GUIDANCE FOR PREPARING MONITORING PLANS AS REQUIRED FOR PHASE I MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) PERMITS

I. Purpose

This document is intended to provide guidance for Phase I MS4 permittees in either designing a new monitoring plan or revising an existing monitoring plan. ***Please carefully review this document prior to submitting your proposed MS4 monitoring plan.***

II. Introduction

Operators of Phase I MS4s are required to develop and implement a comprehensive Stormwater Management Program (SWMP) that must include pollution prevention measures, treatment or removal techniques, monitoring, use of legal authority, and other appropriate means to control the quality of stormwater discharged from the MS4 to the Maximum Extent Practicable (MEP).

Monitoring is an important component of a SWMP. The monitoring requirement for Phase I MS4s is supported by Title 40 of the Code of Federal Regulations (CFR) Part 122.26(d)(2)(iii) and Rule 62-624.600, Florida Administrative Code (FAC).

III. Goals and Objectives of Monitoring

A. Overarching Monitoring Goal

The overarching goal for monitoring required under Phase I MS4 permits relates to both managing and assessing the effectiveness of the SWMP. The primary objective of the SWMP is to reduce pollutants discharged from the MS4 to waters of the state to the MEP. Monitoring results should support decisions made by the permittee and be used to continuously fine-tune the SWMP to meet its primary objective. This could include implementing new or adjusting existing Best Management Practices (BMPs) or prioritizing areas in the permittee's jurisdiction for future stormwater treatment retrofit projects.

Ultimately, monitoring data, along with other appropriate program information and data, should be used when evaluating the overall effectiveness of the SWMP. Further, this data should support the conclusions reached for the "Assessment of Controls" as required by 40 CFR 122.26(d)(2)(v). This assessment is considered a critical component of the federal rules for demonstrating that the permittee is meeting the MEP standard.

In addition, implementing an effective monitoring program can potentially serve several water quality information needs by documenting long-term conditions and trends in water quality. In many cases, monitoring for stormwater management purposes is coordinated with other measurement programs. For example, monitoring data may be used to support the development and the implementation of Total Maximum Daily Loads (TMDLs) as outlined in Attachment 1.

B. Specific Monitoring Goals

Phase I MS4 Monitoring Plans must meet the following goals:

1. Identify potential water quality problem areas related to stormwater runoff that can be targeted for corrective action. Corrective action(s) include but are not limited to retrofits, structural BMPs, and non-structural BMPs (e.g., public education, street sweeping);

2. Measure the effectiveness of stormwater pollution reduction measures (i.e., BMPs) that have been or will be implemented; and

3. Document pollutant loadings and/or trends in pollutant loadings for specific watersheds or outfalls.

IV. Types of Monitoring Approaches

A variety of monitoring approaches can be used to evaluate the impacts of stormwater discharges or the effectiveness of a SWMP. A combination of approaches often makes for the most effective monitoring program, but is not necessary if a single approach can achieve the three Specific Monitoring Goals detailed in the section above. Typical MS4 monitoring can include BMP performance monitoring, site-specific monitoring, sediment monitoring, or biological monitoring.

A. EPA Guidance on Monitoring Approaches

The following is a brief overview of useful water quality monitoring approaches to evaluate SWMPs from the EPA guidance document entitled *Evaluating the Effectiveness of Municipal Stormwater Programs- January 2008 (*EPA Document 833-F-07-010).

Useful Water Quality Monitoring Approaches for Evaluation of SWMPs

Visual observations. Some water quality conditions can be assessed by visual (qualitative) observations of controls, outfalls or receiving waters. Searching for and correcting illicit discharges through observation of oil and grease sheens, floatables, or odors at outfalls is one example. Progress in streambank stabilization and channel restoration might be monitored by regular photography of critical locations. In general, qualitative observations should be supplemented by quantitative measurements where possible, such as with dry weather sampling at outfalls or regular surveys of representative stream cross-sections. The City of Albuquerque MS4 Floatable & Gross Pollutant Study (www.cabq.gov/ storm-drainage-design) is an example of a systematic approach to qualitative observations of water quality conditions. Examples of survey techniques for streambank assessment can be found in the Maryland Stream Corridor Assessment Survey (www.dnr.maryland.gov/streams/ pubs/surveyprotocols2.pdf) and the USACE/USEPA review of protocols for stream assessment (www.mitigationactionplan.gov/Physical%20Stream%20 Assessment%20Sept%2004%20Final.pdf).

