2012) undertaken in Scott County revealed that personal sense of responsibility and concerns about consequences (Figure 8), particularly those related to future generations, wildlife, and aquatic life, were very high among streamside landowners in the watershed. (See Table 3, Chapter 3.) At the same time, awareness of consequences and perceived control were quite low.

Though it was encouraging that self-reported engagement in conservation practices was high, the Scott WMO and SWCD made concerted efforts to build greater awareness of consequences for both action and inaction. One of the best ways to generate this awareness is to use available media, whether it be local newsletters, newspapers, websites, or radio.

Scott County is fortunate to have a county-published newspaper that reaches more than 55,000 households six times a year. In every issue, copy space is dedicated to articles that are, in effect, success stories. These stories offer up-close and personal accounts of farmers and other landowners who have taken advantage of local technical assistance and cost-share programs. The stories share the landowners' background and reasons for participating, as well as their experience working with local conservation staff and the positive outcomes stemming from their conservation actions.

News in the media and personal conversations with landowners can serve as vehicles for discussion about inaction and its consequences. For example, as devastating as they were, heavy rainstorms in the past few years presented local resource professionals with a great opportunity to extend the dialog on conservation.

Staff members were able to discuss and share visually the link between the amount of erosion and other damage that occurred and the level of conservation that was in place. In fields with high residue

levels, there was less erosion and soil damage—and greater resiliency. The message was clear: Conservation works!

Water body-specific fact sheets can also be a valuable tool. By describing the current condition of the streams closest to landowners, these fact sheets localize water quality issues and make them more personally relevant. The premise behind using this tool is that landowners are more likely to consider taking action if the consequences are less distant, and if water quality improvements benefit their land and immediate community.

Finally, it is important to emphasize the consequences of water impairments to future generations, wildlife, and individuals' private property. While erosion and soil loss often are viewed by landowners as serious threats to private property, many other landowners simply don't recognize erosion as a problem because they are used to seeing at least some field erosion and muddy water every spring.

The key to building member/individual capacity lies in pursuing all of these avenues repeatedly and frequently. The modeling of success—whether through personal testimonies from landowners, media stories acknowledging landowner contributions, and field days or demonstration sites—sends a broad message that conservation practices are working, that people are using them (i.e., it's a social norm), and that people are willing to share lessons learned.

After McMahon Lake improved significantly, we sent letters to all the landowners around the lake announcing the improvement—and noting that a number of them had completed practices on their land and thanking them. The result was more landowners calling and wanting assistance to implement conservation on their shorelines.

Building Momentum

Most people lack sufficient knowledge about water quality issues, or they may be so spatially or socially disconnected from the resource, that they don't see themselves as either the cause of or the solution to the problem. Even for those who are aware of their relevance, or who are open to change regardless, there can be many barriers to implementation.

Of course, there are always those few people who will initially—or permanently—resist change. No matter how determined the resource professional or how little effort it would actually take on their part, they simply refuse to take advice or responsibility. Whatever the reason, local partners have found it best not to be overly concerned with setbacks or the unwilling few. They instead maintain a steadfast focus on increasing capacity for change by building trusting relationships and delivering quality services to the willing majority.

In the private sector, a business prospers when customers feel they are treated well and are happy with the products or services. Operating in the public sector is no different. Both the number of land users seeking assistance and the number of practices put on the ground in Scott County have risen tremendously since the focus was placed on relationships and service.

Some might argue that working with willing cooperators limits the ability to target and prioritize. We argue the contrary. By not worrying about the few who are unwilling to work with us, we improve our ability—over time—to target. If the resource professional hasn't built trust within the community, or if land users are unhappy with the service or practice, negative buzz will get around. The "difficult" land users will become even more difficult to reach. Despite efforts at engagement with the land user, issues likely will go unresolved even if the land they own or operate is targeted for a high-priority project.

In a way, rising numbers of land users willing to work with resource professionals is more of a threat to targeting than a small number who won't. Maintaining positive relationships and delivering quality service becomes challenging in this scenario. Available time and resources for individual attention decreases as the number of land users seeking help to make voluntary changes increases.

Even though the ability to actively target is limited, it is still important to go knock on doors and develop new relationships. This is particularly true in today's competitive grant environment, in which PTM (prioritized, targeted, and measurable) is ever important and local plans call for targeting specific practices in specific locations.

Progress can be slow, but as more people see neighbors adopting conservation practices and hear about positive experiences at the coffee shop, or read about them in the local press, the more things start to happen. At first, changes will be small, but an ongoing focus on building community capacity for

change, especially by focusing on the human rather than the technical elements of resource management, will inevitably create momentum with various efforts feeding off of and sustaining one another.

Momentum such as this is an example of the flywheel effect described in Chapter 1. Monitoring, assessing, and planning are great ways to determine what must be done, but building relationships and delivering great service are critical to increasing a community's capacity to take action and implement the sort of change necessary to achieve meaningful outcomes.

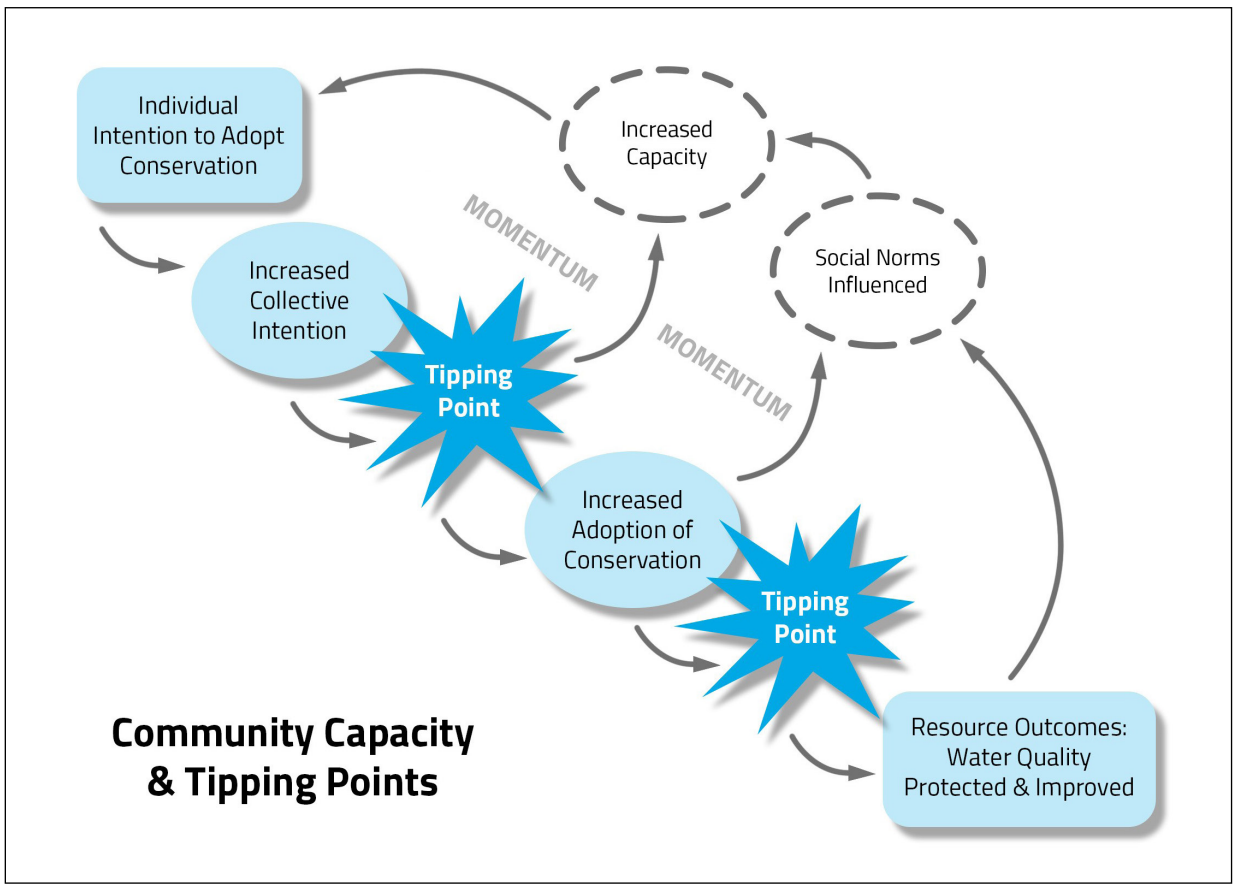


Figure 9. Community Capacity and Tipping Points

Ultimately, NPS pollution control success is achieved when "tipping points" are reached for new social norms. Really, two tipping points must be reached in order to build momentum and achieve water quality or resource-based outcomes (Figure 9). One tipping point stems from a rise in collective intention, and the second from increased adoption of conservation practices. This means enough land users have changed their intentions, and have made enough pro-environmental changes that water quality improvements are realized, and the behaviors and actions associated with those changes are more commonplace, or "normal," than not.

The way farmers till their fields now, compared with several decades ago, offers a perfect example. Prior to the 1980s, nearly all cropland was plowed and cultivated in such a way that nearly all evidence of the previous year's crop residue (stalks, leaves, etc.) was gone. This "clean till" mentality was the social norm, and leaving residue on the surface was considered a poor farming practice.

In 1985 conservation provisions aimed in part at limiting soil erosion were incorporated into the U.S. Farm Bill. Incentive programs began promoting conservation tillage, the tillage method that preserves crop residue cover as a means of protecting soil from wind and water erosion. The convergence of these two phenomena resulted in a paradigm shift.

Today, the practice of conservation tillage is commonplace, and having 30% or more residue cover in a field is viewed as good farming technique. The result has been a drastic reduction in soil erosion and, subsequently, runoff pollution into nearby waterways.

Chapter 5

How to Build Strong Relationships and Enduring Partnerships

Relationship-building is the foundation of effective local delivery and engagement. Building on earlier discussion of the importance of getting to know landowners and the community, as well as the importance of community values, networks, and sense of responsibility in creating sustainable resource management, this chapter focuses on relationships as the foundation for building trust at the individual and partner level, and for building momentum toward voluntary conservation.

Strengthening Relationships

Relationships are important because NPS pollution control demands willing participation on the part of land users who are often asked to change behavior, spend their own time or money, or potentially sacrifice revenue from their land in the name of fixing a problem they may not understand, appreciate, or agree even exists.

Before education, technical assistance, and cost share programs can be effective, land users must be willing to engage in a dialogue about change, conclude that change is in their better interest, accept enough responsibility to undertake change, and believe their efforts will make a difference. Bringing them to this point requires a sustained dedication to building positive relationships.

Only through relationships with those who make land use decisions can resource professionals understand barriers to water resource improvement, whether at an individual or community level, and begin to chart a path to overcoming them—recognizing that the path will be short for some and long for others. More often than not, the needs and interests of individual land users are not aligned with the specific needs of a particular water resource or ecosystem. For this reason, understanding landowner priorities must take precedence for the resource professional.

Relational capacity

Relational capacity refers to existing relationships and networks within the community and their capacity to support conservation action. Relational capacity "encompasses interpersonal relationships and social networks within communities that promote knowledge exchange and sense of community. Common awareness and concern promote a collective sense of responsibility for water resource consequences" (Davenport, 2013, p. 7).

Building relational capacity means supporting existing relationships and bringing people together to form new relationships around water. The more people know and identify with one another, the more likely they are to feel responsible for their own actions and one another's actions.

According to the Multilevel Community Capacity Model, relational capacity includes the following four key elements:

- Informal social networks
- Sense of community
- Common awareness and concern
- Collective sense of responsibility

> Relationships can be good or bad, positive or negative.
>
> If, as a society, we are not cultivating positive relationships with land users, we will inevitably encounter resistance.
>
> Positive outcomes will be limited, and any that do occur are more likely to be temporary.

Networking Leads to More Networking

At the Scott WMO, we were working on a total maximum daily load (TMDL) study for McMahon Lake. McMahon Lake is a small shallow lake that is impaired for excessive nutrients. We were having a difficult time getting lakeshore owners to attend meetings. However, through our relationship-building effort, I was assigned to develop a relationship with the local sportsman's club that had adopted the lake.

The club operated a winter aerator on the lake and annually hosted an ice-off clean-up event and a fishing tournament. I had attended a number of club meetings and was keeping members up to date on the study. At one of these meetings, one of the club members offered to host a meeting for the lakeshore owners. I thought it was a great idea, and they organized it.

Being that McMahon Lake is a small lake, I and the lakeshore owners could fit around a card table in the back room of the local bar. While we were waiting for everyone to arrive, typical chit-chat started with one of the landowners complaining about erosion on her shoreline.

We had already been helping her neighbor with his shoreline erosion problem, and I was about to jump in and say that we could help, but the neighbor jumped in first, stating, "You should work with these guys. They are helping me with my erosion, and they're great."

So, I gave her information on whom to contact at the Scott SWCD. Within a week, this landowner had set up an appointment to have someone come and look at her property, and she ended up installing a lakeshore restoration project with help through our technical assistance and cost-share program.

The story, however, does not stop there. Shortly after this landowner installed her project, her son signed up for assistance and wound up converting 17 acres of cropland adjacent to a nearby lake to native grasses.

The son was also a member of the sportsman's club, and several years later, when the lake level was high—McMahon Lake does not have a natural outlet—he talked the club into approaching the Scott WMO about establishing a no-wake ordinance for boats during high water levels to protect the shoreline.

Once again, the club took the lead in getting the lakeshore owners together, and jointly we wrote an ordinance that had local support. Just in time, too, as the following year brought an unprecedented amount of rain, a Presidential Disaster Declaration, and very high lake levels.

— Paul Nelson

Informal social networks

In many communities, informal social networks serve as primary pathways for information exchange, deliberation and problem-solving. (See call-out box titled "Networking Leads to More Networking.")

Within their social networks, people communicate their knowledge and beliefs, they share their values, and they express attitudes. Behaviors are also on display in social networks; people convene to act and to influence others. Social networks can maintain the status quo, but they can also spark social change.

In the context of conservation action, informal social networks can have positive or negative outcomes for water and for community. Ideally, accurate, reliable, and timely information about conservation programs, projects, and practices is exchanged in social networks. And, network members know how to seek information to address any unknowns or uncertainties. However, just as many of us learned in the childhood game "telephone," messages can get lost or miscommunicated as they are told and retold (filtered and revised) by busy and sometimes distracted network members.

Informal social networks are important not just for the information shared, but also because they allow people to "try out" untested ideas, get and receive feedback, and take unofficial polls among

Making Good News the News

To encourage positive stories to be at least one of the narratives that emerges around the breakfast table, the WMO and SWCD are careful to 1) make stories and information accessible to informal and formal networks (e.g., through the local media and intentional conversations, for example), so that information voids are less likely to be filled by rumors and misinformation; and 2) provide high-quality service for those land users who do chose to work with them. Rather than base communications programming on the old adage "no news is bad news," conservation organizations need to focus on giving land users something positive to discuss.

friends on important and timely topics and issues. Network members also can find support from one another for conservation action by way of resource pooling, confidence building, and social modeling.

Social networks can stimulate collaborative problem-solving, creativity, and innovation in conservation. They can also serve to maintain (or change) social norms through social pressures and controls on community member behavior.

Resource professionals may know, for example, that a group of local farmers often gets together for morning coffee and conversation at a local diner. On occasion, the topic will be conservation, such as discussion of an experience they had participating in a program or a new practice they just installed. Though not always perfectly accurate or inclusive of all farmers in the county, this form of information exchange and influence is significant to social change. While conservation professionals are not likely to directly influence the network, being aware of its existence and considering the network's membership and beliefs is important.

Network membership is important because informal social networks are not typically inclusive of the diversity of members that exist within a community. An informal social network commonly develops because its members' share values or interests (e.g., church congregants, high school friends, co-workers). In some cases, informal social networks are perceived as exclusive, albeit unintentionally, by others in the community.

Sense of community

A sense of community or community identity is developed through member experiences and expressions of community among members. A sense of community may be anchored in perceptions and emotions around community cohesion, pride, and attachment. It can also reflect feelings of isolation, shame, and detachment (Slemp et al., 2012).

A sense of community is not easily influenced by resource professionals, but a healthy natural environment, clean water, and conservation stewardship, if embraced by community members, can become a central storyline of a community's identity.

Sense of community and community attachment develop at varying levels and in different ways. An individual's attachment to a community can be influenced by length of residence, stage in life cycle (e.g., young adult versus retiree), social relations, and emotional connections to the natural (and built) environment (Brehm et al., 2006).

Consider, for example, Scott County, which covers more than 300 square miles and comprises a number of small cities separated by unincorporated area. Certainly, city residents have a sense of community brought about by such things such as close housing, dependence on the same public services, community events, connected sidewalks and trails, etc. Contrast this with the unincorporated areas where residents live relatively far apart, are not dependent on public services, and don't share sidewalks or trails. In such areas, sense of community largely resides in schools, church congregations, community-based service organizations, local taverns and restaurants, clubs, and cooperatives.

In many communities, water is not central to community identity and water resources do not serve as the basis for community attachment. The presence of unique or prominent water features may make water and water quality part of a community's identity.

Local Application and Lessons Learned

Scott County is not necessarily considered "lake country," but it nevertheless has fairly significant water resources including the Prior and Spring chain of lakes, the O'Dowd chain of lakes, and Cedar Lake. Communities around these water resources actually do coalesce around water, forming associations and districts specifically aimed at addressing water issues for which there is collective concern. In these cases, watershed districts, WMOs, and SWCDs seek partnerships and make their own resources available to support and supplement the efforts led by community associations.

Although sense of community around water resources tends to be strong only in the areas immediate adjacent to those resources, sense of community around wildlife extends across the county. In fact, Scott County has a number of "sportsman's" clubs, and the local Pheasants Forever chapter is very active. By considering this sense of community along with the generally accepted characteristics of the county, it is possible to develop a capacity-building strategy tailored to the area.

Understanding that people in Scott County typically like its small-town feel, as well as its open space and rural fringe, and that local units of government in the county pride themselves on being collaborative, the local partners undertook the following targeted actions.

- Marketing water quality efforts as also benefiting open space and wildlife, and promoting practices that have multiple benefits. (See story box titled "Moderating Runoff While Helping Pollinators.")
- Developing partnerships with the cities, townships, and community-based organizations, and taking advantage of shared interests and each other's expertise to accomplish goals rather than a "go-it-alone" approach. (These partnerships are highlighted throughout the manual, and many are described in further detail in Chapter 6.)
- Focusing on a sense of community that is very local rather than try and tap into a larger sense of community associated with Scott County. For instance, the local partners intentionally assigned staff to develop relationships with various community groups that have some link to environmental issues, and it has found success with lake and sportsman's organizations.

Further efforts include work with students from an environmental ethics class at a local high school and conversations with an "eco-faith" group representing multiple area churches interested in starting an effort around water.

In urban communities, where natural hydrology is altered and streams are commonly underground, water may be seen as more of a liability than an asset. Still, recent Minnesota research reveals that clean drinking water and clean streams, rivers, and lakes are highly important neighborhood qualities to Twin Cities metropolitan residents surveyed in 2015 (Davenport et al., 2016).

Local conservation organizations including watershed districts, WMOs, and SWCDs can play a big role in making the connection between water and community identity. Through one-on-one conversations with community leaders and diverse members, resource professionals can identify linkages between community, community identity, and water.

Common awareness and concern

Awareness of consequences is one of the primary activators leading to individual conservation action, as discussed in Chapter 4. Common awareness and concern within a community of resource users is also a critical precursor to collective action in NPS pollution control. If a community is collectively aware of water quality impairments and shares concerns about their consequences, community leaders and actors are more likely to prioritize action and allocate resources for implementation. Awareness of consequences sets the stage for developing social norms around conservation.

Resource professionals often examine water quality issues at the macro-level, preparing plans and strategies at a county-wide, if not multi-county, scale. However, a micro-level approach can be more effective because it can be tailored based on awareness, concern, and readiness of specific communities or groups.

In general, awareness of the NPS pollution problem and its consequences is low in Scott County. (See Table 3, Chapter 3.) In agricultural and rural portions of Scott County, there are no specific water bodies around which to develop collective concern, and people lack common awareness over water quality issues. Because awareness of consequences is one of the primary activators leading to individual conservation action, it is unrealistic to expect wide-scale adoption of new conservation practices by drawing on concerns the county or state might have about water quality.

By the same token, there is a common concern about soil health and erosion, and their effect on crop productivity. Thus, the local partners have focused on a smaller scale, where there is shared awareness and concern about soil health. Similarly, local partners have targeted communities near lakes used for recreation in terms of promoting specific water quality awareness about nutrients or invasive species.

On a larger scale, with respect to promoting common awareness and concerns, the local partners focus on general environmental attributes such as concern for future generations, wildlife, aquatic life, soil health, and preserving groundwater (quantity and quality).

Collective sense of responsibility

Personal sense of responsibility and willingness to engage in (private) conservation practices were very high in the Sand Creek landowner survey results. (See Table 3, Chapter 3.) However, only about half of respondents said that they felt obligated to work with other community members (i.e., public conservation action or civic engagement) to protect the natural environment.

Collective sense of responsibility is the recognition of being accountable for a community's actions and "having a common duty to address a water resource problem or need" (Davenport, 2013, pg. 45). Research findings from the Sand Creek and Vermillion River landowner survey (Davenport & Pradhananga, 2012) revealed statistical differences between adopters and non-adopters of streamside buffers across their civic engagement: adopters were significantly more likely than non-adopters to have attended a community meeting about an environmental issue or discussed water quality issues with community members.

Personal sense of responsibility is an activator of personal norms of conservation action. Thus, Scott County partners viewed leveraging the high sense of personal responsibility among landowners and land users toward enhancing a collective sense of responsibility as a tremendous opportunity to affect social norms and engage the community in collective action. To this end, the local partners undertook several initiatives and actions:

1. Used the community's high sense of personal responsibility to reinforce the idea that implementing conservation is a local social norm and that the area has a strong conservation ethic.
2. Intentionally created community events at which people can work together to implement conservation. Community events send the message that conservation is important to

Moderating Runoff While Helping Pollinators

One of the more popular incentive practices in Scott County is establishing native grasses or prairies. We embrace it as a means of increasing the amount of perennial vegetation. Increasing the amount of perennial vegetation is a runoff reduction strategy articulated in both local and basin water plans. Landowners, however, are interested in the practice for its wildlife, aesthetic, and pollinator benefits. Thus, these are the attributes we highlight when marketing the practice. Water quality and erosion control are secondary.

the community, and they foster a sense of commitment and accomplishment. Events have taken the form of volunteer planting efforts to establish buffers adjacent to lakes or wetlands. Local land and water restoration organization Great River Greening coordinated the event and assisted in finding volunteers.

3. Hosted public "thank you" events to recognize those who have implemented conservation, thereby expressing the message that conservation is the norm and that it is successful and appreciated. (The organization typically invited press to attend these events.)
4. Encouraged and supported other partners to host events, as well. Some of these events have included ice-off cleanups by the lake organizations or sportsman's clubs.
5. Enabled local organizations to get involved through a mini-grant program called Watershed Stewards. Under this program, community organizations can apply for up to $2,500 from the Scott WMO for local water education or management efforts. (In its first few years, the program has received only a handful of applications, but the WMO plans to increase its efforts to advertise the grant, as other Twin Cities area watershed organizations have had success with similar grant programs.)

Recognizing Leaders for Their Conservation Efforts Builds Social Norms

As we have demonstrated throughout this manual, we believe in the power of success stories. This is true in part because research has shown that landowners need to believe their efforts will make a difference. We also believe in providing positive feedback, and we know that stories about people within the community doing conservation reinforce those efforts as a community norm.

The knowledge that community members believe in conservation has as much or more traction with others committing to conservation as anything that staff at the local unit of government can say. To this end, we have provided local staff with training on storytelling, and we emphasize stories about people within our own community doing conservation.

We're fortunate to have a bi-monthly newsletter called the Scott County SCENE that reaches all 55,000 households in the county. Citizens read the SCENE. We know this because people call when we have items in the SCENE and because most attendees at our workshops learned of the opportunity via SCENE.

We try to have a story or two in each issue of SCENE, and each focuses on the work done by the farmer or landowner. For example, on page 10 of the February/March 2012 issue (Appendix B), the story focuses less on the fact that the Scott SWCD has no-till drill equipment for use and more on how local farmers have used this equipment. While the use of community member names in such stories lends credibility, details about how farmers used the equipment and what they liked about the process help to make the story concrete. It also helps that each story is relatively short and concise. On page 1 of the same issue of the SCENE is a story about a couple who put in a rain garden. Another story, on page 3 of the February/March 2015 issue (Appendix B), features local conservation award finalists for the state-wide Outstanding Conservationist Program. Further stories are included in Appendix B.

— Paul Nelson

Trust

Whether through voluntary or other means, the achievement of water resource goals relies on positive relationships with people. From repeated affirming and constructive interactions comes trust, arguably the most essential ingredient for success in encouraging individuals and communities to do something different.

Grant Programs by Other Watersheds

Cynthia Krieg Stewardship Fund at the Minnehaha Creek Watershed District

http://www.minnehahacreek.org/grants

Partners Grants from the Capitol Region Watershed District

http://www.capitolregionwd.org/our-work/grants/2013-crwd-partner-grants/

Stewardship Fund Grants from the Mississippi Watershed Management Organization

http://www.mwmo.org/stewardshipfund.html

Merriam Webster succinctly defines "trust" as "assured reliance on the character, ability, strength, or truth of someone or something."

