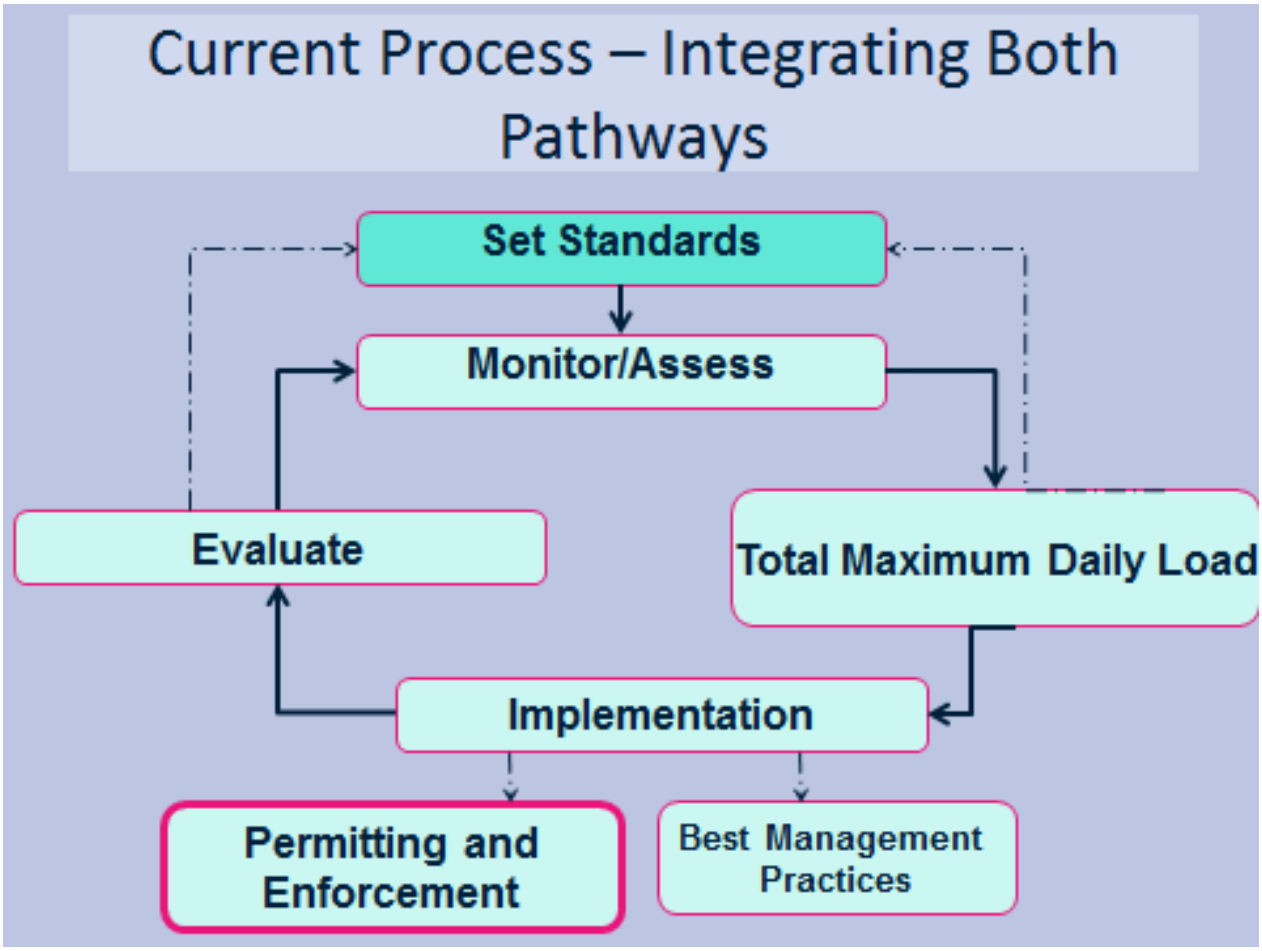
How Does It Work?

Let's take a look now at how this complex Clean Water Act is actually implemented.

The process is complex. The diagram below gives you a visual of how implementation happens. We'll go into detail in this module.



The EPA has authority to oversee the Clean Water Act. The EPA delegates an agency in each state to fulfill the requirements of the Clean Water Act, through a formal process (that was completed years ago). In Minnesota, the agency delegated to implement the CWA is the Pollution Control Agency (PCA). Once Minnesota received formal delegation, the Legislature enacted a state statute authorizing the PCA to enact the programs in the CWA.