BMP performance monitoring. Monitoring of individual BMP performance provides a direct measure of pollutant reduction efficiency of these key components of a SWMP. Conceptually, BMP input/output monitoring is simple – measure pollutant concentrations or loads entering and leaving a wet pond for example, and compute the difference. In practice, BMP monitoring is more complex, requiring careful collection of data concerning storm and runoff characteristics and information on BMP attributes, as well as water quality information. There are several sources of information on BMP performance and on protocols for collecting, storing, analyzing, and reporting BMP monitoring data, including the National Stormwater BMP Database (www.bmpdatabase.org) and the USEPA and ASCE *Urban Stormwater BMP Performance Monitoring Manual*. Some examples of individual BMP monitoring studies can be found at the Villanova Urban Stormwater Partnership (www3.villanova.edu/VUSP/ index.html).

Probability monitoring. Monitoring sites can be selected across a broad geographic area according to some statistical design to broadly characterize water quality conditions in a watershed or to identify possible contamination hotspots. Site selection could be random to achieve wide spatial coverage or stratified to focus monitoring on particular environment types or represent specific target populations. Data from a statistical sample of stream riffle sites across a watershed could be used to assess the overall condition of watershed macroinvertebrate communities. A monitoring program addressing sediment toxicity in a bay might geographically direct sampling to ensure that sediments in different depositional environments or with different physical characteristics are sampled, or that samples are collected within the areas affected by discharges from major tributaries. Results of probability monitoring can be used to guide SWMP implementation efforts and to assess long-term trends in response to SWMP implementation. An example of a probability design applied to evaluating sediment toxicity is found in the NOAA report Magnitude and Extent of Contaminated Sediment and Toxicity in Chesapeake Bay (ccma.nos.noaa.gov/publications/ NCCOSTM47.pdf).

Short-term extensive network monitoring. Short-term grab-sampling at the outlets of numerous small watersheds or other drainages within a large MS4 can identify impaired waters and rank areas for implementation priority. Data collected simultaneously across the MS4 can help characterize the geographical distribution of pollutant sources. The City of Los Angeles monitors a network of shoreline stations in Santa Monica Bay for bacteria to identify stormwater impacts on recreational uses of the bay. This approach can apply not only to streams draining small watersheds but also to storm drains during both wet-weather and dry-weather conditions. If continued over several years, this kind of monitoring can be a good opportunity for volunteer groups to participate in the SWMP evaluation process. Data collected by volunteers could be reported separately or incorporated within "official" data sets used for regulatory purposes depending upon the methods used and level of training provided to volunteers.

Site-specific monitoring. High-value resources such as popular swimming beaches, important shellfish beds, or high-priority habitats could require specific monitoring to regularly assess the status of use support. Similarly, known high-priority pollutant sources or hotspots of impairment like contaminated aquatic sediments, an eroding stream channel threatening property, or a stream reach with a degraded fish population could be monitored to assess progress in restoration. Depending on the situation, such monitoring can be

done in the critical area itself to assess its condition or upstream and downstream of the area to evaluate changes in pollutant stressors. Fairfax County's MS4 program conducts an industrial and high-risk runoff monitoring program to identify and investigate industrial and other high-risk sites to determine if they are contributing substantial pollutant loadings to the MS4. The San Diego Bay MS4 permittees operate a Toxic Hot Spots Monitoring Program to locate and track areas of aquatic sediment contamination related to discharges from MS4s around the Bay.

Long-term fixed stations. Permanent monitoring stations at major discharges from an MS4 or on a receiving water above and below an MS4 can be used to measure changes in pollutant loads discharged from the MS4. Such stations are usually located where it is easy to measure flow and collect representative samples. Accurate load measurement requires consideration of many factors including patterns of hydrologic variation, seasonal patterns of pollutant concentrations, and desired statistical power; it is advisable to consult a monitoring expert before setting up a sample program to monitor pollutant loads. Flow, concentration, and load data from long-term fixed stations can be used for many purposes, including assessing compliance with water quality standards, collection of representative data from drainage areas that are undergoing similar activities and where the discharges are expected to be of similar quality as required in some MS4s under Phase I rules, documenting water quality trends, and marking progress toward meeting pollutant load goals, e.g., for a TMDL. The Los Angeles County stormwater monitoring program operates a system of mass emissions stations (www.ladpw.com/WMD/npdes/Int_report/Section_1.pdf) to update estimated pollutant loads to the ocean and to document long-term trends in pollutant concentrations. The San Diego region urban runoff monitoring program maintains similar long-term mass loading stations (www.projectcleanwater.org/pdf/science_mon/2003-2004_monitoring_summary.pdf) that regular assessment of the biological communities as well as chemical pollutant loads in major drainages.