Emphasizing Customer Service

Over the past decade, the number of land users Scott SWCD assists at any given time has risen from fewer than 100 to more than 250 (Figure 10). The more interesting fact, however, is that the majority (90%) of these individuals called on their own to request assistance from the SWCD rather than in response to a targeted outreach campaign. This is an example of conservation momentum discussed in Chapter 1.

This phenomenon has not developed by accident, but rather by placing topmost priority on building positive relationships and delivering excellent service. The goal with each individual encounter is to have the phrase "Hi, we're from the government, and we're here to help you." be a refreshing reality. Admittedly, prioritizing customer needs can draw time and resources away from resource concerns that may be higher priority. At the end of the day, however, targeting is more likely to be successful (i.e., result in a positive outcome) when the land user trusts and is willing to listen and engage with the resource professional and organization doing the targeting.

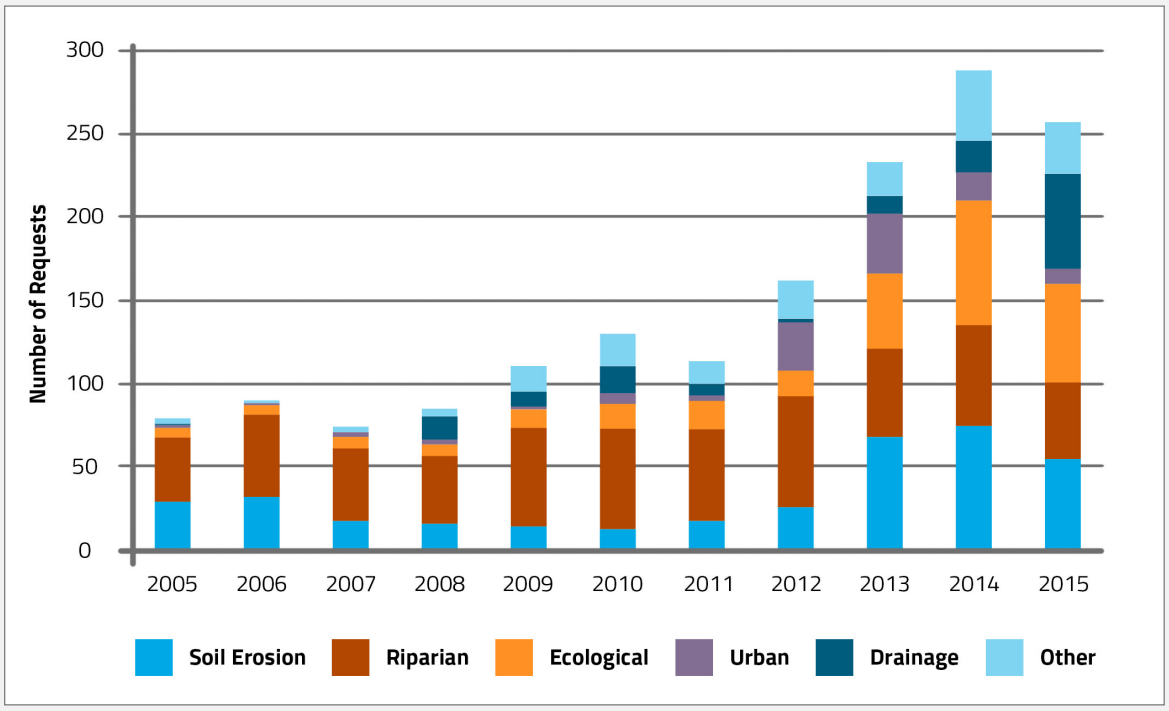


Figure 10. Landowner Technical Assistance Requests

People generally resist change, especially if it is being thrust upon them by someone they don't know or trust. Where trust exists, the opportunity to inspire and persuade land users to at least consider trying something different is boundless. When a resource professional has earned trust and respect, two amazing things begin to happen.

First, land users begin seeking help and information on their own. Change is more lasting and takes far less time and money to implement when it is the result of a land user's own willingness and voluntary initiative than in reaction to unsolicited attempts by external forces to compel behavior change. Second, land users become more willing to be actively involved as partners, and even conservation leaders, in addressing specific issues or concerns.

There comes a point where successful engagement with landowners can be problematic. As we all know, there is no shortage of plans to implement or priority sites to fix. If the majority of resource professionals' time is dedicated to responding to voluntary and unsolicited requests for assistance, however, they have less time available to target further efforts.

It goes without saying that this dilemma is far more desirable than the alternative. If a land user does not trust or feel comfortable engaging with the resource professional, then what will the likely reaction be to receiving a visit and being advised to install a grassed waterway and filter strips to address a water quality concern—one that is likely of little connection or concern to them?

Skills and experience in developing and sustaining relationships with land users is arguably the most valuable asset organizations such as SWCDs bring to the table in encouraging NPS pollution control.

It is critical that the individuals who interact with land users targeted for water resource improvement possess strong interpersonal skills.

Research has shown that SWCDs have the greatest level of trust by land users compared with any other resource protection agency.

As such, they offer the best opportunity for resource improvement plans to be implemented successfully and sustainably, with the trust and support of the community and its individual members.

Unenthusiastic at best, but more likely adverse. Even if the land user wasn't totally dismissive, the likelihood that they would proactively seek help to address other resource concerns is small.

By building positive relationships, resource professionals gain the trust of land users. The result is an ability to knock on a door to engage in a discussion, whether to address a specific resource concern on the property or to seek advice and feedback on programming.

Trust is hard to gain but easy to lose. To gain trust, the resource professional must exhibit—at the least—technical competency, common sense, and respect when engaging with the land user.

Precision Engagement

In 2013 the authors were invited to a conference on precision conservation and asked to give a presentation on "Winning the Trust of Land Owners." To emphasize the importance of relationships, we ended with a slide that said, "RELATIONSHIPS, RELATIONSHIPS, RELATIONSHIPS!" Intuitively, this makes sense. Landowners will listen to and work with people they trust.

Trust is even more important when using precision conservation to get best management practices (BMPs) implemented where science and watershed assessment has identified they will do the most good. With precision conservation the knowledge of where BMPs are most valuable resides with our scientists and watershed managers, and so it is up to us to call land users and ask them to implement. Our experience is that landowner response to these requests is much better where there is trust and a relationship—precision engagement.

Being Genuine and Systematic

Precision conservation or targeting of BMPs has been widely accepted as the way of the future. However, decisions about where the most effective targeted BMPs should be implemented are generally developed as part of state or local studies of the biophysical characteristics of the land, with only limited input of land users themselves. Even with well-designed landowner engagement efforts, the number of land users involved in studies is limited. Some will choose not to participate, others will not have heard about the study, and still others will not understand what is being decided at a given stage.

What this means is that land users must be contacted and asked to consider implementing the targeted BMPs. This undertaking is most likely to be successful if the person or organization doing the calling is trusted by the land user. Understanding this, the Scott WMO and Scott SWCD created a systematic approach to relationship-building that can be replicated.

Step 1. Identify roles. For example, the WMO might take the lead on developing relationships with organizations (i.e., lake associations, outdoor sports clubs, other local units of government) while the SWCD takes the lead in developing relationships with individual landowners and agricultural producers.

Step 2. Make assignments to individual staff for getting to know specific organizations and agricultural producers. (In Scott County this was possible with area landowners largely because most of the county's farmland is operated by a relatively small number of large producers, compared with the total number of landowners.)

Step 3. Explicitly prioritize and support the building of positive relationships and customer experiences—as much as or more than a specific environmental outcome—and acknowledge that providing good service and follow-through affects trust with both land users and the larger community (since they talk with each other).

Step 4. Highlight successes and provide tips on using stories and positive reinforcement to increase staff comfort and confidence making proactive land user contacts.

Step 5. Annually assesses what works and what doesn't, and routinely make changes to policies and strategies used to achieve short- and long-term goals.

Developing Enduring Partnerships

Community-based organizations (CBOs) can prove to be invaluable partners in NPS pollution control.

Historically, CBOs have played an increasingly prominent role in public lands management for many reasons, including discontent with top-down government-driven decisions prompting grassroots or bottom-up community engagement, fiscal challenges to land management agencies forcing them to mobilize community volunteers and service organizations, and recognition by public land managers of the need for landowners and resource users to participate in initiatives aimed at improving ecosystem or watershed health (Baker et al., 2010).

The development of meaningful and enduring partnerships with local government and non-government organizations can be daunting and often requires significant capacity building within the resource agency itself and across prospective partner organizations.

Think about how much easier promoting conservation would be—and how much momentum could be created—if leadership, members/citizens, networks, community organizations and conservation staff in your local community were all aligned and working toward the same outcomes.

Now think about how that could be expanded further if local, state and federal levels were aligned and working together to build up the capacity of these local partners.

Organizational capacity

Organizational capacity reflects the coordination, linkage, and alignment of efforts through community organizing, organizational development, and partnership building. Supporting local organizations is important to NPS pollution control efforts because organizations enhance the ability of a community to respond to problems and to engage in long-term initiatives. Beyond the obvious organizations engaged in conservation, a range of community-based organizations can play a role in NPS pollution control.

CBOs or local non-government organizations—also referred to as boundary organizations because they operate at the boundaries between government and residents—have some local staffing and typically a bottom-up approach to meeting community needs. In a Minnesota study of community capacity for stormwater management in the Twin Cities metro area, Davenport et al. (2016) explain, "CBOs have a keen understanding of community needs. CBOs vary in their missions—health, education, social welfare, economic development, affordable housing, accessibility, youth development, and faith" (pg. 46).

The study authors encourage resource professionals to partner with CBOs to learn more about community assets and needs and how things get done in a community. They conclude, "CBOs are often repositories of community knowledge and resources. [They can] serve as entry points to present and deliberate water problems and opportunities within the community" (p. 46).

Partnering with CBOs expands the pie for water resource management and leverages people and relationships with strong standing and influence in the community.

Although a variety of different organizations, organizational structures and missions exist, the Multilevel Community Capacity Model identifies the following key elements as central to organizational capacity:

- Strong leadership
- Fair and meaningful member engagement
- Formal networks used to exchange knowledge
- Collective memory
- Collaborative decision making
- Conflict management

Hallmarks of high-capacity organizations are collaborative decision-making and effective conflict management (Davenport, 2013).

For many watershed organizations, CBOs are an untapped resource. Conservation professionals can build momentum toward NPS pollution control by building capacity within their own organizations and developing the capacity of existing CBOs to make a difference in clean water.

Strong leadership

Organizational capacity depends on people with influence in the organization and within the broader community. Strong leaders are those who are responsive and visionary when it comes to their community's needs, and who can see the bigger and longer-term picture of community well-being.

Strong community leaders (e.g., local officials, CBO representatives, or other community actors with influence) who are also willing to champion conservation and be vocal (and visible) about it can drive collective conservation action.

Conservation organizations can support leadership development in many ways. For example, a watershed organization may:

- Provide leadership training for those willing to serve as leaders, whether in a data collection effort or through service on a Citizens Advisory Committee, Watershed Planning Commission, or similar body.
- Recognize and thank leaders in newsletters, annual leadership award programs, handwritten "thank you" cards, and regular volunteer/leadership appreciation events.
- Actively solicit the advice of prospective leaders, and listen to them.
- Personally communicate appreciation of efforts. Public appreciation is important, but a heartfelt thank you also goes a long way.
- Seek diverse leaders from underrepresented communities or social groups.

Signing and mailing thank you cards is a standing agenda item at all Scott WMO Watershed Planning Commission meetings.

Reinforcing leadership can also mean averting counterproductive actions and situations. Strong leaders for conservation are not out in the community saying or doing things that cause division for political expediency. For example, comments by elected officials about the failure of certain groups of landowners to do their part could undermine the efforts of the resource professionals working with those landowners. Resource professionals have a responsibility to gently inform or remind leaders that such actions are not helpful.

Fair and meaningful member engagement

By making sincere efforts to engage community members, resource professionals can generate mutual understanding, address common problems, and develop partners committed to implementation. This process requires some sharing of power, as decisions have more traction when they are made collaboratively and locally.

Consider, for example, the story (Example 3, Chapter 6) of building local capacity in the Cedar Lake Improvement District (CLID). Because it was important that the people around the lake and the CLID become long-term partners, the Scott WMO supported the CLID's authority to make its own decision about treating curlyleaf pondweed, and it was prepared to live with that decision. The Scott WMO also was very careful to let the CLID know that improving Cedar Lake would be a challenge—and one that would take time.

For the resource professional, effective engagement demands transparency and a willingness to be honest about uncertainty and challenges afoot. When land users and landowner groups understand that change can be difficult and require a certain amount of risk-taking, they are better able to take ownership of and responsibility for the process and its outcomes. In Scott County, it has been important to make every effort to speak directly with people rather than through the media, particularly if one individual or a group has been identified as a target for improving conservation.

While resource professionals and organizations may develop a positive working relationship with the press, it is impossible to control how information is presented or framed in the media. Thus, the local newspaper is not the appropriate forum in which to debate conservation issues. Rather than inspire land users to take action, this approach can polarize issues, putting landowners on the defensive and making voluntary implementation of conservation unlikely. Once people have taken a side, they

become hard to reach. Backing away from a position after taking a side can feel like admitting to being wrong, and that's rarely easy for anyone.

Other ways to meaningfully engage community members include:

- Allowing many decisions to be made locally. Small group meetings with those most affected by decisions are the most productive.
- Being transparent and not promising too much.
- Avoiding placing blame and, whenever possible, talking to landowners directly rather than through the media.
- Following up and showing people that they have been heard. People are more accepting of decisions if they have been consulted, even if they didn't get the decision they wanted.
- Training staff to negotiate based on empathy and promoting common interests and outcomes (i.e., desire for good water quality), not personal or hard-line positions (i.e., belief that there needs to be more regulation).
- Training staff on effective interpersonal communication and how to use stories to foster better understanding or engagement.

Formal networks used to exchange information

Information sharing, if done correctly, can facilitate social learning, foster collective decision-making, and grow participation in programs. However, information alone may be of little use to community members and organizations without guidance on what the information means and how to apply it.

Formal information networks established within and between communities may help the resource professional present information and deliberate its meaning beyond the typical public information campaigns. Consider how decisions are made within a community around growth, development, community priorities, and spending. Meeting regularly with planning and management departments, county boards, city councils, and development offices sets the context for NPS pollution control as an important consideration, if not a priority, in decision-making.

Formal relationships can be existing, or they may need to be nurtured. Unlike informal networks, where there is little control over the agenda, these relationships provide an opportunity for routine, structured, and deliberate two-way communication. Issues requiring long deliberation, group learning, or trust-building can be addressed more deliberately, and progress can be tracked through summary reports and meeting minutes.

Collective memory

Recognition of a community's history, its long-standing leaders and organizations, and its legacy of land uses and conservation actions is important, particularly for learning and adapting. For resource professionals, it is extremely valuable to have personal accounts or institutional memory and records that document what has already been tried, and why it was (or wasn't) successful.

Collective memory can be formally and informally managed in an organization and between organizations. One way to do this is by documenting the history and progress (learning from success and failure) of conservation initiatives and organizations (or community initiatives/organizations) through annual reports, annual assessment of measures, plans, meeting minutes, studies, monitoring, etc.

To maintain collective memory, it also is valuable to take all reasonable steps to retain staff, not only watching and matching market rates for salary, but also promoting a supportive work environment. Historical knowledge of a community, organizations, and initiatives is not just limited to staff. Maintaining relationships with board members, citizen advisors, and other community actors builds collective memory.

Collective memory about interactions between organizations is also important and can be the source of conflict if not properly documented through memoranda of understanding (MOUs) or other partnership agreements.

Formal Networks Engaged by the Scott WMO

The Scott WMO has a number of formal networks with which it interacts. Those developed by the Scott WMO or other local governments include: the Watershed Planning Commission, the Technical Advisory Committee for the Scott WMO, and Scott County Association for Leadership and Efficiency (SCALE).

The Scott WMO Watershed Planning Commission is a seven-member commission set up to advise the Scott WMO. It is a citizens' advisory committee. This is important because the Scott WMO Board is the Scott County Board. The Scott County Board is involved in numerous issues from roads to human health; its members are not water resources experts. It helps to have the Scott WMO Watershed Planning Commission to look closely at water specific issues.

The seven members are appointed and meet monthly. Activities (scheduling of meetings, preparation of minutes, etc.) of the commission are staff-supported. Both county staff who administer the Scott WMO and Scott SWCD staff bring items to the commission.

The Scott WMO Technical Advisory Committee comprises representatives of municipalities and townships in the watershed, representatives of adjoining watershed organizations and counties, and regional and state agency representatives. It meets once or twice annually when there are specific technical questions that call for wider input and buy-in. It also serves as a place to share information and project updates.

SCALE was formed in the spring of 2003 to encourage greater efficiencies and leadership in public service through enhanced communication, collaboration of services, and sharing of resources. Members include elected and appointed officials from the cities, schools, watershed organizations, and townships within Scott County, the Shakopee Mdewakanton Sioux Community, and the Scott SWCD.

SCALE members meet monthly to discuss ways in which local governments can continue to maximize the value of taxpayers' money through cooperating in mutual service areas, such as public safety, parks and recreation, transportation, community development, water resources, and general government. The SCALE Service and Delivery subcommittee, largely comprising city administrators and township officials, has frequently discussed water resources and governance issues.

There also exists a local (city, county, etc.) water resources staff group that meets once or twice a year to share information, coordinate programs, and align policies. This group comprises staff from watershed organizations in the county, county staff, Scott SWCD staff, staff from the Shakopee Mdewakanton Sioux Community, and staff from municipalities.

Sharing and joint development of Standard Operating Procedures for construction erosion control programs and coordination of joint shoreland and rain garden outreach programs are examples of the types of things addressed by this group.

The Scott WMO is also working to start a farmer-led cooperative to advise on and promote forms of conservation they value. It is important to note that this cooperative will be self-directed with coordination provided by a third party, the Minnesota Agricultural Water Resources Center. (The Scott WMO would be perceived as having an agenda, because it does!)

Other formal networks that the Scott WMO and Scott SWCD recognize locally and share information with include the Cedar Lake Improvement District, sportsman's clubs, the local chapter of Pheasants Forever, and the O'Dowd Chain of Lakes Association.

With these organizations, the local Scott partners are intentionally trying to build relationships. Scott WMO staff members are assigned one or more organizations to stay in touch with and get to know. Making contacts and sharing information can take the form of annual attendance at a meeting to provide an update on projects, or weekly conversations while implementing joint efforts.

Collaborative decision-making

The importance of collaboration and effective collaborative decision-making processes has been emphasized throughout this manual. Without control over all the "systems" at play, conservation-based organizations and professionals need community partners.

Collaboration in NPS pollution control can take many forms and have multiple water resource and community benefits. The benefits of collaboration include building understanding and managing uncertainty around NPS pollution sources/impacts, making good NPS pollution decisions and fostering community support, getting NPS pollution solutions on the ground, and developing long-term community capacity to address water problems (Wondelleck and Yaffee, 2000).

Ways to foster collaborative decision making include:

- Engaging a Citizens Advisory Committee and a Technical Advisory Committee for guidance on water resource-community land use planning; diverse representation in these committees is important.
- Using small groups and working with those most affected by the decisions.
- Training staff on the art of negotiation to reach amicable agreements.
- Working with partners to develop joint annual plans for specific programs. For example, the Scott Clean Water Education Program (SCWEP, described in more detail later) has a steering committee, comprising representatives of all the partners, that develops an annual plan setting out goals and activities for the year.

Collaborative decision-making should not be limited only to board members and administrators; it must also include staff. Staff members have valuable technical expertise and, perhaps more important, they have the relationships with land users. If staff members are not fully committed because they were excluded from decision-making, it will be hard for them to generate the necessary enthusiasm to promote actions with land users. The same is true for state, federal, and regional agencies. Involving local units of government that work more closely with land users is critical to their buy-in.

Another example of a collaborative decision-making process by the local partnership in Scott County is the annual review and update of the Technical Assistance and Cost Share (TACS) program docket. The docket spells out the cost share and incentive rates for eligible BMPs. Review and initial discussions are completed by the staff of both the Scott SWCD and Scott WMO. This is followed by a joint meeting of the Scott WMO Watershed Planning Commission and the Scott SWCD Board of Supervisors to review and act on recommendations made by staff.

Legitimacy is achieved when stakeholders perceive that managing organizations have valid authority and that decision making power is appropriately distributed among levels of government or management agencies.

Conflict management

In any effort involving people, there may be disagreement and conflict. For conservation initiatives, the way conflict is managed affects both land user trust and the success of conservation programs. Effective conflict management involves gathering information on the areas of conflict, getting to know the people and understanding the interests and values involved, and setting up a space for honest and respectful deliberation and negotiation. It may be important to clearly establish a structure and goals for conflict resolution. Depending on the conflict, it may be wise to bring in a neutral third-party facilitator.

Consider what's at stake for the people involved, if any areas of agreement exist, and who will be accountable for outcomes. Conflict avoidance often has hidden costs that may compound over time. To be proactive:

- Try to engage people directly, rather than indirectly through others.
- Avoid highlighting disagreements in the media.
- Train staff in negotiation and on how to focus dialogue on interests and preferences (e.g. erosion reduction) rather than positions (e.g., for or against a conservation program).
- Aim to make collaborative decisions.
- Commit to building and improving relationships to the point at which it's possible to agree to disagree while continuing to work together.

Quality control reviews of every BMP designed and implemented, not just those funded by the state or federal government, and regular customer satisfaction surveys can provide insight into how the organization can do better.

Know and Play to Your Strengths

With its emphasis on developing relationships and trust, the Scott SWCD has been able to build significant legitimacy, as shown in Figure 11, to the extent that it has almost as much influence as family when it comes to conservation decisions. The organization's success is also due to delivering quality service and knowing its limits. This is one of the reasons the Scott SWCD does not take on larger capital projects.

The SWCD does not have the engineering depth or structure to design and manage larger and more risky construction efforts. For these, the Scott WMO or the county takes the lead.

The WMO and the county have access to engineers and construction management staff, with bidding and contracting processes already in place. A local partnership has outlined specific roles for the SWCD, the county, and the WMO based on existing perceptions of legitimacy and the need to preserve legitimacy, as well as organizational strengths.

The Scott SWCD takes the lead with land users, promoting and implementing conservation practices because it has been identified by surveys as the organization with the most influence on land users' conservation decisions.

The Scott WMO takes the lead on developing relationship with organizations such as lake associations and sportsman's clubs because it is more scientifically oriented and more experienced in leading technical studies and planning.

The county and the WMO both take the lead on capital projects because they have the staff and structure conducive to delivering larger projects. The county and the WMO take on most regulatory responsibilities in order to keep the Scott SWCD free of regulatory baggage. The three organizations bring in other organizations, individuals, or agencies to provide additional technical or personal legitimacy as needed.

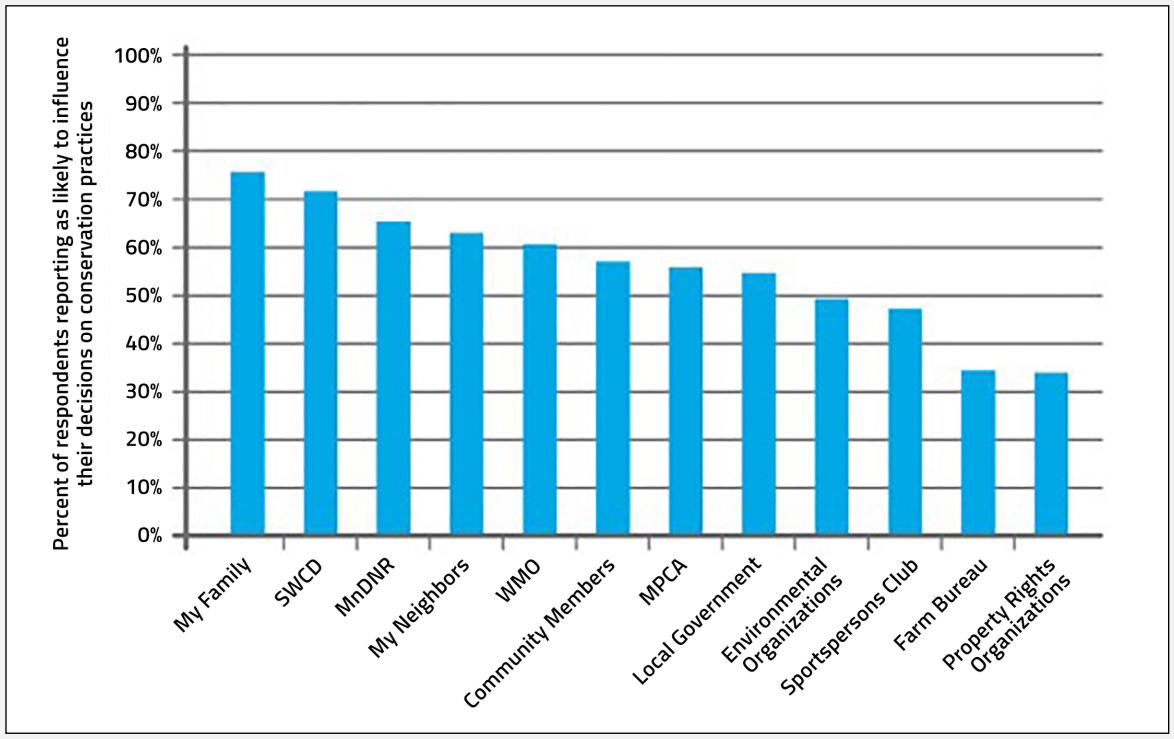


Figure 11. Individuals or groups that influence landowners' decisions about conservation practices (Davenport & Pradhananga, 2012)

Legitimacy

The trust of land users is something individual staff and leaders need to maintain. However, land users also need to believe that the organization(s) behind the individual talking to them is the right one. Even if land users relate to this individual, they might be hesitant to adopt the requested conservation practice if they are uncertain about the legitimacy of the organization. Perhaps they have never heard of the organization, or they perceive the organization as having an agenda counter to their interests, or they have had a bad experience with that organization in the past.

