

2A-3 Stormwater Regulations and Permitting

A. Introduction

During the first 15 years of the national program to abate and control water pollution (1972–1987), EPA and the states focused most of their water pollution control activities on traditional point sources. These point sources have been regulated by the EPA and the states through the National Pollutant Discharge Elimination System (NPDES) permit program established by Section 402 of the Clean Water Act. The NPDES program functions as the primary regulatory tool for assuring that water quality standards are met. NPDES permits, issued by either EPA or an authorized state, contain discharge limits designed to meet water quality standards and national technology-based effluent regulations.

In 1987, in view of the progress achieved in controlling point sources and the growing national awareness of the increasingly dominant influence of non-point source (NPS) pollution on water quality, Congress amended the Clean Water Act to focus greater national efforts on non-point sources. Under this amended version, referred to as the 1987 Water Quality Act, Congress revised Section 101, “Declaration of Goals and Policy,” to add the following fundamental principle:

It is the national policy that programs for the control of non-point sources of pollution be developed and implemented in an expeditious manner so as to enable the goals of this Act to be met through the control of both point and non-point sources of pollution.

The Water Quality Act of 1987 also included language that required comprehensive stormwater permitting using a two-phased approach. (Detailed information on both phases of the NPDES Storm Water Program is available at www.epa.gov/npdes/stormwater). Phase I, in place since October 1992, required operators of medium and large municipal separate storm sewer systems (MS4s) located in incorporated places and counties with populations of more than 100,000; certain industrial activities; and construction activities disturbing 5 acres or more (now reduced to 1 acre) to obtain an NPDES permit to discharge stormwater runoff. Iowa has two Stormwater Phase I communities – Des Moines and Cedar Rapids. Under the permit, regulated operators must develop and implement stormwater management programs/plans.

In October 1999, EPA expanded the federal stormwater program with the promulgation of the Phase II rule. Phase II requires operators of small MS4s (non-Phase I regulated MS4s) in “urbanized areas” (as defined by the Bureau of the Census) and small construction activities disturbing 1 acre or more of land to obtain an NPDES permit and develop stormwater management programs or plans. Further, the Iowa DNR may require operators of small MS4s not in urbanized areas and small construction activities disturbing less than 1 acre to obtain an NPDES permit if deemed necessary to protect water quality.

For small MS4 permits, Phase II prescribes a set of six minimum control measures, as well as requirements for evaluation and assessment efforts. The minimum measures are:

1. Public education and outreach on stormwater impacts
2. Public involvement/participation

3. Illicit discharge detection and elimination
4. Construction site runoff control
5. Post-construction stormwater management in new development and redevelopment
6. Pollution prevention/good housekeeping for municipal operations

The regulated operators must choose and implement appropriate best management practices and measurable goals for each measure. The operators must also periodically evaluate and assess program compliance, the appropriateness and effectiveness of their chosen BMPs, and progress toward achieving their identified measurable goals. This guidance is expected to be consistent with any guidance issued for regulated small MS4 operators to meet the requirements of Phase II NPDES stormwater discharge permits. Therefore, the management measures and practices herein can serve as a guide in developing a community's stormwater management program. It is important to note however, that additional requirements not addressed in this guidance may be imposed under an NPDES stormwater permit.

The Clean Water Act establishes several reporting, funding, and regulatory programs to address pollutants carried in runoff that is not subject to confinement or treatment. These programs relate to watershed management and urban non-point source control. Readers are encouraged to use the information contained in this guidance to develop non-point source management programs/plans that comprehensively address the following EPA reports and programs:

- a. **Section 303(d) lists and TMDLs.** Under Section 303(d) of the Clean Water Act, states are required to compile a list of impaired waters that fail to meet any of their applicable water quality standards or cannot support their designated or existing uses. This list, called a 303(d) list, is submitted to Congress every two years, and states are required to develop a Total Maximum Daily Load (TMDL) for each pollutant causing impairment for water bodies on the list. More information on the TMDL program and 303(d) lists can be found at: www.iowadnr.com/water/tmdlwqa/wqa/303d.html.
- b. **Section 305(b) and the National Water Quality Inventory: report to Congress.** Every two years, states are required to submit a report to Congress detailing the health of their waters. These periodic reports allow Congress to gauge progress toward meeting the goals of the Clean Water Act and to help identify priorities for future pollution control funding and activities. More information on the 305(b) program and the National Water Quality Inventory can be found at: www.iowadnr.com/water/tmdlwqa/wqa/305b.html.
- c. **Section 404 discharge of dredged and fill material.** Under Section 404 of the Clean Water Act, persons planning to discharge dredged or fill material to wetlands or other waters of the United States generally must obtain authorization for the discharge from the U.S. Army Corps of Engineers (USACE), or a state-approved agency to administer the Section 404 program. Such authorization can be through issuance of an individual permit or may be subject to a general permit, which applies to certain categories of activities having minimal adverse environmental effects. Implementation of Section 404 is shared between the USACE and EPA. The USACE is responsible for reviewing permit applications and deciding whether to issue or deny permits. EPA, in consultation with the USACE, develops the Section 404(b)(1) guidelines, which are the environmental criteria that the USACE applies when deciding whether to issue permits. EPA also has authority under Section 404(c) to veto USACE issuance of a permit in certain cases. More information about the 404 program can be found at: www.iowadnr.com/water/section401/index.html.

- d. **Clean water state revolving fund.** EPA established the clean water state revolving fund (CWSRF) to provide states with low- or no-interest loans for projects that improve water resources. These funds can be used to support urban non-point source pollution programs and projects. To receive CWSRF loans from EPA for water quality projects, states must develop annual Intended Use Plans that outline the expected use of these funds. More information on the CWSRF program can be found at: www.iowadnr.com/water/srf/index.html.

The *National Water Quality Inventory: 1998 Report to Congress* identified urban runoff as one of the leading sources of water quality impairment in surface waters (US EPA, 2000c). Of the 11 pollution source categories listed in the report, urban runoff/storm sewers was ranked as the sixth leading source of impairment in rivers, fourth in lakes, and second in estuaries, as shown in Table 1.

Table 1: Leading sources of water quality impairment related to human activities for rivers, lakes, and estuaries

	Rivers and Streams	Lakes, Ponds, and Reservoirs	Estuaries
Pollutants	Siltation (38%) ¹	Nutrients (44%) ¹	Pathogens (47%) ¹
	Pathogens (36%)	Metals (27%)	Organic enrichment (42%)
	Nutrients (28%)	Siltation (15%)	Metals (27%)
Sources²	Agriculture (59%)	Agriculture (31%)	Municipal point sources (28%)
	Hydromodification (20%)	Hydromodification (15%)	Urban runoff/storm sewers (28%)
	Urban runoff/storm sewers (12%)	Urban runoff/storm sewers (12%)	Atmospheric deposition (23%)
¹ Values in parentheses represent the percentage of surveyed river miles, lake acres, or estuary square miles that are classified as impaired.			
² Excluding unknown, natural, and “other” sources.			

Source: US EPA, 2000c

B. Regulated activities

In Iowa, two agencies administer permit programs for protecting the state’s water resources and ensuring their wise use. The agencies are:

1. **The Iowa Department of Natural Resources (IDNR).** The IDNR administers permit programs for conserving and protecting Iowa’s water, recreational, and environmental resources, and, for the prevention of damage resulting from unwise floodplain development. In addition, the IDNR has jurisdiction over sovereign lands and waters, and certain fee title lands of the state, and land below the ordinary high water mark on meandered streams and lakes.
 - a. **Clean Water Act Section 401 permit program.** The IDNR administers the 401 permit program. A Section 401 Water Quality Certification is IDNR’s certification that a project will not violate state water quality standards, and is required before the U.S. Army Corps of Engineers can issue a Section 404 permit. Short and long-term impacts on water quality and water-related uses are evaluated in the Section 401 certification review. Information on the 401 permit can be found at: www.iowadnr.com/water/section401/info.html.

- b. **Clean Water Act NPDES permit program.** The EPA has assigned the IDNR the responsibility of administering the NPDES (National Pollutant Discharge Elimination System) program (402 permit program) for activities within the state of Iowa. The IDNR issues NPDES permits, conducts inspections, and provides enforcement. While the EPA has delegated program responsibilities to the IDNR, it retains the authority to conduct its own inspections and issue fines to the offender.

Additional information on the Iowa stormwater regulation and permit process can be found at www.iowadnr.com/water/stormwater/index.html. Once permit coverage is obtained, the jurisdiction must satisfy the conditions of the permit and submit periodic reports on the status and effectiveness of the program at reducing pollutants to the MEP.

