FACT 1 SHEET

NYS County Water Quality Coordinating Committees

Source: The New York State Soil and Water Conservation Committee
http://www.agmkt.state.ny.us/soilwater/home.html

Sullivan County Water Quality Coordinating Committee—Teamwork Works!

Since nonpoint source (NPS) water pollution is a landuse issue, and land use decisions are made locally, no one level of government or single group of people can solve NPS problems. It take partners working together at federal, state, and local levels, including the private and public sectors, to tackle these issues.

County Water Quality Coordinating Committees (CWQCCs) were formed across New York State to develop and implement County Water Quality Strategies to address NPS issues. Since local governments can address land use issues and work with individuals to improve management practices, localities are able to make a significant contribution to NPS pollution prevention.

As County Soil and Water Conservation Districts are authorized by law to implement local programs to reduce NPS pollution, they become the focal point for establishing the CWQCCs and are key to implementing the strategies that identify and set local priorities. The Sullivan County WQCC was formed in 1992 and continues to meet on a quarterly basis to share issues of concern, develop strategies, and make recommendations.

Sullivan County WQCC Membership

Cornell Cooperative Extension of Sullivan County,
Delaware River Basic Commission,
The Eagle Institute,
NYS Department of Environmental Conservation,
NYC Department of Environmental Protection,
USDA Farm Services Agency,
NYS Department of Health,
Hudson Valley Regional Council,
National Park Service,
The Nature Conservancy,
The Basha Kill Association,
USDA Natural Resources Conservation Service,
Sullivan County Department of Planning & Community Development,
Sullivan County Soil & Water Conservation District,
The Upper Delaware Council

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1 NYS County Water Quality Coordinating Committee

FACT 2 SHEET

Nonpoint Source Water Pollution

Source: NEMO; University of Connecticut Cooperative Extension System
Haddam, CT 06438
nemo.uconn.edu

What is Nonpoint Source Pollution?
Nonpoint source pollution is a fancy term for polluted runoff. Water washing over the land, whether from rain, car washing or the watering of crops or lawns, picks up an array of contaminants including oil and sand from roadways, agricultural chemicals from farmland and nutrients and toxic materials from urban and suburban areas. This runoff finds its way into out waterways, either directly or through storm drain collection systems.

The term nonpoint is used to distinguish this type of pollution from point source pollution, which comes from specific sources such as sewage treatment plants or industrial facilities. Scientific evidence shows that although huge strides have been made in cleaning up major point sources, our precious water resources are still threatened by the effects of polluted runoff. In fact, the Environmental Protection Agency (EPA) has estimate that this type of pollution is now the single largest cause of the deterioration of out nation's water quality.

Whatever They Call It, Why Should I Care About It?
The effects of polluted runoff are not limited to large lakes or coastal bays. In fact, chances are that you don't have to look any farther than your neighborhood stream or duck pond. Water pollution in your town, and perhaps in your own backyard, can result in anything from weed-choked ponds to fish kills to contaminated drinking water. There's not much chance that you can ignore this problem, even if you want to. Concern over polluted runoff has resulted in and ever increasing number of state and federal laws enacted over the last five years. At the federal level, a permit program for stormwater discharges from certain municipalities and businesses is now underway, and coastal zone management authorities are in the process of adding nonpoint source control to their existing programs. In addition to implementing these federal programs, many states have passed laws altering local land use (planning and zoning) processes and building codes to address the problem of polluted runoff. The bottom line is that both polluted runoff and its management are likely to affect you and your town in the near future.

What Causes Polluted Runoff?
You do. We all do. Polluted runoff is the cumulative result of our everyday personal actions and our local land use policies. Here's a brief rundown on the causes and effects of the major types of pollutants carried by runoff.