If the organization also has a regulatory role, perhaps they are afraid to allow a resource professional on their land, for fear they could get cited for something else. With an awareness of these perceptions, it is possible to put forward those organizations with the most legitimacy and best likelihood of being viewed positively.

While conservation organizations are dedicated to implementing BMPs, it is equally important that they provide good customer service. Quality control reviews of every BMP designed and implemented, not just those funded by the state or federal government, and regular customer satisfaction surveys can provide insight into how the organization can do better. Mistakes happen, but steps should be taken to avoid them so that land users are happy with the practices installed and so that their problems are resolved.

People have long memories, and one bad experience can prevent a land user from returning to implement additional BMPs. Land users also talk to one another, and conservation organizations don't want or need negative reviews. The private sector has long known that good service wins referrals, while bad service spreads by word of mouth.

Humanizing the Conservation Organization

Front-line staff

Meaningful relationships and organizational partnerships develop from frequent positive interactions between individuals. Thus, front-line resource professionals must not only be technically competent, but also have interpersonal skills and understand what motivates people to act. In many respects, achieving resource protection requires part science and part sociology.

We've identified three distinct skill sets essential to building effective relationships with land users: technical, practical, and interpersonal. The stability and longevity of front-line staff also have a large impact on an organization's ability to build and maintain relationships.

Technical competency

In the area of resource protection, technical competency is reflected in skills for the planning, design, and implementation of BMPs to address a given resource concern. It's more, however, than just knowing the standards and specifications for every conservation practice in the Field Office Technical Guide.

For example, in rural settings it includes understanding how land is managed, from the type of equipment used for tillage in fall to the type of crops planted in spring. Furthermore, it requires understanding the physical circumstances, such as field conditions, soil types, and climate, that make one management decision preferable over another.

In an urban environment, technical competency requires a basic understanding of land use and zoning restrictions, the practices and principles of stormwater management, and, of course, local governance for how resource management decisions are made.

Until fairly recently, it was common for resource professionals who engage with rural land users to have an agricultural background. They came to the job with a good understanding of agriculture, from basic terminology to rural community culture. This knowledge was important in building much of the credibility SWCDs and their NRCS partners enjoy today.

Familiarity with farming operations and culture are intangible assets that can help minimize communication miscues and blunders that may lead to land user mistrust and apprehension toward resource professionals, let alone their goals and objectives. Even knowing the jargon can prove very beneficial in building trust. It can be impressive to a farmer when a government official knows the difference between sweeps and twisted points on a chisel plow, that a rolling herd average over 24,000 pounds is really good, or that 200-bushel corn and 60-bushel beans are realistic yield goals.

Practicality

Another quality that builds trust is the resource professional's ability to demonstrate practicality, or common sense. The resource professional must have a keen sense for what conservation practices are appropriate and realistic in any given situation, based not only on physical site conditions, but also on the needs and capacity of the land user to implement them. For example, it would defy common sense for a technician to prepare a farm conservation plan that includes hay in the crop rotation to control soil loss if the producer has no livestock and only grows row crops.

Agriculture is becoming an increasingly complex industry, yet fewer and fewer individuals entering the conservation workforce have the experience or background to command a good understanding of what may or may not be feasible. Many are not familiar with the implements used to till the land, how crops are grown, what feed is given to cattle, or how manure and fertilizers are managed or applied.

Members of the farming community will quickly recognize this inexperience and will be suspicious about messages the resource professional is conveying. They might wonder if that person understands all the implications that suggested conservation measures might have on other aspects of the farming operation.

That said, the lack of a farming background or experience in other practical aspects of resource management can be overcome with training and experience. A virtually unlimited number of manuals, workshops and other training resources are available to help one learn the ins and outs of land use and management, whether agricultural or urban.

There is another skill, however, that is perhaps more important to building trust. It is personality. More specifically, how the resource professional interrelates with others.

Interpersonal communication skills

As in any other line of work, having a pleasant personality and good communication skills can go a long way in resource management. Land users might even be willing to overlook a resource professional's lack of knowledge or experience if they are at least personable.

The ability to communicate clearly, show compassion and empathy, and be respectful in adverse situations is an invaluable asset for resource professionals tasked with promoting conservation. They must know how to approach people in a non-threatening manner, and how to listen and learn. They must be convincing without being judgmental, regardless of how poorly they feel the land user is managing land or impacting water resources. Given enough time and opportunity to work on a project with a land user, the resource professional will find all these qualities tested. If they are reasonably demonstrated and positive experiences occur, trust begins to develop. As trust develops, so does the land user's respect and willingness to listen. It is at this point that education can really begin.

A positive relationship anchored in trust must exist before the resource professional can educate and ultimately convince land users to do something that they may not feel is not in their best interests or will have minimal benefit. To get to this point requires more than a knock on a door with the intent of talking about water quality issues and solutions. Initial engagement must include a desire to learn what interests and motivates the land user—and understanding that it may not be NPS pollution or even water quality in a local stream or lake.

The true measure of the success of an engagement is whether the other party respects and trusts the resource professional. Polite nods and courteous agreement with no meaningful exchange might only signify the kind character of an individual. A more meaningful indicator is whether an honest and open two-way dialogue occurs, especially one that includes opposing opinions.

Willingness to share and defend opposing views is a good indicator that land users are comfortable enough to speak what's on their minds, especially amid disagreement. It demonstrates that such land users will risk being shown how they could be wrong. This occurs when there is an atmosphere of trust. Trust is also important in supporting land users' willingness to share personal information that might reveal other, less obvious barriers to their adoption of conservation.

Recommended Reading on Relationship-Building

The Conservation Professional's Guide to Working With People. Scott A. Bonar, 2007. Island Press, 198 pgs.

25 Ways to Win With People: How to Make Others Feel Like a Million Bucks. John Maxwell and Les Parrott, 2005. Nelson Business. 181 pgs.

Getting to Yes: Negotiating Agreement Without Giving In. Roger Fisher, William L. Ury, and Bruce Patton. 2011. Penguin Books. 240 pages.

Even when land users agree that a resource professional's ideas are valid, they might lack one or more of the other keys necessary to implementing the behavioral changes needed for NPS pollution control. Perhaps they are dealing with hard times financially or having family or personal issues.

Very few people will reveal their personal struggles to strangers. When resource professionals approach land users from the perspective of wanting to listen and learn rather than to promote their own ambitions, the otherwise private feelings or circumstances of the land user are more likely to be revealed. It is virtually impossible to learn what challenges the other party might be facing without a high level of trust and respect. This is true whether the relationship is with an individual, as discussed here, or an entire community of individuals.

Longevity and stability

Front-line conservation agencies, especially SWCDs, must often hire entry-level staff, many just out of college or having a brief internship with NRCS' Earth Team, Conservation Corp Minnesota and Iowa, or Minnesota Conservation Apprentice Academy. These new hires receive training on how to assess land, prepare conservation plans, and design BMPs. They receive mentoring from more senior staff on how to approach and develop relationships with land users. Then, over time, they get to know the land users, who likewise get to know them.

For better or worse, though, front-line conservation organizations have rarely had the means to ensure a sufficient level of stable and predictable funding. Instead, they have survived on small base grants from the state and on the goodwill of the county.

It is difficult to keep experienced professionals on staff under these circumstances. There is an ever-present risk they will be targeted for employment at a state agency or some other organization having more secure funding and/or greater opportunities for advancement. When they leave, the relationships they created are severed and must be rebuilt. This is a time-consuming effort that sets back the overall progress of the organization and its work.

Relationships with land users are difficult to maintain when someone new and different arrives on the scene every few years. This lack of stability at the local level is detrimental to NPS pollution control because it is where the work gets done, both figuratively and literally.

Ideally, staff working in the field are the organization's most talented and experienced. The lack of adequate and reliable financial resources on the front line has been a limiting factor for the conservation delivery system relied upon most to achieve NPS pollution control. Recent legislative funding initiatives aimed at increasing SWCD capacity to deliver conservation assistance have gone a long way in addressing this challenge, including but not limited to enhancing their ability to hire and retain quality front-line staff.

Partner networks

The lack of stability in funding and staffing has been overcome in Scott County through a dedicated partnership between the SWCD and local water management agencies. These agencies include the Scott WMO, Prior Lake-Spring Lake Watershed District, Vermillion River Watershed District, and Lower Minnesota River Watershed District.

Unlike the SWCD, these organizations have the ability to generate revenue through property taxes and special assessments. Rather than dedicate their resources to creating duplicate conservation delivery systems, they have instead invested in one that already exists: the SWCD.

Investment in the experience and relationships established through the SWCD takes the form of annual service agreements. These agreements spell out the specific programs and services the local water management agency requires to implement water resource plans. For the SWCD it outlines a level of staffing need and the fees the SWCD will charge for its services.

In this sense, the Scott SWCD operates much like a private consulting firm. Certainly, funding under this arrangement is not as predictable or certain as would be a property tax levy, but it has worked

Partners Are Critical

Promoting voluntary conservation is about more than relationships with individual land users; it's also about relationships with agencies and other organizations, as well as networks.

Working with partners is a must when addressing the challenges of NPS pollution control. NPS pollution is diffuse, authorities are fragmented, conservation efforts demand the cooperation of numerous landowners, and there is a limited ability to control information or how and to whom it is distributed.

The help of others is essential to:

- Gaining the trust of landowners and inspiring a willingness to take action
- Leveraging the resources and authorities of other state and federal agencies, local units of government, and nonprofit organizations
- Building a productive relationship with the press
- Encouraging individuals and community networks to spread accurate information, provide positive endorsements, and encourage conservation

The results of the 2011 landowner survey (Figure 11, earlier in this chapter) show that the Scott SWCD has almost as much bearing on conservation decisions as family. This influence reflects trust. Based on these results, local water resources agencies have all decided to provide support to the SWCD to lead programming efforts that require engagement with individual landowners. (This approach is also simpler and less confusing than having representatives from multiple agencies knocking on doors.)

The Scott SWCD is, in fact, rather protective and selective when other organizations or agencies come into the area and ask about working with landowners. The SWCD either asks to undertake landowner promotions itself, or gets land user permission prior to releasing contact information.

exceptionally well. Since 2004 the Scott SWCD's primary revenue sources have increased from a yearly allocation of $350,000 from the county and $23,000 from the state to $570,000 from local watershed partners, $100,000 from the county, and $120,000 from the state, including recent capacity grants. This diversity of funding sources has helped ensure that the loss or reduction of any one source is not as detrimental to the overall operation of the SWCD and its ability to maintain quality conservation staff.

The SWCD's local water partners realize benefits, as well. By partnering with SWCDs, these partners can tap into the experience, relationships, and implementation-ready programming that the SWCD has developed over its long history. In addition, local water management agencies benefit from SWCDs' unique ability to tap into the resources and expertise of their federal USDA NRCS partners—a relationship that has developed over the same 75-year history.

Partnering with the SWCD also helps to fill short-term staffing gaps that may result from partner agencies' own staff turnover, or from spikes in workload that may occur from cyclical programming. Monitoring is a perfect example of such a scenario. In most cases, understanding water quality doesn't require collecting samples and flow measurements each and every year. A cycle of every three to 10 years is sufficient. Obviously, staffing needs increase in the year or two monitoring takes place, but then return to normal. By contracting with the SWCD, water management agencies can accomplish their monitoring goals without increasing staffing or hiring an expensive consulting firm.

In other words, SWCD partners can implement projects and programs that have a limited term, and they can do so without having to hire and train staff who will be let go when then project is completed.

Chapter 6

How to Stay Focused, Learn, and Adapt

Building community capacity is the most promising way of sustainably addressing NPS pollution control, but building this capacity will take time. Thus, this chapter is dedicated to building programmatic capacity to sustain efforts over the long-term—to keep conservation momentum going. Doing this requires staying focused, learning, and adapting.

Change Takes Time

Nutrient-loading reduction does not happen overnight, and the same is true for building relationships, developing trust, influencing behavior, and gaining momentum toward measurable improvements in clean water. These things take time.

The timeline and tipping point for cleaner water will vary by pollutant type, water body, and watershed characteristics, but small water bodies and watersheds typically will respond more quickly than larger bodies of water. Watersheds that are more natural, versus those that have had a lot of land use change or hydrological modification, will also respond more quickly.

As we point out in previous chapters, watersheds such as the Sand Creek or Minnesota River watersheds have undergone significant alteration, and clean water outcomes will require extensive change. Add to this the time it takes for chemicals or sediment to move through systems, and it becomes apparent that it could take years—if not decades—to restore many water bodies.

Meals et al. (2010) suggest that lag time could be months to years for short-lived pollutants such as bacteria, and decades for phosphorus because excessive amounts are stored in soils and in sediment that has accumulated in river and lake systems.

The spatial and temporal scale and complexity of water quality improvement are key arguments for preventing water quality degradation in the first place. We agree, and we suggest that over the long time frames involved in water quality improvement, the most difficult challenges can be to maintain focus, understand how to be flexible, and recognize when it is appropriate to adapt or change course.

The public and politicians are often impatient and want problems solved quickly. Thus, in the case of a restoration project, the lack of immediate and obvious improvement can easily be interpreted as failure rather than a matter of not yet reaching a tipping point.

In terms of protection projects, the lack of a negative trend is a good thing, but negative news about other water bodies still can create a sense that problems are growing worse overall. In both instances, these interpretations can pull management efforts and dollars away from well-considered plans and disrupt the focus of resource professionals and agencies. Worse yet, such interpretations can contribute to a sense of defeatism, in turn leading to reallocation of resources to other efforts.

Numerous factors can disrupt focus over the long term, and they include disasters that require staff time, new state or federal mandates in other program areas, inaccurate or negative news related to conservation efforts, and a lack of alignment between priorities and objectives of the resources professional or agency and one or more land users. Of course, some of these factors can be indicators that it is time to change or refocus.

Getting Things Done Takes Time

It frequently takes several years from the first conservation with a land user about a targeted practice to the time that person agrees to implement.

For the completion of capital projects, it usually takes three years to get through the process of conceptualization, feasibility assessment, survey, easement acquisition, design, bidding, and construction before the final project can be seen on the ground.

Setbacks, or Too Much Success

The Scott SWCD and Scott WMO started our joint Technical Assistance and Cost Share (TACS) Program in 2006. Since that time we have approved more than 720 cost share applications for practices. The Scott SWCD already had a well-respected program and was receiving 75 to 100 landowner technical assistance request calls per year. Now, however, staff are providing conservation technical assistance to over 230 landowners at any given time, not including 50 to 60 landowners being provided 2014 disaster recovery assistance.

Responding to such a high number of requests coming in the door leaves less time to target sites where our studies show we should be focusing, and it increases the need to assess and consider practices that are not necessarily prioritized in a study. It also puts a stress on staff, stretching the amount of time they have to provide one-on-one assistance. This in turn can impact the quality of customer service, our top goal. We place significant emphasis into building positive relationships. Land users are essential partners in achieving NPS pollution control, and when they come in, we want to help them.

We have done a lot of adjusting to try and address these things.

- Letting staff know it's OK to say "no" when a request does not align with our mission or priorities. This gets a little easier when numerous land owners are coming in for assistance. Losing a few marginal projects is easier to accept when there are a lot other more impactful applications. It also gets easier after you do it a few times.
- Clarifying policies to be clear that cost share and incentive amounts are maximums, and offering something less if we feel the benefit to the public does not warrant the maximum.
- Emphasizing that discretionary decisions are ok, and are a good way to maintain flexibility.
- Emphasizing with staff that the programs are to provide a public benefit, and that maximizing benefit for each public dollar is important.
- Providing staff with tools and training to be able to negotiate or say "no," including:
    1. Helping them script how they respond to requests that don't fully align with our objectives. For example, having them talk about needing to maximize return for the taxpayers. We've found that most land users (as taxpayers themselves) relate to this message.
    2. Providing cover for staff by making counter offers or denials an administrative or a board decision.
    3. Holding up examples of negotiated solutions or "no" answers within staff meetings to make it normal.
    4. Provide training and positive feedback to staff regarding negotiation. Scott WMO employees are all required to read *Getting to Yes: Negotiating Agreement Without Giving In* by Roger Fisher et al. (2011), and we frequently emphasize with staff the concept of negotiating based on interests instead of positions.
- Reviewing and adjusting our cost share policies annually.
- Bringing in temporary help to assist staff respond to the work load created by the disaster. We're fortunate to have a couple of retired but very experienced conservationists in the area.
- Setting priorities and targeted contacts every year even when we're busy, and emphasizing that is the model we want to use long term.

— Paul Nelson and Troy Kuphal

The challenge is to maintain your focus while also knowing when to be flexible, change course and adapt.

For example, excessive rainfall and flooding in 2014 damaged about 115 existing practices in Scott County, and new erosion damage requiring new practices was extensive. In this scenario, not fixing the existing practices would waste the previous public investment, and ignoring the new damage would allow it to get worse. Such a situation calls for a temporary refocusing of objectives and priorities. It may also be necessary to refocus when efforts are not working, or in order to keep up with changes occurring across a community or watershed.

Setbacks are inevitable, but the lessons learned through experience—and the use of systems thinking and adaptive management rather than searching for the "right answer"—can support more efficient and effective pursuit of desirable outcomes. Community, land use and water programs are the vehicles by which conservation organizations engage people, deliver conservation services, and get things done on the ground (or in the water).

Programmatic capacity

Programmatic capacity provides a framework for aligning and coordinating actions across land uses, management jurisdictions, and sectors. It typically involves state, regional, and local cooperation in strategic planning, program development, implementation, and adaptation.

Although the organizations involved in working with land users to implement conservation may offer some similar programs, such as education and technical assistance, the details and delivery will differ. Such variation is good because too much uniformity stifles creativity, flexibility, and the ability to learn and adapt. A common vision and shared goals across programs regardless of who funds or administers the program, however, has important benefits.

The Multilevel Community Capacity Model identifies common characteristics that make watershed programs more effective and sustainable. Intentional consideration of these characteristics will help conservation organizations build capacity for continuous improvement by engaging larger pools of supporters and resources, systematically collecting and evaluating information, and promoting adaptive learning and flexibility. These common characteristics, or components, include:

- Transboundary coordination
- Collective action (resource pooling and innovation)
- Integrated systems monitoring and program evaluation
- Adaptive learning and flexibility
- Equitable outcomes

Transboundary coordination

Minnesota metropolitan and outstate water/watershed legislation was set up to enable management of water resources on a watershed basis. This was done to allow for planning and implementation based on watershed boundaries rather than political boundaries.

Managing on a watershed basis is also recognized as good process by the federal agencies, and other states. However, even in Minnesota some of our watershed organizations are not truly watershed boundary-based, and this fact ultimately requires transboundary coordination. Several factors contribute to successful transboundary coordination.

- Inclusivity with respect to other organizations within formal networks is essential. One example would be to extend an invitation to participate in the conservation organization's technical advisory committee, typically to representatives from neighboring watershed organizations, cities, and townships in the watershed; upstream counties and their SWCDs; and representatives of state and regional agencies.
- Inclusion of others in studies and planning efforts.
- Participation in the planning efforts and technical advisory committees of others.
- Efforts to secure resources for others so that they may increase capacity and complete BMPs that are beneficial to a wider area.

Sand Creek Transboundary Coordination

Two watershed organizations that are not fully based on watershed hydrologic boundaries exist in Scott County, and one of these is the Scott WMO. The Scott WMO boundary stops at the southern boundary of Scott County, even though 40% of the Sand Creek watershed is south of the county line in Le Sueur and Rice Counties. This is because the enabling legislation was written for the metropolitan area, and Le Sueur and Rice Counties are not officially part of the metro. In addition, SWCDs are formed on a county basis rather than by watershed, and land use authorities (i.e., cities, townships or counties) are not organized along watershed boundaries.

To be successful, we need to work across boundaries. This is particularly true for us if we want to address the water quality impairments of Sand Creek.

Our 2007 and 2008 detailed study of Sand Creek included monitoring stations and data collection in the Le Sueur and Rice County portions of the watershed, and representatives of the counties and the SWCDs were part of the technical steering committee for the study.

The Scott WMO recognizes that we benefit from BMPs installed in the upper portions of the Sand Creek watershed in Le Sueur and Rice Counties, and we have developed a policy to help provide financial resources to them even though these areas are not in the Scott WMO. The policy is that will we will not provide them levy money collected from tax payers in the Scott WMO, but we will use our grant writing abilities and resources to leverage dollars for use in these areas of the watershed.

This approach has been reasonably successful with dozens of BMPs being completed by the Le Sueur and Rice SWCDs in their portions of Sand Creek watershed. We also recognize that their staff needs to lead these efforts. We can't go into adjoining jurisdictions and start working with land users. Providing resources to these organizations both enables them and builds capacity.

Collective action: Resource pooling and innovation

Water resources staffing at the local level is typically pretty small, and few conservation organizations can afford to dedicate an internal expert or staff person to areas such as education and monitoring. Rather, they must work together and pool resources so that all groups enjoy access to different types of expertise.

The same approach applies to establishing roles and responsibilities. Conservation organizations can't afford redundancy, and it's not good public policy. To meet their obligation to make the best use of the resources provided to them, they must first define roles, leveraging differing organizational strengths while avoiding duplication, and then pool their resources. Areas in which organizations often pool their local resources include:

- Grant applications and funding
- Water quality monitoring staff and equipment
- Editorial space in the regularly distributed county newsletter
- Jointly hosted public workshops on topics ranging from rain gardens to native prairie installation and maintenance to cover crops
- Facilities and meeting rooms
- Staff expertise
- Funding of projects or programs
- Construction of BMPs—including shoreland buffers, wetland restorations, stream stabilizations, rain gardens, and prairie plantings—in county and regional parks

Working Together: Scott WMO and Scott SWCD

The partnership between the Scott WMO and the Scott SWCD has been on display throughout the manual. We collaborate to the point that we largely behave as one organization. This is possible because we settled into specific and well-defined roles, with the Scott WMO taking the lead on planning, policy development, capital projects, studies, and funding, and the Scott SWCD leading BMP implementation and staffing of monitoring and education/outreach programs.

In this model the Scott SWCD is the public face of both organizations' efforts, and this is appropriate because the organization is trusted by land users. The Scott WMO has made a conscious decision to build on that strength of the Scott SWCD rather than duplicate it.

A good example of resources pooling is the Scott Clean Water Education Program (SCWEP), an idea borrowed from our friends at the Washington SWCD. This program grew out of joint efforts to meet education and outreach efforts mandated by National Pollutant Discharge Elimination System Municipal Separate Storm Sewer System (MS4) permit requirements.

Starting out as an idea to work together voluntarily, the program has had several iterations. Over time it became evident that this voluntary model lacked accountability and needed a clear leader. Today, staffing and leadership are provided by the Scott SWCD, which has seven partners that are all MS4 permit holders.

The joint program is largely financed by the Scott WMO, with additional contributions by other watershed partners. Pooling resources and having one place for expertise and coordination works better for the organizations collectively, and it is more efficient than the small token efforts that could be undertaken independently by each organization.

The program has a steering committee and coordinated messaging. Each partner has a representative on the steering committee, which works with the Scott SWCD to develop an annual plan highlighting efforts for the year. The Scott SWCD then leads and coordinates implementation of the plan, providing each partner with a report at the end of the year regarding accomplishments to include with MS4 permit reporting. Resource pooling for the MS4 education/outreach efforts also allows the Scott SWCD to retain a certain level of staff expertise that can be leveraged for additional education/outreach efforts in rural areas.

Integrated systems monitoring and program evaluation

Monitoring and program evaluation provide the information for informed decision making and learning. Integrated monitoring means looking at social systems, as well as biophysical and hydrologic systems.

While it is common (and important) to monitor surface waters, both lakes and streams, and track things such as the number and type of practices installed, it also is necessary to monitor social systems locally. Because programs are the vehicle for engaging people, delivering service, and generating on-the-ground results, evaluating them is a must.

Both short- and long-term metrics are needed because it typically takes time to see measurable results in the quality of water bodies. Additionally, as discussed in Chapter 4, there are two tipping points before resources outcomes are realized. Short-term metrics should focus on discerning whether momentum is being achieved with respect to the two tipping points, while long-term metrics focus on resource outcomes (Figure 12).

Another way to frame it is that the short-term metrics focus on the questions "How much are we doing?" and "How well are we doing?" as described by Mark Friedman in his book *Trying Hard is Not Good Enough: How to Produce Measurable Improvements for Customers and Communities* (2005). Long-term metrics answer the question "Is anyone (or the resource) better off?"

