Appendix E

Storm Water Management Program Modeled Estimates

What are the CWNS 2000 storm water modeled needs?

The total modeled national storm water needs are $8.4 billion. This figure represents only the estimated CWSRF-eligible portion of the costs that municipal separate storm sewer systems (MS4s) are expected to incur to develop and implement storm water management programs in response to the National Pollutant Discharge Elimination System (NPDES) MS4 Storm Water Program regulations for Phases I and II. Although administrative costs for the ongoing operation of MS4 storm water management programs, as well as operation and maintenance (O&M) costs for storm water controls and best management practices (BMPs), are significant, those costs are not included in the model. State-by-state modeled results are presented in Table E-1 at the end of this appendix.

Why were storm water needs modeled for the CWNS 2000?

Although storm water represents a substantial part of the total water quality problem, few States have systematically documented their storm water needs. Therefore, EPA modeled these needs to gain an understanding of the magnitude of the financial needs for storm water management programs.

EPA developed Storm Water Program regulations for pollution from MS4s. The Phase I regulations, initiated in 1990, include MS4s located in incorporated places with populations of 100,000 or more; systems located in the 47 counties identified by EPA as having populations of more than 100,000 in unincorporated, urbanized areas; and systems designated MS4s by the EPA Administrator or the State. MS4s identified under the Phase I Storm Water Program regulations were required to submit NPDES permit applications. As of February 2000 approximately 1,017 Phase I MS4 Storm Water Program NPDES permits, covering 886 municipal entities, had been issued or were in the final stages of being issued.[1] A few small communities are included in the program because they are associated with larger systems or because they have been designated by the State. Phase II MS4s consist of systems serving a population of fewer than 100,000 in urbanized areas with a population density of at least 1,000 persons per square mile and systems that are designated by the EPA Administrator or the State. More than 5,000 MS4s were designated as Phase II systems, although Phase II MS4 permit applications were not due until March 10, 2003.

The Phase II MS4 Storm Water Program requires permittees to develop a storm water management program that addresses six minimum control measures: (1) Public Education and Outreach, (2) Public Involvement and Participation, (3) Illicit Discharge Detection and Elimination, (4) Construction Site Runoff Control, (5) Program to Control Pollutants in Runoff from New Development and Significant Redevelopment, and (6) Pollution Prevention from Municipal Activities.

What methodology was used to model storm water needs?

To estimate the 2000 needs for Phases I and II of the Storm Water Program, EPA largely relied on modeling efforts completed for the 1996 Clean Water Needs Survey and the 1998 storm water Phase II final regulations. Those efforts were used as the basis for the CWNS 2000 modeled Category VI needs for two reasons: (1) better data on Phase I needs are not currently available, and (2) Phase II permits had not yet been issued, and therefore EPA's modeled needs are the best estimates currently available.

How were the Phase I storm water needs estimated?

To estimate the Phase I storm water needs for the CWNS 2000, EPA used the same modeling approach used in the 1996 Clean Water Needs Survey and also subtracted out needs that should have been met by the Phase I cities. These needs largely represented one-time training costs and one-time costs to develop ordinances or regulations. The resulting needs were then inflated to the January 1, 2000, base year for reporting needs.

[1] U.S. Environmental Protection Agency, *Report to Congress on the Phase I Storm Water Regulations,* February 2000.

The Phase I MS4 modeling methodology from 1996 estimated both state-by-state and national storm water needs, but it did not predict the needs for individual MS4s. The estimated needs for the Phase I MS4 Storm Water Program were modeled as follows:

1. Develop decision rules based on climatic criteria to create a set of storm water management approach groups representing broad climatic characteristics that determine the choice of storm water controls or BMPs.
2. Assign each MS4 to a storm water management approach group by applying the decision rules based on climatic criteria to each MS4.
3. Assign appropriate storm water controls or BMPs to each storm water management approach group.
4. Estimate the scale of the applicable storm water controls or BMPs for each MS4 in a storm water management approach group.
5. Use cost formulas, developed for each storm water control or BMP, to estimate the capital cost during a 20-year period for each applicable storm water control or BMP, for each MS4, in January 2000 dollars.
6. Sum the costs of all the applicable storm water controls or BMPs for an MS4 to estimate total capital costs.
7. Aggregate costs nationally and by State.

