Chapter 3

Identify Your Watershed and Assess Its Current Condition

3-1 Introduction

In this chapter, you learn to identify your municipality's watersheds and determine their current conditions by completing Forms 1 and 2. It also presents an approach for developing goals and selecting key performance metrics to measure progress. The instructions help you

- identify watershed names and hydrological unit codes (HUCs);
- create a map of the watershed and its boundaries;
- prepare a list of regulatory and local designated uses, impairments of concern, and an overall watershed condition score using available information;
- calculate a condition score for each receiving waterbody;
- identify key stakeholders active in the watershed; and
- identify key goals and performance metrics to guide the prioritization of projects and enable the tracking of progress over time.

3-1.1 Using Your Existing Information

In addition to the one this guide describes, other methods and sources are available for determining the conditions of your watershed:

- **Environmental office documentation.** The municipal environmental office may have already identified the watersheds and assessed the conditions of the waterbodies to which your property drains.
- **Watershed vulnerability analysis.** This analysis provides guidance on delineating subwatersheds, estimating current and future impervious cover, and identifying factors that would

Summary

This chapter walks you through the completion of Forms 1 and 2. The information contained in Forms 1 and 2 enables you to identify your watershed and its characteristics.

I already have my watershed information

You may have already identified the watersheds and waterbodies to which your municipality drains. If so, ensure you have all of the information in Forms 1 and 2 and that you have *quantitatively scored their condition.*

alter the initial classification of individual subwatersheds. The document outlines a basic eight-step process for creating a rapid watershed plan for either a large watershed or jurisdiction. It is available at http://www.cwp.org/VulnerabilityAnalysis.pdf.

- **Watershed protection audit.** This audit establishes a baseline of current strategies and practices within the watershed. By understanding the current state of development, watershed groups can assess strategies, practices, strengths, and weaknesses and can better plan future efforts. This document can help watershed organizations audit the watershed protection tools currently available in their watershed. It is available at http://www.cwp.org/Community_Watersheds/WatershedProtection_Audit2.pdf.

If you already have the watershed background information, you have already begun the first step of the watershed assessment process. You need to ensure you have all of the information in Forms 1 and 2 and that you have quantitatively scored the condition of your municipality's receiving waterbodies. You can convert your information into Forms 1 and 2 or leave them in their original format.

3-1.2 Using the Municipal Watershed Impact Assessment Process

The remainder of this chapter walks you through the steps for completing Forms 1 and 2. Complete Forms 1 and 2 by relying on existing information and tools primarily available in municipal documents and from EPA, state, and local regulators. Form 1 enables you to create a summary of key watershed information—including the name of the watershed, its HUC, the significant municipal waterbodies, and their condition and vulnerability scores—using existing information related to watershed indicators. Complete a Form 2 for each significant waterbody identified in Form 1, and then use the results of Form 2 to select key performance metrics to serve as the baseline for measuring your municipality's progress.

3-2 Identify Municipality's Watershed and Its Key Characteristics

EPA, states, and local groups have established extensive online tools to help you identify the watershed in which your municipality resides and assess its characteristics. The two most relevant sites are

- EPA's *Surf Your Watershed* site at http://cfpub.epa.gov/surf/locate/index.cfm and
- EPA's *WATERS* website at http://www.epa.gov/waters/. The WATERS system is a tool that unites water quality information previously available only on individual state agency homepages and at several EPA websites. It can also be used to generate summary reports on all waters of a state.

Both applications provide links to a GIS mapping tool and to related water program information, including a list of impaired waters from the 303(d) list, water quality standards, and designated uses.

The following sections provide instructions on using these sites to locate and document key characteristics of your watershed and print out a map.

Locate your watershed

Locate your municipality and its watershed using the locator function on EPA's *Surf Your Watershed* Internet site at http://cfpub.epa.gov/surf/locate/index.com, or contact your state water permitting program.