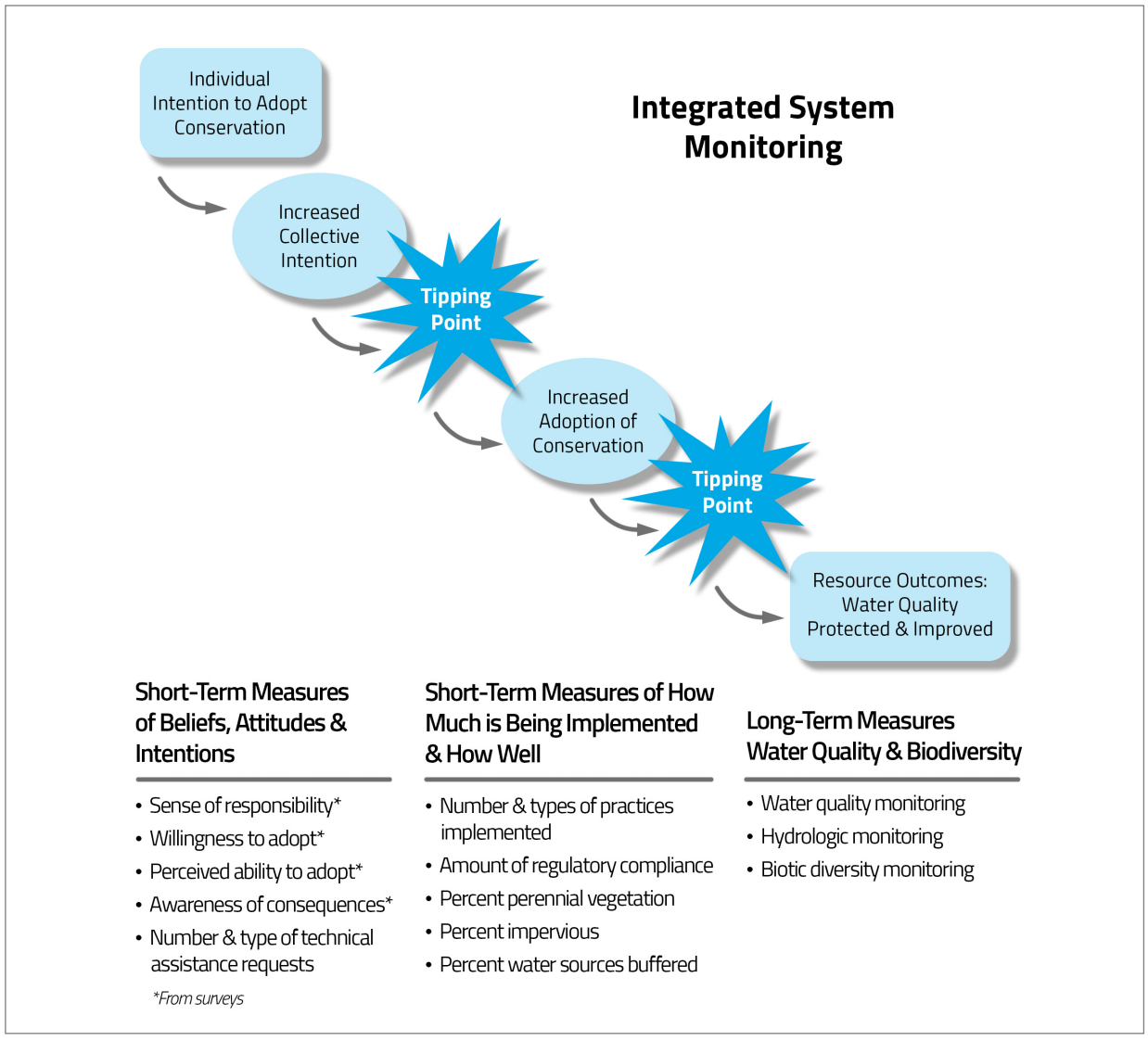


Figure 12. Tipping Points in Integrated System Monitoring

Social Systems Monitoring in Practice

With respect to social systems monitoring, the local Scott County partners are at a very early stage. The partners were fortunate that Sand Creek was selected as one of Dr. Davenport's study watersheds for a survey of landowner beliefs, attitudes, and behaviors associated with water resources and conservation practices (Davenport & Pradhananga, 2012). This information was very valuable in formulating citizen engagement efforts (Davenport, Pradhananga, & Nelson, 2013), but it is just one snapshot in time. We are planning to repeat the survey to assess whether our programs have had an impact on community beliefs, attitudes, and behaviors.

An additional effort that the authors have planned and we're very excited about is a survey of those who have participated in the TACS program. We have had more than 375 participants in the program and anticipate a robust response. Serving as a customer satisfaction survey, it will help us to better understand whether we solved a land user's problem, if the land user likes the BMP, what motivated them to participate, what we did well, and what we could do better. In addition to monitoring, ongoing program evaluation is also important. These efforts include:

- Annually reviewing cost share program attributes (i.e., cost share rates, specifications, etc.)
- Monitoring and reporting on multiple program outcomes including building community capacity for long-term water quality goals
- Hosting an annual team meeting to identify and discuss what went well, what didn't go well the previous year, and how to improve in the coming year
- Reviewing progress toward implementing Watershed Resources Management Plans every few years
- Soliciting feedback from others

Good Data Enhances Program Evaluation Capabilities

By 2012 the need to modernize data management at the Scott SWCD had become painfully obvious. We were receiving more than 150 new requests for conservation assistance annually and implementing between 60 and 90 BMPs through the Technical Assistance and Cost Share (TACS) program. A plethora of spreadsheets and Word document tables helped to capture some of that data, but the number of variables that needed to be recorded and tracked for each project had grown exponentially, limiting the ability of staff to analyze trends. We also needed to track staff time on each project so that technical assistance costs could be linked with the right funding source.

These challenges led to development of the Scott SWCD's Soil and Water Information Management System, or SWIMS. With the click of a few buttons, we can see how many land users we are working with, where they live, and the reason they contacted us. We can tell how many projects are active, what phase of development they are in, and what their total cost is. We also track pollutant reduction benefits, including phosphorus, sediment, and runoff volume reductions, along with which funding sources are being used, including federal, state, local, and land user shares.

When reporting time for the month, staff simply select the project they are working on, and SWIMS automatically calculates staff costs based on individual billing rates and associates those costs with the correct funding source. Data for each project is entered through a single browser-based form, and all this data is auto-populated into cost share applications, vouchers, fact sheets, and other routine forms so staff spend minimal time re-entering information.

More importantly, SWIMS allows us to quickly and easily assess cost benefit. This means knowing how much sediment and phosphorus reduction we are achieving for each dollar spent, not only for each individual project, but also for an entire class of projects. This power enables us to focus on particular practices and evaluate whether our cost share policies should be adjusted to, for example, encourage practices that prove over time to be more cost-effective.

Chapter 5 presents an example of a basic output from SWIMS. The graph in Figure 10 depicts the number of landowners that contacted the SWCD over the past 10 years, as well as the interest or concern that prompted their call.

— Troy Kuphal

Learning and adapting under uncertainty

The systems that resource professionals deal with are very complex, and it is impossible to gain a complete understanding of them. An adaptive management approach enables forward progress despite this incomplete understanding, and it uses continuous assessment and adaptation to facilitate successful implementation of conservation programs and practices.

In fact, there is evidence that an adaptive management approach using prototypes can lead to more rapid achievement of successful outcomes. This approach yields rapid progress when it is intentional and based on the indicators, measures, and program evaluation described in the previous section.

As the Marshmallow Challenge (see sidebar) demonstrates, the process is not linear, nor even circular. Frequently, adaptive management is presented as a circle with planning leading to implementation, to monitoring and evaluation, to adaptation and back to planning.

The problem with this view is that it is not sequential, with one step happening and then another. When this process is at its most effective, the steps happen concurrently or iteratively. Some steps are big and take place formally using program evaluations described in the previous section. Other steps are small.

Once adaptive management becomes the culture of an organization and its partners, the approach grows organically with staff and partners as they continuously and creatively generate new ideas.

The Marshmallow Challenge

A great example of learning by doing or prototyping is provided by Tom Wujec and the Marshmallow Challenge. The following is a link to a 7-minute TED Talk video illustrating the challenge.

http://marshmallowchallenge.com/TED_Talk.html

Table 4

Examples of Technological and Capacity Adaptation

Technological Adaptation	Capacity Adaptation
▪ Adding variable incentive payment rates with higher rates for native grass establishment on steeper and more environmentally sensitive land to improve program cost-effectiveness ▪ Offering an incentive instead of cost sharing for riparian buffers to increase its appeal to land users ▪ Adding a new technology to a cost share program ▪ Completing a LiDAR terrain analysis to improve efficiency of targeted practices ▪ Minimizing financial assistance for farmable WASCOBS ▪ Revising a calculation method ▪ Improving survey methods ▪ Changing seeding specifications	▪ Implementing a tiered payment structure for cost share practices that builds programmatic capacity to implement whole-farm planning ▪ Adding incentives to the program that promote cultural practice and management-based changes (e.g., contour buffers, contour farming, nutrient management, and cover crops) ▪ Developing guidance for self-assessment of additional conservation to build individual capacity ▪ Bringing in an additional partner with different relationships and networks ▪ Requiring compliance with existing applicable regulations in order to be eligible for incentives or cost share ▪ Fabrication of a cover crop drop seeder or drill interseeder for use by farmers to experiment with cover crops

We group adaption into two types: technological adaptation and capacity adaptation (Table 4). Both types of adaption are needed.

Technological adaption is rooted more in reductive thinking, taking singular parts and making them better. It consists of those suggestions and adaptions that improve the effectiveness of specific conservation practices or singular efforts.

Capacity adaption is a change that improves one of the elements of community capacity, and it is rooted in systems thinking. A good example of capacity adaption is recognizing the need for (and hosting) native prairie management workshops for the public. Popular workshops such as these help build individual capacity for implementing and maintaining prairies.

Adaptive Management in Practice

A good example of adaptive management is a change we made a few years ago in how we promote Water and Sediment Control Basins (WASCOBs), one of the local partners' most popular practices. Federal specifications allow for both vegetated and farmable WASCOBs. However, we were noticing that the farmable ones were not lasting. The act of tilling through them slowly flattened them.

We adapted by deciding that we would no longer cost-share for farmable WASCOBs unless our staff found that it was the best option, thereby making vegetated WASCOBS the default standard. Other examples of technological adaptations are provided in Table 4.

Our Next Adaption: Individual Capacity to Plan Ahead

At the start of every year, the Scott WMO and Scott SWCD hold a joint kickoff meeting during which we evaluate our conservation programming efforts, identifying what's worked and what has not. In 2012 this adaptive management process led to a discussion about revamping the entire Technical Assistance and Cost Share program (TACS). This wasn't due to a lack of success.

On the contrary, between 2006 and 2012, the organizations had implemented hundreds of projects totaling over $5.6 million. We felt, however, there was potential to do even more, particularly in promoting good management-based practices that prevent excessive runoff and erosion as opposed to simply offering financial assistance to fix singular problems resulting from poor stewardship choices. We thought that by taking more of a whole-farm conservation planning approach, perhaps we could encourage farmers to move beyond adopting conservation piecemeal, whenever a gully occurred or the ditch filled in with sediment.

The theory was to modify our cost share rates to incentivize whole-farm planning. We thought we could either offer higher rates if the land user agreed to address all the conservation needs on a parcel, or we could make cost share conditional. For example, in order to get cost share assistance to fix a gully, the landowner would need to limit erosion to "T" on the entire field and install a filter strip if it was adjacent to a stream or other water feature.

Before testing this theory, we decided to ask those who would be most affected. We identified some of our most prominent farmers, a dozen or so, and tasked our resource conservationists with meeting them one-on-one to get their input. They were free to meet and even buy them breakfast or lunch as a token of appreciation. Within two weeks our interviews were complete, and we had gleaned invaluable insight about whether or to what degree our theories would fly. (See summary in Appendix C.)

In short, our resource conservationists learned that farmers are open to conditional cost sharing only in cases in which there is a clear nexus between the practices being required. They were also open to the concept of a tiered cost share rate, whereby greater conservation efforts were met with a higher cost share rate. They were very clear, however, that programs shouldn't be too rigid and it is better to achieve some conservation than none.

It's taken the Scott WMO and Scott SWCD a little while to fully develop this idea, but the result has been creation of three sequentially higher cost share tiers as follows:

- Tier 1 requires upland treatment and compliance with existing applicable regulations.
- Tier 2 builds on that and requires a conservation assessment on the affected farm.
- Tier 3 also requires a cover management system (i.e., 30% residue or cover crop be implemented).

Consultation with farmers allowed this approach to be designed in a way the will benefit both them and the public. It maximizes the public investment and builds capacity for more comprehensive conservation rather than the fixing of singular problems.

— Troy Kuphal

Equitable outcomes

Eighty-seven percent of the respondents to the Sand Creek survey (Davenport & Pradhananga, 2012) strongly or somewhat agreed that they had a personal responsibility to protect water quality. Generally, people agree that protecting this resource is everyone's responsibility. However, human nature leads people to react defensively when called on to change their behavior, or when they feel that others are not doing their share.

The perception of inequities or unfairness can result from program eligibility requirements that were easy for some to meet but difficult for others; being called out to change as an individual or as a group

while others were not called out; or seeing a capital project being completed elsewhere while dealing with an unresolved problem, such as erosion, that's causing issues on one's own property. While being identified as a contributor to a problem and being called out to change can cause feelings of guilt and fear of consequences, financial assistance programs and capital projects can cause perceptions of favoritism.

Perceived fairness in water resource management is maintained through fair and open stakeholder interpersonal interactions, effective and inclusive stakeholder engagement processes, and decisions that are consistent and absent of bias or favoritism, as well as the equitable distribution of management costs and benefit. Once people feel as though they are being treated unfairly, they are difficult to approach and resistant to change. Lord et al. (1979) found that once people take a position, they are likely to interpret conflicting evidence with skepticism while accepting consistent evidence uncritically.

Biased thought processes may also minimize perceptions of a person's own complicity or the significance of the problem in the first place (Markowitz & Shariff, 2012). Minimizing perceptions of complicity often takes the form of blaming others, such as when point source pollution dischargers blame farmers, who blame urban runoff, and so on. Thought processes can even evolve as far as justifying defeatism and concluding that individual action wouldn't do any good anyway.

Perceptions of equity (or inequity) can be particularly problematic with a precision or targeted conservation effort. In this type of approach, resource professionals call land users, point out a problem, and ask them to change their behavior. Although the resource professional is also suggesting that they work together to solve the problem and offering assistance to that end, the very act of calling the land user runs the risk of generating a perception that the land user is being singled out. A variety of actions can be used in combination to help minimize this risk.

Perceived Favoritism

The perception of favoritism is a problem that often arises with highly visible capital projects. This was the case with a capital project undertaken by the Scott WMO along the Minnesota River Valley bluff, which is prone to erosion, gullying, and landslides. Along the bluff, elevations drop 200 to 300 feet in a distance of only a mile or two. The surficial materials are glacial till and very susceptible to stream incision and mass wasting.

The Scott WMO commits to capital projects in this area if public infrastructure is threatened, or if the problem is so acute that it has become a large sediment source affecting public waters and will get significantly worse without intervention. However, because these can be expensive, the Scott WMO sets priorities and tends to be choosy.

Several years ago, the Scott WMO completed a project restoring several thousand feet of a stream in the bluff area that was significantly incised and in the stage of channel evolution where the banks were undercutting and sloughing. This was a high priority because it was a perennial stream designated as impaired for aquatic life. Other ravines in the area were also incised and eroding, but they were not public waters.

During construction of the project, one of the landowners along an adjacent ravine got upset, perceiving that the WMO was helping his neighbor but not him. An investigation of his ravine revealed that he did have a significant problem and that it was a very large source of sediment. It took several years for the WMO to find money to address some of these issues, and in the interim, a private ditch filled with sediment, and cropland was flooded. The landowner asked the WMO for help cleaning out the ditch. The WMO declined, as it was a private ditch, but did offer to help reduce the upstream sources sediment with the recently acquired funding. The landowner angrily declined because he perceived that he was being treated unfairly. He saw favoritism in the organization's willingness to address an issue on a neighbor's property and its unwillingness to help him with ditch cleaning.

— Paul Nelson

While developing and maintaining a relationship with the land user is essential, it's also important to help the land user to understand that targeting and contacting specific land users is simply the way the conservation organization operates; it is not a critique of property management skills or ethic.

Tools that support this effort can take the form of:

1. A general news article that an effort is being started to promote practices targeting certain problems—gully erosion, for example.
2. A letter sent to targeted land users before calling them.
3. Casual conversations telling them that targeting is the way we do business and that we know they are not doing things intentionally, but targeting is a way to be much more effective with limited public funds for conservation.
4. Calling the land user personally to discuss the issue rather than allow that person to learn of it from a news source or third party.
5. Let each land user know that they are not the only one being contacted by the organization.
6. Let landowners know that only they can make the decision to act (or not).
7. Show appreciation that land users are listening—and when they take action.

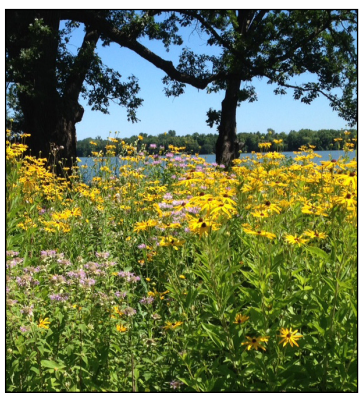
A good example of prepping is the staff-to-landowner interviews completed in 2012. When meeting with the farmers, staff specifically described the precision conservation approach and its benefits, and then asked if the land user would feel singled out if he or she received a call about it. Though they answered "Yes," land users still told staff members to call them. (See earlier story titled "Our Next Adaption: Individual Capacity to Plan Ahead.")

The bottom line is that perceptions of equity and of fairness can and do affect land users' willingness to listen and, ultimately, to change their behavior. It is easy to make mistakes in this process, and hindsight often reveals shortcomings in communication. The lesson going forward, however, is that to avoid perceptions of unfairness, land user engagement must be completed early—and approached intentionally at the start of a new program or project. Once people become defensive and take a position, it becomes much harder to reach out to them.

Examples of Capacity-Building Initiatives

In the following section, we present three examples of locally delivered community capacity building programs that highlight the four attributes for relationship-building: trust, legitimacy, culture, and fairness. Two of the efforts were successful, and one was not. The first two examples (i.e., Master Water Stewards and FarmWise) were provided by the Freshwater Society, and more information about these efforts can be found at www.freshwater.org. The third example is from a successful effort undertaken by the Scott WMO.

Volunteers planting the buffer at Cedar Lake. Photo: Great River Greening



Native buffer planted along the Cedar Lake shoreline. Photo: Becky Groshens, Scott County

EXAMPLE 1

Master Water Steward Success in Building Citizen Capacity

Challenge/Problem:
Reduce the volume and rate—and improve the quality—of stormwater running off privately owned urban landscapes

Goal:
Develop community leadership and engage more community members in managing stormwater from privately owned urban properties

Key Players:
Freshwater Society, Minnehaha Creek Watershed District

Keys to Success:

- Partners from watershed districts and environmental organizations contributed to the development of the program
- The program works intentionally to create strong relationships among stewards, and with partner organizations
- Stewards work on a scale that is within their locus of control
- Stewards explicitly promote the ideas of local capacity and efficacy, and build community resilience to generate local solutions
- The curriculum gives stewards more information than they will likely need, increasing their confidence in their capacity to engage in the work
- The program evaluates stewards' impact on the resource
- Local capacity and leadership expertise stays within the community

The Master Water Steward program is now in the third year of its pilot phase and about to launch its expansion throughout Minnesota's metro area. The Master Water Steward program certifies and supports community leaders to install pollution prevention projects that educate community members, reduce pollutants from urban runoff, and allow more water to soak into the ground before running into storm sewer systems.

The success of this program has come from its focus on helping citizens, or stewards, take action to protect and restore water. Citizens in Minnesota and the Twin Cities have a culture of volunteering and doing good work, regardless of how they utilize public waters. The Master Water Steward program gives people the tools they need to work physically to decrease stormwater pollution, as well as the tools and experience they need to reach out to their neighbors to change how water runs across their properties.

The program was piloted for three years on the Minnehaha Creek Watershed District. In the first three years of the pilot, 80 community members completed their certification as Master Water Stewards. In year, four, the program expanded to seven metro-area watershed districts. Seventy community members are engaged in the certification process. Projects completed by stewards reduce runoff volume by over 1.2 million gallons per year. By building local capacity and leadership, the "pollution prevention" expertise stays within the community and grows each time the steward makes a connection with someone new.

The stewards and program sponsors have extended and deepened their legitimacy by joining citizen advisory groups in cities and watershed districts, becoming watershed district staff, and working with city planning committees. Stewards work with churches, schools, small businesses, and private property owners to teach, raise awareness, and put stormwater management practices in the ground. Continuing education, rewarding volunteer opportunities, and a strong loyalty to the growing community of Master Water Stewards keep the steward consistently engaged.

Master Water Stewards learn to speak the language of their city's staff, as well as the language of their neighborhoods, helping to create a bridge of trust between the two. That bridge increases both the city's capacity to reach the community and the community's capacity to reach and trust the city, strengthening both. Capacity building as a collaborative process between government and community has been one of the most positive outcomes of this program.

EXAMPLE 2

FarmWise: Challenges in Building Citizen Capacity

Challenge/Problem:
Many agricultural producers have not yet adopted conservation farming practices that protect public water from agricultural pollution

Goal:
Accelerate conservation farming in Minnesota

Key Players:
Freshwater Society, Cannon River Watershed Partnership

The Freshwater Society, in partnership with the National Park Service Mississippi National River and Recreation Area, focused the work of the FarmWise program in the Rice Creek, Belle Creek, and Little Cannon subwatersheds. The program was based on the "farmer-led" model of programming developed in Iowa, and in the Whitewater watershed in Minnesota. The goal of the program was to promote conservation farming. The program did not achieve its goal. What it did achieve is to highlight a set of very real, systemic misalignments in the voluntary conservation delivery system in Minnesota that prevent farmers from participating to the fullest extent in conservation programs.

Capacity building in this type of program has been difficult because farmers did not know enough about the program, did not have time to participate, and may not have agreed with the conservation strategies the program promoted. While several farmers participated, no farmer was willing to assume leadership in the community as a voice among farmers for conservation. Farmers want to farm, not lead conservation programs. Strong economic conditions create a high level of competition among and between farmers, and few are willing to share (i.e., trust) their "trade secrets" with neighbors who are also competitors. SWCDs and other local partners lack the capacity to reach out to more farmers, and they also lack expertise in social sciences that would allow them to more effectively reach out to farmers—especially those farmers who are not already visiting agency offices.

Many farmers are reluctant to adopt new practices without a better understanding of what a BMP will cost them over time, what the return will be, and who will benefit. When farmers do make the decision to implement BMPs in their fields, there is often a long waiting period for cost share funding to be available. As they currently exist, funding cycles are misaligned with farming cycles and the pace at which farmers make changes in their practices.

Relationships are a critical piece in working with farmers on conservation, but there is a widely acknowledged pattern of rapid and frequent staff turnover at SWCD offices that damages and short circuits the process of building those relationships. The person hired to coordinate this project did not remain in the job long enough to develop relationships and trust. Although crop advisors and agronomists are trusted agricultural partners and could play an important role in selling conservation to farmers, agronomists are in the business of selling products and services, not conservation, to row crop producers. Water quality outcomes are generally not considered in farm planning processes unless the farmer raises the topic first.

Finally, there may have been some issues with legitimacy with the program. One of the farmers interviewed after the project stated that having the effort led by or starting with the farmers gave it legitimacy. However, it was also clear that partners initiating the program were outsiders and may not have been considered legitimate.

Key Lessons Learned:

- Most farmers want to farm, not necessarily lead conservation programs. They will participate, but rarely assume leadership roles, in "farmer-led" programs
- A high level of competition among and between farmers means few are willing to share (i.e., trust) their "trade secrets" or failures with neighbors or other farmers who may judge them
- SWCDs and other local partners can lack necessary capacity to reach out to more farmers
- Frequent turnover at local partner organizations, including SWCDs, means that relationships are frequently disrupted
- SWCD staff often lack expertise in social sciences that would allow them to more effectively reach out to farmers
- The timing of grant cycles does not align well with the timelines of how farmers make planning decisions

EXAMPLE 3

Capacity Building in Action: The Cedar Lake Improvement District

Challenge/Problem:
Restore a lake that is impaired by excessive nutrients and infested with a non-native exotic plant

Goal:
Develop community support and ownership of solutions

Key Players:
Scott WMO, Cedar Lake Improvement District, Minnesota Department of Natural Resources, Minnesota Pollution Control Agency

This project was not focused on NPS pollution control; rather, it started as a collective effort to combat aquatic invasive species. In 2007 the Scott WMO and state agencies started a total maximum daily load (TMDL) study for Cedar Lake. Cedar Lake is a shallow 790-acre lake that is listed as impaired for recreation due to excessive nutrients. In addition, the lake is infested with curlyleaf pondweed, a non-native aquatic plant. The infestation in 2007 was so extensive that 98% of the lake was choked with the weed, only one native plant species was found, and the lake was unnavigable for half the summer.

The study engaged lakeshore residents and the Cedar Lake Improvement District (CLID), a small local unit of government allowable in Minnesota for lake management. It is run by a volunteer board and has no staff. Its jurisdiction includes lakeshore areas, but not the entire watershed. The CLID and a local sewer district were originally formed to provide sewer service around the lake. In doing so successfully, the two groups earned legitimacy. As part of its effort to build trust, the Scott WMO assigned a staff person to develop a relationship with the CLID and ensure its interests were heard. The CLID and the Scott WMO held meetings to inform residents of the needed clean-up efforts, determine roles, and promote a fair approach involving everyone.

The Scott WMO agreed to take the lead on watershed actions while the CLID embraced in-lake management. The Scott WMO also agreed to cost share some of the in-lake management efforts recognizing, in fairness, that lake clean-up would benefit the larger watershed community, not just the residents in the CLID's jurisdiction. This was important because the study found that excess nutrients were largely from the recycling of historic pools of phosphorus already residing in lake sediment, and the recycling was driven by the life cycle of curlyleaf pondweed and carp. The Scott WMO, however, left the decision of whether to try and tackle these in-lake issues to the CLID.

