CHAPTER FOUR: IDENTIFYING OPPORTUNITIES FOR IMPROVEMENT

While much can be learned about a watershed through developing a characterization report, there is no substitute for getting out in the field to evaluate on-the-ground conditions. Field assessments along water resource corridors and upland areas can help you gain a greater understanding of what is going on in the watershed as well as identify opportunities for improvement. In this chapter, we will work through the following steps:

- Prioritizing subwatersheds
- Evaluating watershed conditions

Prioritizing subwatersheds

Depending on watershed size, assessment needs, and staffing capacities, you may or may not have the resources available to conduct an entire watershed-wide assessment at one time. By prioritizing your subwatersheds you can target your field assessment to one or two priority areas early on in the process. Priority subwatersheds will generally be those that are impaired, are the most vulnerable to future development, contain important resources, or present the best opportunity for improvement. To help prioritize subwatersheds, consider selecting a manageable number of factors that can be used to compare subwatersheds. These factors, such as percentages of impervious cover, forests, and agricultural land, can be used to score and weigh subwatersheds. Examples of factors that can be used are summarized in Table 4.1. Many factors can be identified by revisiting the characterization report.

A written summary can be prepared that supports the selection of priority subwatersheds, explains the factors used in the ranking process, and identifies subwatersheds on a simple watershed map.

Evaluating watershed conditions

Up to this point you have generated a general characterization of your watershed. You know your watershed boundaries; you know how many streams, rivers, lakes, and ponds are found within your watershed; you know what local controls are focused toward natural resource protection; and you have a general idea of pollutant loads generated throughout the watershed.

To evaluate and refine your characterization and to develop specific management recommendations and site specific projects, it is important to understand and examine several key characteristics of aquatic and upland systems:

- *Chemical* - the chemical composition of water and sediment affects the living resources and human uses that can be supported within the waterbody. Specific parameters that can be monitored include dissolved oxygen, pH, temperature, salinity, conductivity, nutrients, pathogens, and toxic contaminants.
- *Biological* - the composition of living organisms, including fish, macroinvertebrates, and aquatic vegetation, can reveal information about the conditions of habitats. Biological communities are often used as indicators of ecosystem health and can be used to track or predict significant changes. For example, sensitive macroinvertebrate species, such as mayfly larvae, are indicators of high quality freshwater stream habitat.
- *Physical* - the physical environment provides the foundation for all chemical and biological characteristics. Physical conditions, including sediment composition, hydrology, and bank/shoreline erosion, can provide important information regarding overall health.
- *Human Influenced* - in addition to assessing ecological characteristics, it is also important to inventory how waterways and waterbodies have been impacted by humans. Outfalls and illicit discharges, barriers to flow, water use, and other notable impacts can be identified through field assessments.

Table 4.1 Example Factors Used to Classify and Rank Subwatersheds

Impairment • % streams with CWA Section 303(d) listing, # violations of water quality standards • % impervious cover (current) • % cropland • Livestock density • % forested stream buffer *Sensitivity* • % forest cover or % forest interior • % critical habitat for rare, threatened and endangered species • % wetlands • Benthic macroinvertebrate diversity • Fish diversity • Physical in-stream habitat *Future Vulnerability* • % future impervious cover • Net change in future impervious cover • % developable land • % future forest loss	*Restoration Potential* • Length of eroded stream bank • Condition of sewer system • Density of point sources or hotspots • Density of septic systems • Density of stormwater outfalls • Density of stormwater treatment practices • # road crossings per stream mile • % detached residential land • Age of development *Other useful metrics* • Density of streams • % public land • Presence of community or watershed organization • Presence of public drinking water supply • Presence of combined sewer systems