Pathogens: Pathogens are disease-causing microorganisms, such as bacteria and viruses, that come from the fecal waste of humans and animals. Exposure to pathogens, either from direct contact with water or through ingestion of contaminated shellfish can cause a number of health problems. Because of this, bathing beaches and shellfish beds are closed to the public when testing reveals significant pathogen levels. Pathogens wash off the land from wish animal, farm animal and pet waste, and can also enter our waterways from improperly functioning septic tanks, leaky sewer lines and boat sanitary disposal systems.

Nutrients: Nutrients are compounds that stimulate plant growth, like nitrogen and phosphorous. Under normal conditions, nutrients are beneficial and necessary, but in high concentrations, they can become an environmental threat. Nitrogen contamination of drinking water can cause health problems, including "blue baby" syndrome. Over fertilization of ponds, bays and lakes by nutrients can lead to massive algal blooms, the decay of which can create odors and rob the waters of life-sustaining dissolved oxygen. Nutrients in polluted runoff can come from agricultural fertilizers, septic systems, home lawn care products and yard and animal wastes.

Sediment: Sand, dirt and gravel eroded by runoff usually ends up in stream beds, ponds or shallow coastal areas, where they can alter stream flow and decrease the availability of healthy aquatic habitat. Poorly protected construction sites, agricultural fields, roadways and suburban gardens can be major sources of sediment.

Toxic Contaminants: Toxic contaminants are substances that can harm the health of aquatic life and/or human beings. Toxins are created by a wide variety of human practices and products, and include heavy metals, pesticides and organic compounds like PCBs. Many toxins are very resistant to breakdown and tend to be passed through the food chain to be concentrated in top predators. Fish consumption health advisories are the result of concern over toxins. Oil, grease and gasoline from roadways, and chemicals used in homes, gardens, yards and on farm crops, are major sources of toxic contaminants.

Debris: Trash is without a doubt the simplest type of pollution to understand. It interferes with enjoyment of our water resources and, in the case of plastic and styrofoam, can be a health threat to aquatic organisms. Typically this debris starts as street litter that is carried by runoff into out waterways.

What Can I Do About All This?

First of all, you can begin to clean up your own act. There are many good publications and programs that can help you to do simple but important things, like conserving water, disposing of hazardous waste properly and gardening in an environmentally responsible manner. As you can see, polluted runoff is largely the result of the way we develop, use and maintain our land. These policies are largely decided at the municipal level, through the actions of town officials and local commissions like planning, zoning and wetlands. There are many techniques and regulations that can greatly reduce the effects of polluted runoff, and there are more being developed every day. The rest of this fact sheet series is devoted to telling you about your options. If you're on a local commission, learn a little more about polluted runoff and how you can combat it in the course of your everyday decisions. If you're not on a commission, ask your friends and neighbors who are what they are doing about polluted runoff.

FACT 3 SHEET

Impacts of Development on Waterways

Source: NEMO; University of Connecticut Cooperative Extension System
Haddam, CT 06438
nemo.uconn.edu

Key Finding

Standard land development can drastically alter waterways. Increase stormwater runoff associated with development often begins a chain of events that includes flooding, erosion, stream channel alteration and ecological damage. Combined with an increase in man-made pollutants, these changes in waterway form and function result in degraded systems no longer capable of providing good drainage, healthy habitat or natural pollutant processing. Local officials interested in protecting town waters must go beyond standard flood and erosion control practices and address the issue of polluted runoff through a multilevel strategy of planning, site design and stormwater treatment.

Disruption of the Water Cycle

When development occurs, the resultant alteration to the land can lead to dramatic changes to the *hydrology*, or the way water is transported and stored. Impervious man-made surfaces (asphalt, concrete, rooftops) and compacted earth associated with development create a barrier to the percolation of rainfall into the soil, increasing surface runoff and decreasing groundwater infiltration (Figure 1). This disruption of the natural water cycle leads to a number of changes, including:

- increased volume and velocity of runoff;
- increased frequency and severity of flooding;
- peak (storm) flows many times greater than in natural basins;
- loss of natural runoff storage capacity in vegetation, wetland and soil;
- reduced groundwater recharge; and decreased base flow, the groundwater contribution to stream flow. (This can result in streams becoming intermittent or dry, and also affects water temperature.)