As evidenced by the successful sewer project, the CLID Board of Directors had a culture of stepping up to address problems. It called a public meeting to discuss contributing to and moving forward with in-lake management. The result was a vote in which more than 90 percent of those attending agreed to increase property taxes they paid to the CLID to implement the plan.

Since this decision the CLID has tried a variety of carp control efforts, developed a website, hosted annual ice-off lake clean-up events to remove garbage left by ice anglers, and teamed with the Scott WMO for four years of progressively larger curlyleaf pondweed control treatments. The Scott WMO has also completed a number of shoreline stabilization projects on public land and as cost share projects with lakeshore residents. The lake seems to be responding. There are now six species of native plants in the lake, early summer boating is possible, and residents claim water quality is improving. The CLID Board of Directors demonstrated its appreciation of the Scott WMO's staff person's assistance by presenting them a plaque and a public thank you.

Keys to Success:

- Scott WMO staff assistance, supported by relationship- and trust-building
- A culture of leadership on the CLID Board of Directors
- The empowerment of the CLID to make the decision about in-lake management
- Assurance that the lakeshore owners' investment will make a difference
  - The plan was based in science and backed by other local, state, and federal agencies, which added legitimacy
  - The Scott WMO was already in the process of completing watershed projects to complement in-lake management
  - The State Department of Natural Resources showed its support and lent legitimacy by approving a plan allowing a whole-lake aquatic plant treatment approach
  - The Scott WMO brought in residents from another lake association to relate their success in undertaking a similar aquatic plant control effort, and these stories lent the project independent legitimacy

Chapter 7

A Broader Perspective: Stakeholder Insights and Feedback

The authors realize that the approach proposed in this manual is affected by our own personal and professional knowledge, experience, and worldviews. For this reason we solicited input from a cross-section of well-respected individuals involved in NPS pollution control, ranging from professionals in the field to private land users. This chapter provides a summary of their feedback.

Input From Stakeholders

Prior to writing this manual, we summarized its concept and content in a brief description and outline, which we provided to a variety of stakeholders keenly interested in the topic of NPS pollution control. Each of those stakeholders reviewed the brief and provided feedback in a phone interview.

This chapter offers some of their perspectives on the role this manual could or should play in improving success of NPS pollution control; the information, strategies, and tactics they think would be useful for resource professionals working in the field; and their own experiences working to reduce NPS pollution.

The stakeholders interviewed include Rebecca Flood, assistant commissioner, water policy, at the Minnesota Pollution Control Agency; Warren Formo, executive director, Minnesota Agricultural Water Resources Center; Dennis Fuchs, manager, Stearns SWCD; Paul Krueger, who is a dairy farmer, real estate agent, and past SWCD elected supervisor; Melissa Lewis, assistant section manager, Minnesota Board of Water and Soil Resources; and Brian Watson, manager, Dakota SWCD.

These reviewers' comments on the plan for the manual and its content reflect a variety of concerns, interests, and insights, many of which validated our approach. The following chapter sections highlight their input on various concepts discussed within the manual.

The original outline presented to stakeholders focused on how NPS pollution control could be more successful by offering a different approach to promoting voluntary conservation. After writing and editing initial drafts, however, we authors found it increasingly apparent that the alternative approach we are espousing is not unique to voluntary conservation.

Indeed, using systems thinking, being locally relevant and locally delivered, building community capacity, staying focused and adapting, and so on are essential to any successful NPS endeavor whether voluntary or regulatory, or a combination of these or any other possible approaches.

Consequently, we acknowledge the scope of stakeholders' comments and feedback are more narrowly focused on the voluntary aspect of NPS pollution control than is ultimately presented in the published version of this manual.

General Support

"This voluntary approach to conservation is so frequently criticized that there needs to be such a manual to outline how it can work effectively and in a positive way that is encouraging to people," said Formo.

"I think the ag community will very much welcome a manual or publication of this sort that actually lays out a clear process for how to make voluntary conservation programs work better," he continued. "It will be very helpful to have a manual that explains some of the behind-the-scenes thinking and helps people understand why the model works."

Thank you to the stakeholders interviewed for this manual:

Rebecca Flood, assistant commissioner, water policy, at the Minnesota Pollution Control Agency

Warren Formo, executive director, Minnesota Agricultural Water Resources Center

Dennis Fuchs, manager, Stearns Soil and Water Conservation District

Paul Krueger, a dairy farmer, real estate agent, and past SWCD elected supervisor

Melissa Lewis, assistant section manager, Minnesota Board of Water and Soil Resources

Brian Watson, manager, Dakota Soil and Water Conservation District

Rebecca Flood noted that there is a wide spectrum of possible actions that can be taken to address agricultural nonpoint source pollution. "Options run the gamut from strict regulation to total volunteerism, and everything in between. However, from a practical perspective, it will take a mix of approaches, including incentives, to get us to our clean water goals," she said. "This manual can be very helpful to give guidance to locals about how to deal with voluntary actions," she said. "How do we get the best benefit out of this as the paradigm? If this is the paradigm, then what are some helpful tools?"

"I certainly agree with the premise that local action is what's going to make things happen," continued Flood. "Providing some guidance to locals about how to continue to build voluntary actions is absolutely essential. There is a niche for this manual, I think, given that there really isn't a lot of information out about how to get localized action on the ground. There are lots of theories, and people are talking about setting up the engagements and that sort of thing, but actually trying to present some different models for folks—I think we need to get more of that out there."

"I think at the local soil and water districts, we probably have larger capacity than we ever have," said Watson, referencing the recent growth in staff numbers—as well as a surge in efforts and increase in focus—at the local level, within SWCDs and WMOs. "I think part of this document is trying to build that local capacity."

> I certainly agree with the premise that local action is what's going to make things happen.
>
> Rebecca Flood

Emphasizing the Multilevel Community Capacity Model for sustainable watershed management, the manual establishes what we authors believe to be the primary techniques for on-the-ground implementation, including building on success, developing positive relationships, and reinforcing feedback loops. Like many reviewers, we understand that it's not always easy or straightforward.

"To be honest, I don't know if you can put a recipe on it," said Watson. "It's not like opening up a cookbook, and it says, 'Here's how you make meatloaf.' It's just not that simple. I've been involved with it a long time, and every landowner is different. It's all about trying to understand what their motives are."

The manual provides an adaptable framework for acknowledging these challenges and concerns. It speaks to the variables that contribute to success: effective staff training; strategies for building relationships, maintaining local relevance, and adapting; and understanding the differing needs and goals of individual landowners and surrounding communities.

Staff Training and Skills

Many reviewers agreed that the manual would be particularly valuable for people who are new to the field. "A document like this is especially helpful for those who are just beginning, and we're seeing an awful lot in our field who are fairly new to it," said Watson. He noted the impact of retirements in the federal system and challenges associated with an increasing number of employees with limited experience. In the Dakota SWCD office, for example, four of 10 employees have fewer than two years of experience.

"With the new folks coming in, I'm seeing some really, really tremendous talent. It's amazing what they can do with GIS and other things. But what I am also seeing is they have no field experience. When I say field experience, I'm not talking about just going out with a piece of survey equipment and designing something. I'm talking about meeting folks and talking to them and working through solutions and gaining their trust and building that relationship. That's the biggest thing that I see."

> Every landowner is different.
>
> Brian Watson

Watson's observations support the overall need for guidance, education, and training, as well as the importance of training in the specific areas of relationship- and trust-building, as well as clear communication, all of which are emphasized in Chapter 5, "How to Build Strong Relationships and Enduring Partnerships."

"Communication and being accessible for folks goes a long way," Watson added. "If you're working towards voluntary conversation, and the ball gets dropped for too long, it's tough to pick it back up." Krueger likewise stressed communication skills, noting that when one individual says the wrong thing at the wrong time, it can ruin a relationship with the landowner.

Watson also gave an example that speaks to the importance of training in helping staff to manage difficult situations when working with landowners. He recalled a landowner who got financial assistance for conservation measures, failed to comply with the program, and then became upset when further assistance was withheld. The manual addresses these types of hurdles and provides guidance on staff training that includes how to negotiate without giving in and how to convey to landowners that public dollars must yield a public benefit.

Formo spoke more specifically to the need to develop a solid knowledge base. "If you're going to engage with agricultural producers, you really need to have, in addition to your conservation background and the programs you bring, a basic level of competency with respect to how farm practices work and agronomy and those sorts of things. If you cannot establish your credibility with the farmer audience, it will be very difficult to establish a level of trust and a kind of relationship where you can help that farmer make decisions."

Interpersonal Relationships and Trust

"The authors talk about the importance of interpersonal relationships and trust. I can't agree with that statement more," said Fuchs, who was among several reviewers to seize on this element of the manual.

"We want landowners to feel welcome to come into our office to discuss natural-resource concerns that they may have," he added, noting that the SWCD board has more or less pushed all of the regulatory programs out of his office. "We also have staff here that have been here for a long time. They've built a relationship with these farmers, and that relationship is shared with other landowners."

Fuchs explained that relationships are critical to building capacity, saying, "You've got to have projects and work to do in order to pursue grants and for grants to accomplish what they were created for. It all starts with that relationship with the landowner—in providing competent service and technical assistance to these landowners."

> The authors talk about the importance of interpersonal relationships and trust. I can't agree with that statement more.
>
> Dennis Fuchs

Watson commented on how voluntary conservation relies on the development of positive relationships. He also acknowledged that relationship-building can be challenging, saying, "We all know that there's a certain percentage we're not going to develop positive relationships with, so what happens when you have a positive relationship and then it goes sour?"

Chapter 5 acknowledges that it can be difficult to turn around a relationship that has soured and offer strategies for preventing this problem. Chief among these strategies is to create a deep enough relationship that it can withstand some disagreements and to win back trust through networking and building strong relationships with others in the community.

In fact, both the manual and its reviewers offer some cautionary words with respect to relationship-building. "You've got to be careful out there in making promises where you literally could be at church or at the ball field, or at a local restaurant, and you bump into a landowner you know and you start making promises. You can't do that," said Watson. "You need to make sure you're accountable—make sure you gain that trust by being supportive and not promising the world." His comments speak not only to relationships and trust, but also to accountability and engaging in a fair and meaningful way, which are emphasized in Chapter 6.

"It's extremely important—and we've found this to be true here in Scott County—to build a rapport and a relationship with the farmers and to go out and work with them," stated Krueger. "Going out there and saying, 'You've got to do this, or we're going to make you do this or that,' it just ruins everything." He noted that to get different entities and individuals to work together, "you need to work cooperatively with them, make suggestions for them, and make them fully aware of the fact that you are there to help them."

This manual offers another perspective as it pertains to relationships, and that is the importance of staying focused. There will naturally be individuals who oppose change, or who disagree with the very premise NPS pollution is a problem, but they generally represent a small fraction of the community.

Being unable to convince them otherwise can be disappointing and frustrating, but it's important not to be overly concerned about it.

Instead, we emphasize the importance of staying focused on building capacity. At the heart of this effort, as covered in Chapters 5, is building trusting relationships and experiences with the greater percentage of community members who are open and positive. Over time, momentum towards positive views and behaviors will grow, and individuals with negative views and behaviors will become increasingly fewer and marginalized. Success is possible even when not everyone does everything right all the time.

Stimulating Action: Social Norms, Positive Encouragement, and Feedback

Fuchs encouraged the authors to examine the subject of motivating landowners to participate in voluntary programs. "We really need to encourage participation, and we do that through education and incentives to get people to participate in voluntary programs, but sometimes even that isn't enough," he said. "We need to better identify what it takes to move people."

Much of Chapter 3 is intended to cover the topic of landowner motivation through discussion of activators and building social norms. The manual also reinforces the value of positive encouragement and feedback, both of which were cited by reviewers as being important factors.

"People who are encouraged tend to be willing to do more than people who feel discouraged and who tend to withdraw," noted Formo. Within the manual, we address this point in several ways, offering advice on how to avoid a sense of defeatism; present positive, accurate information to the public and media; build on success; and recognize people and organizations for their role in that success.

> People who are encouraged tend to be willing to do more than people who feel discouraged and who tend to withdraw.
>
> Warren Formo

As Formo put it, farmers might well say, "If you're going to ask more of me, give me credit for what I've already done." He reflected that the idea of conservation momentum implies that encouragement and recognition are part of the process.

Kreuger pointed out that there always will be "naysayers who say, 'No, it doesn't work. It's not going to work, and I'm not going to try it.'" He added that once enough people begin cooperating and showing naysayers that conservation programs can work, people who previously stood on the sidelines come forward and begin to participate.

Although social norms can be powerful, they have much less influence on those landowners who do not live within the community. Moreover, it is not always economically feasible for a renter to pursue conservation practice implementation if there's no guarantee how long they will control of the land. Both Fuchs and Lewis used examples from their own experiences to speak to this issue.

"We have failed at some of our areas in Stearns County because of the lack of motivation from our landowners," said Fuchs. "When land is rented and the landowners no longer live in the area and have moved to, say, the Metro, they typically will go with the highest rent value. Typically, the renters are in for the short term, not for the long term, which results in less conservation being applied—less opportunity to apply conservation because it doesn't pay dividends quickly enough."

Lewis recalled a conversation with several of the [agency] board members about willingness and ability to implement conservation. "One owns a lot of farm land, but is not actively farming herself; she rents it all out. And so her interest and ability might be different than the interest and ability of someone who is farming directly, that willingness to implement conservation when there's larger-scale economic pressures."

Lewis pointed out that the landowner who rents his or her farm land and lives in a metro area might be more focused on financial numbers than on understanding the reasons behind growing one type of crop or another, corn rather than alfalfa.

Motivating landowners is difficult in this situation, and there is no simple solution. In Scott County we have had some limited success working through renters because they frequently have significant influence with the landowner. However, we acknowledge that better tools and approaches are

needed to reach absentee landowners. Ultimately, this may be where some of the other approaches are useful.

In instances in which a strong relationship with the renter has been developed, that person can become the primary advocate for conservation. This is especially true when the NPS concern is obvious and/or the solutions will result in improved condition and productivity of the land.

The local partners in Scott County often find themselves working with renters rather than the actual landowner, and often it is the renter that seeks help. Obviously, this is not true in all cases, and ownership or at least long-term interest in the land is better, but there is some play with social norms through the renter. Financial incentives, and in some cases regulations, can play a particularly important role in these situations.

Local Relevance

Flood used an example from her experience working on the Gulf of Mexico Hypoxia Task Force to support the manual's focus on local relevance. "Even though we have this great strategy and a lot of actions, the thing that is going to drive landowners' action is what's happening in their local water resource," she said. "Some people may be incentivized by thinking about their contribution to the Gulf, but I don't think so. The vast majority probably aren't motivated by the Gulf."

With this example, Flood illustrates that NPS impacts are distal such that they are hard for people to relate to, unless there is some effect within their own community. Chapter 1 speaks to this problem, a significant issue for voluntary conservation.

Lewis raised the topic of local relevance with respect to recognizing the changing economic factors influencing specific communities. She spoke of working down in the river valley and about how a change within the industry—the shift from raising a few cows on smaller farms to raising cattle in large feed lot operations—has had an impact on how specific areas are farmed.

"They don't have cattle around anymore, so they don't need alfalfa or hay anymore, so they don't have those fields with alfalfa and hay, which means that they lose out on those big hills," Lewis said. "It means that the whole relationship has changed. It's not that they don't want to be conservationists, but that the economic realities of the type of farming they're doing has changed. It has changed the way they are managing the landscape."

> It's not that they don't want to be conservationists, but that the economic realities of the type of farming they're doing has changed.
>
> Melissa Lewis

Local relevance and an understanding of what's going on with the larger picture are critical to conservation programs. The manual delves into these topics and also explores activators, such as awareness of consequences, that can incentivize landowners—in this case, to keep in some sort of perennial cover even though they don't have livestock anymore.

Examples within the manual also demonstrate that when problems such as this occur across a watershed, a targeted incentive might yield results in terms of participation and mitigation of erosion and other problems. Chapter 6 focuses not only on targeted/precision conservation, but also on learning and adapting through changes in circumstance, such as those Lewis described.

Measurement/Developing Metrics

Environmental management agencies have made major investments in identifying stressors and monitoring biophysical conditions that affect water quality. Information and data are an important piece of the NPS pollution puzzle. Flood underscores the role stressor identification and water monitoring programs have played in building momentum within state agencies and setting the stage for local action:

"It's been really important, the state's and our ability to be able to characterize water quality, to look at things from a watershed approach—all of the various reports and studies that we've been able to put out, primarily because of constitutional amendment funding. So, thanks for paying your sales tax! But all of those things, all of that information and data that we have about the impact of nutrients on

water quality, on information about what are the stressors to our local water resources. All of those things begin to build the momentum. You're talking about building conservation momentum, and I absolutely agree, and there are a number of things that help."

"It's not anecdotal anymore about where these impairments to our water resources and stressors to our aquatic life are coming from. We can say that 85% is coming from nonpoint sources and primarily agriculture and the rest of the pollutants are coming from other sources."

The authors argue that, at the same time, investments in biophysical data and information have led to reductive thinking in NPS pollution control programs. Social science research suggests that most people aren't motivated by information, but rather they are motivated by social pressures, a sense of personal responsibility, perceived ability to make a difference, and concerns for local impacts.

"A manual like this can be helpful because it's one thing to encourage and then track performance on things like fertilizer rates and practices," said Formo. "It will be different to track things like, are buffers where they need to be, and are we controlling erosion with appropriate tillage, because they're highly visible, and yet the metrics for them are challenging. We just don't have a good system in place to measure those things."

Chapter 6 has some suggestions for developing metrics, as well as references for where to get more information.

Visibility/Need to Get Out Accurate Information

The manual emphasizes the need to raise awareness with positive stories and accurate information about conservation programs and their impact. This focus was supported by the comments of reviewers who pointed out that public expectations can be unrealistic and that conservation work—and progress—can be difficult to see, and even that common assumptions can be contrary to what's actually happening on the land.

"I think the single biggest area of improvement that is largely unseen, because you just can't drive down the road and see it, is in how we manage and apply fertilizers," said Formo. "The way we've done that, the way the industry has improved, is simply by looking at data and showing farmers that there is an economic efficiency as well as an environmental efficiency, and farmers are very interested in that kind of data."

"One of the concerns that I have always had is that people seem to think that these problems can be solved overnight and in short periods of time," said Krueger. "Even if it isn't overnight, they think it's within a period of two to five years that we should be able to change things substantially. It just isn't going to happen that way. It took a long time to create these problems, and it's going to take a long time and a lot of cooperation from a lot of different people and entities to get it back to where it was."

Chapters 5 and 6 address the fact that results in water bodies are slow to occur. Chapter 5 introduces the idea that there are two tipping points—one with respect to reaching a social norm and one for reaching a critical number of practices that cumulatively will make a water quality difference. Chapter 6 begins by stressing that change takes time and requires patience on the part of land users and communities.

"There are folks who are saying, 'Well, we need to have a law because not enough farmers are doing buffers,'" added Formo. "I even hear people saying, 'No farmers have adequate buffers.' In my experience, again, if you get out and actually work with farmers, this is one of those that's visible and you can drive around and actually see. We find that many farmers are doing a great job at getting buffers in place and controlling soil erosion, and that sort of thing. But it also, because it's visible, it's an area where you can drive around and find the areas where more needs to be done."

"The model laid out here requires you to get close to the ground and fact check and be out there working with farmers and learning about their practices," he continued. "If you understand some ag history and where we've come from, and the improvement farmers have made in the way they till and apply nutrients to all of those things, it shows us that the things that we're going to be asked to do

> It took a long time to create these problems, and it's going to take a long time and a lot of cooperation from a lot of different people and entities to get it back to where it was.
>
> Paul Krueger

in the future, as far as nutrient reductions and pollution reductions from farming, are doable because we can demonstrate that we've done similar things in the recent past."

Adaptability, Flexibility, and Scale

"So, I appreciate what the authors are talking about with local relevance and getting to know the community," said Formo. "The manual provides a uniform framework because you can approach the problem the same way, anywhere you go. But it recognizes that once you get there, you may end up recommending and working with landowners to do different things based on their local condition."

"You've got to understand agriculture, and you've got to understand agriculture in its many forms across the state," he continued. "The manual outline does talk about understanding water quality data and how they're connected to agriculture, farming practices, and the importance of being local. I think that's one of the challenges, that too often we see a lesson learned in one part of the state that's too specific to a practice and then there's an assumption that it will work in other parts of the state, and it won't."

> [T]here's no silver bullet.
>
> Brian Watson

Krueger also talked a lot about need to work with many different people, that what works in one place will not in another, and the need for flexibility. As the manual suggests, in both the first and last chapters, NPS pollution is a complex problem, and there is no single right answer. Chapter 6 goes into some detail about how to stay focused; monitor, measure, and learn from ongoing work; and adapt to changing circumstances. Scale is also an important aspect of an outreach or programmatic effort. Although there is no magic size, our experience shows that it must be small enough that results and responses have a community feel, but not so small that only a handful of folks are affected.

Watson repeated that there is no single recipe for success. "I think what they're doing is great. I think there's a lot of information that can be shared with others that will help, but there's no silver bullet." The authors agree, which is why the manual encourages more systems thinking, as well as a framework that is flexible and customizable—one that institutionalizes learning and can be used intentionally to approach the NPS pollution problem.

"We've got some framework here, but it's really kind of 'the devil is in the details' on this, and this is where I think it's going to get challenging," said Watson. "It's going to get challenging because things change daily for us, and landowner to landowner."

Economics/Markets

Although reviewers expressed their support for the manual and its objectives, they also expressed some concerns and an awareness of the many obstacles to fostering voluntary action. Among these obstacles were financial priorities and economic forces and their impact on landowner decision-making.

"Money pays the bills, and it pretty much drives a lot of the decisions out there," said Fuchs. "I mean, the conservation ethic, a certain percentage of landowners have that. The other percentage, they're more into making sure that the bottom line is taken care of and that they're making a profit." It can be a win-win situation, he noted, if landowners can change what they're doing in a way that still allows them to be competitive and make that money.

> Money pays the bills, and it pretty much drives a lot of the decisions out there.
>
> Dennis Fuchs

Fuchs noted that that much of the industry and its infrastructure is built on commodity crops such as corn and soybeans. "The ag economy is tied to those types of crops, but we really need to start exploring other perennials that can provide ecosystem services that we demand as a society and that also provide money, financial incentives, for the farmers to plant them. Right now, there are no perennials out there that are as economically favorable to plant as corn and soybeans."

Lewis stressed the importance of considering economic influences and provided an example. "My uncle is retired. He was a part-time farmer and a full-time banker because he tried to make it as a full-time farmer, but couldn't. Things that he does on his farm are often economically influenced because that's his retirement, that's their livelihood. I just think we sometimes don't bring that into the conversation enough."

We concur and stress that resource professionals working on the front lines need to be aware of the

economic situation of land users to avoid putting them in an awkward financial situation. To avoid recommending solutions that are impractical or unrealistic, they must also be aware of the type of farming operation and practices of each land user.

In the farmer interviews conducted by the Scott SWCD staff, discussed in Chapter 6 and summarized in Appendix C, one of the most frequent comments was that farmers were open to conservation practices provided they the practices fit with their business plan. Understanding of a land user's economic situation, current practices, and future goals can only come through trusting relationships in which these topics can be openly discussed and discovered. Focusing on promoting conservation practices without considering their implication for the land user can doom efforts to failure and, even worse, destroy trust. This is why we cover the importance of relationships extensively in the manual.

Regulation

"One of the things that I find myself doing is trying to be kind of a go-between, or liaison, between that world that wants to regulate everything and then that world of most farmers who still want to do some things on a voluntary basis," said Formo. "A manual of this sort can help define exactly what we mean when we're talking about voluntary programs, and how can they be effective. I think that if those who are determined to go more to regulation would read this with an open mind, perhaps it would help them begin to see that there's actually a need for a mixture of some regulatory and some voluntary."

In Chapter 1 we acknowledge that regulation is one of the tools available to address NPS pollution control. However, it is just one tool, and for now and the foreseeable future, row crop agriculture is exempt from regulation under the Clean Water Act. In addition, the diffuse nature of NPS pollution makes regulatory approaches difficult; millions of permits or compliance points would be needed. These challenges support the notion of using regulation as one tool within a larger systems-thinking approach to solving this complex problem.

> ... there is actually a need for a mixture of some regulatory and some voluntary.
>
> Warren Formo

Systems Thinking

"I definitely think, as far as planning and working with landowners, the systems approach is definitely the way to go about it," stated Fuchs. "I'll give you an example. We had a lakeshore resident call us and say, 'I can't use my boat lifter. Too much soil underneath it after this rainfall event.' Our shoreline specialist from the office went out and, 'Yeah, you definitely do,' but it wasn't specifically what was happening on the shoreline that resulted in that problem. There were several landowners upstream that had some soil loss that contributed to his problem."

"So, we need multiple landowners working together on a project," added Fuchs. "Finding a motivated landowner sometimes can be difficult, but to find a group of motivated farmers is even more difficult. Getting the group to move together in solving the problem sometimes is extremely difficult. The systems approach to thinking and solving that problem is the way you have to do it. You've got to look it up, land treatment, pull all the tools out of the toolbox, provide all the options out there for the landowners to participate in a voluntary fashion, which can be crop residue management, cover crops, water and sediment basins, grassed waterways, terraces—you name it. All of those have to be explored with each one of the landowners and try to get them excited about the project."