- 2. **Stormwater permits.** With respect to stormwater discharge, two types of permits are available: individual and general.

- a. **General permits** are developed to cover many different users. The conditions of these permits have been developed to cover activities that have similar types of discharges. The IDNR has adopted three general permits for stormwater. General permits are applicable to discharges which are composed of stormwater only. Iowa's stormwater general permits do not cover mixtures of stormwater with non-stormwater, where the non-stormwater would require a NPDES permit from the IDNR (refer to the specific general permit for additional details). Discharges that have a federal effluent limit may not be covered by a general permit.
 - 1) **General Permit No. 1** – For "stormwater discharge associated with industrial activity" (excludes construction). Industrial activities that have the potential for contamination of stormwater runoff are required to obtain and comply with an NPDES permit. These activities include storage of chemicals or fuel in areas that are exposed to precipitation or runoff. The intent of this permit is to reduce chemical pollutants in runoff.
 - 2) **General Permit No. 2** – For "stormwater associated with industrial activity for construction activities" (land disturbing 1 acre or more). Construction activities that result in the disturbance of more than one acre of ground cover are required to obtain an NPDES general permit normally associated with earthwork, grading, or any other non-agricultural land-disturbing activity. Construction of animal feeding operations and confinement buildings are covered under this permit. The goal of the permit is to reduce the amount of sediment being transported from construction site by stormwater runoff.
 - 3) **General Permit No. 3** – For "stormwater discharge associated with industrial activity from asphalt plants, concrete batch plants, rock crushing plants, and construction sand and gravel facilities".
- b. **Individual permits** are unique and developed specifically for the facility or jurisdiction it covers. This type of permit rarely applies to construction activities.

Municipal Separate Storm Sewer Systems (MS4s). The NPDES program requires certain designated operators of MS4s to develop a stormwater management plan, with the purpose of reducing pollutant levels in the runoff discharged by publicly-owned storm sewer systems. Additional discussion on the Phase II Stormwater NPDES regulations and requirements are provided below. The MS4 program generally covers municipalities between 10,000 and 100,000 population. The affected entities must develop a stormwater management program that provides best management practices and addresses six minimum control measures under the MS4 program. See Table 2 for a current list of MS4 jurisdictions in Iowa (as of date of publication).

Table 2: Cities and universities in Iowa required to obtain stormwater permits for their MS4s

Altoona	Ames	Ankeny	Asbury
Bettendorf	Bondurant	Buffalo	Carter Lake
Cedar Falls	Cedar Rapids	Clinton	Clive
Coralville	Council Bluffs	Davenport	Des Moines
Dubuque	Elk Run Heights	Evansdale	Grimes
Hiawatha	Iowa City	Iowa State University	Johnston
Le Claire	Marion	Marshalltown	North Liberty
Norwalk	Ottumwa	Panorama Park	Pleasant Hill
Raymond	Riverdale	Robins	Sergeant Bluff
Sioux City	Storm Lake	University Heights.	University of Iowa
Urbandale	Waterloo	Waukee	West Des Moines
Windsor Heights			

Local communities may implement additional regulations, such as requiring additional permits. It should be noted that even if an erosion and sediment control permit is required by a local jurisdiction, a stormwater NPDES permit must still be obtained for sites one acre or larger. Additional detailed information can be found at:
www.iowadnr.com/water/stormwater/info.html.

3. **Other IDNR permits** (relating to protection of water and recreational sources or adjacent lands):
 - a. **Floodplain construction permits.** The IDNR has authority to regulate construction on all floodplains and floodways in the state. www.iowadnr.com/water/floodplain/index.html. Local governments may have obtained transfer of this jurisdiction from the IDNR.
 - b. **Construction permits.** Pursuant to the Iowa Code, no person, association, or corporation can build or erect a pier, wharf, sluice, piling, wall, fence, obstruction, building, or erection of any kind, upon or over any state-owned land or water under the jurisdiction of the IDNR, without first obtaining a permit from the IDNR. www.iowadnr.com/other/slands.html.
 - c. **Special permits.** Projects involving a standard recreational boat dock require authorization by the IDNR. Permits are also required by commercial operations removing sand or aggregate from meandered streams. www.iowadnr.com.
4. **The US Army Corps of Engineers (USACE).** The USACE has authority over public waterways. This jurisdiction includes:
 - All waters susceptible to use in interstate or foreign commerce
 - All interstate waters, including interstate wetlands
 - All other waters, such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce
 - All impoundments of waters
 - Tributaries of waters identified above

- Wetlands adjacent to waters (other than waters that are themselves wetlands)
- a. **Clean Water Act Section 404 permit program.** This program regulates the non-point source discharges of dredged or fill material into waters of the United States, including wetlands. Information on the 404 permit can be found at:
<http://pillar.saj.usace.army.mil/permit/regulations/section404.htm>.

