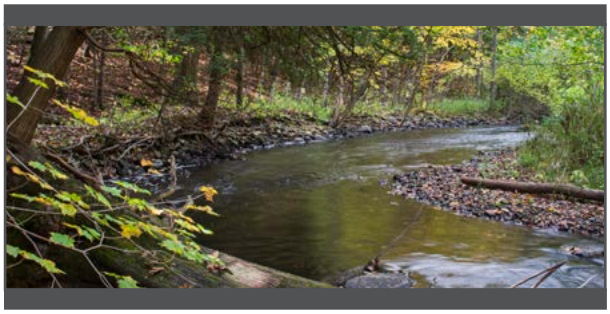
A Citizen's Guide to Watershed Planning in Wisconsin

The Framework for Protecting or Restoring Local Water Resources



Wisconsin Watershed Planning Guidance

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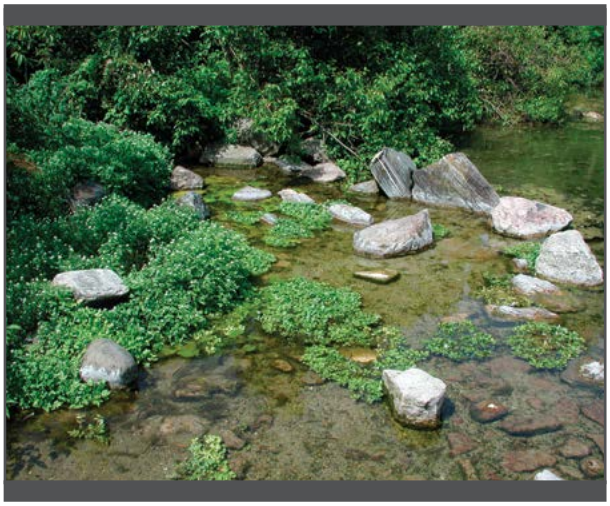


INTRODUCTION

Compared to most places in the world, Wisconsin is water rich. Our state boasts over 15,000 lakes, more than 84,000 river miles, over 5 million acres of wetlands and more than 1 quadrillion gallons of groundwater. Throughout our history, these water resources have been used for many things, including transportation, industrial processes, drinking water, irrigation, recreation and as a source of fish and other food. However, these activities can result in degradation, especially if there is misuse or overuse of the water resources.

Efforts to prevent loss of water quality have sometimes been quite successful, especially the controls initiated to minimize or eliminate pollution that spills from the end of a pipe (such as from a waste-water treatment plant or factory) into a water body. While there is still pollution coming from these "point" sources, there is far less than there was in the mid-20th century. This is mostly due to the U.S. Clean Water Act of 1972 and Wisconsin rules that were enacted in support of it.

Nonpoint source, or runoff pollution, refers to the contaminants picked up by water running off city streets, parking lots, roofs and lawns, as well as from farm fields and livestock facilities. These pollutants are sometimes referred to as "pollutant load" or simply "load", when delivered to a local river or lake via storm drains, ditches, small streams, culverts and other conveyances. Controlling runoff pollution is especially challenging because these many and varied pollution sources come from very large areas and are often spread across multiple governmental jurisdictions (cities, towns, villages and counties).

> *"I know no safe depository of the ultimate powers of the society but the people themselves; and if we think them not enlightened enough to exercise their control with a wholesome discretion, the remedy is not to take it from them, but to inform their discretion by education."*
>
> THOMAS JEFFERSON

Traditionally, the protection of Wisconsin's water resources has been led by public agencies such as the Wisconsin Department of Natural Resources (DNR) or the U.S. Environmental Protection Agency (EPA). While the DNR, EPA and other agencies are still working to protect the state's water resources, locally led "grassroots" stewardship efforts are becoming more common. Generally, this is a watershed-based approach involving a group of concerned citizens who take ownership of the process of planning and implementing the actions necessary to protect or restore the water quality of their local lake, river or stream. Governmental entities often provide technical and/or financial assistance to such groups.

With all these sources of pollution and the various jurisdictions involved, cooperation among the many diverse stakeholders is necessary to accomplish both the planning and implementation of any strategy focused on protecting and/or restoring water resources. This guide to watershed planning is written with the grassroots approach in mind. It offers processes, tips, lists, resources and other information to assist you in writing and implementing a watershed plan that will provide the framework for protecting or restoring local water resources.

Much of the data, information, and professional assistance needed come from people who are stakeholders in the protection or restoration of your local water resource. This includes professionals who have a governmental responsibility, residents who are concerned about the management of water resources and possibly even people outside the watershed who have insight into the process of planning and implementing a watershed protection or restoration strategy.

This guide also offers reminders of the EPA's "Nine Elements of a Comprehensive Watershed Plan." These elements, listed below, need to be addressed in your plan to ensure that it meets the EPA and DNR planning guidelines, thereby making your group eligible for various grants and resources that will assist you in reaching your watershed project goals. These are explained in more detail in Chapter 3.

The EPA's Nine Elements of a Comprehensive Watershed Plan: *

1. Identification of causes of impairment and pollutant sources that need to be controlled to achieve needed pollutant load reductions and any other goals identified in the watershed plan.
2. An estimate of the load reductions expected from any recommended management measures.
3. A description of the nonpoint source management measures that will need to be implemented to achieve load reductions and a description of the critical geographical areas in which those measures will be needed.
4. Estimates of the amounts of technical and financial assistance needed, costs, and/or the sources and authorities that will be relied upon to implement the plan.
5. An information and education component that will be used to enhance public understanding of the project and encourage the public's early and continued participation in selecting, designing, and implementing the appropriate non-point source management measures.
6. A timely schedule for implementing the nonpoint source management measures identified in the plan.
7. A description of the interim measurable milestones for determining whether nonpoint source management measures or other control actions are being implemented.
8. A set of criteria that can be used to determine whether pollutant load reductions are being achieved over time and how the plan will be reevaluated.
9. A monitoring component to evaluate the effectiveness of the implementation efforts over time.

*Paraphrased from EPA's "Nonpoint Source Program and Grants Guidelines for States and Territories."

Another important and necessary element of your watershed plan is a detailed strategy for getting the people who live and work in the watershed to become involved in the process of making decisions about how land is managed in the watershed. The process of protecting or restoring a water body will not happen unless those who manage the land that drains to it understand their role in water quality and are empowered and willing to make changes. A civic engagement and civic governance element of your planning process will help ensure that it is truly a grassroots effort, owned and implemented by the residents of the watershed.

Note to the Reader

Watershed planning is not an exact science. Plans, and those who write them, often come together in very different ways, with different levels of participation from stakeholders, and with different degrees of success. If your planning process shows success and good participation, the approach you're using is working. Successfully writing and implementing a watershed plan, with the participation of those who live and work in the watershed, is the goal. This guide will help you get there.

This document contains a great deal of useful information, and often references other people, groups, or organizations you can seek out for help. Including specific websites in a document like this is difficult, as sites often become outdated, change their addresses or simply disappear. Therefore, web addresses for specific topics or agencies are not included here. As always, using a search engine to find references on a specific topic is helpful, and many of those topics are discussed in this document. There is an increasing amount of research into the best ways to plan and implement watershed management. You will find many resources, some that were not available at the time this document was written, that will prove helpful to you as you work to improve your local water resource.

Although listing many web resources can be problematic, there is a companion site for this guide that provides links and other information for those interested in or already undertaking a watershed planning process. The site, maintained by University of Wisconsin–Extension, can be found at:

http://fyi.uwex.edu/watershedplanning

chapter 1

GETTING STARTED

If you're consulting this guide, chances are you have a water body in or near your community in need of restoration or protection, and you are hoping that a watershed plan can help you in these efforts. Getting started may seem difficult, especially if the process is unfamiliar to you. You are likely to make a few mistakes along the way, but if you persevere, you'll soon have a comprehensive, workable plan to protect your local water resources.

Why and How to Create a Watershed Plan

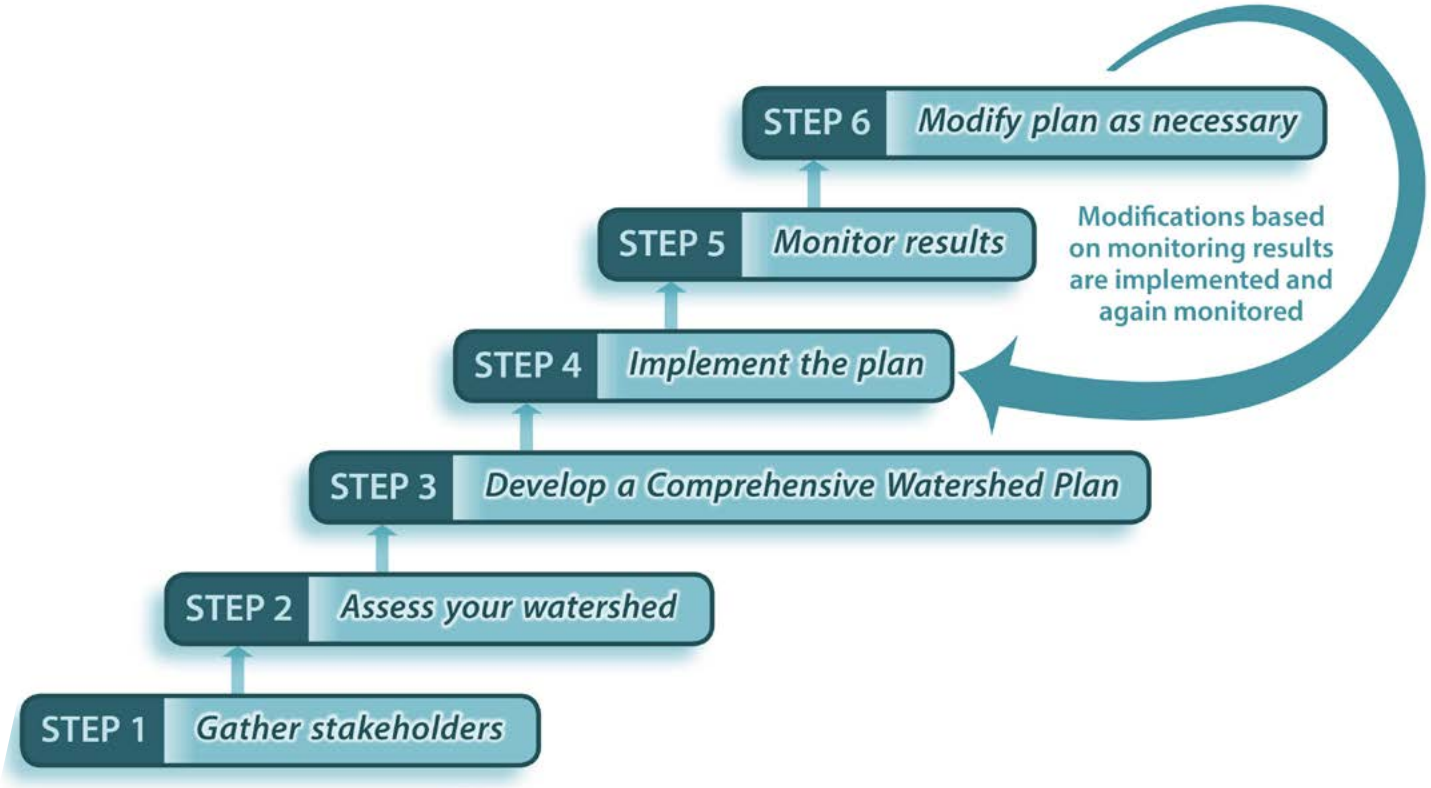
Generally, watershed planning processes start to form when individuals, organizations or government agencies are concerned about pollutant levels in a river, stream or lake. While the issue for you, personally, may be tied to swimming, fishing or other recreation, others may note that your local water body is on the state's list of impaired waters, or that a Total Maximum Daily Load (TMDL) was established by DNR, describing the pollutant problem in your lake, river or stream. Perhaps it's a combination of these or other circumstances that have prompted you to consider organizing an effort to address local water quality issues. Whatever the reason for the planning effort, you should ask yourself what it is you hope to accomplish.