3-2.1 Form 1—Identify the Watershed Name and Hydrological Unit Code (HUC)

The first step is to fill in Form 1 about your municipality's watershed and its 8-digit HUC using information provided by EPA, your state, and other resources. A HUC is a numbering system the U.S. Geological Survey (USGS) developed, which uniquely identifies all watersheds in the United States. The HUC, commonly called a "watershed address," ranges from 2 to 16 digits—the higher the number is, the smaller the watershed. Exhibit 3-1 shows examples of 2- to 12-digit HUCs.

A HUC is a watershed's address

The watershed's HUC is commonly called its "watershed address." The U.S. Geological Survey provides access to watershed GIS boundary files on its Internet site at http://water.usgs.gov/GIS/huc.html.

Exhibit 3-1. Sample Hydrological Unit Codes

Description	Proper name	HUC	Digits
Region	Ohio River	05	2
Subregion	Wabash and White Rivers	0512	4
Basin	Wabash River	051201	6
Subbasin	Vermilion River	05120109	8
Watershed	North Fork Vermilion	0512010909	10
Subwatershed	Lake Vermilion	051201090905	12

Form 1. Summary of the Municipality's Receiving Watersheds and Associated Waterbodies

Instructions: Complete this form for each 8-digit HUC watershed. Enter watershed priority scores (WPS) from Form 2. Please attach your watershed map to all Form 3s.

1. Name	2. State and County	3. Zip Code(s)

4. Name of 8-digit HUC watershed(s)	5. 8-digit HUC(s)

6. List of the Receiving Watersheds or Waterbodies Listed as Impaired by the Federal or State Regulators

Name of waterbody	HUC, 8- to 16-digit, or state identifier	List of impaired designated uses	Summary of impairments of concern (from Form 2)	WPS (from Form 2)

7. List of the Receiving Watersheds or Waterbodies Listed as Impaired by the Federal or State Regulators

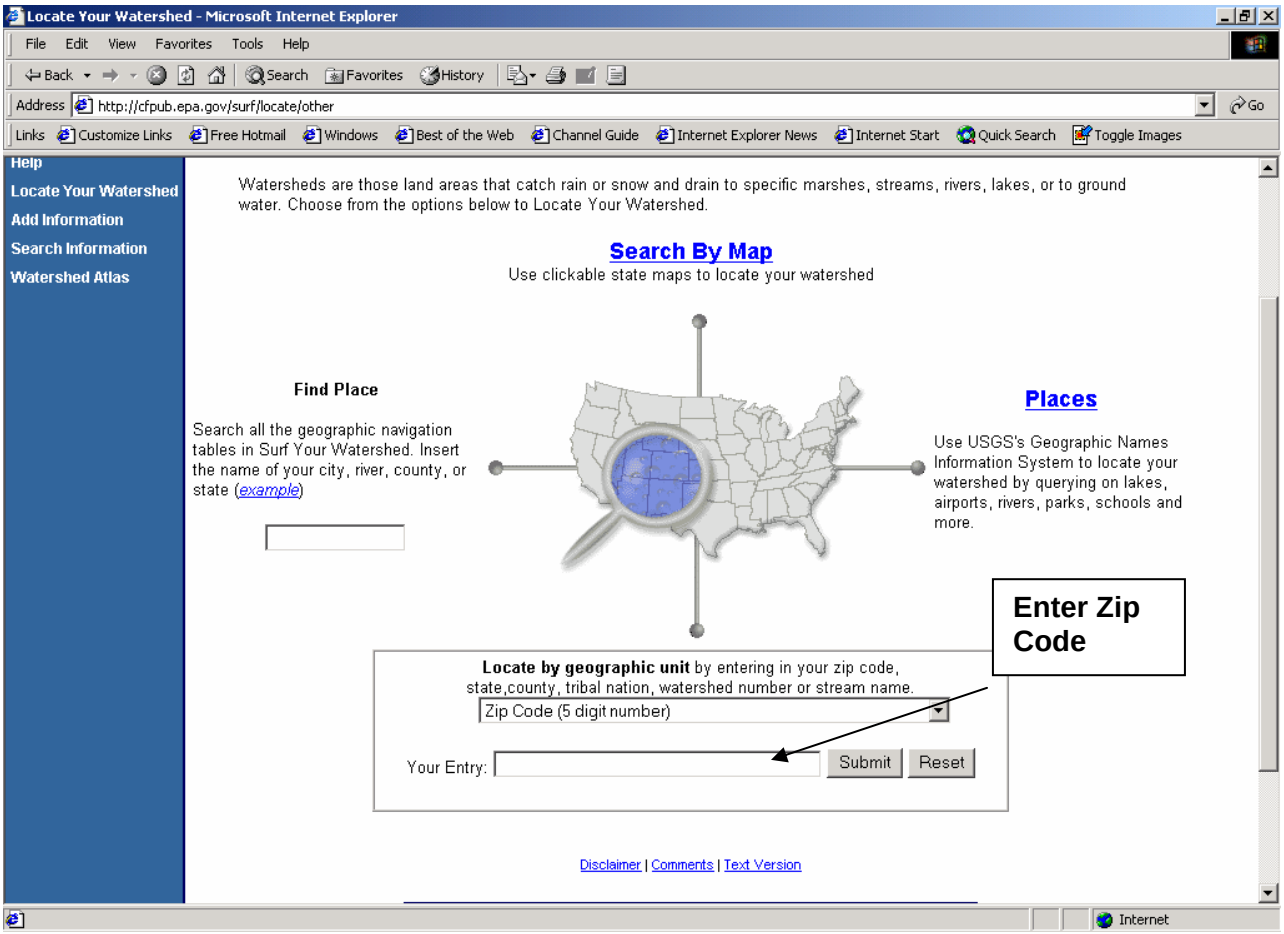
Name of waterbody	HUC, 8- to 16-digit, or state identifier	List of designated uses	Summary of impairments of concern (from Form 2)	WPS (from Form 2)

