Watershed Plan Builder

Annotated Outline for Schoharie

02020005-

USING THE ANNOTATED OUTLINE TO HELP YOU PREPARE A COMPREHENSIVE WATERSHED PLAN

Congratulations! You have just prepared an annotated outline that can be used to develop a comprehensive watershed management plan. The outline includes sections describing what types of information should be included, as well as providing links to sources of information and data that you may want to use when developing your plan.

Based on the information you provided, we have "grayed" out some of the sections, meaning they are not relevant to your watershed. We have left these sections in the outline, however, so that you can confirm that they are not relevant to your watershed planning effort and delete them.

How do I use this outline to develop my watershed plan?

There are several different ways you can use this outline in your watershed planning effort. For example, you may only want to use the links provided as a starting point for your data collection efforts. Or you may want to take sections of the outline and assign them to various members of your watershed planning committee to fill in the necessary information. Or you may simply want to use this outline as reference and decide that you want to reorganize your plan around different headings to emphasize key issues in your watershed.

Moving through the watershed planning process

Now that you have the outline, you will use it to guide you through the process of developing a watershed plan. There are 4 major steps to developing a watershed plan and this outline will help get you started. The remaining 2 steps occur once you begin implementation. The outline will help you to fill in the blanks and ask additional questions to produce your plan.

Watershed Planning Step	Major Activities	Section in Outline
Build Partnerships	Identify stakeholders; Identify issues of concern; Set preliminary goals; Conduct outreach	2.0
Characterize Watershed	Gather existing data and create a watershed inventory; Identify data gaps and collect additional data if needed; Analyze data; Identify causes and sources of pollution that need to be controlled; Estimate pollutant loadsIdentify critical areas	3.0; 4.0; 5.0; 6.0
Set Goals/Identify Solutions	Set goals and management objectives; Develop indicators/targets; Determine load reductions needed; Develop management strategies	7.0; 8.0
Design Implementation Program	Develop implementation schedule and milestones; Develop criteria to measure progress; Develop information/education component; Develop monitoring component; Identify technical/financial assistance needed; Develop evaluation framework; Assign roles and responsibilities	9.0

Implement Watershed Plan	Prepare workplans; Implement management strategies; Share results	10.0
Measure progress and Make Adjustments	Monitor progress; Make adjustments	10.0

We have provided a few tips under each step showing you how to most effectively use the outline to prepare your watershed plan.

Step 1. Build Partnerships

If you have not already formed a working group or committee to develop the watershed plan, now is the time. Partners and stakeholders form the backbone of the workforce needed to develop and implement the watershed plan. Use the outline to help you identify what types of expertise you need both for plan development and implementation (Section 2.0). When recruiting stakeholders to participate in the process, send them the outline to help them understand what's involved in developing a plan.

Step 2. Characterize the Watershed

Before you can develop solutions for managing the watershed, you first need to characterize the watershed, identifying key features and any problems. This step involves quite a bit of data gathering to assess the current health of the watershed. Use the outline to help you determine what types of information you need to effectively characterize the watershed. Oftentimes the information has already been collected and is included previous studies or plans. Refer to url: xxx to get a list of where some of this information might be located to help you start your search.

Within the characterization step there are 3 major types of information that you need to provide:

1) Description of the watershed, including natural and physical features, as well as land use characteristics (Section 3.0)
2) Current conditions in the watershed such as water quality and biology, as well as any current standards that have been set by your state, tribe, or the USEPA, (Section 4.0)
3) Assessment of pollutants in the watershed and their sources. (Section 5.0)

All of this information will be used to help you set goals for managing the watershed.

In some cases we have included more sections than you need, so carefully consider if the section is not relevant to your watershed. For example, we may have included a section on dams and you have determined that there are no dams in the watershed.

To help prioritize and target your management efforts within the watershed, you will identify the critical areas where the pollutant sources are causing the most damage so that you will want to apply management measures in these areas first. This is often done using a map of the watershed and marking the areas that are most critical. Use this outline to work with the stakeholders to identify and rank the critical areas. Work with your team to develop criteria to rank the critical areas.

Step 3. Set Goals and Identify Solutions

You will set goals and identify solutions that will help to achieve those goals based on information you have collected from stakeholders as well as using the results of the watershed characterization. Once you have estimated the pollutant loads, you will first compare those numbers to any national or state standards that have been established. Use the links in the outline to help you locate the water quality standards (WQS) for your watershed. (Section 4.0) In addition to meeting WQS, you will provide any additional goals that have been identified by stakeholders. (Section 7.0)

For each goal you will work with your stakeholders to develop indicators or criteria that can be used to measure progress. These indicators will usually include a combination of water quality parameters as well as programmatic and social parameters. (Section 7.0)

There are various solutions that you will use to meet the goals outlined in your watershed plan. (Section 8.0) We have provided several different categories of management strategies that you might use. These strategies include both structural controls such as detention basins, as well as non-structural controls such as the development of ordinances or new zoning regulations. You will first identify what management strategies are currently being implemented in the watershed. Then you will work with your stakeholders to develop a combination of strategies that are both acceptable to the community as well as effective. Use the outline as a starting point to show you the various options from which to choose.

Step 4. Develop Implementation Program

The last step in developing a watershed management plan is to prepare the implementation program, incorporating all of the information from previous sections and outlining your road map for how to implement your program. Use the outline to identify what components should be included and to what level of detail. (Section 9.0) The implementation program will include several features such as the following:

1) A list of the management strategies to be implemented and milestones to track their implementation
2) A schedule for implementation
3) A list of technical and financial resources needed for implementation

4) A monitoring component to measure the indicators you developed

5) An information/education component, and

6) An evaluation framework for measuring progress and adapting your plan over time.

Once you have the watershed plan

Once you have used the outline to fill in the sections and prepared your watershed plan, you're ready for implementation. (Section 10) Remember, it doesn't have to be perfect. Watershed plans are intended to be living documents and you will continually make changes and improvements to your plan over time. The key is to move toward implementation to start improving and protecting our water resources. Good luck!

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Watershed Plan for:
Schoharie

Disclaimer: Based upon the information you have submitted, the system has generated suggested contacts, data sources, and analysis tools. Please keep in mind that these are only suggested sources of information and may not all be up-to-date. Make sure to contact local watershed planners and authorities for additional information.

Note: EPA's Handbook for Developing Watershed Plans to Restore and Protect Our Waters provides much of the information needed to develop a comprehensive watershed plan. You can click on the WATERSHED HANDBOOK icon at any time to get more information on a particular section when preparing your watershed plan.

1 Executive Summary

Provide a brief summary of the watershed plan that can be used separately as an outreach piece. Include the major highlights and results of the watershed planning process. Describe how citizens can get involved and provide contact information.

Example Plans	Description
Example of Executive Summary (PDF)	(160 KB, 5 pg) Corsica River Watershed Restoration Action Strategy
Example of an Executive Summary (PDF)	(52.2 KB, 2 pg) Millers Creek Watershed Improvement Plan

2 Introduction

Plan Drivers

Restore/protect Habitat - You selected Restore/Protect Habitat (including animal migration, forested lands and stream buffers) as a driver for developing a watershed plan. Habitat restoration and protection can be a vital component of a watershed's healthy ecosystem. Briefly describe how you hope this watershed plan will accomplish your habitat protection/restoration goals.

Satisfy Regulatory Requirements - You selected Satisfy Regulatory Requirements as one of the reasons why you are developing a watershed plan. There are several regulatory requirements that can be satisfied with a comprehensive watershed plan. Briefly describe the various regulatory requirements you hope to satisfy with the development of this watershed plan.

Prevent Degradation - You selected Prevent Degradation as one of the reasons why you are developing a watershed plan. Antidegradation policy and implementation procedures are established by state environmental organizations and EPA (if the state regulations do not meet the requirements of the Clean Water Act). Antidegradation requirements are established in section 303 of the Clean Water Act and are under the

jurisdiction of EPA. You may wish to involve representatives from your state environmental organization and regional representatives from EPAs Office of Water as you begin to build partnerships and develop your list of stakeholders to address any concerns you may have about antidegradation policy or implementation in your watershed.

Protect Drinking/Source Water - You selected Protect Drinking/Source Water as one of the reasons why you are developing a watershed plan. Briefly describe how this watershed plan will help to protect drinking water sources.

Information Sources	Description
Wetlands	Projects that Receive funds from section 319 program that achieve water quality improvements
State/Territorial Fish and Wildlife Offices	The US Fish and Wildlife Service works in partnership with many organizations and individuals. Fish and wildlife conservation requires coordinated efforts by the states and the territories, as well as private landowners, tribes, and other countries besides the Unites States.
EPA Region 2	EPA Region 2 home site where you can find contact information datasets, and most environmental regional information. This is a good starting point for data and resources.
EPA Region 2 Watershed Protection Home Page	Provides information about specific watershed protection efforts within Region 2.
EPA Region 2 Targeted Watershed Protection Grants	EPA Region 2 home site where you can find contact information datasets, and most environmental regional information. This is a good starting point for data and resources.

Contact Link	Description
EPA Region 2 Contact Links	EPA Region 2 contact us

Funding Sources	Description
TMDL Program Authority: Section 303 (d) of the CWA.	Funding is available through various sources such as sec. 319, Clean Water State Revolving Fund (CWSRF), sec. 106, Targeted Watershed Grants Program (for the non-regulatory components)
Nonpoint Source (NPS) Program Authority: Section 319 (h) of the CWA.	Section 319 annually provides funding to states and tribes. Funding may also be obtained through sec. 106, CWSRF, Targeted Watershed Grants Program
Dredged Material Management Program: Authority: Section 102 of the Marine Protection, Research and Sanctuaries Act and section 404 of the CWA.	Funding for the development of DMMPs is generally provided by the COE and States.
Stormwater Phase II Program. Authority: Section 402 of the CWA	Funding can be obtained through CWSRF, sec. 106, 104(b)3 grants,
National Estuary Program (NEP). Authority: Section 320 of the CWA, Estuaries and Clean Waters Act of 2000	EPA Regional Offices distribute funds to each NEP (recipients include state agencies, universities, county and local governments and planning agencies, and nonprofits). Funding for implementation activities may be obtained through CWSRF, sec. 319, sec. 106,
Coastal Nonpoint Pollution Control Program. Authority: Section 6217 CZARA of the Coastal Zone Management Act. Program administered jointly with NOAA.	Section 319 funding is available for program development and implementation. Section 6217 funding is only available for the development of CZARA programs.
Source Water Assessment and Protection Program (SWAP). Authority: Section 1453 of the Safe Drinking Water Act	Up to 15 percent of a state's Drinking Water State Revolving Fund (DWSRF) money may be set aside for loans to provide funding to implement incentive-based source water protection measures and to acquire land or easements to protect source waters. Funding is also available through Clean Water Act Section 106 and Section 319.
Wetlands Program. Authority: Section 404 of the CWA regulates dredged and fill activities, Section 401 of the CWA.	Specific funding is available through Wetland Program Development Grants and the Five Star Restoration Program. Additional funding may be obtained through sec. 319, CWSRF, sec. 104(b)3, Targeted Watershed Grants Program, and near coastal waters initiatives. CZMA Section 309 funds can support the development of SAMPs in coastal areas.
EPA Region 2 Grants and Funding Page	EPA Region 2 home site where you can find contact information datasets, and most environmental regional information. This is a good starting point for data and resources.
Targeted Watersheds Grants Program	The Targeted Watersheds Grant Program (TWG) promotes successful community-based approaches and management techniques to protect and restore the nation's waters. The program is an integral approach to the Agency's watershed approach to clean water by providing assistance to watershed groups and service provider organizations working to protect and restore watersheds valued for fishing, swimming, drinking and other important uses.
EPA Region Grants & Financial Information	Find the Grant Regional Office Near You Grants and Debarment
Office of Water Funding and Grants	Links to Office of Water various grants and funding pages.
Catalog of Federal Funding Sources for Watershed Protection	EPA's Office of Water published this catalog to provide information to State/local water resource professionals and watershed groups on Federal monies that might be available to fund a variety of watershed protection projects

Databases/Datasets	Description
EPA Region 2 - Watershed Data	Web site provides access to comprehensive environmental information about watersheds across the nation.