A panel of outside experts reviewed the model used to estimate the Phase I MS4 storm water needs. The peer review generated several comments related to the O&M costs as estimated by the model, but this did not affect the modeled capital needs presented in this report. Another major peer review comment is that this report presents only one estimate of needs instead of a range. EPA agrees that, depending on the complexity of each individual storm water problem and the variability of local circumstances, a range rather than a single estimate could be developed. Given the objective of the CWNS 2000 to estimate the needs for pollution control, one set of assumptions was selected for use in the report. If the model had been used for economic analysis, a number of different assumptions would have been used to develop upper and lower cost bounds.

How were the Phase II storm water needs estimated?

The Phase II MS4 needs for the CWNS 2000 were based largely on EPA's economic analysis completed for the final Phase II rule in 1999. This economic analysis estimated that the Phase II regulations would cost $3.50 per person per year based on 1998 data. EPA updated the population data to determine the total population affected by Phase II and applied these compliance costs (inflated to a 2000 need) to estimate 2000 Phase II MS4 needs.

To update the Phase II population from a 1998 to a 2000 estimate, EPA used the 1990 U.S. Census coverage of urbanized areas to identify Phase II cities. Phase I geographic areas and combined sewer overflow (CSO) cities were factored out of the population summation for Phase II. Because the 2000 urbanized area would not be available until summer 2002, the population figures were increased by 25 percent to account for growth in the urbanized area since 1990. Therefore, EPA estimates that 75 million people will be affected by Phase II's designation of urbanized areas.

Phase II also potentially regulates cities outside urbanized areas, including cities with a population of at least 10,000. The Phase II final regulation contained a list of these potentially regulated cities based on the 1990 Census. To account for growth in these cities since 1990 and to include other cities that might be regulated under Phase II, EPA inflated these numbers by 20 percent. When the potentially eligible Phase II population is added, the total population affected by Phase II is 89 million.

Therefore, based on a Phase II population of 89 million, the 2000 Phase II MS4 need for the CWNS 2000 is $333 million. This estimate is similar to the 1998 EPA Phase II Rule estimate for the cost of compliance, $297 million.

Table E-1 summarizes the EPA 2000 assessment of modeled needs estimates, by State, for Phase I and Phase II of the NPDES Municipal Storm Water Program. The modeled estimates for storm water management programs represent the estimated capital investment necessary for the municipalities to meet the requirements of Phase I and Phase II Municipal Storm Water Management Programs.

Table E-1. CWNS 2000 Modeled Estimates for Storm Water Management Programs (January 2000 dollars in millions)

State	Phase I Need	Phase II Need
Alabama	358	5
Alaska	31	0
Arizona	149	3
Arkansas	39	4
California	1,315	17
Colorado	117	9
Connecticut	11	4
Delaware	47	0
District of Columbia	20	0
Florida	1,268	10
Georgia	493	4
Hawaii	56	0
Idaho	10	2
Illinois	10	20
Indiana	121	8
Iowa	36	4
Kansas	111	6
Kentucky	78	4
Louisiana	188	5
Maine	0	0
Maryland	331	1
Massachusetts	20	10
Michigan	37	12
Minnesota	27	12
Mississippi	42	4
Missouri	178	10
Montana	0	2
Nebraska	27	2
Nevada	42	0
New Hampshire	0	0
New Jersey	0	18
New Mexico	21	2
New York	88	22
North Carolina	176	17
North Dakota	0	1
Ohio	106	15
Oklahoma	218	9
Oregon	141	5
Pennsylvania	50	14
Rhode Island	0	1
South Carolina	93	5
South Dakota	8	1
Tennessee	308	5
Texas	981	32
Utah	35	4
Vermont	0	0
Virginia	422	4
Washington	227	5
West Virginia	33	11
Wisconsin	0	1
Wyoming	0	3
Total	8,063	333
TOTAL Phase I and II		**8,396**