



1996 Clean Water Needs Survey Report to Congress



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COVER: Androscoggin River

RIGHT INSET: Monterey Regional Wastewater Treatment Plant

LEFT INSET: Palm Desert Wastewater Reclamation Facility



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

SEP 23 1997

THE ADMINISTRATOR

The Honorable Albert Gore, Jr.
President of the Senate
Washington, D.C. 20510

Dear Mr. President:

Enclosed is the Environmental Protection Agency's (EPA's) 1996 Clean Water Needs Survey report on the "Assessment of Needs for Publicly Owned Wastewater Treatment Facilities, Correction of Combined Sewer Overflows, and Management of Storm Water and Nonpoint Source Pollution in the United States." This report is required biennially by sections 205(a) and 516(b)(1) of the Clean Water Act (CWA) and is a joint effort by the States and EPA.

The survey covers the broad range of water quality and public health problems eligible for funding from the State Revolving Fund program under Title VI of the CWA. This includes the collection and treatment of municipal wastewater, the control of combined sewer overflows, storm water management, and the control of nonpoint source runoff.

The survey includes only those needs related to documented public health or water quality problems. In some categories of need, notably storm water and nonpoint source pollution, States have limited documentation of need or cost. In these cases, EPA used models to supplement the documented needs.

The 1996 survey report also discusses the possibility of assessing needs on a watershed basis in the future. This comprehensive approach may help identify the needs that would best achieve water quality goals in a cost-effective manner.

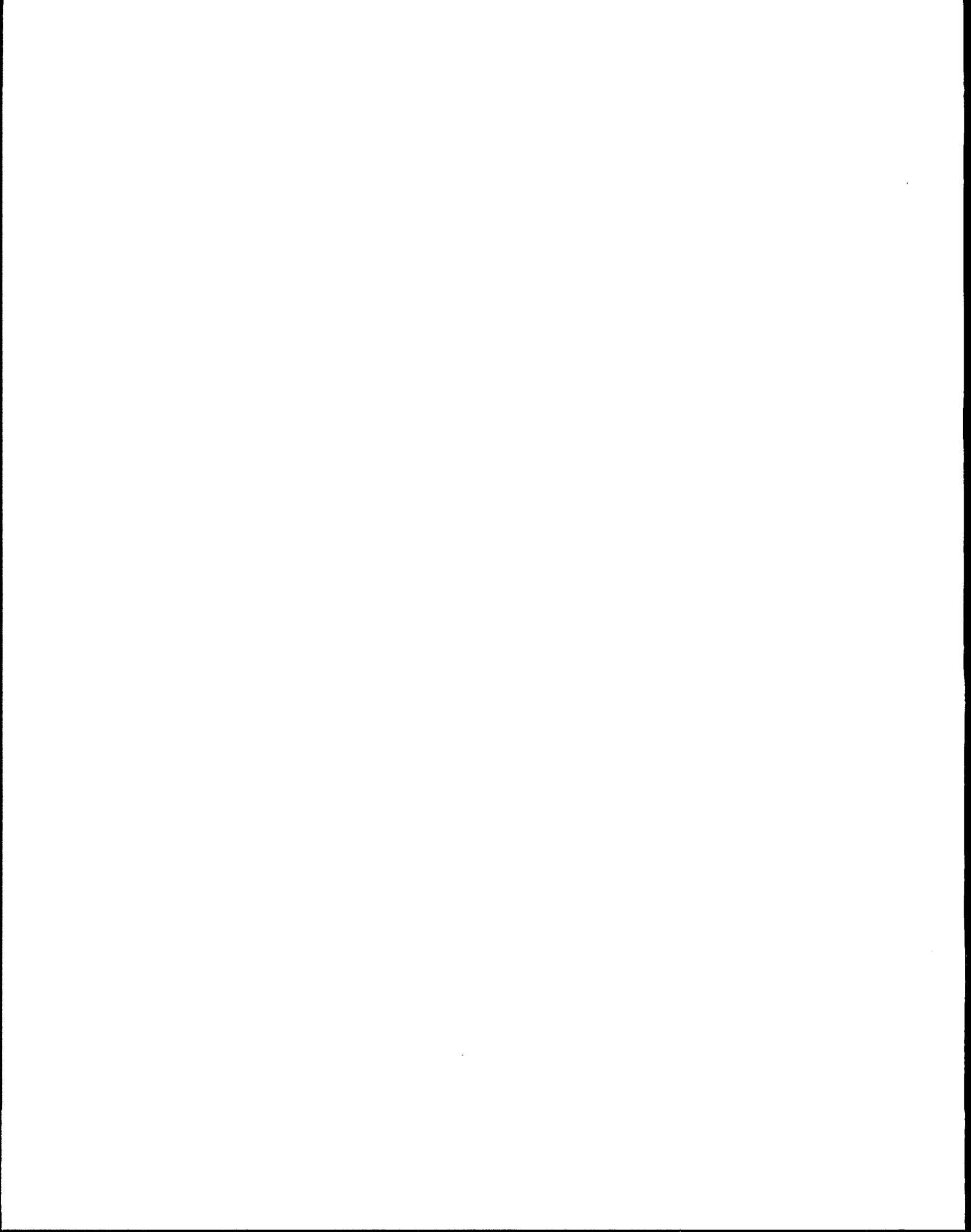
I would be pleased to further discuss the results of this survey at your convenience.

Sincerely,

A handwritten signature in cursive script, reading "Carol M. Browner".

Carol M. Browner

Enclosure





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

SEP 23 1997

THE ADMINISTRATOR

The Honorable Newt Gingrich
Speaker of the House of
Representatives
Washington, D.C. 20515

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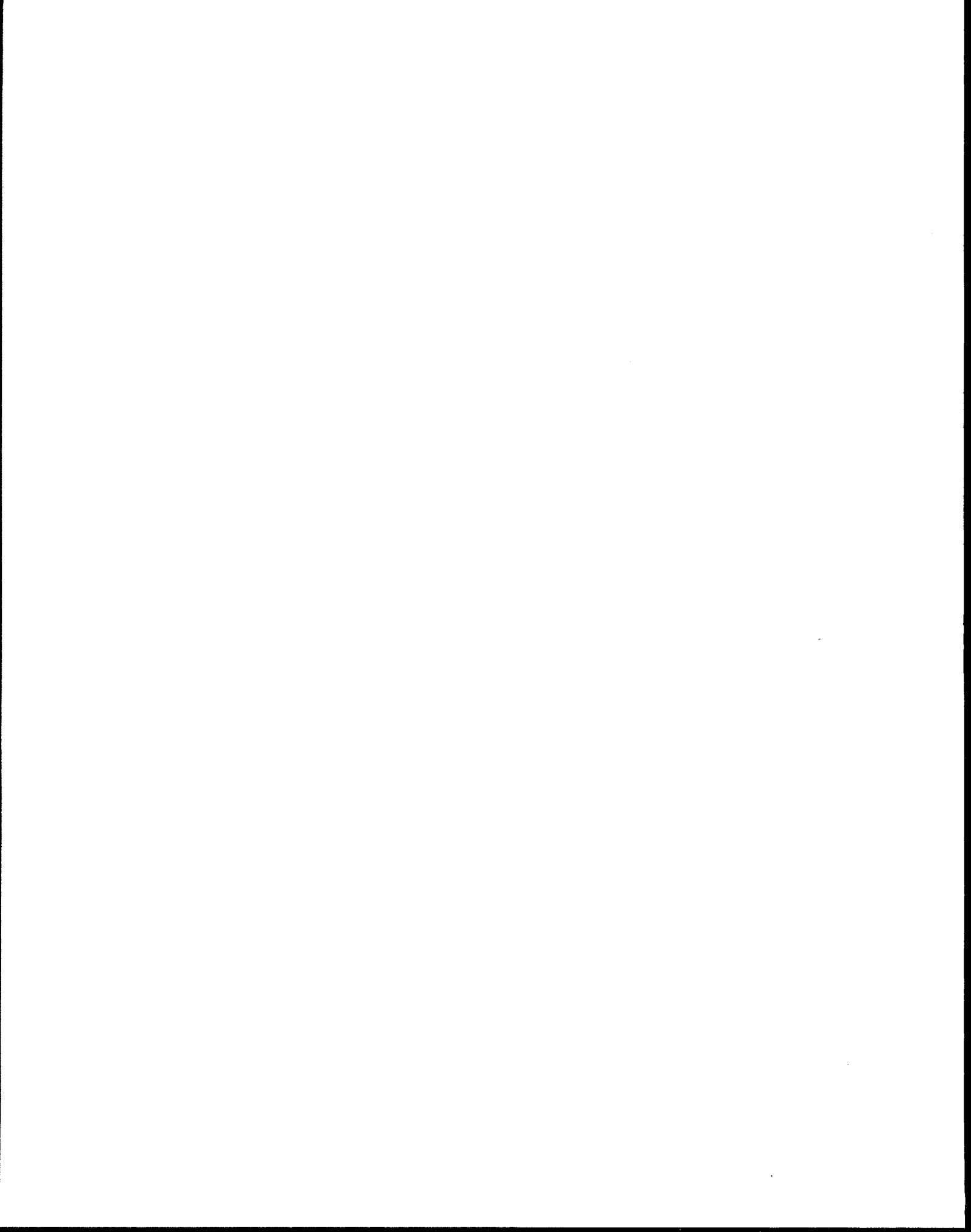
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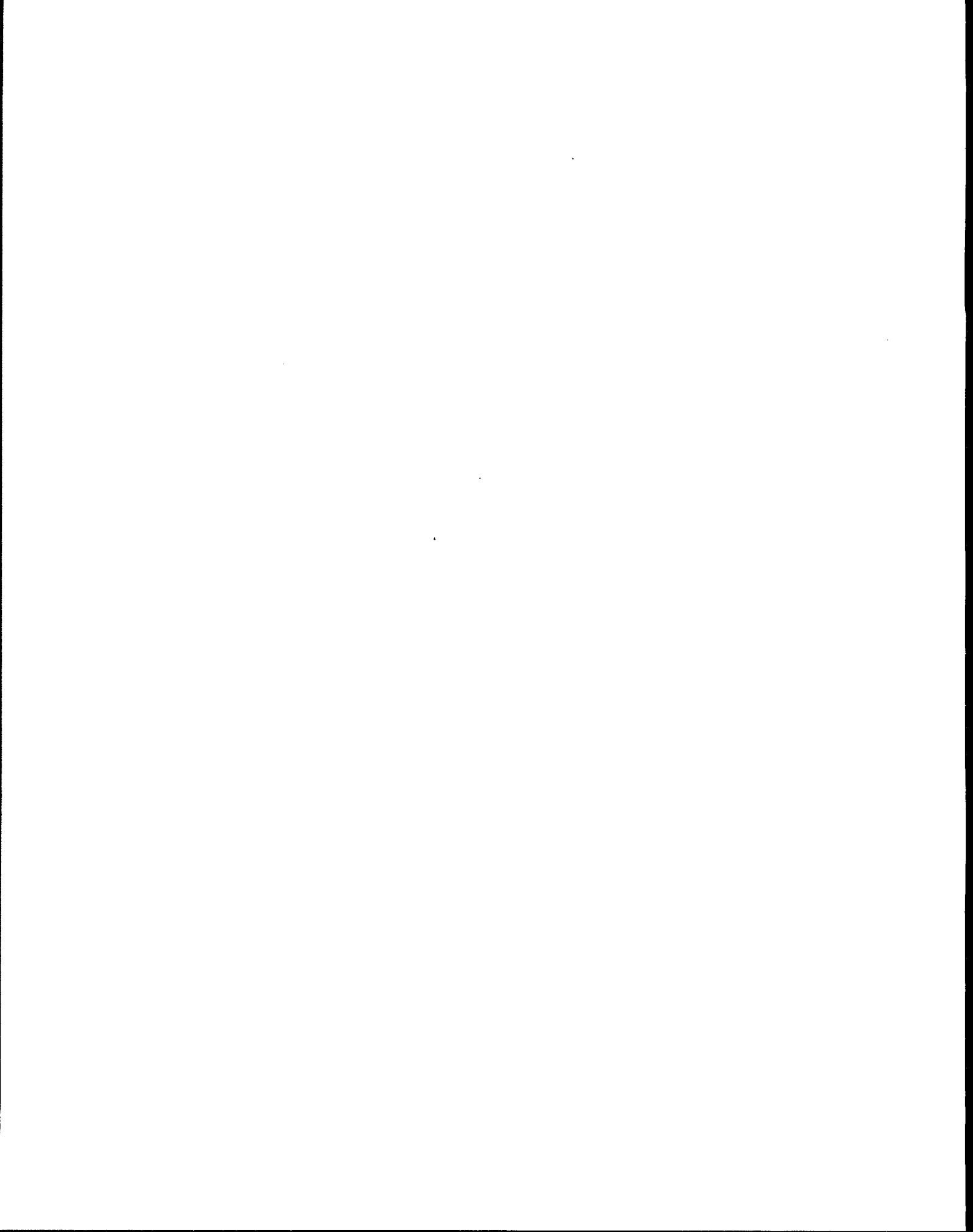
1996 Clean Water Needs Survey Report to Congress

**Assessment of Needs for Publicly Owned Wastewater
Treatment Facilities, Correction of Combined Sewer
Overflows, and Management of Storm Water and
Nonpoint Source Pollution in the United States**

SEPTEMBER 1997

U.S. Environmental Protection Agency
Office of Water
Washington, DC 20460
(202) 260-5837





Acknowledgments

The success of the 1996 Clean Water Needs Survey is the result of the hard work and dedicated contribution of many individuals. Particular recognition goes to the EPA Regional and State Coordinators for their active support, perseverance, and continuing interest in the Clean Water Needs Survey.

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Executive Summary

The 1996 Clean Water Needs Survey, a joint effort of the States and EPA, was conducted to meet the requirements of Sections 205(a) and 516(b)(1) of the Clean Water Act.

This report presents the results of the U.S. Environmental Protection Agency's (EPA's) 1996 Clean Water Needs Survey (CWNS). It includes EPA's detailed estimates of the capital costs eligible for funding under the State Revolving Fund (SRF) provisions of the 1987 Amendments to the Clean Water Act (CWA). The CWNS covers publicly owned, municipal wastewater collection and treatment facilities, facilities for the control of combined sewer overflows (CSOs), activities designed to control storm water (SW) runoff and nonpoint source (NPS) pollution, and programs designed to protect the nation's estuaries.

The goal of the 1996 CWNS was to provide a broad and valuable source of water quality program information. The primary objective was to update and expand the documented costs for all program categories eligible for SRF funding. Another objective was to improve the estimates for the needs that depend on cost curves and cost models. The national CSO cost model used in the 1992 CWNS was replaced by site-specific cost curves. Also, the 1992 cost model for the NPS management programs to control runoff from agriculture, confined animal facilities, and silviculture was updated with more current data for 1996. In addition, a new national cost model was developed to estimate the Phase I municipal Storm Water (Phase I SW) Program needs. Substantial effort also went into improving the technical information associated

with individual facilities and into improving the needs estimates for small communities.

The 1996 CWNS, the twelfth such survey since the CWA was passed in 1972, is a cooperative effort between EPA and the States. The heart of the CWNS is the database that contains technical and cost information on approximately 16,000 publicly owned wastewater treatment facilities. The database also contains cost and technical information for other specific programs and projects that target documented water quality or public health problems. The CWNS does not address private wastewater treatment facilities that are, nevertheless, an integral part of the nation's water quality infrastructure.

The 1996 CWNS does not include needs for Indian tribes on reservations. A separate assessment is conducted and presented to Congress annually by the Indian Health Service for the needs of Indians and Alaska Native Villages.

The total 1996 documented and modeled needs are estimated to be \$139.5 billion, to satisfy all program categories eligible for SRF funding for the design year (2016) population. These needs are summarized in Figure 1. The total includes \$44.0 billion for wastewater treatment; \$10.3 billion for upgrading existing wastewater collection systems; \$21.6 billion for new sewer construction; and \$44.7 billion for controlling CSOs.

States reported documented needs in the 1996 CWNS for all program areas. However, the total needs shown in Figure 1 include only the

modeled estimates, rather than documented needs for those program areas that EPA modeled. Models were used to estimate SW and NPS needs on a State-by-State basis for the entire nation. These are areas in which most States have little documentation on specific projects. The modeled needs estimates are \$7.4 billion for SW and \$9.4 billion for NPS projects. The supplemental modeling does not include needs for controlling various other types of water quality problems, such as abandoned mine drainage, septic systems, contaminated sediments, unintended stream modification, and atmospheric deposition.

The water quality program needs for small communities are significant. The total documented needs for communities with populations less than 10,000 are \$13.8 billion, representing 11 percent of the total documented needs for the nation. There is a greater requirement in small communities for basic infrastructure when compared to the needs for larger communities. Whereas secondary treatment (Category I) comprises 20 percent of the total documented needs for larger communities, the proportion is 28 percent for small communities. New collector sewers (Category IVA) account for only 6 percent of the total documented need for larger communities but represent 29 percent for small communities. This reflects, in part, the continuing efforts to extend wastewater collection and treatment to small communities.

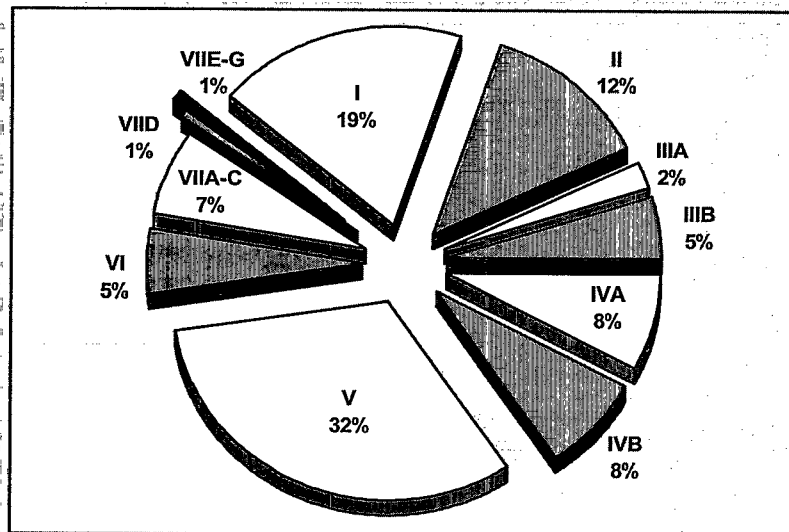
Nationally, 16,024 wastewater treatment facilities are identified in the 1996 CWNS. These facilities pro-

vide service to 190 million people, representing 73 percent of the total population (258 million). Based on State population estimates, when all of the needs are met in 2016, there will be 18,303 publicly owned wastewater treatment facilities serv-

ing 275 million people, or 90 percent of the projected population (305 million).