Complete Form 1 as follows:

- *Blocks 1 through 3*. Enter the municipality's name, state, and zip code.

- *Blocks 4 and 5*. Go to EPA's *Surf Your Watershed* site at http://cfpub.epa.gov/surf/locate/index.cfm as shown in Exhibit 3-2. Enter your municipality's zip codes into the "Locate by geographic unit" box. This provides the "Watershed Profile" (at the 8-digit HUC) for your municipality. Enter the watershed name and 8-digit HUC into blocks 4 and 5.

Exhibit 3-2. Example EPA Surf Your Watershed Locator



You may also use the "search by map" function at the top of the screen to locate the watershed. If using the mapping function, select the state your municipality is in, and drill down to your general location until the "watershed profile" page is returned.

Current 303(d) list

States are required to update their list of impaired waters every 2 years.

When identifying whether your municipality's waterbodies are impaired, make sure you are using the latest 303(d) list.

- *Block 6*. To obtain the 303(d) listed waterbodies, use one of the following sources:

  - **State Water Management Agency.** Call your state water management agency or visit their website, which usually includes the latest 303(d) report. The 303(d) report lists the impaired waterbodies. If your waterbody is not listed, then it is not impaired.
  - ***WATERS* Website.** Use the *WATERS* website at http://www.epa.gov/waters/enviromapper/index.htm. Select the area on which you would like information, such as by zip code, and enter the appropriate information. Then click on the "Zoom to Selected Area" button. A map of that area will appear. Select the "Update Map" button. A map of the impaired waterbodies in that area will appear. Select "identify active feature" and click on the "Update Map" button. Information on the impaired waterbodies appears below the map (Exhibit 3-3). You may need to use the zooming tools to identify the impaired waterbodies.
  - ***TMDL* Website.** Use the *TMDL* website at http://www.epa.gov/owow/tmdl (Exhibit 3-4). Click on your state, then the waters listed by watersheds, and then your watershed. This will return a list of the 303(d)-listed waterbodies in the watershed. Click on your waterbody. For each listed waterbody, the website provides the following information: name, parameters (pollutants) of concern, priority for TMDL development, and potential sources of impairment.