The USACE issues two types of 404 permits, individual and general:

- 1) Individual permits are issued to a single entity (individuals or companies) to authorize specific activities. Once a complete permit application is received by the USACE, a public notice is issued, which describes the proposed project. The USACE evaluates all comments received and makes a final permit decision.
- 2) A general permit authorizes specific activities that have minimal environmental impacts, such as bank stabilization activities, construction of farm buildings, and filling of relatively small areas, if the permitted activity is consistent with the Clean Water Act regulations. A general permit can be issued on a nationwide basis. Activities authorized by a general permit require less review than an individual permit would require.

Some projects may fall under a nationwide permit but require a "Pre-Construction Notification" (PCN) and wetland delineation to the USACE before a nationwide permit is applicable. The PCN gives the USACE a chance to review an activity to determine if potential impacts warrant processing under an individual Section 404 permit. Detailed information on existing nationwide general permits, called Nationwide Permits (NWP), may be found in the Federal Register. Summary information regarding Nationwide Permits may be found at: www.usace.army.mil/inet/functions/cw/cecwo/reg/Summary_table.pdf.

Refer to this source to determine if your project exceeds the threshold for formal regulatory involvement. Several activities, although generally authorized under a Nationwide Permit, require Pre-Construction Notification (PCN) and wetland delineation.

Typical activities addressed under Nationwide Permits include:

- Linear transportation projects (NWP 14)
- Residential, commercial, and institutional developments (NWP 39)
- Agricultural activities (NWP 40)
- Recreational facilities (NWP 42)
- Stormwater management facilities (NWP 43)

The Nationwide Permit Program Fact Sheet No. 5 (IA) can be found at:
www.mvr.usace.army.mil/Regulatory/nationwidepermits/Documents/FS_IA_5.pdf.

- b. **Wetlands.** Wetlands are defined as “those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.” Wetlands have three essential characteristics, all of which must be present for an area to be identified as a wetland:
 - Hydrophytic (water-loving) vegetation
 - Hydric soils
 - Wetland hydrology

Examples of wetlands include, but are not limited to:

- Seasonally flooded basins or floodplains
- Wet meadows
- Shallow marshes
- Deep marshes
- Shrub swamps
- Woodland swamps and bogs

CAUTION: If affected wetlands are on agricultural land, the Natural Resource Conservation Service (NRCS) should be contacted for assistance in making wetland determinations and permitting requirements.

- c. **Wetland delineation.** Identification of Section 404-regulated wetlands requires wetland delineation by the USACE, the EPA, or by submission of a wetland delineation report to the USACE by a qualified wetland specialist. Wetland delineation is often requested or contracted by a property owner who needs to know restrictions on the development or use of the land. In particular, a property owner may need wetland delineation when seeking an individual or general permit.
- d. **Wetland mitigation.** Every effort should be made at the beginning of a project to avoid or minimize impacts. Any project that does not meet the conditions of any one of the Nationwide Permits must be sent to the USACE and probably will require satisfactory mitigation for the loss of wetlands. Mitigation is defined as wetland restoration, creation, enhancement, or preservation for the purpose of compensating for unavoidable wetland losses in advance of development actions, when such compensation cannot be achieved at the development site or would not be as environmentally beneficial. Compensation of impacted resources is only accepted if mitigation occurs in the following sequence:
- 1) Avoid direct or indirect impact by not taking a certain action
 - 2) Minimize impacts by limiting the degree of action
 - 3) Rectify the impact by repairing, rehabilitating, or restoring the affected environment
 - 4) Reducing or eliminating the impact over time by preservation and maintenance operations
 - 5) Discharge of stormwater into jurisdictional wetlands is to be avoided
 - 6) Compensating for unavoidable impact by replacing or providing substitute resources:
 - a) Replace or provide substitute resources on-site
 - b) Replace or provide substitute resources off-site at an approved location, owned by either the project sponsor or a federal, state, or local conservation entity
 - c) Purchase compensatory credits at an approved wetland bank

CAUTION: Wetland mitigation by repair, rehabilitation, restoration, or replacement requires monitoring and maintenance plans to ensure mitigation goals are met in perpetuity.