2.1 Document Overview

Provide a brief background and purpose for this document. Explain what it is and what it will be used to do. Introduce the sections and briefly describe what is discussed under each heading. Discuss the history of the current planning effort, major issues that have led to the planning initiative, etc.

Example Plans	Description
Example of a Watershed Plan Introduction (PDF)	(141 KB, 3 pg) Corsica River Watershed Restoration Action Strategy

2.2 Watershed Management Plan Purpose and Process Used

Describe the process used to develop the watershed plan. Explain how community input was solicited. Describe the frequency with which meetings were/are held, participants, agencies involved, and stakeholder groups. Include the overall mission in developing this management plan along with any regulatory drivers and government issues. List the working groups established. Include a list or lists of members who make up any working groups.

Information Sources	Description
USACE - Operations and Regulatory Gateway	USACE - Operations and Regulatory Gateway
USACE - Division and District Offices	USACE - Division and District Offices
USACE Dredging Operations and Environmental Research	USACE - Dredging Operations and Environmental Research

Example Plans	Description
Example of Introductory Information (PDF)	(164 KB, 4 pg) Corsica River Watershed Characterization
Example of a Management Plan Purpose and Process Summary (PDF)	(3.20 MB, 26 pg) Millers Creek Watershed Improvement Plan

2.2.1 Watershed Management Team

Watershed planning process is a collaborative and participatory process. Describe the watershed management team and their roles and responsibilities. Provide an organizational structure.

Plan Drivers

Restore/protect Habitat - You selected Restore/Protect Habitat (including animal migration, forested lands and stream buffers) as a driver for developing a watershed plan. Consider including state and local wildlife protection and forest agencies, organizations such as Trout Unlumited and the Audubon Society, and local planning commissions on your planning team.

Information Sources	Description
Ecosystem Restoration and Management	The U.S. Army Corps of Engineers is required to evaluate and mitigate the environmental impacts of Corps water resource development activities at the ecosystem level. Ecosystems that are of particular concern to the Corps are streams, riparian corridors, wetlands, and special aquatic sites. The Corps has developed the following programs in response to the demand for new and expanding technologies to address the need for ecosystem assessment, restoration, and stewardship of high priority ecosystems

Example Plans	Description
Example of How to Document the Watershed Management Team (PDF)	(64 KB, 4 pg) Millers Creek Watershed Improvement Plan

Databases/Datasets	Description
US Fish and Wildlife Service Offices in New York	US Fish and Wildlife Service Offices in New York
New York Division of Fish, Wildlife, and Marine Resources	New York Division of Fish, Wildlife, and Marine Resources
New York Department of Environmental Conservation	New York Department of Environmental Conservation

2.2.2 Public Participation

Describe the process used to solicit input from the community on the development of the watershed plan. Include key meetings held and results.

Contact Link	Description
Watershed Groups in (Not Categorized)	Contact list of watershed groups in your state organized by county
Watershed Groups in New York	Contact list of watershed groups in your state organized by county
Environmental Protection Agency - Adopt Your Watershed Groups by State	Adopt Your Watershed - Group entry form for the national catalog of organizations involved in protecting local water bodies

Example Plans	Description
Example of Information Related to Public Participation and Stakeholder Involvement (PDF)	(129 KB, 4 pg) Corsica River Watershed Restoration Action Strategy

Databases/Datasets	Description
Contamination and pollution	Introduction of harmful substances into the environment by human action or natural processes. Provides links to USGS information about contamination and pollution and related topics. Provides a topical browse interface into USGS information utilizing controlled vocabularies arranged as formal thesauri.

3 Watershed Description

Provide a comprehensive description of the watershed including the physical, political, and environmental setting. Links provided should help you to locate basic data sources that can be used to characterize your watershed. Previous Studies and Existing Plans : Work with your partners to identify what studies have already been conducted in the watershed. This information can be used to help populate Sections 3, 4, and 5. Provide a list of these studies and any existing plans in which information or data were used to help develop the watershed plan. These studies can be referenced in the appendix of the document. A listing of possible documents to draw from can be found at url:xxxxxx

Below is a map of your selected watershed area. Click on the image to use an interactive map (Note save your document before clicking on the image).

Plan Drivers

Restore/protect Habitat - You selected Restore/Protect Habitat (including animal migration, forested lands and stream buffers) as a driver for developing a watershed plan. As you develop this section identify the major types of habitat such as wetlands, sensitive areas, and migratory pathways. Document major wildlife species, including any threatened and endangered species.

Information Sources	Description
Drinking Water Protection	Links to useful EPA site on Drinking Water Protection

Example Plans	Description
Example of Information Related to the Watershed Management Plan Purpose and Process Used Section (PDF)	(110 KB, 3 pg) Corsica River Watershed Restoration Action Strategy
Example of Watershed Description Information (PDF)	(1.45 MB, 6 pg) Millers Creek Watershed Improvement Plan

Databases/Datasets	Description
GeoCommunity GIS Data Depot	Large Dataset repository of GIS data throughout the entire country; contains flood plain data, EPA data, and USGS data. The GIS Data Depot provides FREE GIS data downloads and creates custom GIS data CD-ROMs for CAD, mapping, and location based applications.
NRCS Geospatial Data Gateway	The Geospatial Data Gateway provides One Stop Shopping for natural resources or environmental data at anytime, from anywhere, to anyone. The Gateway allows you to choose your area of interest, browse and select data from our catalog, customize the format, and have it downloaded or shipped on CD.
Surf Your Watershed - New YorkResources	USEPA tool that provides links and resources for the state of New York

3.1 Physical and Natural Features

Example Plans	Description
Example of Documentation Regarding Watershed Physical and Natural Features (PDF)	(3.85 MB, 4 pg) Millers Creek Watershed Improvement Plan

Databases/Datasets	Description
Census 2000/TIGER Line	Census 2000 TIGER/Line shapefile download, contain line features, boundary features, landmark features of each state
Digital Raster Graphics	A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey (USGS) standard series topographic map, including all map collar information. The image inside the map neatline is georeferenced to the surface of the earth and fit to the Universal Transverse Mercator projection. The horizontal positional accuracy and datum of the DRG matches the accuracy and datum of the source map. The map is scanned at a minimum resolution of 250 dots per inch.
Seamless Data Distribution System, Earth Resources Observation and Science (EROS)	Free data downloads, acquire data from different hosts. Where you can get seamless data, NED, SRTM,NHD/RAD, NLCD, Landsat, elevation, maps, orthoimagery, data delivery, web services, homeland security and much more.
USDA Digital Orthophoto Quadrangle Data	The National Cartography & Geospatial Center (NCGC) is active in providing technical assistance and digital elevation data resources to NRCS staff and partners. NRCS is a member agency of the National Digital Elevation Program. The National Digital Elevation Program (NDEP) is a multi-agency federal partnership chaired by USGS to expedite the collection and availability of elevation data.

3.1.1 Watershed Boundaries

Watershed boundaries are defined by topographic divides and delineate areas where surface-water runoff drains into a common surface-water body, such as a lake or section of a stream. Watersheds may be identified at many

different scales. Many smaller watersheds (also referred to as subbasins) can be identified within this large watershed. Each of those smaller watersheds can again be subdivided into smaller subbasins. The level of watershed delineation depends on the purpose. Watershed boundaries are selected on the basis of topographic information. Discuss the individual sub-basins of your watershed (if applicable). Include maps of surface (and groundwater if applicable) resources such as tributaries, receiving waters, wetlands etc. You can obtain information on watershed boundaries from federal and state websites.

Information Sources	Description
NWHI Activities	NWHI Activities, Information on the Northwest Wildlife, Funding
USGS Local Offices for Water Resources	Water Resources of the United States. Water is essential for life. USGS operates in every State; the Water Resources mission is to provide water information that benefits the Nation's citizens: publications, data, maps, and applications software. The USGS manages water information at offices located throughout the United States. Although all offices are tied together through a Nation-wide computer network, each collects data and conducts studies in a particular area. Local information is best found at sites listed below. If you can't find the information you want at one site, we recommend checking neighboring sites, as study areas sometimes overlap. Additional information also can be found under National Programs or Headquarters and Regional Offices.

Example Plans	Description
Example of How to Document Watershed Boundaries (PDF)	(1.98 MB, 5 pg) Corsica River Watershed Restoration Action Strategy
Example of How to Document Watershed Location and Position (PDF)	(148 KB, 3 pg) Corsica River Watershed Characterization

Databases/Datasets	Description
USDA Watershed Boundary Dataset	Watershed boundaries define the aerial extent of surface water drainage to a point. The intent of defining hydrologic units (HU) for the Watershed Boundary Dataset is to establish a base-line drainage boundary framework, accounting for all land and surface areas. The selection and delineation of hydrologic boundaries are determined solely upon science-based hydrologic principles, not favoring any administrative or special projects nor particular program or agency. At a minimum, they are being delineated and georeferenced to the USGS 1:24,000 scale topographic base map meeting National Map Accuracy Standards (NMAS). A hydrologic unit has a single flow outlet except in coastal or lakefront areas.

3.1.2 Hydrology

Describe the overall hydrology in the watershed. Information on the hydrology of your watershed is necessary to visualize and document the waterbody network, including the locations of all the water bodies and how they are connected to one another. Not only is this information important for characterizing your watershed and evaluating sources and waterbody conditions, it is also necessary input when modeling the watershed. GIS coverages with attribute tables containing information about stream connectivity and geometric characteristics (width, depth, slope, length, etc.) are available for the entire United States (NHD Flow data).

Example Plans	Description
Example of Hydrology Documentation (PDF)	(373 KB, 5 pg) Millers Creek Watershed Improvement Plan

Databases/Datasets	Description
National Hydrography Dataset	The National Hydrography Dataset is now available in a new database design that allows better web-based access and query, as well as truly seamless data that can be downloaded in various extents. The new database design provides a distribution format called NHDinGEO. Data requests in NHDinGEO can be extracted by subbasin, county, congressional district or by topographic map quad. Data can be extracted in blocks encompassing several adjacent reference areas. Data are also available in a modified form of the traditional NHDinARC model called NHDGEOinARC. Data requests in NHDGEOinARC are only available by individual subbasins. An upgrade to the NHD ArcView 3.x Toolkit, which is compatible with the NHDGEOinARC format, is now available.
USGS Real-Time Water Data for the Nation	Real-time data typically are recorded at 15-60 minute intervals, stored onsite, and then transmitted to USGS offices every 1 to 4 hours, depending on the data relay technique used.

3.1.3 Climate/Precipitation

Provide current and historic climate data for your watershed. Climate data provides information that is critical in evaluating the hydrology of an area. Information about temperature, rainfall, snowfall, and evapotranspiration, is used to simulate rainfall-runoff processes in watershed models. Local climatological data helps one to better understand the local water budget for the region and also helps for modeling purposes.

Information Sources	Description
NOAA National Weather Services	The starting point for the Climate Prediction Center, the home of the official U.S. climate outlooks.
USDA NRCS National Water and Climate Center	National Water and Climate Center

Example Plans	Description
Example of Climate Documentation (PDF)	(36.7 KB, 2 pg) Millers Creek Watershed Improvement Plan

Databases/Datasets	Description
USDA US Climate Mapping	The NRCS climate mapping web site provides spatial climate products (digital maps) including mean monthly and annual precipitation coverages, organized by states, regions, and the continental U.S. These products were developed through a partnership between the NRCS' National Water and Climate Center (NWCC), the National Cartography and Geospatial Center (NCGC), and the PRISM Group at Oregon State University (OSU), developers of PRISM (the Parameter-elevation Regressions on Independent Slopes Model).
Get/View Online Climate Data	NCDC is the world's largest active archive of weather data. NCDC produces numerous climate publications and responds to data requests from all over the world.
NOAA Locate Weather Observation Station Record	determine weather stations for climate conditions

3.1.4 Surface Water Resources

Identify all surface water features in the watershed. Surface water includes all water that is naturally open to the atmosphere, such as lakes, rivers, seas and reservoirs. In addition to being an important source of drinking water and recreation, these waters are also vital parts of local and regional ecosystems. Surface water pollution can result from a number of sources, including dredging, stormwater runoff, ocean dumping and industrial wastewater discharges. Your state Department of Environmental Quality can provide useful information on surface water, data inventory, maps and related issues.