  Copy the listed waterbodies, HUC, and parameters of concern to the appropriate column under block 6. The priority score, or WPS, you enter in column 4 under block 6, is determined in Form 2.

- *Block 7*. Identify and list the waterbodies not listed as impaired but that are still a priority for your municipality. For each waterbody listed in block 7, complete a separate Form 2. Form 2 enables you to develop a WPS for each waterbody.

- *Block 8*. Identify potential regional watershed partners by referring to http://www.epa.gov/win/contacts.html. List each potential partner in block 8. You will also be asked to use this information to complete the Regional Partnering Template located in Chapter 6.

Exhibit 3-3. Example of EPA WATERS Map

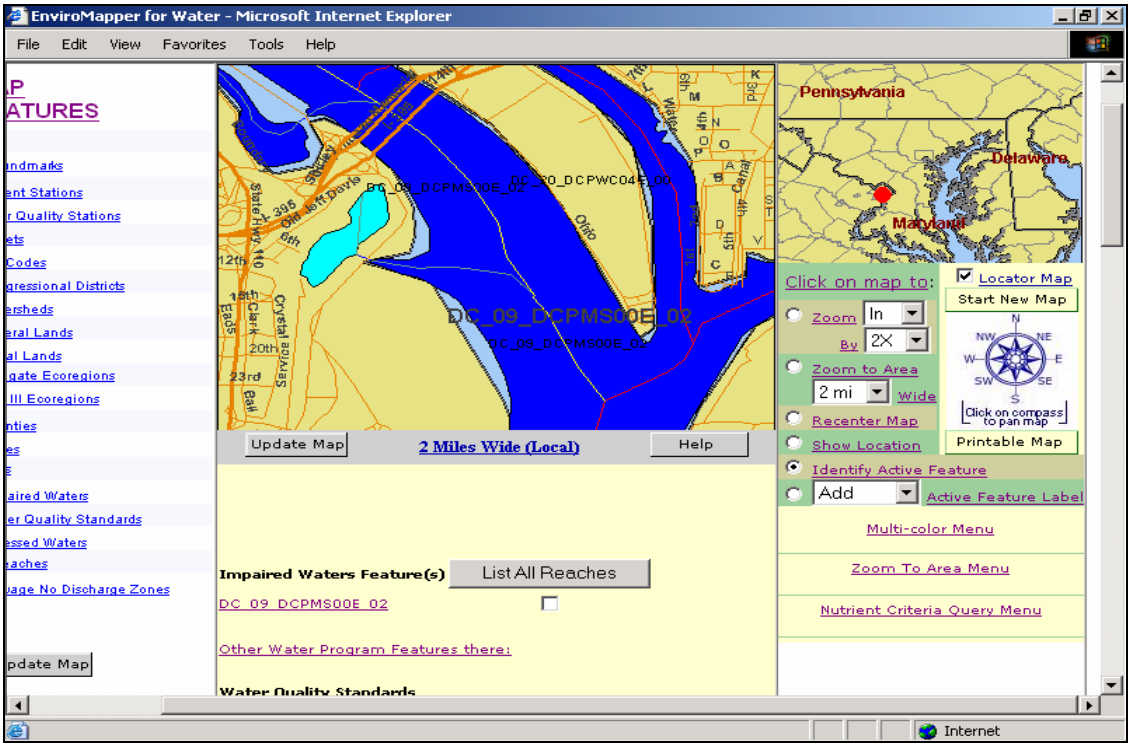
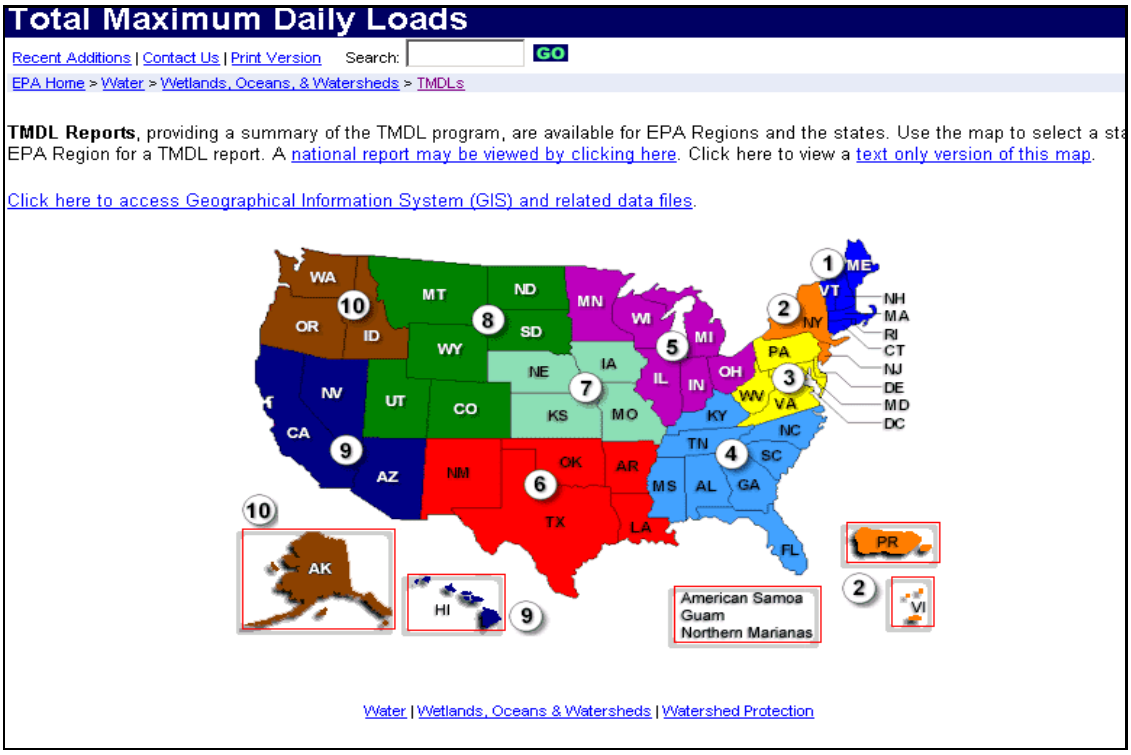