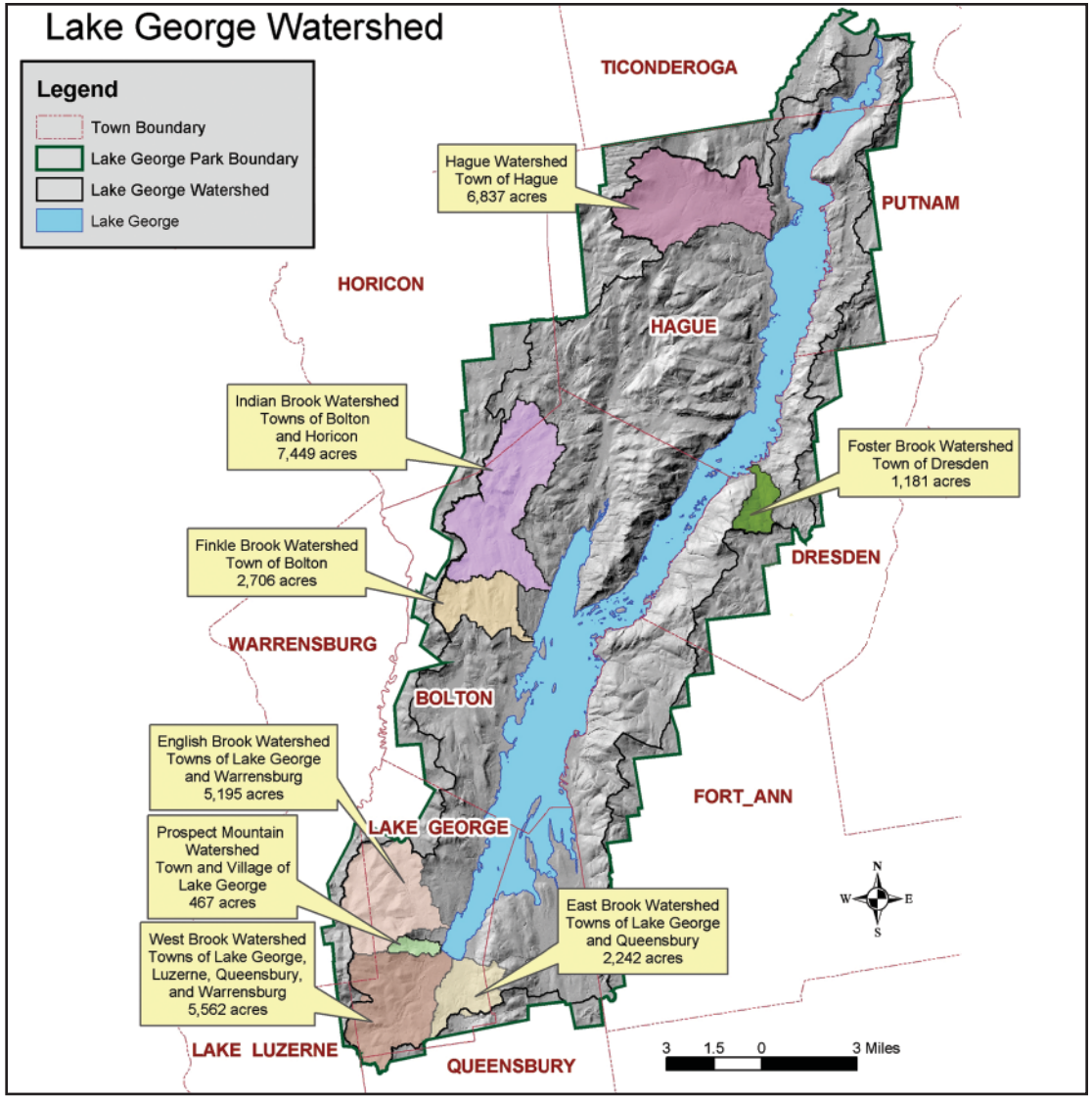
Conducting field assessments in your watershed is a good way to study these characteristics and collect important information that will help you understand your watershed in more detail.

The data you collect during your assessments will help you distinguish between high quality habitats and waterbodies and those that have experienced some level of degradation.

Assessments will also allow you to target opportunities for water quality improvement, habitat restoration, or open space protection. You should build on previous assessment work - don't reinvent the wheel. When considering the types of assessment to use, you should choose those that:

- can be conducted by existing staff, local consultants, or trained volunteers - keep it simple and allow those involved in the planning process to get some field time and develop a sense of what is going on in the watershed

- are designed to monitor and track conditions over time - make sure you are able to do the assessment from year to year to see what improvements have been made



Lake George subwatershed map

Before you begin your assessments you may want to research additional sources of existing data for your watershed. Types of available data include biological, physical, and water quality data. Table 4.2 identifies some of these important sources of data.

Watershed assessments should be conducted in both the aquatic and upland systems in order to get a comprehensive understanding of existing conditions throughout the entire watershed.

Aquatic Assessments

Aquatic assessments consist of collecting data associated with a particular waterbody and its riparian buffer. These assessments allow you to gain a greater understanding of in-stream conditions, locate stormwater outfalls and illicit discharges, identify areas of concern, and generate potential management recommendations.