Feedback obtained from the interviews further demonstrates that NPS pollution control is a complex problem, and that there is no silver bullet. Many of the comments by the reviewers supported the creation of a manual on inspiring NPS pollution control and the use of systems thinking for navigating this complex problem.

Chapter 8

Getting Started and Maintaining Momentum

NPS pollution control doesn't have to rely on miracles. Conservation momentum builds through doing, learning, adjusting, and letting go. As a conservation organization or partnership reaches a tipping point of desired outcomes, communities take on more and more of the heavy lifting, until the community, not the organization, is driving conservation and it is sustained over the long term. This chapter summarizes some valuable lessons provided in this manual and offers guidance on getting conservation started and maintaining momentum.

Embracing Change

We chose to write this book for two reasons. First, we are frustrated by the limitations of the current reductive thinking approach. Second, we have had success with the approaches advanced in this book and feel that we have an ongoing success story to tell.

We have been listening to the debate about NPS pollution control, and we agree that most approaches have failed to be effective. However, we disagree with those who contend the problem is that land users don't want to implement conservation and that the current approach relies too much on voluntary implementation.

We also disagree with those who say that NPS pollution reduction efforts must stay exclusively within the realm of voluntary implementation. We contend, instead, that the lack of success stems from the adoption of solutions that treat NPS pollution control as a complicated problem rather than a complex problem.

In tackling NPS pollution, conservation organizations and agencies are trying to duplicate what has worked well for point source pollution control. But NPS pollution control is much more complex, and what works for point source pollution control will not work for NPS pollution control. Significant flexibility is needed because what works in one watershed may not work in another.

NPS pollution control requires all five of the general tools described in Chapter 1: providing technical and financial assistance, encouraging and informing land users, completing capital projects, enacting regulations, and taking advantage of market forces. It also requires a different approach—one that meaningfully engages and empowers land users.

Paul Nelson has called the current approach the SPH3M approach: Study, Plan, and Hope for Three Miracles, with the first miracle being that landowners agree with the studies and plans, miracle two being that landowners are suddenly inspired to change their behavior, and miracle three being that conservation practices build themselves. As silly as all this sounds, it is to a large extent the model now in place.

For the most part, studies and plans are completed through top-down processes, without any requirements dictating their implementation or funding. In the meantime, land users are perceived as being unwilling to implement practices when they are told what to do to reduce NPS pollution. It is more likely the case they have been given neither the guidance to know what is specifically expected of them, nor the assistance they need to take action. Further, as Warren Formo shares in Chapter 7, we often lack information about what any given land user owner is or is not doing to control NPS pollution at the individual field or farm level, since many practices are not visible or measurable.

> Instead of trying to understand the social systems at play and intentionally trying to address them, the current approach to NPS control hopes that miracles will happen.

Only recently in Minnesota has the legislature begun to make significant investments in SWCDs, to the point where they can begin to overcome some of these barriers. Building SWCD capacity to more effectively engage with land users and communities will result in more practices being constructed within their watersheds.

With this manual we make the point that NPS pollution control doesn't have to rely on miracles. Although efforts must be intentional, and noticeable water quality improvements will take time, there is a compelling framework for building community norms, capacity, and conservation momentum (FIgure 13).

We contend that NPS pollution control efforts are successful when they:

1. Apply systems thinking
2. Are locally relevant
3. Are locally delivered
4. Build strong relationships and enduring partnerships
5. Stay focused, learn, and adapt

Previous chapters explore each of these principles, offering tools and examples. The Multilevel Community Capacity Model presented in this manual provides a framework for navigating the complexities of the NPS pollution control problem.

We recognize that what we are proposing represents a significant change. Indeed, changes in the way water resource professionals, elected officials, and land users view the problem and one another

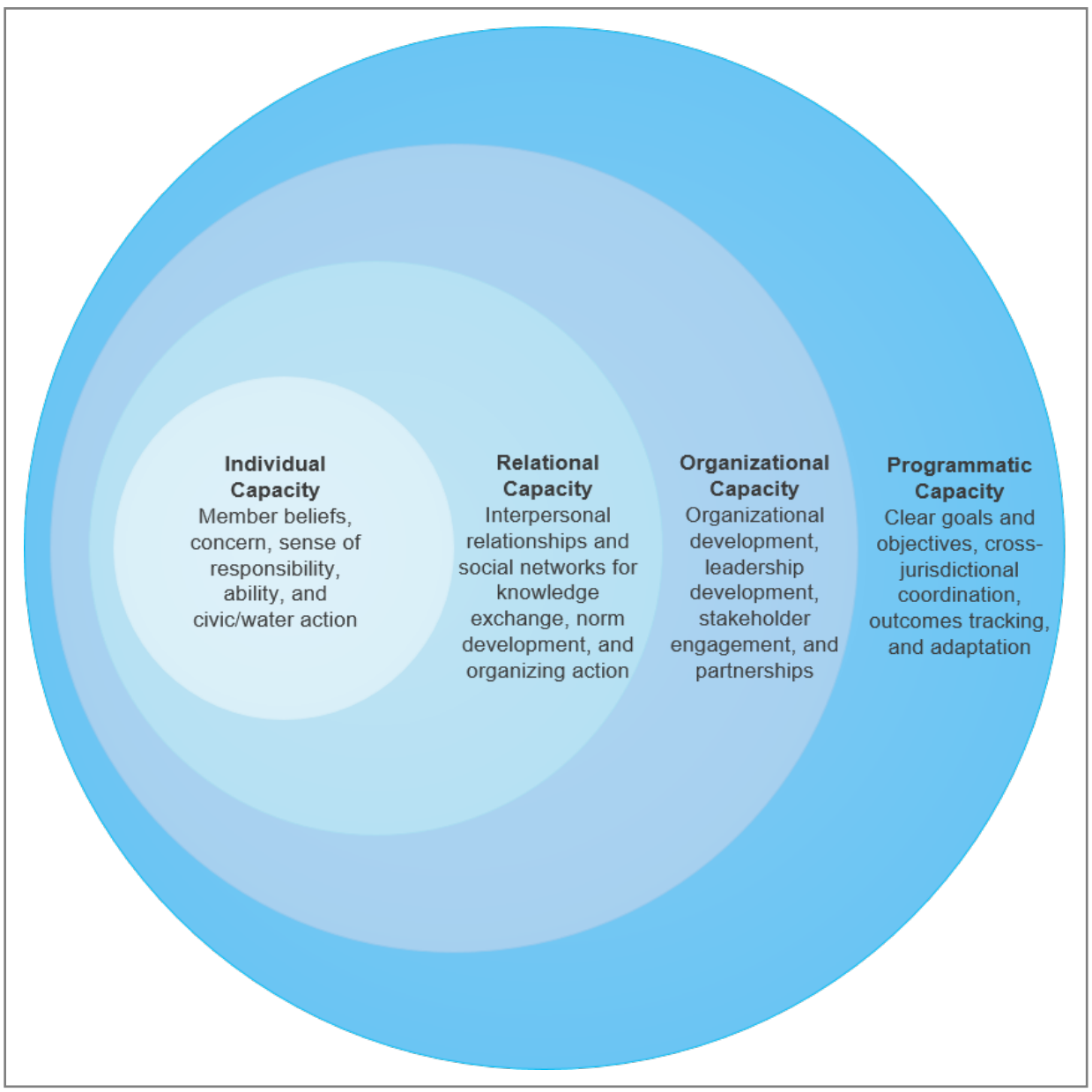


Figure 13. Interconnectedness of capacity building

> Those who are most adept at making change happen recognize the local rules of interaction and then leverage them to increase their potential.
>
> *Getting to Maybe: How the World Is Changed* , Westly, Zimmerman, & Patton, 2007.

must occur, and these changes are discussed throughout the book and are summarized in Figure 14.

Successful change will require greater investment in the capacity of individuals and organizations to implement NPS pollution control practices, and it also will require room for experimentation during implementation. Lastly, successful implementation requires the ability to learn and adapt.

We argue that the fastest way forward is not to double down on more studies and plans, but instead to learn by doing: set desired outcomes, perform ongoing measurement and assessment, and adapt as necessary for continuous improvement.

Getting Started

The Multilevel Community Capacity Model is a framework, and conservation organizations can start almost anywhere, because each element of community capacity is interconnected—building programmatic capacity also builds individual capacity (Figure 13). In fact, we suspect that most conservation organizations already have put some of these elements in place. They don't have to put the framework in place all at once to realize progress.

Organizations can try to address everything at once, or they can explore and develop a few pieces at a time. The key is to get started and learn by doing. That said, we do suggest the following initial efforts:

- Compare your organization's current activities and programs against the model to identify parts of the framework that you are already addressing, as well as gaps.
- Consider addressing the gaps, but also build on some of your successes.
- Get to know your watershed community (see "Community capacity assessment" in Chapter 3 and the Community Assessment Worksheet, Appendix A) and use this

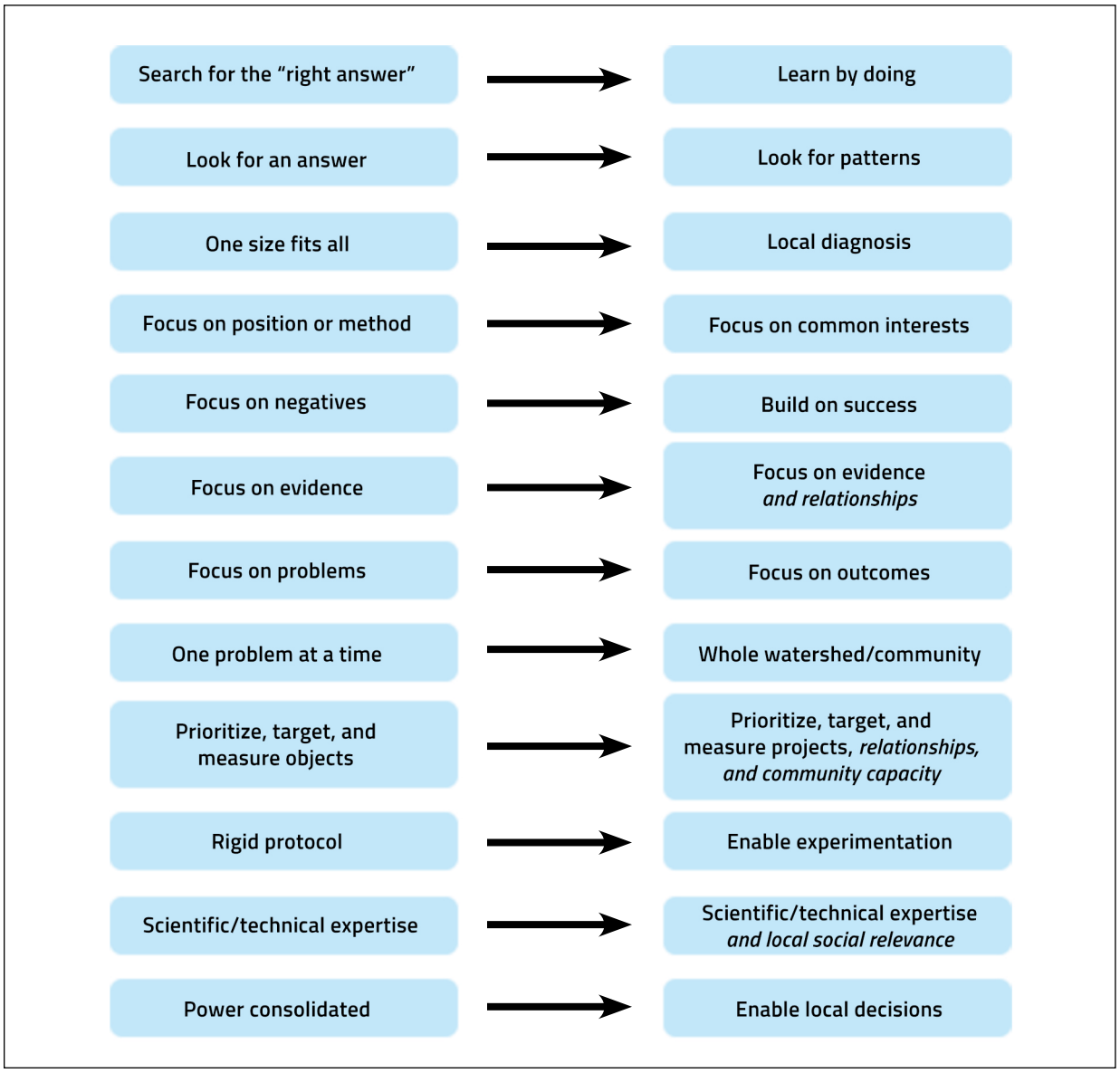


Figure 14. NPS management requires thinking and acting differently

knowledge to understand the local "rules of engagement" and how to make NPS pollution control efforts locally relevant.

- Be intentional about relationship building and providing good customer service.
- Identify desired outcomes and develop measures so they are in place from the beginning to use for learning and adapting.
- Regardless of the elements with which you start, keep in mind the changes in thinking and acting, as identified in Figure 14.

Persistence Pays Off

Chapter 3 started with a story about the Sand Creek Study and the development of a scientifically rigorous diagnosis of excessive sediment in Sand Creek. We developed a prioritized implementation strategy and set out to talk with targeted landowners. However, we found little interest in one of our primary strategies, that of improving riparian vegetation. This was disturbing because the Scott WMO had embraced a vision of creating a buffered environment. We didn't give up, though. We adapted.

The next year we repeated our work contacting landowners, and each year since we have adjusted our cost-share/incentives, trying different configurations. For example, we changed the riparian buffer practice from a cost share to a flat payment amount to address the perception that landowners were paying for half of something they didn't perceive as a benefit and instead present the idea that they could get up to $XXX dollars for improving vegetation.

Eventually, as efforts accumulated and additional ideas emerged, this persistence started to pay off. One of the more successful ideas involved using the Minnesota Conservation Corp crews to knock on doors where we knew improvements would be beneficial.

Through this effort, we asked landowners if the crews could go down to the creek and put in willow and dogwood stakes. Twelve sites were ultimately treated this way with very low cost and effort by either us or the landowner.

We've gone back and checked the sites, and we found that more robust vegetation did get established at most sites. We've also published articles in the county newsletter, the SCENE, about the benefits of buffers to the environment and wildlife. We also completed a number of lakeshore buffers on public property, and some of these were completed as community events with volunteers doing the planting. In short, we found success using many of the approaches described in this manual.

We have now completed more than 35 riparian buffer and shoreline protection improvement projects in the seven years since we first contacted targeted landowners. We've also completed another 130 filter strips where vegetation was improved or added, many of these using native vegetation. Thus, we are making progress, but we're not done. We're targeting another 10 landowners with a different approach.

Many of the landowners we're contacting for the new effort are the same as those we contacted seven years ago. They seem to be more receptive this time, and one has already improved the riparian buffer on his own. I sent him a "Thank You" card, and I heard back through the grape vine that he very much appreciated it, saying that this was the first time anyone ever thanked him for doing something with respect to conservation and that he felt he typically heard from the government only when he was doing something wrong.

Several additional individual conservation efforts have emerged with this landowner since. In fact, he became one of the first farmers in the country to apply for the Minnesota Agricultural Water Quality Certification program, and he has even volunteered to host a cover crop demonstration.

— Paul Nelson

Conservation Momentum: The Flywheel Effect

Once conservation intentions and actions get traction, tipping points get reached and the whole of this work becomes greater than the sum of the parts. Collins calls this the flywheel effect; we call it conservation momentum; Westly, Zimmerman, and Patton call it emergence. Basically, once an organization or movement reaches this point, things start to have their own momentum, become self-organizing, or emerge on their own.

We feel the Scott County partnership is at this stage, and we have provided several examples in previous chapters. (Example 3 "Capacity Building in Action: The Cedar Lake Improvement District" in Chapter 6; "Sweat the Small Stuff, but Focus on Capacity Building" in Chapter 4; "Networking Leads to More Networking" in Chapter 5; and our increasing number of land user technical assistance requests shown in the story called "Good Data Enhances Program Evaluation Capabilities" in Chapter 6.)

Once momentum gets traction, key tipping points are reached and outcomes start to emerge on their own. When this happens, the initiative can grow bigger than the organization. At this stage, the organization may not have a lot of control over directions the initiative might take.

While letting go might allow seeming inefficiencies to creep in, such as cost share for practices that do not appear to advance the organization's goals, heavy-handed or coercive management might stifle creativity or damage trust. So, the question is how to manage momentum during this stage.

Westly, Zimmerman, and Patton talk about it in terms of flow and going with the flow. They suggest nudging the initiative in directions that will deliver desired outcomes. This approach makes sense to us, provided momentum is already moving toward those outcomes. However, when momentum starts to deviate significantly from this path, organizations may want to take more aggressive action. We advise organizations faced with this situation to consider the following suggestions.

1. Stay true to the factors that created the momentum in the first place and the key characteristics that build relationships—trust, fairness, legitimacy, and cultural understanding.
2. Stay focused on desired outcomes using integrated systems monitoring and program evaluation to make informed decisions to learn and adapt as discussed in Chapter 6.
3. Further broaden the organization's network, pulling in additional partners who can add to the collective ability to achieve shared desired outcomes.
4. Include others in the decision-making.
5. Tolerate some imperfection. Initiatives and implementation don't need to be done exactly as the organization may have specified. Remember that for NPS pollution control, there is no single answer or magic wand.

Additional Parting Thoughts

Our hope is to inspire a different way of approaching NPS pollution control. In this book we present our experiences with an alternative approach. We realize, however, that our experience is limited to just a few watersheds and to selected research, and our perspective is affected by our own worldviews. For this reason, we engaged others involved in NPS pollution control, including land users, to review and provide feedback on the alternative approach we propose here.

A summary of what we heard from these experts is presented in Chapter 7. The experts gave us valuable feedback, and we made many modifications in response. They also brought up issues and topics that we acknowledge are not covered in depth in this manual. To a large extent, this is because of our lack of expertise on these topics, or because we simply don't have a good answer at this time We are hoping that others join the conversation and offer additional expertise and thoughts on these topics. They include:

- Influencing or changing the farm bill to help NPS pollution control
- Developing economic/market-based solutions
- Reaching and influencing absentee landowners

We'd like to note, with respect to the last bullet point, that we have had some success engaging absentee landowners through relationships with the renters, who are very often influential in landowner decision-making, but we need to get better.

There are also topics about which we have questions. We welcome input on these matters.

- Most of our success has been with structural and ecological practices, especially in cases where benefits are more tangible. How do we use or adapt this framework (or other frameworks) to work just as effectively for practices such as soil health, nutrient management, and water storage?
- How do we best capitalize on positive social norms and changes we are seeing to better achieve very specific, targeted outcomes (e.g., widespread adoption of a specific practice in specific subwatershed)?
- How do we best capitalize on changing social norms to achieve specific water resource outcomes (e.g., site-specific or wholesale practice adoption)?
- How do we decrease our dependence on financial incentives?

Finally, we are more optimistic than ever about organizations' and agencies' ability to make progress on the complex problem of NPS pollution control. Why? We're having some local success. Consideration of the social aspects of watershed management is gaining parity with consideration of the biophysical aspects. Complexity theory and systems thinking are starting to provide useful management insights. Most important, we're seeing some water quality improvements.

However, successful NPS pollution control is a long-term effort. What's more, watershed conditions are dynamic, and the world around us continues to evolve. Our climate is changing, and new pollutants are being introduced. A lot of creative thinking will be needed to address these emerging challenges.

Please join the conversation at www.freshwater.org/inspiring-action and contribute your ideas, links to additional information, and your stories.

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Appendix A

Community Capacity Assessment Worksheet

by Mae Davenport

- ☐ **How can I better engage community members?**
  - ☐ Who are community members?
  - ☐ Are members aware and concerned about community or water resource issues?
  - ☐ Are members motivated to take action to address community or water resource problems?
  - ☐ Are members able to take action to address community or water resource problems?
  - ☐ What drives actions? What constrains actions?

- ☐ **How can I tap existing social networks or encourage community members to work together?**
  - ☐ How do community members interact? Are social interactions positive? Is there conflict?
  - ☐ How are information and ideas exchanged in the community?
  - ☐ How do members influence one another? (e.g., Who are leaders? Who do people trust?)
  - ☐ Do strong social networks exist? Do they include diverse members?
  - ☐ Do members cooperate to address community or water resource problems
  - ☐ What drives cooperation? What constrains cooperation?

- ☐ **How can I create or strengthen partnerships with community organizations?**
  - ☐ What organizations exist to address community or water resource issues?
  - ☐ Are they influential in the community?
  - ☐ Do organizations engage and unite diverse community members?
  - ☐ Do organizations effectively address community or water resource problems?
  - ☐ What drives organizations' influence? What constrains influence?

- ☐ **How can I create, strengthen or coordinate programs to address water resource issues?**
  - ☐ What programs exist to address community or water resource issues?
  - ☐ Do programs effectively engage diverse community members?
  - ☐ Are programs coordinated across organizations? Is there conflict?
  - ☐ Are programs successful in addressing community or water resource problems?
  - ☐ What drives program success? What constrains program success?

- ☐ **How can I increase the likelihood that water resource planning and management is viewed as fair and legitimate in the community?**
- ☐ **How do cultural differences shape community engagement in water resource planning and management?**

Appendix B

Scott County SCENE Stories

Scott County SCENE Oct./Nov. 2013 edition (page 10)

Hillside erosion claims cow's life; owners respond

Rain is often a blessing when crops are drought-stressed. But when torrential rains come, it's the muddy hillsides, slopes, and washouts that wreak havoc. **Maynard, Ruth, Dale** and **Sam Schmidt** of Blakeley Township can attest to that. For years, their cattle used a gravel path to connect them to lush grazing areas downhill in the valley surrounding the Schmidt farm. Unfortunately, after heavy rains last year, one of their cows got stuck in the unexpected slough and muck; sadly, the animal didn't make it out alive. In fact, through time, the hillside along this slope had become less stable, with a 25-foot-high drop on the outer edge.

Through the years, Maynard said they'd tried dikes, retaining walls, drop pipes, and other fixes on trouble spots on their 176-acre property, property that lies less than two miles from the Minnesota River. Because of the proximity to the river, they have paid close attention to their farming operation as it relates to water quality, leaving residue on their fields to anchor soil, fertilizing at appropriate levels, et cetera… and they've noticed a difference. But with the extreme washout on the cattle path, they realized that this area of their farm -- the hill -- had to be re-sloped and re-built or they would no longer be able to use one of the grazing areas.

The farm has been in the family since 1875. Now living on the farm with Maynard and Ruth are sixth-generation grandsons **Adam, Sam** and **Levi** and their parents **Dale** and **Gail.** The family has been interested in conservation for decades, putting in more than 12 acres of harvestable filter strips in areas they could have farmed, because they knew these vegetative areas were beneficial in catching pollutants and slowing large rainfalls. Maynard and Ruth have farmed for all of their married life. Maynard worked off the farm too, as a livestock hauler and then custodian with the Belle Plaine School District for 25 years. They have taught their family to love the land and take care of their livestock, so the flooding of a couple years ago made them realize that damaging heavy rains and steep terrain can and do lead to devastating consequences.

They contacted the Scott SWCD office to get help with stabilizing the hillside along the cattle path. Today, from above ground, the elements of a grade stabilization project are almost invisible except for the seep drain. This project included water bars, strips of gravel every 10 feet to hold the soil and slow the water, fencing, regrading of the slope, a seep drain, and rock-lined check dams. Now the cattle are grazing downhill again, thanks to this grade stabilization project and a much safer, more stable path to get to those pastures.

For more information on ravine and gully repair projects, available funding and technical advice, call the Scott SWCD office in Jordan to schedule a free site visit at (952) 492-5425.

Hillside erosion was a major problem.

A grade stabilization project was completed with assistance from the Scott SWCD.

One year later, the family's cattle have a path to take (background) when grazing on areas in the valley.

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"Blue Thumb" workshop helps couple resolve water problem

For awhile, **Josh and Shelly Ruble** of New Prague have been dealing with a lot of water moving through their yard. "For years, we've been frustrated with our backyard, not being able to mow because of standing water, watching our fence sag, having water freeze as it flows over the sidewalk in the winter," Shelly said, "We decided something had to be done." So last summer, the couple attended a *Blue Thumb* workshop to learn how a raingarden can reduce runoff and improve drainage.

After attending the workshop, the Rubles discovered they learned a lot more than they thought they would. "I really enjoyed the 'before-and-after' photos," Shelly noted, "It really made me excited. Not only were we going to be able to improve our drainage problem in an environmentally-friendly way, but we were going to end up with a beautiful garden as well."

A raingarden is a depressed landscape feature planted with perennial native plants or cultivars that help

Blue Thumbs to Page 3

The Rubles designed and installed their own raingarden (in background) after attending the *Blue Thumb* workshops.

Blue Thumbs

From Page 1

soak water into the soil. The soil cleans the water as it moves below ground, and the perennial native plants add color and beauty to the landscape bed. Raingardens are designed to hold water for a short period of time, and most of the rain water soaks into the soil within two days after a rain event.

The *Blue Thumb* workshops help residents learn how raingardens work and how they keep our wetlands, rivers, and lakes clean. Two more sessions are planned in March 2012 (see article, page 1). At the workshops, attendees also learn how native plants soak up rain water, stabilize soils from eroding, and provide important wildlife habitat for birds, bees, and butterflies.

"We came to the initial workshop with our fingers crossed that we would be able to figure something out," Josh pointed out. "At each follow-up workshop, we had the opportunity to discuss our unique situation with the Scott Clean Water Education Program staff."

The fun, hands-on part of the *Blue Thumb* workshop is when each participant can actually design his or her own raingarden; choose plants, understand how it fits into existing landscaping, and size it based on the amount of rain water that will flow to it.