The 1996 CWNS results show a continuing trend toward higher levels of wastewater treatment. In

FIGURE 1
NEEDS FOR PUBLICLY OWNED WASTEWATER TREATMENT
FACILITIES AND OTHER ELIGIBILITIES
(January 1996 Dollars in Billions)



NEEDS CATEGORY		TOTAL NEEDS
TITLE II ELIGIBLE PROJECTS		
I	Secondary Treatment	26.5
II	Advanced Treatment	17.5
IIIA	Infiltration/Inflow Correction	3.3
IIIB	Sewer Replacement/Rehabilitation	7.0
IVA	New Collector Sewers	10.8
IVB	New Interceptor Sewers	10.8
V	Combined Sewer Overflows	44.7
VI	Storm Water*	7.4
TOTAL CATEGORIES I-VI		128.0
OTHER ELIGIBLE PROJECTS (Sections 319 and 320)		
VIIA-C	Nonpoint Source (agriculture and silviculture only)*	9.4
VIID	Urban Runoff	1.0
VIIE-G	Ground Water, Estuaries, Wetlands	1.1
TOTAL CATEGORY VII		11.5
GRAND TOTAL		139.5

* Modeled needs only. Estimated Category VI needs documented by the States are \$3.2 Billion. Estimated Category VIIA-C needs documented by the States are \$0.5 Billion.

Costs for operation and maintenance are not eligible for SRF funding and therefore are not included.

1988, 1,789 (11 percent) of the 15,591 operational facilities were providing less than secondary treatment. This declined to 868 (6 percent) in 1992 and to 176 (1 percent) in 1996. At the same time, there has been a steady increase in the proportion of facilities providing greater than secondary treatment. In 1988, 22 percent of the 15,591 facilities provided greater than secondary treatment. This grew to 24 percent in 1992. In 1996, 28 percent (4,428 out of 16,024) of the operational treatment facilities are providing greater than secondary treatment.

Sanitary sewer overflows (SSOs) are releases of raw sewage from a sanitary sewer collection system before the headworks of a wastewater treatment plant. The most immediate health risks associated with SSOs are bacteria, viruses, and other pathogens. Accordingly, SSO problems have much in common with the needs addressed by the CWNS.

SSO problems can be found throughout the United States. Although SSO needs are not identified separately in the CWNS, some associated costs to address SSO problems are included in Categories I, III, and IV. In general, EPA believes that the needs estimates in these categories related to SSOs underestimate the total costs associated with preventing SSOs. Therefore, the scale of the SSO problem is currently being addressed by EPA separately from the CWNS. EPA is developing cost estimates for addressing SSOs on a national basis to support the work of the SSO Federal Advisory Committee and other Agency work.

Historically, the needs in the CWNS have been presented on a State-by-State basis. In part this reflects the responsibility that the States have in achieving water quality standards and other CWA goals. Recently, however, substantial emphasis has been placed on using the watershed approach to address the water quality goals of the CWA more holistically. Rather than managing sources of pollution within political boundaries or from a single type of discharge, the watershed provides a more comprehensive view for both analysis and efficient use of resources. EPA has issued several guidance documents discussing how a watershed approach helps attain CWA goals. The watershed approach offers the prospect of more efficiently managing the available resources within a watershed by optimizing investment in water quality improvement and improving communication and coordination.

The 1996 CWNS information is presented on a State-by-State basis. However, the implications of organizing the same data on a watershed basis are also explored. Later in this report, three case studies are presented that illustrate the nature of organizing needs information by watershed. The 1996 CWNS foreshadows the direction in which EPA believes water quality management will progress. While States continue to have primary responsibility for achieving CWA goals, these goals may be best pursued on a watershed basis.

While the CWNS is neither designed nor intended to be used as a vehicle for determining funding priority

under the SRF program, priority setting is an important part of all EPA programs and is key to the success of addressing problems on a watershed basis. Although EPA encourages States to give priority to projects that are necessary to ensure compliance with the requirements of the CWA, States may fund any project on their State priority list, regardless of its position on the list. Over the past two years, EPA has been working with their State counterparts in the Clean Water SRF program to outline options for enhanced planning and priority systems that would include nonpoint source and estuary projects along with more traditional wastewater treatment projects. The objective of this and other ongoing efforts is to target SRF resources better to solve high priority problems in the nation's watersheds.

The Environmental Protection Agency's CWNS is required by Sections 205(a) and 516(b)(1) of the CWA. The CWNS is a summary of the estimated capital costs for water quality projects and other activities eligible for SRF support as authorized by the 1987 CWA Amendments. These activities include both facilities and certain water quality program elements. Activities include the planning, design, and construction of publicly owned wastewater collection and treatment systems

and projects controlling CSOs, SW, and NPS pollutants. Other eligible water quality program elements are those that involve one-time expenditures supporting the CWA goals, such as program development and implementation. Ongoing expenditures, such as operation and maintenance (O&M) costs, are not included. The 1996 CWNS, a joint effort of the States and EPA, is the twelfth such survey since the CWA was enacted in 1972.

How Is the CWNS Used?

The CWNS has served as a basis for Congressional allocation of funds for the Construction Grants program as established by the CWA in 1972, and for capitalization grants for the SRF program. Further, the CWNS can help States and EPA plan how they will attain and maintain CWA goals. The needs estimates and other information that are compiled for the CWNS can help agencies develop a comprehensive view of

the projects and other activities necessary to comply with the CWA.

The SRF program gives States the flexibility to fund projects that are more comprehensive than those eligible under Title II of the CWA, including new or expanded treatment facilities to accommodate projected population growth. States can allocate SRF funding to a broader range of projects to address the problems that they consider most significant in terms of achieving water quality goals. This flexibility provides the opportunity to develop watershed-based water quality plans. Aggregating needs by watershed can provide a useful complement to needs aggregated by jurisdictional boundaries. Among other benefits, identifying needs by watershed can help to develop a strategy to optimize the effectiveness of water quality investment in the watershed.

The CWNS is used to assist the Federal government and the States in program planning, policy evaluation, and program management. Private firms, public interest groups, and trade associations use CWNS information in marketing, cost estimating, and policy formulation.

The CWNS database contains detailed cost and technical information on publicly owned wastewater treatment and collection facilities nationwide, and includes data on facilities with existing needs and on those for which needs have already been met. The primary purpose of this report is to summarize the cost information for existing needs.

Introduction

What Is the Clean Water Needs Survey?

What Are the Objectives of the 1996 CWNS?

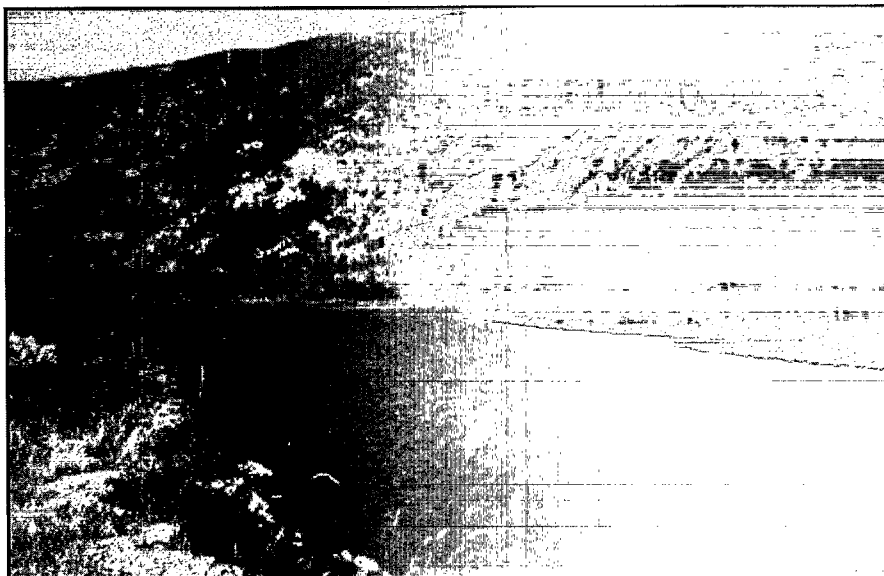
The goal of the 1996 CWNS is to provide a broad and valuable source of water quality program information. The primary objective is to update and expand the documented costs for all program categories eligible for SRF funding. This included a substantial redocumentation effort for individual documented projects with needs greater than \$5 million and documentation dated prior to 1990.

Another objective is to improve the estimates for the needs that depend on cost curves and cost models. In the 1992 CWNS report, CSO needs were estimated in part by a national cost model. This model has been replaced by CSO cost curves suitable for use on a site-specific basis. These cost curves were used in conjunction with documented needs to arrive at the total CSO control needs. The 1992 cost model for the NPS management programs to control runoff from agriculture, confined animal facilities, and silviculture was revised for greater accuracy. A new national cost model was developed for estimating the SW needs.

Finally, substantial effort went into improving the technical information associated with individual facilities, particularly population and flow data, and into improving the needs estimates for small communities.

What Is the Scope of the CWNS?

The 1996 CWNS includes water quality programs and projects eligible for funding under the SRF pro-



The CWNS defines the needs for ensuring clean water

gram in accordance with Title VI of the CWA. It encompasses the documented capital costs required to meet the needs of the nation's wastewater collection and treatment infrastructure in accordance with Section 212 of the CWA. It also covers the NPS and National Estuary Programs defined in Sections 319 and 320 of the CWA, respectively.

This report also includes modeled estimates for the Phase I SW Program and NPS control programs, for which documented information was not available or was incomplete. Modeling did not directly cover eligibilities in all NPS areas, such as ground water, estuaries, and wetlands. In these areas, only the documented needs are reported. The estimates do not reflect the total costs required to address problems in these areas. For estuaries, EPA assumed that the majority of the activities conducted under the Section 320 estuary programs are either point source or NPS control activities and that their needs will be cap-

tured in Categories I-VI or by the NPS model.

The needs for small communities are emphasized in the 1996 CWNS. While individually the small community needs are often overshadowed by those of larger population centers, collectively they make up a substantial portion (11 percent) of the total documented needs and 71 percent of the total number of facilities.

What Is a "Need"?

With respect to the CWNS, a "need" is a cost estimate for a project eligible for SRF funding under the CWA. It includes those costs associated with the prevention or abatement of a public health or water quality problem. The cost estimates for the needs identified in the 1996 CWNS database were either reported by the States or modeled by EPA. Reported needs include costs for facilities used in conveyance, storage and treatment, and recycling and

reclamation of municipal wastewater. In addition, costs for structural and nonstructural measures and costs to develop and implement State and municipal SW and NPS programs were included in the database. For the modeled categories (i.e., SW and NPS), EPA prepared cost estimates for facilities and program activities eligible for funding under the SRF program.

Needs estimates for all categories do not include annual costs for O&M. They also do not include needs that are ineligible for Federal assistance under Title VI of the CWA, such as house connections to sewers and costs to acquire land that is not a part of the treatment process.

What Are the Eligible Clean Water Needs Categories?

Needs estimates are presented for the following categories of wastewater treatment and water pollution control projects:

- **Category I**
Secondary Wastewater Treatment
- **Category II**
Advanced Wastewater Treatment
- **Category IIIA**
Infiltration/Inflow Correction
- **Category IIIB**
Replacement/Rehabilitation of Sewers
- **Category IVA**
New Collector Sewers
- **Category IVB**
New Interceptor Sewers

- **Category V**
Combined Sewer Overflow Control
- **Category VI**
Storm Water Control (Phase I municipal Storm Water Program)
- **Category VIIA**
NPS Control: Agriculture (Crop-land)
- **Category VIIB**
NPS Control: Agriculture (Confined Animal Facilities)
- **Category VIIC**
NPS Control: Silviculture
- **Category VIID**
NPS Control: Urban Runoff
- **Category VIIE**
NPS Control: Ground Water Protection
- **Category VIIF**
NPS Control: Estuarine Protection
- **Category VIIG**
NPS Control: Wetlands Protection

Categories I-V were prominent in the Construction Grants program. Accordingly, these are often referred to as "traditional" needs categories. A more detailed explanation of all these categories can be found in the Glossary.

What Is the Priority of a Need?

The CWNS does not attempt to prioritize the various categories of need and is not intended to be used by States as a vehicle for determining the priority of eligible needs projects to be funded. Under the SRF pro-

gram, States may fund any project on their priority list regardless of its position on the list. However, EPA encourages the States, to the maximum extent practicable, to give priority to the needs that:

- address the most serious risks to human health; and
- are necessary to ensure compliance with requirements of the CWA.

Over the past two years, the EPA Clean Water SRF program staff has been working with its State partners to develop a document that would clarify the range of projects that may be funded with the SRF. The *SRF Funding Framework* (EPA 832-B-96-005, October 1996) is a policy and guidance document that outlines options for States to consider for improving and enhancing their systems for planning and prioritizing projects eligible for funding. The *Framework* presents two broad options for States that would integrate broader watershed planning activities to include NPS and estuary projects along with more traditional wastewater treatment projects.

What Time Period Is Covered?

The eligible needs identified in this report include existing needs as of January 1, 1996. Historically, because of the nature of the Construction Grants program, wastewater infrastructure needs were planned and designed for a community for a 20-year period. This period approximates the design life for newly constructed facilities that are designed to meet the requirements of the current population plus the net popula-

tion change for the next 20 years. Thus, for those facilities with an existing need, estimates are reported for the "design year" (2016).

Since the 1987 passage of the CWA Amendments, however, communities often plan their infrastructure needs for a shorter period. This planning horizon for SW, NPS, and other program areas may be only five or ten years and States often submit five- and ten-year planning documents as the basis for documenting a need. These are all reviewed in accordance with the established documentation criteria.

What Needs Were Reported and Documented?

As in prior CWNSs, EPA asked States to update their needs for wastewater treatment and collection on a facility-by-facility basis in accordance with established documentation criteria for all categories of need. A more detailed discussion of the documentation process is presented later in this report in the section entitled "Documentation of Needs." Additionally, a special effort was made in the 1996 CWNS to improve the quality and national consistency in the reporting of documented needs. Special criteria, developed jointly by EPA and the CWNS Workgroup, required States to redocument their needs greater than \$5 million if the documentation was dated prior to 1990.

What Needs Were Modeled?

In past CWNSs, certain categories of needs were not adequately reported, often because the information to complete the necessary planning was

lacking. There is reason to believe that some needs continue to be underestimated. For example, since States and localities are still evaluating how to meet the requirements of the Phase I SW Program, the documented needs do not fully reflect the program costs. In the case of NPS pollution, types of controls very different from traditional wastewater treatment infrastructure may be required. For these reasons, EPA developed modeled estimates for the Phase I SW Program and selected NPS programs to be able to present more complete needs estimates in the 1996 CWNS report. Ultimately, the goal is to supplant modeled estimates with documented needs. Summaries of the modeling methodologies are presented in the sections on modeled needs.

What Is the Scale of the Sanitary Sewer Overflow Needs?

SSOs are releases of raw sewage from a sanitary sewer collection system before the headworks of a wastewater treatment plant. SSO problems can be found throughout the United States. The most immediate health risks associated with SSOs are bacteria, viruses, and other pathogens.

The scale of the SSO problems is being studied by EPA. In efforts separate from the CWNS, EPA is developing cost estimates for addressing SSOs on a national basis to support the work of the SSO Federal Advisory Committee and other Agency work.

The causes of and solutions to the SSO problems are closely related to the issues addressed by the CWNS.

SSOs can be caused by a variety of factors, including blockages, system failures (e.g., power outages at pump stations or pipe collapses), high flows caused by large volumes of infiltration and inflow (I/I), and inadequate pipe or pump capacity. A comprehensive mix of measures is needed to prevent SSOs, including:

- Sewer and pump rehabilitation/replacement;
- I/I correction measures;
- Expansion of sewer, interceptor, and pump capacity to address existing capacity limitations and/or to provide for future growth;
- Expansion of treatment plant capacity;
- Provision of backup facilities;
- Preventive maintenance measures (e.g., cleaning); and
- Improved operational procedures.

Although SSO needs are not identified separately in the CWNS, many costs associated with these measures overlap with, and are included in, needs Categories I, IIIA, IIIB, IVA, and IVB. In many cases, documented needs in Categories IIIA and IIIB are related to preventing SSOs and related treatment plant compliance problems. The overlap in other categories is expected to be less. In general, EPA believes that the needs estimates in these categories related to SSOs underestimate the total costs associated with preventing SSOs for the following reasons:

- Many municipalities have not fully investigated their SSOs or measures necessary to correct them;
- Some municipalities have not submitted documented needs for SSO correction measures such as I/I measures or sewer rehabilitation/replacement because these types of projects have traditionally been given low priority; and
- Some of the costs of addressing SSOs are not capital related (e.g., preventive maintenance and operational measures) and are not eligible for funding under the SRF program.

What Is the Relationship to the Drinking Water Needs Survey?

There is a close parallel between the CWNS and the Drinking Water Needs Survey (DWNS). In the CWNS, needs are associated with meeting the requirements of the CWA. In the DWNS, needs are associated with meeting the requirements of the Safe Drinking Water Act (SDWA) and maintaining the infrastructure of drinking water systems. In considering the cost implications for water, wastewater, and other water quality utilities, both types of needs are generally additive. However, in certain cases, improvements in water quality may even reduce the need for drinking water treatment.