Receiving water monitoring. Protection of a water body receiving discharges from an MS4 is often the ultimate goal of stormwater management. However, an MS4 may not be the only stormwater discharge into a water body, and achievement of the MS4's discharge quality goals may not eliminate the impairment in the receiving water. It may nevertheless be important to monitor water quality in the river, lake, estuary, or bay that receives its discharge, especially if localized impacts can be identified. Evaluation of the effectiveness of a SWMP on maintaining recreational benefits, for example, might involve monitoring both storm drains and swimming beaches for *E. coli.* If a goal of a SWMP is to reduce the impacts of toxic materials delivered in stormwater, a program monitoring a combination of water and sediment chemistry, sediment toxicity, and benthic communities in the receiving water might be appropriate.

EPA 8333-F-07-010 Evaluating the Effectiveness of Municipal Stormwater Programs

B. Ambient Monitoring Approach

A variety of ambient monitoring programs can be used to evaluate the impacts of stormwater discharges. Typically this can include water column monitoring, biological monitoring, or sediment monitoring. Since few stormwater pollutants reside in the water column, instead settling to the bottom of receiving waters, biological and sediment monitoring are the best at evaluating the cumulative impacts of stormwater discharges to receiving waters. In particular, the bioassessment and sediment monitoring techniques are excellent tools to help determine "hot spots" where stormwater treatment retrofit projects should be implemented. Each of these tools is briefly discussed below.

1. Water Column Monitoring

   Traditionally, water column monitoring has been done to evaluate the health of water bodies. However, such monitoring only provides a snapshot of conditions at the time of sample collection and must be used in conjunction with data collected over a ten year period in order to identify trends in water quality. Water column monitoring is appropriate if the pollutants of concern are nutrients or pathogens. However, because of inherent variation, water column sampling must be done on a frequent (e.g., quarterly) basis. An equal number of samples should be taken during the wet and dry seasons.

2. Biological Monitoring

   It is widely recognized that stormwater discharges are intermittent and represent relatively short-term, shock loadings to receiving waters. Since most stormwater pollutants become associated with bottom sediments, sediment and biological community assessment techniques can be more appropriate than traditional water chemistry standards in assessing environmental effects of stormwater discharges. For additional information on the use of biological organisms to assess water quality, visit: www.dep.state.fl.us/water/bioassess/index.htm

3. Sediment Monitoring

   The Department's Watershed Monitoring Section has developed a number of guidance manuals describing standard sampling and analysis techniques for sediment sampling. The following guidelines are available online at: www.dep.state.fl.us/water/monitoring/sediments.htm

   Sediment Guidelines:
   - Volume I – An Ecosystem-Based Framework for Assessing and Managing Contaminated Sediments (1 MB)
   - Volume II – Design and Implementation of Sediment Quality Investigations (2 MB)
   - Volume III – Interpretation of the Results of Sediment Quality Investigations (3 MB)

   Marine/Estuarine Guidelines:
   - 1994 Florida Sediment Quality Assessment Guidelines (SQAGs)
   - A Guide To The Interpretation Of Metal Concentrations In Estuarine Sediments

Freshwater Guidelines:

- Interpretative Tool for the Assessment of Metal Enrichment in Florida Freshwater Sediment
- Development and Evaluation of Numerical Sediment Quality Assessment Guidelines for Florida Inland Waters

V. Elements of Phase I MS4 Monitoring Plans

Proposed monitoring plans that are submitted to the Department to satisfy Part V.B of the MS4 permit, shall provide a minimum description of key elements of the plan. The plan shall address each of the elements as prescribed in sub-paragraphs A through E below:

A. Monitoring Plan Goals and Objectives

What is your monitoring intended to accomplish? The monitoring plan shall include a narrative description outlining how the monitoring addresses or will address all three of the Specific Monitoring Goals listed in section III.B above.

B. Monitoring Approach

The monitoring plan shall specify the monitoring approach or approaches you have chosen to implement. For each monitoring approach chosen, the monitoring plan shall include a narrative summary outlining the rationale for selecting the approach, the parameters, the collection methods, the frequency of sampling, and the monitoring locations in relation to the three Specific Monitoring Plan goals listed in section III.B above.

