

SECTION 6 RUNOFF

GOAL: Rainwater is good: Slow it down. Spread it out. Soak it in.

- Protect and re-establish the natural functions of floodplains, forests, wetlands, and groundwater recharge areas.
- Use better site design, green infrastructure, and standard stormwater management practices to reduce impacts from development.
- Keep clean water clean.

CHALLENGE

Water runs downhill. Along the way it picks up sediment and other pollutants. It may also pick up speed. As flowing water joins with runoff from other areas, concentrated flow often contributes to washouts and flooding. But it doesn't have to be this way!

The new paradigm for managing drainage is to treat rainwater as a resource that is used and managed as close to where it falls as possible. The idea is to preserve, restore, or mimic natural hydrologic systems so that the balance between infiltration, evapotranspiration, and surface runoff is retained. On a regional scale, this is accomplished by preserving and restoring natural landscape features, such as forests, floodplains, and wetlands. This is coupled with policies that reduce the area disturbed by new development, such as: infill development, redevelopment, and cluster development. On the local scale, various practices are used to reduce and mitigate the impacts from paving, grading, soil compaction, de-forestation, and other aspects of development.



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New York State has embraced a “green infrastructure” approach for stormwater management that reduces the impacts of new development on aquatic systems through the use of site planning, reduction of impervious cover (roads, roofs, and other surfaces that prevent rainfall from soaking into the ground), and localized techniques for reducing runoff. Traditional “end-of-pipe” stormwater management practices (such as stormwater ponds) are also used where needed, particularly to manage flood flows from large storm events. This green infrastructure approach to stormwater management was included in the NYS Stormwater Management Design Manual in 2010. As a result, developers are struggling with the learning curve associated with the new runoff reduction requirements that now apply to many construction projects. The use of numerous small-scale practices presents new challenges for ensuring long-term maintenance. In addition, the mandated 5-step stormwater planning process requires integration of site planning and drainage concerns early in the project design process. This expands the role of municipal planning boards in stormwater management design.

NYS administers three general permits for managing stormwater runoff:

- A Stormwater Construction Permit is required for construction activities that disturb one acre or more of soil. This permit requires development and implementation of a plan for reducing erosion and sediment during construction and long-term management of water quality and quantity from many sites after construction is complete.
- The Multi-Sector General Permit addresses stormwater runoff from certain industrial activities.
- Municipalities in urban areas are required to get MS4 Stormwater Permits (for discharges from Municipal Separate Storm Sewer Systems). This permit requires development and implementation of a Stormwater Management Program to reduce the discharge of pollutants. The Susquehanna-Chemung Watershed includes MS4 municipalities in the Elmira area, Binghamton area, and part of the Ithaca

area. Individual municipalities and coalitions are working to implement and enhance local stormwater programs in these areas.

Although these state permit programs target concentrated sources of polluted runoff, most of the rain that falls in the watershed is not covered by stormwater permits. Existing development, roads, timber harvesting, agriculture, and other activities affect the amount of water that flows off the land, drainage patterns, and pollution loads. There are thus numerous opportunities for protecting beneficial runoff characteristics and integrating practices to slow down runoff and use it for irrigation, habitat, recreation, and groundwater recharge.

Since it rains everywhere in the watershed, there is widespread potential for contact with contaminants that are then washed downstream into lakes and rivers. Chemicals and pathogens from automobiles, fertilizers, pesticides, sediment, animal wastes, and numerous other sources can contaminate runoff. Studies indicate that a significant proportion of pollutants in urban and suburban waters are the result of deliberate or inadvertent discharges of hazardous substances, including sewage, chemical spills, waste oil, and trash. To address this issue, MS4 municipalities are required to have illicit discharge programs to detect and eliminate those pollution sources. The challenge of keeping clean water clean is also addressed through a wide variety of other efforts, including agricultural management practices, pet waste management, spill response, septic system maintenance, street sweeping, erosion control, integrated pest management, and anti-littering campaigns.

“No single raindrop believes it is to blame for the flood.”

- author unknown

RECOMMENDATIONS

Education: Promote public understanding of how activities on the land can cause water quality and flooding problems. Foster public support and personal responsibility for improved drainage practices, even when long-term benefits require increased short-term costs.

6a. Educate children about the water cycle, how it is altered by human activities, and ways to mitigate negative impacts.

Immediate action: Continue to implement and enhance stormwater education by informal educators (such as nature center staff and stormwater coalitions) using a variety of resources, such as the stormwater-floodplain model, Project Wet activities, Ronnie Raindrop outfit, etc.