Key Results

What Are the 1996 Clean Water Needs?

Table 1 presents EPA's estimates of the investment necessary to address the nation's municipal water quality needs. The table is a summary of both documented needs and modeled estimates, with total SRF-eligible needs of \$139.5 billion. The needs for wastewater treatment (Categories I and II) and collection (Categories III and

IV) are \$44.0 billion and \$31.9 billion, respectively. Needs for CSO controls (Category V) total \$44.7 billion. The modeled needs for SW (Category VI), estimated to be \$7.4 billion, reflect the programs in those communities required to obtain a Phase I SW Program National Pollutant Discharge Elimination System (NPDES) permit. The total NPS needs are \$11.5 billion, including modeled and documented estimates.

TABLE 1	
NEEDS FOR PUBLICLY OWNED WASTEWATER TREATMENT FACILITIES AND OTHER ELIGIBILITIES (January 1996 Dollars in Billions)	
NEEDS CATEGORY	TOTAL NEEDS
TITLE II ELIGIBLE PROJECTS	
I Secondary Treatment	26.5
II Advanced Treatment	17.5
IIIA Infiltration/Inflow Correction	3.3
IIIB Sewer Replacement/Rehabilitation	7.0
IVA New Collector Sewers	10.8
IVB New Interceptor Sewers	10.8
V Combined Sewer Overflows	44.7
VI Storm Water*	7.4
TOTAL CATEGORIES I-VI	128.0
OTHER ELIGIBLE PROJECTS (Sections 319 and 320)	
VIIA-C Nonpoint Source (agriculture and silviculture only)*	9.4
VIID Urban Runoff	1.0
VIIIE-G Ground Water, Estuaries, Wetlands	1.1
TOTAL CATEGORY VII	11.5
GRAND TOTAL	139.5
* Modeled needs only. Estimated Category VI needs documented by the States are \$3.2 Billion. Estimated Category VIIA-C needs documented by the States are \$0.5 Billion.	
Costs for operation and maintenance are not eligible for SRF funding and therefore are not included.	
See Appendix A Table A-1 for State totals of needs by category.	

TABLE 2

SUMMARY OF DOCUMENTED NEEDS
(January 1996 Dollars in Billions)

NEEDS CATEGORY		TOTAL NEEDS
TITLE II ELIGIBLE PROJECTS		
I	Secondary Treatment	26.5
II	Advanced Treatment	17.5
IIIA	Infiltration/Inflow Correction	3.3
IIIB	Sewer Replacement/Rehabilitation	7.0
IVA	New Collector Sewers	10.8
IVB	New Interceptor Sewers	10.8
V	Combined Sewer Overflows	44.7
VI	Storm Water	3.2
TOTAL CATEGORIES I-VI		123.8
OTHER ELIGIBLE PROJECTS (Sections 319 and 320)		
VIIA-C	Nonpoint Source (agriculture and silviculture only)	0.5
VIIID	Urban Runoff	1.0
VIIIE-G	Ground Water, Estuaries, Wetlands	1.1
TOTAL CATEGORY VII		2.6
GRAND TOTAL		126.4

Costs for operation and maintenance are not eligible for SRF funding and therefore are not included.

See Appendix A Table A-2 for State totals of documented needs by category.

Table 2 presents EPA's estimate of total documented needs reported by the States. The difference in needs between Tables 1 and 2 is \$13.1 billion, which represents the modeled needs for SW and NPS, in categories VI and VII A-C. The total SRF-eligible documented needs are \$126.4 billion, which excludes the modeled SW and NPS needs presented in Table 1. States provided documented estimates of \$3.2 billion for SW projects and only \$2.6 billion for other eligible projects (under Sections 319 and 320 of the CWA) to include NPS. Total documented needs on a State-by-State basis are provided in Appendix A.

How Have the Needs Changed?

Table 3 is a summary of the total needs, by category, from each of the last four CWNSs, in 1996 dollars. From 1992 to 1996, the total needs decreased by \$15.5 billion. This reflects, in part, progress made in meeting the nation's water quality infrastructure needs.

For a given facility, a reduction in need may signify completion of project construction, reduction in the original project scale, or elimination of the need for projects included in previous CWNSs. In contrast, an increase in need signifies entirely new facilities being required or new

projects to upgrade or expand existing facilities.

Underlying factors that influence these changes include continued population growth, deterioration of existing facilities, and increasingly stringent water quality requirements.

Substantial changes in needs occurred in four of the traditional needs categories since the 1992 CWNS:

- **Category I:**
\$8.9 billion decrease
- **Category IIIB:**
\$2.9 billion increase
- **Category IVA:**
\$9.5 billion decrease
- **Category IVB:**
\$5.8 billion decrease

By contrast, there is little change in total needs in Categories II, IIIA, V, and VII. While there are substantial changes in Category VI, these reflect the introduction and use of a newly developed SW model and these 1996 needs are not directly comparable to the 1992 needs.

Changes in needs also reflect efforts to improve the quality of the data in the CWNS database through a substantial redocumentation effort. Because of this redocumentation requirement, the States systematically updated their needs information. This updated information indicated that, for the most part, the facilities subject to redocumentation had either proceeded to construction or still had needs based on more recent documentation. Nevertheless, there were a noteworthy number of

facilities where updated documentation could not be provided. Therefore the needs for these facilities showed a decrease between 1992 and 1996. In Category I, where the largest overall decrease in needs was found, the reduction in needs attributable to outdated documentation is estimated to be \$1 billion, out of a total net decrease of \$8.9 billion.

Analysis of the needs categories with substantial change revealed a distinct pattern. In each category:

- A small proportion of the facilities analyzed (less than 5 percent) are very large and have changes greater than \$100 million each. The impact of these very large facilities on the overall change in needs is substantial and disproportionate to the number of such facilities. For example, in Category I, the very large facilities resulted in a net decrease in needs of about \$8 billion, accounting for almost all of the total change.
- The number of facilities for which new needs have been identified is about the same as the number of facilities for which previously identified needs have been satisfied or otherwise reduced.
- The majority of facilities have changes in need of less than \$25 million.
- For those categories with a net decrease in needs (I, IVA, and IVB), the number of very large facilities with reduced needs is more than twice the number of facilities with new or increased needs. This indicates that previously identified projects are proceeding more rapidly than new needs are being identified.

TABLE 3 COMPARISON OF TOTAL NEEDS 1988 THROUGH 1996 CLEAN WATER NEEDS SURVEYS (January 1996 Dollars in Billions)				
NEEDS CATEGORY	CWNS			
	1988	1990	1992	1996
TITLE II ELIGIBLE PROJECTS				
I Secondary Treatment	33.2	29.4	35.4	26.5
II Advanced Treatment	6.2	5.5	17.5	17.5
IIIA Infiltration/Inflow Correction	3.6	3.3	3.1	3.3
IIIB Sewer Replacement/Rehabilitation	4.5	4.2	4.1	7.0
IVA New Collector Sewers	17.1	16.3	20.3	10.8
IVB New Interceptor Sewers	18.5	16.7	16.6	10.8
V Combined Sewer Overflows	20.2	19.5	46.6*	44.7
VI Storm Water			0.1*	7.4*
OTHER ELIGIBLE PROJECTS (Sections 319 and 320)				
VIIA-C Nonpoint Source (agriculture, silviculture only)			10.0*	9.4*
VIID Urban Runoff				1.0
VIIIE-G Ground Water, Estuaries, Wetlands			1.3	1.1
TOTAL NEEDS	103.3	94.9	155.0	139.5
Treatment Categories I and II only	39.4	34.9	52.9	44.0
Collection, Conveyance Categories III and IV only	43.7	40.5	44.1	31.9
Category I to V subtotal	103.3	94.9	143.6	120.6
* Modeled needs.				
Note that the 1990 estimates were derived using a methodology different from that used in this and previous CWNSs. For 1990, the EPA simply adjusted needs estimates for grant and loan awards and inflation.				

While new water quality or growth requirements have resulted in new needs, it is evident that during the four years from 1992 to 1996, great progress has been made in satisfying previously identified needs.

How Are the Needs Distributed?

Figure 2 presents the geographical distribution of needs. As in the 1992 CWNS, the largest needs occur in New York, Illinois, and California. New York has \$16 billion in needs, while California and Illinois have needs in excess of \$11 billion. Sixteen additional States have needs in excess of \$2 billion.

Needs continue to be generally concentrated in the highly populated northeastern States (New Jersey, New York, and Pennsylvania) and in the Great Lakes States (Illinois, Michigan, and Ohio) as well as in Florida and Texas. The less populated States, generally located in the Rocky Mountains and the Plains, have lower levels of needs.

Figure 3 presents the geographical distribution of the needs to correct CSO problems. Again, as in the 1992 CWNS, most CSO needs are concentrated in the northeastern States (Massachusetts, New Jersey, New York, and Pennsylvania) and in the Great Lakes States (Illinois, Indiana, Michigan, and Ohio).

Illinois has the largest documented CSO needs (\$9.4 billion), indicating that considerable effort has gone into documenting this State's CSO problems and into developing municipal CSO program plans. Indiana, Massachusetts, Michigan, New Jersey, New York, Ohio, and Pennsylvania all have CSO needs in excess of \$2 billion. This geographical concentration of CSO needs reflects the age of the infrastructure in these areas and the fact that combined sewers were considered acceptable practice at the time many older sewer systems were built.

FIGURE 2

DISTRIBUTION OF DOCUMENTED AND MODELED NEEDS
(January 1996 Dollars in Billions)

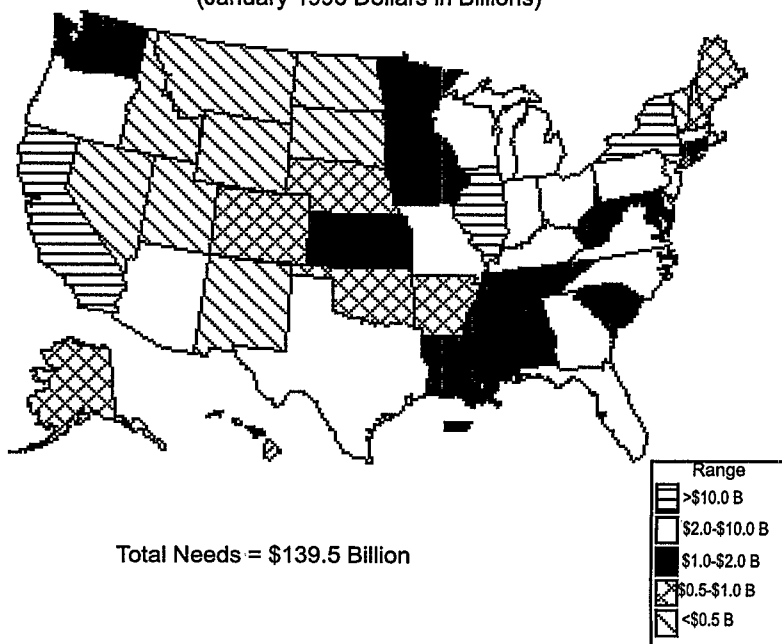


FIGURE 3

DISTRIBUTION OF NEEDS TO CORRECT COMBINED SEWER OVERFLOWS
(January 1996 Dollars in Billions)

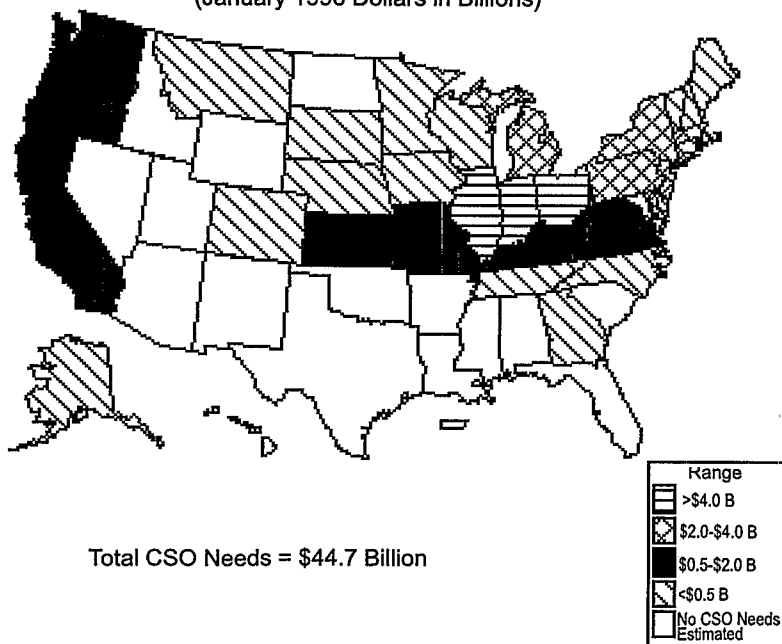


FIGURE 4

DISTRIBUTION OF MODELED STORM WATER NEEDS
(January 1996 Dollars in Billions)

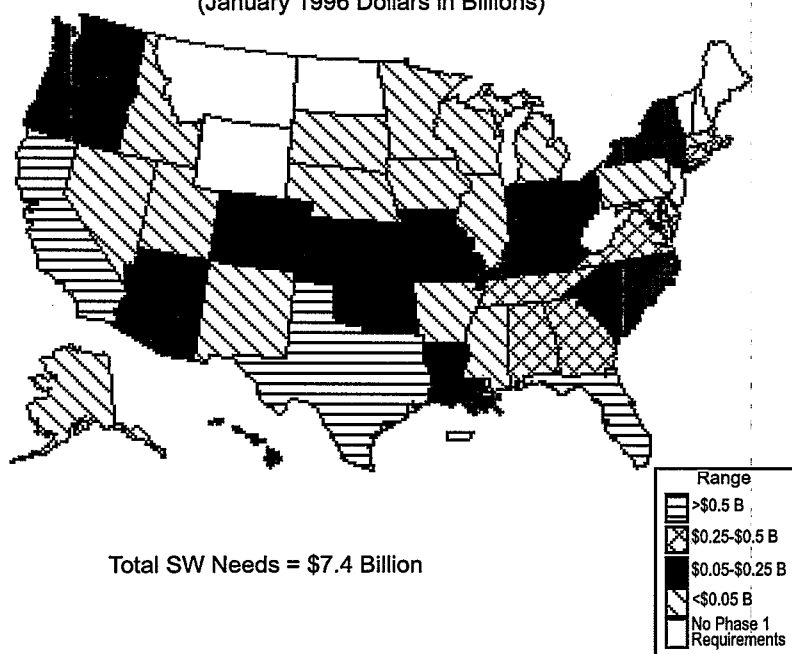


Figure 4 presents the geographical distribution of the modeled SW needs. The Phase I SW Program requires designated municipalities and counties to obtain NPDES permits for the discharge from municipal separate storm sewer systems (MS4s).

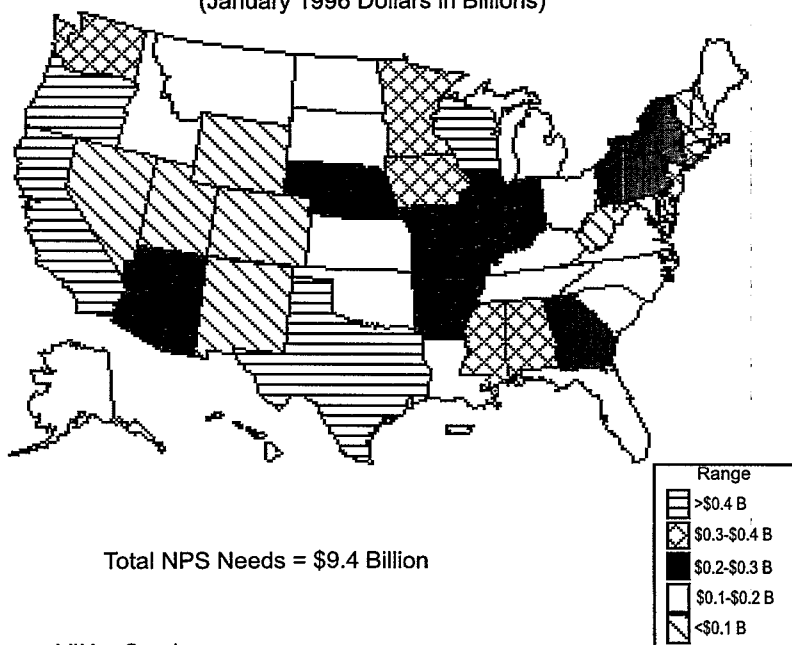
Some of these jurisdictions' SW needs are reflected in the total documented needs. However, this total does not cover the entire SW needs because, in other jurisdictions, they are not documented. Accordingly, EPA has developed a national model of SW needs to provide a more complete estimate. A discussion of the SW modeling methodology and results is presented in the "Modeling of Storm Water Needs" section. This modeling effort identifies total SW needs of \$7.4 billion. Most SW needs are concentrated in the south and the west, with both California and Florida having modeled SW needs in excess of \$1 billion. Texas has modeled SW needs of \$0.9 billion. The State-by-State modeling results are presented in Table A-4 in Appendix A.

EPA also modeled estimates for the control of some categories of NPS pollution. Figure 5 presents the geographical distribution of these modeled NPS needs (Categories VIIA through VIIC). A discussion of the NPS modeling methodology is presented in the "Modeling of Nonpoint Source Needs" section. The estimated needs that were modeled are:

- **Category VIIA**
Agriculture (Cropland): \$3.8 billion

FIGURE 5

DISTRIBUTION OF MODELED NONPOINT SOURCE* NEEDS
(January 1996 Dollars in Billions)



*Category VIIA - C only

Small Community Wastewater Treatment Plant



- **Category VIIB**
Agriculture (Confined Animal Facilities): \$2.1 billion
- **Category VIIC**
Silviculture: \$3.5 billion

The total modeled needs for Categories VIIA, VIIB, and VIIC are \$9.4 billion. Texas has the largest proportion of NPS needs with total needs of \$0.7 billion. Eight other States have modeled NPS needs of greater than \$0.3 billion, including Alabama, California, Iowa, Minnesota, Mississippi, Oregon, Washington, and Wisconsin.