C. Monitoring Parameters and Sampling

The monitoring plan shall clearly identify the parameters being sampled, type of monitoring (e.g., storm-event, ambient, biology, sediment, etc.), collection method (grab, flow-weighted composite) and the frequency of sampling for each monitoring location over the life of the permit term. The Department recommends including this information in the plan per the example in Table 1 below.

Table 1: Example Parameters and Sampling Table

Monitoring Station #	Monitoring Parameters	Type of Monitoring	Collection Method	Sampling Frequency	Special Notes

The Department recommends that Phase I MS4 permittees sample for the parameters listed in the first column of Table 2 below. The second column of Table 2 provides additional parameters for your consideration given your specific needs and objectives. The recommended parameters are known pollutants of concern associated with stormwater discharges. In addition, the parameters should assist MS4s in refining pollutant loadings for specific watersheds or outfalls. MS4s that discharge stormwater into waters on the Verified List of Impaired Waters or to waters where a TMDL has been developed should monitor for the parameter(s) associated with the impairment.

Table 2: MS4 Monitoring Parameters*

Recommended Parameters	Other Parameters for Consideration
Chlorophyll A	Biochemical Oxygen Demand
Conductivity (Salinity)	Cadmium, Dissolved
Copper, Dissolved	Chemical Oxygen Demand
Dissolved Oxygen	Chromium
Fecal Coliform	Color
Hardness	Lead, Dissolved
Nitrate + Nitrite	Oil & Grease
pH	Orthophosphorus
Total Kjeldahl Nitrogen	Total Dissolved Phosphorus
Total Nitrogen	Total Dissolved Solids
Total Phosphorus	Total Organic Carbon
Total Suspended Solids	Zinc, Dissolved
Turbidity	Any other parameter(s) of interest to the jurisdiction

***MS4s that discharge stormwater into waters on the Verified List of Impaired Waters or to waters where a TMDL has been developed should monitor for the parameter(s) associated with the impairment.

D. Monitoring Locations

1. Monitoring Location Information

At a minimum, the monitoring plan shall include the following information to specify monitoring site locations:

a. A map showing the following*:

- The major surface water bodies within the permittees' jurisdictions;
- Identification of major MS4 outfalls that discharge to surface water bodies, including those discharging to waters on the Verified List of Impaired Waters or to waters for which TMDLs have been adopted; and
- The location of the monitoring/sampling stations.

b. A table identifying the monitoring/sampling station(s) that includes the latitude and longitude of any in-lake or in-stream monitoring stations as well as any outfalls and the water bodies to which they discharge or are associated.

c. For any lake or stream sites, or stormwater outfall monitoring stations, a table summarizing the land use in acres and percent of the contributing drainage area using standard land use classifications.

[*Maps should be provided in hard copy and as GIS shape files, if possible.]

The Department recommends including this information in the plan per the example in Table 3 below.

Table 3: Example Monitoring Location Table

Monitoring Station Number	Location	Acres Drained/ Area Description	Latitude/ Longitude	Water body Associated With the Discharge Point or Location	Is the Water body on the Verified List of Impaired Waters? (Yes/No)	Does the Water body Have an Adopted TMDL? (Yes/No)
D001	Municipal stormwater pond outfall at the end of Rosetta Street	155 acres drained / 100% is residential land use	30: 24':15" 86: 25': 09"	Bear Creek	No	No
D002	Manhole site at the intersection of Bear Creek Drive and Highway 98	162 acres drained / 100% is commercial land use	30: 24':07" 86: 24': 22"	Bear Creek	No	No
D003	End of South Street at 48" stormwater outfall	125 acres drained / 100% is industrial land use	30: 24':06" 86: 25': 25"	Choctaw Bay	No	No
D004	Instream station- Hwy 85 bridge	2440 acres drained/40% is residential/commercial 60% is agricultural	30: 23':01" 86: 24': 11"	Cross River	Yes	No

2. Selection of Monitoring Locations

It is highly recommended that monitoring be conducted on major outfalls and/or instream monitoring locations to measure the pollutant loadings of stormwater discharges from the MS4. Specific examples include the following locations:

a. A major outfall that discharges stormwater from a predominantly residential, commercial, or industrial area.

b. A major outfall that discharges to an impaired water body.

c. Inputs into the MS4 (i.e., waterbodies that bring water into the jurisdiction).

d. For instream monitoring, a stable cross-section with well-mixed flow within the boundaries of the MS4.

e. If there are no discharge locations within the permittees jurisdiction that meet the criteria in paragraphs above, the following alternative locations may be substituted:

- A major outfall associated with a BMP that is in the planning stage.