Information Sources	Description
Surface Water	Surface water is all water that is naturally open to the atmosphere, such as lakes, rivers, seas and reservoirs. In addition to being an important source of drinking water and recreation, these waters are also vital parts of local and regional ecosystems. Surface water pollution can result from a number of sources, including dredging, stormwater runoff, ocean dumping and industrial wastewater discharges. Under the Clean Water Act, the EPA sets and enforces total maximum daily loads for pollutants in assessed water bodies. The Agency also regulates dredging activities and ocean dumping sites and issues permits for stormwater sources.

Databases/Datasets	Description
USGS Office of Surface Water	The Office of Surface Water provides national leadership and technical support in the science of surface-water hydrology, hydraulics, and fluvial geomorphology and ensures the consistency and quality of these activities in the USGS.

3.1.5 Groundwater Resources

Describe the ground water resources in the watershed. Ground water replenishes streams and rivers as well as provides fresh water for irrigation, industry, and communities. For many Americans, ground water is also the primary source of drinking water. Information on groundwater can be critical because ground water is highly susceptible to contamination from septic tanks, agricultural runoff, highway de-icing, landfills, and pipe leaks.

Information Sources	Description
Ground water	Ground water is an important resource in our environment. It replenishes our streams, rivers, habitats and also provides fresh water for irrigation, industry, and communities. For many Americans, ground water is also the primary source of drinking water. However, ground water is highly susceptible to contamination from septic tanks, agricultural runoff, highway de-icing, landfills, and pipe leaks. EPA protects ground water supply from pollutants in a number of ways. The Agency sets and enforces water standards, offers guidance to private well users, regulates the storage, transportation, treatment, and disposal of solid and hazardous wastes which may infiltrate groundwater systems and offers resources and expertise to facilitate the rehabilitation of contaminated ground water sources.

Databases/Datasets	Description
USGS Groundwater Data for the Nation	Groundwater Data for Every State in the Country
USGS Ground Water Information Pages	These pages are designed to provide useful information about ground-water resources of the Nation and ground-water activities of the USGS.

3.1.6 Flood Plains

Identify designated floodplain areas. This information is important o address flooding and control water quality. The Federal Emergency Management Agency (FEMA) requires municipalities to perform floodplain mapping and develop management plans to receive federal flood insurance. This information is also relevant to water quality protection and restoration activities because floodplains, when inundated, serve many functions and provide important habitats for a variety of fish and wildlife. Floodplains are important for spawning and rearing areas. Floodplain wetlands act as nutrient and sediment sinks, which can improve water quality in streams. They also provide an area for water storage; helping to decrease the magnitude of floods downstream, which can benefit fish and riparian landowners. Therefore, it is important to incorporate protection of these benefits of floodplain areas into watershed management planning.

Databases/Datasets	Description
Federal Emergency Management Agency Flood Data	flood plain data

3.1.7 Navigation Channels, Ports and Harbors

Describe the location of all navigation channels, ports and harbors in the watershed. Information on the locations of these channels, ports and harbors can help to understand sources and activities in these areas that may result in contaminated sediment, habitat degradation, storm water runoff, oil spills, and potential introduction of non-native species.

3.1.8 Dams

Identify any dams in the watershed. Dams can change the stream flow pattern, create barrier to migration of fish and other aquatic fauna, and increase concentration of some toxic chemicals. Visit websites of US ACE, US Department of Interior- Bureau of Reclamation, and some universities for data, maps and general information on dams.

Information Sources	Description
US Army Corps of Engineers	Information about the projects and activities regarding watershed in general and channels, ports, and harbors

Databases/Datasets	Description
Physical Oceanographic Real-Time System (PORTS®)	The National Ocean Service (NOS) is responsible for providing real-time oceanographic data and other navigation products to promote safe and efficient navigation within U.S. waters.

3.1.9 Topography/Elevation

Include a topographic map of the watershed. Characterizing the topography or natural features of the watershed can help determine possible sources of pollution. Topographical information is also needed in many watershed models to route movement of runoff and loading across the land and to the waterbody. Topography and elevation data are also used to determine susceptibility to erosion and runoff related problems. Paper copies of U.S. Geological Survey Quadrangle maps are available from USGS. Digital images of USGS quads are also available for use in GIS systems.

Example Plans	Description
Example of Surface Features (PDF)	(123 KB, 2 pg) Corsica River Watershed Characterization
Example of How to Document Watershed Topography and Elevation (PDF)	(1.28 MB, 4 pg) Millers Creek Watershed Improvement Plan

Databases/Datasets	Description
Major Dams of the United States	The National Inventory of Dams (NID) is a collection of information about dams in the United States and its territories, produced by the U.S. Army Corps of Engineers (USACE).
National Inventory of Dams	U.S. Army Topographic Engineering Center National Inventory of Dams
Dams and Reservoirs	Maps of dams and reservoirs at state scale

3.1.10 Geology and Soils

Describe the soil types that dominate the watershed. Soils can be an important factor in determining the amount of erosion and stormwater runoff that occurs in your watershed. Understanding the types of soils in your watershed and their characteristics helps to identify areas that are prone to erosion or areas more likely to experience runoff.

Example Plans	Description
Example of Characterizing Soils of a Watershed (PDF)	(165 KB, 3 pg) Corsica River Watershed Characterization
Example of How to Document Watershed Geology and Soils (PDF)	(1.28 MB, 4 pg) Millers Creek Watershed Improvement Plan

Databases/Datasets	Description
USDA Soil Survey Geographic Database	The Natural Resources Conservation Service (NRCS) - National Cartography and Geospatial Center (NCGC) previously archived and distributed the Soil Survey Geographic (SSURGO) Database. Only file downloads were available from this site. This limited the amount of soil survey information that could be accessed. The NRCS NCGC also supplied SSURGO data to the United States Department of Agriculture - Service Center Agencies (Farm Service Agency, Natural Resources Conservation Service, and Rural Development) Geospatial Data Gateway.
Soil Data Mart	USDA-NRCS Soil Data Mart State page is the starting place for navigating the Soil Data Mart. It allows the user to select a state or territory which contains the data that they are interested in.
USDA State Soil Geographic (STATSGO) Database	The Natural Resources Conservation Service (NRCS) - National Cartography and Geospatial Center (NCGC) previously archived and distributed the State Soil Geographic (STATSGO) Database. The STATSGO spatial and tabular data have been revised and updated. STATSGO has been renamed to the U.S. General Soil Map (STATSGO). It is available for download from the Soil Data Mart.
Earth Resources Observation and Science	Digital Line Graphs (DLGs) are digital vector representations of cartographic information derived from USGS maps and related sources.

3.1.11 Vegetation

Identify the vegetation in your watershed. Familiarity with the types, quantity, and location of vegetative species throughout your watershed will help better determine what management practices should be used and where to use them. USDA can provide both qualitative and quantitative information on vegetation within your watershed. Note that wetlands are included in section 3.2.2 as a land cover but can also be discussed here.

Databases/Datasets	Description
Earth Resources Observation and Science	Digital Line Graphs (DLGs) are digital vector representations of cartographic information derived from USGS maps and related sources.
USGS GAP Projects Organized by State	GAP is organized on a project basis. Most states have conducted an analysis of their own landcover and vertebrate biodiversity. Regional mapping projects have begun, as have some aquatic projects. These pages provide content detailing the status of projects, as well as links to project contacts, products, and home pages. Click on a state to see a list of all the data available for that state, including land cover, stewardship, and vertebrate distribution data, and the state's final GAP report.

3.1.12 Exotic/Invasive Species

Describe any exotic or invasive species in the watershed. Exotic species can have many negative impacts on the environment, the economy, and human health. When species are introduced into an area, they may cause increased predation and competition, disease, habitat destruction, genetic stock alterations, and even extinction. A leading cause of biodiversity loss in many aquatic ecosystems is the introduction of exotic species.

Information Sources	Description
Exotic Species	Exotic Species. A leading cause of biodiversity loss in many aquatic ecosystems is the introduction of exotic species. Watershed Academy Web: Invasive Non - Native Species. Information regarding invasive non - native species. Mid Atlantic Integrated Assessment: Introduced Species Discusses various species that have entered the ecosystem which are not native to North America.

Databases/Datasets	Description
U.S. Fish and Wildlife Service: GIS/Mapping Vegetation Standard	The usefulness of a standard method for classifying and mapping vegetation has been apparent to natural resource agencies for some time. The problem has been to agree on a standard in as diverse an area as vegetation in the United States. The National Wetland Inventory maps form the wetland vegetation standard, and have been a model for a terrestrial standard. The classification is performed in layers; both land forms and vegetation are used.
USDA National Invasive Species Information Center State Resources	National Invasive Species Information Center (NISIC): gateway to invasive species information; covering Federal, State, local, and international sources.Click on a state to view information for your area.
Vegetation Condition from AVHRR NDVI data	Vegetation Condition from AVHRR NDVI data

3.1.13 Wildlife

Identify the major wildlife that lives in the watershed. Identifying the types of wildlife in your watershed can help to identify areas for protection in the watershed plan. Be sure to consider information that might be provided in previous studies. In addition, local and state fish and wildlife offices can provide you with information on wildlife species and distribution in their jurisdictions. It¿s especially important to consider wildlife habitat in your watershed plan when endangered or threatened species occur in your watershed. Understanding the types of wildlife in your watershed can not only identify critical habitat areas to protect but sometimes also identify pollutant sources affecting water quality.

Example Plans	Description
Example of How to Characterize Species Populations (PDF)	(201 KB, 2 pg) Corsica River Watershed Restoration Action Strategy

Databases/Datasets	Description
USGS GAP Projects Organized by State	GAP is organized on a project basis. Most states have conducted an analysis of their own landcover and vertebrate biodiversity. Regional mapping projects have begun, as have some aquatic projects. These pages provide content detailing the status of projects, as well as links to project contacts, products, and home pages. Click on a state to see a list of all the data available for that state, including land cover, stewardship, and vertebrate distribution data, and the state's final GAP report.

3.1.14 Protected Species

Identify any threatened or endangered species within the watershed. Under the Endangered Species Act of 1973, Congress provided for the conservation of endangered species and their habitats. Information on endangered species together with other biological data reveals disturbances and impacts on the waterbody. This information can be obtained through federal and state agencies, such as USEPA, USDA, USFWS, the National Park Service, and state fish and wildlife departments. If your watershed is located near the marine ecosystems, the Office of Protect Species NOAA Fisheries can provide you with information on protected marine species. Refer to Endangered Species Act for list of species and related information on protection, conservation of these species.

Information Sources	Description
Species	A healthy diversity of plant and animal species is essential to the nation's environment. In addition to its varied native species, the United States is home to many other introduced species. The relationship between plant and animal species and the ecosystems in which they exist is fundamental. Understanding and protecting this relationship from the effects of pollution is an important part of the EPA's mission as is the protection of the nation's endangered species.
Wildlife	Wildlife
NOAA Protected Species Branch	Marine protected species, Endangered Species Act and other programs, activitites and publication
NOAA Office of Protected Resources	Welcome to the Office of Protected Resources Protecting the nation's marine life. NOAA Fisheries' Office of Protected Resources is the lead Federal office in protecting marine mammals and endangered marine life.

Example Plans	Description
Example of How to Document Protected Species (PDF)	(200 KB, 3 pg) Corsica River Watershed Characterization

Databases/Datasets	Description
USGS GAP Projects Organized by State	GAP is organized on a project basis. Most states have conducted an analysis of their own landcover and vertebrate biodiversity. Regional mapping projects have begun, as have some aquatic projects. These pages provide content detailing the status of projects, as well as links to project contacts, products, and home pages. Click on a state to see a list of all the data available for that state, including land cover, stewardship, and vertebrate distribution data, and the state's final GAP report.

3.1.15 Sensitive Areas

Describe any sensitive areas within the watershed. Sensitive areas offer critical or unique fish and wildlife habitat, including seasonal or lifestage requirements, or offer water quality or erosion control benefits to the body of water. Information on sensitive areas is important when setting up goals and objectives during the planning process. Protecting these areas is often targeted under watershed management plan.