Exhibit 3-4. Example EPA TMDL Website



3-2.2 Form 2—Calculate WPS for Each Waterbody Listed on Form 1

Complete a separate Form 2 for each waterbody listed in Form 1. Use the information provided by EPA on its *Surf Your Watershed* site to assess the WPS. The WPS is the sum of the watershed indicator condition and vulnerability scores, plus points applied to the TMDL and compliance-based questions found in Form 2. Calculating a WPS enables you to prioritize the sensitivity of your waterbodies and thus the activities that occur in their drainage basin. The higher the WPS is, the more sensitive the watershed is to municipal activities.

Use the following instructions to complete Form 2:

- *Block 1*. Enter the name and HUC for the waterbody listed in blocks 6 or 7 of Form 1.

- *Block 2*. For the waterbody listed in block 1, answer questions 2a through 2i, which determine the designated uses of the waterbody and whether it meets them. Go to the state regulator or EPA's state 305b reports to determine the waterbody's designated uses. The designated uses are from EPA's national use support categories, *Guidelines for Preparation of the Comprehensive State Water Quality Assessments (305(b) Reports) and Electronic Updates*. Your state may have state-specific subcategories, which you can enter in block 2i. For each designated use, check the degree to which it meets the use, the impairments, and the causes or stressors of them. For example, if the waterbody does not fully support the water use classification of fishing and non-point source pollution from urban runoff is the cause of the impairment: check "partially supporting" for 2b and enter non-point source pollution as the impairment and urban runoff as the cause. If you do not know the answer for the specific waterbody, enter the default value for the corresponding 8-digit HUC.