- A major outfall associated with an area of redevelopment that is in the planning stage.

- A major outfall associated with a BMP that is already implemented.

E. Identification of Responsible Authorities and Partnerships

The monitoring plan shall specify all the entities involved in the coordination and execution of the monitoring activities, and define the role and responsibilities of each. This shall include any organization that will take and analyze samples on the permittee's behalf per a contract or an interlocal agreement.

For MS4 permits with multiple co-permittees, the monitoring plan shall also specify which co-permittees are partners in the plan as opposed to having their own monitoring plans.

VI. Stormwater Discharge Monitoring Sample Collection

A. Storm Event Discharge Samples

1. Samples shall be collected from the discharge resulting from a storm event that is greater than 0.1 inches in magnitude and that occurs at least 72 hours from the previously measureable (greater than 0.1 inch rainfall) storm event. The required 72-hour storm event interval is waived where the preceding measurable storm event did not result in a measurable discharge. The required 72-hour storm event interval is also waived where the permittees document that less than a 72-hour interval is representative for local storm events during the season when sampling is being conducted.

2. Sampling Method(s): Permittees shall sample for parameters as required by their monitoring plan in accordance with the methods below.

B. Composite Samples

1. Method-Flow-weighted composite samples may be collected manually or automatically. For both methods, equal volume aliquots may be collected at the time of sampling and then flow-proportioned and composited in the laboratory, or the aliquot volume may be collected based on the flow rate at the time of sample collection and composited in the field.

2. Composite samples may be taken with a continuous sampler or as a combination of a minimum of three (3) sample aliquots taken in each hour of discharge for the entire discharge or for the first three (3) hours of the discharge, with each aliquot being separated by a minimum period of fifteen (15) minutes.

C. Grab Samples

1. Grab samples for storm event samples shall be taken during the first two hours of discharge.

2. Grab samples shall be used for analysis of fecal coliform, hardness, oil and grease, pH, and temperature.

VII. Quality Assurance

All samples shall be collected and analyzed in accordance with the methods specified in 40 CFR Part 136. Field testing, sample collection, preservation, laboratory testing, including quality control procedures and all record keeping shall comply with Chapter 62-160, F.A.C. For additional information on the Department's Quality Assurance requirements and Standard Operating Procedures visit: www.dep.state.fl.us/labs/qa/index.htm.

VIII. Monitoring Records Requirements

Records of all monitoring data shall be maintained for at least three years from the date of sampling or measurement (in accordance with Rule 62-624.300(2), F.A.C.). At a minimum, records of monitoring information shall include the following:

- The date, place and time of the sampling or measurement;
- The name(s) of the individual(s) who performed the sampling or measurement;
- The date(s) and time(s) the analyses were performed; and
- The results of the analyses.

IX. Reporting / Evaluation of Monitoring Results

Each Annual Report shall include a summary providing an assessment of water quality trends and/or pollutant loading trends based on data gathered and analyzed as a result of the monitoring program. Specifically, the monitoring summary shall:

- Provide a summary of the monitoring data from the reporting year; and

- Provide a long-term assessment of water quality and/or pollutant loading improvements or degradation based on data gathered and analyzed as a result of the monitoring program or a statement indicating that the results are inclusive. For the purposes of the annual report monitoring summary, "long-term" can be defined by the permittees (e.g., 5-years, 10-years, 15-years, etc.). See Tables 4 & 5 for example formats for reporting monitoring trend results.