Information Sources	Description
Pipeline and Hazardous Material Safety Administration	The Pipeline and Hazardous Materials Safety Administration (PHMSA) of the Department of Transportation is required to identify areas unusually sensitive to environmental damage in the event of a hazardous liquid pipeline accident, in accordance with pipeline safety laws (49 U.S.C. Section 60109).

Contact Link	Description
Wildlife Habitat	Wildlife Habitat

Handbooks	Description
U. S. Fish and Wildlife Service Endangered Species Listing Program	Through the Listing Program, the Service determines whether to add a species to the Federal lists of endangered and threatened wildlife and plants. Once listed, a species is afforded the full range of protections available under the Endangered Species Act, including prohibitions on killing, harming or otherwise "taking" a species. In some instances, species listing can be avoided by the development of Candidate Conservation Agreements which may remove threats facing the candidate species.

Databases/Datasets	Description
Wildlife Habitat	Wildlife Habitat

3.1.16 Cultural Resources

Describe any cultural resources within the watershed. These resources include archaeological sites, historic buildings and structures, landscapes, and objects

Information Sources	Description
NR GIS Metadata and Data Store Homepage	NR GIS Metadata and Data Store Homepage
NPS Home Page	Culture National Park Service: Preservation
NPS GIS Data	The Intermountain Geographic Resource Information Management Team strives to support the National Park Service mission in a resourceful and creative manner. To effectively represent the Intermountain Region parks GIS issues and needs, providing GIS develo"

Databases/Datasets	Description
US Census Bureau	Detailed information about the TIGER/Line File, Overview, Technical Documentation, sample files, Cartographic Boundary files and other products based on the TIGER/Line files, with links to ordering information.

3.2 Land Use and Land Cover

Describe the major land uses and land covers in the watershed. It is helpful to display this information in a pie chart. Evaluating the land uses of a watershed is an important step in understanding the watershed conditions and source dynamics. Land use types (together with other physical features such as soils and topography) influence the hydrologic and physical nature of the watershed. In addition, land use distribution is often related to activities in the watershed that impact water quality; therefore, land use distribution can help to identify pollutant stressors and sources.

Example Plans	Description
Example of Land Use/Land Cover Documentation (PDF)	(448 KB, 3 pg) Corsica River Watershed Restoration Action Strategy
Example of Land Use/Land Cover Information (PDF)	(477 KB, 8 pg) Corsica River Watershed Characterization
Example of How to Document Land Use Information (PDF)	(6.16 MB, 11 pg) Millers Creek Watershed Improvement Plan

Databases/Datasets	Description
Land use and land cover	The vegetation, water, natural surface, and cultural features on the land surface. Provides links to USGS information about land use and land cover and related topics. Provides a topical browse interface into USGS information utilizing controlled vocabularies arranged as formal thesauri.
Natural resources	Stocks of anything naturally occurring that have a beneficial use for man including economic, nutritional, recreational, aesthetic, and other benefits.
Water resources	Stocks of water, the liquid derived from precipitation. A constituent of living matter and necessity for all life, it covers a large proportion of the earth's surface.
MRLC Consortium Data Viewer	MRLC Consortium provides an dynamic online map interface that can be used to view USGS datasets.
Multi-Resolution Land Characteristics Consortium	The Multi-Resolution Land Characteristics (MRLC) Consortium is a group of federal agencies who first joined together in 1993 (MRLC 1992) to purchase Landsat 5 imagery for the conterminous U.S. and to develop a land cover dataset called the National Land C
Maps, Data, Reports for Gap Analysis	These pages provide access to all GAP data and reports. You can read project Final Reports online, or download them. You can also view or download all GAP data by state, by theme, or by vertebrate species.
National Resources Inventory	A statistical survey of land use and natural resource conditions and trends on U.S. non-Federal lands.
USGS Geographic Data Download	USGS Geographic Data Download. The National Elevation Dataset (NED) 1 Arc Second is a raster product assembled by the U.S. Geological Survey (USGS). 1:250,000 & 1:100,000 Scale Land Use Land Cover (LULC). National Hydrography Dataset (NHD) for streams and delination.

3.2.1 Open Space

Describe the location and extent of open space in the watershed. Open space includes natural areas, wildlife and native plant habitat, important wetland or watershed lands, stream corridors, passive or low-impact activities, little or no land disturbance, and/or trails for non-motorized activities. Description of open space can help to characterize your watershed. You can obtain information and data on open space through several government websites. Your state's and city's websites can also be useful resources.

3.2.2 Wetlands

Describe the location and extent of wetland areas in the watershed. Identifying wetlands is crucial to protecting natural habitats in your watershed. The National Wetlands Inventory (NWI) is operated by the U.S. Fish and Wildlife Service (USFWS) and provides information on the characteristics, extent, and status of the nation¿s wetlands, as well as deepwater habitats and other wildlife habitats. The NWI includes a Wetlands Mapper feature that allows you to map wetlands habitat data. US EPA and ACE are other useful sources of wetland data as well as wetland projects and links to other resources.

Information Sources	Description
National Estuary Program	Each National Estuary Program was charged with creating and implementing a Comprehensive Conservation and Management Plan (CCMP) that addresses all aspects of environmental protection for the estuary, including issues such as water quality, habitat, living resources, and land use. The CCMP is based on a scientific characterization of the estuary, and is developed and approved by a broad-based coalition of stakeholders. The CCMP establishes priorities for action, research, and funding, and serves as a blueprint to guide future decisions and activities related to the estuary.
California Wetlands Information System	Comprehensive wetlands information to the general public, the educational community, and government agencies

Example Plans	Description
Example of Wetland Documentation (PDF)	(223 KB, 4 pg) Corsica River Watershed Characterization

Databases/Datasets	Description
USGS NWI Wetland Digital Data	Build, search, query, and download digital maps in the area you choose using the Online Wetland Mappers. Download Seamless NWI Wetlands Data. By using the new Wetlands Data Extraction Tool you can download current seamless wetlands data as viewed on the Wetlands Mapper.The Wetlands Data Extraction Tool uses the USGS topographic quadrangle names for area selection and extraction. If you are unfamiliar with the name of the quadrangle you wish to download you can use the Wetlands Mapper to zoom to your area of interest and view the quadrangle names.

3.2.3 Forested Areas

Describe the location and extent of forested areas within the watershed.

Information Sources	Description
Forest	Links to useful EPA site on Technical Documents, Forestry Guideline and Other Information

Databases/Datasets	Description
USDA FS Region 2 Home Page	USDA FS Region 2 Home Page
USDA Forest Service geospatial data clearinghouse	The FSGeodata Clearinghouse provides searching, viewing and downloading of geospatial datasets and metadata created and maintained by the USDA Forest Service over lands of the National Forest System. Access to datasets is provided through a user-driven ge

3.2.4 Agricultural Lands

Describe the type and extent of agricultural lands within the watershed. These types of lands include farms, orchards, and ranches. Agricultural practices can have important role in your watershed especially in rural areas.

Databases/Datasets	Description
2002 Census of Agriculture	USDA National Agricultural Statistics Service Information. NASS publications cover a wide range of subjects, from traditional crops, such as corn and wheat, to specialties, such as mushrooms and flowers; from calves born to hogs slaughtered; from agricult

3.2.5 Mining

Describe the location and extent of mining activities within the watershed. This includes hard rock mining as well as gravel mining from streambeds. Environmental issues related to mining activities can include erosion, formation of sinkholes, loss of biodiversity, and contamination of groundwater by chemicals from the mining process and products.

3.2.6 Fisheries

Describe the commercial fisheries within the watershed. Information on fishery programs and conservation activities can be found at several federal websites such as US FWS or NOAA.

Information Sources	Description
NOAA Fisheries Service	NOAA's National Marine Fisheries Service (NOAA Fisheries Service). NOAA Fisheries Service is dedicated to the stewardship of living marine resources through science-based conservation and management, and the promotion of healthy ecosystems.
U.S. Fish and Wildlife Service, Fisheries and Habitat Conservation Program	America¿s fish and other aquatic resources are among the world¿s richest, they help the Nation grow by providing enormous social, economic, and ecological benefits. The Service¿s Fisheries Program has played a vital role in conserving America¿s fisheries since 1871, and today is a key partner with States, Tribes, Federal agencies, other Service programs, and private interests in a larger effort to conserve fish and other aquatic resources.

Databases/Datasets	Description
Fishery resources	The stock of anadromous, marine, and freshwater fish in fishing areas of commercial, subsistence, and recreational value.
Overfishing	Taking too many fish from an area beyond the capacity for the population to replenish its numbers. The balance of the ecosystem is upset, leading to long-term depletion of fish stock.

3.2.7 Recreation

Describe the major recreational uses in the watershed. Information on recreational land use can help to identify pollutants and their sources from recreational activities.

Information Sources	Description
Federal Recreation	Recreation.gov is your One Stop source for recreation information on public lands.

Handbooks	Description
Recreation Use of Land in the United States	Recreation Use of Land in the United States

Databases/Datasets	Description
Recreational Risk Assessment	Recreational Risk Assessment. Under recreational land use, individuals are assumed to be exposed to contaminated media while playing, fishing, hunting, hiking, or engaging in other outdoor activities. This use also includes what is often described as a "trespasser" or "site visitor" scenario in some risk assessments.
Recreation	Provides links to USGS information about recreation and related topics. Provides a topical browse interface into USGS information utilizing controlled vocabularies arranged as formal thesauri.

3.2.8 Developed Areas

Describe the location and extent of developed areas. This is often presented as percent impervious surface area. The total coverage by impervious surfaces in a watershed is usually expressed as a percentage of the total land area.

Information Sources	Description
Urban Ecosystems	Links to useful EPA site on Urban Ecosystems

Databases/Datasets	Description
Impervious Surface Analysis Tool	The Impervious Surface Analysis Tool (ISAT) is used to calculate the percentage of impervious surface area of user-selected geographic areas
Human impacts	The effects, intentional or unintentional, beneficial or harmful, direct or indirect, which human activities have upon the environment and living things.Provides links to USGS information about human impacts and related topics. Provides a topical browse interface into USGS information utilizing controlled vocabularies arranged as formal thesauri.

3.2.9 Transportation

Describe the major transportation corridors within the watershed. List major transportation uses that take place within a watershed to assess which usage could be a major source of pollution. Check to see if you community has prepared a transportation master plan.

Information Sources	Description
Federal Lands Highway Division	General information, programs related to constructing federal lands highway through reserves, Indian lands and others.The Federal Highway Administration is responsible for ensuring the safety, efficiency, and economy of the Nation's highway transportation system. The Federal Highway Administration oversees all phases of highway policy, planning, research, design, operations, construction, and maintenance. There are two principal programs that accomplish this vital task.The Federal Aid Highway Program offices, in cooperation with the State Departments of Transportation, administer the nation's comprehensive highway system.

Example Plans	Description
Example of What to Include in the Transportation Characterization Section (PDF)	(446 KB, 2 pg) Corsica River Watershed Restoration Action Strategy

Databases/Datasets	Description
Earth Resources Observation and Science	Digital Line Graphs (DLGs) are digital vector representations of cartographic information derived from USGS maps and related sources.

3.2.10 Political Boundaries

Delineate the various political boundaries within the watershed. Many watersheds include lands with multiple ownership such as private citizens, federal, state, and county government agencies. It is important to accurately record the various jurisdictions since it will affect what stakeholders are involved in the process and what authorities may need to be consulted when implementing the management practices. You can obtain this information from USGS, nationalatlas.gov and other federal and state websites.

Information Sources	Description
North American Atlas	North American Atlas Political Boundaries

Databases/Datasets	Description
Administrative and Political Boundaries	Administrative and Political Boundaries

3.2.10.1 Federal Lands

Federal lands are lands in the United States for which ownership is claimed by the U.S. Federal Government. Federally-owned and managed public lands include National Parks, National Forests, National Wildlife Refuges, military bases, and the District of Columbia under the federal government control. The Federal agencies responsible for managing America's natural resources must meet both the public desire to protect them and the public expectation of economic growth based on them. Federal websites can provide you with maps of federal lands where your watershed is located. Information on federal lands highway construction might impact your watershed management and you can visit website of Department of Transportation. Maps of the US military bases can be obtained through USGS and National Park Services web sites.