- *Stream Assessments*

  Stream assessments are done along identified stream reaches throughout the watershed. Data is often used to evaluate physical in-stream conditions where water quality and biological communities are also sampled. Physical conditions, including sediment composition, hydrology, and bank/shoreline erosion, can provide important information regarding overall stream health. This is a useful assessment to quickly identify impacted and sensitive subwatersheds.

Table 4.2 Important Sources of Monitoring Data in NY

Type of Data	Source	Description
Hydrologic, Water Quality	USGS National Water Information System	Surface water data, groundwater data, and water quality data for more than 1.5 million sites nationwide.
Biological	NYS DEC Statewide Stream Biological Monitoring Program	Biological sampling of streams and rivers throughout the state, as part of the Rotating Intensive Basins Studies (RIBS) Project.
	NY Regulatory Freshwater Wetlands maps, available at CUGIR website	Maps of regulatory wetlands across the state.
	USGS GAP Program at Cornell University	Part of a nation-wide geographic analysis of distribution of native aquatic and terrestrial species to identify species gaps for conservation, data includes public and conservation lands, species distribution.
	Hudson River Watch	Annual Bioassessment Surveys of Hudson River Watershed, data available directly online, along with guidance on macroinvertebrate identification and assessment protocols.
Water Quality	National Water Quality Assessment Program (NAWQA), available at CUGIR website	Ambient fixed station water quality monitoring.
	NYS DEC Bureau of Water Assessment and Management	Chemical sampling of streams and rivers throughout the state, as part of the Rotating Intensive Basins Studies (RIBS) Project.
	US EPA BEACON Program	Database of beach monitoring data and advisories, through a volunteer partnership with beach managers.
	NYS DEC Bureau of Marine Resources	Bacteriological monitoring of shellfish beds to determine the status of shellfisheries for public consumption.
Physical	County Soil and Water Conservation Districts often have some of this information	Streamwalk designed to identify environmental problems such as eroding stream banks, inadequate stream buffers, and to collect habitat data.

Popular stream assessment protocols include the EPA recommended *Rapid Bioassessment Protocol* (Barbour et al., 1999) which uses the presence of aquatic invertebrates to determine stream health, and the *Stream Visual Assessment Protocol* (USDA, 1998) which focuses on stream bank stability. The NYS DEC Stream Biomonitoring Unit Quality Assurance Work Plan also highlights procedures for biological stream monitoring and has a detailed quality assurance/quality control component. Training is provided periodically by the Greene County Soil and Water Conservation District and by Hudson Basin Water Watch, with support from NYS DEC. The Upper Susquehanna Coalition has developed the ArcView Stream Evaluation and Assessment Monitoring System (AVStrEAMS) that helps communities develop assessment reports focused on a particular stream segment. The program helps organize, store, and utilize GIS data.

- *Corridor Assessments*

  Corridor assessments include collecting data for an entire stream or shoreline network rather than a specific stream reach. By walking the entire stream or shoreline, extensive information can be collected on outfall location and condition, stream bank/ shoreline erosion, trash accumulation, and riparian buffer quality. Specific restoration and protection projects can be identified and a more comprehensive picture of the subwatershed stream corridor can be understood. The *Unified Stream Assessment* (Kitchell and Schueler, 2004) is a guide that can be used to conduct corridor assessments.

- *Geomorphic Assessments*

  These assessments are often used to evaluate bank stability. The Greene County Soil and Water Conservation District, under contract with the NYS DEC, has been developing and implementing a Geomorphology Based Stream Stability Assessment methodology. This method focuses on the use of stream morphology or form as the basis for stream classification, stability assessment, and restoration design strategies, and is a more thorough assessment than the Stream Visual Assessment Protocol outlined above.

- *Wetland Assessments*

  Wetland assessments can range from a rapid survey of observable impacts to more detailed assessments of functional capacity, reference conditions, or restoration potential. Depending on your needs, the rapid approach may prove ideal for short-term watershed and wetland planning, followed by more detailed assessments where appropriate. Many different wetland

Stream restoration workshop, Auburn

Wetland at Sucker Brook, Canandaigua

Stream barrier inspection

Wappinger Creek, Wappingers Falls

assessment methodologies exist. As these are often specific to a region or wetland type, care should be taken to decide which method is right for your watershed. In the Wetland Journal (Vol.12, No. 4) Bartoldus offers a selection matrix to assist wetland managers in distinguishing between wetland assessments and for choosing an appropriate protocol for use. The NYS DEC has also published the *New York State Freshwater Wetlands Delineation Manual* (1995). This manual provides methods, field indicators, and technical criteria for freshwater wetland delineation.