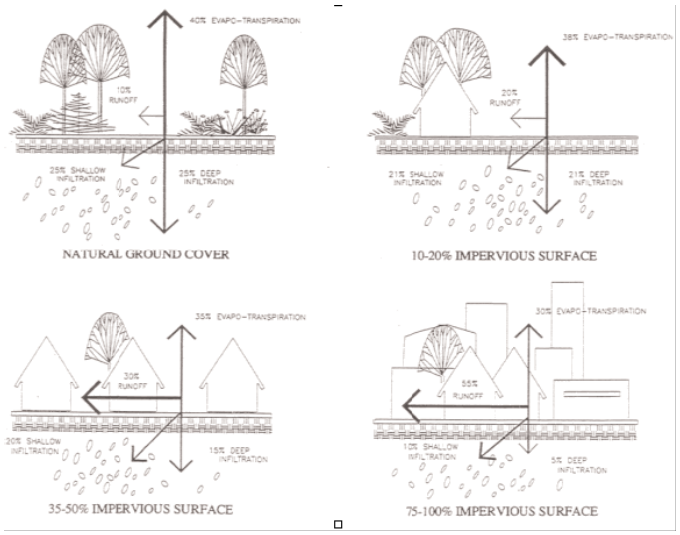

Figure 1. Water cycle changes associated with urbanization (after Toubier and Westmacott, 1981).

Impacts on Stream Form and Function

Impacts associated with development typically go well beyond flooding. The greater volume and intensity of runoff leads to increased erosion from construction sites, downstream areas and stream banks. Because a stream's shape evolves over time in response to the water and sediment loads that it receives, development-generated runoff and sediment cause significant changes in stream form. To facilitate increased flow, streams in urbanized areas tend to become deeper and straighter than wooded streams, and as they become clogged with eroded sediment, the ecologically important "pool and riffle" pattern of the stream bed is usually destroyed (Figure 2).

These readily apparent physical changes result in less easily discerned damage to the ecological function of the stream. Bank erosion and sever flooding destroy valuable streamside, or riparian, habitat. Loss of tree cover leads to greater water temperature fluctuations, making the water warmer in the summer and colder in the winter. Most importantly, there is substantial loss of aquatic habitat as the varied natural streambed of pebbles, rock ledges and deep pools is covered by a uniform blanket of eroded sand and silt. All of this of course assumes that the streams are left to adjust on their own. However, as urbanization increases, physical alterations like stream diversion, channelization, damming and piping become common. As these disturbances increase, so do the ecological impacts—the endpoint being a biologically sterile stream completely encased in

underground concrete pipes. In addition, related habitats like ponds and wetlands may be damages or eliminated by grading and filling activities.

Figure 2. Changes in stream form associated with urbanization.

Then There's Water Quality

With development comes more intensive land use and a related increase in the generation of pollutants. Increased runoff serves to transport these pollutants directly into waterways, creating nonpoint source pollution, or polluted runoff. Polluted runoff is now widely recognized by environmental scientists and regulators as the single largest threat to water quality in the United States. The major pollutants of concern are pathogens (disease-causing microorganisms), nutrients, toxic contaminants and debris. Sediment is also a major nonpoint source pollutant, both for its effects on aquatic ecology (see above), and because of the fact that many of the other pollutants tend to adhere to eroded soil particles. NEMO Fact Sheet #2 provides more detail on polluted runoff and its effects.