Table A-5 in Appendix A provides a detailed presentation of NPS needs, by category, for each State and U.S. territory.

What Are the Needs for Small Communities?

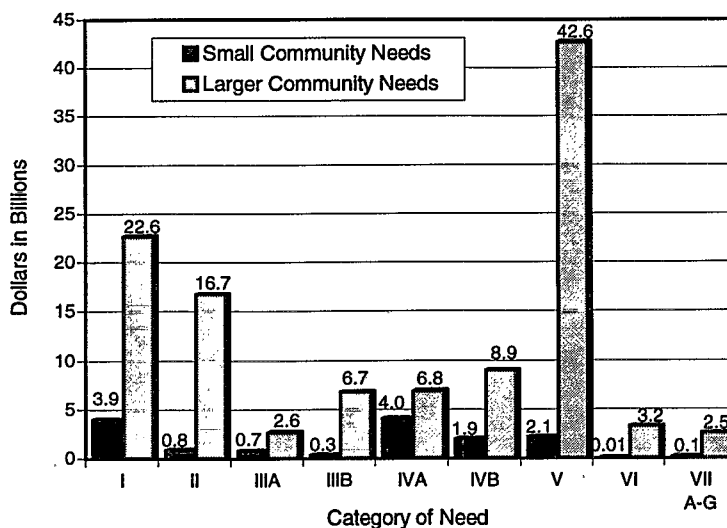
Many small communities lack the resources to adequately document their existing needs. Accordingly, beginning with the 1992 CWNS, EPA has made a special effort to

obtain a better representation of the needs of small communities. For purposes of the CWNS, a "small community" has fewer than 10,000

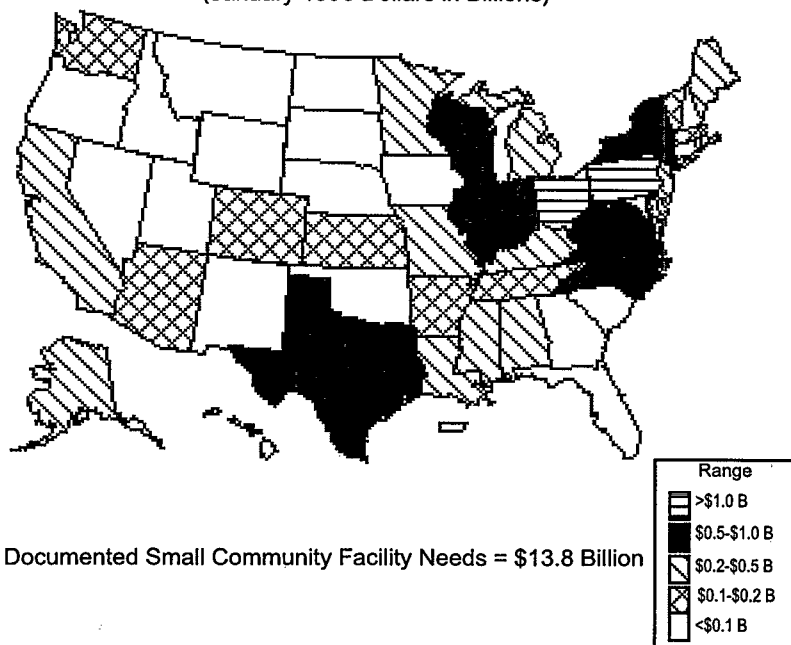
people and a wastewater flow of no more than 1 million gallons per day (mgd). To address the needs of the smallest communities, three population ranges were examined: (1) below 1,000; (2) between 1,000 and 3,500; and (3) between 3,500 and 10,000.

Figure 6 depicts the total documented needs for small communities, by category, comparing them with the needs of larger communities. The documented small community needs are estimated to be \$13.8 billion, representing 11 percent of the total documented needs for the nation. In four categories, the small community needs are a higher proportion of the overall need. These are: secondary treatment (\$3.9 billion, 15 percent), I/I correction (\$0.7 billion, 21 percent),

FIGURE 6
COMPARISON OF DOCUMENTED SMALL COMMUNITY FACILITY NEEDS AND LARGER COMMUNITY FACILITY NEEDS
BY CATEGORY
(January 1996 Dollars in Billions)



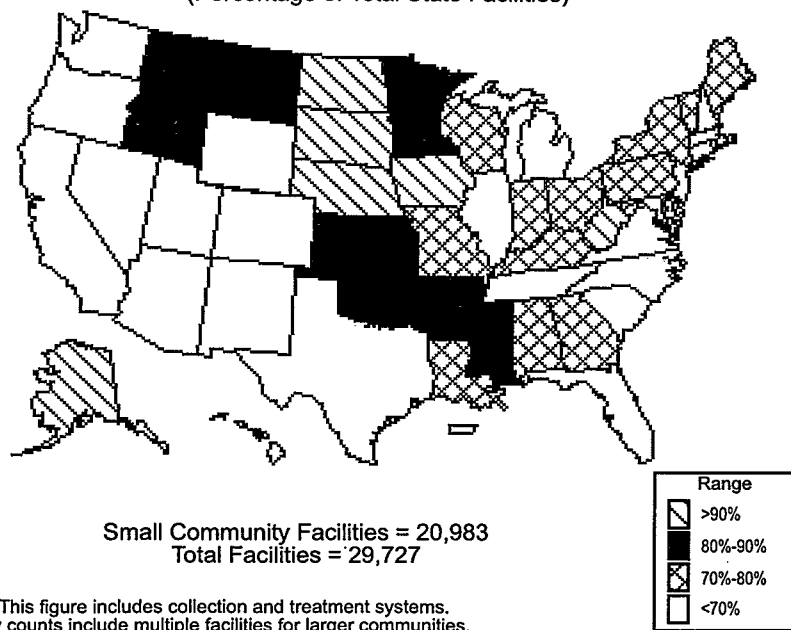
Total Documented Small Community Needs = \$13.8 Billion
Total Documented Needs = \$126.4 Billion

FIGURE 7**DISTRIBUTION OF SMALL COMMUNITY FACILITY NEEDS**
(January 1996 Dollars in Billions)

new collector sewers (\$4.0 billion, 37 percent), and new interceptor sewers (\$1.9 billion, 18 percent). New sewers and secondary treatment in small communities are relatively more important than the other categories when compared to overall needs.

Figure 7 shows how small community needs are distributed geographically. The States with small community needs greater than \$0.5 billion are contiguous from New York and North Carolina in the east to Wisconsin and Illinois in the Midwest, plus Texas.

Figure 8 shows the percentage of wastewater treatment facilities in each State that will serve small communities when all documented needs are met. With few exceptions, small community facilities comprise a large majority of the total number of publicly owned facilities in each State. It is noteworthy that 90 percent or more of the facilities in six States (Alaska, Iowa, Nebraska, North Dakota, South Dakota, and West Virginia) serve small communities.

FIGURE 8**PERCENTAGE OF SMALL COMMUNITY FACILITIES WHEN ALL DOCUMENTED NEEDS ARE MET**
(Percentage of Total State Facilities)

Note: This figure includes collection and treatment systems. Facility counts include multiple facilities for larger communities.

Alternative documentation was accepted for small community needs. This is discussed in the "Documentation of Needs" section. This alternative documentation enabled States to document an additional \$0.4 billion of small community needs in Categories I - V. This is approximately 3 percent of the total documented small community needs. The importance of this type of documentation is particularly significant for the very small communities with populations less than 1,000. Such communities submitted more than 50 percent of the needs that were supported by alternative documentation.

FIGURE 9
COMPARISON OF SMALL COMMUNITY FACILITIES TO THE
NATION WHEN ALL DOCUMENTED NEEDS ARE MET

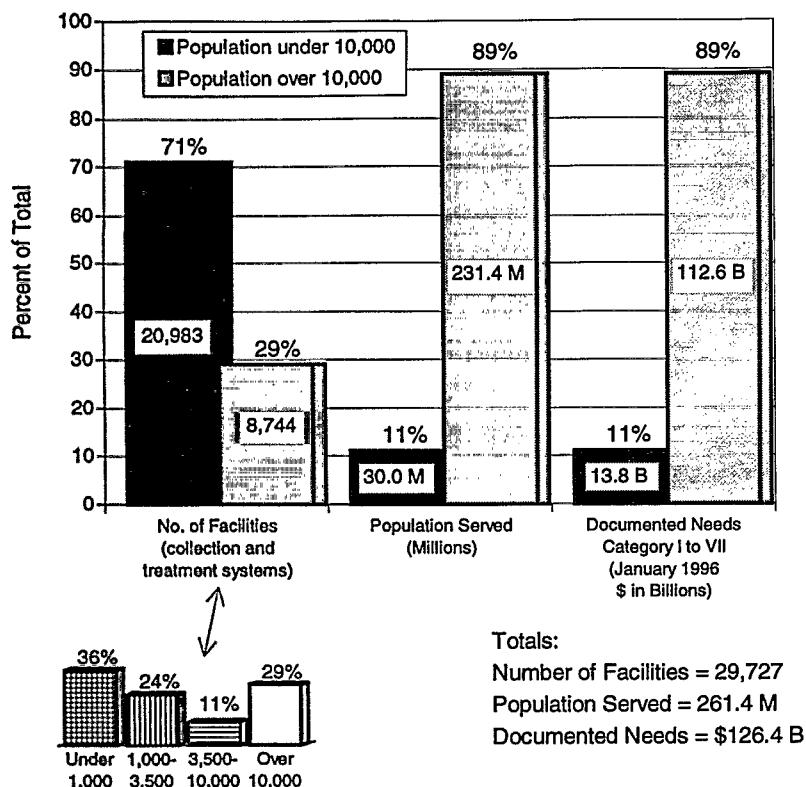


Figure 9 contrasts the documented needs and facilities of small communities with total documented needs and facilities for the nation as well as with the population proposed to be served. A majority (71 percent) of the total number of treatment and collection facilities will serve small communities. These facilities will serve 11 percent (30 million people) of the total population and account for 11 percent (\$13.8 billion) of the total documented needs. Figure 9 also shows how the small community facilities are further divided into those facilities serving populations of 3,500 to 10,000; 1,000 to 3,500; and less than 1,000. Consistent with the overall findings, it is the smallest facilities, those serving communities

with a population less than 1,000, that represent the greatest percent (36 percent) of the total number of facilities.

State-by-State presentations of various aspects of small community needs are presented in Tables A-6 through A-13 and Table A-16 in Appendix A.

What Are the Separate State Estimates?

To maintain national consistency in documentation of needs, EPA has established strict standards governing the form and content of acceptable needs documentation, as described in the "Documentation of

Needs" section. In those instances in which State documentation was determined by EPA to be at variance with these standards, the needs have been reported as Separate State Estimates (SSEs). In other cases, States themselves recognized that fully acceptable documentation was simply not available, but still wished to have their needs recognized as being a potential demand on State resources. Such estimates were also reported in the SSEs.

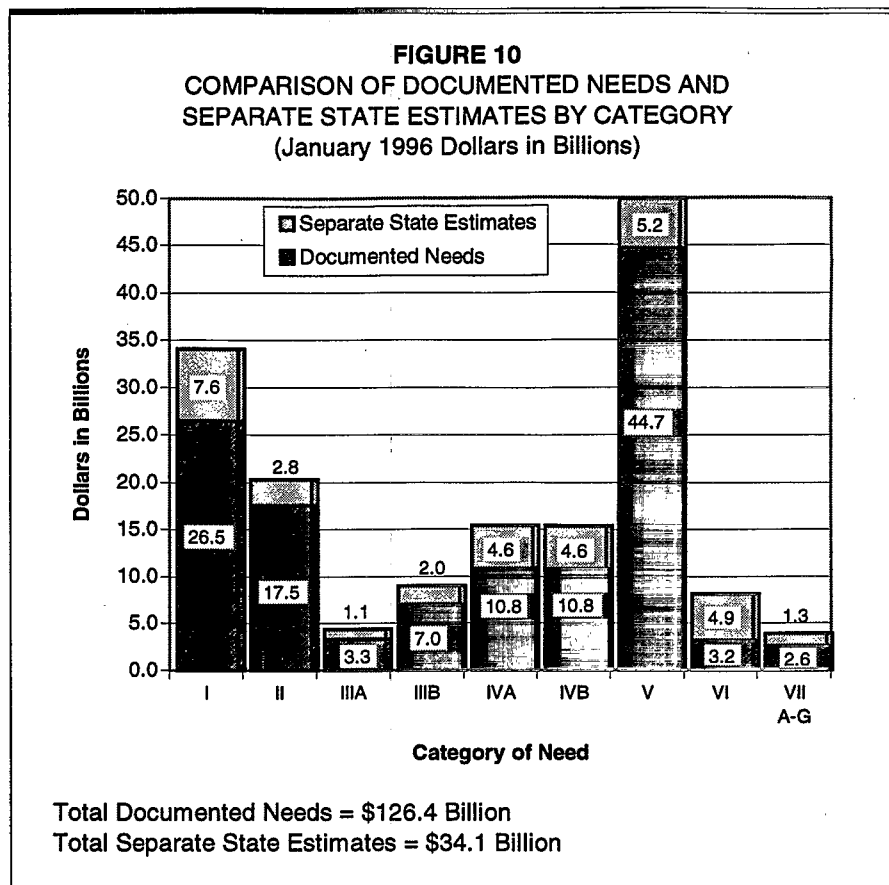
The level of effort by each State with respect to SSEs was voluntary. Therefore, reported needs are not all-inclusive or representative of the total needs that would be reported as SSEs if State resources allowed.

The States were allowed to report SSEs for all of the SRF-eligible categories (I - VII). Tables A-14, A-15, and A-16 in Appendix A provide a State-by-State presentation of the total SSEs for each category. Nearly all of the States reported some needs that could not be documented using the EPA documentation criteria. Figure 10 provides a comparison of the documented total needs and SSEs by category. The SSEs represent a total of \$34.1 billion in addition to those needs meeting the EPA documentation criteria. The proportion of this amount reported for small communities was \$6.2 billion, or about 18 percent of the total SSE needs. The types of needs that have been reported as SSEs by the individual States generally fall into the following groups:

- Construction of centralized wastewater treatment facilities for unsewered communities that have not been adequately documented;

- Upgrade or expansion of wastewater treatment systems based on anticipated changes to State regulations or water quality criteria;
- Replacement of existing facilities that are currently operating at a satisfactory level but are projected to be replaced in the next 20 years; and
- NPS, CSO, and SW control problems for which formal studies documenting a water quality or public health problem have not yet been completed.

Realizing that documentation criteria for NPS activities were evolving, EPA encouraged the States to submit all NPS documentation for review. All documentation was reviewed by EPA in consultation with State representatives in an effort to establish criteria and documentation requirements for NPS program needs. As a result, the States reported more than \$1.3 billion in NPS needs as SSEs, in addition to the \$2.6 billion in NPS needs that satisfied the accepted documentation criteria. As indi-



As individual States progress in developing their NPS programs, it is anticipated that more detailed documentation will be available in the future, thus

increasing both documented and SSE needs for NPS pollution control.

What Is the Status of the Municipal Wastewater Treatment Infrastructure?

Tables 4 and 5 present the recent and anticipated trends in treatment technology in the United States. In 1988, the CWNS reported a total of 15,591 operational publicly owned wastewater treatment facilities. This number increased to 15,613 in 1992 and to 16,024 in 1996, a 2.8 percent increase over the eight-year period. The factors leading to these increases are summarized below.

First, there was a significant effort to ensure that the data were comprehensive and current. The States in-

Advanced Wastewater Treatment Plant

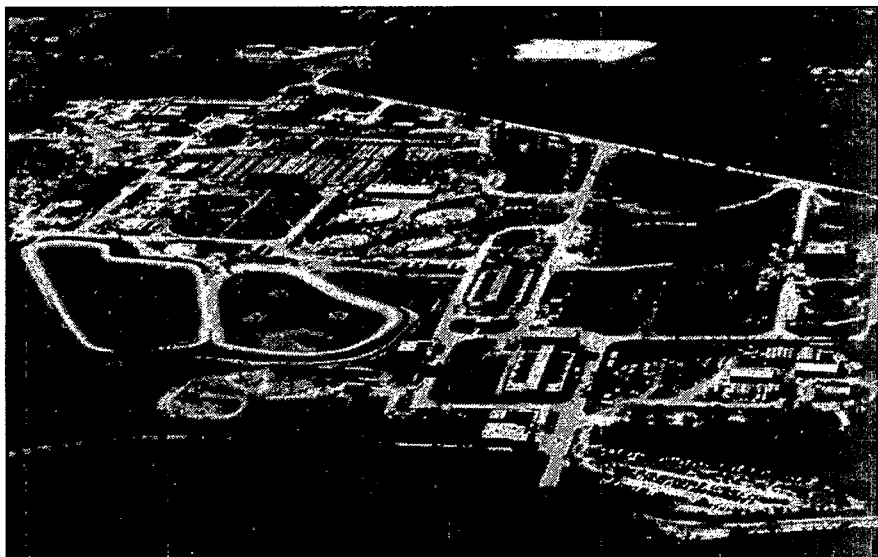


TABLE 4
IMPROVEMENTS IN TREATMENT LEVEL
OF WASTEWATER TREATMENT FACILITIES

LEVEL OF TREATMENT	1988 Number of Facilities	1992 Number of Facilities	Change 1988- 1992	1996 Number of Facilities	Change 1988- 1996	Change 1992- 1996
Non-discharge	1,854	1,981	+6.9%	2,032	+9.6%	+2.6%
Less than Secondary	1,789	868	-51.5%	176	-90.2%	-79.7%
Secondary	8,536	9,086	+6.4%	9,388	+10.0%	+3.3%
Greater than Secondary	3,412	3,678	+7.8%	4,428	+29.8%	+20.4%
Total Facilities	15,591	15,613	+0.1%	16,024	+2.8%	+2.6%

Note: "Non-discharge" refers to facilities that do not discharge effluent to surface waters (e.g., spray irrigation, ground water recharge). A secondary treatment level is defined as an effluent BOD of between 25 and 30 mg/l.

vested a significant amount of time in identifying and updating both new and existing projects.