- *Vernal Pond Assessments*

  Vernal pond assessments can help identify high quality ponds that are critical for wildlife. Vernal ponds, while not containing fish, are vital habitats for salamanders, frogs, fairy shrimp, and other species. A methodology for assessing vernal ponds and identifying conservation strategies can be found in *Conserving Pool-Breeding Amphibians in Residential and Commercial Developments in the Northeastern United States* by Aram J. K. Calhoun and Michael W. Klemens (2002).

- *Outfall Inventories and Illicit Discharge Investigations*

  Outfall investigations can be done in conjunction with other stream and shoreline assessments. Problem outfalls can be found using dry weather monitoring of indicators such as bacteria that signify the presence of a possible wastewater discharge, or by evaluating all outfalls during stream walks to discover suspicious flows or evidence of discharge events. More guidance on outfall inventories and methods for finding and eliminating illicit discharges can be found at *(www.dec.ny.gov)*.

<u>*Upland Assessments*</u>

Along with assessing aquatic environments, investigating upland conditions is also critical to comprehensive watershed planning. Upland assessments involve field work directed away from specific waterbodies and focused more on 'dryland' evaluation. These assessments consist of investigating residential areas for possible pollutant contribution, open space investigation to identify possible areas for conservation, and hot-spot inventories to identify illicit discharges and possible point sources of pollution.

- *Impervious Cover Assessments*

  The Impervious Cover Model (ICM), developed by the Center for Watershed Protection, can help you predict current and future water resource conditions and craft improvement recommendations. Doing this desk-based assessment first will help you target field assessment needs.

The model assumes that watershed and water quality health begin to decline when impervious cover exceeds 10%, with severe degradation expected beyond 25%. Using the ICM, subwatersheds can be grouped into one of four categories and can be used to develop subwatershed goals (Figure 4.1). Subwatershed goals will help you focus recommendations for improvement, restoration, and protection.

Four subwatershed categories that can be used are:

- *Sensitive* (<10% impervious cover) - good to excellent water quality, typically high, stable channels, excellent habitat structure, and diverse fish and aquatic insect communities. When working in sensitive watersheds it will be important to maintain stream biodiversity and channel stability in order to maintain water quality. Goals may include creating a land protection program, buffer ordinances, or more stringent development controls.

- *Impacted* (10-25% impervious cover) - clear signs of degradation due to changing land use such as increased urban development. Greater stormwater flows begin to alter stream geometry and coastal waters and show measurable nitrogen and bacterial loading. Stream biodiversity declines to fair levels, after the most sensitive fish and aquatic insects disappear from the stream. Since water quality is starting to decline, subwatershed goals should focus on limiting degradation of habitat quality and maintaining a good biological community.

- *Non-supporting* (26-60% impervious cover) - channels highly unstable, exhibit severe widening, down-cutting, and streambank erosion. Many streams have been hardened. The water and biological quality of non-supporting watersheds is generally considered poor and is dominated by pollution tolerant insects and fish. When working in a non-supporting subwatershed it will be important to reduce downstream pollutants and alleviate downstream flooding. Goals should also focus on streambank stabilization and stormwater management.

- *Urban drainage* (>60% impervious cover) - stream often piped underground, or consists of concrete channels that do not support any aquatic life and serve only to convey flows. Goals for urban drainage subwatersheds should be similar to non-supporting subwatersheds and focus on reducing nonpoint source pollution.

The ICM allows predictions to be made based on build-out of current zoning to better understand which subwatershed may become degraded over time. Using the ICM, you can gain a clearer understanding of the potential impacts and problems affecting specific subwatersheds and determine where further studies need to be conducted, where potential protection measures should be focused, and where more intensive nonpoint source pollution management is needed.