5-year target: Facilitate increased integration of water cycle and stormwater information into the classroom curriculum through peer-to-peer training of teachers and lending programs for educational resources (such as the stormwater-floodplain model). Promote extensive classroom projects to assess runoff characteristics at school or in neighborhoods and service projects that improve drainage (such as planting trees or constructing rain gardens).

Measure: Number of stormwater education programs, classroom projects, and service projects.

6b. Conduct public education about proactive strategies for managing runoff, targeting land owners, developers, landscape architects, construction industry, municipal leaders, and other audiences. Promote increased integration of drainage concerns into land use decisions and responsibility for the consequences of those decisions (positive and adverse).

Immediate action: Continue and enhance public education programs by MS4 municipalities and the active stormwater coalitions.

Immediate action: Conduct public outreach about drainage issues through exhibits at public events, in newsletters, on websites, through the distribution of information sheets, and other means. This is done by a variety of water resource professionals and environmental educators.

Immediate action: Seek opportunities to facilitate media coverage of stormwater management issues, including recognizing outstanding management efforts through awards and news articles.

Immediate action: Publicize stormwater demonstration projects through news stories and signage (such as the educational signs posted at rain gardens in Chemung, Schuyler, and Steuben Counties).

5-year target: Conduct hands-on public workshops that provide skills for improving local drainage, including information about: rain gardens, tree planting, riparian buffers, ephemeral wetlands, lawn maintenance, and other topics.

Measure: Number of community outreach events, news reports, and workshops.

New Construction and Reconstruction: Work toward full compliance with NYS permit conditions for sediment control and stormwater management from construction activities by providing training and technical assistance (to promote good planning, design, and construction) backed up by enforcement actions when needed. Promote improved drainage for all construction and reconstruction projects (regardless of size) through voluntary measures and/or municipal regulations.

- 6c. Strengthen the state's capabilities to effectively promote and enforce the NYS Stormwater Construction Permit. Sufficient staff is needed to conduct training, provide technical assistance, review Stormwater Pollution Prevention Plans (SWPPPs), conduct on-site inspections, and undertake enforcement activities when necessary. If designers have questions, there should be regional staff available to provide clarification and assistance. If expansion of the natural gas industry fosters increased development in rural parts of the watershed, state resources should expand to accommodate additional program needs.

Immediate action: Establish permanent staff positions to provide non-regulatory assistance, training, and enforcement for NYS stormwater permit programs throughout the watershed.

Immediate action: Facilitate statewide implementation of construction and post-construction standards by providing training, clarification, and technical assistance, particularly regarding new provisions in the 2010 NYS Stormwater Design Manual.

5-year target: Secure funding for research efforts to document the effectiveness of green infrastructure practices for reducing runoff and protecting water quality.

Measure: Number of staff dedicated to providing non-regulatory assistance. Number of workshops. Number of studies.

- 6d. Maintain and enhance the capabilities of MS4 municipalities and coalitions to effectively implement construction and post-construction programs (Minimum Control Measures 4 and 5), including contractor training, design review, site inspections, and verification that permanent practices function properly.

Immediate action: Conduct stormwater conferences and programs in the watershed (in addition to those in other parts of the state) to provide training and networking opportunities for municipalities.

Immediate action: Periodically offer erosion and sediment control training for contractors and others.

5-year target: Secure reliable funding to support trained staff to conduct the review, inspections, and enforcement needed to ensure full compliance with NYS construction and post construction standards for all projects within MS4 municipalities.

Measure: Number of conferences and trainings. Number of programs that meet MS4 permit requirements and number that exceed requirements.

- 6e. Train design professionals (engineers, architects, and landscape architects) on stormwater management strategies, with particular emphasis on the new green infrastructure requirements and cost effective practices for reducing runoff.

Immediate action: Conduct stormwater training. When possible these classes should be accompanied by networking opportunities or roundtable discussions to facilitate peer-to-peer information sharing. Promote attendance by providing continuing education credit.

Immediate action: Find existing and new sites that can be used as demonstration projects for green infrastructure planning and management practices. Document the design considerations and costs of these projects for inclusion in the “STC Low Impact Development (LID) Sampler” (STCRPDB, 2007) and integration into training.

5-year target: Seek funding to enable development of demonstration projects that incorporate numerous green infrastructure practices. Publicize these locations and provide on-site descriptions of the green infrastructure features through signs and/or fliers.

Measure: Number of training sessions. Number of demonstration projects.