- *Block 3*. List the state 303(d)-listed pollutants of concern (impairment) from block 2. Note whether or not the state has developed a TMDL for the waterbody. EPA and the states provide this information for most waterbodies on EPA's *TMDL* tracking site at http://www.epa.gov/waters/tmdl/ and the 303(d) list. If the TMDL is in place, note the effective date.

Form 2. Watershed Priority Score (WPS): A Sensitivity Scoring and Data Collection Form for Waterbodies/Watersheds

Complete a Form 2 for each waterbody listed Form 1. Record the WPS and pollutants of concern into Form 1 for each waterbody.

1. Name of the Watershed and Corresponding 8- to 16-Digit HUC Code (or State Identifier):

2. Waterbody/Watershed Impairment Score for the watershed listed in Block 1. Go to the State regulator or EPA's State 305b reports to determine the waterbody's designated uses and if they are being met. For each designated use, check the degree it meets the use, the impairment(s), and the causes/stressors.

Designated Use	Impairment	Cause/Stressor	Not Supporting = 3 pts	Partially Supporting = 2pts	Fully Supporting = 1pt	Not a Designated Use= 0 pts
a. Aquatic life use						
b. Fish consumption use						
c. Shell fishing use						
d. Swimming use						
e. Secondary contact use						
f. Drinking water use						
g. Agriculture use						
h. Cultural/ceremonial use						
i. State/municipal specific use _____						

3. Transfer the State 303(d) listed pollutants of concern (impairments) from question 2 and note if the State has developed TMDL.	TMDL in place? Yes = 3 pt	TMDL in place? No = 0 pts	Enter TMDL Effective Date
a. 303(d) Impairment 1:			
b. 303(d) Impairment 2:			
c. 303(d) Impairment 3:			
d. 303(d) Impairment 4:			
e. 303(d) Impairment 5:			

4. Waterbody/Watershed Vulnerability Score for the watershed listed in Block 1.	Yes = 1 pt	No = 0 pts
a. Are the impervious surfaces above 25% of watershed land area (for either current or projected land use)?		
b. Is the population growth rate of the watershed above 7%?		
c. Does waterbody contain impounded water (e.g., dams and fish barriers)?		
d. Is the receiving water listed as a protected estuary?		
5. Has EPA, individual service, state, water authority, or local group listed restoration goals for the waterbody in Block 1? If so, list the specific goals.	Yes = 1 pt	No = 0 pts
a. Biodiversity and habitat loss. If yes, list goal:		
b. Riparian buffer strip loss. If yes, list goal:		
c. Imperviousness/uncontrolled SW runoff. If yes, list goal:		
d. Invasive species. If yes, list goal:		
e. Wetlands. If yes, list goal:		
f. Other: If yes, list goal:		
6. Has an enforcement official requested the municipality to monitor/sample the waterbody?		
7. Have water withdrawal/use restrictions been imposed for the waterbody?		
8. Have potential impacts to human health been identified as a significant concern for the waterbody (e.g., air deposition of a pollutant to the waterbody, or pollutants in the water are causing a risk to drinking water)?		
9. Is this watershed or waterbody designated as a special water resource under the American Heritage River Program, Great Lakes Program, Scenic Waters Program, or another special program?		
10. **Watershed Priority Score (WPS) =** impairment score (blocks 2 a-i) + TMDLs (blocks 3 a-e) + vulnerability score (block 4 a-d) + goal score (blocks 5 a-f) + answers on blocks 6 to 9.		

- *Block 4*. For the waterbody listed in block 1, answer "yes" or "no" to questions 4a through 4d to determine the waterbody's vulnerability.