The EPA can also withdraw or override delegation if there are egregious violations of the provisions of the CWA. Flint Hills Resources is a good example of how the EPA uses its oversight authority.

During several years in which Flint Hills committed a series of Clean Water Act violations, the state of Minnesota issued relatively small fines. The Koch Petroleum Group, which runs the refinery, found it less expensive to pay the fines than to fix the problem. The EPA stepped in and pursued a larger case against the company, and issued much larger fines. In 2000, the Koch Petroleum Group was ordered to pay a record $6 million criminal fine and an additional $2 million in remediation costs to the Dakota County Park System.

In some cases, political pressures at the state level can make it difficult to issues high penalties to companies who violate the Clean Water Act. In those cases, states can call in the EPA to pursue a case.

Learning Activity

Read the short article linked above about the settlement reached in the Flint Hills Resources case.

Water Quality Standards

Water quality standards are a fundamental tool of the Clean Water Act. The goal of the Act was to "Restore and maintain the chemical, physical and biological integrity of the nation's waters." An interim goal was to make lakes and rivers "fishable and swimmable." The problem with that interim goal is that it is entirely subjective. Water quality goals based in sound science and using objective numbers allows us to know how much of each pollutant can a water body handle and still meet the uses for the water. Scientists have to be able to answer three questions about water quality and the standards for each water body:

1. What and who are we protecting?
2. What conditions are protective?
3. How do we maintain high water quality?

Most water quality standards were set back in 1974. The process of setting standards involves first determining

the use of the water body, and then how much of each pollutant the water body can tolerate and still maintain sufficiently high quality for that use.

According to the PCA's web site, "Explicit in the Clean Water Act was the presumption that a water body should attain healthy aquatic life and recreation uses unless proven otherwise. Minnesota's rules provide a framework that includes broad uses for those, and also the following additional uses: drinking water (domestic consumption), industry, agriculture, navigation and aesthetic enjoyment. Waters not meeting the minimal aquatic life uses are called "limited resource value waters" and may have modified standards, but are still protected."

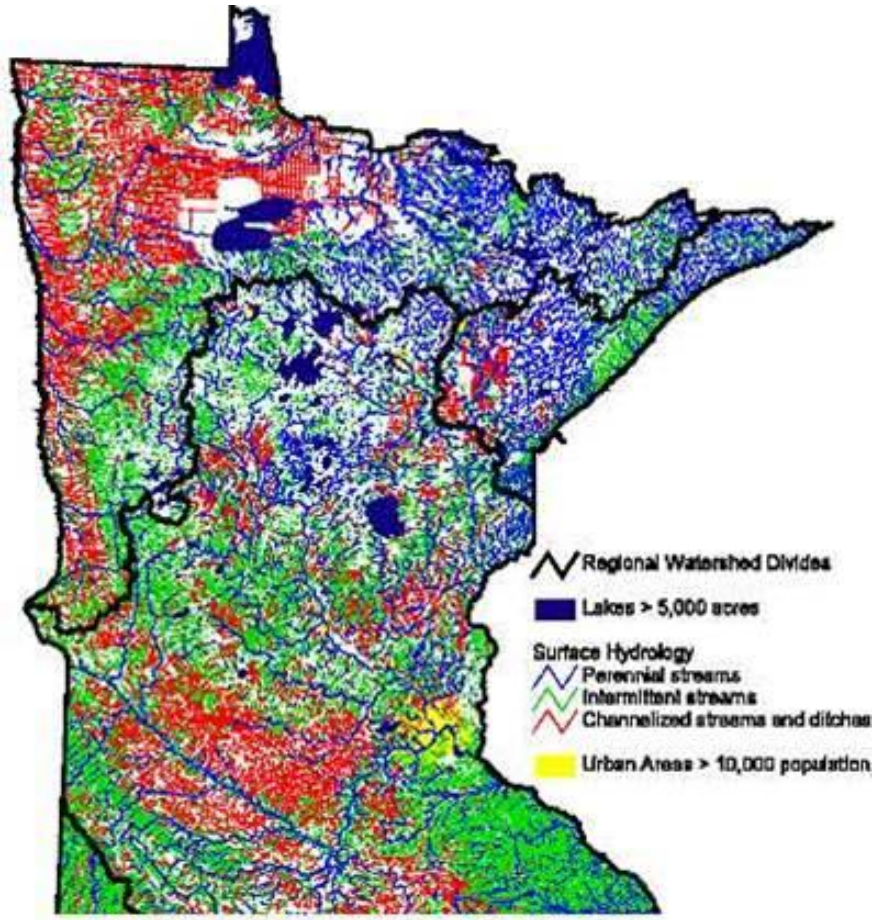
In Minnesota, there are seven classes of uses:

1. Drinking water
2. Aquatic life and recreation
3. Industrial use and cooling
4. Agricultural and wildlife use
5. Aesthetics and navigation
6. Other uses
7. Limited resource value

If there has been no formal designation of use or there is not enough data to determine a use classification, the water body is given the default classification of 2b- recreation. Waters can also have multiple uses.

Then we monitor. The CWA requires monitoring of all waters every 10 years. This is very tough in MN, given the very large numbers of lakes, rivers, and streams in the state. We used to only monitor 13% overall, because of the cost. The Clean Water Land and Legacy Act provides additional funding and allows us now to monitor in compliance with CWA. There were federal funds available for this, but even these supplemental funds were not sufficient for MN.

In the image at right, note the extent to which streams have been channelized. Much of this activity corresponds to land use areas dominated by agriculture.

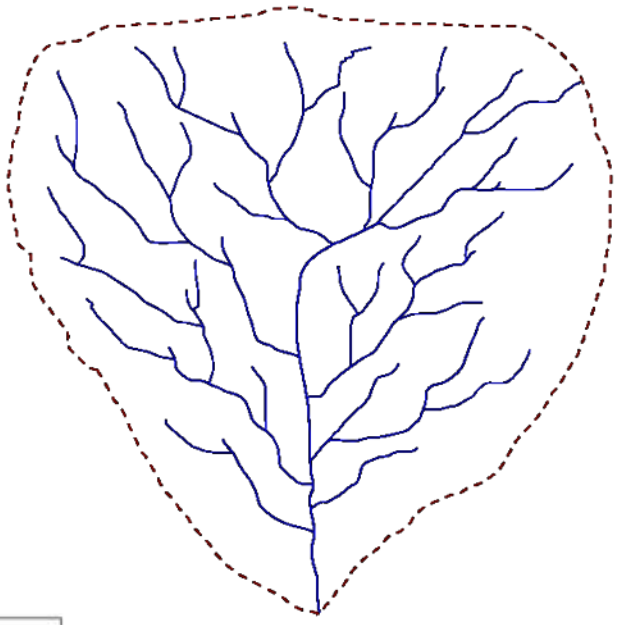


The Total Maximum Daily Load (TMDL) is a tool used to determine the amount of that pollutant that a water body can handle and still meet water quality standards. For those waters that do not meet we need to determine where pollutants come from, who is causing pollution, and where we need to reduce.

The goals of monitoring waters are to:

- Monitor/assess waters on a 10-year cycle
- Integrate agency, citizen & local efforts
- Assess conditions (not just impairments)
- Identify stressors
- Inform TMDL/protection strategy development
- Track trends
- Report to Congress every 2 years