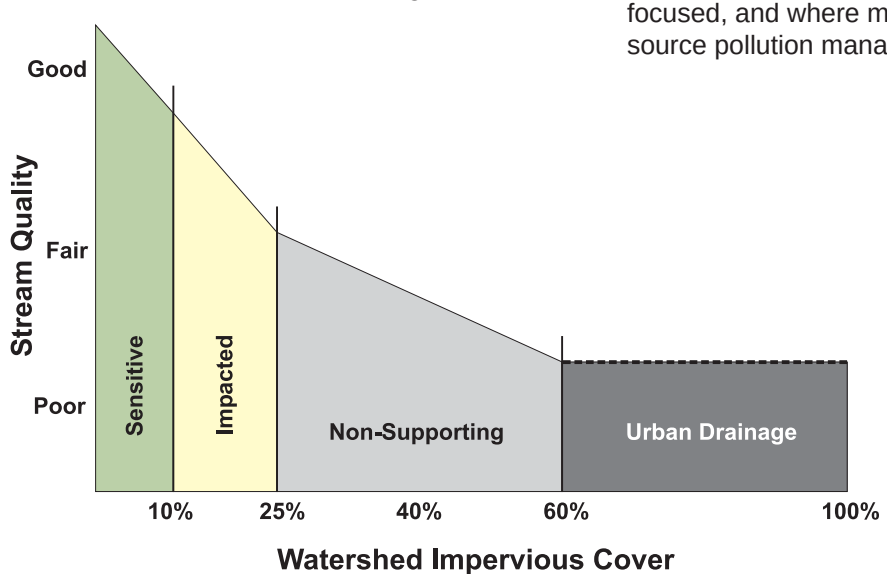


Figure 4.1 Stream and watershed quality as a result of impervious cover.

Eelgrass and salt marsh restoration in Shinnecock Bay

Cornell Cooperative Extension (CCE) is conducting an assessment of eelgrass in Shinnecock Bay. The goal of this project is to restore coastal ecosystems by restoring eelgrass and scallops, which naturally coexist in this area. The project consists of analyzing aerial photography to identify eelgrass meadows, and then ground truthing those aerial photographs. Going out into the bay, CCE assesses the populations of scallops and eelgrass by looking at stem density, macro algae, bottom types, depth and nutrients. This assessment will help prioritize restoration projects within the bay.

The Cornell Cooperative Extension previously participated in a salt marsh assessment project during the 1990s along the Southampton coastline. Working with a local consultant, degraded town owned salt marshes were identified and prioritized for potential restoration projects. One successful project restored a former dredge spoil site to a productive salt marsh. The site now offers public access, provides fish and wildlife habitat, and includes a trail and gazebo heavily used by bird watchers.

More information about eelgrass restoration is available through Cornell Cooperative Extension's Eelgrass Program. *(http://counties.cce.cornell.edu/suffolk/habitat_restoration/seagrassli/index.html)*

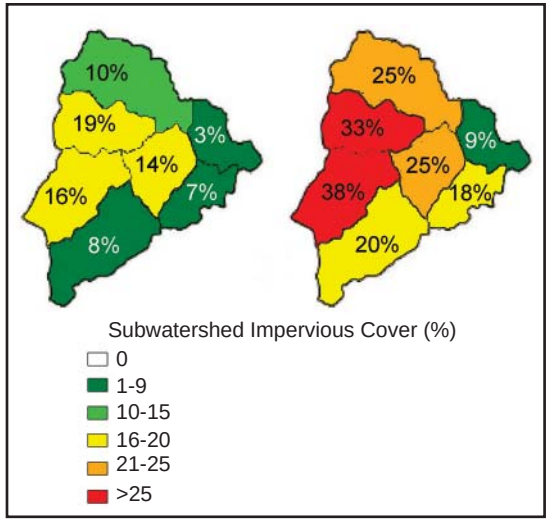


Figure 4.2 Shifting Impervious Cover

With changing land uses, subwatersheds can often shift from one category to another. Subwatersheds that are expected to shift from sensitive to a more impacted category in the future are of particular interest to watershed planners because they are likely to experience significant degradation unless development is restricted through zoning regulations (e.g., cluster development), development criteria and/or land conservation techniques to protect natural hydrology and pollution abatement functions. Impacted subwatersheds not expected to shift to non-supporting may become priority subwatersheds for restoration due to a higher chance of long-term success.

Subwatersheds that are highly impacted, such as those considered urban drainage, can also benefit significantly from restoration, and may become a priority in your watershed based on the opportunity to improve the quality of life in the surrounding community. Figure 4.2 illustrates subwatersheds shifting from sensitive to impacted conditions under future growth scenarios.

It is important to keep in mind that the ICM is only a guide to the approximate relationship between impervious cover and water quality. Water resources are variable. Factors such as gradient, watershed size, flushing rates, local geology, age of subwatershed development, and past management practices can and will make some water resources depart from these predictions.

- *Urban Pervious Area Assessments*

These assessments are useful in identifying areas such as vacant lots, parks, and large turf areas that may have compacted soil, invasive plants, and fragmented habitat. Assessments of these areas should be designed to identify sites where the soil and vegetative cover can be restored to better meet canopy cover, infiltration, and community health goals. The *Unified Subwatershed and Site Reconnaissance* (Wright et al, 2004) and the *Urban Watershed Forestry Manual* (Capiella et al, 2005) describe protocols for assessing natural area remnants and open space.