Table 4: Sample Trend Plot, Single Station

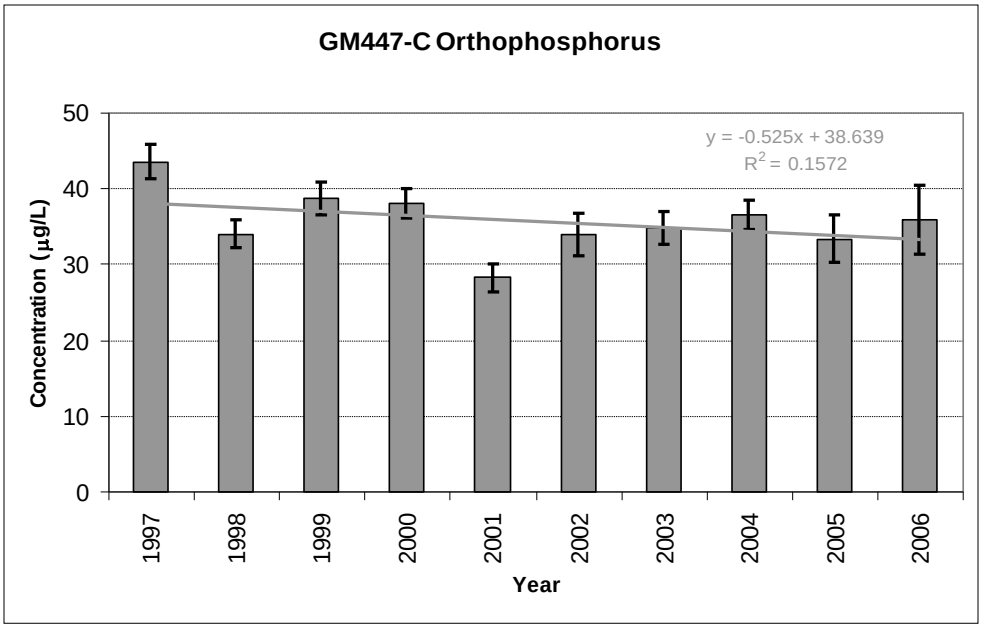
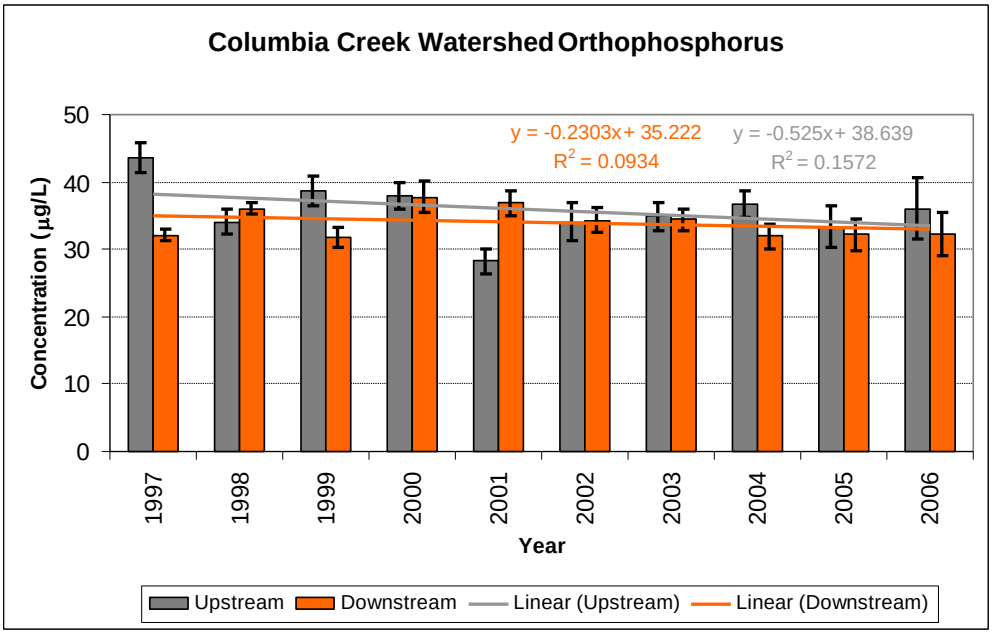


Table 5: Example Trend Plot, Upstream-Downstream



X. Additional Resources

The following are additional resources available to assist with the development and implemention of an MS4 monitoring program:

- **Monitoring Plan Examples** ↓ Center for Watershed Protection, "*Monitoring to Demonstrate Environmental Results: Guidance to Develop Local Stormwater Monitoring Studies Using Six Example Study Designs*, August 2008. This manual presents six monitoring study designs that can be used by permitted MS4s to assess their local stormwater programs. http://cfpub.epa.gov/npdes/stormwater/munic.cfm.