A water body that is officially considered "impaired" is required by the U.S. Clean Water Act to have a designated Total Maximum Daily Load (TMDL). A TMDL is the amount of a particular pollutant that a water body can receive before it exceeds water quality standards. In the case of a pollutant like phosphorus, think of it in recipe terms. Some salt in cookies is good, just as some phosphorus in a river or lake is good, as it provides nutrients for algae and other life forms at the very bottom of the food chain. If there's too much salt in your recipe, the cookies are inedible; too much phosphorus in a water body produces too much algae, which can produce conditions that become toxic to wildlife, or make it unsuitable for fishing, swimming and other activities. Some pollutants, such as mercury, are detrimental even in small amounts. Although "daily" is part of the title, a TMDL may also be expressed in annual terms. For example, a TMDL might state that more than 500 pounds of phosphorus flowing into your lake or stream each year will cause water quality impairments. The research that supports each TMDL is presented in a document. These reports contain valuable information about local water quality conditions and why certain pollutants need to be reduced. They also provide a specific numeric target for you to work toward in terms of a pollutant load reduction for your local water resource.

There are proven steps to help achieve your water resource restoration or protection goals in the most efficient and effective manner (see Figure 1.1). First, you will want to gather the watershed stakeholders. Together, you will collect information that helps you understand the water quality impairments or issues associated with your river or lake. Once you have brought people together to study the issues and understand them, you will work to find and implement the best solutions for those issues. Monitoring progress during and after implementation is important and will provide valuable insight needed for future modifications and adjustments.

Preparing for, creating and implementing a watershed plan can be a challenging process. Even if the issues are fully understood and solutions are available, transforming that knowledge into action can often be difficult due to many obstacles, such as lack of participation by necessary partners or lack of adequate funding. Many such problems can be minimized by giving proper attention to developing a stakeholder team and by using civic engagement strategies in the planning process.

FIGURE 1.1 **Basic steps to a citizen-driven watershed planning process.**



Geographic Scope of Your Plan

Much of how you approach the watershed issues of concern will depend on the size and geography of your watershed. Is it a small lake with a watershed that is only a few thousand acres? Is it a small stream with a watershed of ten or twenty thousand acres? Is it a river system watershed that is hundreds or thousands of square miles?

Working in a small watershed with few governmental jurisdictions, such as one county or one town, may prove much easier in many ways compared to working in a larger watershed with multiple governmental jurisdictions, great distances and lack of trust and familiarity among distant residents. Make sure you understand the geographic area of concern as you begin to think about how a plan for your watershed will come together and who the players in the process might be. For ease and effectiveness, working in smaller watersheds is generally preferable.

The U.S. Geological Survey (USGS) gives watersheds code numbers in addition to names. The codes, known as Hydrologic Unit Codes (HUCs), reflect the size of a watershed. A watershed designated with an 8-digit HUC code (Figure 1.2) is large. Smaller sub-watersheds have additional digits added, such as the HUC 12 watersheds in Figure 1.2. The HUC 12 designation is the smallest watershed identified by the USGS, but even within these, there are smaller tributary streams with their own smaller watersheds.

Figure 1.2 (next page)
A watershed is the area that drains to a particular water body. Watersheds are "nested" within each other. For example, the Red Cedar River runs through part of northwest Wisconsin, creating a large watershed designated with an HUC 8 code. The Red Cedar River Watershed is comprised of the smaller HUC 12 watersheds created by the many rivers and streams that drain into the Red Cedar River (for example, the Trout Creek Watershed shown in Figure 1.2). The Red Cedar River Watershed is part of the larger Chippewa River Watershed, which is part of the even larger Mississippi River watershed which includes a substantial portion of the U.S. (not shown in this figure).

FIGURE 1.2 Example of HUC 8 and smaller HUC 12 watersheds.

Gathering Stakeholders

In theory, everyone who lives in a watershed is a stakeholder in the process of protecting or restoring the resources in that watershed, but a group of "everyone" can be a little cumbersome. Therefore, it becomes important to find key stakeholders who can speak for many people, or represent various interests, groups or individuals. Often, several people or groups of people notice a need for action regarding a degraded or endangered water resource. While you might be tempted to proceed with just this initial group, it is often a good idea to look further. Do others perceive a problem as well? Are they motivated enough to join in a partnership to take action?

Table 1.1 presents possible stakeholders in a watershed. Depending on the size, location and other characteristics of your watershed, some on this list may be relevant to your project, while others may not. It's important that your group includes a diverse membership. For instance, you wouldn't want all members to come from the local government sector. Inviting influential individuals and interest groups with different points of view to join your effort will save you time down the road. Setbacks are more likely to occur later if individuals or groups not initially contacted to join the effort feel overlooked and therefore work to oppose your effort.

First Contact

After you determine key stakeholders in your watershed, you need to invite them to become involved. This step is often accomplished by mass advertising of a public meeting or informational gathering, but a personal contact, such as a phone call, to each of the key stakeholders is also beneficial. Inform them of the focus of your concern about the lake or river, and the desire and support for a planning process to address the issue. Tell them why you consider them a stakeholder, ask about their concerns and issues regarding the watershed and if they know of others who may have an interest in participating in a watershed planning effort. It's essential to gauge stakeholder interest. Since your planning and implementation process is stakeholder driven, it is important to understand the level of concern, motivation and knowledge of stakeholders. Some education during initial stages may be necessary; however, the education of stakeholders, as well as determination of their interest level, will continue throughout the project.

Understanding water governance as it relates to your lake or river is also important at this stage. Multiple governing bodies, be they town, village, county, city or state agencies, may have some level of control or responsibility for the water resources in your area. Creating a water governance map or chart will help ensure that the appropriate government officials are contacted, and hopefully will participate in your planning process.

Stakeholders should know that the group's eventual goal is to create and implement a comprehensive watershed management plan, aimed at protecting or, in the case of a water body that's already impaired, restoring water quality. Invite and encourage them to attend the upcoming public meeting and to become involved in the planning process. Water quality, water quantity, recreation, public health, aesthetic beauty and wildlife protection are just some of the watershed issues that often

resonate with stakeholders as something they are concerned about and/or want to protect. Helping stakeholders understand the connections between their life and livelihood and the water within their watershed is a good approach.

TABLE 1.1 **Potential stakeholders to involve in your watershed planning process.**

A. Local/County Government

1) Mayors, City Managers, City Councils
2) County Boards, County Executives
3) Town Boards and Chairs
4) Land Conservation Departments and Committees
5) County and Regional Extension Educators
6) County Foresters
7) Lake District Boards
8) School Boards
9) Local and County Planning and Zoning Staff
10) Regional Planning Commissions
11) Local and County Storm Water Management Staff
12) Local Public Works Directors
13) Local Schools and Universities

B. State and Federal Government

1) Wisconsin Department of Natural Resources
2) Elected State Representatives
3) Wisconsin Department of Agriculture, Trade and Consumer Protection
4) USDA Natural Resources Conservation Service
5) U.S. Forest Service
6) U.S. Fish and Wildlife Service
7) U.S. Army Corps of Engineers
8) U.S. Geological Survey
9) U.S. Environmental Protection Agency

C. Non-government Agencies/ Non-profit Organizations

1) Local Lake Associations
2) Resource, Conservation and Development Councils (RC&D)
3) Homeowner and Neighborhood Associations
4) Agriculture Associations
5) Sportsman's Associations
6) Conservation Groups
7) Civic Organizations
8) Religious Organizations

D. Business Representatives

1) Large Local Employers
2) Chambers of Commerce
3) Farmers and Agriculture Businesses
4) Small/Local Business Owners

E. Other Stakeholders

1) Citizens and Landowners
2) Local Civic Leaders
3) Local Environmental Advocates
4) American Indian Tribes
5) Newspaper Editors and Other Media Representatives

First Meeting

Once you've contacted stakeholders and determined that there is enough interest to proceed, it's time to have your first meeting. Choose a location that is easily accessible and/or known locally to ensure a good turnout. If you're unsure of a location, ask others in the group for advice. In a large watershed you might consider holding meetings in different areas of the watershed to encourage local attendance. Although most key stakeholders should have been contacted previously, a public announcement of the meeting (or meetings) should also be posted and/or sent out. Individual post cards or notices/e-mails sent to lists of known interested parties may also be appropriate if time and resources allow. Use of social media and appropriate websites may also help gather more stakeholders missed during initial contacts. Some individuals may not participate in the process, but you can bet you'll hear from them if they feel uninformed or left out.

It is difficult to predict the turnout and tone of the first meeting. If there are contentious issues in the watershed you may find yourself in the awkward position of advocating your personal point of view while simultaneously encouraging people with dissenting viewpoints to also speak up. If this is the case, you might ask someone with facilitation skills and knowledge of civic engagement techniques (see "civic engagement" on page 36), who is perceived as neutral, to lead the first few meetings. Later, you or someone else could take on the leadership role. Local University of Wisconsin-Extension educators are trained in organizational development and facilitation and may be available to offer assistance.

