

CHAPTER FIVE: CRAFTING THE WATERSHED PLAN

Now that you have a thorough understanding of your watershed, it is time to pull all the information together into a cohesive watershed plan. In this chapter, we will work through the following steps:

- Refining watershed goals
- Crafting the watershed plan
- Identifying watershed management recommendations
- Developing your recommendations and preparing an implementation strategy
- Requesting review and comments

Refining watershed goals

By now you have developed a vision and a set of watershed goals to protect and restore water quality, build community support for watershed planning, and established partnerships to develop a watershed plan. You have also characterized your watershed, conducted field assessments to understand existing conditions, completed assessments of local programs and practices in order to identify the changes needed to better control activities causing pollution, and heard from the community about their concerns for the watershed.

Until now your vision has been based upon your initial understanding of your watershed. Now that you have taken a closer look around, you can re-evaluate your vision, give it a “reality check”, and make any appropriate changes. When refining your vision and initial watershed goals, ask yourself a few questions:

- What have you learned about how you can fulfill your vision and achieve your goals?
- What are the obstacles to your vision and goals?
- Have you discovered more opportunities than you originally thought?
- Are your ideas still sound?

Crafting the watershed plan

Now it is time to focus on putting your watershed plan together. In your watershed plan you explain the purpose of your planning efforts, present your understanding of the watershed, lay out your vision for its future, and outline how, over time, your community will achieve its vision.

A watershed plan should be:

- **Realistic** - it should indicate what is possible given available or potential resources

- **Comprehensive** - it should address fully the range of conditions that affect the quality of water and the quality of life within the watershed
- **Specific** - it should target and address the distinct needs of different parts of your watershed
- **Coordinated** - it should be integrated with other planning tools, including comprehensive plans and Phase II requirements
- **Partnership-based** - it should bring public and private interests together in a combined effort to address issues and opportunities
- **Citizen-focused** - it should enjoy broad community support
- **Understandable** - it should be easy to read and understand
- **Solution-specific** - it should identify community issues and directly propose solutions which will remedy or address these issues
- **Timely** - it should be updated when necessary to reflect changing conditions and changing community perceptions



Lake George



Democrat Point, Long Island

Your watershed plan should be well organized and easy to navigate. It should include prioritized recommendations such as capital improvements to correct existing impairments and the revision of local controls to prevent future impacts to water quality. Recommendations should be keyed to a watershed map showing specific project locations. Photographs can often improve the visual presentation of a watershed plan by providing the reader with specific examples of problem areas and threats and potential areas for protection and restoration. Watershed plans generally include six main sections:

- *Executive Summary*

The executive summary presents the key points of the watershed plan. Here, you provide a brief overview of the purpose of the watershed plan and who was involved in the planning process. The executive summary is also where you highlight your vision, the main findings, the list of watershed goals, and your recommendations. The executive summary is important as it provides a quick, concise, and clear reference for the entire document.

- *Introduction*

The introduction should describe the watershed plan and allow the reader to get a basic understanding of the planning

process. An overview of the watershed - where it is located, general facts about the watershed and the communities that lie within its boundaries, and general demographics of the watershed - will give the reader an understanding of the watershed and why watershed planning is important. It will also be useful to explain the methodologies used to prepare the plan. You will identify the partners involved in the planning process and how they contributed. Finally, you will want to discuss the watershed vision - what it means to the community and how it will shape the future of the watershed.

- *Characterization*

This section will build on your watershed characterization developed in Chapter 3 of the Guidebook. It will provide an inventory and analysis that describes the current state of the watershed. This section delineates the watershed and subwatershed boundaries and describes its waterbodies. It will describe the physical and biological characteristics of the watershed, including how the watershed functions, explain existing land use and land cover patterns, and identify trends within the watershed. The characterization should also include an identification of sensitive resource areas, water quality issues, pollutants, and corresponding activities impacting water

resources. Another important aspect of the characterization is the assessment of the programs and practices in place for controlling pollution. It will be helpful to describe the assessment process used and discuss the gaps found during the assessment. The characterization is the basis for the development of watershed management recommendations.