If there is any doubt about a project, contact the appropriate office for a ruling:

Iowa Department of Natural Resources
Wallace State Office Building
ATTN: Floodplain Permits Section, Sovereign Lands Section
502 East 9th Street
Des Moines, IA 50319-0034
515-281-8693

USACE District Engineer
Operations Division
Clock Tower Building
PO Box 2004
Rock Island, IL 61204-6361
309-794-5373

US Army Engineer District
Omaha Corps of Engineers
PO Box 5
Omaha, NE 68102
402-896-0896

CAUTION: The USACE District Engineer now has discretionary authority to require an individual permit on a case by case basis. Highly controversial projects, in particular, should be examined carefully. (These should be submitted to the USACE regardless of the amount of wetlands involved).

C. Requirements for regulated MS4s

As a Phase II regulated MS4, the jurisdiction is required to submit a permit application and obtain coverage under an NPDES stormwater permit. Under the permit, the jurisdiction is required to develop and implement a stormwater management program that includes six minimum control measures, evaluation/assessment and reporting efforts, and recordkeeping, as described below.

Design a stormwater management program that:

- Reduces the discharge of pollutants to the maximum extent practicable (MEP)
- Protects water quality
- Satisfies the appropriate water quality requirements of the Clean Water Act

MEP is a standard that establishes the level of pollutant reductions that MS4 operators must achieve through implementation of a stormwater management program. The strategies used to reduce pollutants to the MEP may be different for each small MS4 because of unique local hydrologic, geologic, and water quality concerns in different areas. The EPA envisions that permittees will determine what the MEP is on a location-by-location basis and consider such factors as conditions of receiving waters, specific local concerns, and other aspects of a comprehensive watershed plan. Since many diverse factors can dictate the specifics of a stormwater management program, the jurisdiction should determine appropriate BMPs to satisfy each of the minimum control measures through an evaluative process. The definition of MEP should adapt continually to both current conditions and BMP effectiveness, but ultimately, successive iterations of the mix of BMPs and measurable goals should be made to achieve the objective of meeting water quality standards. If, after implementing the minimum control measures and completion of a local watershed assessment, there is still water quality impairment associated with discharges from the MS4, the jurisdiction may need to expand BMP implementation in the watershed.

The intent of this manual is to provide guidance to local jurisdictions on planning and implementation of BMPs for water quality improvement.

D. Stormwater management programs

The Phase II Rule defines a stormwater management program for a small MS4 as a program composed of six elements that, when implemented together, are expected to reduce pollutants discharged into receiving surface waters to the MEP. These six program elements, or minimum control measures, are:

- Public education and outreach on stormwater impacts
- Public involvement/participation
- Illicit discharge detection and elimination
- Construction site runoff control
- Post-construction stormwater management in new development and redevelopment
- Pollution prevention/good housekeeping for municipal operations

For each minimum control measure, the jurisdiction selects and implements BMPs and measurable goals that comprehensively address the specific stormwater problems within their area.

The process for developing a stormwater management program is described in Section 2A-2 of this manual. Guidance on the selection and design of structural BMPs for water quality is included in later sections. Selection and design of BMPs for construction site runoff control (erosion and sediment) is covered in Chapter 7 of this manual. Guidance on selection of measurable goals for post-construction runoff control is provided below.

1. **Post-construction runoff minimum control measures.** The Phase II Final Rule requires an operator of a regulated small MS4 to develop, implement, and enforce a program to reduce pollutants in post-construction runoff to their MS4 from new development and redevelopment projects that result in the land disturbance of 1 acre or more. The small MS4 operator is required to:
 - Develop and implement strategies which include a combination of structural and/or non-structural BMPs
 - Have an ordinance or other regulatory mechanism requiring the implementation of post-construction runoff controls to the extent allowable under state, tribal or local law
 - Ensure adequate long-term operation and maintenance of controls
 - Determine the appropriate BMPs and measurable goals for this minimum control measure

The Phase II Final Rule applies to redevelopment projects that alter the footprint of an existing site or building in such a way that there is a disturbance of 1 acre or more of land. Redevelopment projects do not include such activities as exterior remodeling. Because redevelopment projects may have site constraints not found on new development sites, the Phase II Final Rule provides flexibility for implementing post-construction controls on redevelopment sites that consider these constraints.