Sharing food, or "breaking bread" with others is a way to build community and cooperation. Local stakeholders or producers may often be able to provide refreshments for the first meeting. Locally produced food items especially help build community and camaraderie.

Suggested topics/agenda for a first meeting:

Background: The meeting chair/facilitator introduces him/herself and gives an overview of the reasons why people have been asked to come together regarding the local water body. The purpose of the meeting is described and the agenda presented. Ground rules are established and explained (see below).

Introductions: Attendees introduce themselves and briefly share their reason(s) for participating.

Preliminary list of issues: Participants are given an opportunity to share the watershed issues that are important to them. It is helpful to use a flipchart or whiteboard to record the issues so everyone can see them. Save this list for reference and discussion at future meetings. Don't be surprised to receive a mix of issues and proposed solutions, some of which may be outside the scope of your group's abilities and authority. Eventually, the group will decide to prioritize and narrow these issues to help focus its efforts.

Next steps: Before the meeting ends, ask if the group feels all interests were represented at this initial meeting, and if not, who else should be included. If the group agrees that the right people are currently at the table, then you are ready to move forward. If not, you may need to do some additional recruitment of stakeholders to join your effort. Also at this first meeting, you may want to ask for volunteers to serve on a leadership team – a group that will move the project forward and be the principal body behind writing and implementing the watershed plan. It's also a good idea to discuss potential future meeting dates, times, locations and what individuals can do in the meantime.

Typical Ground Rules for a Facilitated Discussion:

1) The facilitator is in charge of maintaining order, staying on task, and allowing everyone time to speak.
2) Participants will respect the role of the facilitator, and each other.
3) No one person is allowed to dominate the conversation.
4) Everyone will have an opportunity to speak.
5) If time requires, the facilitator may need to end discussion.

Planning Team

As mentioned above, your watershed planning project will need a core group of stakeholders who are willing to take the lead on writing the watershed plan, keeping the public informed, seeking funding, etc. This group could be referred to as the watershed team, the project team, the project partnership, stakeholder leadership team or various other descriptive names. For the purpose of this document, we will call this the planning team (PT).

Organizing the PT may be as easy as asking for volunteers or passing around a sign-up sheet during your initial meeting, or you may need to make follow-up phone calls or contacts later to find willing volunteers. Chances are the PT will be smaller than the group who attended the first stakeholder meeting, as many of those may have come to the initial meeting out of curiosity or just to voice an opinion.

The PT can be structured in a number of ways – formal, with elected leaders such as a President or Chair and other officers – or informal, possibly with a volunteer or paid facilitator as the leader. In some cases, the facilitator may take on a leadership role and be considered the project's Watershed Coordinator or Team Leader. Some groups will go so far as to form an officially recognized 501(c)(3) non-profit organization.

The size of your watershed may influence how best to structure your PT. In a very large watershed it may be impossible for one PT to be responsible for all planning and implementation, and it may be difficult just to get everyone together for meetings. In these cases, it may be easier if local teams working on projects meet regularly, and a larger PT representing all the local teams meets less frequently for general oversight and communication. In contrast, a small watershed PT may find that members already know each other and potential project partners. It is likely that they have worked together in the past, can meet more easily, and are more familiar with their watershed. Whether your watershed is large or small, you may find that you can work most effectively if you organize subcommittees around topical areas – such as research and technical issues, education and outreach, or funding and grants procurement.

As you can see, there is no exact template for how to organize the PT and accomplish the work that needs to be done. Leadership, organization, structure of meetings and process may depend on who is involved, the issues of concern, primary land use in the watershed, the size of the watershed and other such factors. If the PT maintains a positive outlook, shows progress and gets some public recognition now and then, their energy level and enthusiasm will remain high and prevent them from losing members and focus.

You may experience turnover in your PT, as some members drop out and others join. This is normal and to be expected. New members will need to be brought up to speed on progress, and also on the history of the project. Keeping good notes or minutes from meetings can help in this regard. Also, maintaining a public presence with active outreach will insure that people who join "along the way" are aware of the status and progress of your project.

Education and Outreach

Throughout all phases of a citizen-led watershed project, it's important to educate and inform not only the stakeholders participating in the process, but also other potential stakeholders and residents of the watershed. There are many ways to get the word out about your local project, such as: tours of the watershed, workshops, press releases, and exhibits or displays at public buildings and local events. When stakeholders and residents feel informed, they are more likely to support your efforts. This will lead to more success when the time comes to implement the recommendations called for in your plan, and ultimately, help everyone become more conscious of local land and water resources.

chapter 2

WHAT YOU NEED TO KNOW AND HOW TO FIND IT

Now that your PT is assembled, it's time to work on understanding your watershed more thoroughly. There is probably information readily available about your river or lake, about the land that drains to it, about water quality and the perceived risks to it and possibly even things that have already been done to address certain water quality concerns. In order to create and implement a plan for your watershed, it's important that the PT has access to and understands this information.

This chapter will cover where to find data, designated uses for water bodies, the criteria for measuring water quality, and the causes and sources of impairments. And finally, we'll discuss how to create a watershed management assessment.

The Watershed Profile

You are likely to start with many questions about your watershed. What's the water quality now? What was it in the past? What should it be? What kind of wildlife, fish and aquatic life does it support now, or should it support? How much do the residents in the watershed know about the water quality issues? These and other questions may be answered by existing research, or it may be necessary to conduct additional research. As you gather the data already available and/or generate new data, you will want to assemble them into a Watershed Profile. You may already have gathered some information for the profile. As you recognized a problem and started asking questions of local and state officials about your lake or river, they likely provided you with some information (See Table 2.1).

A Watershed Profile typically includes some or all of these items:

- Maps of your watershed (boundaries, streams, land use, soil types, special sites, etc.)
- The TMDL for your water body if one has been established
- Water quality data
- Fish and wildlife surveys and studies
- Aquatic plant studies
- Social data (population, demographics, economics, etc.)

TABLE 2.1 **Potential data to include in your Watershed Profile and where to find it.**

Data Category	Components	Source and Internet Search Words
WATERSHED	General	**NRCS** - rapid watershed assessments **County LCD** - land and water resource management plans
	Streams	**USGS** - National Water Information System **DNR** - Surface Water Data Viewer
	Lakes	**USGS** - Water Data Discovery **DNR** - lakes (lake monitoring)
	Flooding	**FEMA** - floodplain mapping **DNR** - Surface Water Data Viewer
	Stormwater Management	**EPA** - National Pollutant Discharge Elimination System (NPDES) permits **DNR** - stormwater
	Drainage	**USGS** - topography maps **DNR** - Surface Water Data Viewer, watersheds
	Dams	**DNR** - Surface Water Data Viewer
WATER QUALITY	Raw Data	**USGS** - groundwater data **DNR** - SWIMS data, citizen monitoring data
	Impairments	**DNR** - impaired waters
	Groundwater	**USGS -** Wisconsin groundwater-level data **UW -** Water Resources Institute **DNR** - Groundwater Retrieval Network
	Mapping	**DNR** - Surface Water Data Viewer
BIOLOGICAL	Fish and Biotic Indicators	**EPA** - STORET **DNR** - citizen-based monitoring and SWIMS
PHYSICAL TRAITS	Geology	**WGNHS** - geology
	Soils	**NRCS** - Web Soil Survey **UW** - Soils Testing Labs
	Topography	**DNR** - Surface Water Data Viewer
	Groundwater	**USGS** - groundwater-level data **USGS** - groundwater comprehensive plan **UW Stevens Point Center for Watershed Science and Education** - well water quality **UW** - Water Resources Institute **DNR** - Groundwater Retrieval Network
	Weather Records	**National Weather Service Wisconsin Climatologist's Office**
	Wetlands	**DNR** - Surface Water Data Viewer
	Wildlife	**DNR** - wildlife
	Habitat	**DNR** - habitat
	Shoreline Conditions	**Google Maps** - aerial photos

(continued on pg. 20)

TABLE 2.1 (*continued*)

Data Category	Components	Source and Internet Search Words
HUMAN IMPACTS	Socioeconomics	**U.S. Census Bureau** - state and county quick facts **Wisconsin Applied Population Laboratory** - Get Facts
	Land Use and Development	**County LCD** - GIS Maps **Wisconsin Local Government Web Mapping Sites** (University of Wisconsin Sea Grant) **Google Maps** - aerial photos **DNR Wisconsin Land Cover (WLC) data** - WISCLAND
	Municipal/Industrial Point Sources	**DNR** - wastewater permit holders
	Population Forecasts	**Wisconsin Department of Administration** - Population Projection
	Agriculture Practices	**NRCS** - District Conservationist **USDA** - National Agricultural Statistics Service **County LCD**
	Stormwater Management	**DNR** - stormwater management
	Air Quality	**DNR** - air quality
GENERAL RESOURCES	Watershed Education	**Nonpoint Education for Municipal Officials (NEMO)** - Northland NEMO **UWEX Regional Natural Resource Educators**

EPA - Environmental Protection Agency
FEMA - Federal Emergency Management Administration
LCD - Land Conservation Department - County
NRCS - Natural Resource Conservation Service
USDA - United States Department of Agriculture
USGS - United States Geological Survey
UWEX - University of Wisconsin Extension
DNR - Department of Natural Resources
WGNHS - Wisconsin Geological and Natural History Survey

Solving water quality problems requires an understanding of the issues, practices and solutions that will address the water quality impairment sources, and of the people responsible for implementing these practices.

When assembling your Watershed Profile, determine if you have adequate data and information to help you understand all these aspects of your watershed. Sometimes, the people or group you ask for information may not have it, but they can put you in touch with someone who does. Don't be afraid to ask more questions, or to ask for assistance. If the information does not exist, you will have to forge ahead without it.

Water Quality Standards

Wisconsin, like all states, has water quality standards established to demonstrate when water bodies are in an acceptable condition, and when they are not. Although individuals may define "acceptable" differently, the water quality standards set by the state are the official measurement by which it defines the level of water quality in a water body. In Wisconsin, water quality standards have two main components: designated uses, and water quality criteria, each described below. Understanding these components will help guide your restoration and protection efforts.