Second, States examined individual facilities to determine if previously proposed projects had been built, or if subsequent planning documents had shown consolidation or splitting of specific construction projects. Depending on the magnitude of these changes, the number of facilities in individual States may have increased or decreased.

A third factor contributing to the change in the number of operational facilities was project completion. There was significant facility construction, including expansions and upgrades, in many States from 1992 to 1996. This is reflected both in the number of grant/loan cost reductions recorded in the 1996 database and in the increase in the number of facilities providing treatment at secondary and advanced treatment levels.

The overall result is a net increase in the number of active treatment facil-

ities from 1992 to 1996. In addition, the 1996 CWNS reports that increasing numbers of treatment facilities are proposed to be built. Thus, these data reflect two of the objectives of the CWNS. First, these data show

the continuing commitment to provide treatment to all areas of the United States. Second, these data reflect the improvement of the technical information stored in the database.

As is evident from Table 4, the level of treatment has improved significantly over the last eight years. The number of facilities providing less than secondary treatment has declined by 90 percent since 1988, while the number of facilities providing secondary treatment has increased by 10 percent. The number of facilities providing advanced wastewater treatment increased by almost 30 percent since 1988.

Table 5 projects the continued improvement in wastewater treatment infrastructure to the year 2016 based on the 1996 CWNS documented needs. The number of facilities providing less than secondary treat-

TABLE 5
INFRASTRUCTURE IMPROVEMENTS FROM MEETING
DESIGN YEAR NEEDS

INDICATOR	IMPROVEMENT		
	FROM 1996	TO 2016	CHANGE
Number of treatment facilities providing secondary or more advanced treatment	15,848	18,242	+15.1%
Number of treatment facilities providing less than secondary treatment	176	61*	-65.3%
Total design capacity of treatment facilities (million gallons per day)	42,225	48,787	+15.5%
Total population served by wastewater treatment facilities (millions)	190	275	+44.7%
Total number of operational treatment facilities	16,024	18,303	+14.2%

* Includes facilities granted Section 301(h) ocean discharge waivers and interim treatment facilities discharging to other facilities meeting secondary treatment or better.

ment is projected to decline by 65 percent between 1996 and 2016, while the number of facilities providing secondary or more advanced treatment is projected to increase by 15 percent. Once all of the needs are met, there are projected to be a total of 18,303 operational facilities serving a population of 275 million people.

The cost estimates included in the CWNS are associated with facilities eligible for funding under the SRF program. For each facility, the States are required to show both the need's existence and the cost necessary to satisfy that need. The purpose of documenting the needs and costs for each State is to ensure the national consistency and credi-

bility of the data for inclusion in the CWNS database.

All needs documentation was required to

meet certain basic criteria. Specifically, the documentation (1) *had to show that there was an existing need to prevent or abate a water quality or public health problem*, and (2) *had to be project specific*. For example, documentation describing a general, county-wide problem of septic system failures due to poor soils would be deemed unsuitable to document the needs of a particular town in that county. EPA reviewed all documentation submitted by the States to ensure that the documentation complied with these criteria.

What Levels of Documentation Were Accepted for Needs Justification?

States could use a wide variety of documentation to report needs. Table D-1 in Appendix D lists the 31 EPA-approved types of documentation for the 1996 CWNS and indicates whether they were acceptable for justification of need and/or cost. Generally, if a document was one of the approved document types, it was accepted for justification of need if

it included sufficient details concerning the proposed project (i.e., a definition of the problem, a description of the solution to the problem, and cost estimates when appropriate).

EPA strongly encouraged States to submit any available documentation of needs and costs for SW and NPS program needs. Needs and costs that could not be documented to the extent required by the EPA standards are discussed later in the section entitled "What Was the Connection Between Documentation and the Separate State Estimates?"

What Were the Redocumentation Requirements?

A main objective of the 1996 CWNS is to improve the validity and accuracy of the needs data in the CWNS database. For this reason, States were required to redocument the larger needs that appeared in the 1992 CWNS that they still considered valid. The States and EPA decided that any need greater than \$5 million (1996 dollar base) which was supported by documentation dated earlier than January 1, 1990, had to be redocumented for the 1996 CWNS.

How Did Documentation Requirements Differ for Small Communities?

It is difficult for some small communities to document needs and costs for projects because, in many cases, local governments do not have the resources required to develop the necessary detailed planning and engineering studies. For this reason, EPA established alternative, less extensive documentation require-

Documentation of Needs

What Is the Purpose of Documenting Needs?

ments for facilities associated with small communities.

In general, alternative documentation for small communities required: a description of the proposed project; an explanation of why the project was necessary (e.g., public health or water quality problem); and a statement of how the project would benefit the community. Commonly, this information was submitted on a standardized survey form that required signatures from suitable community and State officials. The alternative documentation could also contain a preliminary cost estimate. However, if it did not, cost curves were used to estimate the need, as described in the next section.

How Were Needs Estimated if Supporting Documents Did Not Contain Cost Data?

Once a State adequately documented a need, EPA accepted it for purposes of the CWNS, regardless of whether a documented cost estimate was available. This allowed States to use a wider variety of documents for needs justification rather than being restricted only to those containing cost data. For example, NPDES permits and administrative orders were permissible to document a water quality need even though these typically include no cost information.

For documented needs without cost estimates, EPA-approved cost curves were available to calculate the needs for secondary treatment, advanced treatment, new collector sewers, new interceptor sewers, septic tank upgrades, and CSO abatement. A more extensive explanation of the CSO cost curves follows in the next section.

How Were the CSO Needs Calculated?

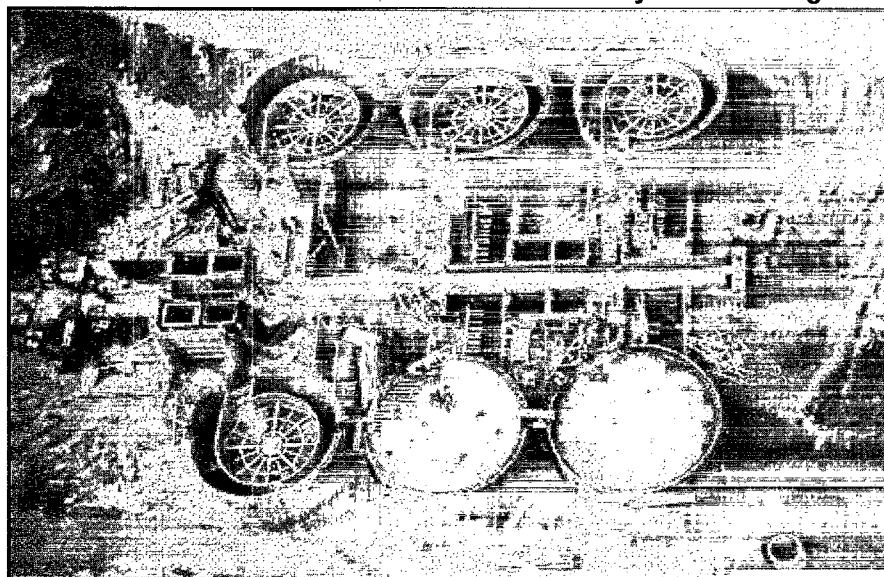
Currently, about 950 communities nationwide have combined sewer systems designed to carry both municipal wastewater and storm water. As point sources, CSOs are regulated under the CWA. In 1994, EPA concluded a negotiated dialogue with State, municipal, and environmental organizations that resulted in a CSO Control Policy. The CSO Control Policy offers a "presumptive" approach which allows a municipality three options to control their CSOs: (1) limiting, on average, the number of overflow events to between four and seven per year, (2) eliminating or capturing for a

minimum of primary treatment no less than 85 percent by volume of the annual rainfall flow through the system, or (3) eliminating or reducing the mass of pollutants equivalent to the above 85 percent volume control. In addition, the presumptive approach establishes a minimum of primary clarification, solids and floatables disposal, and, if appropriate, disinfection.

As part of the 1996 CWNS redocumentation effort, EPA reviewed all facilities in the CWNS database that had documented Category V (CSO) needs or that were identified as CSO facilities. EPA then compared these facilities with the list of CSO facilities with State NPDES permits. In this way, the CWNS database was corrected to eliminate incorrectly identified CSOs and to reflect accurately CSO problems that had been solved.

Since the 1992 CWNS, the CSO communities have made significant progress in documenting their needs for CSO control to reduce the water quality and human health effects of

Facility for controlling CSOs



CSOs and to comply with EPA's CSO Control Policy. At the same time, many CSO communities, particularly smaller-sized communities, were unable to adequately document the cost for CSO controls. For the 1996 CWNS, EPA used a cost curve, based on the CSO model that was developed during the 1992 CWNS, to help provide these costs. Costs were estimated for all individual CSO facilities in communities with CSO needs that were unable to document fully the cost of meeting the CSO Control Policy objectives.

The cost curve methodology was based on the CSO Control Policy option that requires the elimination or capture for primary treatment of no less than 85 percent of the wet weather flow by volume. The cost curve uses rainfall patterns for each CSO community and a runoff coefficient to calculate flows resulting from storm events and to estimate the community-based flow requiring CSO control measures. The cost of the facilities required to provide additional treatment consisting of primary sedimentation, chlorine disinfection, and dechlorination was then estimated with the cost curves. This method is an improvement over the estimation method used for the 1992 CWNS which did not allow for developing costs on an individual facility basis.

How Were On-site Reviews Used in Support of the CWNS?

In years past, EPA would conduct on-site visits to States as part of the review and verification of the needs reported in the CWNS. EPA CWNS officials visited Texas and California as part of the 1996 CWNS quality assurance process. These officials

performed a general review of how the data were collected and how the needs were documented for these two States. The review covered traditional needs, the SW and NPS categories of SRF-eligible projects, and facilities requiring redocumentation in the 1996 CWNS. For specific facilities, the two States provided EPA with documentation meeting approved criteria, such as capital improvement plans, facility plans, and State priority lists.

During these on-site reviews, EPA met with State CWNS coordinators to examine and discuss the documentation Texas and California submitted to support their needs, particularly documentation that demonstrated needs to prevent or abate a water quality or public health problem. These on-site reviews gave the State CWNS coordinators the opportunity to discuss details of this CWNS in depth, and provided the EPA officials a better understanding of where States needed assistance in documenting needs.

Both States have substantial needs and had large redocumentation requirements targeted in the 1996 CWNS clean-up effort. Some facilities required additional information and the EPA officials described the documentation needed to meet the redocumentation criteria. EPA officials also met with each of the State's NPS officials and discussed the documentation methods used to support their NPS needs.

Finally, the EPA officials visited a major wastewater treatment facility in each of the two States. The majority of both facilities visited were constructed with Federal grant and SRF loan dollars, and have had

documented needs reported since the first survey in 1973. Both facilities have documented needs in the 1996 CWNS to serve continued growth. In California, EPA visited the Sacramento Regional County Sanitation District (SRCSD). This facility is located on a 900-acre site, and has an average flow of 180 mgd and a peak flow of 400 mgd. This activated sludge facility reclaims water from the treated wastewater for non-potable irrigation use on golf courses and parks. SRCSD was formed in 1973, replacing 17 treatment facilities, and currently serves 1 million residents across 220 square miles.

In Texas, EPA officials visited the Walnut Creek Wastewater Treatment facility owned by and serving the City of Austin. This facility was constructed in 1973 for a total cost of \$57 million, of which \$31 million was provided by construction grant funds. It is unique in that it was one of the first facilities to be constructed with all of its process components underground. The Walnut Creek facility now serves 240,000 people, has an average flow capacity of 60 mgd, and treats its wastewater to advanced treatment standards.

What Was the Connection Between Documentation and the Separate State Estimates?

When EPA determined that State documentation was at variance with the EPA-defined criteria for needs documentation, the needs were reported as SSEs. Additionally, EPA allowed States to submit separate estimates for needs that they believe are valid, but are not supported by documents meeting EPA's criteria. These needs estimates are not reported as CWNS needs, but as SSEs.

States are permitted to report any needs estimates they feel were justified in the CWNS SSEs without EPA review.

Modeling of Storm Water Needs

Why Were the Phase I Storm Water Program Needs Modeled?

In the 1996 CWNS, EPA used a model to estimate the SW (Category VI) needs. While SW represents a substantial part of the total water quality problem, few States have systematically documented their SW needs. EPA developed a model to help build a more complete picture of these needs.

What Are the Phase I SW Program Requirements?

Pollutants in SW discharges from urban areas are a significant source of degradation of the nation's waters.

SW runoff can impair the beneficial use of water resources and pose health risks. Pollutants commonly found in SW runoff include pathogens, nitrogen, phosphorus, sediment, heavy metals, pesticides, herbicides, and synthetic organic compounds. Further, pollutants in SW runoff can deplete a waterbody's oxygen level. In addition to pollutants, the increased quantity of SW discharged from rapidly urbanizing areas also poses a threat to aquatic ecosystems by physically altering the receiving waterbody.

To help improve the quality of SW discharges, Congress amended the CWA in 1987 to add Section 402(p). This section directs EPA to establish phased NPDES permit requirements for SW discharges. Accordingly, EPA published the Phase I SW Program permit application requirements on November 16, 1990. These requirements applied to certain categories of SW discharges associated with industrial activity,

and SW discharges from MS4s serving populations of 100,000 or more. At this time, EPA is evaluating the requirements for Phase II SW sources, generally covering those urban or urbanized areas with smaller populations.

MS4s that are covered by the Phase I SW Program regulations include: storm sewer systems located in incorporated places with populations of 100,000 or more; systems located in 47 counties identified by EPA as having populations of over 100,000 in unincorporated, urbanized areas; and systems that are designated by the EPA Administrator or the State. Those MS4s identified under the Phase I SW Program regulations were required to submit an NPDES permit application. Approximately 266 Phase I SW Program NPDES permits will be issued, covering about 850 municipal entities. A few small communities are included in the program because they are associated with larger systems or because they are designated by the State.

Part 1 of the permit application requires information about any existing SW management programs and what means are available for controlling pollutants in SW discharges. Part 1 also requires a field screening analysis of major outfalls to detect any illicit connections to the storm sewer system. Building on the Part 1 information, Part 2 of the permit application requires a limited amount of representative discharge characterization data, and a description of a proposed SW management program. EPA is committed to the goal that all Phase I municipal SW Program permits will be issued by the end of September 1997.

Section 402(p)(3) of the CWA specifies that Phase I SW Program permits must meet a new statutory standard that requires controls to reduce the discharge of pollutants to the maximum extent practicable. MS4 permits must also ensure compliance with State water quality standards. According to EPA's *Interim Permitting Approach for Water Quality Based Effluent Limits in Storm Water Permits* (August 1, 1996), SW permits should require MS4s to develop and implement site-specific SW management programs based on best management practice (BMP) requirements rather than numeric water quality-based limitations. While this policy applies only to EPA, the Agency also encourages States to adopt similar policies for SW permits. The NPDES permitting authority (EPA or the State) and the permittee under the Phase I SW Program will jointly develop components of an MS4 SW management program to provide for attainment of water quality standards.

What Are the Goals for SW in the 1996 CWNS?

For the 1996 CWNS, EPA used a two-pronged approach to estimate

the SW needs. First, EPA obtained available technical data to estimate the documented needs. Second, EPA developed a model to generate national needs estimates. The goal for SW in the 1996 CWNS is both to estimate the SW needs for the 1996 CWNS and to build a base for future refinements and additions as better planning and cost information become available. In addition, the SW model for the 1996 CWNS was designed to reflect more accurately SW management costs under the Phase I SW Program, especially costs for structural controls and BMPs that may be eligible for SRF funding. Under the 1992 CWNS, only the costs of implementing NPDES municipal SW programs on a nationwide basis were estimated. For the 1996 CWNS, the model was expanded based on available information on SW controls and BMPs proposed in MS4 SW management programs to produce a refined estimate of both State-by-State and national SW needs.

The SRF-eligible portions of the Phase I SW Program consist of capital costs for developing and implementing municipal SW management programs. Capital costs include:

construction costs for structural controls and BMPs; program development costs; and program implementation costs. Examples of the latter costs include: drafting new ordinances or regulations; preparing training materials and training staff; and producing public education materials.

What Is the Modeled Estimate for the 1996 Phase I SW Program Needs?

The modeled estimate of the SW needs is \$7.4 billion. This represents only the estimated SRF-eligible portion of the costs that the MS4s are expected to incur to develop and implement a SW management program in response to the Phase I SW Program regulations. While not included in the model, O&M costs for the continued operation of MS4 SW management programs as well as O&M costs for SW controls and BMPs are significant. State-documented needs under the Program amount to \$3.2 billion.

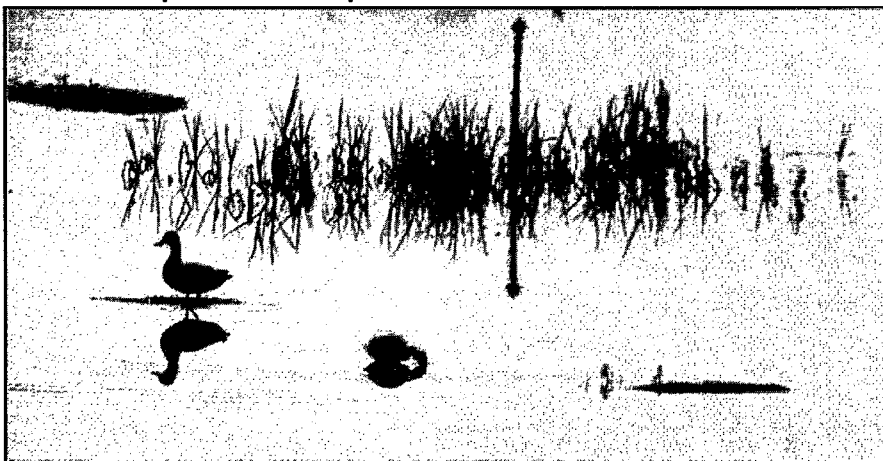
The distribution of modeled SW needs is depicted in Figure 4 in the "Key Results" section. A State-by-State tabulation is presented in Table A-4 of Appendix A.