Information Sources	Description
US Park Service	Federal Lands To Parks. Select a state to view projects in your area.

3.2.10.2 State Lands

State lands are owned by state government and might affect your watershed management plan. Each state agency has a State Lands Department. Links to state government's environmental agencies and related issues can be found at EPA's web sites or by visiting your state land department websites.

Databases/Datasets	Description
USDA Soil and Water Conservation Districts Boundaries	Developing spatial data to assist in strategic planning and for use in GIS is an essential step in continuing the conservation work locally. The SWCD layer was created from a variety of sources from each state and aggregated into a standard national layer for use in strategic planning and accountability.

3.2.10.3 Tribal Lands

Include maps of tribal lands if applicable in your watershed or in which your watershed is located and provide contacts of responsible tribal government. Links to tribal government's environmental agencies and related issues can be found at EPA's web sites.

Information Sources	Description
The Bureau of Indian Affairs (BIA)	The Bureau of Indian Affairs (BIA) responsibility is the administration and management of 55.7 million acres of land held in trust by the United States for American Indians, Indian tribes, and Alaska Natives.
American Indian Environmental Office	American Indian Environmental Office
Tribal Water Quality Standards approved by EPA	U.S. EPA Water Quality Criteria for Tribal lands

3.2.10.4 Local Lands

Describe any lands within the watershed that are owned by the local jurisdiction. This information can most likely be found in your community¿s Master Plan.

Databases/Datasets	Description
USDA Soil and Water Conservation Districts Boundaries	Developing spatial data to assist in strategic planning and for use in GIS is an essential step in continuing the conservation work locally. The SWCD layer was created from a variety of sources from each state and aggregated into a standard national layer for use in strategic planning and accountability.
Watershed Boundary Dataset	Watershed Boundary Dataset Resources

3.2.11 Relevant Authorities

For each of the lands owned by the federal, state, tribal, or local agency, describe the relevant authorities that apply. This includes agencies that have decision-making authority and are responsible for carrying out policies.

3.2.12 Future Land Use Considerations

Describe any future land use scenarios that have been conducted. This may influence the goals and objectives that you set for your watershed plan. This information can most likely be found in your community Land Use Master Plan or a transportation build out study.

Example Plans	Description
Example of How to Document Future Land Use Considerations (PDF)	(331 KB, 2 pg) Corsica River Watershed Restoration Action Strategy

Databases/Datasets	Description
Land use change	Effect of changing land use patterns on ecological systems. Provides links to USGS information about land use change and related topics.

3.3 Demographic Characteristics

Data collected from the US Census Bureau can be used to provide demographic information on the watershed. Demographic data includes information on the people in the watershed such as the number of persons or families, commuting patterns, household structure, age, gender, race, economic conditions, employment, and educational information. This information can be used to help design public outreach strategies, identify specific subpopulations to target during the implementation phase, or help determine future trends and needs of the populations.

Databases/Datasets	Description
Census 2000/TIGER Line	Census 2000 TIGER/Line shapefile download, contain line features, boundary features, landmark features of each state
Culture and demographics	Provides links to USGS information about culture and demographics and related topics. Provides a topical browse interface into USGS information utilizing controlled vocabularies arranged as formal thesauri.

3.3.1 Population

Describe the location and extent of the population within the watershed.

3.3.2 Economics

Describe the socioeconomic situation in your watershed. US Census Bureau provides economic data on your watershed. This data collection covers wide range of economic aspects in each state and the United States.

3.3.3 Languages

Describe any major ethnic groups within the watershed and their primary languages. This information will be used in developing effective outreach materials.

4 Watershed Conditions

In this section you will describe the current watershed conditions in terms of water quality, flow, and biology. There are several existing sources of information that can provide helpful information on the current condition of the waterbodies in your watershed, including whether they meet water quality standards and support designated uses. Once you have gathered current dataset and existing studies you will document the available data in a data inventory.

Plan Drivers

Restore/protect Habitat - You selected Restore/Protect Habitat (including animal migration, forested lands and stream buffers) as a driver for developing a watershed plan. In this section identify the current status of habitat

and related species.

Databases/Datasets	Description
Watershed Assessment, Tracking, & Environmental Results : The Reach Address Database	The Reach Address Database (RAD) stores the reach address of each Water Program feature that has been linked to the underlying surfacewater features (streams, lakes, etc) in the NHD. These reach addresses record the geographic extent of Water Program features in both tabular and spatial formats. Using Geographic Information System (GIS) terminology, the reach addresses are implemented as event tables and associated event shapefiles. The reach addresses link to a static copy of the NHD obtained from the USGS, which also resides in the RAD. Periodically, EPA retrieves an updated version of the NHD from USGS and migrates all reach addresses in the RAD to this new version.

4.1 Water Quality Standards

List the applicable federal, state, or tribal water quality standards (WQS) for your watershed. Water quality standards are composed of three elements: designated uses, numeric and narrative criteria, and antidegradation policies and procedures. Water quality standards set the goals, pollution limits, and protection requirements for each waterbody. USEPA provides links to all states and tribes that have established their own water quality standards.

Example Plans	Description
Example of Water Quality Standards Documentation (PDF)	(136 KB, 2 pg) Corsica River Watershed Characterization

Databases/Datasets	Description
Water Quality Standards	Water Quality Standards Database

4.1.1 Designated and Desired Uses

Describe the designated uses for the waterbodies within the watershed as well as any desired uses identified in the planning process. Appropriate uses are identified by taking into consideration the use and value of the water body for public water supply, for protection of fish, shellfish, and wildlife, and for recreational, agricultural, industrial, and navigational purposes. You will use these designated and desired uses to determine if you are meeting WQS and to help you determine your goals and targets in the watershed plan.

Plan Drivers

Restore/protect Habitat - You selected Restore/Protect Habitat (including animal migration, forested lands and stream buffers) as a driver for developing a watershed plan. Identify any designated or desired uses related to habitat protection.

4.1.2 Numeric and Narrative Criteria

Describe the numeric or narrative criteria that have been established for the waterbodies within the watershed. States and Tribes typically adopt both numeric and narrative criteria. Numeric criteria are important where the cause of toxicity is known or for protection against pollutants with potential human health effects. Narrative criteria have been developed where no numeric criteria exist and provide a means to convey the context, conditions, and full intent of water quality protection efforts.

4.1.3 Antidegradation Policies

Describe the antidegradation requirements specified in the water quality standards.

4.2 Available Monitoring/Resource Data

Describe in the following sections, existing data sets that are available for water quality, flow, and biological parameters.

Example Plans	Description
Example of How to Document Existing Monitoring and Resource Data (PDF)	(147 KB, 3 pg) Millers Creek Watershed Improvement Plan

Databases/Datasets	Description
STORET Stream flow data from gaing station in CONUS	STORET Stream flow data from gaing station in CONUS

4.2.1 Water Quality Data

For available water quality data, describe data sources, location of monitoring stations, and the duration of monitoring. This includes both surface water and ground water data, if available. Highlight areas of the watershed for which there are adequate data for characterizing loading conditions and areas for which data are inadequate for characterizing loading conditions. The U.S. Geological Survey's (USGS) National Water Information System (NWIS) is a comprehensive and distributed application that supports the acquisition, processing, and long-term storage of water data. NWISWeb serves as the publicly available portal to a geographically seamless set of much of the water data maintained within NWIS.

Contact Link	Description
USGS Local Offices for Water Resources	Water Resources of the United States. Water is essential for life. USGS operates in every State; the Water Resources mission is to provide water information that benefits the Nation's citizens: publications, data, maps, and applications software. The USGS manages water information at offices located throughout the United States. Although all offices are tied together through a Nation-wide computer network, each collects data and conducts studies in a particular area. Local information is best found at sites listed below. If you can't find the information you want at one site, we recommend checking neighboring sites, as study areas sometimes overlap. Additional information also can be found under National Programs or Headquarters and Regional Offices.

Example Plans	Description
Example of How to Document Water Quality (PDF)	(47 KB, 4 pg) Millers Creek Watershed Improvement Plan

Databases/Datasets	Description
Surface water quality	Chemical, physical, and biological characteristics of water in lakes, rivers, or streams related to its fitness for use. Provides links to USGS information about surface water quality and related topics. Provides a topical browse interface into USGS information utilizing controlled vocabularies arranged as formal thesauri.
Marine water quality	Observed intrinsic characteristics of marine waters affecting their ability to support life or facilitate biological processes such as waste decomposition.
Ground-water quality	Fitness of subsurface water for use based on its composition and properties. Provides links to USGS information about ground-water quality and related topics. Provides a topical browse interface into USGS information utilizing controlled vocabularies arranged as formal thesauri.
Water quality	The chemical, physical, and biological characteristics of water, usually in respect to its suitability for a particular purpose.
USGS Ground-Water Data for the Nation	The Ground-Water database contains ground-water site inventory, ground-water level data, and water-quality data. The ground-water site inventory consists of more than 850,000 records of wells, springs, test holes, tunnels,drains, and excavations in the United States. Available site descriptive information includes well location information such as latitude and longitude, well depth, and aquifer.
USGS Surface Water Data for the Nation	Surface Water Data for Every State in the Country. Nationally, USGS surface-water data includes more than 850,000 station years of time-series data that describe stream levels, streamflow (discharge), reservoir and lake levels, surface-water quality, and rainfall. The data are collected by automatic recorders and manual measurements at field installations across the Nation.
USGS Water-Quality Data for the Nation	Water Quality Samples for Every State in the Country. The U.S. Geological Survey's (USGS) National Water Information System (NWIS) is a comprehensive and distributed application that supports the acquisition, processing, and long-term storage of water data. NWISWeb serves as the publicly available portal to a geographically seamless set of much of the water data maintained within NWIS (additional background).
EPA STOrage and RETrieval	Water Quality Data since 1999 along with the Old Data from Legacy Data Center (LDC) since Early 20th Century

4.2.1.2 Impaired Uses and/or Water Quality Threats

List any streams in the watershed that appear on your state¿s 303(d) list of impaired waterbodies. Each state has a list of impaired water bodies under CWA Section 303 (d). Discuss identified threats to water quality as well as designated uses, which are no longer being supported due to water quality impairments.

4.2.2 Flow Data

Describe the locations of available flow data and the period of record. The National Water Information System Web site (NWISWeb) is the USGS's online database for surface water and groundwater flow and water quality data. USGS of state may have data specific for that state or region. Your state may also be able to provide you with flow data within your watershed.

Databases/Datasets	Description
USGS Real-Time Water Data for the Nation	Real-time data typically are recorded at 15-60 minute intervals, stored onsite, and then transmitted to USGS offices every 1 to 4 hours, depending on the data relay technique used.

4.2.3 Biological Data

In this section you will describe any biological data that exists in the watershed. Biological assessments, or bioassessments, are highly effective for understanding overall water quality and watershed health. They consist of surveys and other direct measurements of aquatic life, including macroinvertebrates, fish, and aquatic vegetation. Changes in the resident biota are ultimately caused by changes in their surrounding environment. Therefore, by determining how well a waterbody supports aquatic life, bioassessments directly assess the condition of ecosystem health; that is, when a waterbody¿s biology is healthy, the chemical and physical components are also typically in good condition.

Example Plans	Description
Example of Living Resources and Habitat (PDF)	(339 KB, 6 pg) Corsica River Watershed Characterization

Databases	Description
Causal Analysis/Diagnosis Decision Information System (CADDIS)	CADDIS is an online application that helps scientists and engineers in the Regions, States and Tribes find, access, organize, use and share information to conduct causal assessments in aquatic systems.

Technical Documents	Description
Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Macroinvertebrates and Fish	Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Macroinvertebrates and Fish

Databases/Datasets	Description
U. S. Fish and Wildlife Service Biological Data Sites	U. S. Fish and Wildlife Service Biological Data Sites GIS data and links to other websites

4.2.3.1 Benthic Macroinvertebrates

Describe any benthic macroinvertebrate data summaries.

Information Sources	Description
Invertebrates as Biological Indicators	Invertebrates as Biological Indicators. You may have heard about sampling fish and benthos, and what good indicators they are, but do you know what really happens? How do we use these "bugs" and fish to assess watershed health? This website helps answer many of those questions.