The Total Picture: A System Changed for the Worse

The hydrologic, physical and ecological changes caused by development can have a dramatic impact on the natural function of our waterways. When increased pollution is added, the combination can be devastating. In fact, many studies are finding a direct relationship between the intensity of development in an area—as indicated by the amount of impervious surfaces—and the degree of degradation of its streams. These studies suggest that aquatic biological systems begin to degrade at impervious levels of 12% to 15%, or at even lower levels for particularly sensitive streams. As the percentage of imperviousness climbs above these levels, degradation tends to increase accordingly. The end result is a system changed for the worse. Properly working water systems provide drainage, aquatic habitat and a degree of pollutant removal through natural processing. Let's look at those functions in an urbanized watershed where no remedial action has been taken:

Drainage: Increased runoff leads to flooding. Drainage systems that pipe water off-site often improve that particular locale at the expense of moving flooding (and erosion) problems downstream. Overall system wide water drainage and storage capacity is impaired.

Habitat: Outright destruction, physical alteration, pollution and wide fluctuations in water conditions (levels, clarity, temperature) all combine to degrade habitat and reduce the diversity and abundance of aquatic riparian organisms. In addition, waterway obstructions like bridge abutment, pipes and dams create barriers to migration.

Pollutant removal: Greater pollutant loads in the urban environment serve to decrease the effectiveness of natural processing. Damage to bank, streams and wetland vegetation further reduces their ability to naturally process pollutants. Finally, the greater volume and irregular, "flashy" pulses of water caused by stormwater runoff impair natural processing by decreasing the time that water is in the system.

What Towns Can Do

Flood and erosion control have long been part of the municipal land use regulatory process, and are usually addressed with engineered systems deigned to pipe drainage off-site as quickly and efficiently as possible. Flooding and erosion, however, are only two of the more easily recognized components of the overall impact of development on waterways.

FACT 4 SHEET

Strategies for Coping with Polluted Runoff

Source: NEMO; University of Connecticut Cooperative Extension System
Haddam, CT 06438
nemo.uconn.edu

Key Finding

As the intensity of development increases, so does the generation of nonpoint source water pollution, or polluted runoff. A good indicator of the intensity of development in a given area is the amount of impervious surface. Studies have shown that the greater the impervious surface coverage in a watershed, the greater the potential degradation of that watershed's water systems. Thus, local officials can do much to protect their water resources by considering the location, extent, drainage and maintenance of impervious surfaces on the town, watershed and individual site levels. Natural resource planning, site design and use of best management practices form an effective three-tiered approach to the problem.

The Problem

Development affects both the quantity and the quality of stormwater runoff, which in turn has impacts on watercourses. By enhancing and channeling surface drainage in favor of natural drainage systems, impervious surfaces like asphalt, concrete and roofing increase the volume and velocity of the runoff, often resulting in flooding, erosion and permanent alterations in stream form and function (see NEMO Fact Sheet #3). In addition, by blocking the infiltration of water and its associated pollutants into the soil, impervious surfaces interfere with natural processing of nutrients, sediment, pathogens and other contaminants, resulting in degradation of surface water quality.

Because of these impacts, a growing body of scientific research is finding a direct relationship between the amount of impervious surface in watershed and the water quality of the watershed's receiving stream. Many studies find that without nonpoint source management of some kind, stream water quality becomes increasingly degraded as impervious levels climb above 15%; in highly sensitive streams, degradation can begin when as little as 8% to 10% of the watershed area has impervious cover.

What Towns Can Do

Pavement is an unavoidable fact of modern life. However, there are still many options available to the municipality interested in reducing the water quality impacts of existing or future development. Strategies can be organized into a three-tiered approach, which can be summarized as: ***plan, minimize, mitigate.***

Plan *Development Based on Your Town's Natural Resources.*

Remember, preventing pollution by wise planning is by far the least expensive and most effective way to protect your town's waterways. To this end, a working knowledge of your town's natural resources is critical to guide appropriate development. A natural resource inventory is an essential first step. Identifying important natural resources and setting protection priorities provides a framework within which the impacts of proposed or existing development can be evaluated. Formal inclusion of these priorities in town plans and procedures is also important. Broad resource protection strategies applied at the town or watershed level, such as buffer zone and setback requirements, are increasingly coming into use. With regard to impervious surfaces, approach that sets an overall limit for key areas, and above that limit requires increase in pavement on one site to be compensated for decreases on another site (or some other acceptable method of compensation). This technique might be appropriate, for instance, in a watershed where analyzes show a threat to critical water resources from future growth.