What Cost Estimating Methodology Was Used?

The objective of the model was to estimate both State-by-State and national SW needs, but not to predict the needs for individual MS4s. Estimated needs for the Phase I SW program were modeled as follows:

- Develop decision rules based on climatic criteria to create a set of SW management approach groups

SW retention ponds can also provide habitat benefits



representing broad climatic characteristics that determine the choice of SW controls or BMPs;

- Assign each MS4 to a SW management approach group by applying the decision rules based on climatic criteria to each MS4;
- Assign appropriate SW controls or BMPs to each SW management approach group;
- Estimate the scale of the applicable SW controls or BMPs for each MS4 in a SW management approach group;
- Use cost formulas, developed for each SW control or BMP, to estimate the capital cost during a 20-year period for each applicable SW control or BMP, for each MS4, in January 1996 dollars;
- Sum the costs of all the applicable SW controls or BMPs for an MS4 to estimate total capital costs; and
- Aggregate costs nationally and by State.

The model used to estimate the Phase I SW needs was peer reviewed by a panel of outside experts. Several points related to the O&M costs, estimated by the model, were raised by the peer review and did not affect the modeled capital needs presented in this report. The second major area receiving 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 SW problem and the variability of local circumstances, a range rather than a single estimate could be developed.

However, given the objective of the CWNS to estimate the needs for pollution control, one set of assumptions was selected for use in the report. If the model was to be used for economic analysis, then a number of assumptions would have been utilized to develop upper and lower cost bounds.

What Are the Limitations of the SW Cost Modeling?

The following types of costs were not included in the SW needs modeling due to insufficient information or ineligibility for SRF funding:

- O&M costs for SW management (ineligible);
- Land acquisition costs (ineligible);
- Permitting and mitigation costs (ineligible);
- Capital costs for some SW controls or BMPs that are not widely used or had insufficient cost information;
- Developer-financed SW controls or BMPs and other private costs. (For some SW controls, such as erosion and sediment controls for construction site runoff, most capital costs are borne by developers and private costs are ineligible for SRF funding. However, public costs for establishing a program and for training municipal inspectors to review private erosion and sediment controls would be capital costs eligible for SRF funding. These were included in estimated SW needs.);
- Costs to provide SW controls or BMPs for future development. (It would be difficult to predict the size and location of future development throughout the nation. In addition, many of those SW controls or BMPs would probably be developer-financed and ineligible for SRF funding.);
- Costs for designated MS4s that are not associated with cities or counties (e.g., departments of transportation and special districts);
- Costs associated with developing Part 1 and Part 2 SW NPDES permit applications;
- Costs associated with SW permits for industrial activities owned and operated by municipalities;
- Costs associated with SW permits for construction activities under the Phase I SW Program;
- Costs associated with the industrial component of the Phase I SW Program; and
- Costs associated with the Phase II SW Program.

Modeling of Nonpoint Source Needs

Why Were Nonpoint Source Needs Modeled?

In the 1996 CWNS, EPA used a model to estimate the needs for controlling certain categories of NPS pollution. While a large part of the nation's water quality problem is attributable to NPS pollution, few States have systematically documented their NPS needs. EPA prepared an NPS needs model to help build a more complete picture of the total water quality needs.

What Is NPS Pollution?

NPS pollution is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves over or through the soil, it picks up and carries away natural pollutants and pollutants resulting from human activity, eventually depositing them into lakes, rivers, wetlands, coastal waters, and ground waters. In addition, habitat alteration and hydrologic modification (changes in hydrologic characteristics) can have adverse effects on the biological and physical integrity of surface waters. NPS pollution is *not* regulated by NPDES permits.

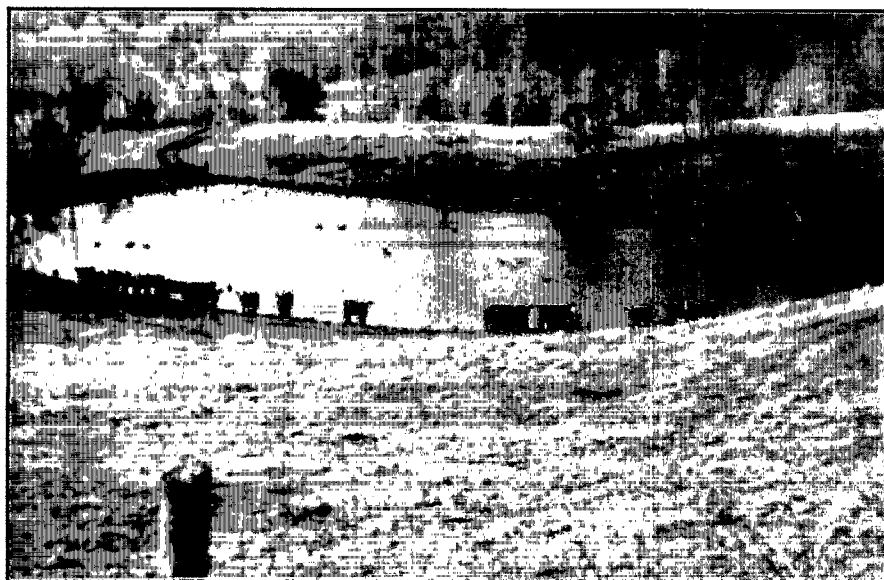
Sources of NPS pollution include agriculture, silviculture, atmospheric deposition, channelization, construction, contaminated sediments, contaminated ground water, runoff from highways, hydrologic and habitat modification, land development, land disposal, marinas, onsite disposal systems, recreational activities, removal of riparian vegetation, resource extraction, shoreline modification, and streambank destabilization. Agriculture is the leading

source of impairment in the nation's rivers, affecting 60 percent of the impaired river miles assessed in the United States, according to EPA's 1994 305(b) report. Other sources of NPS pollution affecting impaired river miles include urban runoff (12 percent of impaired river miles), hydromodification or habitat alteration (17 percent), mining or resource extraction (11 percent), and silviculture (9 percent).

The distinction between NPS and diffuse point sources is sometimes unclear. Although diffuse runoff is usually treated as NPS pollution, runoff that enters and is discharged from storm sewer systems is treated as a point source discharge and hence is subject to the CWA permit requirements. In contrast, NPS dischargers are not subject to Federal permit requirements. Under Section 6217 of the Coastal Zone Act Reauthorization Amendments (CZARA), municipal and commercial SW dischargers in the coastal zone that are not covered by the Phase I SW Program must comply with the requirements of the CZARA. States are encouraged to develop consistent approaches in dealing with urban SW runoff.

What Are the Goals for NPS in the 1996 CWNS?

The 1987 CWA Amendments allow States to use their SRF to fund selected non-Federal NPS control activities that are contained in approved Section 319 NPS Management Plans. Section 319 of the CWA addresses NPS pollution by providing grant funds to help solve NPS problems and by requiring States to develop NPS Management Plans to address these problems.



Agricultural NPS needs are part of the CWNS

The NPS goals of the 1996 CWNS are to capture as many NPS needs as feasible through reporting those needs documented by the States and to supplement these needs through modeling.

What Are Eligible NPS Needs?

The SRF can fund projects designed to alleviate pollution caused by a wide variety of diffuse sources, including agriculture, silviculture, and abandoned mines. Eligible NPS control projects include virtually any activity that a State has identified in its NPS Management Plan. Such activities include projects to control runoff from agricultural land; conservation tillage and other projects to address soil erosion; development of streambank buffer zones; and wetlands protection and restoration. Documented NPS needs greater than \$0.5 million for agriculture and silviculture were reported by 10 States in the 1996 CWNS as shown in Table A-3 in Appendix A. Since few States have developed

comprehensive estimates for NPS control, EPA developed a model to estimate national costs for agricultural and silvicultural controls. This model is similar to the model used in the 1992 CWNS, with the differences noted below.

What Is Included or Excluded from the Modeled NPS Estimates?

The modeled estimates include activities to develop and implement NPS management programs to control runoff from:

- Agriculture (cropland, pastureland, and rangeland);
- Confined animal facilities with fewer than 1,000 animal units (AU); and
- Silviculture.

Because of the lack of nationwide information, EPA did not develop a modeled needs estimate for other sources of NPS pollution. The fol-

lowing areas were excluded from the needs modeling due to insufficient data:

- Abandoned mines;
- Inappropriate land disposal of wastes;
- Channelization and hydromodification;
- Atmospheric deposition;
- Construction;
- Marinas;
- Runoff from roads, highways, and bridges;
- Urban/suburban areas not covered by Phase I SW Program permits; and
- Remediation of contaminated sediments causing a water quality problem.

These sources of NPS pollution could represent significant needs for SRF funding. In addition, other NPS costs that were excluded are recurring O&M costs as well as technical assistance, engineering, and related services that are often provided to farmers or others free of charge by Federal and State agencies.

What Is the Modeled Estimate for NPS Control Needs?

The modeled estimate of the NPS control needs is \$9.4 billion. Table 6 summarizes the estimates by category and compares them to the 1992 modeled needs (converted to 1996 dollars). Table A-5 in Appendix A

contains State-by-State modeled estimates for each of the NPS categories modeled.

The estimated needs for controlling runoff from cropland, pastureland, and rangeland is \$3.8 billion. The 1996 needs for agricultural land of \$3.8 billion are slightly less than the needs modeled in the 1992 CWNS of approximately \$4.2 billion (inflated to 1996 dollars). The area of cropland reported in the 1992 Natural Resources Inventory (NRI) was approximately 10 percent, or 40 million acres less than the 1987 NRI value used in the 1992 CWNS. This drop may be attributed to the fact that conservation reserve program (CRP) land was not considered as cropland in the 1992 NRI, but was considered as such in the 1987 NRI.

The 1996 estimated needs for confined animal facilities of \$2.1 billion are lower than the 1992 needs of \$3.1 billion (adjusted to 1996 dollars). The lower needs are primarily due to the reduced number of animal

feedlots containing fewer than 1,000 AU. This reduction is attributable to the trend in the animal industry toward larger operations. Operations with more than 1,000 AU are considered to be point sources and therefore are ineligible for funding as NPS projects. Compared to the 1987 Census of Agriculture, the total number of farms reported in the 1992 Census were 13.4 percent fewer for broilers, 39.2 percent fewer for layers, and approximately 22 percent fewer for beef, dairy, and swine. Similarly, within each livestock category, the number of animals also decreased for a majority of the farm sizes.

The annual national cost for implementing forestry BMPs was estimated to be \$316 million. The 20-year period cost was determined to be approximately \$3.5 billion. The 1996 CWNS estimate for silviculture of \$3.5 billion is larger than the 1992 estimate of \$2.7 billion (adjusted to 1996 dollars). The difference between the 1992 and 1996

needs estimates can be attributed partially to the increase in total area of timberland harvested in the United States, but mostly to the increase in average BMP implementation cost per acre of timberland harvested in each State. The number of States that have a formal regulatory structure for forestry operations increased from 1992 to 1996, thereby increasing BMP implementation costs.

The methodologies used to develop the modeled estimates are presented in the paragraphs that follow. These methodologies are similar to those used in the 1992 CWNS, with some refinements, and use of the most recent data.

How Were Cropland, Pastureland, and Rangeland Modeled?

Runoff from crop production and grazing land carries primarily sediments, salts, nutrients, and pesticides to the downstream receiving waters. Sediments generally result from erosion of cropland and grazing land. Excessive application of chemical fertilizer or animal manure on land frequently results in high concentrations of nitrogen and phosphorus in runoff or in leaching of nitrogen to ground water. Pesticide applications on cropland and pastures can introduce toxic pollutants into both surface water and ground water.

The cost estimating methodology addressed the control of erosion and pollutant export from cropland and grazing land. This methodology is based on applying a best management system (BMS), which combines soil conservation practices and other management measures that,

TABLE 6
MODELED NEEDS
FOR NONPOINT SOURCE POLLUTION CONTROL
(January 1996 Dollars in Billions)

NEEDS CATEGORY	1992 CWNS	1996 CWNS
VIIA - Agricultural Land (Cropland, Pastureland, and Rangeland)	4.2	3.8
VIIIB - Confined Animal Facilities (< 1,000 AU)	3.1	2.1
VIIC - Silviculture	2.7	3.5
GRAND TOTAL	10.0	9.4

when applied, will achieve NPS pollution control through the reduced transport of sediments, nutrients, and chemicals into surface and ground water.

Erosion control measures in the model were based on the implementation of soil conservation practice groups identified by the U.S. Department of Agriculture's (USDA's) Farm Service Agency. Water quality management was incorporated into the model by applying additional control measures, such as nutrient management, pesticide management, and irrigation water management.

The model estimated costs by determining an appropriate set of BMPs and estimating the implementation costs. This was accomplished as follows:

- **Review NRI data.** This national database provides data on area of farm land, crop type, soil erosion rate, soil loss tolerance, slope, and conservation practices in use in 1992. (The NRI is compiled by the USDA every five years. The 1996 CWNS used the latest available 1992 NRI data. The 1992 CWNS used the 1987 NRI data.)
- **Develop a best management system.** If land required erosion control, conservation practice groups were selected to reduce soil erosion to the soil loss tolerance level specified for that land. Additional measures to provide water quality management were also selected to complete the BMS.
- **Determine needs for cropland, pastureland, and rangeland.**

Total capital costs of erosion control and water quality management were computed for cropland, pastureland, and rangeland in each State.

The cost estimating methodology used for the 1992 CWNS was also applied in the 1996 CWNS. The national databases used, however, were updated to reflect the most recent data available.

How Were Confined Animal Facilities Modeled?

A confined animal facility is a lot or facility where animals have been, are, or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period. Crops, vegetation forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility.

Runoff from confined animal facilities may contain nutrients, oxygen-demanding substances, organic solids, salts, pathogens, and sediments. Runoff includes process-generated wastewater and precipitation that comes into contact with manure, litter, or other material used in or resulting from the production of animals.

For the purposes of the 1996 CWNS, costs were estimated only for confined animal operations with fewer than 1,000 AU. Confined animal operations (feedlots) with 1,000 AU or more are considered point sources, and are not eligible for funding under the Section 319 program. Therefore, the large operations cannot receive SRF loans.

Under certain circumstances, facilities with less than 1,000 AU can be regulated as point sources, which could result in an overestimation of these needs.

The methodology used to develop EPA's estimate was based on the use of model feedlot facilities, which were intended to represent typical facility sizes within each livestock category. Livestock categories considered were beef feedlots, dairies, swine feedlots, and broiler and layer houses. The approach was similar to that used in the economic analysis for the CZARA, and cost data from that analysis were used in developing the 1996 CWNS cost estimates.

The methodology was based on the assumption that facility runoff was going to be controlled primarily through diversion for runoff containment and channelization of on-site effluent to the ultimate control structures. All runoff collected in these control structures was assumed to be used for irrigation.

The following steps were used to estimate the cost of controlling NPS pollution from feedlot operations:

- **Identify model feedlots.** Model feedlots were defined to represent typical sizes within each livestock category.
- **Develop NPS management plan.** NPS runoff control measures were identified and a typical management plan was selected for the model feedlots in each livestock category.
- **Estimate needs for confined animal facilities.** The number of

livestock operations in each model feedlot was obtained from the 1992 Census of Agriculture data for each State (which is the latest data available; the 1992 CWNS used 1987 data). The total cost of implementing the NPS management plan was then estimated using this national database. Estimates for two control options were developed. Option 1 included lined retention ponds and irrigation for ultimate disposal. Option 2 also included irrigation for ultimate disposal but used filter strips in lieu of lined retention ponds. The estimate presented in this report is for Option 1. This is considered by the agricultural community to be the more effective approach, although it has the higher cost of the two options.

There was no change in the cost estimating methodology for the 1996 CWNS. However, the national databases used were updated to reflect the most recent data available.

EPA also modeled the needs for controlling runoff from confined animal facilities based on the USDA's definition of an animal unit, or AU. An AU is a unit of measurement which allows comparison between various animal types (e.g., cattle, dairy, poultry, etc.). EPA's definition of an AU is based on the NPDES permit regulations. The USDA revised these AU definitions based on the weight of the animals. If this revised definition were used, the number of facilities eligible for SRF funding would increase and result in total needs of \$2.8 billion for confined animal facilities (compared to the EPA estimate of \$2.1 billion reported).

How Was Silviculture Modeled?

Silvicultural activities can degrade water and habitat quality if sufficient care is not taken to prevent adverse effects. Sediment from erosion due to the presence of access roads and harvesting activities, temperature increases due to riparian shade removal, and pesticides and fertilizers used during timber operations are some of the major pollutants exported from timber-harvesting sites to receiving waters.

The methodology used to estimate the costs of controlling NPS pollution from silvicultural activities employed the following components:

- **Develop estimates of annual forestland area harvested per State.** The area of forestland harvested annually was computed by using the U.S. Forest Service's *Forestry Resources of the United States, 1992*. The distribution of the timberland area in relation to the type of terrain, however, was developed by considering the geographical characteristics of each State. Only privately owned forestlands were considered (Federal lands are ineligible for SRF loans).
- **Identify silvicultural best management practices.** Silvicultural BMPs were identified to control erosion from roads built to gain access to harvesting sites, to control the introduction of pesticides into watercourses, to maintain the stability of stream banks, and to ensure the revegetation of harvested sites, among other pur-

poses. BMPs identified were similar to those used for CZARA but were more refined.