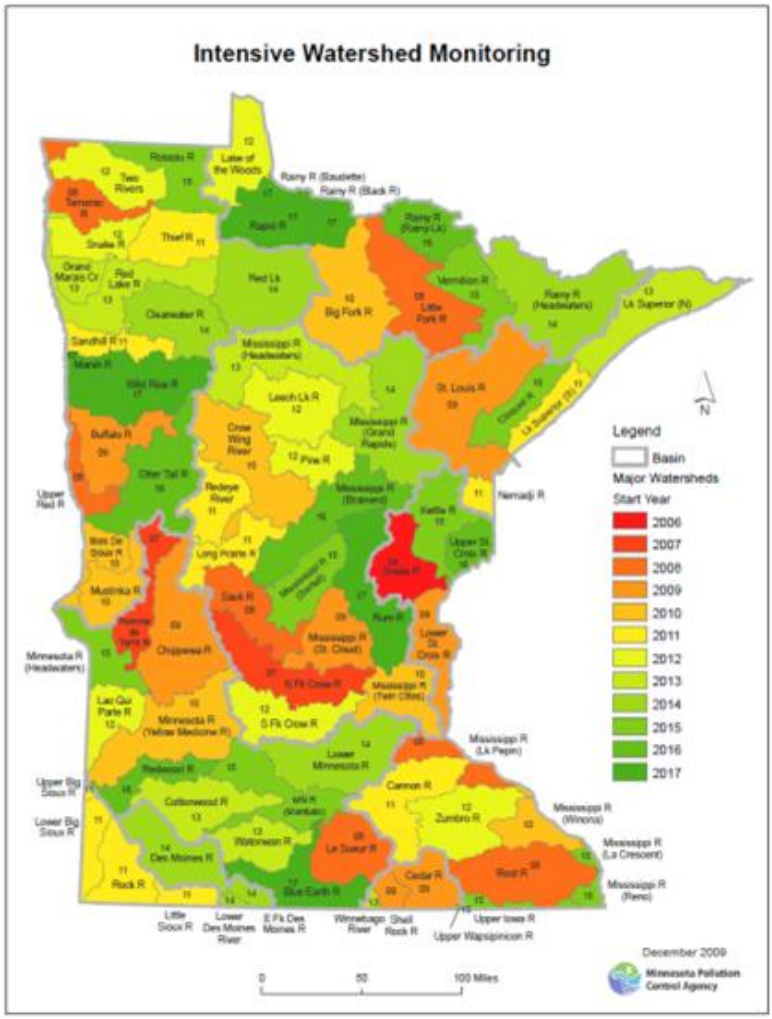
When the state monitors water quality, monitoring starts at the pour point (the downstream end of a watershed) and works upstream. You might recall this image of a simplified watershed at right, from the hydrology class.



Pour point

Several kinds of monitoring contribute to the process. Citizen-led lake and stream monitoring can identify problems that should be investigated further by agency staff – using secchi disc or sediment tube readings. Monitoring done by the PCA and other agencies has to meet certain scientific quality standards, to ensure measurements are accurate.

The image below shows which watersheds are monitored in each year of the ten-year monitoring cycle.



Each pollutant has a monitoring protocol. The PCA has these all online, based on pollutant, science, and the regulatory requirements. From this sampling you get the list of which watersheds meets water quality standards for each pollutant and which do not.

PCA staff compare monitoring results to standards for each pollutant. Waters are identified as

- supporting beneficial use
- not supporting use, or
- not assessed

In selecting monitoring data, staff consider:

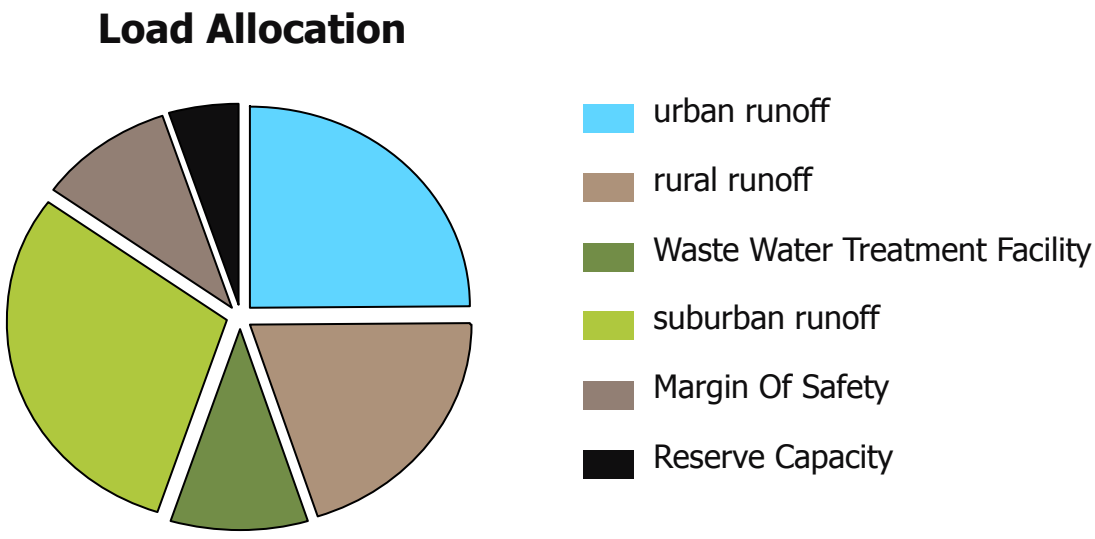
- Data quality (How reliable is the data, based on the monitoring protocol)
- Monitoring design/purpose (how and why was the monitoring done)
- Frequency of exceedance (how often were standards exceeded)
- Local knowledge (what other information has been provided by people who live in proximity to the water body)

All of these factors are figured in to the final assessment.