- *Watershed Management Recommendations*

This section will explain how water quality will be protected and restored within your watershed through a series of projects and actions developed to correct existing impairments and prevent future impacts to water quality. You should explain how you arrived at these specific recommendations and include a discussion of the assessments conducted which support the recommendations. While recommendations should be supported by data, consider moving extensive technical information into an appendix or supplemental report.

- *Implementation Strategy*

This section will set the stage for implementation by identifying the actions needed to address the problems and opportunities in your watershed. It will set out an implementation schedule, lay out

priorities, establish realistic expectations for partner involvement, and outline budget needs.

- *Monitoring and Tracking*

This section will outline a proposed long-term monitoring plan, describe indicators and performance criteria for monitoring restoration projects, establish milestones and tracking mechanisms to evaluate progress over time, and propose mechanisms for reporting progress and updating the watershed plan. Creating a plan for observing changes in water quality will help you understand how well certain practices work and how to adapt your plan to continue to provide water quality improvement. Monitoring and tracking will be discussed in more detail in Chapter 6.

Using this structure will create the framework for a successful watershed plan.

Identifying watershed management recommendations

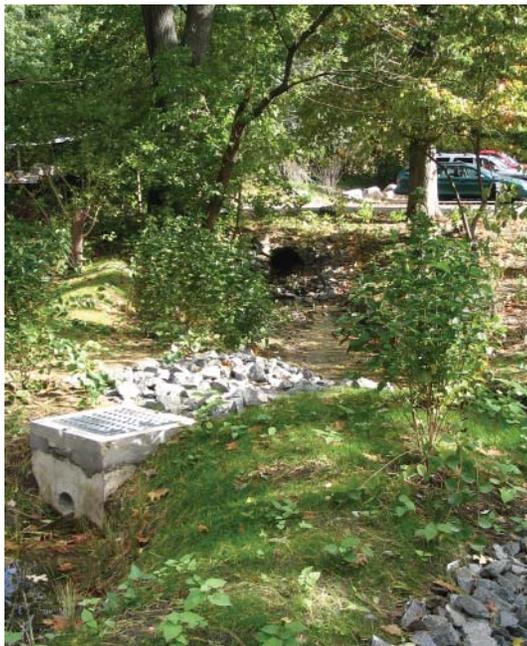
You have already characterized your watershed and undertaken assessments that have identified problems, impairments and threats that your watershed is facing and where there are opportunities for specific improvements. As you craft your watershed plan you will need to develop watershed management



Esopus Meadows, Hudson River



East River, New York City



Stormwater treatment, Westchester



Six Mile Creek restoration, Caroline

recommendations to achieve your goals.

Watershed recommendations are generally broken down into two categories:

- Regulatory and programmatic actions - includes recommended changes to local laws and programs identified during the municipal and field assessments. Examples include adopting a stream buffer or stormwater ordinance, updating development standards to promote better site design, hiring a watershed coordinator, or enhancing a municipal street sweeping program.
- Restoration and protection projects - includes land acquisition, structural activities such as stream restoration or stormwater retrofits, and educational programs such as storm drain stencils that are implemented on-the-ground and are identified during field assessments.

As you begin to develop recommendations, use existing data and the information collected while preparing your watershed characterization and assessments to help you frame your recommendations. These assessments will help you develop specific management recommendations based on existing problems. Aquatic corridor assessments might lead you to identifying areas needing streambank stabilization, flood control management, or barrier mitigation. Similarly, upland assessments might lead you to identifying areas in need of buffer restoration, agricultural best management

practice education, or stormwater retrofits.

Think about what the problems are, where they are located, and what on-the-ground project or regulatory action can help reduce adverse impacts to the watershed. It is often helpful to organize recommendations into watershed-wide and subwatershed recommendations.

Watershed-wide recommendations will include broad-reaching recommendations for the entire watershed. These recommendations may include building capacity of the watershed organization; adopting local laws for environmental protection; or creating a monitoring and project tracking system.