- *Upland Conservation Area Assessments*

  Conservation area assessments are useful to investigate the quality of and threat to remaining natural areas in your watershed and to determine which sites should be priorities for land acquisition or other conservation efforts. Potential areas for conservation often include upland contiguous forest tracts; rare, threatened, or endangered species habitat; recharge areas; agricultural or historic preservation sites; steep slopes; etc. Field assessments can be targeted to specific areas through mapping tools such as those provided by the New York Open Space Conservation Plan and the New York Natural Heritage Program (NHP). NHP manages a database of information about the location of habitat for rare, threatened and endangered species, and provides information on field techniques. The New York Flora Association also maintains a New York Flora Atlas, which provides information on the distribution of plants, habitat specifics, and taxonomy.

- *Neighborhood Source Assessments*

  Neighborhood Source Assessments are used to evaluate residential areas to determine which areas convey substantial amounts of stormwater pollutants directly into receiving waters or to stormwater conveyance systems. Businesses, residents, and landowners in these areas can then be targeted for education and outreach programs (e.g,. pet waste, lawn care practices, buffer management, and storm drain stenciling) and onsite retrofits (e.g., downspout disconnection, rain gardens). These assessments can also be used to include local homeowner associations as partners in the watershed planning process, as well as to check on the maintenance status of residential stormwater practices. *The Unified Subwatershed and Site Reconnaissance* (Wright et al., 2004) outlines a protocol for assessing neighborhoods. *The Home-A-Syst Assessment* by Cornell Cooperative Extension provides tools for evaluating homes and property for pollution and health risks.

- *Hotspot Source Investigations*

  These investigations are useful for confirming which commercial, industrial, and municipal facilities are significant sources of stormwater contaminants in the subwatershed. This involves assessing the outdoor storage, waste management, vehicle maintenance, and other pollutant generating behaviors at typical hotspot locations. This investigation can help tailor pollution prevention plans and help target areas for pollution source control education. The *Unified Subwatershed and Site Reconnaissance* (Wright et al, 2004) outlines a protocol for assessing hotspots.

- *Farm Assessments for Water Resource Protection*

  Farm assessments can be used to locate potential water quality degradation areas and help create an action plan to remediate problems. Through the 5-tiered approach of Agricultural Environmental Management (AEM), the New York State Department of Agriculture and Markets and local soil and water conservation districts provide assistance to farmers by surveying current farm activities and identifying potential environmental concerns. Farmers are then able to prioritize concerns and work with resource professionals to develop possible strategies and solutions and implement best management practices. Cornell University Cooperative Extension also provides assistance in farm assessments.

- *Stormwater Retrofit Inventory*

  Stormwater retrofits help communities meet pollutant load reduction goals, improve flood attenuation, or increase infiltration. Retrofit inventories identify opportunities to provide stormwater treatment in developed areas where practices previously did not exist or are ineffective. Typical sites that may be investigated for possible retrofit projects include culverts, storm drain outfalls, highway rights-of-way, open spaces, parking lots, and existing detention ponds. Sites can often be identified through stream, neighborhood,

Stormwater retrofit inventory

Stormwater treatment installation

and hotspot assessments, or sometimes through the use of aerial photography. This investigation is also useful in creating an inventory of existing structures that can be used to update mapping information.

- *Septic System Assessments*

  Septic system assessments can identify problem areas where there may be septic system failure. The New York Onsite Wastewater Treatment Training Network (OTN) has developed the *Uniform Inspection Documentation Form* and provides training in conducting septic system inspections. Cornell Cooperative Extension provides assessment tools for determining pollution risks in association with small water systems.

- *Source Water Assessments*

  Source water assessments are used to evaluate basic information about drinking water supplies. These assessments will help the community identify where their drinking water comes from and what contaminants could threaten their water supply. NYS Department of Health has an ongoing Source Water Assessment Program that focuses assessments on all public water supplies. Local assessments can be conducted to produce a comprehensive source water protection plan.