Designated Uses

Not all water bodies are equal. While some are cold and deep, others are warm and shallow; some are fed by groundwater and others are not. Designated Uses are specified in water quality standards for each water body, usually based on what your lake or river could be used for if it was restored and naturally functioning. As an example, let's say that years ago your local river was clean and cool, with a thriving trout population. However, today it no longer supports trout because it's too warm and polluted, and some people are even concerned about swimming in it for health reasons. The Designated Use for that river would likely be that it should be swimmable and fishable, with water cool and clean enough to support trout. Returning your river to conditions that would allow it to meet those Designated Uses may be a vision or goal in your watershed plan.

Wisconsin waters are assigned designated uses in each of these four categories: Fish and Aquatic Life; Recreation; Public Health and Welfare; and Wildlife.

The **Fish and Aquatic Life** category is further divided (see Table 2.2) to characterize the water temperature and type of fish supported. The designated use for your particular water body and descriptions of the different categories can be obtained from the DNR.

TABLE 2.2 Designated use Fish and Aquatic Life subcategories.

Subcategories for Streams and Rivers	Subcategories for Lakes
Cold Water	Shallow Seepage
Warm Water Sport Fish	Shallow Headwater
Warm Water Forage Fish	Shallow Lowland
Limited Forage	Deep Seepage
Limited Aquatic Life	Deep Headwater
	Deep Lowland
	Small Lakes
	Spring Ponds
	Two-Story Lakes (warm water fish at the surface, cold water fish such as trout farther below)
	Reservoirs

Water Quality Criteria

The Federal Clean Water Act requires every state, to have a set of surface water quality criteria. Water quality criteria are numeric pollutant concentrations and narrative descriptions designed to protect the designated uses discussed earlier. The DNR does periodic monitoring of water bodies throughout the state to determine if they are meeting water quality standards for various conditions and various pollutants that may be found in the water.

Impaired Waters

If a water body exceeds the water quality standards for concentrations of a particular pollutant, it will be designated as an Impaired Water by the DNR, meaning the pollutant level is affecting the water body's ability to meet its designated use. The Impaired Waters List, which the federal government requires be updated every two years, can be obtained from the DNR. It states the type of water quality impairment and the pollutants responsible for the impairment.

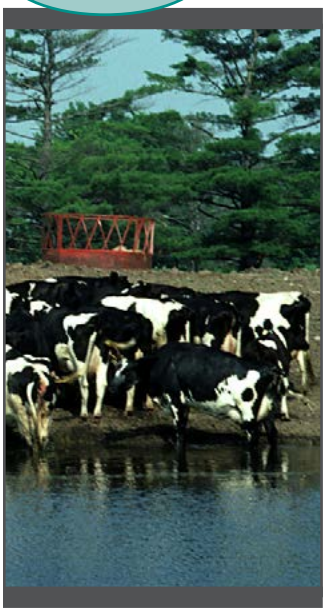
For impaired waters, it can be difficult to understand the relationship between the impairment, the pollutant, and the source of that pollutant. Here's an easy example to help you understand these terms. Many lakes in Wisconsin have the impairment "contaminated fish tissue." For this impairment, the pollutant responsible is often mercury, and the source of the pollutant is likely atmospheric deposition. (When power plants burn coal, mercury is released into the atmosphere. Through precipitation the mercury ends up in rivers and lakes, where it accumulates in fish tissue in high enough concentrations to present a fish consumption health hazard.) Other impairment/pollutant/source relationships are not as clear, and you may have questions regarding your local water body and these criteria. More detailed information is provided below and regional or statewide DNR staff may also be able to help clarify this for your water body.

Although you may know the pollutant affecting your water body, determining the source of that pollutant is not always easy. Table 2.3 shows some of the more common pollutants affecting water quality in Wisconsin, and their possible sources.

TMDLs

The DNR is required to develop a TMDL (see Chapter 1) for all impaired waters. Some of these are already complete, while others are not. Whether a TMDL is in place or not, impaired waters are still a concern, and planning should be done to improve these waters. If a TMDL has been written for your lake or river, you can use it as a source of valuable data for your watershed planning efforts. If you are working in an impaired water body that does not yet have a TMDL in place, you may have less data available, but you can still proceed with efforts to restore it to a condition whereby it meets water quality standards.

TABLE 2.3 **Wisconsin's most common pollutants and their possible sources.**



Pollutant	Possible Sources
Total Phosphorus	Agricultural fields Urban runoff Waste water treatment plants Manure storage/barnyards
Sediment/Total Suspended Solids	Row crop agricultural fields Urban runoff Construction sites Streambank/shoreline erosion
Mercury	Coal-fired power plants Industrial discharges
Elevated Temperature	Urban runoff Industrial discharges Loss of shoreline vegetation
E. coli bacteria	Manure storage/barnyards/animal wastes Septic systems Urban runoff
PCBs (polychlorinated biphenyls)	Industrial sites/discharges

Watershed Assessment

Once you know the causes and sources of any water quality issues in your watershed, you can begin to assess the problems in more detail. You can start by looking at the current land use in the watershed: cities and towns, agriculture and livestock operations, and other business or industrial operations. There are many tools to help you in this process.

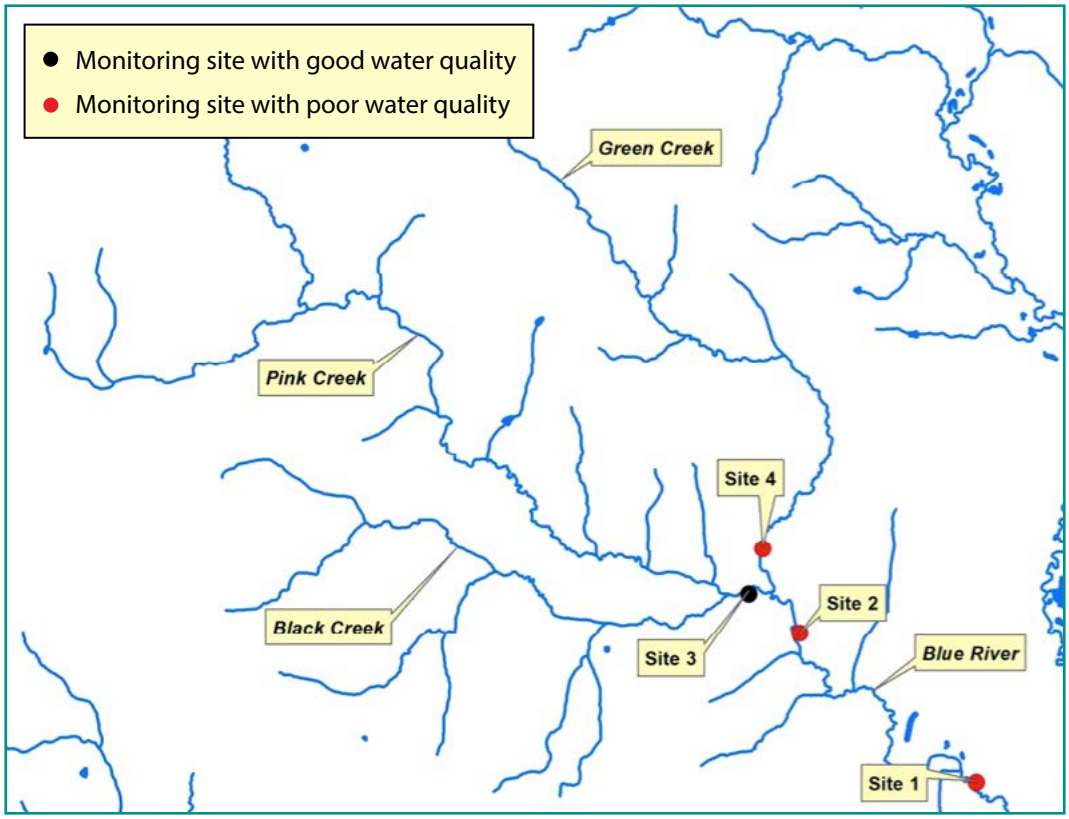
Monitoring

Water quality monitoring can help determine differences in water quality within the watershed, and help determine the pollutant and its source. The DNR monitors many water bodies, and the data are often available from their staff or website. Monitoring is also done by other entities, such as County Land and Water Conservation Departments, local universities and private consultants. There are many citizen monitoring groups and individuals who document water quality in local watersheds. The rules for such monitoring are often less stringent, and the results often can't be used for "official" designations or research. Make sure you know the source of any water quality monitoring data you obtain, and how it can be used.

Figure 2.1 illustrates one potential use of monitoring. In this example, results from monitoring Sites 1 and 2 on the Blue River indicate that it is impaired (red dots). To get a better idea of the source of the impairment, you could set up additional monitoring sites on the Blue River's tributaries. Black Creek and Pink Creek are sampled at Site 3, and Green Creek at Site 4. While Site 3 shows consistently good water quality (black dot), pollution is detected at monitoring Site 4 on Green Creek. What we can conclude from this is that the Black Creek and Pink Creek watersheds probably shouldn't be your first priority; efforts should be focused in the Green Creek and Blue River watersheds.

Additional monitoring could isolate smaller creeks in those watersheds and help narrow the focus even further. However, reliable water quality monitoring can be expensive so you will need to balance your need for data with available resources. Also, the example is a very simple and small watershed. Chances are your river or lake has a much larger watershed, so you may not get any clear answers from a handful of monitoring sites.

FIGURE 2.1 **Strategically placed monitoring sites can help determine the source of a pollutant in your water body.**



If your planning effort is in an Impaired Watershed with an established TMDL, there has likely been intensive monitoring to help determine the impairments, the responsible pollutants, and their sources. The data from that monitoring will be included in the TMDL documentation and available for your use. In this case, you may not have to do further monitoring before writing your watershed plan. If there is no TMDL for your water body, the DNR or other agencies may have monitoring data that will be useful to you. It will be important to your planning efforts to either locate existing monitoring data, or set up the means to collect your own.

Remember that documenting trends in water quality through monitoring is difficult over the short term. One year's data could be skewed considerably due to weather conditions or other variables. Monitoring over long periods of time is ideal when possible.

Modeling

Watershed modeling is another useful tool for watershed planning and management. Modeling uses mathematical formulas (usually in the form of equations or with computer modeling software) to calculate pollutant loading and determine areas that may be more likely to produce pollution than others. Modeling uses parameters such as land cover and use, slope and soil type to simulate how water and runoff move in a watershed, pointing out areas that may be more or less likely to produce a particular pollutant (sometimes referred to as a "pollutant load") delivered to the water body. Models can be used to characterize runoff and pollution from urbanized areas as well as from rural and agricultural areas.