  - Question 4a. Is the percentage of impervious surfaces above 25 percent of the watershed land area for either current or projected land use? This information can be obtained by contacting your state water program point of contact or from EPA's watershed indicators site at http://www.epa.gov/iwi/.

  - Question 4b. Is the projected population growth rate of the watershed above 7 percent? This information can be obtained from your watershed's profile page on EPA's watershed indicators site at http://www.epa.gov/iwi/.

  - Question 4c. Does the waterbody contain impounded waters such as dams or fish barriers? This information can be obtained from your watershed's profile page on EPA's watershed indicators site at http://www.epa.gov/iwi/.

  - Question 4d. Is receiving water listed as a protected estuary? This information can be obtained from EPA's National Estuary Program site at http:// www.epa.gov/owow/estuaries/find.htm.

- *Block 5*. Has EPA, an individual service, state, water authority, or local group listed restoration goals for the watershed or waterbody? If so, list the specific waterbody or watershed restoration goals associated with each category. These goals can serve as potential watershed restoration performance metrics. Information about the active groups in the watershed can be obtained from your watershed's profile page on EPA's *Surf Your Watershed* site under the "Environmental Websites" heading.

- *Block 6*. Has a federal, state, or local enforcement official requested that the municipality monitor or sample the watershed or waterbody? Contact your state water program point of contact for environmental permits.

- *Block 7*. Have water withdrawal or use restrictions been imposed on this waterbody? Contact your state drinking water point of contact.

- *Block 8*. Have potential impacts to human health been identified as a significant concern for the waterbody? Contact your state drinking water point of contact.

- *Block 9*. Is this watershed or waterbody designated as a special water resource under the American Heritage River Program, Great Lakes Program, Scenic Waters Program, or other special program established to protect the water resource? Refer to EPA's *Surf Your Watershed* site at http://cfpub.epa.gov/surf/locate/index.cfm for more information.

- *Block 10*. Calculate the total WPS for the waterbody by adding the overall watershed condition score (blocks 2 a-i), TMDL score (3 points for each yes in blocks 3 a-e), vulnerability score (1 point for each yes in blocks 4 a-d), watershed goal score (1 point for each yes in blocks 5 a-f), plus 1 point for each yes to answers on blocks 6 to 9.

- Remember to complete a separate Form 2 for each waterbody listed in blocks 6 and 7 of Form 1. After completing each Form 2, record the WPS on Form 1, blocks 6 and 7, as a summary sheet.

3-3 Create Watershed Map

To continue the assessment process, you need to create a map of the municipality in relation to the watershed and waterbodies. Creating a map that models hydrologic conditions and land use can identify watershed areas with the greatest potential impact on source water quality.

Many state and municipal agencies have in-house GIS capabilities. Most maintain a GIS map of the municipality that contains various data layers that will be helpful in creating the watershed map. A GIS is an effective way to develop a map of the municipality. It presents selected data layers from the watershed assessment process into an easily interpreted format.

You should create a municipal map that shows the following data layers:

- Watershed (e.g., 8 digit HUC) and subwatershed (e.g., 10-16 digit HUC) boundaries
- Municipal boundaries
- Topography
- All major NPDES discharge points
- Vegetative cover
- Waterbodies and points flowing on- and off-site
- Major structures, utility lines, and roads.

Aerial and topographic maps are available online

The following Internet sites contain various digital and topographic maps that can assist with watershed efforts:

- **USGS provides digital, topographic, and HUC maps.**
- **WATERS is an Internet-based GIS mapping tool.**
- **Montana State University maintains an extensive online collection of HUC maps backed up with digital maps.**

You may need to create the watershed boundary layer. Delineating watersheds is generally a straightforward process, but it may not be the easiest step, depending on the type and number of sub-watersheds involved in the municipality. The delineation involves identifying the drainage area above municipal boundaries on a topographic map. In some cases, the total watershed area may be very large, thus prohibiting the investigation of all contributions from pollutant sources over such a wide area. The watershed drainage area must still be defined in order to identify the total area contributing to the water quality in the watersheds affected by the municipality and to eventually consider all potential contributors to any identified impairment.