Subwatershed recommendations are site specific. Subwatershed recommendations can include implementing streambank stabilization on a specific creek; installing stormwater retrofits on a specific road; or performing further stream assessments at specific locations. The subwatershed scale offers a variety of water quality and management opportunities. Take a close look at your subwatersheds to help focus and prioritize your recommendations. By doing this, you can tailor recommendations to specific problem areas.

You may want to develop management recommendations that focus on a particular pollutant, such as nitrogen. In this case, all activities generating that particular pollutant may need to be better controlled. Alternatively,

recommendations may focus on a single activity known to be the most significant source of a pollutant. For example, road runoff might be a significant source of pathogens to a lake, or failing septic systems might be the most significant source to that lake.

When developing your recommendations, keep in mind that it may take more than one approach, project, or action to fully address a particular problem. Remember to cover all your bases and look at the problem from all angles. Each recommendation does not have to meet all your watershed goals, but collectively they should. Involve the public when deciding which alternative is best for your community. This will help build support for your project.

When generating a list of potential recommendations, consider:

- the water quality, quantity, and related infrastructure such as outfalls and other conveyances
- the sources and extent of pollution and the various types of pollutants
- uses and activities impaired by pollution
- local nonpoint source pollution management programs and practices

- existing institutional arrangements of local, state and federal agencies, and roles of regional planning boards and non-governmental groups in protecting water quality
- existing land and water use laws, including zoning, site plan review, harbor management, erosion and sediment control, and wetlands and watercourse laws to see if they deal with water quality issues
- key resources warranting special protection or restoration

Your recommendations should be well justified and include a summary of supporting data compiled for the watershed characterization. Data should include information on water quality, land use or natural resources, as well as a discussion of current problems and future threats. Recommendations should also include maps and photographs showing project locations and conditions.

Developing recommendations and preparing an implementation strategy

Having a list of recommended on-the-the ground projects and regulatory and programmatic actions is a good start to implementation. Now you need to take these further. Preparing an



Watershed-Based Stormwater Management on Eastern Long Island

The Suffolk County Department of Health Services is implementing stormwater management plans in four pilot watersheds on eastern Long Island to address runoff from farms, villages, and commercial properties. The project involves identifying potential stormwater retrofits in each watershed and developing a ranking system to identify the top sites for priority construction. Factors considered in the ranking system include the potential reductions in nitrogen and bacterial loading, construction cost, land ownership, permitting constraints, construction and maintenance access, maintenance burden, habitat potential, and supplemental public benefit (e.g., educational opportunity). Project sites were scored and ranked to develop a “short list” of projects for immediate implementation. This ranking will be used to focus funding for stormwater retrofits over the next several years. (www.co.suffolk.ny.us/)



Black River, Tug Hill



Lake Ontario beach and dunes

implementation strategy will help you develop your ideas and allow you to set out a systematic plan for putting your recommendations into action.

Most communities will not be able to implement all the recommended actions or projects simultaneously due to staffing, funding, and time constraints. When it comes to an implementation strategy, prioritizing your recommendations will help you decide which projects to tackle first.

When prioritizing recommendations you may want to use some ranking factors to compare your projects and actions. It may also be helpful to prioritize your on-the-ground projects and your regulatory actions separately.

Some potential ranking factors include:

- Watershed goals - Will the project address watershed goals, and how many?
- Subwatershed priority - Does the project lie within a priority subwatershed?
- Vulnerability - Is the project area likely to be developed or impacted in the near future?
- Pollutant reduction - How much pollutant reduction will be achieved?
- Habitat value - Will the project improve, conserve, create, or enhance wildlife habitat?

- Cost - What is the overall cost, including planning, design, and implementation?
- Permitting - What permits or approvals are needed? What is the time period for permit issuance?
- Maintenance - What are the maintenance requirements? Is special equipment needed?
- Land owner cooperation - Are landowners in support of the project? Are they willing to provide necessary easements?
- Project integration - How well can this project be integrated with other initiatives and projects to gain maximum benefits?
- Access - How difficult is access to the project site? Will steep slopes, soils, or other barriers limit access?
- Innovation - Does the project involve a practice that has not yet been implemented in the community? Can the project be used as a demonstration site?
- Partner involvement - How many partners will need to be involved in project implementation?
- Public visibility - Will the project be in the public eye? Will the community be able to learn more about water quality and watershed planning from the project?