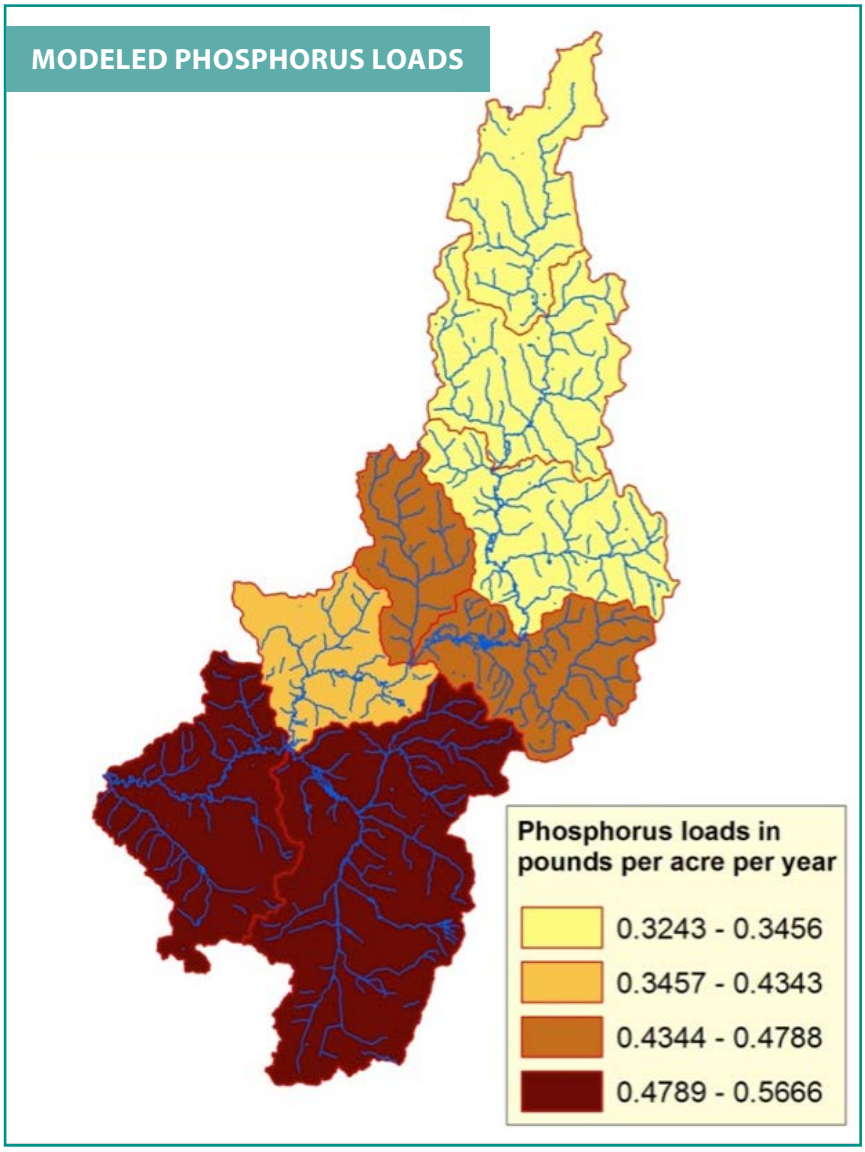
Modeling requires proper training and experience. Some models are less complicated than others, but all require an understanding of how they work, what the inputs need to be, and what the model can tell you. County Land Conservation Departments often use models to estimate the pollutant loads coming off fields. Such models include SnapPlus, and RUSLE2. More complicated, large-scale models such as AGNPS or SWAT can estimate pollutant loads for an entire large watershed. Some models need to be calibrated—meaning they need real world monitoring data entered into their equations in order to make the modeling more accurate.

Models can also be used to predict how pollutant loads might change in a watershed if certain best management practices are adopted, and can be used to predict changes in runoff due to changes in weather patterns and precipitation. Consult with natural resource or modeling professionals when investigating models that have been used or could be used in your watershed.

To demonstrate how modeling can inform decision making for watershed planning, look at Figure 2.2. This example uses a large watershed that is comprised of eight smaller subwatersheds (delineated by red borders). Phosphorus loads (fictional in this example) have been calculated for the subwatersheds using modeling software. The color-coding of the map indicates the subwatersheds that potentially produce more (dark brown) or less (yellow) phosphorus load compared to the others. You can see that the two subwatersheds near the bottom of the watershed have the highest phosphorus load potential. Used in this way, modeling might help you determine where to invest initial resources focused on decreasing phosphorus loads and improving water quality.

Modeling can be done on a watershed scale, like in the example in Figure 2.2, or on a smaller scale such as a farm field or urban construction site. As the example shows, watershed-scale models are good tools for isolating specific areas of a large watershed where your PT may want to focus their efforts. Alternatively, field-scale models estimate the pollutant loads coming from a particular parcel of land, and can predict how changing practices will affect the runoff load coming from that field or parcel.

FIGURE 2.2 Watershed map showing modeled phosphorus loads.



Much like water quality monitoring, there may already be a model developed for your watershed if you have a TMDL in place. Such a model might demonstrate something similar to Figure 2.2, pointing out areas where pollutant loads may be higher than others. If you do not have a model developed for your watershed by DNR, County Land Conservation Departments, or some other entity, it is possible (though expensive) to hire an organization to develop one for you. If you don't have the resources to develop a model for your watershed, it's not a reason to stop pursuing your planning process. Watershed modeling is but one tool in a large toolbox to help you with watershed planning.

Local Knowledge

Another tool in your watershed assessment toolbox is the knowledge of local officials and residents. Even without water quality monitoring or a watershed model, you can learn much about your watershed from your local conservation and natural resource staff. County conservation staff are responsible for producing a Land and Water Resource Management Plan, which will include detailed information about the water resources in the county. A county's Land and Water Resource Management Plan may already have information about impaired waters in your area. And if your team is working on water quality issues, chances are county conservation staff would like to be informed of such efforts, and include them in their county plans. Additionally, local DNR staff, county foresters, University of Wisconsin-Extension staff, city public works staff and others may also have information of value to your planning process, or they may be able to tell you whom to contact.

The People of the Watershed

Understanding the science is certainly important, but understanding the people and their societal values for water, as well as their culture, issues, concerns and livelihoods, is equally important and often overlooked. Who are the people living in the watershed and what do they know and feel about the water quality in their watershed? Would they be willing to change their behavior to improve the water quality in their watershed? If not, why? How could these barriers be addressed or removed?

Knowledge, attitudes and opinions of watershed residents and users of your lake, river or stream may be assessed through a survey process. Mail or phone surveys, focus groups, personal visits…all of these can be used in various ways and situations to help determine the public's willingness to be active participants in water quality improvement. Results of such surveys will also be useful for the outreach and education efforts regarding your planning and implementation process. Local universities, UW-Extension and private consultants may have knowledge and expertise in surveys and assessments and may be able to offer assistance. It's very important to remember that water quality improvements will occur when people change their land management practices, so without the understanding and cooperation of people, your efforts may not go very far.

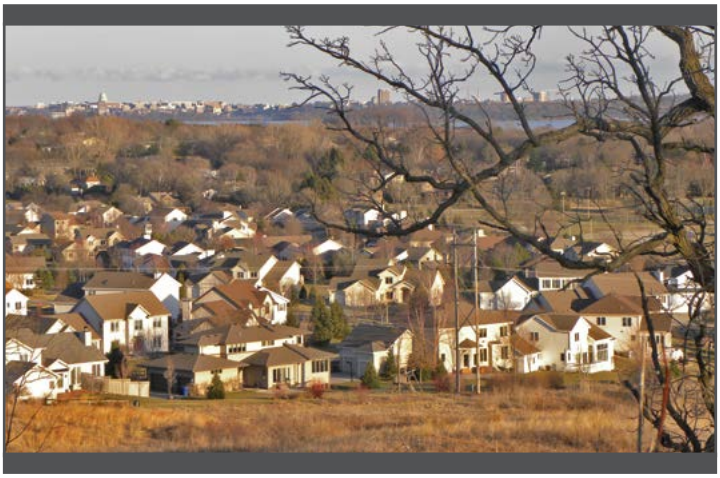
Ideally, engaging local citizens in the effort of improving the water quality of their rivers and lakes becomes a "from the bottom up" process. As such, residents work to understand the issues and, with government assistance, become key decision makers in developing policies and management strategies that work for them while also meeting water quality goals. You can learn about this method from other local watershed groups or watershed projects in Wisconsin and other states. Consulting with others who are working on citizen-led water quality and watershed planning processes will help you gather ideas for your watershed, hear lessons learned and in the end increase citizen participation in your watershed planning project.

Watershed Protection

Sometimes a water body meets water quality standards, but local residents, agencies, groups or citizens see threats to that water body and want to protect it before it becomes impaired. This situation can also lend itself to watershed planning. Fortunately, the practices necessary for protection are often less intense and widespread than those needed once a water body is impaired. However, it may be more difficult to rally support for a protection project because residents' opinions may vary in whether or not they see the need for protection efforts.

Tools often used to protect high quality water resources include:

- **Conservation easements**
- **Protective zoning districts**
- **Fee title land purchasing/ownership**
- **High levels of protective best management practices**



chapter 3

CREATING YOUR WATERSHED PLAN

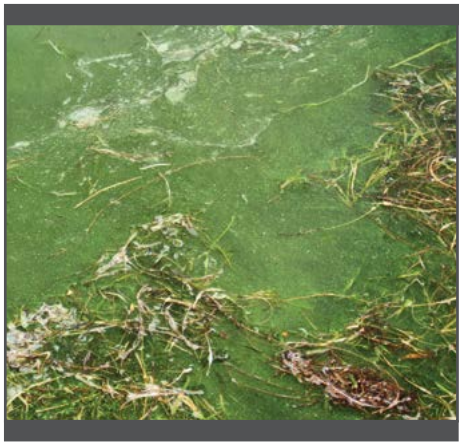
Your PT has assembled the Watershed Profile that contains a wealth of information about your lake or river. Now you're ready to use that information to develop your watershed plan. This chapter will help you set priorities, goals and objectives; discuss items that your plan should include in order to meet the guidelines for EPA and DNR grants and help you outline the various steps you will take to address the issues affecting your local water body.