The Rubles developed a raingarden plan, including a breakdown on labor and material costs. Watershed organizations and some cities in Scott County provide grants to residents interested in creating raingardens. To be eligible for the funding, residents need to attend a *Blue Thumb* workshop and seek help in designing their raingardens. Once the raingarden is in the construction stage, Scott Clean Water Education Program staff visits the site to check on correct installation and design.

Planning and hard work pay off

It was a weekend of hard work for the Rubles before they were able to see the fruits of their labor. "It was a lot of hard work to move soil and dig out the shallow raingarden, but we know the work will pay off," Shelly said. "And we'll be helping to conserve our soil and water resources for future generations. Having the Scott Clean Water Education Program staff come out and inspect the work as we progressed really gave us the peace of mind we needed to complete our raingarden."

Now Josh and Shelly can't wait for the spring rain so they can see their raingarden in action.

"I was surprised to learn how easy it is to make a difference and have a positive impact on the environment. It doesn't take much time or money to design and install a raingarden," Josh summed up.

If you are interested in installing a raingarden and helping to keep our waters clean, register for a *Blue Thumb* workshop. In addition, the workshops also help lakeshore property owners stabilize their shoreline with native plants and connect interested residents with available grants. For registration, contact Dan Miller with the Scott Clean Water Education Program, (952) 492-5424, or send an e-mail to dmiller@co.scott.mn.us.

Attending the SWCD awards ceremony from Scott County were (left to right) Scott SWCD Supervisors Jim Fitzsimmons and Rob Casey; Linda and Ken Glisczinski; Linda's mother Leona Sellnow; daughters Sara and Elizabeth Glisczinski; SWCD Supervisor Linda Brown; and Ken's mother Joan Glisczinski. Not pictured is Ken and Linda's son Scott.

New Prague family among state finalists honored by SWCD

Scott Soil and Water Conservation District Board members recently congratulated **Linda and Ken Glisczinski** of New Prague for being finalists in the *2014 Outstanding Conservationist Program*. As Scott SWCD's nominee, the Glisczinski family was honored at a December 9 luncheon at the Minnesota Association of Soil and Water Conservation District's (MASWCD's) 78th annual convention in Bloomington. This awards program recognizes farm families, individuals, organizations, and others for their accomplishments in implementing conservation practices and improving Minnesota's natural resources. MASWCD, with support from *The Farmer* magazine, sponsors the *Outstanding Conservationist Award*. Other finalists were from Parkers Prairie, Otter Tail County; Brooten, Pope County; Bock, Mille Lacs County; Beaver Creek, Rock County; East Chain, Martin Country; Rushford, Fillmore County; and Wadena, Wadena County.

"We're proud of Ken and Linda for their diligence and innovative approach to protecting and conserving natural resources in our area," said Jim Fitzsimmons, past Chair of the Scott SWCD's Board of Supervisors. "It's great to be able to recognize the work they've done locally."

The Glisczinskis are common-sense land stewards. They plant crops and spread manure on the contour, use grazing rotations, practice minimal fertilizer/pesticide use, and added harvestable filter strips that slow runoff to a nearby drainage ditch. These are just some ways they farm with an environmental twist. They're concerned about their farming operations because runoff eventually leads to Sand Creek, and they also live close to Cedar Lake, an 800-acre recreation destination.

The Glisczinskis take the impacts of their everyday actions seriously, and work closely with the Scott SWCD and Natural Resources Conservation Service on renovating pasture areas, creating buffer field borders, and installing grassed waterways. They also advocate for education, developing programs for the Scott County Fair and serving on county-wide agencies and committees. They were responsible for launching the Miracle of Birth at this year's Scott County Fair. All of these things come naturally for Ken and Linda, making them good stewards of the land in Scott County.

Scott County SCENE Feb./March 2012 edition (page 10)

Local landowners make use of no-till rental equipment

When **Tim O'Loughlin** of Shakopee wanted to seed winter wheat into soybean stubble on 250 acres in Spring Lake Township, he rented no-till equipment from the Scott Soil and Water Conservation District (SWCD) in Jordan. For many landowners in Scott County, this is a convenient, cost-effective option for interseeding/overseeding alfalfa, planting soybeans or small grains, and establishing native grasses or wildflowers on large or small acreages. And the best part? The equipment can be delivered directly to your seeding site and picked up from that same location when you are finished with it.

John Bisek Jr. of New Prague (left) and Scott Schneider discuss the benefits of the John Deere No-Till Drill, which the Scott SWCD rents out to Scott County landowners. Schneider, Resource Conservationist with the District, delivers the equipment directly to the seeding site and picks it up when planting is finished.

John Deere 1560 No-Till Drill

For Tim, the John Deere drill was what he preferred to rent because of its 15-foot planting width and 7.5-inch rows. Fortunately, he has a larger tractor with hydraulics to pull it (a 100 HP tractor is the minimum requirement for use). For many years, Tim has used the grain box on the John Deere to seed soybeans and small grains; a legume box is also often used to seed alfalfa and to renovate pasture areas. Tim also prefers using this equipment because his land has sandy soil that can dry out quickly. By leaving the maximum amount of residue, the soil on his land holds moisture longer, giving crops a better chance for high yield while minimizing erosion potential by surface runoff.

The John Deere is one of three drills available to rent for use on lands in Scott County. Rental rates are $8 an acre; in addition, a minimum non-refundable drop charge of $100 is required. This drop-charge amount will be applied to the total acres planted.

The **Bisek Brothers** Partnership -- which includes **John Jr., Albert**, and **Frank** of rural New Prague -- has rented the John Deere no-till drill for years. Each fall, the brothers typically rent this drill to seed winter wheat into old alfalfa stands after they have killed the alfalfa with herbicide; they also use the no-till drill to plant soybeans into corn stubble and seed small grains in the spring. The Biseks appreciate the 15-foot seed width of the drill, which helps them get the job done quickly and allows for easier maneuvers on steep hillsides. They have contour strips in place to minimize erosion. Combined with the lack of conventional tillage, the potential for erosion on the fields is greatly reduced.

Every other year, **Ted Kornder** of Belle Plaine uses the John Deere to plant almost 60 acres of soybeans and winter rye into corn stubble on his property that runs along Highway 169 north of Belle Plaine in Sand Creek Township. Ted's land has sandy soil in an open flat area, prone to wind erosion and lacking adequate surface residue to prevent soil from blowing. By no-till seeding, he is able to keep maximum residue on the field and minimize soil loss through wind erosion.

"Using the no-till drill during last fall's drought, we were able to establish a rye crop and got good emergence with no rainfall. A conventional drill would not have done the job on it," Ted explained. "It was the right tool to use for the 2011 field conditions. With my acreage, I can't justify buying this equipment, so renting it works out well for me."

Great Plains 705NT No-Till Drill

Last year, **Tim and Molly Havlicek** of Elko New Market purchased Tallgrass Prairie Mixes through the Scott SWCD's tree program. To restore more than four acres of native prairie in Cedar Lake Township, they rented the Great Plains 705NT No-Till Drill. The drill has three seed boxes: A grain box for oats and small grain seeds; a legume box for seeding legumes, switchgrass, and other small grass seeds; and a large fluffy seed box for seeding native grasses or brome grass. The Havliceks like the narrow planting width of seven feet and the fact that it only requires a 50 HP tractor with hydraulics system. When using either the John Deere or Great Plains, crop residue, corn stalks, and grassy established pasture areas are all acceptable conditions for use.

Since 2005, **Jon Zweber** of Elko New Market has rented both the John Deere and the Great Plains drills to plant grasses for his pasture areas, and to interseed hayfields on various acreages in New Market Township. Jon appreciates the versatility of the seeding boxes that allow him to plant several types of seeds. The narrow width allows him to access pastures and seeding areas with the equipment through cattle gates without removing fencing. Jon can seed directly into the existing grasses or legumes with one pass.

"Renting the no-till drills work out the best for us," Jon noted. "We have a lot of acres that we never plan on plowing again. We've got the kind of land that is more erodible, so tilling less and keeping the soil in place are important."

Brillion "Sure-Stand" Seeder

Mike and Ellen Shea of Prior Lake own property in Cedar Lake Township. They used the Brillion seeder to plant native grass filter strips on about 20 acres. Mike's land was already tilled in the fall, so it needed a pass or two with secondary tillage to smooth the seedbed before he could seed with the Brillion. They chose it because of its ten-foot planting width and ability to broadcast seed into a loose, clean-tilled seedbed. Firming of the seedbed provides the great seed-to-soil contact for better germination as well as smoothing the soil surface for future clipping. He found his 40 HP tractor with hydraulics was a good match for the equipment.

See other rental options at left.

SWCD has other equipment available to rent

In addition to the equipment mentioned in the article at right, Scott SWCD also has a Finn Krimper available for rent. The Krimper is ideal for seeding projects that require the use of straw or hay mulch to protect the seed and help it grow while retaining moisture. Used to anchor the straw into the soil to avoid loss of coverage, the Krimper helps reduce erosion and runoff while seed is germinating.

Hand seeders for grass seeding bare spots on lawns as well as loppers and saws for buckthorn removal are also available. There is a deposit required on this equipment, but no per-acre charge. A contract and fact sheet can be mailed to you. Once the deposit has been paid and the contract completed, a map of your property with the planting area will be highlighted. Scott Schneider, Resource Conservationist with the Scott SWCD, will contact renters a few days prior to planting to make arrangements for delivery and pickup. Call Schneider at (952) 492-5425 if you would like to be added to the 2012 equipment rental schedule or to discuss which equipment would be best for your no-till needs.

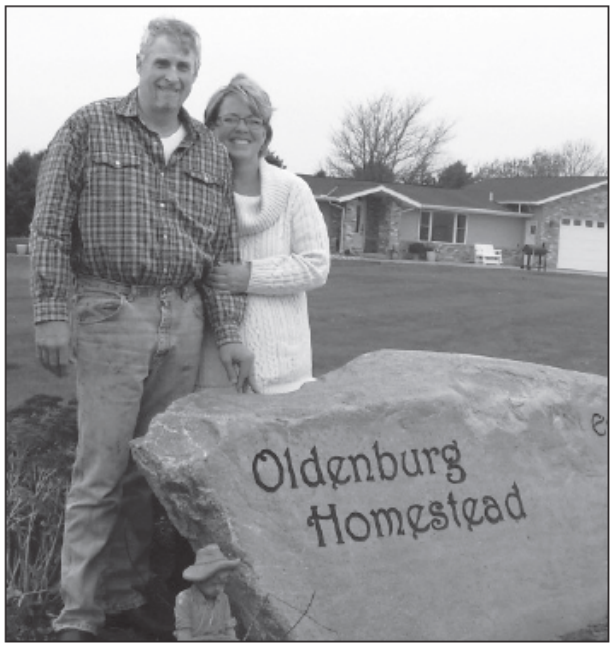
Oldenburgs good stewards in Blakeley Township

The Oldenburg farm, homesteaded in 1863, is nestled in the rolling hillsides of Blakeley Township. The terrain quite naturally lends itself to problems with erosion, ravines, and runoff in spite of its beauty. But Randy and Jane, along with those renting their farmland, are doing everything they can to foresee, minimize, and repair any potential consequences with conservation practices.

With direction from the Scott Soil and Water Conservation District (SWCD) and Natural Resources Conservation Service (NRCS) staff, they've installed almost 10 projects over the last 15 years, dotting their farmable and non-farmable land. Working with the flow of water, the lay of the land, and the latest technology, these environmental practices have actually resulted in clearer waters, healthier wetlands, and less erosion. In one case, a water and sediment control basin saved 28 tons of soil loss, sediment, and phosphorus a year from entering local waters.

Since 2001, the couple has made a conscious effort to invest in conservation, with their own money and with federal and county funds that are available to qualifying landowners. One example is the living snow fence they planted almost 14 years ago. Until this planting, they experienced impassable blowing snow and drifting along German Road, watching as County plows spent hours busting through and clearing the road or traffic. They worked with Scott SWCD staff on installing a three-acre tree line (cedar, spruce, and lilac) that formed the "living snow fence" on the east side of their property. The starter seedlings, purchased from the Scott SWCD tree program, now stand up to 20 feet tall and play a critical role in catching blowing snow before it even gets to the road, improving safety while providing cover and nesting habitat for wildlife as well.

Also in 2001, Randy and Jane decided to clear out some dying trees in a ravine along Roberts Creek. But the trees didn't go to waste: The cherry, ash, and walnut trees were cut, treated, and now provide beautiful flooring throughout their home. Their daughter also



Working with SWCD, Randy and Jane Oldenburg have installed conservation projects that retain soil and keep water clean.

lives on the homestead, in the original home built by Oldenburg ancestors. The couple's other children live in Shakopee, Henderson, and Belle Plaine.

The next project? To guard against sediment washing down hillsides during heavy rains, they decided to plant a couple areas -- almost 12 acres -- into filter strips at various sites. These strips of natural grasses now hold soil in place and filter any pollutants before they reach nearby ditches and wetlands. More than 10 years later, these structures are still performing the way they were designed to do.

In 2002 and 2009, the Oldenburgs again worked with Scott SWCD staff to install three water and sediment control basins (WASCBs). These are basically earth embankments constructed across a slope to form a sediment trap and water-holding basin during heavy rains. These commonly used structures reduce gully erosion, keep sediment from flowing to local waters, and reduce and manage runoff, all while improving water quality downstream.

They also take good care and monitor the condition of the wetland on their property, home to ducks, geese, deer, and returning swans. The wetland is named the "German Settlement Wetland," with farming partners the Krentz and Panning families. Many of the Oldenburgs' farmable acres are rented out.

Randy has worked off the farm for 17 years with Chard Tiling & Excavating out of Belle Plaine. Jane is also from the area, having grown up on her parents' (Don and Marion Breeggemann) farm near Marystown. Jane remembers her parents being involved in restoring a wetland there, so land care was also an ethic passed on to her through the years.

Because both have farming backgrounds, the Oldenburgs -- now six generations of conservationists -- realize the importance of caring for the land. Today, they agree, those in the ag and rural areas have to consider bringing back more pasture and wooded areas, keeping soil covered, and guard against behaviors such as using more chemicals on fields.

In more recent years, the Oldenburgs installed a grade stabilization structure, which prevents the formation or advancement of gullies. They also installed another water and sediment control basin due to erosion they were experiencing due to field tillage. Scott SWCD staff is also working with the Oldenburgs on putting in terraces in spring 2016 to control erosion and runoff in a couple farm locations.

"Conservation projects work. They save soil and reduce erosion," Randy summed up. "We're proud of our homestead that has been around for several generations. With improvements, it will continue to be the Oldenburg farm for generations to come." For more information on these and other conservation projects, contact the Scott SWCD office in Jordan, located on the Scott County Fairgrounds at (952) 492-5425.

Appendix C

Conservation Delivery Revamp Initiative
Farmer Meeting Results Summary and Conclusions

CONSERVATION DELIVERY REVAMP

Summary of local farmer views and opinions

Introduction

In March 2012, resource conservation staff from the SWCD met individually with fifteen active farmers in Scott County to get their thoughts and opinions regarding conservation. The goal of these interviews was to gather insight and feedback that could help improve our conservation delivery system. We were particularly interested in learning what we could do to increase practice adoption and improve the cost effectiveness of public funding for installation and maintenance of practices.

The farmers selected for interview represented a diverse cross-section of Scott County's agricultural community in, both in terms of type and size of operations as well as geographic distribution. Their views and adoption of conservation varied widely as well, from very skeptical to very proactive.

Following is a summary of what was heard from these meetings, followed by some ideas and thoughts for moving forward.

Summary

The explanation most farmers gave for why they practice conservation is responsibility to the environment and ensuring sustainability of their land for future generations. This can be reasonably defined as conservation ethic. The extent to which this ethic translates into practice adoption is, however, driven or at least moderated by practical considerations. In short, they must believe a solution is necessary and feasible. It is unlikely they will be receptive to adopting practices for which they either do not see the need or feel the solution(s) is too complicated, expensive or unproven.

Certainly, there appears to exist some disconnect between what farmers might feel is necessary and what monitoring data, modeling and other scientific studies dictate. Some farmers, for example, feel tiling is a benefit to the environment because it increase the lands capacity to accept moisture therefore reduce runoff, not understanding impacts to hydrology and bank stability downstream. Another example pertains to soil loss, where they may not appreciate the impact of sediment and phosphorus pollution resulting from soil erosion unless it is very visible, such as a major washout on a hillside or large plum or sediment at the bottom of a slope.

Like most people, farmers don't like being told what to do or feeling forced to do something they view is impractical or unnecessary. They feel strongly they know what is best for their land in terms of where conservation is most needed and workable. They indicated conservation is not needed everywhere, and skepticism grows when they are told to do something where it's not. A solution may be viewed impractical when it addresses a problem they don't view as real or significant, requires too stringent of standard (e.g. overbuilt), is inflexible (buffers with a set width or that cannot be harvested or renovated), or is not appropriate for site conditions (e.g. no-till on clay soils). The issue of practicality heightens when it involves taking land out of production.

The resource concern must be apparent, the solution must be practical, and the outcomes must benefit both the environment and farmer. Benefit is often but not always measured in economics return. Other benefits can include but are not limited to saving time and equipment costs, improved productivity, improved farmability of land, and positive public perception.

Notwithstanding the above, there are producers who may not discount the need for conservation entirely but make decisions based entirely on personal benefit, as measured primarily by profitability. There is also a small but significant contingency of farmers that fall on the other end of the spectrum. These individuals lack a conservation ethic and do not feel obligated to practice environmental stewardship or sustainability.

Conservation on rented land presents a different dynamic than it does on owned land. Certain types of projects require

significant capital investments and returns on that investment can be longer than they might have control of the land.

Another central theme heard throughout our interviews deals with relationships. Farmers will listen to and seek assistance from people they trust. Trust builds when the conservationist proves to be knowledgeable, displays common sense, and is willing listen. Trust fades in the absence of these, and the ability to promote conservation suffers when the engaging conservationist is a poor communicator, lacks practical knowledge and/or fails to listen to issues or concerns. Several farmers admitted they avoid seeking assistance and/or will discount advice of individuals they do not trust or respect. Success requires is a two-way conversation and no one likes being told what to do or have their needs or ideas ignored.

Farmers were not asked specifically about whole farm planning (WFP) as a method to deliver conservation. Questions were instead structured in such a way as to help determine whether this direction would be accepted and result in increased adoption of conservation. The responses suggest farmers are not inclined to participate in programs that result in unnecessary and unproductive time. At the same time, there was support for increased communication and regular contact with the conservationist, to stay informed of new opportunities or issues they might otherwise not be aware of. Examples given were newsletters, email, and regular one-on-one meetings.

Targeted approaches were for the most part viewed positively and recognized as a way to focus limited time and resources. Mass mailings, however, were viewed as ineffective, especially if not pertinent to farmer's specific needs/issues. It was cautioned that targeting must be done carefully so as to not offend or make farmers feel singled out.

Farmers were asked questions about recognition and the concept of "certification". While some farmers spoke favorably, the concept of certification did not seem to resonate strongly, and there was considerable agreement that recognition served more to enhance public education and perception than as motivation to increase their own adoption of practices. There is strong feeling sense that the public is generally uninformed, disconnected, and/or has unrealistic expectations. It seems the value of certification a selling point to prospective landlords would be minimal, as success in securing rented land had more to do with how much a farmer is willing to pay per acre, and who knows who.

On the issue of cost sharing, most of the farmers feel it is an appropriate use of taxpayer money because it provides public benefit such as resource protection and improvement. Cost share can balance the equation where economic returns are otherwise weak, but is not always necessary. Some farmers felt the level of cost share was adequate, while others felt it should be higher. It's unclear whether property tax incentives would substantially increase practice adoption. Regardless of cost share level, the need and practicality of the conservation practice is paramount in the eyes of the cooperator.

There was also considerable consensus that cost share should not be conditional to doing other conservation practices unless the need is clear and benefits outweigh the costs. In the absence of clear need and cost effectiveness, a "conditional" cost share program this would be viewed as a mandate or regulation. A common sentiment is that it's better to achieve some conservation than none. Opinions vary considerably as to whether cost share funds should be limited to installation or apply to maintenance as well. There was, however, a high degree of support to use public funds for maintenance of practices that require taking good land out of production, such as buffers.

One possible exception or alternative to conditional cost sharing is a tiered approach, where cost share rates vary depending on level of adoption. Several keys to making this work include identifying what other conservation issues issue the recipient would need to address. This would require more thorough planning along with the farmer, and clear identification of expectations (e.g. performance standards) by whoever controls the cost share funds.

Conclusions

The farmer interviews provide good insight into where we may want to focus efforts to improve our conservation delivery system. They confirmed a considerable though variable conservation ethic already exists in the farm community of Scott County. Ethics, however, are deep rooted personal values that develop and change slowly. Someone's conservation ethic is most likely to change, if it does at all, by having positive experiences over long periods of time.

While conservation ethic may open doors, pragmatism determines what conservation actually gets on the ground. In other words, farmers adopt practices and behaviors based on what they believe is necessary and practical, not based on an ideal.

Ideas for revamping our delivery system have thus far centered on whole farm planning (WFP) and using certification, prorated cost share, and /or property tax relief as possible incentives. The extent to which these help to improve our program efficiency, effectiveness and long-term sustainability will depend on the degree to which they increase what conservation practices farmers believe are truly necessary and practical.

Moving farmers beyond what they currently believe is sufficient requires their willingness to listen and be open to ideas. The quality of the relationship between farmer and conservationist is critical in determining whether this happens. Conservation staff, through the current delivery system, have been relatively successful in terms of building trust and positive relationships, and maintaining and enhancing this component must be central to any revamp effort.

Moving farmers beyond what they currently believe is practical requires attention to how practices are designed and what they cost. Farmers value flexibility, innovation, and options, and may accept less or in some cases no cost share if they are allowed to try things their way. Where standards and costs cannot be relaxed, cost share and incentives will need to continue. This is especially true for practices that take land out of production. Regardless, it's important to keep in mind that public funding merely helps a farmer decide whether it's practical to adopt a practice he might otherwise deem unnecessary or infeasible. This can lead to positive experiences and therefore permanent behavioral changes. On the other hand, providing incentives to compel adoption of practices or behaviors the farmer ultimately does not believe are environmentally needed, operationally practical, or economically feasible will not be effective or sustainable in the long term.

The concept of certification did not resonate very strongly, and like recognition is not particularly motivating. Since it is already being pursued at the state and federal levels (e.g. ag certainty) a similar local initiative might be confusing if not contradictory. It would make sense to let this concept mature at that level while we focus locally on relationship building and local priorities.

Thoughts and suggestions for moving forward:

1) Incorporate a whole farm planning element into current programming.

The current conservation delivery system includes a component called "large operator initiative". It's an informal but deliberate effort to maintain open communication and positive relationships with the producers who occupy a significant portion of cropland in the county as owners and/or operators . Conservation staff are each assigned their list of producers. Some base level planning is done ahead of time, including identifying the tracts they operate along with possible conservation opportunities. WFP can enhance this by providing a consistent set of standards and methods for identifying and communicating conservation needs and opportunities. It needs to be designed, however, with the farmer's perspective in mind. Important considerations include:

- Participation must be simple and straightforward. Farmers will eventually turn away if they sense its taking more time and/or paperwork than necessary, and or lacks priority focus
- Recommendations must be rooted in science or at a minimum reflect plain, common sense. Farmers must see and believe a reasonably strong nexus exists between the sorts of practices they're being asked to adopt and the environmental issue being addressing.
- Practices must be as simple, economical and non-intrusive as possible. Farmers may adopt but in the long run will not maintain practices they feel are infeasible operationally or economically.

2) Decide where to focus efforts.

Conservation staff is already at full capacity responding to calls, assisting cooperators with projects, and promoting practices like wetland restoration (WREP), filter strips, riparian buffers, etc. WFP requires more time with individuals, so prioritizing where we spend time geographically and/or with whom is important. Options:

- Impaired watersheds?
- Willing landowners?
- Other?

3) Decide what to focus on.

When meeting with farmers it's important to be clear about what practices we want them to adopt, and why. There may be a range of things from critical to less import, but regardless there needs to be solid rationale based on resource need and common sense. Other things to consider:

- Farm-specific based on subwatershed analysis or other small-scale modeling?
- Farm specific based on compliance with countywide or watershed-specific performance standards?
- Other?

4) Define process and format.

There should be an identified process for gathering, evaluating, presenting, storing and managing data. This will help to create efficiencies through repetition and provide consistency in application over time and among staff.

5) Support change.

Conservation staff are willing and eager to spend whatever time it takes to build relationships and promote adoption of priority practices. Budget, work plans, performance measures and training all need to support moving in this direction.

6) Review and revise financial assistance policies.