- **National Stormwater Quality Database** ↓ A national database of Phase I stormwater monitoring data providing a scientific analysis of the data, and recommendations for improving the quality and management value of future NPDES monitoring efforts. unix.eng.ua.edu/~rpitt/Research/ms4/mainms4.shtml

- **Volunteer Monitoring** ↓ Download fact sheets and methods manuals, learn about upcoming events, and link to other helpful resources. www.epa.gov/owow/monitoring/volunteer/

Attachment 1
Total Maximum Daily Load (TMDL) Program

TMDL Overview

When it was enacted in 1999, the Florida Watershed Restoration Act gave the Department primary responsibility for implementing Section 303(d) of the federal Clean Water Act. These responsibilities include assessing and identifying impaired water bodies, establishing TMDLs, and working with responsible parties to implement water body restoration plans. General information about the TMDL program can be found at the Department's Web site (www.dep.state.fl.us/water/tmdl/index.htm).

A goal of the U. S. Environmental Protection Agency (EPA) and the Department is to develop, allocate, and implement TMDLs on a watershed basis (managing water resources within their natural boundaries). One element of this approach is evaluating surface water conditions and sources of pollution on a basin or sub-basin scale. To this end, we are encouraging entities with MS4 permits to consider the needs and objectives of a coordinated approach in developing and implementing their monitoring programs. The TMDL watershed-based approach addresses the state's fifty-two major hydrologic basins in five groups (Table A-1).

Table A-1: Basins by Group and Department District Office

District	Group 1 Basins	Group 2 Basins	Group 3 Basins	Group 4 Basins	Group 5 Basins
Northwest	Ochlockonee-St. Marks	Apalachicola-Chipola	Choctawhatchee-St. Andrews Bay	Pensacola Bay	Perdido Bay
Northeast	Suwannee	Lower St. Johns	Upper St. Johns	Nassau-St. Marys	Upper East Coast
Central	Ocklawaha	Middle St. Johns		Kissimmee	Indian River Lagoon
Southwest	Tampa Bay	Tampa Bay Tributaries	Sarasota Bay-Peace-Myakka	Withlacoochee	Springs Coast
South	Everglades West Coast	Charlotte Harbor	Caloosahatchee	Fisheating Creek	Florida Keys
Southeast	Lake Okeechobee	St. Lucie-Loxahatchee	Lake Worth Lagoon-Palm Beach Coast	Southeast Coast Biscayne Bay	Everglades

Each group will undergo a cycle of five phases on a rotating schedule (Table A-2):

Phase 1: Preliminary Evaluation — Conduct preliminary basin water quality assessment using existing data; inventory existing and proposed management activities; identify management objectives and issues of concern; develop a strategic monitoring plan; and produce a preliminary Basin Status Report that includes a planning list of potentially impaired waters.

Phase 2: Strategic Monitoring and Assessment — Collect additional data; support in upload of stakeholder data into a common database; complete water quality assessment; produce Verified List of impaired water bodies for adoption by the Department and submittal to EPA; produce a Basin Assessment Report based on the updated water quality

assessment; and evaluate existing management plans for their affect on potentially impaired water bodies.

Phase 3: TMDL Development and Adoption — Department develops and adopts TMDLs for impaired waters; Department establishes initial allocations of pollutant reductions and categories of dischargers.

Phase 4: TMDL Basin Management Action Plan (BMAP) — Department and stakeholders develop plan (including pollutant load allocations) for reducing pollution discharges, using existing management plans where feasible.

Phase 5: Implementation — Department supports BMAP implementation; helps secure funding; informs the public and others; monitors and evaluates BMAP implementation.

Table A-2: Generalized Basin Rotation Schedule For TMDL Development and Implementation

YEAR	00 01	01 02	02 03	03 04	04 05	05 06	06 07	07 08	08 09	09 10
Group 1	PHASE 1	PHASE 2	PHASE 3	PHASE 4	PHASE 5	PHASE 1	PHASE 2	PHASE 3	PHASE 4	PHASE 5
Group 2		PHASE 1	PHASE 2	PHASE 3	PHASE 4	PHASE 5	PHASE 1	PHASE 2	PHASE 3	PHASE 4
Group 3			PHASE 1	PHASE 2	PHASE 3	PHASE 4	PHASE 5	PHASE 1	PHASE 2	PHASE 3
Group 4				PHASE 1	PHASE 2	PHASE 3	PHASE 4	PHASE 5	PHASE 1	PHASE 2
Group 5					PHASE 1	PHASE 2	PHASE 3	PHASE 4	PHASE 5	PHASE 1