For more information on the above watershed assessments, go to: *www.nyswaterfronts.com*

When conducting assessments it is beneficial to keep in mind some key questions:

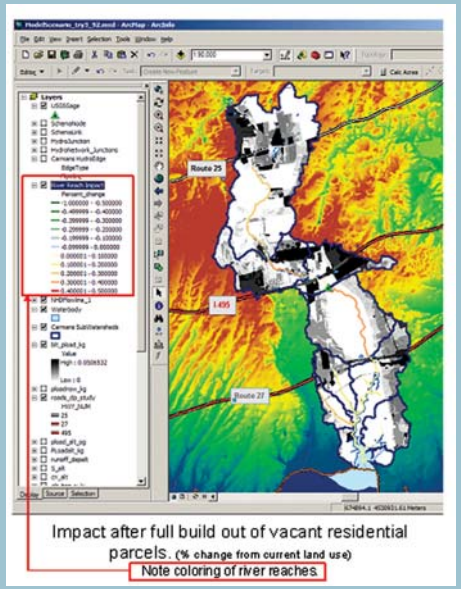
- What changes in pervious or impervious cover will affect water quality?
- Where would you expect impairments to be located?
- What types of improvement projects will help maintain or improve water quality? How can impacts be reduced?
- How can you maintain or increase the number (or acreage) of conservation areas that provide water quality benefits?
- What are the main human uses for these resources? How have they changed over time?
- What level of protection does this resource have? Is it publicly owned or owned by a conservation group? Is it protected by government regulation?
- Who in the community is knowledgeable about the natural areas in your watershed?

Nonpoint Pollution Runoff Potential Model

As part of the development of the Long Island South Shore Estuary Reserve comprehensive management plan, the Department of State Division of Coastal Resources developed a nonpoint source pollution runoff potential model. This GIS-based model factors in land cover, elevation, soils, and distance to surface waters and graphically depicts the relative risk of pollution to nearby surface waters.

The model has been useful in prioritizing stormwater retrofit projects in the Reserve and has been incorporated into stormwater discharge identification and mitigation plans for the towns of Islip, Oyster Bay, and Babylon. The model has also been applied in the Lake George watershed.

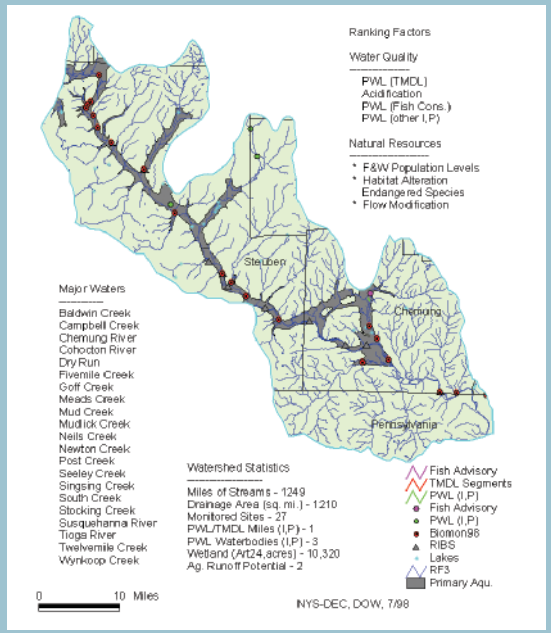
Through a partnership with SUNY College of Environmental Science and Forestry (ESF), the Division further developed a pilot dynamic nonpoint pollution interactive model for the Carmans River watershed on the south shore of Long Island. ESF delineated the watershed, developed a database of hydrologic data, and wrote additional code to implement the model. The model can help decision makers evaluate storm intensity, pollutant loading, development in a watershed, and the potential effects of mitigation. *(www.nyswaterfronts.com)*



Coastal development in Long Island

Case Study: Susquehanna River Watershed

Jim Curatolo, Watershed Coordinator for the Upper Susquehanna Coalition, identifies two key components in developing management opportunities within a watershed. One is to have a point person that develops and provides the link between and among a network of interested and involved citizens throughout the watershed and a network of interested governmental agencies. The second is having access to a Geographic Information System (GIS).



Jim, who coordinated the efforts of the Upper Susquehanna Coalition with a broad network of local citizens and local government agencies, sees GIS as a valuable tool for mobilizing activities, pushing projects forward, advocating for funds, and implementing projects throughout the watershed's 15 counties. Working with area farmers, best management practices were implemented on local farms, reducing nutrient and sediment loads to the Susquehanna River and its tributaries.

To address chronic flooding within the watershed and the associated problems of erosion, habitat loss, and water quality degradation, the Coalition used GIS to gather information about the watershed, track changes over time, and locate potential wetland creation and restoration opportunities. By storing flood waters, wetlands provide for groundwater recharge and slow runoff during storm events.