As assessments are completed for other water systems upstream, that information will be available for review and incorporation into your assessment and protection plan. The USGS provides detailed guidance and hard-copy maps on delineating surface watersheds on their *User's Guide for Source Water Assessment and Protection* at http://water.usgs.gov/usaec/tools.html.

A number of federal, state, and local government agencies may already have topographic data in digital form, including the delineation of various watersheds and aquifer boundaries. These sources should be contacted first to reduce duplicate effort. State or regional geologic agencies should be the first source for hydrogeologic conditions of the area, and will most likely have studied the conditions in great detail. State agencies also know the information available in digital or other format such as reports and studies. A listing of state agencies is available at http://www.epa.gov/OGWDW/source/contacts.html.

In addition, digital and topographic maps of 8-digit HUCs are available from the following sources:

- Web-based watershed mapping tools
  - EPA's *WATERS* site at http://www.epa.gov/waters/
  - The Montana State University website at http://www.esg.montana.edu/gl/huc/index.html.
- Digital USGS topographic maps. The USGS identifies many places to get topographic maps and aerial photos. Access the USGS site at http://mapping.usgs.gov/. It also provides access to watershed GIS boundary files on its site at http://water.usgs.gov/GIS/huc.html.

3-4 Select Goals and Performance Metrics

Having systems in place to measure and communicate progress is a critical part of improving a watershed's health and ensuring environmental burden is integrated into asset management. Therefore, this guide includes a block on Form 1 to identify measures of progress (often referred to as "performance metrics") for a specific watershed. Appropriate measures not only keep watershed issues on management's mind, but, as they are met, they allow stakeholders to share successes and highlight new challenges to the watershed. Make sure that the appropriate measures of progress are selected and that information on these measures is shared with relevant stakeholders.

Measurements of progress should be associated with achieving goals set for the municipal watershed effort. Work with your municipality's environmental office to develop specific watershed restoration goals. Then determine how they tie into asset management. For example, you may choose meeting water quality measurements (such as decreasing the percentage of dissolved oxygen, bacteria levels, or fecal coliform) or less direct water-quality based results (such as number of feet of wastewater collection pipes retrofitted, number of miles protected from erosion, or number of trees planted). To make sure that progress does indeed occur, the watershed restoration goals should be incorporated into the asset management plan.

For many watersheds around the country, different stakeholders, including regulators, have identified specific restoration goals. For example, the Chesapeake Bay Program has set various goals to improve the Chesapeake Bay watershed. One such goal is to have "a Chesapeake Bay free of toxics by reducing or eliminating the input of chemical contaminants from all controllable sources to levels that result in no toxic or bioaccumulative impact on living resources that inhabit the Bay or on human health." The Puget Sound Water Quality Action Team has set a variety of goals, including reducing non-point source pollution and nuisance species. Most of these goals are voluntary, but the trend is for them to become mandatory. For example, the Estuaries and Clean Waters Act of 2000 requires federal agencies in the Chesapeake Bay Watershed to comply with previously voluntary Chesapeake Bay agreements. Thus, you should clarify your goals so that they focus the municipality's actions on the impacts they have on the watershed, the resources they control, and the specific property within municipality boundaries.

3-5 Conclusion

The previous sections provide instructions for completing Forms 1 and 2. At this point, you should have

- identified the watershed name and HUC number,
- created a map of the watershed and its boundaries,
- identified overall watershed conditions and potential impairments,
- prioritized the condition and vulnerability of municipality's watersheds, and
- identified key goals and performance metrics to guide the prioritization of projects and enable you to track progress over time.

The next chapter provides you with instructions on how to identify and prioritize specific municipal land-use conditions and activities that may be contributing to the watershed impairments listed on Form 1.