Example Plans	Description
Example of Benthic Macroinvertebrate Sampling (PDF)	(98.3 KB, 2 pg) Corsica River Watershed Restoration Action Strategy
Example of Biological Monitoring Information (PDF)	(150 KB, 3 pg) Corsica River Watershed Characterization
Example of How to Document Macroinvertebrate Populations (PDF)	(37 KB, 2 pg) Millers Creek Watershed Improvement Plan

4.2.3.2 Fish

Describe fish sampling and analysis data sets. Include any fish consumption advisories that have been issued.

Information Sources	Description
Fish and Wildlife Consumotion Advisories	Regulations/Polocy, Programs, Reports, Techincal Documents on Fish and Wildlife Consumption Advisories
Fish	Fish

Example Plans	Description
Example of a Description of Fish Sampling (PDF)	(98.1 KB, 2 pg) Corsica River Watershed Restoration Action Strategy
Example of Documentation of Fish (and Oysters) (PDF)	(255 KB, 4 pg) Corsica River Watershed Characterization

4.2.3.3 Aquatic Nuisance Species

Describe any monitored data that has been collected on Aquatic Nuisance Species (ANS) Visit web sites of EPA, USDA National Invasive Species Information Center and Aquatic Nuisance Species Task Force for publication, monitoring data and methods to detect ANS.

Information Sources	Description
Aquatic Nuisance Species Task Force	Aquatic Nuisance Species Task Force

4.2.3.4 Migratory Patterns

Provide any migratory data of birds and wildlife within the watershed. Information on migratory wildlife can be obtained through US FWS web sites and other conservation NGOs.

Information Sources	Description
Migratory Bird Treaty Act	Migratory birds

4.2.4 Stream Survey Data

Stream survey data might include aspect, channel type, bedload, substrate, streambank stability, slump potential, large woody debris, and riparian vegetation. This data can be used to create maps of areas of concern such as slumping, wetlands, and erosion, as well as to establish trends within the watershed. Visit websites of EPA and USGS for downloadable data sets of stream survey.

Example Plans	Description
Example of Stream Sampling Documentation (PDF)	(1.35 MB, 38 pg) Corsica River Watershed Restoration Action Strategy
Example of How to Document Stream Conditions (PDF)	(895 KB, 4 pg) Millers Creek Watershed Improvement Plan
Example of Stream Survey Information (PDF)	(190 KB, 3 pg) Corsica River Watershed Characterization

Databases/Datasets	Description
USGS Water Watch	Maps and graphs of current current water resources conditions. Map of real-time streamflow compared to historical streamflow for the day of the year (United States)
National stream survey data sets	The specific primary goals or the National Stream Survey (NSS-I) are (1) to determine the percentage, extent (number, length, and drainage area), location, and chemical characteristics of streams in the United States that are presently acidic, or that have low acid neutralizing capacity (ANC) and thus might become acidic in the future, and (2) to identify streams representative of important classes in each region that might be selected for more intensive study or long-term monitoring.

5 Pollutant Source Assessment

In this section you will provide information on possible pollutant sources. This includes both nonpoint sources and point sources. The information presented in this section will be used to link the pollutants or problems discovered in the monitored data with possible sources of the pollutants or problems. Once the sources have been identified, then management strategies can be developed to control the sources.

Below is the image of your watershed overlayed with point source discharges. Click on the image to use an interactive map (Note save your document before clicking on the image).

Plan Drivers

<u>Restore/protect Habitat</u> - You selected Restore/Protect Habitat (including animal migration, forested lands and stream buffers) as a driver for developing a watershed plan. In this section identify possible sources that might be contributing to the degradation of habitat. This includes both pollutants as well as loss of physical habitat due to erosion and alteration.

Example Plans	Description
Example of How Pollutant Information Can be Collected and Assessed (PDF)	(107 KB, 6 pg) Corsica River Watershed Restoration Action Strategy

5.1 Nonpoint Sources

Nonpoint source pollution generally results from precipitation, land runoff, infiltration, drainage, seepage, hydrologic modification, or atmospheric deposition. As runoff from rainfall or snowmelt moves, it picks up and transports pollutants resulting from human activity, ultimately depositing them into rivers, lakes, wetlands, coastal waters, and ground water. For technical definition of nonpoint source pollutant refer to Section 502(14) of the Clean Water Act of 1987. Discuss relevant nonpoint sources including but not limited to; Livestock, Cropland, Urban, On-site Wastewater Disposal, Silviculture, and Wildlife Sources.

Information Sources	Description
EPA's Smart Growht to minimize NPS	EPA web page describing smart growth principles, community example, publication, and funding opportunities.
Nonpoint Source Pollution Resources at EPA	Information on NPS management success stories, publications on various management measures, funding opportunities, and education and outreach resources.
Natural Resources Defense Council (NRDC)	This non-governmental advocacy organization provides background information on controlling stormwater and NPS pollution from urban and agricultural areas.

Example Plans	Description
Example of Nonpoint Source Pollution Characterization (PDF)	(167 KB, 4 pg) Corsica River Watershed Characterization

5.1.1 Agriculture

Discuss relevant nonpoint sources from livestock and cropland including, but not limited to, increased erosion and sedimentation. Agricultural runoff can be an important nonpoint source pollutant. The primary agricultural

nonpoint source pollutants are nutrients, sediment, animal wastes, salts, and pesticides. Agricultural activities also have the potential to directly impact the habitat of aquatic species through physical disturbances caused by livestock or equipment.

Information Sources	Description
New York National Resource Conservation Service Website	New York National Resource Conservation Service Website - Contains links and information for your state.Stewardship, Rental Rate, Watershed Practice List, Watershed Background

Databases/Datasets	Description
FEMA Flood Data	FEMA Flood Data Digital Flood Rate Map Database

5.1.1.1 Livestock

In watersheds with extensive agricultural operations, livestock can be a significant source of nutrients and bacteria and can increase erosion. If available, site-specific information on livestock population, distribution, and management should be used to characterize the potential effects from livestock activities. Local USDA officials are typically the best source of livestock information. If local information is not available, you can use the Census of Agriculture to find information about the number and type of animal units per county. The census is conducted every 5 years; the most recent census was conducted in 2002. Data from the census are available online at www.nass.usda.gov/census/, and data can be analyzed at the county level in a GIS. Local USDA officials should be consulted to determine whether conditions in the watershed are accurately reflected in the census. Local information on additional agricultural sources, such as land application of manure, should also be obtained.

Databases/Datasets	Description
USDA 2002 Agricultural Census	USDA 2002 Agricultural Census

5.1.1.2 Cropland

Depending on crop type and management, croplands are a potentially significant source of nutrients, sediment, and pesticides to watershed streams. Cropland can experience increased erosion, delivering sediment loads and attached pollutants to receiving waterbodies. Fertilizer and pesticide application to crops increases the availability of these pollutant to be delivered to waterbodies through surface runoff, erosion (attached to sediment), and ground water. If cropland is an important source in your watershed, it is useful to determine the distribution of cropland as well as the types of crops grown. Land use coverages for your watershed can identify the areas of cropland in your watershed. For more information on the types of crops and their management, contact local extension offices or conservation districts. The USDA Census of Agriculture can also provide information on crop types and fertilizer and chemical applications. However, census data are presented at the county level and might not reflect cropland characteristics in your watershed.Literature values for the pollutant

generation by crop type are often used in modeling and other loading analyses to estimate loads from cropland sources. NRI data also provide information on cropland characteristics by county and cataloging unit.

Databases/Datasets	Description
USDA 2002 Agricultural Census	USDA 2002 Agricultural Census

5.1.2 Wildlife

Although wildlife inputs typically represent natural background sources of pollutants, they can be an important source of bacteria or nutrients in forested or less-developed areas of the watershed. It¿s important to consider their potential impact on water quality and their importance relative to other pollutant sources when characterizing your watershed. .

Information Sources	Description
National Listing of Fish and Wildlife Advisories (NLFWA)	National Listing of Fish and Wildlife Advisories (NLFWA)

5.1.3 Septic Systems

Septic systems can contribute significant nutrient and bacteria loads to receiving waterbodies because of system failure and surface or subsurface malfunctions. Local agencies can provide estimates of the total number of septic systems in a specific area or county. To evaluate septic systems as a source of pollutants, however, you want to know the distribution of malfunctioning or failing systems. In some cases, local health departments can provide information on failing septic systems (e.g., location, frequency, failure rates), but in many watersheds the specific incidence and locations of malfunctioning systems are unknown. Literature values and local or county statistical information can be used to estimate the number of failing septic systems in a watershed. Using the county-specific estimates from NSFC (1993), the number of failing septic systems in a county can be extrapolated to the watershed level based on county and watershed land use distribution. The number of failing systems can also be estimated by applying some appropriate failure rate, from literature or from local sanitation personnel, to the total number of septic systems in a watershed.

5.1.4 Silviculture

Silviculture can be a significant source of sediment and other pollutants to a waterbody. The primary silviculture activities that cause increased pollutant loads are road construction and use, timber harvesting, site preparation, prescribed burning, and chemical applications. Without adequate controls, forestry operations can cause in-stream sediment concentrations and accumulation to increase because of accelerated erosion. Activities can also cause elevated nutrient concentrations as the result of decaying organic matter on the ground or in the water and prescribed burns. Organic and inorganic chemical concentrations can increase because of harvesting and fertilizer and pesticide applications. Harvesting can also lead to in-stream accumulation of organic debris,

which can lead to dissolved oxygen depletion. Other waterbody impacts include increased temperature from the removal of riparian vegetation and increased streamflow due to increased overland flow, reduced evapotranspiration, and runoff channeling. BLM administers millions of acres of commercial forests and woodlands in the western United States. Local BLM personnel can help you identify areas of siviclutural activities in your watershed.

Information Sources	Description
Silviculture Quantitative Tools	Links to federal and state Silviculture Quantitative Tools

5.1.5 Urban/Suburban Runoff

Impervious coverage information is typically used to characterize the density of and potential loading from urban areas. Impervious coverage¿s are developed from direct photointerpretation and delineation or estimated by relating imperviousness to land use and land cover. With higher percentages of impervious area, urban or developed areas typically experience greater magnitudes of stormwater runoff than more rural areas. Runoff from developed areas can wash off and transport pollutants, and urban pollutant loads can be a significant source when the watershed is predominantly developed, with little or no agricultural area.

Information Sources	Description
Managing Urban Runoff	The most recent National Water Quality Inventory reports that runoff from urban areas is the leading source of impairments to surveyed estuaries and the third largest source of water quality impairments to surveyed lakes.

5.1.6 Streambank Erosion

Streambank erosion is the direct removal of banks and beds by flowing water. Usually this type of erosion is initiated by heavy rainfalls, but can also gradually occur overtime as a result of weathering. Erosion of stream or river banks causes an increase in the amount of sediment carried by or deposited in the water. Subsequent deposition of soil causes problems on productive land downstream and sedimentation in reservoirs. Other problems include reduction in water quality due to high sediment loads, loss of native aquatic habitats, damage to public utilities (roads, bridges, and dams) and maintenance costs associated with trying to prevent or control erosion sites. Catchments with little vegetation cover and steep gradients will often have high rates of water run-off that result in high-velocity stream flows. Stream straightening, dredging or realignment to accommodate roads or rail lines leads to increased stream power and velocity, which in turn will increase the energy applied to stream banks. The erosive impact of these high-velocity stream flows will depend on the stability of the bank material. For instance, sand will erode more easily than gravel and silt will erode more easily than sand.

5.1.7 Atmospheric Deposition

Pollution from the air may deposit into water bodies and affect water quality in these systems. Airborne pollution can fall to the ground in raindrops, in dust or simply due to gravity. As the pollution falls, it may end up in streams, lakes, or estuaries and can affect the water quality there. There are five categories of air pollutants with the greatest potential to harm water quality: nitrogen, mercury, other metals, combustion emissions, and pesticides. These pollutants all have the ability to settle into bodies of water and damage ecosystems as well as public health. Both natural and man-made processes can lead to air pollution. Volcanoes, forest fires and storms are all natural processes that can place large amounts of harmful substances into the atmosphere. Volcanoes release various sulfur compounds, carbon dioxide, soot, and other pollutants. In some parts of the world, natural lake processes can also release large amounts of toxic material in rare, catastrophic events. There are also many man-made, or anthropogenic, sources of air pollution. Driving cars, operating power plants and spraying pesticides all release pollutants into the atmosphere. As human activities increase, the amount of air pollution also increases.