The requirements of the post-construction runoff control minimum measure can be achieved through the use of both non-structural and structural BMPs. It is important to recognize that many BMPs are climate-specific, and not all BMPs are appropriate in every geographic area. Because the requirements of this measure are closely tied to the requirements of the construction site runoff control minimum measure (see Chapter 7), it is recommended that small MS4 operators develop and implement these two measures in tandem. A short summary is provided below with a more detailed discussion provided in other sections of this manual.

- a. **Non-structural BMPs.**
 - 1) **Planning Procedures.** Runoff problems can be addressed efficiently with sound planning procedures. Local master plans, comprehensive plans, and zoning ordinances can promote improved water quality in many ways, such as guiding the growth of a community away from sensitive areas to areas that can support it without compromising water quality.
 - 2) **Site-based BMPs.** These BMPs can include buffer strip and riparian zone preservation, minimization of disturbance and imperviousness, and maximization of open space.
 - b. **Structural BMPs.**
 - 1) **Stormwater Detention BMPs.** Retention or detention BMPs control stormwater by gathering runoff in wet ponds, dry basins, or multi-chamber catch basins and slowly releasing it to receiving waters or drainage systems. These practices can be designed to both control stormwater volume and settle out particulates for pollutant removal.
 - 2) **Infiltration BMPs.** Infiltration BMPs are designed to facilitate the percolation of runoff through the soil to groundwater, and thereby result in reduced stormwater runoff quantity and reduced mobilization of pollutants. Examples include infiltration basins/trenches, bioretention area, rain gardens, dry wells, and pervious and porous pavements.
 - 3) **Vegetative BMPs.** Vegetative BMPs are landscaping features that, with optimal design and good soil conditions, remove pollutants, and facilitate percolation of runoff, thereby maintaining natural site hydrology, promoting healthier habitats, and increasing aesthetic appeal. Examples include grassy swales, filter strips, artificial wetlands, and rain gardens.
2. **Stormwater management measurable goals.** Measurable goals are described in the Phase II rule as BMP design objectives or goals that quantify the progress of program implementation and the performance of your BMPs. Measurable goals are required for each minimum control measure and are intended to gauge permit compliance and program effectiveness. They are objective markers or milestones the IDNR can use to track the progress and effectiveness of BMPs in reducing pollutants to the MEP. A jurisdiction should develop a program with a variety of short- and long-term goals. At a minimum, measurable goals should contain descriptions of actions taken by the jurisdiction to implement each BMP, what can likely be achieved by each goal, and the frequency and dates for such actions to be taken. BMPs and measurable goals can help establish a baseline against which future progress at reducing pollutants to the MEP can be measured. For example, information on current water quality conditions, numbers of BMPs already implemented, and the public's current knowledge/awareness of stormwater management would be useful in setting this baseline.

Measurable goals can be stated in a variety of ways. The jurisdiction can consider developing measurable goals based on one or more of the following general categories:

- a. **Tracking implementation over time.** Where a BMP is continually implemented over the permit term, a measurable goal can be developed to track how often, or where, this BMP is implemented.
- b. **Measuring progress in implementing the BMP.** Some BMPs are developed over time, and a measurable goal can be used to track this progress until BMP implementation is completed.
- c. **Tracking total numbers of BMPs implemented.** Measurable goals also can be used to track BMP implementation numerically, e.g., the number of wet detention basins in place or

the number of people changing their behavior due to the receipt of educational materials.

- d. **Tracking program/BMP effectiveness.** Measurable goals can be developed to evaluate BMP effectiveness, for example, by evaluating a structural BMPs effectiveness at reducing pollutant loadings, or evaluating a public education campaign's effectiveness at reaching and informing the target audience to determine whether it reduces pollutants to the MEP. A measurable goal can also be a BMP design objective or a performance standard.
- e. **Tracking environmental improvement.** The ultimate goal of the NPDES stormwater program is environmental improvement, which can be a measurable goal. Achievement of environmental improvement can be assessed and documented by ascertaining whether state water quality standards are being met for the receiving surface water or by tracking trends or improvements in water quality (chemical, physical, and biological) and other indicators, such as the hydrologic or habitat condition of the stream segments within the watershed.