Case Study: Lake George Watershed

The Lake George Watershed Coalition - comprised of municipalities, non-governmental organizations, county and state agencies, and citizens interested in preserving the beauty and health of Lake George - developed a plan to manage the Lake George watershed titled *Lake George - Planning for the Future*. With the number of diverse groups involved, it was essential to gain consensus on the issues affecting Lake George.

During the watershed planning process, the Lake George Watershed Coalition acknowledged the need to address four key actions in order to develop and implement a successful watershed plan. These included:

- *Providing staff* for the development and implementation of the plan;
- *Reviewing previous studies* relating to water quality issues and land use;
- *Establishing a report card* of successes and status of implementation within the watershed; and
- *Developing public participation* during plan development and implementation.

Addressing these key actions early on in the planning process resulted in a document that reflects consensus and includes comprehensive recommendations to address nonpoint source pollution, a major concern in the watershed and a priority recommendation in *Planning for the Future*. Since the completion of the plan in 2001, twenty-five stormwater management projects have been completed which together eliminate and/or treat over 250,000 gallons of runoff per day.

The Lake George Watershed Coalition also recognizes the importance of water quality monitoring. Biweekly samples are collected and analyzed to track the rapid changes that occur in water quality during the spring. Monitoring is conducted at 12 sites throughout Lake George, which allows planners, scientists, and citizens to track the health of the lake and determine the effectiveness of water quality improvement projects.

Public outreach and education is another priority identified in *Planning for the Future*. The Coalition supports a number of public outreach programs including an interactive web site and cable television programs that highlight water quality issues and invasive species such as zebra mussels and Eurasian watermilfoil.



Volunteer sampling

The Dutchess County Better Site Design Roundtable

By reviewing the development codes of the Towns of Wappinger and Clinton, the Dutchess County Environmental Management Council determined the extent to which Better Site Design principles could be applied in each community. Better Site Design principles aim to reduce impacts from traditional types of development and use innovative design techniques to maintain natural resources on a site. During the review process, the Dutchess County Environmental Management Council hosted a Better Site Design workshop and roundtable in April 2005 to discuss options that could be employed in the Hudson River Watershed. The results of the development codes review and the workshop have been used to kickoff a county wide roundtable process to revise existing codes and ordinances that will promote environmentally friendly development.



Wappingers Falls

Once you have generated a list of priority recommendations, you now have to think about how you will begin to implement them. You will need to ask yourself:

- Who will be involved in implementation?
- What permits will be needed if it is a construction project?
- What funding sources are available to help support the project?
- How much time will it take? Will you need to phase the project? How long will the review process take?

Presenting your recommendations clearly in your watershed plan will help you answer some of these questions and allow potential partners and funding agencies to determine whether the time and assistance they provide will be well spent. Placing brief descriptions of projects and other actions in a table will clearly show the priority of projects and how you expect to implement them.

The implementation strategy does not have to be very detailed. As more information on individual projects is gained, budgets evolve and your experience grows, the implementation strategy can be updated. The elements of an implementation strategy include:

- *Watershed goal(s) targeted* - reference specific watershed goal(s) and objective(s) to be addressed
- *Target area* - identify whether each set of recommendations targets the whole watershed, a specific subwatershed, a specific pollution generating activity, a municipal jurisdiction, or other defined area, such as a stream corridor
- *Project leader/Other involved organizations* - identify which partners will take the lead on implementation and which ones will assist on the project
- *Potential funding sources* - determine agencies/organizations that could provide grant funding for specific projects and other actions
- *Cost* - provide cost estimates for both capital improvement projects and regulatory or programmatic changes. Also include costs for project monitoring
- *Implementation timing/Schedule* - consider the need for phasing by pollution-generating activity or by subwatersheds and estimate when the implementation of specific projects and other actions should take place

Table 5.1 shows an example of an implementation strategy.