- 6f. Train municipal planning boards, code enforcement officers, zoning boards of appeals, and elected officials on stormwater management strategies, with particular emphasis on green infrastructure planning and site design. Integrate information about costs and emphasize practices that are less expensive than conventional designs (such as parking reduction or use of grass pavers). Provide examples of green infrastructure strategies that contribute to multiple community objectives.

Immediate action: Add additional data to the Susquehanna-Chemung Data Atlas¹¹ and promote its use by municipal planning boards to obtain site information for consideration during the review of development proposals (such as slopes, drainage, floodplains, and images of land cover).

Immediate action: Conduct stormwater training sessions for municipalities.

5-year target: Document examples of stormwater green infrastructure successes. These local examples may include existing projects, new development projects, and retrofit projects.

Measure: Information and features added to the Data Atlas. Number of training sessions. Number of documented success stories.

- 6g. Review and revise local codes for consistency with green infrastructure strategies for avoiding and reducing drainage impacts. Incorporate additional stormwater requirements where warranted (such as standards or incentives for small projects that do not require NYS permit or that require only erosion and sediment control measures).

Immediate action: Assist MS4 and rural municipalities with review of local codes for compatibility with green infrastructure practices. Follow up with technical assistance to eliminate incompatible provisions and integrate green infrastructure principles as warranted.

Long-range target: All local codes in the watershed are consistent with good drainage practices and green infrastructure approaches for managing stormwater.

Measure: Number of municipalities receiving assistance.

Maintenance: Establish mechanisms for ongoing maintenance of permanent stormwater management practices, including localized (lot-specific) green infrastructure practices (such as rain gardens, tree planting, and cisterns).

- 6h. Maintain and enhance the capabilities of MS4 municipalities and coalitions to facilitate maintenance of stormwater facilities, including inventories, inspection, and requiring maintenance. This will become increasingly challenging due to the high number of localized practices that may be installed to fulfill green infrastructure requirements.

¹¹ Susquehanna-Chemung Data Atlas: <http://24.97.219.74/SCAtlas/>

Immediate action: Complete the inventories of permanent stormwater management practices in MS4 municipalities, expanding this effort to include older structures (installed prior to 2003) as resources permit.

5-year target: Secure the funding needed to enable adequate operation and maintenance of all stormwater management practices in MS4 municipalities, including structures that pre-date current regulations.

Measure: Number of programs that meet MS4 permit requirements and number that exceed requirements.

- 6i. Develop and implement strategies for improved inspection and maintenance of stormwater management practices in rural (non-MS4) areas, including increased municipal involvement if appropriate.

Immediate action: Address maintenance issues in municipal stormwater management training (for planning boards, highway departments, and others). Follow up with technical assistance for those municipalities interested in establishing drainage districts, inspection programs, or other mechanisms for improving operation and maintenance of stormwater practices.

5-Year target: Assemble information and resources to help municipalities develop programs that enhance the maintenance of stormwater management practices. This could take the form of a website with descriptions of successful programs (one or more per county), information about drainage districts, sample language for maintenance agreements, and other resources.

Measure: Number of municipalities receiving assistance. Amount of resources assembled and available.

- 6j. Conduct targeted educational efforts in neighborhoods where small-scale green infrastructure practices are implemented (in compliance with the 2010 NYS Stormwater Design Manual), to provide the owners of those practices with information about the value of those systems and maintenance needs.

Immediate action: Develop information sheets about the function and maintenance of green infrastructure practices. Provide copies to county Soil and Water Conservation Districts (SWCDs) and Cornell Cooperative Extension (CCE) offices for distribution. Post on the internet.

Immediate action: Provide Master Gardeners with resources and training about stormwater green infrastructure practices and maintenance requirements so that they can provide technical assistance and education.

5-year target: Develop and implement targeted educational programs for residential neighborhoods and other areas where green infrastructure practices are used for stormwater management. This can include signs, targeted mailings, neighborhood work parties, and other strategies.

Measure: Number of educational resources developed/distributed. Number of training sessions. Number of community education events or projects.

Retrofit: Promote proactive local stormwater management projects to remediate past shortcomings in design, construction, and maintenance.

- 6k. Promote urban forestry programs to enhance the use of trees for managing runoff and providing other ecosystem services.

Immediate action: Select (or develop if necessary) educational resources about the value of trees in addressing stormwater runoff (along with other benefits) and recommended species for different conditions. Involve Master Gardeners and environmental education centers in the dissemination of these resources at garden centers, on websites, in municipal offices, and other means.