Information Sources	Description
Emissions and Dispersion Modeling System (EDMS)	Emissions and Dispersion Modeling System (EDMS)

Technical Documents	Description
EPA MOBILE6 Vehicle Emission Modeling	EPA MOBILE6 Vehicle Emission Modeling

5.2 Point Sources

Sources permitted to discharge at specific locations from pipes, outfalls, and conveyance channels are "point" sources and are regulated through National Pollutant Discharge Elimination System (NPDES) permits. Generally, state permitting agencies possess the most recent and accurate point source discharge information. When obtaining permit information, be certain to verify actual monitored discharges and future discharge projections or capacity because often not all of the water quality parameters in which you may be interested, are monitored. Discuss all relevant point sources in the watershed, including their locations, their permitted discharge levels, and whether or not they are operating within or in excess of identified limits. Indicate whether new facilities are projected to come online or whether existing facilities intend to expand.

Information Sources	Description
Drinking Water	Links to useful EPA site on Drinking Water

Example Plans	Description
Example of Point Source Pollution Characterization (PDF)	(192 KB, 3 pg) Corsica River Watershed Characterization

Databases/Datasets	Description
Envirofacts	Envirofacts, your one-stop source for environmental information.

5.2.1 NPDES Permits

As authorized by the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. List relevant permitted facilities, discharge limits, average discharge monitoring data, permit types (sewerage, industrial, etc.), and renewal schedules. Individual homes that are connected to a municipal system, use a septic system, or do not have a surface discharge do not need an NPDES permit; however, industrial, municipal, and other facilities must obtain permits if their discharges go directly to surface waters. In most cases, the NPDES permit program is administered by authorized states.

Information Sources	Description
Stormwater Plans	Storm water discharges are generated by precipitation and runoff from land, pavements, building rooftops and other surfaces. Storm water runoff accumulates pollutants such as oil and grease, chemicals, nutrients, metals, and bacteria as it travels across land. Heavy precipitation or snowmelt can also cause sewer overflows which, in turn, may lead to contamination of water sources with untreated human and industrial waste, toxic materials, and other debris. EPA controls storm water and sewer overflow discharges through its National Pollutant Discharge Elimination System. NPDES provides guidance to municipalities and state and federal permitting authorities on how to meet stormwater pollution control goals as flexibly and cost-effectively as possible.

Other Websites/Publications	Description
EPA Permit Compliance System (PCS)	- EPA Permit Compliance System (PCS)

Databases/Datasets	Description
EPA Permit Compliance System (PCS)	The Permit Compliance System (PCS) provides information on companies which have been issued permits to discharge waste water into rivers. You can review information on when a permit was issued and expires, how much the company is permitted to discharge, and the actual monitoring data showing what the company has discharged. The Water Discharge Permits Query allows you to retrieve preselected data from the PCS database in Envirofacts. You can narrow your search by selecting various options including facility name, geographic location, standard industrial classification, and chemicals. You may also use the PCS Customized Query to retrieve data and design a query for your particular needs, using any data element available from the Envirofacts Warehouse. Customized Queries are primarily geared toward more experienced users.

5.2.1.1 Phase I and II Stormwater Permits

Check with the local water authority or public water works for data associated with the sewer network in your particular watershed. Federal regulations require certain municipalities, generally those in urban areas, to obtain municipal stormwater permits. These permits require each municipality to develop a stormwater management

plan that describes how the municipality will prevent stormwater pollution. Copies of the permits are available from your state environmental agency or EPA regional office. The stormwater management plans written to comply with the requirements in the permit typically include activities to educate the public about stormwater impacts, control stormwater runoff from new developments and construction sites, identify and eliminate illicit discharges, and control stormwater runoff from municipal operations. Contact your local municipality¿s environmental agency or public works department to find out if it addresses stormwater runoff. You may also be able to obtain a copy of the municipality¿s current stormwater management plan to see what activities are planned.

Information Sources	Description
USEPA Stormwater Program	This page contains technical and regulatory information about the NPDES stormwater program.

5.2.1.2 CAFO Permits

Identify any NPDES permits that have been issued for Concentrated Animal Feeding Operations (CAFOs).

Information Sources	Description
Animal Feeding Operations	Concentrated Animal Feeding Operations
Animal Feeding Operations (AFO) Virtual Information Center	The AFO Virtual Information Center is a tool to facilitate quick access to livestock agricultural information in the US. This site is a single point of reference to obtain links to state regulations, web sites, permits and policies, nutrient management in

5.3 Hazardous Waste

Identify any hazardous waste sites that are located in the watershed. There are different categories of waste depending on the properties of the material.

5.3.1 CERCLA Sites

Identify any Superfund sites in your watershed. The Superfund program was created by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), amended by the Superfund Amendments and Reauthorization Act (SARA). The acts established authority for the government to respond to the release/threat of release of hazardous wastes, including cleanup and enforcement actions. Long term cleanups at National Priority List (NPL) sites last more than a year while short term /emergency cleanups are usually completed in less than a year. The Office of Superfund Remediation and Technology Innovation, under the Office of Solid Waste and Emergency Response provides the policy, guidance and direction for this program.

Information Sources	Description
Cercla Overview, Superfund, US EPA	This page provides an overview of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

5.3.2 RCRA Sites

Identify any RCRA sites in your watershed. The Resource Conservation and Recovery Act (RCRA) regulates hazardous and non-hazardous wastes that may be impacting your watershed. This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous wastes.

Databases/Datasets	Description
RCRA Online	The RCRA Online database is designed to enable users to locate documents, including publications and other outreach materials, that cover a wide range of RCRA issues and topics. "

5.3.3 Brownfields

Identify and brownfield sites in your watershed. Brownfields are property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.

Information Sources	Description
Brownfields Cleanup and Redevelopment	Brownfields Cleanup and Redevelopment

5.3.4 Underground Storage Tanks

Identify the locations of underground storage tanks in the watershed. Underground storage tanks have the potential to leak with no visible evidence until serious environmental pollution has occurred. Millions of gallons of groundwater and large areas of soils may become severely contaminated before a problem is ever recognized from the surface.

Information Sources	Description
US EPA Office of Underground Storage Tanks (OUST)	US EPA Office of Underground Storage Tanks (OUST)

5.4 Other Potential Pollutant Sources

We have tried to identify the major sources of pollutants that might affect the water quality in your watershed, but there might be more. Review the data and information you have collected to determine if there are other

categories to include.

6 Linkage of Pollutant Loads to Water Quality

There are several activities that occur between Section 5 and Section 6 of this outline. These activities will help you to identify pollutant sources and to quantify the pollutant loads in the watershed. Depending on the skills sets on your watershed planning team, you may need to seek additional technical support to complete these activities. Ask a representative at your state environmental protection agency for recommendations. Compilation of Data : Once you have gathered information and datasets outlined in Section 5, you will create an inventory of the data and begin to compile the information. The inventory is typically an Excel spreadsheet where you will provide information on the data you have collected. The kind of information to be summarized in the data inventory include type of data, source of data, quality of data, number of samples, and spatial and temporal coverage. Provide a summary of the data inventory in your Appendices. Data Analysis to Identify Sources : During this step you will identify the sources of pollutants in the watershed and causes of impairment. There are many approaches that can be used in these analyses such as statistical analyses, temporal and spatial analyses, trends and relationships. Together with input from stakeholders and the data results, you should have an understanding of where and when problems occur in the watershed and what could be causing the problems. The results of these analyses will be presented in Section 6.

Databases/Datasets	Description
WebRIT Waters	Web-Based Reach Indexing Tool for Watershed Assessment, Tracking, & Environmental Results
BASINS: Better Assessment Science Integrating Point & Nonpoint Sources	A powerful tool for managing watersheds

6.1 Estimation of Pollutant Loads

Data Analysis to Estimate Loads : Describe the approach used to estimate pollutant loads. The loading analysis provides a more specific numeric estimate of loads from the various sources in the watershed. By estimating source loads you can evaluate the relative magnitude of the sources, the location or sources, and the timing of the loadings. This step is critical to your watershed planning efforts because without knowing where the pollutants are coming from, you can¿t effectively control them and protect the watershed. There are two general types of techniques used to estimate pollutant loads. The first technique estimates loads directly from monitoring data or existing literature values. The second technique uses watershed models to estimate loads, predict future conditions, and help to evaluate multiple management scenarios. Watershed Models : Watershed models play an important role in linking sources of pollutants to receiving waterbodies as nonpoint source loads. Watershed models are driven by precipitation, land use, impervious areas, slope, soil types and drainage area. GIS programs like BASINS and WCS provide the data that is needed for watershed models to predict both water and pollutant runoff from a watershed.

6.1.1 Existing Conditions and Pollutant Load Estimates

Describe results and predictions of current loading conditions.

Example Plans	Description
Example of an Assessment of Existing Conditions and Pollutant Load Estimates (PDF)	(71.8 KB, 3 pg) Corsica River Watershed Restoration Action Strategy
Example of Existing Conditions and Pollutant Load Estimates (PDF)	(346 KB, 5 pg) Corsica River Watershed Characterization

6.1.2 Future Conditions and Pollutant Load Estimates

Describe results and prediction of future conditions.

6.2 Identification of Critical Areas

Provide a map of critical areas to be addressed. To help prioritize and target your management efforts within the watershed, you will identify the critical areas where the pollutant sources are causing the most damage so that you will want to apply management measures in these areas first. This is often done using a map of the watershed and marking the areas that are most critical. Use this outline to work with the stakeholders to identify and rank the critical areas. Work with your team to develop criteria to rank the critical areas.

Information Sources	Description
Safe Drinking Water Information System	Information about Public Water Systems and Their Violations of EPA's Drinking Water Regulations
Small Systems and Capacity Development	Small Systems and Capacity Development

Example Plans	Description
Example of How to Document Critical Areas (PDF)	(272 KB, 2 pg) Corsica River Watershed Restoration Action Strategy

7 Watershed Goals and Objectives

Describe goals for the watershed management plan, management objectives, indicators to measure the objective, load reduction targets and load reductions needed to meet the goals. Once you have analyzed the data, identified the problems in the watershed, and quantified the sources that need to be managed, you will develop goals and management objectives for your watershed plan. This process builds on the initial goal setting you conducted with stakeholders early on in the process. At this stage you will refine the initial goals to incorporate findings from the data analysis phase. You have identified the pollutant loadings so you¿ll need to determine by how much you need to reduce those loads to meet your goals.

Plan Drivers

Restore/protect Habitat - You selected Restore/Protect Habitat (including animal migration, forested lands and stream buffers) as a driver for developing a watershed plan. As you develop goals and objectives for your watershed plan, consider the improvements you would like to see made to existing habitat or protection of critical habitat areas. Set quantifiable targets for the number of acres you wish to restore or protect.

Information Sources	Description
USACE - Beneficial Uses of Dredged Material	USACE - Beneficial Uses of Dredged Material

Example Plans	Description
Example of How to Document Watershed Goals and Objectives (PDF)	(37.2 KB, 2 pg) Millers Creek Watershed Improvement Plan

7.1 Management Objectives

Based on the goals you have set, identify specific management objectives. For example, if one of your goals is to reduce flooding, a management objective might be to minimize flooding impacts by improving peak and volume controls on urban sources and retrofitting inadequate road culverts. Establish indicators to measure progress in achieving the objectives such as peak flow volume and velocity. It¿s helpful to present the goals, objectives, and indicators in a table.

Example Plans	Description
Example of Management Objectives (PDF)	(44.3 KB, 3 pg) Millers Creek Watershed Improvement Plan

7.2 Load Reduction Targets

Describe the load reduction targets needed to achieve watershed goals. Once you have set the targets you will calculate the reductions needed in current loads to meet this target. To estimate the load reductions expected from the proposed management strategies, you need to understand the cause-and-effect relationship between pollutant loads and the waterbody response. A number of techniques can be used such as mass balance, empirical relationships, and watershed models. Provide a summary that documents the source loads, numeric targets to meet the watershed goals and objectives, and load reductions needed to meet the targets.