Table 5.1 Sample Watershed Implementation Strategy								
Management Recommendation	Goal	Target Sub-watershed	Project Leader* & other involved organizations	Potential Funding Sources	Potential Cost†	Implementation Timing		
						1 year	2-5 years	5+ years
Build capacity of watershed organization and coordinator	1, 2, 4, 5	All	Watershed Task Force* SWCD, County Planning Dept., Town A, Town B	NYS DOS, NYS DEC, EPA	\$15,000	X		
Adopt local laws for environmental protection	10, 13, 14	All	Town A*, Town B*, NYS DOS, Regional Planning Council	NYS DOS	\$20,000- \$60,000	X		
Implement priority stream restoration	7, 10	A, C, E	Watershed Task Force*, NYS DEC, SWCD, Town B,	NYS DEC; Hudson River Estuary Program	\$260,000		X	
Install priority stormwater retrofit	11, 12	B, D, E	SWCD*, Watershed Task Force, Town A, NYS DOS, NYS DEC	NYS DEC; NYS DOS; NYS DOT	\$350,000		X	
Illicit discharge detection and elimination	11	C, E, F	Watershed Task Force*, Town B, County DOH	NYS DEC, NYS DOH, EPA	\$7,200	X		
Monitoring and project tracking	2, 3	All	Watershed Task Force*, NYS DEC, USGS			X	X	X

† Potential costs are for illustrative purposes only * Denotes project leader



Agriculture, Susquehanna River Watershed



Clarks Gully, Italy

It will also be helpful to think about which recommendations can be implemented in the short, mid, and long-terms. This will help you prioritize your projects and plan for implementation. Examples of short to long-term recommendations include:

Short-term (years 1 and 2)

- Identify/hire a watershed coordinator
- Establish conservation easements to protect remaining sensitive habitats
- Implement easy demonstration projects (stream buffer plantings, rain gardens, stream cleanups) and begin permitting and design process for top priority projects
- Initiate enforcement and critical maintenance activities (i.e., illicit discharges and culvert cleanouts to alleviate flooding)

Mid-term (years 2 - 4)

- Update local land use laws or ordinances to protect stream buffers, encourage conservation design, improve stormwater treatment, and provide erosion control
- Build on or create an education program to target specific pollutants and behaviors of concern

- Implement top three stream restoration and stormwater retrofit projects
- Prepare and submit grant applications for special studies (i.e., greenway planning, septic system surveys, hydrologic modeling)

Long-term (years 5 and beyond)

- Identify sources of funding for long-term implementation
- Establish monitoring and tracking program
- Conduct special studies
- Report progress and update the watershed plan

Keep in mind that the first project that you implement may not be ranked as the highest priority. It will usually be one that can be achieved quickly, with positive and visible results.

Requesting review and comment

Once you have prepared a draft watershed plan, it is important to send the draft to your partners for review and comment. You should also provide the public a chance to review the plan and provide comments. One way to do this is to conduct a public meeting where you can provide partners and the community with an overview

of the document and explain what types of comments you may be looking for. You may want to consider making the draft available to people electronically. Having the plan available on a website or on CDs may allow you to reach a broader audience and may save you money by reducing the number of paper copies needed. Make sure to give people enough time to fully review the document; typically, a month is an adequate amount of time.

Below is a list of agencies and organizations that may provide a critical review of your plan:

- NYS DOS Division of Coastal Resources
- NYS DEC Division of Water
- NYS Department of Health
- NYS Department of Agriculture and Markets
- County Soil and Water Conservation District
- County Health Department or Environmental Agency
- County Water Quality Coordinating Committee
- County Planning Department
- Regional Planning Agency
- Municipal Water Supplier or Water Authority (District)

Remember, the goal of the public review is to gain input from the community and from those that can help with implementation. Public review will also help attain overall support for the plan and identify or resolve any issues that may arise. Once comments are addressed, you can finalize your watershed plan.



Fishkill Creek, Beacon



Bronx River volunteers and staff assess restoration potential