- **Identify typical comprehensive management plans.** Typical comprehensive management plans were identified for controlling pollution and adverse habitat impacts for various site and timber characteristics.
- **Develop cost estimates for management plans.** Estimates for the cost per acre of implementing BMPs were developed for various types of forest management units (FMUs). These estimates indicated that the greatest variations in BMP implementation costs were caused by the general slope of the FMU and the degree of regulatory control practiced in the State.
- **Estimate needs for silvicultural activities.** Total costs of managing NPS pollution from silvicultural activities were estimated for each State.

In the 1992 CWNS, the factors influencing BMP implementation costs were assumed to be the general slope of the harvested land and the presence or absence of streams, rivers, and other waterbodies in the area. The 1996 CWNS identified the terrain of the harvest site and the degree of regulatory stringency of the States as the dominant factors influencing the cost of implementing BMPs. Proximity to a waterbody appeared to be less significant than those factors. In addition, the data used for the silvicultural modeling were updated to reflect the most recent data available.

What Are the Limitations of NPS Control Modeling?

The estimates presented in the 1996 CWNS represent EPA's effort to assess needs nationally for selected aspects of NPS control. The estimates represent only a portion of the total expected costs for NPS activities (specifically, agricultural land, confined animal facilities, and silviculture). Estimates will be refined and enhanced in future CWNSs, with documented NPS needs reported on a watershed basis.

Several cautions on the use of this information are appropriate:

- The estimates for confined animal facilities were prepared assuming no controls were in place. Therefore the estimates may overstate the real needs.
- Estimates for NPS BMPs were based on practices and requirements developed under the CZARA. Examples of these practices include appropriate erosion control, nutrient management planning, containment of runoff from confined animal facilities, and preharvest planning for silviculture.
- Some SRF-eligible areas with potentially very high costs, such as NPS runoff from abandoned mines, were not included.
- The estimates for agricultural controls, confined animal controls, and silvicultural controls are for capital investment or initial implementation of NPS controls, not for ongoing costs of O&M. O&M costs are not eligible for SRF

funds but nevertheless represent a portion of the costs for NPS control.

- Areas with a large number of confined animal facilities, including permitted facilities with more than 1,000 AU, may have underestimated needs. This is because of the lack of land for spreading manure and the higher cost of transporting the manure to land adequate for spreading. These areas can also have large phosphorus inputs already in the soil, further increasing the cost of spreading manure.

Watershed-Based Needs Accounting

How Can Watershed-Based Needs Accounting Enhance Water Quality-Based Planning?

The reporting of needs in prior CWNSs has focused on individual facilities, aggregated by State. As water quality management becomes more sophisticated, there will be a greater emphasis on the watershed as a water quality planning unit to attain water quality goals. This emphasis is expected to provide a

more comprehensive and efficient basis for water quality planning. This section presents three examples to demonstrate how multiple pollution sources can be addressed together. The next CWNS will explore the watershed approach in greater detail.

The term *watershed* refers to a geographic area in which water, sediments, and dissolved materials drain to a common outlet: a point on a larger stream, a lake, an underlying aquifer, an estuary, or an ocean. This area is also called the *drainage basin* of the receiving waterbody. A watershed-based management approach allows an agency to consider not only the water resource itself, but also the land from which the water drains and activities that are undertaken on that land. This type of holistic planning helps agencies target the principal water quality problems regardless of their source.

The watershed approach makes sense for financial, environmental, and community-building reasons. It facilitates program integration, promotes public participation, and focuses energy on environmental results. Coordinating efforts across traditional program areas (for exam-

ple, drinking water protection, pollution control, fish and wildlife habitat protection, water supply, transportation, and power generation) allows for planners to look at *all* the issues within watersheds. This results in a better understanding of the cumulative impact of various human activities.

There are several reasons to report needs on a watershed basis. Many States are moving toward basing their water quality work on watersheds. This allows the State to assess both the point and nonpoint pollution sources in the watershed, and to address them in the most cost-effective way. With limited resources at all levels of government, watershed-based planning and assessment allow States to focus on their highest priorities in a holistic manner.

The following case studies show the benefits of accounting for needs on a watershed basis. Watershed-based needs accounting links the land use in the watershed, all the potential sources of pollution in the watershed, and the eligible needs to the waterbody. The State then has an idea of the effort required to meet water quality standards for that particular waterbody.

Wisconsin: Yahara-Monona Watershed

The Yahara-Monona watershed, depicted in Figure 11, is a 60,160-acre (94 square mile) drainage area located entirely within Dane County, Wisconsin. More than 60 percent of the land use in the watershed is classified as urban or urbanizing. The remaining land use is considered rural, with agricultural lands

being prevalent in the southern part of the watershed. The watershed includes parts of three cities (Madison, Monona, and Fitchburg), one village, and four towns. The City of Madison accounts for approximately half of the total land area in the watershed. The average annual precipitation is approximately 31 inches.

Water quality problems in the watershed include low gradients and low flows, channel straightening, sedimentation, and excessive aquatic plants. The three largest lakes in the watershed are all classified as eutrophic (nutrient rich). Previously, the water quality of the lakes has been affected by municipal and industrial sewage discharges, which have now been diverted around the lakes. The levels of phosphorus, sediments, and metals all need to be reduced.

Models were used to estimate the amount of various pollutants that might be discharged from urban and agricultural lands. The pollutant load estimates were used to develop

TABLE 7 YAHARA-MONONA WATERSHED NEEDS (1996 Dollars)	
CATEGORY	NEED
I - Secondary Treatment	25,251,000
II - Advanced Treatment	723,000
VI - Storm Water	25,011,000
VII - Rural Nonpoint Source Pollution	385,000
TOTAL NEEDS	51,370,000

pollution reduction targets in the watershed to meet water quality goals.

The needs identified for the Yahara-Monona watershed are listed in Table 7. The needs for wastewater treatment (Categories I and II) are for the Nine Springs wastewater treatment facility, which treats the waste from the Madison Metropolitan Sewer District. The SW needs include those referenced in the City

of Madison's Phase I SW permit. Finally, the needs that are required to control rural NPS pollution, primarily agricultural, are presented. Calculating these needs on a watershed basis allows the State to evaluate the cost of different controls, and their expected effect on water quality, to determine the best approach to solving their water quality problems.

Vermont: LaPlatte River Watershed

The LaPlatte River drains a 33,100-acre (51.7 square mile) watershed in southwestern Chittenden County, Vermont. The watershed is depicted in Figure 12. Approximately 45 percent of the land use is agricultural, 34 percent is forested, and less than 10 percent is residential. The remaining land uses are open, wetland, water, or transportation. The total population residing in towns in the watershed is fewer than 6,000. The average annual precipitation is 33.5 inches.

FIGURE 11

LOCATION OF THE YAHARA-MONONA WATERSHED

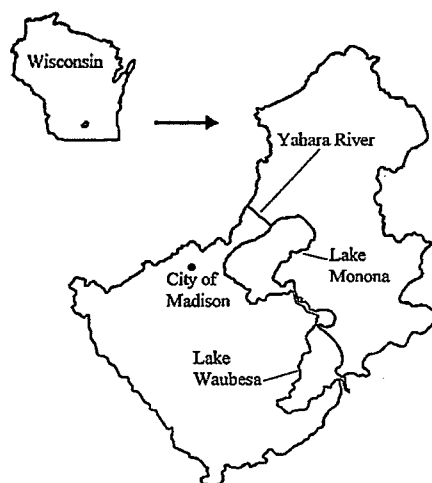
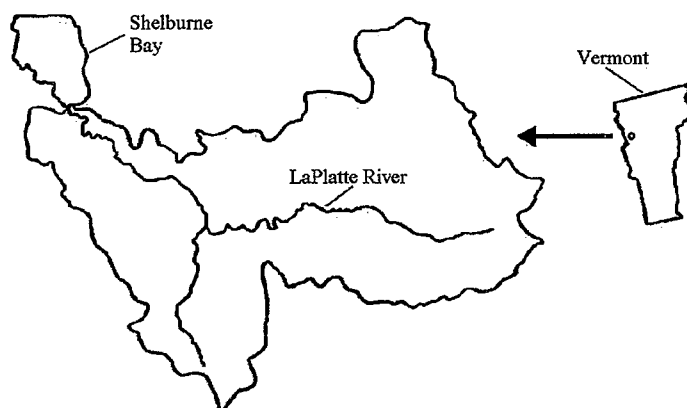


FIGURE 12

LOCATION OF THE LAPLATTE RIVER WATERSHED



The primary water quality impairment in the LaPlatte River, and in Lake Champlain into which it drains, is excessive phosphorus. Phosphorus levels are sufficiently high to cause severe eutrophication and impairments to recreational use. Currently, two municipal wastewater treatment facilities and one industrial facility discharge into the watershed. Runoff from agricultural and urban areas also contributes to excessive phosphorus loadings.

A phosphorus loading study of Lake Champlain from the 31 major tributaries flowing into the lake was conducted. Phosphorus load reductions were assigned to each lake segment subwatershed to achieve the established in-lake water quality standards for phosphorus. A model was developed to estimate the total phosphorus load from crop/pastureland, animal facilities, and urban areas. Four strategies were developed to

achieve a 20 percent phosphorus reduction. The estimated needs for these four strategies were then computed.

The public was involved through a local steering committee that provided input and served as a "reality check" for output and other results. Meetings were conducted to inform the public regarding project goals

and objectives, progress, and findings.

As shown in Table 8, Scenario 1 allocated the entire load reduction to agriculture at an estimated cost of \$1.95 million. Scenario 2 modeled the cost as if an equal percentage of the phosphorus reduction were taken from both agriculture and urban areas. Scenario 3 modeled the cost if half of the phosphorus reduction was from agriculture and half was from urban areas. Finally, Scenario 4 modeled the cost if both agriculture and urban areas contributed an equal dollar amount for the phosphorus reduction.

Scenario 1, in which the entire reduction is taken from the agricultural land, is the least costly scenario. This is because of the lower cost of some agricultural controls compared to urban controls. In this case, assessing needs on a watershed basis allows for a comparison of various pollution sources affecting a waterbody. This provides a holistic approach to control those sources.

TABLE 8

LAPLATTE RIVER WATERSHED NEEDS
(1996 Dollars)

SCENARIO	PHOSPHORUS LOAD REDUCTION		TOTAL CAPITAL COSTS
	AGRICULTURAL (kg/yr)	URBAN (kg/yr)	
1	1325	0	1,950,000
2	1025	300	2,800,000
3	750	575	4,500,000
4	625	700	6,000,000

Tennessee: Richland Creek Watershed

The Richland Creek Watershed, depicted in Figure 13, is a 311,125-acre (486 square mile) drainage area located in Giles, Lawrence, Marshall, and Maury Counties. The watershed is inhabited by approximately 10,000 people, of whom 90 percent depend on its water for domestic use. Approximately 60 percent of the land cover is agricultural row crops and pasture. The remaining land cover comprises forest (38 percent) and urban (2 percent).

The largest urban area is Pulaski, which encompasses 1.2 percent of the watershed. Annual precipitation is 55 inches, with the heaviest rainfall in the winter and spring.

Water quality problems are primarily from NPS pollution. Runoff from agricultural plots contributes to increased sedimentation and nutrient

TABLE 9 RICHLAND CREEK SUBWATERSHED NEEDS (1996 Dollars)		
LAND/WATER USE	WQI SCORE	COST
Current	60	-
Add buffer strip	62	460,700
Reforestation	78	29,280,000
Tertiary treatment/nitrogen and phosphorus removal	62	10,900,000
Tertiary treatment/nitrogen and phosphorus removal and reforestation	78	40,180,000

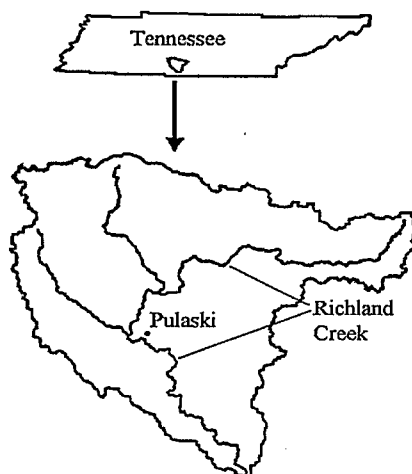
enrichment. Runoff from a private solid waste facility has also been problematic. Additionally, the City of Pulaski has identified storm water runoff from asphalt areas as a source of water quality problems.

Concern by local officials and private citizens has resulted in an awareness of water quality problems. The City of Pulaski has undertaken a project to reduce the influence of urban runoff by constructing buffer strips in problem areas. Several local, State, and Federal agencies, as well as Tennessee Technological University, have cooperatively developed a model to identify problem areas, explore corrective actions, and provide a cost-benefit analytical procedure. This process was developed using existing surface and ground water models, integrated with geographic information system technology, to provide local citizens with a tool for watershed planning.

The needs identified for a subwatershed of the Richland Creek Watershed are listed in Table 9. These scenarios were based on local citizen visions for the condition of the subwatershed and the cost effectiveness of remedial actions. The output is

FIGURE 13

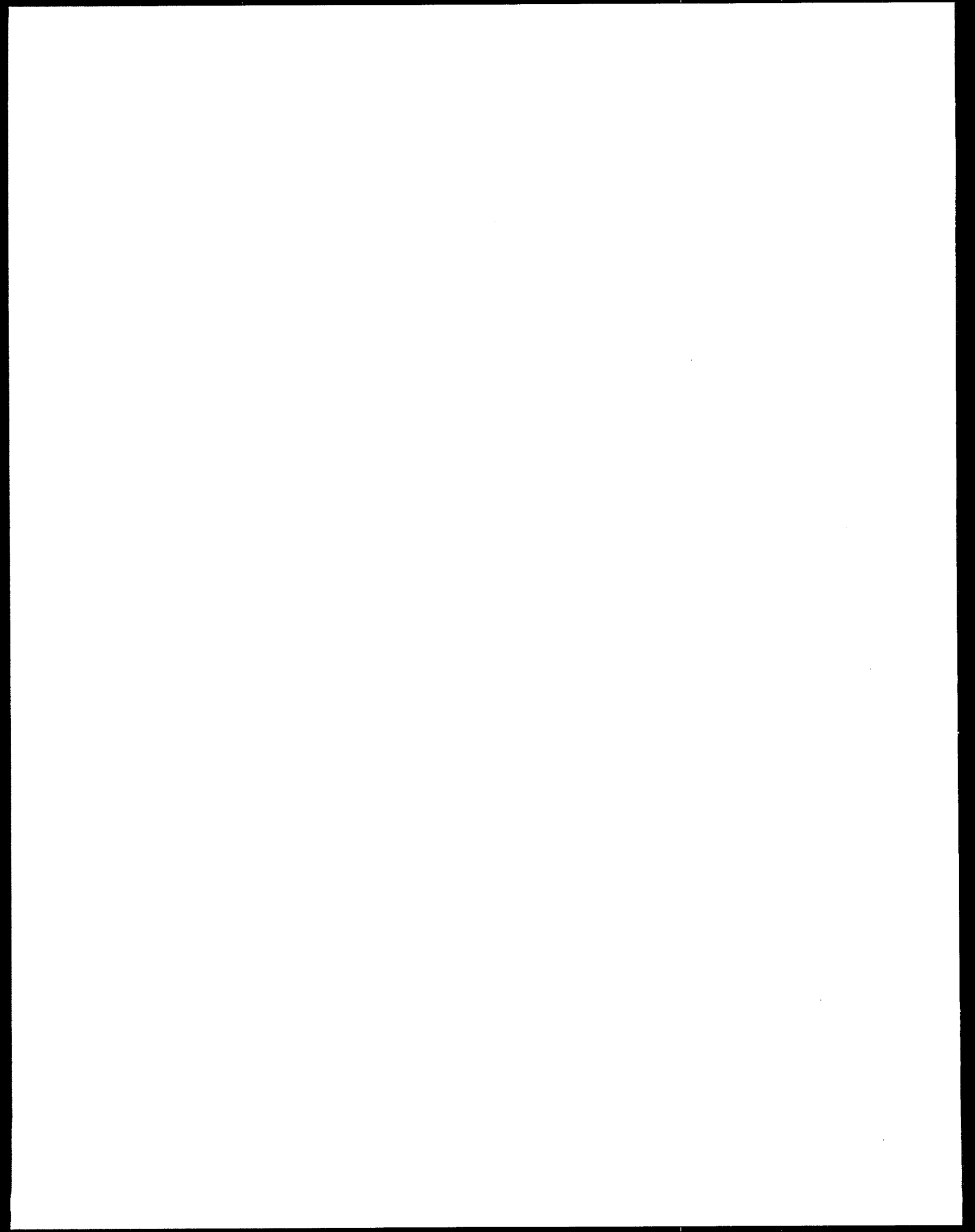
LOCATION OF THE RICHLAND CREEK WATERSHED



based on a Watershed Quality Index (WQI) derived from the developed model (a higher WQI score indicates better water quality). A single storm event of 1 inch was used in all scenarios. The results show that a relatively low-cost option, such as adding buffer strips around waterbodies, would have about the same impact on the watershed as upgrading the treatment plant to tertiary treatment. These changes were also compared to a scenario in which all land in the watershed would be reforested, which would achieve the best possible water quality.

What Can Be Concluded from These Case Studies?

Assessing needs on a watershed basis encourages integrated planning, encompassing all the sources within a watershed. As these examples show, various scenarios can be evaluated, with the cost and water quality improvement to the watershed estimated. This allows States to address their water quality concerns in the most cost-effective manner and can help form the basis for such management approaches as waste load allocations and effluent trading. Future CWNSs will provide an opportunity to integrate multiple needs on a watershed basis. The goal will be to identify the level of needs required to achieve water quality compliance for individual watersheds.