***Minimize** Impacts Through Site Design.*
The site planning stage offers the best chance for local officials, designers and builders to work together to reduce polluted runoff from a site. Evaluate site plans with an eye to minimizing both impervious areas and disruption of natural drainage and vegetation. Cluster development, which reduces the total area of paved surfaces and increases open space, should be considered. Are the proposed sidewalks, roads and parking lot sizes absolutely necessary or could they be reduced? Brick, crushed stone, or pervious pavement is often a viable alternative in low traffic areas. Are curbing and piping necessary, or could drainage be directed to vegetated swales? Designs which reduce grading and filling and retain natural features should be encouraged. In addition to protecting waterways, such designs can often be less expensive and more pleasing to the eye.

***Mitigate** Unavoidable Impacts by Using Best Management Practices.*
Best management practices (BMPs) include a whole range of methods designed to prevent, reduce or treat stormwater runoff. Choosing the correct BMPs is often highly site-specific. There are a number of agencies and publications that can provide guidance. There are some basic BMP concepts to keep in mind:

- **Slow that stormwater**. This is the basic idea behind both detention basins, which are meant to slow and hold stormwater before releasing it, and retention basins, which are designed to hold the water permanently until it infiltrates into the ground. In both cases, pollutant removal takes place through settling of particles and through chemical and biological interactions in the standing water or in the soil. As with any device, these BMPs must be correctly designed in order to work properly. For instance, basins must be large enough to treat runoff generated by the combination of local climate and site configuration.

- **Avoid direct connections.** Break up the “expressway” of polluted runoff by using grass swales, filter strips or other forms of vegetative BMPs wherever possible in placeof curving and piped drainage. In many cases, these methods are most effective when used in combination with structural BMPs like detention ponds.

- **Ensure regular maintenance.** Most structural BMPs require regular maintenance to retain peak pollutant-removal efficiency. Maintenance ranges from the frequent, but simple (sweeping parking lots, cleaning storm drains) to the infrequent, but complex (sediment removal from detention/retention ponds), but in all cases it must be budgeted and planned for.

- **Don’t forget the two “e’s”: enforcement and education.** It’s important to make sure that contractors are following through on agreed-upon designs and methods. Don’t underestimate things like storm drain stenciling and hazardous waste disposal days, which can reduce pollution, raise public awareness and help to engender support for all your town’s water protection activities.

FACT 5 SHEET

Protecting Your Town From Polluted Runoff

Source: NEMO; University of Connecticut Cooperative Extension System
Haddam, CT 06438
nemo.uconn.edu

Key Finding
Protecting your town's water resources from polluted runoff will require the involvement of many municipal departments and commissions, as well as other sectors of the community. A coordinated approach, combined with a clearly stated goal of protecting your town's waterways, is an excellent way to start.

The Problem
Nonpoint source pollution, or polluted runoff, is the cumulative result of a multitude of personal and municipal actions. As such, only an organized, collaborative approach to solving the problem will be successful. Local land use decisions will continue to be made on a case-by-case basis. However, an action plan incorporating certain key elements into the municipal decision-making processes will serve to strengthen and consolidate your town's effort to protect its waterways.

A Coordinated Approach to Polluted Runoff: Key Considerations

Communication
Many municipal commissions and departments must be involved in managing polluted runoff. For instance, the zoning commission makes land use decisions, the planning commission determines the general direction of future development and the public works department oversees design.