Prioritizing Sources of Pollutants

If your water body has been designated an Impaired Water (see Chapter 2), there may be several different sources for the pollutants that have led to the impairment and these may have differing levels of priority in the eyes of stakeholders. It is also likely that addressing the sources of the pollutants will involve varying degrees of difficulty. For these reasons, as you develop your plan you should consider prioritizing these sources so you can be more effective when it's time to implement your plan.

A simple example will be used throughout the rest of this chapter to illustrate how you might approach pollutant source prioritization in your plan. In this example, the water body of concern is a flowage lake (a dammed portion of a large river), and phosphorus is the pollutant causing the impairment. In reviewing the watershed profile (see Chapter 2) it is discovered that the **sources of phosphorus are**:

- Uncontrolled manure runoff from barnyards in the watershed
- Phosphorus-laden runoff from cropland near the rivers and streams (tributaries) feeding your lake
- Phosphorus already in the sediment at the bottom of the lake (sometimes referred to as legacy pollutants)



Through research, it is learned that the legacy phosphorus in the lake sediments is the least of the problem, and the most expensive source to address (solutions such as removal by dredging can be very costly). It also would make sense to reduce the flow of phosphorus into the lake before addressing what has already accumulated, so the removal of legacy phosphorus becomes a low priority and can be set aside for future planning.

It is also found that the barnyards contributing to the phosphorus pollution problems are few in number. It turns out that the vast majority of the phosphorus is coming from the cropland adjacent to the tributaries. Continuing with the example, the PT can then determine whether or not certain sources of pollution are a higher priority than others, and should be addressed as such. It is likely that the PT, along with other stakeholders, will suggest addressing the phosphorus sources in this order:

1) Phosphorus-laden runoff from cropland near tributaries

2) Runoff from barnyards

3) Legacy phosphorus in lake sediments

Keep in mind that your situation may be quite different from the example, with different issues, pollutants and concerns about your water resource. Remember too, that it is not always easy to determine the sources of a particular pollutant. However, no matter what your issues are - phosphorus, sediments, eroding shorelines, poor fish habitat or other issues that may have brought you to this level of concern - prioritizing the issues and, more specifically, the sources of impairment(s) you wish to address is a helpful step.

Vision, Goals and Objectives

Vision

You likely have a "vision" for your water body – an image in your mind of what you want it to look like. If it's in good condition now but faces possible threats, you want to protect it and keep it in good condition. If it's degraded, you want to restore it. A restored condition may involve some of the designated uses mentioned in Chapter 2, such as being swimmable, fishable or meeting certain water quality standards. While individual stakeholders may each have their own vision for the water resource, it is also important for all stakeholders to have a shared vision. A group's shared vision will often state what is important to them and why they value it, and will also help give the group a sense of purpose. Your PT may want to write down an agreed upon vision for your water resource, to help keep focused on the reasons for undertaking this planning effort.

Goals

Including well-thought-out goals and objectives in your plan will help you achieve your vision. Goals are statements of what your group expects to achieve in the short, mid or long-term. Using the highest priority item from the example above, a goal might be to, minimize phosphorus loads coming from cropland runoff near rivers and streams. This is a realistic and achievable goal. To have a goal of "eliminating" phosphorus loads from runoff would be overstating what was possible. On the other hand, "reducing" loads from runoff perhaps would not go far enough. Goals should be based on your identified needs and should clearly state what you want to achieve.

There is no right or wrong number of goals to include in your watershed plan and it may be difficult to determine how many are needed to adequately address your vision. Your PT can work to develop a manageable set of goals that address as many of the stated priorities as possible.

It is important not to get too caught up in the "how" when talking about goals. For example, you wouldn't want the goal stated above to read, "Minimize phosphorus loads coming from cropland runoff near rivers and streams by installing vegetated buffers." The details of how are better left to be described in the objectives that will be written to support each goal.

Objectives

The objectives stated for each goal will list the specific methods, steps and practices that can be used to attain that specific goal. Objectives generally have measurable and obtainable outcomes; defined completion dates; and include who, what, where and when.

Let's look again at the watershed plan example stated earlier. Under each goal, there will be one or more objectives and for each objective, one or more action items that specifically describe how that objective will be accomplished:

Goal 1) Minimize phosphorus loads coming from cropland runoff near rivers and streams.

Watershed planning goals should:

1) Focus on identified needs
2) Be realistic and achievable
3) Avoid too much information on "how"

Watershed planning objectives should:

1) Be a realistic means for achieving goals
2) Be specific and measurable
3) Consider all methods that could help achieve desired goals
4) Focus on desired outcomes such as the changes you 'd like to see in your watershed and in people's behavior in your watershed

Objective 1.1) Reduce phosphorus loss from fields near streams by changing tillage practices.

An action often requires assistance or cooperation from other individuals, groups or agencies. For instance, getting tillage practices changed depends on the willingness of landowners to undertake a change in how and when they till their soil. Action items for this objective might be:

Objective 1.1 Action Items

a. Organize landowners into a farmer-led citizens' team and assist them in developing ways to incorporate tillage practices that leave crop residue on the land to minimize runoff

b. Work with government agencies who offer cost-share programs to promote conservation tillage to landowners

Minimizing phosphorus runoff from farm fields may also involve how the landowners manage nutrients, such as fertilizers and manure, on their land. Therefore, a second objective under Goal 1 could be:

Objective 1.2) Reduce phosphorus loss from fields near streams through better management of fertilizer and nutrients.

Objective 1.2 Action Items

a. Organize landowners into a farmer-led citizens' team and assist them in developing ways to manage nutrients for optimal yields and minimal nutrient loss to runoff

b. Work with government agencies who offer assistance to producers focused on better management of nutrients

c. Conduct nutrient management workshops in the watershed

While developing your plan's goals, objectives and action items, it is beneficial to include additional details such as who will do the work, estimated costs and potential sources of funds. It is best to work with your County Land Conservation Department and other natural resource agency personnel to determine these details.

Your situation may be much different from the example shared above. It's up to your PT to determine the goals and objectives for your project. You may find it helpful to organize and display your goals and objectives in a table or spreadsheet, such as the one shown in Table 3.1. This can be especially useful as you implement the plan and track your progress.

Your PT will decide the scale of the work needed, calculate costs, and seek the resources necessary to achieve the objectives. Also, depending on your situation, your action items may be much more detailed, with more specific benchmarks and timelines. Some objectives will lend themselves better to stricter guidelines, while others may not. While this example is fairly simple, your project may be complicated by multiple jurisdictions, counties, watersheds, etc. If so, you may need to include additional details in your planning table to cover expected pollutant load reductions, needs, actions and funding sources for each of these jurisdictions.

TABLE 3.1 An example format for organizing your watershed planning goals, objectives, and actions.

Goal 1) Minimize phosporus loads coming from cropland runoff near rivers and streams.						
Objective 1.1: Reduce phosphorus loss from fields near streams by changing tillage practices.						
BMP or Method to Achieve Goal	***Action Items Needed***	***Target Audience***	***Cost***	***Funding Source***	***Responsible Entity***	***Timeline***
Conservation tillage and no-till farming	**a)** Organize land owners into a "farmer-led" citizens' team and assist them in developing ways to incorporate tillage practices that leave crop residue on the land to minimize runoff **b)** Work with government agencies who offer cost-share programs to promote conservation tillage to landowners.	Farms and producers with cropland adjacent to tributary streams and rivers.	$12,000	NRCS-EQIP, state segregated funds, other funds	NRCS, County LCD, UW-Extension	Over the next three years
Objective 1.2: Reduce phosphorus loss from fields near streams through better management of fertilizer and nutrients.						
Better management of nutrients in all aspects of farming.	**a)** Organize land owners into a "farmer-led" citizens' team and assist them in developing ways to manage nutrients for optimal yields and minimal nutrient loss to runoff **b)** Work with government agencies who offer assistance to producers focused on better management of nutrients. **c)** Conduct nutrient management workshops in the watershed	Farms and producers with cropland adjacent to tributary streams and rivers.	$8,000	Grants, UW-Extension, state segregated funds, other funds	NRCS, County LCD, UW-Extension	Over the next three years

EPA's Nine Elements of a Watershed Plan

Once you have developed goals, objectives and action items, you've done quite a bit of the hard work of watershed planning. However, a thorough plan will also address the EPA's "Nine Elements of a Watershed Plan." These Nine Elements (also listed in this guide's Introduction) must be included in your watershed plan for it to meet the requirements of many federal and state grant programs. Many of the grant programs available for watershed projects addressing water quality will not consider your project for funding if the Nine Elements are not included in your plan. Plus, addressing the Nine Elements will help insure that you've done all you can to properly plan for the management of your water body and its watershed.

In this section, we'll address each of the Nine Elements and how they might be included in your plan.

1 *Identification of causes of impairment and pollutant sources that need to be controlled to achieve needed pollutant load reductions, and any other goals identified in the watershed plan.*

If you've done a thorough job assembling your Watershed Profile using a TMDL, monitoring, modeling or other research/available data to determine the causes of impairment(s) and pollutant sources, and included this information in your plan, then you have met the needs of this element. Having access to a document such as a TMDL will certainly make this easier, but without this you still can gather similar information from your local county land conservation staff, regional DNR staff and others who have done work on water issues in the watershed.

2 *An estimate of the pollutant load reductions expected from any recommended management measures.*

Modeling can help estimate pollutant load reductions that can be achieved through the installation of recommended best management practices. If there has been no modeling done in your watershed, rough estimates can be determined with the help of county land conservation staff, city engineers or other professionals who work with runoff from farms, cities, industrial sites, etc. These estimates will be based on the known effectiveness of some management practices (e.g., X pounds of a certain pollutant can be kept out of a water body by using this practice) and can then be used for an entire watershed by knowing how many acres or sites in the watershed are in need of that particular practice. The numbers may not be precise, but they will show estimates based on the best information available.

3 *A description of the nonpoint source management measures that will need to be implemented to achieve load reductions, and a description of the critical geographical areas in which those measures will be needed.*

Elements 2 and 3 go hand-in-hand. In order to calculate estimated load reductions, you will need to determine which best management practices you will need and to what extent they will be used. Much like Element 2, you will likely need assistance from professionals to determine the practices that may be effective for your situation.

4 *Estimates of the amounts of technical and financial assistance needed, costs, and/or the sources and authorities that will be relied upon to implement the plan.*

Once you know the best management practices needed, and the extent to which they'll be needed (Element 3), you will be able to estimate the costs for those practices, identify the entities most likely to provide the assistance needed and discover possible funding sources. Professionals who work in this area can assist you in finding this information. The numbers that result from such calculations may surprise and/or overwhelm you, and perhaps make you wonder how you will ever find the necessary resources. Don't get discouraged. Continue to move forward, keeping in mind that there are many stakeholders and partners all working together to implement the plan, and that improving water quality is seldom done quickly or inexpensively.