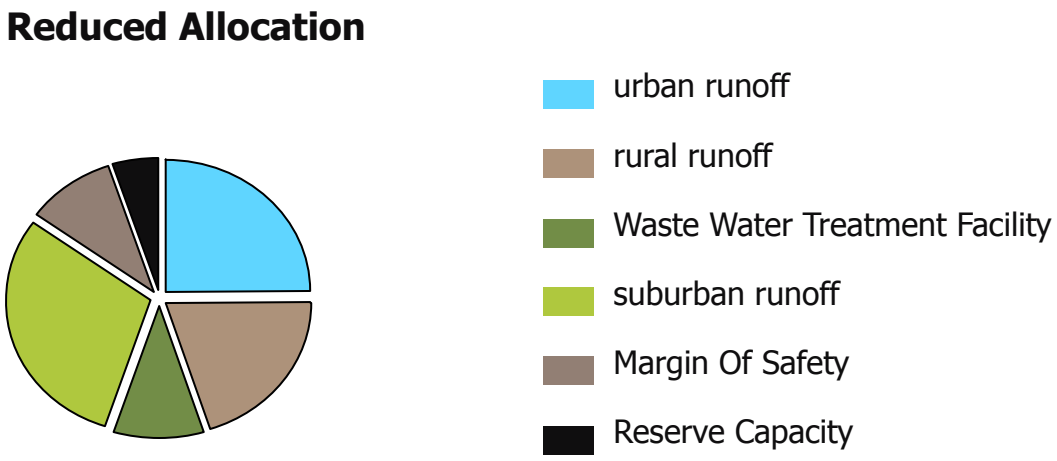
As we noted above, the Total Maximum Daily Load (TMDL) is a tool used to determine the amount of that pollutant that a water body can handle and still meet water quality standards. For those waters that do not meet we need to determine where pollutants come from, who is causing pollution, and where we need to reduce. The calculation for waters that do not meet water quality standards is:

Point source (Waste Load Allocation) + Nonpoint source (Load Allocation) + Margin of safety + reserve capacity)= Total Maximum Daily Load

A pollution load allocation would look something like the pie chart below.



In order to reduce pollution in a water body, you have to think about not just reducing a pollutant but shrinking the whole pie. Unlike the photo below, you don't have to shrink it proportional to contribution. You can, but it may be more cost effective to ask one entity to shrink more.



There is an inherent inequity at play when you begin a conversation about how to reduce pollution from different sources. Unpermitted entities don't want new regulations, and permitted entities feel it is an unfair playing field. For instance, in watersheds that have both agricultural land use and cities that have permitted stormwater systems, it is only the permitted cities that can be compelled by law to reduce their pollutant contributions to lakes and rivers. Agricultural interests are not permitted, so all pollution reduction measures farmers make are voluntary.

Minnesota has launched a new protocol for assessing and monitoring waters. Called Watershed Restoration and Protection Strategy (WRAPS) t**he goal is clean water. To get there we are:**

- Monitoring all 81 watersheds by 2017; by watershed
- Monitoring: chemical, physical and biological pollutants
- Developing protection and restoration strategies
- Taking a comprehensive, focused and targeted approach
- Adapting – revisit and build off what's been done and see if it's working
- Incorporates TMDLs

On the next two pages, you will see an example of an implementation table in the new WRAPS program.

In the next module, we'll take a look at where Master Water Stewards fit into all of this.