Legal Requirements
Depending on the location and size of your municipality, a number of recent federal and state laws on polluted runoff management may soon be coming your way (if they haven't already!). These include stormwater permitting and, in the coastal zone, new requirements related to coastal zone management. In addition, many states have enacted legislation affecting a range of local activities, from zoning decisions to septic system repair to setback requirements for development near wetlands and watercourses. Local officials need to be aware of these laws, both from the standpoint of compliance and with regard to the authority that they confer to municipalities wishing to aggressively manage polluted runoff. The New York Department of Environmental Conservation is usually the best place to call for information about these laws.

Focus
As part of a town-wide effort to control polluted runoff, there are certain basic things that may be done "across the board" for all existing areas or planned developments, such as requiring stormwater controls and minimizing the amount of impervious surfaces. However, this does not preclude and approach that focuses on identifying and protecting your town's most important water resources. Your priorities will likely be set based on a combination of water resource information and the needs of the local populace. For instance, the primary goal might be improving the water quality of a heavily-used lake, pond or cove, or it could be protecting a relatively pristine reservoir or critical groundwater recharge area. The NEMO technique of doing a zoning build-out analysis is only one way to help assess the threats to your water-from digging out old reports to taking field samples. Expertise can be found in many places, including consulting firms, local residents, state agencies, universities or even your own town hall.

Financing

Unfortunately, the rising tide of new nonpoint source regulatory programs has not yet resulted in an accompanying increase in funding sources. Currently available federal and state technical and funding sources are listed at the end of this fact sheet. It's clear, however, that local funding will have to account for most of the expenses involved in polluted runoff programs. General funds, capital funds, special tax districts (like stormwater utility fees), and local bond issues are all options. Costs associated with new development can and should be negotiated with the developers. A couple of positive things to remember include 1) preventing pollution is by far the most cost effective way to protect your resources, and 2) many of the nonstructural best management practices involving reduced impervious surface and use of vegetation can actually save you money compared to conventional development.

What Towns Can Do: Suggestions for an Action Plan

The technical aspects of polluted runoff can be complicated. However, just because your town doesn't have a water quality expert or 20 years of monitoring data doesn't mean that you can't protect your water resources. There are a number of places to get help (see last section), and remember, communication is the most important aspect of any action plan. You are final judge as to what will work in your town, but here are some suggestions:

1. **Form an ad hoc committee** of members of various appropriate commissions and departments to get the ball rolling. Remember to get the blessing of the town's chief elected official.
2. **Educate** yourself and your key commissions on the basics of polluted runoff and its management through programs and materials like those available through the NEMO Program.
3. **Seek** local, state or private help to assess your town's water resources. Which are the most valuable to your town (economically, historically, socially)? Which are the most impaired, or endangered, by polluted runoff? Are there any water resources deemed especially important by state or federal agencies? Weigh these factors and try to come up with a consensus priority list.
4. **Assess** what, if anything, your town is currently doing about polluted runoff. Factors to be inventoried include erosion control requirements, subdivision regulations, town maintenance of roads and storm drains, open space plans and any setback or buffer zone requirements.
5. **Write** and issue a polluted runoff policy statement, laying out the importance of polluted runoff management and the commitment of the town to address this problem.
6. **Go ahead and dive in!** Write a brief Action Plan that spells out the roles of each of the key commissions/departments represented on the ad hoc committee. Don't forget funding, maintenance and other points you'd just as soon forget!
7. **Hold** an educational meeting for all the commissions/departments and the public to brief them on your work and Action Plan, and get comments. You can also use the media to raise awareness of the problem in your town, through things like newspaper articles on the Action Plan and the NEMO videotape shown on public access television.
8. **Incorporate** your Action Plan into the appropriate town plans, procedures and regulations.

Can We Really Do This?

Absolutely. Remember, the most important step in the process—a clearly stated desire on the part of the town to protect its water resources from polluted runoff—takes no technical or legal expertise. Establishing that priority, articulating it in town policy and setting up a framework for internal cooperation and communication will provide a solid foundation for all that follows.