8 Identification of Management Strategies

Present the various strategies identified that will reduce the pollutant loads and help achieve the watershed goals. Organize your discussion by first listing existing management tools, then identify significant gaps and discuss additional strategies needed to fill those gaps. Process for Selecting Management Strategies : The process used to select the management strategies to be included in your watershed management plan will vary

from group to group, but in general will include the following : 1. Identification of factors that will influence selection of the preferred management strategies. 2. Selection of the suitable approach to evaluate the ability of the management techniques to meet the watershed objectives. 3. Quantification of the expected load reductions from existing conditions resulting from the management strategies. 4. Identification of capital and O&M costs and compare initial and long term benefits. 5. Selection the final preferred strategies

Plan Drivers

Restore/protect Habitat - You selected Restore/Protect Habitat (including animal migration, forested lands and stream buffers) as a driver for developing a watershed plan. Identify existing strategies used to protect habitat, such as buffers, ordinances, etc., and idneityf any new strategies that will be needed to meet your goals.

Example Plans	Description
Example of Identification of Potential Management Strategies (PDF)	(4.16 MB, 23 pg) Millers Creek Watershed Improvement Plan

8.1 Existing Management Strategies

Provide a summary of existing strategies including initiatives and programs that will continue to be used to implement the watershed plan. Review the current management framework, from the perspective of what has already been done, and determine if it is working (i.e., existing ordinances and evaluations of implementation, locations of BMPs, inventory of agricultural practices, existing permits, etc.). Quantification of the Effectiveness of Existing Strategies : For the existing strategies that you identify, you need to quantify the effectiveness of current management strategies so you will know what types of new strategies need to be implemented to further reduce pollutant loads.

Example Plans	Description
Example of Existing Management Strategies Documentation (PDF)	(250 KB, 6 pg) Corsica River Watershed Characterization
Example of Existing Management Strategies (PDF)	(87 KB, 6 pg) Millers Creek Watershed Improvement Plan

8.1.1 Structural Controls

Describe location of existing structural controls. There are a variety of structural controls and most require some level of routine maintenance such as urban runoff ponds and constructed wetlands. Describe the effectiveness of current structural controls in reducing pollutant loads.

8.1.2 Nonstructural Controls

Describe the location of existing nonstructural controls. Nonstructural controls are practices that prevent pollution by reducing potential pollutants at their source before they come into contact with stormwater, or capturing and disposing of stormwater at its source. These BMPs aim to eliminate contamination by preventing their introduction into the environment such as buffers along stream banks and minimizing the amount of impervious area are types of nonstructural controls. Describe the effectiveness of current nonstructural controls in reducing pollutant loads.

8.2 Additional Strategies Needed to Achieve Goals

Describe the additional strategies that need to be implemented to achieve watershed goals. Break out the strategies into structural vs. nonstructural controls.

8.2.1 Structural Controls

Describe additional structural controls to be implemented to assist in reducing pollutant loadings to the waterbodies. Include the anticipated removal efficiencies of the controls.

8.2.2 Nonstructural Controls

Describe additional nonstructural controls to be implemented to assist in reducing pollutant loadings to the waterbodies. Include the anticipated removal efficiencies of the controls.

Example Plans	Description
Example of How to Document Required Management Strategies (PDF)	(101 KB, 5 pg) Corsica River Watershed Restoration Action Strategy

9 Implementation Program Design

This section will serve as your action plan for implementing the watershed plan. It incorporates all of the information presented in the previous sections and outlines the implementation component of the watershed plan. This section includes specific information on activities to be conducted, roles and responsibilities, costs, indicators for measuring progress, and mechanisms for evaluating progress. This section should be able to exist as a stand-alone document and you will refer to it frequently as you begin implementation.

Information Sources	Description
USGS Center for Biological Informatics	Locate potential expertise on biological, ecological, and natural resources management issues.

Example Plans	Description
Example of an Implementation Program (PDF)	(181 KB, 19 pg) Corsica River Watershed Restoration Action Strategy
Example of an Implementation Program Design (PDF)	(1.55 MB, 13 pg) Millers Creek Watershed Improvement Plan

9.1 Management Strategies

Describe the management strategies and locations to be implemented within the watershed. These strategies include the final strategies that were selected in Section 8. You may want to crate an overall table that clearly outlines the strategies to be implemented and locations, responsible party, costs, timeline, interim milestones, and criteria for measuring progress. Incorporate both the information/education and monitoring component into the table as well.

9.2 Schedule of Activities

Provide a schedule for implementation. The schedule should be divided into increments that you can reasonably track and review, such as quarters. In this section the database will generate a template for creating the schedule, and for allowing a user to generate a 5 or 10 year action plan. The system will pull pieces of the document and begin to populate a matrix.

Example Plans	Description
Example of a Proposed Schedule (with Cost Information) (PDF)	(42.5 KB, 3 pg) Millers Creek Watershed Improvement Plan

9.3 Interim Milestones

Describe interim milestones that will be used to determine whether management practices or other control actions are being implemented. Milestones can be written in time intervals such as Short-term (1 to 1½ years), Mid-term (1 to 4 years), or Long-term (5 to 10 years or longer). It is also helpful to think of the milestones as subtasks, or what needs to be accomplished over time, to fully implement the practice or management measure. When determining time scales and subtasks for actions, place the milestones in the context of the implementation strategy. Given the selected practices and the available funds or time frame for obtaining grants, estimate what can be accomplished by when.

Plan Drivers

Restore/protect Habitat - You selected Restore/Protect Habitat (including animal migration, forested lands and stream buffers) as a driver for developing a watershed plan. Identify the final management strategies selected to achieve your habitat/restoration and protection goals, and describe how you will implement the strategies and measure progress.

9.4 Indicators to Measure Progress

Describe the indicators you will use to measure progress in meeting your watershed goals. While the interim milestones will track implementation of the activities, provide indicators that will help determine whether you are achieving load reductions over time and making progress toward meeting your overall watershed goals. These criteria can also support an adaptive management approach by providing mechanisms by which to reevaluate implementation plans if you are not making substantial progress toward meeting your watershed goals. These criteria can be expressed as indicators and associated interim target values. There are various indicators you can use to help measure progress. You¿ll want to select indicators that will provide quantitative measurements of progress toward meeting the goals and can be easily communicated to various audiences.

Example Plans	Description
Example of How to Develop Indicators to Measure Progress (PDF)	(117 KB, 6 pg) Millers Creek Watershed Improvement Plan

9.5 Estimation of Costs and Technical Assistance Needed

For each activity, provide an estimation of costs and technical assistance that will be required. For costs include both start-up costs as well as maintenance costs. Indicate sources of proposed funding and any requirements needed to secure the funding.

Example Plans	Description
Example of Implementation Project Cost Estimation (PDF)	(83.1 KB, 2 pg) Corsica River Watershed Restoration Action Strategy
Example of How to Estimate Potential Costs (and Document Potential Funding Sources) (PDF)	(77.7 KB, 7 pg) Millers Creek Watershed Improvement Plan

9.6 Information/Education Component

Describe the information/education (I/E) component that will be used to support your watershed management program. Include outreach and education goals, target audiences to be reached, information needed from those target audiences, formats and distribution mechanisms for materials, and an evaluation framework. Describe how you are going to share results on the watershed plan implementation with both your stakeholders and the larger community. The I/E activities should be incorporated with the other management practices outlined in Section 9.2 and include the same categories such as costs, responsible parties, schedule, interim milestones, etc.

Information Sources	Description
USEPA Getting In Step Outreach Guide	USEPA Getting In Step Outreach Guide

Example Plans	Description
Example of How to Document Public Involvement in Plan Implementation (PDF)	(36 KB, 2 pg) Millers Creek Watershed Improvement Plan

9.7 Monitoring Component

Describe the implementation monitoring strategy that be used to track progress in meeting your water quality and other goals. The monitoring component should be sued to measure the indicators listed in Section 9.4. Include the monitoring design and sampling locations, frequency, sampling techniques, and data management. In the appendices provide more detailed information on a quality assurance project plan, if required. Similar to the I/E component, incorporate the monitoring activities into the overall implementation table discussed in Section 9.2. Indicate responsible parties for data collection and analysis. Monitoring and measuring progress could potentially be conducted at the federal, regional, and state level. Most likely at the local level, individual agencies and communities will be held responsible for the monitoring and measuring progress.

9.8 Evaluation Framework

Describe the framework and process that will be used to periodically evaluate the implementation of your watershed management plan. In general, you will evaluate three major parts of your watershed implementation program to be able to demonstrate progress and make improvements in your program. These components include inputs to the programs, outputs, and outcomes. You need to structure your evaluation framework to consider all three components and develop indicators that will measure each.

Example Plans	Description
Example of a Monitoring Component (PDF)	(48.5 KB, 3 pg) Millers Creek Watershed Improvement Plan

10 Watershed Plan Implementation

Section 10 will not actually be included in your watershed plan because it describes activities that occur once implementation begins. We include it here because many planning efforts focus so much on the development of the plan without connecting to implementation. So we are providing some suggestions on next steps once you are ready for implementation. 1. Revisit the organizational structure you created for the development of the watershed plan. You may want to reform as an implementation committee or augment the existing group. 2. Prepare annual workplans to help secure funding and provide more detail to your activities. 3. Create a process for formal review of your watershed plan. Review the implementation activities outlined in your work plan, at least quarterly, and compare results with your interim milestones, provide feedback to stakeholders, and determine whether you want to make any corrections.

APPENDICES Data Inventory

After you have gathered information and datasets outlined in section 5, you will create an inventory of the data that you will use for your analyses. It is also important to document datasets that you will not use and indicate why. The types of information to be summarized in the data inventory include type of data, source of data, quality of data, number of samples, and spatial and temporal coverage. The data inventory will also be used to help identify any relevant gaps, particularly those that will hinder data analysis and may require you to collect additional data before moving on to the next step. You do not have to include the entire inventory in the Appendix, but a summary is extremely useful to support the findings outlined in the watershed plan. Watershed Planning Team;

 Summary of Data Inventory

Methodology for Models

 Existing Agreements (TMDL, MOUs, etc)

  Acronyms

  References

Figures

 Regional Map

 Watershed Map

  Topo

  Political

 Geology

 Hydrology

 Soil Profiles

 Ecosystems

 Land Covers

 Land Use Maps

 Zoning Maps

 Sewer Systems

 Wetlands

 Data Gaps

Tables

 Location Dependent

Example Plans	Description
Example of Material that Can be Included in the Appendix (PDF)	(142 KB, 6 pg) Corsica River Watershed Restoration Action Strategy

You have entered the following information for your watershed plan.

Watershed Name: Schoharie

Contact Information:

Amy Degaetano

GCSWCD

Soil and Water Conservation District

518-622-3620

Watershed Location:

State: New York

HUC: 02020005-

303d Impaired Waterbodies:

By HUC: ;

By Reach Code: N/A

305b Assessed Waterbodies:

By HUC: - NY;

By Reach Code: N/A

Existing Plans:

Name	Type	Reason for Updating
East Kill, West Kill, Batavia Kill	Source Water Protection Plans	Existing plan called for routine updates

Why are you developing a watershed plan?

Improve Water Quality

Satisfy Regulatory Requirements

Prevent Degradation

Protect Drinking/Source Water

Restore/protect Habitat

Activities in your Watershed:

Commercial Fishing/Fisheries

Dams

Flood Plains

Forest

Low Density Residential

Wildlife Reserves/Protected Lands

Parks/Recreational Areas

Issues/Concerns:

Water Quality:	Air Quality:
Drinking water protection Flooding Harmful/Nuisance/Invasive Species Impaired water quality Wetlands restoration/protection Point Source Dischargers Polluted runoff (nonpoint source pollution) Stormwater management	Mercury Deposition
Land and Habitat:	**Other Issues:**
Erosion Loss of habitat Sediment management	Exotic/invasive
Additional issues/concerns:	
N/A	

Pollutants:

Metals

Temperature

Pathogens

Sediment

Stakeholders:

David Burns

NYCDEP

Other

dburns@dep.nyc.gov

845-340-7628