2. APPROACH USED IN THIS REPORT

EPA has collected preliminary information on the Phase I program that documents specific instances where the program has resulted in better control of storm water discharges and greater protection of water quality. EPA's response to the Appropriations Act requirements builds on several of the Agency's ongoing efforts to track the progress of wet weather programs, including the Phase I storm water program. When completed, these efforts will provide valuable insights and information that will assist in establishing the future direction of storm water regulatory and permitting efforts. Also, in the limited time since the Appropriations Act, EPA has collected and analyzed a limited amount of additional data and information related to the Phase I storm water program.

As noted in Chapter 1, most NPDES permitting actions attributable to the Phase I storm water program have occurred within the past several years. EPA's programmatic design foresaw a phased storm water program. Per this design scheme, the initial permitting cycle would establish the mechanisms to control storm water discharges, including requiring storm water characterization to facilitate the design of storm water controls. Subsequent NPDES permitting cycles would increasingly focus on refinement of requirements to address pollutants and practices of concern.

2.1 THREE TYPES OF INDICATORS

Consistent with the Agency's programmatic expectations and with congressional direction, this Report assesses where the Phase I storm water program has been successful and unsuccessful. Three key categorical measures are used as benchmarks to assess the success of the Phase I program — programmatic indicators, loading reductions, and water quality improvements. The definition of each measure and how it relates to assessing the overall impact of the Phase I storm water program is provided in detail below.

2.1.1 Programmatic Indicators

Programmatic indicators demonstrate the evolution of storm water controls attributable to the Phase I storm water program through the programmatic cycles defined by EPA's permitting strategy. As the Phase I program evolves, a steady progression toward watershed protection is expected.

In developing the Phase I program, EPA made every effort to increase programmatic net benefits by limiting the burden on affected facilities. The Agency took great care to develop a flexible, efficient process whose broad blueprint could be tailored to meet site-specific needs. Because many local and State jurisdictions had storm water control programs in place before the rulemaking (e.g., local erosion and sediment control programs), EPA had an experience base on which to build. As a result, the Agency was able to assess what was working and what was not working, before the rulemaking. In addition, the Phase I program makes extensive use of general permits, an approach that reduces the administrative costs of administrative authorities and

regulated parties. EPA was also in the position to make use of existing technical and programmatic expertise, thereby enabling the relatively rapid technical transfer of those skills and capabilities through traditional training and guidance, as well as the Internet. The effectiveness of EPA's efforts can be determined through an analysis of programmatic indicators.

2.1.2 Loading Reductions

The Phase I program was designed to achieve pollutant loading reductions as the primary means of protecting water quality from the impacts of storm water discharges. Although the Appropriations Act specifically requested information on water quality improvements that have resulted from implementing Phase I, EPA believes the load reductions attributable to Phase I must also be included in this Report. For most circumstances, the Agency requires its permittees to report on local pollutant load reductions and does not require Phase I permittees to document water quality improvements in their local water bodies resulting from the Phase I program. More importantly, load reductions is the only way to measure the pollution prevention aspect of the Phase I program. A major aspect of the Phase I program is helping to prevent further loss of water quality by minimizing the pollutants in storm water discharges. Consequently, this Report describes actual or estimated pollutant load reductions resulting from the storm water controls required by the Phase I program (e.g., best management practices). These reductions are relatively easy to report because they are based on actual performance data collected as part of NPDES permit requirements.

2.1.3 Water Quality Improvements

Pollutants contained in storm water discharges can affect receiving water quality independently or in combination with pollutants discharged from other point and nonpoint sources. As a result, pollutant levels can exceed applicable water quality standards designed to protect aquatic life and human health.

Often, EPA and the States do not have the resources to sufficiently monitor water quality impacts. Moreover, in many cases monitoring of water bodies would not show the full benefits of Storm water control because storm water controls are designed to protect water bodies from degradation as well as to improve already impaired waters. Indeed, one of the goals of the Phase I program is to foster achievement of water quality standards, including protection of designated uses. In these cases, a demonstration of the effectiveness of storm water controls (e.g., pollutant loading reductions) is strong evidence of Phase I program success. This Report includes such information and analyses, as well as specific studies of cases where water quality improvements have been evidenced.

> "Monitoring of several urban streams in Milwaukee County showed that the urban streams are highly degraded. Storm water discharges are blamed for high concentrations of pollutants in the water and bottom sediments, flashy flows, poor habitat, low diversity of aquatic organisms, and accumulation of pollutants in fish and crayfish tissue." (Bannerman, 1996)

In this Report, EPA describes many specific efforts that have been initiated by Phase I regulated entities and have resulted in water quality benefits. Although the Phase I program has resulted in many efforts to better manage storm water discharges and protect water quality, EPA also acknowledges that the Phase I program has not been the only incentive for addressing the impacts of storm water. In some cases storm water impacts have independently encouraged many States, local governments, and academics to determine the extent of impacts and to identify effective and efficient management options. For this Report to Congress, EPA has tried, to the extent possible, to identify benefits that are directly attributable to the Phase I program. However, efforts may include programs or program components that were not necessarily adopted in response to Phase I specifically. In many cases, it may not be possible to determine the exact extent to which program elements resulted from the Phase I rule and what extent they represent part of an existing or parallel effort.

2.2 OVERVIEW OF METHODOLOGIES USED FOR THE ANALYSIS OF THE PHASE I PROGRAM

EPA is reporting on the effectiveness of the Phase I storm water program using three measures: programmatic indicators, loading reductions, and water quality improvements. EPA used several techniques to derive the measures for each major component of the Phase I program (MS4s, construction activities, and industrial activities). A general description of the techniques is provided below. More detailed descriptions of the techniques and data sources used to assess the effectiveness of each major component of the Phase I program are provided in Chapters 3, 4, and 5.

Case studies are used throughout this Report to specifically document efforts, programs, and initiatives used by permittees to comply with Phase I storm water program requirements. The case studies mainly provide detailed information related to how the Phase I program is being developed and implemented by individual permittees. EPA has used the information provided in the case studies to demonstrate how effective the Phase I program has been in protecting water quality from storm water discharges. For this Report, EPA identified case study candidates from a number of sources. For example, the recent NRDC publication *Stormwater Strategies: Community Responses to Runoff Pollution* (NRDC, 1999) was used as a source of case study candidates. In addition, EPA performed searches of literature, periodicals, and the Internet to identify other potential case studies. Case studies were selected based on their direct applicability to the Phase I program.

Because of the relatively short time period provided to prepare this Report to Congress, EPA was not able to collect an extensive amount of new data and information to assist in assessing the Phase I storm water program. However, as described throughout this Report, EPA has used and built on the results of several other survey and data collection efforts to report on the Phase I program. Some of the efforts were undertaken by EPA for other purposes (e.g., for use in analyses not related to this Report), including several initiatives undertaken to comply with the

Government Performance and Results Act (GPRA). EPA also has built on several ongoing efforts related to defining and tracking indicators to measure progress toward Phase I program goals. Finally, the Agency has used data and information collected for use in promulgating the Phase II storm water regulations, including, for example, the *Report to Congress on the Phase II Storm Water Regulations* (USEPA, 1999a).

EPA also collected and analyzed the results of other efforts outside the Agency that were made available for use in this Report. For example, the National Association of Flood and Stormwater Management Agencies (NAFSMA) conducted a survey of its members to solicit input related to the effectiveness of the Phase I storm water program. EPA also used the results of a study performed by the Water Environment Federation (WEF) to assess the effectiveness of the industrial storm water general permitting program.