Water Quality Parameter	Current Conditions	Water Quality Targets by Parameter.	Strategies	Required Adoption Rate	Measures	Who	Milestone
Total Suspended Solids Watershed Derived Sediment: approx. 35% Pervious Areas by land-use category	**Current Loading by Flow Zone all sources.** Very High – 29 T/day High 4.9 T/day Mid - 1.6 T/day Low – 0.49 T/day Very low – 0.027 T/day	TSS levels reduced by _% by flow zones, to achieve WQ standards. Moving the 90% to 52mg/l TSS. **Loading Capacity by Flow Zone all sources.** Very High – 15 T/day High – 3.1 T/day Mid - 1.2 T/day Low – 0.40 T/day Very low – 0.027 T/day	**Source Prevention:** **Interception & Treatment:** **In-Channel Work:**	All cropland continuously protected by 30% residue or equivalent. 100 year flood plan in permanent vegetation. * Top 5% of EBI areas protected. *	Percent of TSS reduced by flow zone per year to meet TMDL reduction targets	Land-owners SWCD BWSR NRCS	100% in 10 years. 10% or more protected during each year.
Total Suspended Solids Watershed Derived Sediment: Impervious Areas. - MS4	NA this watershed	TSS levels reduced by _% to achieve WQ standards. BMPs designed to achieve target levels.	**Source Prevention:** **Interception & Treatment:** **In-Channel Work:**	Compliance with SWPPP	None – no MS4s in watershed	NPDES Permit Holders MS4s.	Schedule of Compliance if needed.

Total Suspended Solids Near-Channel Derived Sediment. Approx. 65%		TSS levels reduced by _% to achieve WQ standards. Moving the 90% to 52mg/l TSS. Channel embeddedness.	**Source Prevention:** **Interception & Treatment:** **In-Channel Work:**	100 year flood plan in permanent vegetation. * Top 5% of EBI areas protected. *	Percent of TSS reduced from near channel sources to meet TMDL reduction targets	Land-owners SWCD BWSR NRCS	100% in 10 years. 10% or more protected during each year.
Phosphorus Nonpoint Phosphorus – by land-use category	**Current Loading by Flow Zone all sources.** Very High –82 lbs./day High – 8.4 lbs. /day Mid - 2.4 lbs./day Low – 0.90 lbs./day Very low – 0.15 lbs./day	Reduce phosphorus levels to FWM 18.4 lbs. /day or less. This level set to achieve compliance with D.O. WQ standard during 7Q10 flows. WLA – 0.02 lbs./day MOS 1.84 lbs./day LA: Very High –27 lbs./day High – 4.7 lbs. /day Mid - 1.6 lbs./day Low – 0.69 lbs./day Very low – 0.13 lbs./day	**Source Prevention:** **Interception & Treatment:** **In-Channel Work:**	All manure applied at agronomic rates for phosphorus. 25 foot permanent vegetation buffers around all pasture lands.*	Percent of flow-weighted mean goal achieved from nonpoint sources	Land-owners SWCD BWSR NRCS	100% in 10 years. 10% or more protected during each year.

Clearly, there is plenty of work to go around in protecting clean water and implementing the Clean Water Act. So, who does that work? The charts below give you a quick snapshot of the agencies involved and the focus of their work.

Primary State Agencies – Water Responsibilities

Agency	A Primary role	Other roles
Agriculture	Pesticides	loan program; ag/water research
Environmental Quality	Water plan	Coordination, environmental review
Health	Drinking water	Ground water
Natural Resources	Water Quantity	Drought; lakes; training; ground water permitting
Pollution Control	Water Quality – point and nonpoint source	Ground water; local monitoring; training & certification
Water & Soil Resources	Local implementation	Wetland conservation act

State and local agencies need to work together on these complex monitoring and restoration efforts. The next chart gives you a snapshot of local agencies and their primary areas of responsibility.

Primary Local Agencies

Entity	Primary Water Activities	Taxing Authority	Plan	Number
Municipalities	Wastewater, stormwater, drinking water	yes	land use planning	584
Counties	Feedlots, septic systems, stormwater	yes	comprehensive plan; county water plan;	87
SWCDs	Water and soil conservation programs	no	SWCD 10 year plan	91
WD	Stormwater, flooding, conservation	yes	Watershed plan – 10 year	46 (31 non metro)
WMO	stormwater	yes	Watershed plan 10 year	43 (metro only)

SWCDs – Soil and Water Conservation Districts; WD – Watershed Districts
WMO – Watershed Management Organizations

As Master Water Stewards, you will be primarily working with local agencies. Get to know your local staff!

Learning Activity

Follow the links below and find out which watershed district, watershed management organization or Soil and Water Conservation District you are in. Identify at least one point of contact for your local organization.

For watershed districts:
http://www.mnwatershed.org/

For watershed management organizations:
http://www.bwsr.state.mn.us/partners/wmo/wmo.html

Soil and Water Conservation Districts:
http://www.maswcd.org/