5 ***An information and education component that will be used to enhance public understanding of the project and encourage the public's early and continued participation in selecting, designing and implementing the appropriate non-point source management measures.***

It will be critical to the success of your project for people to be interested and involved in the actions needed to restore or protect your local water resource, especially since it may mean making voluntary changes in their own actions. Your outreach campaign may involve standard approaches such as news releases, websites and public meetings. You should also consider additional avenues, such as surveying stakeholders to better understand their perceptions of the issues, how proposed solutions might affect them and how they relate to the water resource. You might consider the concepts of social marketing, whereby you use certain marketing techniques in an attempt to understand motivations and effect changes in how people manage land and resources.

6 ***A timely schedule for implementing the nonpoint source management measures identified in the plan.***

A well-thought-out and realistic timeline (potentially included in a goals and objectives table) will help you meet the needs of this element and, just as importantly, keep your group focused and on-task for implementing your watershed plan.

7 ***A description of the interim measurable milestones for determining whether nonpoint source management measures or other control actions are being implemented.***

In addition to the timeline mentioned above, you will want to list some milestones or benchmarks by which you will measure progress. For example, if you want to accomplish a particular goal over the course of three years, you can list the items that will be completed in year one, year two and year three. Such benchmarks will help keep your process moving forward with the end goal in site.

8 ***A set of criteria that can be used to determine whether pollutant load reductions are being achieved over time, and how the plan will be reevaluated.***

As you are implementing your plan, how will you know that you are achieving the desired improvements in your water body? You will need to have a process to evaluate your work. You might use the number of individuals participating in any modifications or actions, assessments of land management changes or other criteria to evaluate progress made toward reaching your goal. Monitoring water quality may be a part of this element, and the details of such monitoring would meet the criteria for Element 9, below.

You will also need to think about evaluating and modifying your plan over time to allow for unforeseen circumstances such as changes in the availability of funding or other necessary resources that might slow down or otherwise change the work outlined in your goals and objectives. Routinely assessing your progress and your plan and making any needed adjustments to your goals, objectives or action items will keep you on track and moving toward the desired pollutant load reductions.

9 *A monitoring component to evaluate the effectiveness of the implementation efforts over time.*

Using estimates of load reductions works well for planning, but you will need to include a water quality monitoring component in your plan in order to show measureable results. This can be a professional monitoring program conducted by a state agency or contracted company, or if you do not have the resources for professional monitoring, timely monitoring by individuals or a group or organization trained in volunteer monitoring may suffice.

Civic Engagement

Even with the best planning process, little will change if people do not alter land management practices related to runoff and water quality. However, change does not come easily for most people. It is compounded in water quality situations because it is often difficult to pinpoint the ways or to what extent certain changes will lead to water quality improvements. In addition, the geographic location of a polluted lake or river may be distant from the land management practices that are contributing to that impairment, so it's hard for residents to see the connections between the land management and the water quality issues.

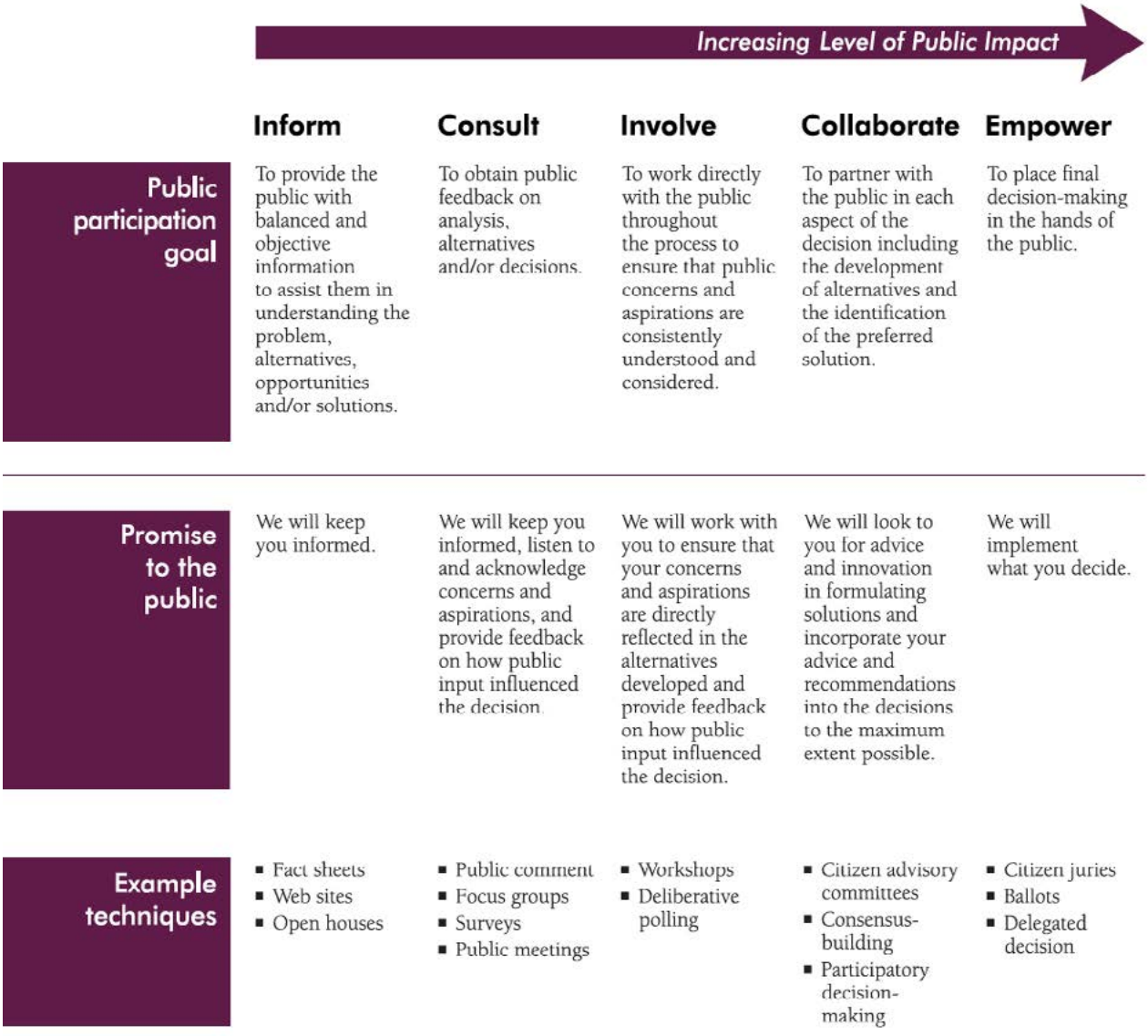
It is important in your planning process and subsequent implementation, to find ways to bring citizens together to work collaboratively on the issues. Too often in the traditional "top down" approach to watershed issues, fingers are pointed at certain groups. Often, people don't feel connected to or responsible for the local water quality and react defensively to any suggestions of needed change. Some people may even see these efforts to change behavior and improve water quality as interference and a hindrance to their livelihood. Others may presume a form of government intervention to solve the problem exists where it does not.

"Civic engagement" refers to active participation by the public in decision making about public resources and services. Civic engagement includes a spectrum of different levels of public participation that can include minimal input from the public, such as being informed or providing feedback to government, all the way up to being empowered by government to make decisions that will be honored by governmental agencies *(See Figure 3.1)*.

Your watershed's health and water quality are the responsibility of everyone who lives in or manages land and resources in the watershed and, therefore, the most effective way to achieve results is for as many people as possible to work together to define and address the issues.

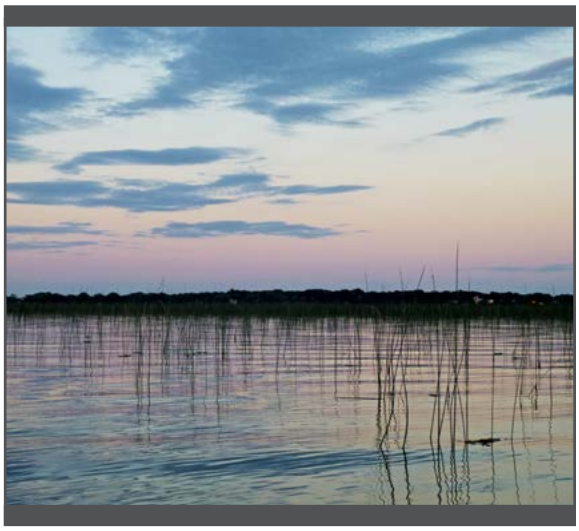
You are likely to have the most success if the watershed stakeholders are involved in making decisions that best suit them, as well as the goals of the watershed restoration or protection efforts, and the local officials and government agencies are willing to give citizens a true voice and empowered status. There are many reliable sources of information on how to promote civic engagement and cooperation. Contact your County Extension Office or Extension Natural Resource Educators, County Land Conservation Department, DNR staff and others for assistance.

FIGURE 3.1 **Spectrum of public participation.**



chapter 4

PUTTING YOUR PLAN INTO ACTION



Now that your PT has designed a comprehensive strategy to address the issues in your local river, lake or stream, it's time to get to work on the tasks outlined in your plan. Great work often goes into a planning process only to find the plan sitting on a shelf or in a computer somewhere, never fully implemented. This chapter will provide guidance on implementing the strategy you've created, keeping things moving forward, measuring your success and navigating bumps you may encounter along the way.

Overseeing Implementation

Much thought went into putting together the PT that created the plan for your water body. It would make sense then, that members of this team oversee implementation of the plan. Every project is different, but the PT is a good place to start when forming an implementation team.

Your PT has likely already sought advice from professionals (DNR staff, County Land Conservation staff, researchers, etc.) who work on the technical aspects of watershed management. If not, it may be appropriate to ask such professionals to join your team when you enter the implementation phase. Or, perhaps your PT already has frequent communication and a good working relationship with them, and their actual membership on the team is not considered necessary. However you structure the implementation team, it's important that they understand their role in putting the written plan into action.

Implementing the specific activities outlined in your plan will require project management skills, technical expertise, communication skills, funding procurement and oversight, and public relations skills. Assess your PT for such skills, and determine if there are current members or partners who can provide the necessary skill sets.