The resulting wetlands program focuses on creating and restoring wetlands in key locations throughout the watershed. The wetlands provide flood attenuation and improve habitat, water quality, and recreational opportunities. The wetlands program has been successful in completing many projects, including a 40-acre wetland complex in the Seeley Creek watershed among the over 400 acres already constructed. These wetland creation projects also enhance in-stream habitat in the Susquehanna River's tributaries by helping to dampen high velocity stream flows that tend to erode streambanks.

The Upper Susquehanna Coalition has also been instrumental in developing several watershed management plans. As headwaters of the Susquehanna River and the Chesapeake Bay, watershed management in the Catatonk and Seeley Creeks benefit downstream water quality beyond their own watersheds. Both plans represent a strategic process to managing flooding, habitat degradation, and streambank erosion. With prioritized projects and opportunities for restoration and protection, these plans not only address water quality within the Catatonk and Seeley Creek watersheds, but address issues that are important for the entire Chesapeake Bay.

- What value does the community place on these resources? Is there a community stewardship program?

- What types of education programs can be initiated to address nonpoint sources of pollution in residential neighborhoods and agricultural communities?

Here are a few things to consider when conducting field assessments:

- You may want to consider the time of year you conduct your assessments. Summer leaf out may make walking difficult, but plant identification is often easier. Snow cover often makes residential and natural area assessments difficult, as it becomes difficult to assess lawn care conditions or to determine soil suitability. Snow melt, however, may show polluted runoff - particularly from salt and other de-icing chemical applications. Identifying which outfalls may be discharging pollution may be easier to detect during dry weather conditions.

- While some field assessments should be left to professionals, there are many that can be conducted by trained staff and volunteers. Make sure that those conducting field assessments have been trained to do so. A training field day may be helpful for volunteers to practice conducting assessments and filling out data sheets. Training field days are also a good time for staff members or trainers to answer any questions that volunteers may have prior to conducting assessments.

- When heading out to the field it is important to be as well prepared as possible. Prior to conducting assessments, make sure you prepare field maps including recent aerial photography, topography, hydrology, and road maps. Prepare an itinerary. Identify where you will conduct your assessment, how you will get there, and what supplies you will need. Make sure to notify property owners that you will be conducting assessments in the area. They can often direct you to problem areas and provide a historical context to local watershed conditions.

- While data sheets can be very detailed and highlight all the information you will need to gather, there is no substitute for photographs. Consider taking a digital camera with you to document present conditions. Log all the photos you take. Include the date, time, and location and identify which data sheet the photo complements. A GPS (Global Positioning System) unit is also very helpful in identifying locations, photographs, and datasheets. The coordinates derived from the GPS unit will allow you to visit the exact same location from year to year.

- Watershed assessments present a unique opportunity to conduct outreach and meet residents of the watershed. Informally interview residents, business owners, and farmers to introduce them to the watershed planning process and to hear their concerns or ideas. Assessments are also useful in identifying watershed partners (i.e., schools, community associations, interested farmers) that should be included in the planning process and that can be key to implementation.

- Remember to always work in teams - there is always safety in numbers. Establish safety protocols and keep a cell phone handy - preferably in a waterproof container. Always be aware of private property boundaries. Limit disturbance to vegetation and habitat. If you have more than one team in the field working at different locations, be sure to meet up at the end of each day to 'debrief.' This provides quality control as well as an opportunity to share findings among team members.

Once assessments have been completed, you should have a good idea of the problems and threats that your watershed is facing and where there are opportunities for specific improvements. (Table 4.3) You will develop these issues and opportunities further as you pull together your watershed plan.

Table 4.3 Opportunities for Water Quality Improvement	
Aquatic Assessments	• Stream repair - bank stabilization, day-lighting, natural channel design, de-channelization • Outfall, sewer, or culvert maintenance and repairs • Potential stormwater retrofit • Discharge prevention; illicit discharge detection • Buffer restoration - reforestation, invasive management • Stream cleanups; dumping prevention • Fish barrier removal • Exclusionary fencing/alternative water source • Enforcement actions • Wetland protection and land acquisition projects • Wetland restoration candidates • Source water protection • Good housekeeping BMPs
Upland Assessments	• Inspection and maintenance tracking database • On-site septic upgrades • Downspout disconnection - rain barrels and rain gardens • Lawn care education • Pet waste signage and storm drain stenciling • Neighborhood stormwater practice maintenance • Buffer management • Stormwater retrofits and management • Pollution Prevention Plan - secondary containment, covered outdoor storage; improved vehicle operations • Nutrient management plans • Farm BMP application • Soil reclamation • Urban reforestation • Tree planting