Interviews suggest we'll need to continue providing cost share and incentives to help balance economic considerations. Current policies reflect how far we go, but there are an infinite number of ways they can be modified and improved. One thing for certain is that farmers do not feel cost share for one practice should be conditional to adoption of other practices, except perhaps in cases where they are clearly needed and cost share is available. Other things to consider:

- Some form of a tiered (vs. conditional) system may be acceptable and make for good public-policy; however, deciding what the criteria are and how to apply them may be difficult (e.g. by practice? cost effectiveness? percent of plan adoption? combination?).
- Allow/encourage farmers to use alternative designs and innovate approaches, even if only on a demonstration or pilot basis
- A property tax incentive or reimbursement system holds promise, but like a tired system, deciding what the requirements are might be difficult. Other questions arise, such as how much of a tax break is needed? are sufficient funds available if heavily subscribed to? how does it tie in with a cost-effectiveness strategy? will it yield long-term behavioral change or only last as long as the incentive do?
- Identify ways to make the cost share process simpler and quicker. One example given is supplying seed and offering free use of equipment for ecological practices
- Ensure solutions require as little land and construction costs as necessary
- Ensure solutions are designed according to operator skill and operation (e.g., equipment) versus programmatic rule or regulation
- Streamline the approval and payment process

7) <u>Develop additional educational resources.</u>

- Fact sheets explaining resource issues and concerns in plain English (must be specific to a resource the farmer can relate to; the more distant the resource, the less their feeling of connection/responsibility)
- Fact sheet on agency roles/responsibilities (many farmers are confused)
- Fact sheets showing pictures and having descriptions of practices being recommended
- Maps showing locations of practices being successfully used on other farms in the area (perhaps develop a "self-guided" tour)
- Email/e-newsletter distribution lists to stay more in touch with quick bits of information

8) <u>Increase resource conservationist's knowledge and interpersonal communication skills.</u>

- Provide staff information about specific resource concerns
- Provide staff information about specific corrective measures needed (i.e., what should farmers do that they are not already doing, and why)
- Ensure staff have solid understanding and appreciation of agricultural operations and management
- Enhance professional and interpersonal communication skills through on-site training or coaching
- Provide adequate resources, venues and time for communication to occur
- Keep staff long term by providing a satisfying work environment and competitive compensation

Appendix D

The Difference Between Point Source and Nonpoint Source Pollution

Funding for Point Source and NPS Pollution Control

The construction of wastewater facilities in the 1970s and 1980s constituted one of the largest infrastructure investments in the history of the United States, with federal appropriations totaling more than $85 billion dollars (Copeland, 2012). The current value of this investment, accounting for inflation, is around $180 billion. Most of this investment took the form of grants, with the federal share ranging from 75% to 55%. Municipal wastewater utilities have the ability to charge for the service of handling consumer and business waste. Business and industry, in turn, can build waste-disposal costs into their product costs. The NPS sector does not have this luxury.

Table 5
Federal Conservation Program Funding 2014
(USDA-NRCS, Financial Management Modernization Initiative (FMMI) and USEPA319 Grant Program for States and Territories)

Agency	Program	Funding (in millions)
USDA- NRCS	EQIP	$1,300
USDA-NRCS	WRP	$62
USDA-NRCS	CRP	$1,700
USDA-NRCS	CSP	$120
USDA-NRCS	ACEP	$317
USEPA	Section 319 NPS	$159
	Total	**$3,658**

*EQIP – Environmental Quality Incentive Program, WRP- Wetland Reserve Program, CRP – Conservation Reserve Program, CSP – Conservation Stewardship Program. ACEP – Agricultural Conservation Easement Program

The negative consequences associated with NPS pollution resulting from a single individual's actions rarely have a direct financial or other negative impact; rather, they are externalities that pale in importance relative to other drivers. In the case of agriculture, for example, commodity prices set by national or even world markets drive management decisions that affect NPS pollution.

Although NPS pollution control funding has not increased to the level historically applied to point source pollution control, it has increased in recent years through federal, state, and local programs. Federal programs, including the United States Department of Agriculture – Natural Resources Conservation Service (USDA-NRCS) conservation programs, and the United States Environmental Protection Agency (USEPA) Section 319 Program, provided funding in 2014 that totaled $3.7 million nationwide (Table 5).

The Environmental Quality Incentive Program (EQIP) and the Conservation Reserve Program (CRP) have been around for 20 to 30 years, respectively, and over that time the combined funding totals about $65 billion adjusting for inflation (USDA Conservation Reserve Program Statistics by State 1986-2014). However, it should be noted that the primary objectives of these programs are soil conservation and wildlife habitat improvement; therefore, the level of investment in them does not translate entirely into NPS pollution control. The USEPA Section 319 program provided $159 million nationwide in 2014 (USEPA, 2016), and since its inception in 1990 through 2014 it has provided a total of about $3.9 billion. Thus, total federal NPS funding in 2014 is about $3.7 billion/year, and totals around $70 billion since 1987. This is nothing to sneeze at. Though, even considering these recent cash infusions, it would take another 25 - 30 years of all these NPS pollution control funding sources—at the current $3.7 billion per year rate—to match historic federal investment in point source pollution control.

Some states, like Minnesota and Missouri, have dedicated sales tax revenues for conservation. In Minnesota in fiscal year 2014-2015, clean water funding from the Clean Water, Land and Legacy Amendment was approximately $194 million. Of

What if more of the billions of combined state and federal dollars were intentionally invested in building capacity to implement and learn while implementing?

Would our NPS control efforts be more or less successful?

The authors contend that they would be more successful.

this amount, roughly $70 million was directed toward on-the-ground NPS control and $22 million was directed toward point sources and septic systems. The Minnesota legislature also appropriates a small amount of funding for the state cost-share program with general funds, and in Scott County this funding amounts to about $15,000 to $17,000 per year.

The purpose of this funding discussion is not to argue for more NPS control funds. NPS control has had considerable resources dedicated to it. Rather, we aim to point out that point source control has had significantly more resources dedicated to it, making it difficult to compare the results. Additionally, we contend that NPS pollution control will be more effective if more strategic investments were made to build community capacity to manage water and to develop a fully integrated and iterative adaptive management approach.

Management of Point Source and NPS Pollution

Point sources are easier to manage than nonpoint sources because they are fewer in number, represent much larger pollutant loads at singular points, and are more easily identified and regulated. The greater variability of NPS discharge and the immense change—to the landscape and to land user behaviors—required to address NPS problems add to the challenge of managing NPS pollution.

Table 6
NPDES Waster Water Discharge Permits in the Upper Mississippi River Basin by State
(USEPA Envirofacts Warehouse)

State	Number of Wastewater NPDES Permits
Illinois	1272
Iowa	1042
Minnesota	515
Missouri	565
Wisconsin	584
Total	3,978

Wastewater utilities and municipal stormwater point source dischargers aggregate individual waste producers into fewer discharge points. For example, point sources represent discharge at only a few thousand points in the Upper Mississippi River Basin (Table 6). National Pollutant Discharge Elimination System (NPDES) municipal stormwater permits have multiple discharge points, making them more distributed than wastewater discharges. There are 235 NPDES municipal stormwater permits (233 small and two large) in Minnesota (Personal Communication, Shauna Bendt, MPCA, 2015).

Thus, in Minnesota there are only 750 point source discharge permits combined between wastewater and stormwater serving millions of people. Another way to look at this is to consider the Blue Lake Treatment Plant in Scott County. This plant treats wastewater collected from over 100,000 homes and businesses totaling 285,000 residents in 27 communities. Some of the communities also have to get permits for their stormwater collections systems, meaning that all 285,000 residents are regulated by 28 NPDES permits (one wastewater and twenty-seven stormwater permits) plus several industrial and other miscellaneous permits.

Because discharge points for point source pollution are larger and fewer in number than nonpoint sources, they make much easier targets for the significant investments in research and planning that enable cost-effective large-scale capital investments. For nonpoint sources, which are diffuse and less easy to aggregate and manage, significant investment to improve precision makes less sense.

With respect to nonpoint sources, aggregation of individual waste producers is made difficult by the enormous number of pollutant source points needing to be addressed. While point source presents hundreds or thousands of discharge points (Table 6), nonpoint sources number in the tens or even hundreds of thousands. The Sand Creek watershed illustrates this difference, having only three NPDES wastewater discharges but almost 90,000 acres of row crop agriculture. In this instance, many thousands of relatively small landscape alterations have created NPS problems that can only be addressed effectively with many thousands of fixes.

Variability of Point and NPS Pollution

Nonpoint sources are also subject to more variability than point sources. Wastewater design engineers can reasonably estimate waste characteristics and effluent flow rates, and treatment plant operators can make adjustments in response. This level of control is absent in dealing with nonpoint sources of pollution. Variable weather and precipitation affect nonpoint sources, and

their impact can be amplified by differences in soils, geology, vegetation, landscape, and land use and management. Further variability is driven by the social aspect of NPS management. Many different types of land users, from urban shopping centers to row crop agricultural producers to cattle ranchers, play a role in NPS pollution control, and different values, motivations, and business models affect each of these land user's acceptance and ability to implement NPS controls.

Geographic Setting of Point and NPS Pollution

Geographic setting affects both point source and NPS pollution control. However, for wastewater treatment, greater demand can to a large extent be handled by building a larger facility or more sewers (i.e., implementation of engineered solutions). Large-scale changes to individual behaviors or land-cover conditions are not necessary. For NPS control issues, on the other hand, the amount of land-cover alteration and its contributions to NPS problems creates numerous diffuse discharges across the landsacpe that act cumulatively to cause problems as the scale of alteration increases. Thus, in many cases landscape-wide changes to land cover (i.e., business/economic solutions)—and individual behavior (i.e., social solutions)—are necessary to address NPS problems.

Table 7
Alternative Land Use and Management Needed to Achieve an 89% Sediment Load Reduction in the Minnesota River
(MPCA, 2015)

What Was Simulated to Achieve an 89% Reduction (MPCA2015)
• 20% of land in perennial vegetation • 75% of row cropland with slopes greater than 3% use crop residue of 37.5% or greater • 75% of row cropland use of cover crops to increase spring cover • MS4 treat first inch of runoff • All surface tile intakes eliminated • Reduce sediment loading from ravines and gullies by 40% in the Blue Earth and LeSueur tributaries, and 30% elsewhere • Water storage through 1) controlled drainage on lands <1% slope; b) two-stage ditches; and c) store runoff for 24hrs or more • Reduction of sediment from developed land outside of MS4 boundaries • Rates of sediment supply from bluffs reduced by 25% by changing orientation of stream channels away from bluff faces • Bluff, stream bank, and channel erodibility greatly reduced • Perennial vegetation enhanced from pasture to CRP

For example, land cover in the Sand Creek watershed has been almost completely altered since European settlement. The only land covers not significantly altered include the open water, some of the wetlands, and some of the forest: roughly 15% of the watershed. On top of this area are more than 8,000 acres of drained or altered wetland and hundreds of miles of public and private ditches (Scott WMO, 2010). This scale of alteration is common. It is typical for watersheds within the Minnesota River Basin, and it will take significant landscape-wide changes to address. In fact, the MPCA identified the need for up to a 90% reduction in sediment loading to meet the water quality need of the Minnesota River and its tributaries (MPCA, 2015). Modeling by the agency found that massive changes would be needed to achieve this outcome. (Table 7.)

Finally, NPS pollution problems, as demonstrated earlier in the examples of Sand Creek and the larger Minnesota River Basin, are more nested than point source issues. Collecting influent, routing it to plants, and then discharging effluent, point sources can avoid more localized water bodies and their unique issues. A small watershed drains to a wetland, which is part of the larger watershed, to a stream that in turn is part of a watershed in a basin. Each of these water bodies has water quality standards and goals, and NPS pollution control efforts must meet all of them.

Appendix E

Credit River Success Story

Section 319

NONPOINT SOURCE PROGRAM SUCCESS STORY

Minnesota

Watershed Management Efforts Help Reduce Sediment Loading in Credit River

Waterbody Improved

Runoff from urban and agricultural areas led to excess sediment and suspended solids loading into the Credit River. As a result, in 2002 the Minnesota Pollution Control Agency (MPCA) added the entire Credit River to the state's Clean Water Act (CWA) section 303(d) list of impaired waters for failing to support the aquatic life beneficial use because of turbidity impairment. Watershed partners worked with private landowners to stabilize streambanks and ravines, thereby reducing erosion and sediment runoff into the river. Several cities in the watershed also implemented nonpoint source pollution control projects to reduce urban runoff. Monitoring data from 2008–2009 showed that excess turbidity was no longer present, prompting the state to remove the Credit River from Minnesota's list of impaired waters in 2012.

Problem

The Credit River watershed is in Scott County, Minnesota, and it covers a drainage area of approximately 59 square miles. The river originates in New Market Township and flows north through Credit River Township before discharging into the Minnesota River in the city of Savage (Figure 1). The primary land uses in the watershed are urban (30 percent), agriculture (27 percent) and forest (22 percent). Other land uses include wetland, pasture, water and sand mining. The watershed includes large amounts of highly erodible land, especially in the headwaters area.

Excess sediment and suspended solids in a waterbody can block light penetration and inhibit healthy plant growth, increasing turbidity. (Turbidity is a measurement of the degree to which light traveling through a water column is scattered by suspended organic particles, including algae, and inorganic particles. It is measured in nephelometric turbidity units, or NTU.) Elevated turbidity can also inhibit aquatic organisms' ability to feed, affect gill function and cause spawning beds to be covered in sediment. Data from the Metropolitan Council Environmental Services (MCES) collected in the late 1990s showed that 24 percent of samples exceeded 25 NTU. A waterbody is considered impaired by turbidity if 10 percent or more of water samples exceed 25 NTU.

On the basis of these data, Minnesota added the entire length of the Credit River (22 miles, from the headwaters to the Minnesota River) to the 2002 CWA section 303(d) list for failing to support the river's aquatic life beneficial use because of turbidity impairment. MPCA identified the primary source of the turbidity impairment as polluted runoff from urban and agricultural land uses.

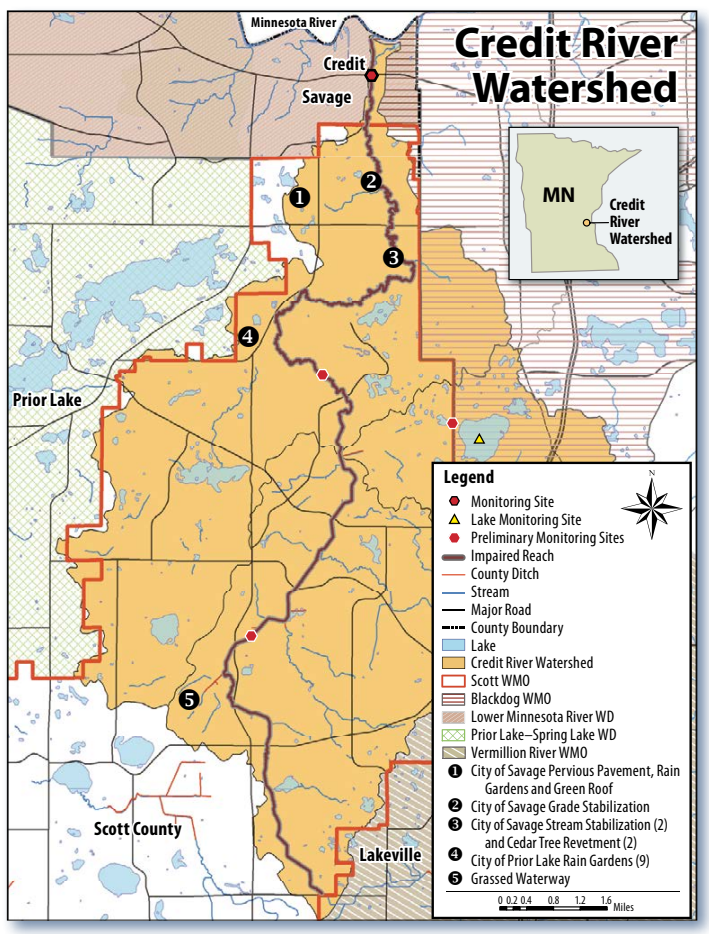


Figure 1. The 22-mile-long Credit River empties into the Minnesota River. Multiple partners collaborated to install a variety of restoration projects in the basin (numbered on map).

In 2007 the Scott County Watershed Management Organization (Scott WMO) hired a consultant to conduct a comprehensive geomorphic assessment of the river to identify potential project locations at which to improve water quality. Water quality was restored before a total maximum daily load (TMDL) for turbidity was finalized.

Project Highlights

Through a number of nonpoint source pollution control efforts, sediment loading in the Credit River watershed has been reduced. Mechanisms such as the National Pollutant Discharge Elimination System (NPDES) regulation of stormwater discharge from municipal separate storm sewer systems were instrumental in controlling sediment loadings, as were locally led erosion control programs involving many watershed partners.

Between 1999 and 2010, the City of Savage, Credit River Township, Scott WMO and other watershed partners led a number of management efforts to improve water quality in the Credit River. Through its technical assistance and cost share program, the Scott WMO has supported several watershed projects, including streambank stabilizations with private landowners, as well as several innovative low impact development (LID) projects, such as rain gardens, with the cities of Savage and Prior Lake. Over the past several years, partners have also installed grassed waterways (vegetated channels used to direct water flow and reduce soil erosion from croplands) and added cedar tree revetments (anchoring trees along a streambank to decrease erosion).

The local cities and Scott WMO have also targeted projects and capital improvement programs to reduce sediment loading into the Credit River. In 2010 the City of Savage, Scott WMO and other local partners used Minnesota Clean Water Legacy Act (MCWL) funding and a Scott WMO grant to reconstruct and stabilize the 2,600-foot Utica Ravine, which had contributed significant sediment loads to the Credit River (Figures 2 and 3). This project reduced sediment loading by an estimated 50 tons per year.

Results

Credit River turbidity data continuously collected from 2008 through 2009 showed that only 1.2 percent of samples exceeded 25 NTU, indicating that the river now meets the turbidity criterion to support its aquatic life beneficial use. On the basis of these data, the MPCA recommended that the river be removed from the 2012 list of impaired waters. The state attributes the water quality improvement, in part, to installing nonpoint source pollution control projects, adopting better construction erosion control practices, and implementing more permanent vegetative coverage throughout the watershed.

Figure 2. Before restoration (left), the rapidly eroding streambanks of Utica Ravine were contributing large amounts of sediment downstream.

Figure 3. After restoration (right), Utica Ravine has gently sloping streambanks that are vegetated and stable.

In 2011 the MPCA approved the Scott WMO's *Credit River Protection Plan*, which assessed the efficacy of current management efforts and provided an outline for future protection strategies in the Credit River watershed to ensure that the river remains unimpaired.

Partners and Funding

Project partners included the Black Dog WMO, Minnesota Board of Water and Soil Resources (which provided $130,000 for the Utica Ravine project), cities of Lakeville, Prior Lake and Savage, townships of Credit River and Spring Lake, Lower Minnesota Watershed District, MPCA, MCES, Scott County, Scott Soil and Water Conservation District, Scott WMO (which provided $20,000 for the Utica Ravine project), and Three Rivers Park District. MPCA provided $84,575 in MCWL funding to the Scott WMO to support the development of the *Credit River Protection Plan*. Other major partners involved with developing the *Credit River Protection Plan* included the MCES, the Black Dog WMO and the cities of Savage and Prior Lake. State funds (serving as match for the CWA section 319 grant) supported the MPCA staff project manager responsible for overseeing development of the protection plan.

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Paul received his Master of Science in Forestry with a minor in Biological and Agricultural Engineering from North Carolina State University and his Bachelor of Science in Biology from Central Michigan University. In his spare time, he reads, bikes, hikes, and kayaks.

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Troy Kuphal has 27 years of experience in the conservation field and is currently District Director for the Scott Soil and Water Conservation District (SWCD) in Jordan, Minnesota. He grew on a dairy farm in southeast Wisconsin and in 1990 received his bachelor's degree in geography from the University of Wisconsin-Milwaukee.

Troy began his career as a watershed technician with the Land and Water Conservation Department in Washington County, Wisconsin. There, he worked directly with farmers, local governments, and civic groups to address soil erosion, nonpoint source pollution, and other resource concerns. He also served on the board of directors for the Wisconsin Association of Land Conservation Employees, including three years as president. In his spare time, Troy enjoys biking, canoeing, kayaking, and spending time with family.

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The Center for Changing Landscapes offers social science research, conservation program evaluation, sustainable landscape design, community assessment training, and other services to natural resource agencies, non-profit organizations, and communities throughout Minnesota and beyond. Hallmarks of the Center include interdisciplinary community-based research, innovative multi-methods evaluation, and inclusive landscape design. A primary goal of the center is to empower communities and environmental managers in visionary planning, design and problem-solving for sustainable, livable, and equitable futures.

Scott County Local Partners

Scott County was established and organized by an act of the Minnesota state legislature on March 5, 1853. The county, with an area of 375 square miles, comprises 11 townships and seven cities. During the 1990s and up to the current year, Scott County was the fastest growing county in Minnesota. Its populationhas grown from 57,846 in 1990 to 129,928 in the 2010 Census. Scott County has the 9th largest population out of the 87 counties in Minnesota and was named the 8th fastest growing county in the U.S. in 2003. Despite this rapid growth, much of the southern portion of the county remains rural and in an agricultural land use.

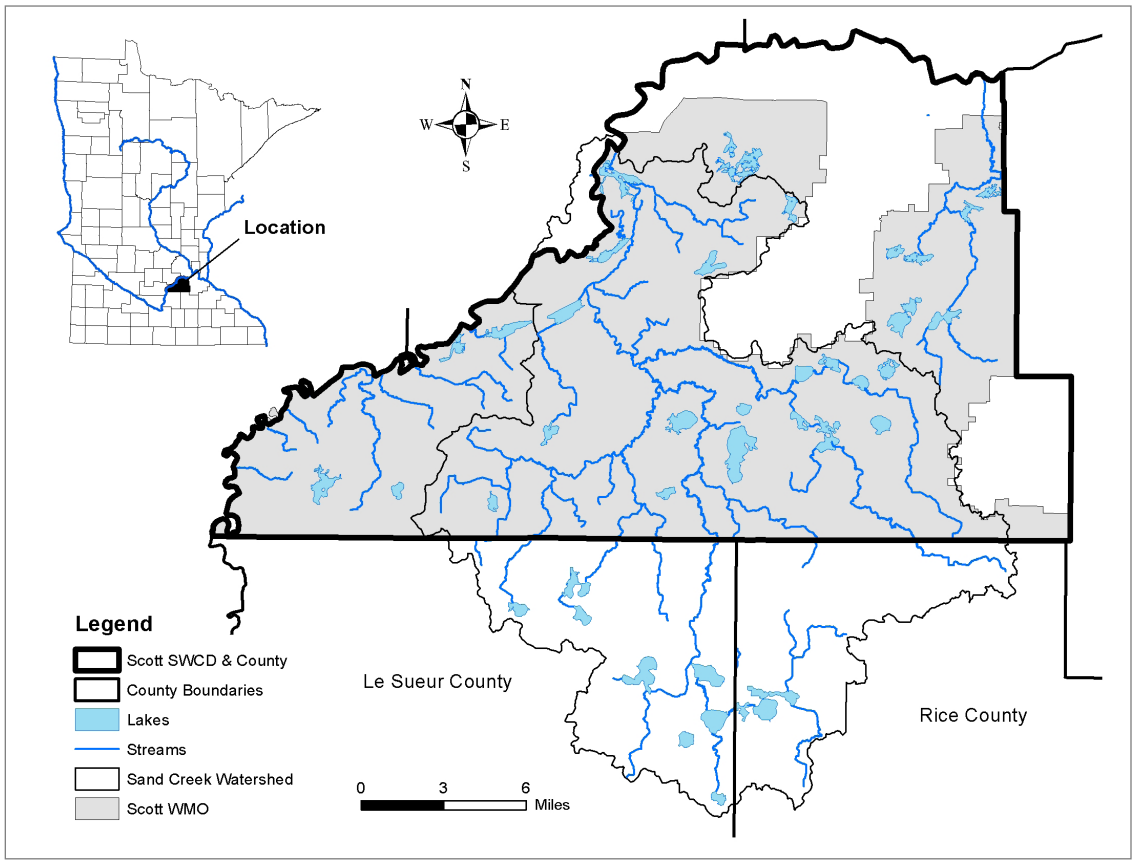

Figure 15. Scott County Local Partners: Scott WMO and Scott SWCD

Scott WMO

The Scott Watershed Management Organization (Scott WMO) covers the majority of Scott County, about 300 square miles. The remainder of the county is within one of three other watershed jurisdictions. The Scott WMO was formed in July 2000 by the Scott County Board of Commissioners after previous watershed management organizations covering the area were declared "non-implementing" or voluntarily chose to join the newly formed Scott WMO.

Minnesota Metropolitan Surface Water Management Act (Minnesota Statue 103B) provides authorities of the Scott WMO. The Scott County Board of Commissioners also set up a special taxing district to fund the Scott WMO. The Scott WMO is not a separate unit of government from the county; the Scott County Board of Commissioners is the governing body. The county board is advised by a seven-member Watershed Planning Commission made up of appointed commissioners representative of different subwatersheds of the Scott WMO. www.scottcountymn.gov

Scott SWCD

The Scott Soil and Water Conservation District (SWCD) is a governmental and political subdivision of the state of Minnesota, with duties and authorities provided under Section 103C, Minnesota Statute. Formed in 1941, Scott SWCD shares a common political boundary with Scott County but is governed by a separate five-member elected Board of Supervisors. The Board meets monthly to review, direct, and establish district policies. Its office is located at the Scott County fairgrounds, which lies between the City of Jordan and the Minnesota River.

Like all SWCDs in Minnesota, Scott SWCD has no tax levy authority. Instead, it maintains its operation with an eleven-member staff through 25+ different sources of funding including grants, fee-for-service agreements, and program charges.

The SWCD administers programs and services in support of Minnesota's soil and water conservation policy, which is to "encourage land occupiers to conserve soil, water, and the natural resources they support through the implementation of practices." More than anything, however, the Scott SWCD sees itself is a public service organization with its primary focus being on providing excellent customer service and forming strong trusted relationships with local landowners, communities, and partner organizations. Chief among these are Scott County and the Scott Watershed Management Organization. www.scottswcd.org