Measurable goals should include, where appropriate, the following three components:

- The activity or BMP to be completed
- A schedule or date of completion
- A quantifiable target to measure progress toward achieving the activity or BMP

Measurable goals that include these three components and are easy to quantify will allow the jurisdiction and the IDNR to assess progress at reducing pollutants to the MEP. Measurable goals guidance for Phase II MS4s has been developed by EPA to help program managers comply with the requirement to develop measurable goals. The guidance presents a methodology for MS4 operators to develop measurable goals as part of the jurisdiction's stormwater management plan. This can be found at: www.epa.gov/npdes/pubs/measurablegoals.pdf.

For example, an MS4 program goal might choose to reduce by 30 percent the road surface areas directly connected to storm sewer systems (using traditional curb and gutter infrastructure) in new developments and redevelopment areas over the course of the first permit term. Using "softer" stormwater conveyance approaches, such as vegetated swales, will increase infiltration and decrease the volume and velocity of runoff leaving development sites. Progress toward the goal could be measured by tracking the linear feet of curb and gutter not installed in development projects that historically would have been used.

Some examples of measurable goals for post-construction BMPs (from EPA guidance document):

1) **Bioretention:**

- Reduction in impervious cover
- Reduction in runoff quantity
- Changes in runoff water quality (nutrients, sediments, metals, organics, etc.)
- Number of new bioretention cells installed (both commercial and residential)
- Number of acres that are drained by bioretention cells

2) **BMPs:**

- Develop a program for maintenance of structural stormwater controls
- The frequency of inspection and maintenance activities
- The number of problems that were identified and remedied
- The change in the proportion of BMPs that are well-maintained as a result of inspection and maintenance
- Whether or not an inventory of BMPs requiring maintenance was completed and is regularly updated

- Changes in water quality from BMPs
- 3) **Measurable goals.** In the first year, conduct an inventory of structural runoff controls. In Year 2, develop a GIS inventory to integrate the location of these controls with schedules for regular inspection and maintenance. Conduct four inspections of each structural control per year and conduct regular maintenance as prescribed for each type of practice.
 - 4) **Justification.** There are many structural controls located throughout the municipality that are owned and operated by both public and private entities. Before a comprehensive maintenance plan can be implemented to address all of the practices, a complete list of BMPs and their locations and site conditions needs to be compiled. An inspection and maintenance schedule can be developed to maximize efficiency and minimize labor requirements. The system can be expanded to include other types of MS4 maintenance, including street sweeping, catch basin cleaning, storm drain flushing, etc.
 - 5) **Buffer zones:**
 - Whether or not development codes were changed to require buffer zones
 - The acreage of land conserved as buffers
 - The acreage of land converted to buffers
 - Changes in water quality of runoff leaving buffer areas
 - Changes in the physical characteristics of streams downstream from areas with buffer zones
 - The frequency of inspections and maintenance activities in buffer zones
 - The acreage that drains to buffer zones
 - 6) **Vegetated swales:**
 - The number of new grassed swales installed
 - The miles of streets with grassed swales
 - The reduction in runoff quantity
 - The reduction in runoff velocity
 - Changes in water quality of runoff from areas with grassed swales
 - The number of acres drained by grassed swales
 - 7) **Infrastructure planning:**
 - Whether or not development codes were modified
 - The number of new developments using stormwater BMPs
 - The reduction in impervious surface area and infrastructure
 - 8) **On-lot treatment:**
 - Reduction in runoff quantity
 - Reduction in runoff peak flow
 - Number of lots that use on-lot treatment
 - Acreage of impervious surfaces that drain to on-lot treatment BMPs
 - Number of manufactured products sold to store runoff onsite (i.e., rainbarrels)
 - Changes in water quality downstream from areas that use on-lot treatment
 - 9) **Open space design:**
 - Whether or not development codes were modified to accommodate open space developments
 - Number of new developments that use open space design principles
 - Number of acres of open space preserved with open space design
 - 10) **Wet detention or extended detention ponds:**
 - Changes in water quality
 - Reduction in runoff quantity
 - Number of wet ponds or extended detention ponds installed
 - Acreage of impervious surface that drains to wet ponds and/or extended detention ponds