Once assembled, your implementation team can decide how they wish to proceed. There may be subgroups formed, each charged with specific tasks. These subgroups may meet separately in addition to meeting with the entire team. Subgroups might be organized around funding or outreach and education, etc. Work plans for certain action items from your plan may be a good idea, depending on the scope and resources for the action items. It's also good to track and record progress and tasks, both underway and completed. Grants often require such tracking and may also require work plans.

Keeping the Momentum Going

It's important that the energy and momentum of your project stay vibrant and apparent as you move forward. The work put into planning will be in vain if implementation falters. If your PT has lost some of its energy during the planning process, you may need to look for new members who can focus on getting the on-the-ground work done, and can inject a level of enthusiasm that your group needs at this point in the process. It may be helpful to have celebratory events for the team when certain tasks are accomplished, or even just to get people together to socialize outside of their implementation duties. Be sure to include some short-term goals that can be attained and celebrated during your planning process to help keep momentum going as you progress toward larger goals.

An important part of the project at this stage will be public relations. Stakeholders and citizens will want to know what's being done and why. You'll need to communicate the purpose of the work and how it relates to the goals and objectives of the plan you are implementing. Recruiting new stakeholders to the team will be easier if they've already heard about the project and can see what has been accomplished. Below are some examples of activities that will keep the project in the public eye, demonstrate and reward success, and generate interest that will help keep your project and team on task.

Activities that will maintain interest and enthusiasm in your project

- **Press releases about recent developments**
- **Field trips/tours of projects in progress or already completed**
- **Recognition signs for property owners who are cooperating on the project**
- **Presentations at local/regional/state watershed management conferences**

Defining Success

As plan implementation proceeds, you should begin reaching milestones such as accomplishing action items, objectives, and eventually, goals. Tracking and recognizing such progress, and determining if you are being successful should be part of your implementation process.

The term "success" can have many meanings. There is success in completing a small task, or in something as grand as accomplishing the overall vision of a cleaner, healthier watershed. It's important to track all the little successes along the way. As you proceed, make sure to look back at your plan. Check off action items under your objectives as they are completed. Check your timeline to be sure you're staying reasonably close to accomplishing the tasks in the time allotted. Celebrate these successes along the way and publicize them.

Monitoring Progress

It's one thing to accomplish tasks and objectives in your plan: a type of success, for sure. However, the ultimate level of success is seeing improved water quality in your watershed. To be able to quantify this type of success, you'll need to have a monitoring strategy in place (this is also one of the "Nine Key Elements" of a watershed plan mentioned earlier). Data collected prior to the start of implementation activities established a baseline from which to measure change (see Chapter 3). You may have a continuous monitoring program set up with a state or local agency, or you may have to establish a new monitoring program to track changes.

Some monitoring will focus on water quality, but other data might also be collected such as the presence of certain fish, invertebrates, or frogs, or in the case of shoreland habitat, animals such as amphibians, waterfowl and certain small mammals. The monitoring program you design should be one that tracks those indicators that will best determine if you're improving the conditions that are the focus of your plan.

Monitoring is expensive, and you may need to seek grants or assistance in setting up a monitoring program if there is not a professional agency or organization already monitoring in your watershed. Also, keep in mind that monitoring is very complex, and claiming success with monitoring data depends on many variables. For instance, if baseline data was collected during fairly dry years, it may show water quality differently than if monitoring was done during several wet years. Generally, water quality monitoring will have to be done for many years to be able to smooth out those extremes and determine whether or not your watershed project is having measurable success.

Remember too, that some best management practices will show results in water quality at different rates than others. For instance, fixing a leaking manure storage facility near a stream will likely show water quality changes in a much more pronounced and rapid way than planting a vegetated or forested buffer between cropland and that stream.

Modifying Your Plan

As your team tracks the changes in your watershed that are occurring as a result of the implementation of your plan, and monitors water quality changes, you will begin to see a picture of your progress. But at some point, you may see that things are not moving ahead the way you had originally planned, or that on-the-ground changes being made are not bringing about the anticipated water quality improvements. At this point, it may be necessary to modify your plan.

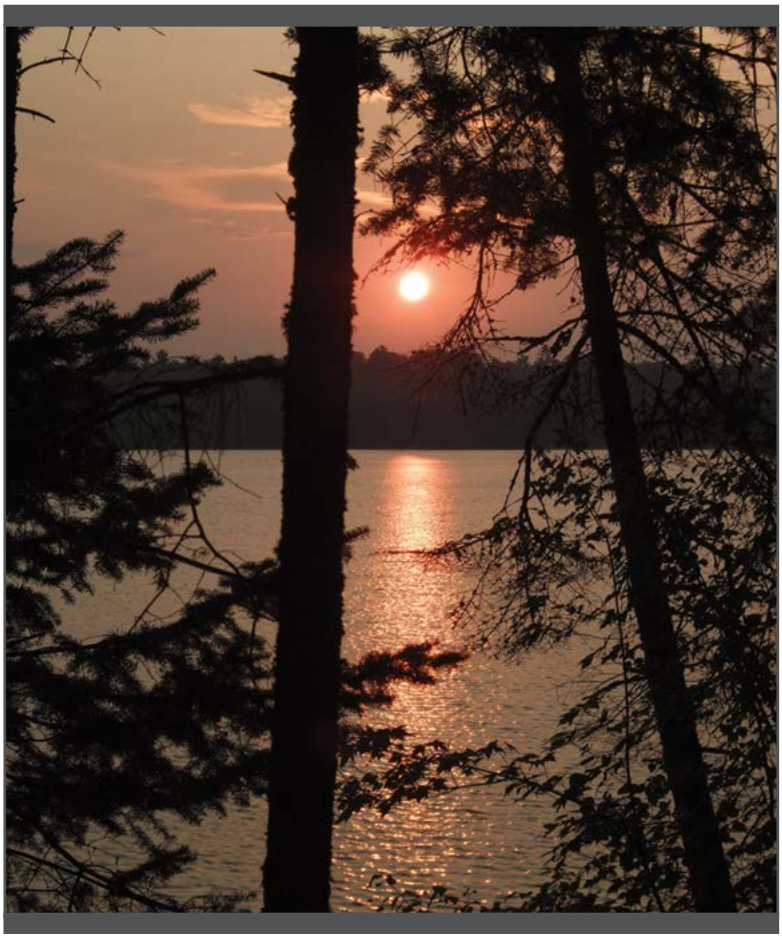
Don't panic if things aren't going exactly how you envisioned them. Land management and resulting ecological responses often can be variable and unpredictable. Your team should have a schedule and methods in place for revisiting the plan and modifying it accordingly. Some planned activities might be set aside in favor of others. You may discover a need for more public outreach and education. You may need to seek additional or alternative funding for certain elements of your plan. Whatever the changes you decide upon, be sure to review your progress periodically and consider possible plan revisions.

Conclusion

Some of what you read in this guide may seem a bit overwhelming, and you may be wondering if all the pieces are in place for you to undertake such a task as creating and implementing a plan to improve your local water body. Remember that there is no "perfect" template for how to go through this process. Every watershed project differs in some way - often many ways - from other such projects. The good news is that there are many resources and many professionals out there who can help you along the way, and who want you to succeed in the protection or restoration of your local water resource. Don't hesitate to seek out their assistance as you undertake your own exciting and worthwhile watershed planning and implementation effort.

The companion website for this document, featuring other links and resources, can be found at:

http://fyi.uwex.edu/watershedplanning



GLOSSARY

AGNPS – Agricultural Non-Point Source Pollution Model, an advanced water quality model, used for modeling pollutant loads in watersheds.

Civic Engagement – Active participation by the public in decision making about public resources and services.

Conservation Easements – An agreement established by a landowner and a land trust or government entity, specifying that a certain parcel of land will be used for conservation purposes, now and into the future no matter who owns the land after the current owner.

Designated Use – A term used by the state to describe what a particular water body is/should be suitable for, such as fishing, swimming, irrigation, etc. Designated uses are part of overall Water Quality Standards.

Fee Title Land Purchasing – A real estate term that means the type of ownership entitling the owner to use the property in any manner consistent with federal, state and local laws. The owner may designate the land for conservation purposes.

Impaired – A term used to describe a water body that does not meet Wisconsin's water quality standards.

Modeling – Refers to watershed modeling, whereby a mathematical model (often in the form of a computer program) is used to simulate how pollutants flow through a watershed and to water bodies. Models can be adjusted to show how water quality might change if certain parameters, such as land use, are changed.

Monitoring – Refers to water quality monitoring. Water temperature and pH are measured at a certain point on a river or in a lake and samples are collected and analyzed for the presence of pollutants; biological monitoring, such as fish, invertebrate and aquatic plant counts may also be done.

Protective Zoning Districts – An area of land that has been zoned to protect the land, usually for park space, for conservation of a species or habitat or to protect nearby resources such as rivers.

PT or Planning Team – Used in this document to describe the group of stakeholders assembled to oversee the writing of a comprehensive watershed plan.

Runoff – Water that flows over land, carrying with it whatever it picks up along the way, eventually flowing downhill (or through storm drains) to a nearby water body.

RUSLE2 – Revised Universal Soil Loss Equation Version 2, a water quality model, used to model runoff and soil erosion.

SnapPlus – Soil Nutrient Application Planner, a water quality model for Wisconsin, used for nutrient management planning to help determine runoff and erosion, as well as proper amounts of fertilizer needed to maximize plant growth and minimize pollutant runoff.

SWAT – Soil and Water Assessment Tool, an advanced water quality model used for modeling pollutants in anything from a small watershed to river basin-sized watersheds.

TMDL – Total Maximum Daily Load, is the maximum amount of a pollutant that a water body can receive and still meet water quality standards. TMDL also refers to the research document that describes the research needed to determine this level.

Water Quality Criteria – Numeric pollutant concentrations and narrative descriptions designed to protect designated uses. Water quality criteria are part of overall Water Quality Standards.

Water Quality Standards – The standards that Wisconsin uses to judge the water quality condition of a particular water body.

Watershed – The area of land that drains to a particular water body. A watershed also includes the groundwater resources beneath the surface. Watersheds are nested within each other, with the watershed of a smaller stream considered to be part of the watershed of the larger into which it flows.

Watershed Profile – A term used in this document to describe a collection of information about your watershed that will help inform any decisions and planning. Maps, fish data, water quality data, history of the watershed/water bodies, population data, public opinion surveys and other such information can be included.

Wisconsin Watershed Planning Guide

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