5-year target: Utilizing GIS analysis and the suite of i-Tree Tools developed by the National Forest Service (or other tools), analyze tree cover in the watershed's cities, villages, and hamlets to identify priority areas for targeting urban tree planting programs.

5-year target: Work with priority communities to conduct additional urban tree assessments and then develop, fund, and implement urban forestry projects.

Long-range target: An urban forestry team provides technical assistance (including information about funding strategies) to all municipalities with urban areas to facilitate integration of urban forestry into municipal plans and programs. Cities and villages achieve "Tree City USA" designation by the Arbor Day Foundation.

Measure: Number of educational resources. Number of urban tree assessments and urban forestry projects. Number of "Tree City USA" communities.

- 6l. Provide property owners with resources and technical assistance to facilitate voluntary use of improved practices to manage runoff. This includes disconnection of down spouts from storm sewers, improved drainage from driveways, soil restoration, and landscaping practices that reduce runoff.

Immediate action: Disseminate information sheets about driveway drainage, rain gardens, and other topics through SWCD and CCE offices, environmental education centers, Master Gardeners, websites and other means.

Immediate action: Lobby for the inclusion of green infrastructure in the streetscape portion of NYS Main Street grants and increased credit for green infrastructure practices in the Leadership in Energy and Environmental Design (LEED) certification program.

5-year target: Secure funding to enable county SWCD and/or CCE staff to provide increased technical assistance to individual property owners.

Measure: Number of events, locations, or publications in which information was distributed. Number of letters and expressions of support for green infrastructure. Number of agencies providing assistance to property owners.

- 6m. Implement retrofit stormwater management projects to improve drainage from existing development, targeting parking lots, roads, and other areas where it is cost-effective and/or local drainage problems can be alleviated. Utilize these projects as demonstration sites for public education and training.

Immediate action: Identify priority areas where improved stormwater management is needed to alleviate existing local drainage or water quality problems. Conduct preliminary analysis to develop remediation strategies that may be cost-effective.

5-year target: Conduct an analysis of the watershed's public road systems to identify areas where retrofit stormwater management practices have the potential for providing cost-effective nutrient reductions for the Chesapeake Bay TMDL. Secure funding to implement priority projects to retrofit roadway drainage.

Long-range target: Implement retrofit stormwater management projects and develop educational materials in order to establish at least one urban demonstration project in each city and one rural demonstration project per county.

Measure: Number priority areas identified and retrofit projects implemented. Number of demonstration projects.

Contaminated Runoff: Prevent the contamination of stormwater runoff through education, improved management practices, cleanup of accidental releases, and enforcement.

- 6n. Maintain and enhance the capabilities of MS4 municipalities and coalitions to implement Illicit Discharge Detection and Elimination (IDDE) programs that include drainage system mapping and procedures for eliminating illicit discharges.

Immediate action: Secure reliable funding to support trained staff to continue and improve the implementation of MS4 IDDE programs.

Measure: Number of programs that meet MS4 permit requirements and number that exceed requirements.

- 6o. Promote improved reporting of spills and polluting discharges that violate environmental conservation law.

Immediate action: Develop information sheets for each county that encourage voluntary reporting of spills and polluting discharges and provide telephone numbers for the appropriate contacts (such as those developed for the STC counties). Distribute to highway departments and others.

Measure: Number of counties that have developed and disseminated information.



Photo from www.bing.com/images.

- 6p. Maintain and enhance the capabilities of MS4 municipalities and coalitions to implement pollution prevention/good housekeeping programs that reduce potential contributions of pollution from municipal operations and facilities.

Immediate action: Secure reliable funding to enable MS4 municipalities to continue and enhance their stormwater good housekeeping programs, including staff training, self assessments, and improved management practices for highway garages, road management, parks (including pet waste management), and other facilities. Training should include recognition of successful programs, distribution of printed resources, and opportunities for municipalities to exchange information.

Measure: Number of programs that meet MS4 permit requirements and number that exceed requirements.

- 6q. Educate private sector and rural municipalities about pollution prevention practices, including spill prevention.

Immediate action: Include spill prevention, spill reporting, proper disposal of waste materials, septic system maintenance, and other pollution prevention information in the stormwater public education programs conducted by MS4s and others (reaching the public through news segments, public service announcements, online resources, hand outs, and other means).

Immediate action: Continue to install storm drain markers at visible locations in Chemung County (“No Dumping; Drains to Waterway”) and assess the effectiveness of these markers as a public education tool.

5-year target: Expand public education programs about pollution prevention strategies, including storm drain marking and increased technical assistance for managing septic systems.

Measure: Number of public education events or projects.