Concluding Remarks

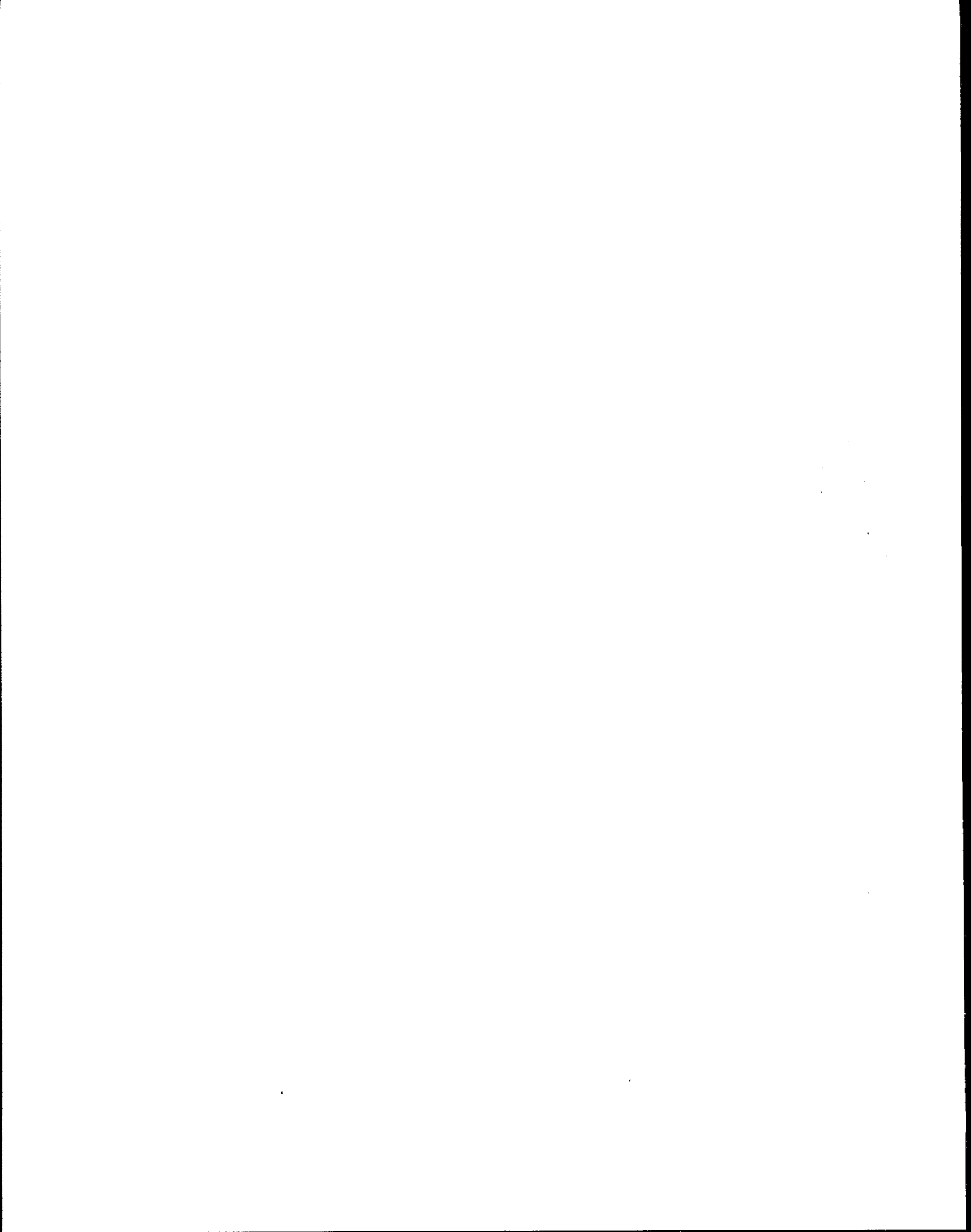
The 1996 CWNS has built on the accomplishments of past surveys. Both the breadth and depth of the CWNS have increased. The States provided the staffing to update the quality of the cost and technical information in the database. This involved extensive redocumentation and data quality improvement efforts which succeeded in eliminating obsolete data, updating ongoing project information, and ensuring the currentness of the CWNS database. Increased attention was given to the needs of small communities, which contain the majority of wastewater treatment facilities.

The 1996 CWNS incorporated several major improvements in estimating the needs related to CSO, SW, and NPS controls. This reflects EPA's increasing concern about wet weather contributions to the nation's water quality problems. Cost curves were developed to estimate better site-specific CSO needs. The CWNS results show that the States are giving increasing attention to SW and NPS problems. The documented SW and NPS needs have increased. Many States, however, have not yet systematically documented their SW and NPS needs. Accordingly, EPA developed a national SW needs model and refined the NPS model that was introduced in the 1992 CWNS.

In the future, more extensive documentation, especially addressing SW and NPS problems, will improve the needs estimation for a broader range of SRF-eligible

programs and projects. EPA also expects to continue expanding the range of water quality problems included in the CWNS. States will be encouraged to augment further their documentation of the wet weather conditions that contribute to their water quality problems. Additional refinements will be made to the SW and NPS modeling to supplement the documented needs further.

The use of watersheds for organizing needs information will enhance both EPA's and the States' understanding of the overall water quality requirements. The watershed approach makes sense for both environmental and financial reasons because it facilitates program integration and focuses energy on holistic environmental results. Coordinating efforts across traditional program areas allows for a comprehensive look at all of the issues within watersheds, which results in a more complete understanding of the cumulative impact of various human activities. Analysis of needs by watershed offers the prospect of defining more specifically the investment required to meet the CWA goals. Such analysis can also help determine how water quality investments can be optimized. Looking ahead, EPA expects that future CWNSs will become even more comprehensive, encompassing the full spectrum of the nation's water quality problems.



301(h) Ocean Discharge Waiver

A variance (authorized under Section 301(h) of the CWA) from secondary treatment requirement for treatment facilities discharging to bays or estuaries.

Advanced Treatment

See Categories of Needs: Category II.

Glossary

NOTE: Definitions are provided to help the reader understand the terms used but are not necessarily to be used for legal purposes.

Animal Unit (AU)

A unit of measurement for any animal feeding operation. 1,000 animal units is equal to 1,000 slaughter and feeder cattle or 714 dairy cattle or 2,500 swine weighing over 25 kilograms (approximately 55 pounds) or 10,000 sheep or 500 horses.

Atmospheric Deposition

A process by which airborne particles (sometimes pollutants) are deposited on the ground. After their deposition, these particles may be transferred to surface waters by storm water runoff.

Best Management Practice (BMP)

A practice or combination of practices that are determined to be an effective and practicable (including technological, economic, and institutional considerations) means of controlling point and nonpoint pollutants at levels compatible with environmental quality goals.

Best Management System (BMS)

A combination of conservation practices or management measures that, when applied, will achieve desired nonpoint source pollution control through reduced transport of sediment, nutrients, and chemicals into surface and ground water.

Biochemical Oxygen Demand (BOD/BOD₅)

Amount of oxygen consumed by aerobic bacteria to decompose organic matter. Used to measure extent of pollution by sewage or industrial waste. BOD₅ refers to the 5-day test to determine BOD.

Categories of Needs

Needs estimates address the following categories:

1. Secondary Treatment (Category I)

The minimum level of treatment that must be maintained by all treatment facilities except those facilities granted ocean discharge waivers under section

Glossary

301(h) of the CWA. Treatment levels are specific in terms of the concentration of conventional pollutants in the wastewater effluent discharged from a facility after treatment. Secondary treatment typically requires a treatment level that will produce an effluent quality of 30 mg/l of both BOD₅ and total suspended solids (TSS), although secondary treatment levels required for some lagoon systems may be less stringent than this. In addition, the secondary treatment must remove 85 percent of BOD₅ and TSS from the influent wastewater. Needs to attain incremental reductions in conventional pollutant concentrations beyond secondary treatment requirements are included in Category II.

2. Advanced Treatment (Category II)

A level of treatment more stringent than secondary treatment or a significant reduction in nonconventional pollutants present in the wastewater treated by a facility. Needs reported in this category are necessary to attain incremental reductions in pollutant concentrations beyond basic secondary treatment.

3. Infiltration/Inflow (I/I) Correction (Category IIIA)

Control of the problem of penetration *into* a sewer system of water other than wastewater from the ground through such means as defective pipes or manholes (infiltration) or from sources such as drains, storm sewers, and other improper entries into the system (inflow). Included in this category are costs for correction of sewer system infiltration/inflow problems. Costs also are reported for preliminary sewer system analysis and for detailed sewer system evaluation surveys.

4. Replacement/Rehabilitation of Sewers (Category IIIB)

Reinforcement or reconstruction of structurally deteriorating sewers. This category includes cost estimates for rehabilitation of existing sewer systems beyond those for normal maintenance. Costs are reported if the corrective actions are necessary to maintain the structural integrity of the system.

5. Collector Sewers (Category IVA)

Pipes used to collect and carry wastewater from a sanitary or industrial wastewater source to an interceptor sewer that will convey the wastewater to a treatment facility. The needs in this category include the costs of constructing new collector sewer systems and appurtenances.

6. Interceptor Sewers (Category IVB)

Major sewer lines receiving wastewater flows from collector sewers. The interceptor sewer carries wastewater directly to the treatment facility or to another interceptor. The needs in this category include costs for constructing new interceptor sewers and pumping stations necessary for conveying wastewater from collection sewer systems to a treatment facility or to another interceptor sewer.

Glossary

7. Combined Sewer Overflow (CSO) Controls (Category V)

Facilities or measures to achieve water quality objectives by preventing or controlling periodic discharges of a mixture of storm water and untreated wastewater (combined sewer overflows) that occur when the capacity of a sewer system is exceeded during a rainstorm. This category does not include costs for overflow control allocatable to flood control or drainage improvement, or for treatment or control of storm water in separate storm and drainage systems.

8. Storm Water (SW) (Category VI)

Activities to plan and implement municipal storm water management programs pursuant to NPDES permits for discharges from MS4s. These include structural and nonstructural measures that (1) reduce pollutants from runoff from commercial and residential areas that are served by the storm sewer, (2) detect and remove illicit discharges and improper disposal into storm sewers, (3) monitor pollutants in runoff from industrial facilities that flow into municipal separate storm sewer systems, and (4) reduce pollutants in construction site runoff.

9. Nonpoint Source (NPS) Pollution Controls (Category VII)

Activities to plan and implement programs to control NPS pollution of both surface water and ground water. These include structural and nonstructural measures to reduce or eliminate pollutants from both urban (non-Phase I SW) and rural areas. This category is further divided into: (A) agricultural cropland sources; (B) agricultural animal sources; (C) silviculture sources; (D) urban sources (excluding those covered in Category VI); (E) ground water protection; (F) estuary protection; and (G) wetland protection.

Collection System

A system of collector and/or interceptor sewers collecting wastewater from a community.

Collector Sewers

See Categories of Needs: Category IVA.

Combined Sewer Overflow (CSO)

See Categories of Needs: Category V.

Combined Sewer Systems

Sewer systems designed to convey both domestic sanitary wastewater and storm water.

Glossary

Community

In the wastewater treatment sense, a group of residences, businesses, and/or industries sharing a common treatment and/or conveyance facility.

Confined Animal Facility (Feedlot)

A facility for the controlled feeding of animals that tends to concentrate large amounts of animal waste that cannot be absorbed by the soil and hence may be carried to nearby streams or lakes by rainfall runoff. Facilities with less than 1,000 AU are generally considered nonpoint sources. Facilities with more than 1,000 AU or facilities with water quality problems which discharge directly to waters of the United States are considered point sources and are regulated through NPDES permitting.

Conservation Practice Group

A combination of practices identified by the Farm Services Agency of the USDA to address erosion control and water quality for agricultural land.

Conveyance Needs

The cost estimate to construct, expand, or upgrade sewer systems for transporting wastewater to treatment facilities. See Categories of Needs: Categories IVA and IVB.

Designated Use

The use designated to a stream or body of water which subsequently dictates the water quality standards necessary to meet that use.

Design Year Needs

The cost estimate for building publicly owned wastewater treatment facilities eligible for assistance under the CWA to serve the population expected within 20 years. For the 1996 CWNS, the design year is 2016.

Drainage Basin

See Watershed.

Estuarine Protection

Activities necessary to develop and implement Comprehensive Conservation and Management Plans (CCMP) for protecting estuaries under the National Estuary Program. Estuarine protection activities focus on restoring and maintaining the chemical, physical, and biological integrity of the estuary and controlling nonpoint sources of pollution.

Glossary

Eutrophication

The process whereby a waterbody becomes rich in organic nutrients, particularly phosphate and nitrate, that promote the growth of algae. The rapid growth of algae depletes the waterbody of oxygen and impedes the survival of other species.

Facilities Plans

Plans and studies that directly relate to the construction of treatment works necessary to comply with the CWA. A facilities plan investigates needs and provides information on the cost effectiveness of alternatives. A recommended plan and an environmental assessment of the recommendations are also presented in a facilities plan. A facilities plan includes a description of the treatment works for which construction drawings and specifications are to be prepared. The description includes preliminary engineering data, cost estimates for design and construction of the treatment works, and a schedule for completion of design and construction.

Fertilizer

Any organic or inorganic material of natural or synthetic origin that is added to soil to supply elements essential to plant growth.

Forest Management Unit (FMU)

A parcel of forest land that is harvested, regenerated, and managed as a single entity. Its area, shape, and boundaries are determined by operational considerations, such as forest cover type, forest age, density of trees, timber merchantability, soil productivity, and presence of natural boundaries, such as ridge tops, streams, and roads.

Ground Water Protection

Activities addressed in a State's ground water protection strategy that must be a part of the nonpoint source management program under Section 319(i) of the CWA to build State institutional capabilities to protect ground water resources from nonpoint sources of contamination. Activities include demonstrations, enforcement, technical assistance, education, and training. Wellhead protection and underground injection control for Class V wells, as well as water conservation programs, may be included.

Headworks

With respect to a treatment facility, the initial component into which the influent wastewater flows.

Glossary

Herbicide

A chemical substance designed to kill or inhibit the growth of plants, especially weeds.

Hydromodification

Alteration of the hydrologic characteristics of coastal and noncoastal waters, which in turn could cause degradation of water resources. In the case of a stream channel this is the process whereby a stream bank is eroded by flowing water. This typically results in the suspension of sediments in the water course.

Infiltration/Inflow Correction

See Categories of Needs: Category IIIA.

Interceptor Sewers

See Categories of Needs: Category IVB.

Lagoon

With respect to wastewater treatment, a pond in which algae, sunlight, and oxygen interact to restore wastewater to a quality often equal to that of the effluent from the secondary treatment stage. Lagoons are widely used by small communities to provide wastewater treatment.

Municipal Separate Storm Sewer System (MS4)

Any pipe, ditch or gully, or system of pipes, ditches, or gullies, that is owned or operated by a governmental entity and used for collecting and conveying storm water.

National Pollutant Discharge Elimination System (NPDES)

A provision of the CWA that prohibits discharge of pollutants into waters of the United States unless a special permit is issued by EPA, a State, or (where delegated) a Tribal government on an Indian reservation.

National Resources Inventory (NRI)

A national database for all non-Federal rural lands that provides information on the status, condition, and trends of soil, water, and related resources.

Needs

The estimated costs for constructing publicly owned wastewater conveyance or treatment facilities or funding activities that are eligible for SRF assistance under the CWA.

Glossary

Needs for Traditional Eligibilities (Categories I-V)

Documented cost estimates for the seven categories of needs for publicly owned wastewater conveyance and treatment facilities (Categories I, II, IIIA, IIIB, IVA, IVB and V). These needs are limited to the costs eligible for Federal financial assistance under Title II of the CWA. See also Categories of Needs.

Nonpoint Sources

Pollution sources that are diffuse and do not have a single point of origin or are not introduced into a receiving stream from a specific outlet. The pollutants are generally carried off the land by storm water runoff. Sources of NPS pollution include runoff from agriculture, silviculture, urban development, mining, construction, dams and channels, inappropriate land disposal of waste, marinas, and saltwater intrusion.

Nutrient

An element or compound which is essential for growth and development of an organism: for example, carbon, nitrogen, or phosphorus.

Pesticide

Any chemical agent used for control of plant or animal pests. Pesticides include insecticides, herbicides, fungicides, nematocides, and rodenticides.

Point Source

A pollution source that has a single point of origin or is introduced into a receiving stream from a specific outlet. Wastewater treatment plant outfalls and CSO points of discharge are typically point sources of pollution.

Primary Treatment

The first stage of wastewater treatment, including removal of floating debris and solids by screening and sedimentation.

Publicly Owned Treatment Works

A wastewater treatment facility owned by a public entity, such as a city, a county, or a special sanitary district.

Redocumentation

The process by which documentation dated prior to 1990 supporting an individual facility's needs in excess of \$5 million was updated and/or revised for the 1996 CWNS.

Glossary

Replacement/Rehabilitation of Sewers

See Categories of Needs: Category IIIB.

Riparian Vegetation

Vegetation that is present on the banks of a river or stream or on the shore of a lake.

Sanitary Sewer

A sewer designed to carry only domestic sanitary sewage and no storm water.

Sanitary Sewer Overflow (SSO)

A discharge of raw domestic sewage from a separate sewer system before the headworks of a wastewater treatment facility.

Secondary Treatment

See Categories of Needs: Category I.

Separate Sewer System/Sanitary Sewer System

A sewer system, designed to exclude storm water, used to convey domestic sanitary wastewater.

Separate State Estimates (SSEs)

Needs that are not included in the 1996 EPA estimates for the CWNS because they are justified with documents other than the established documentation types or they have no written documentation.

Silviculture

Care and cultivation of forest trees (e.g., forestry).

Small Community

A community with less than 10,000 population and total wastewater flow of less than 1 mgd.

State Revolving Fund (SRF)

A State-managed revolving fund providing loans for specific water pollution control purposes. Under the SRF program, States and municipalities are primarily responsible for financing, constructing, and managing wastewater treatment facilities. The SRF program is based on the 1987 Amendments to the CWA which replaced the Construction Grants program with the SRF program.

Glossary

Storm Sewer

A sewer carrying only runoff from storm events.

Storm Water

Runoff water resulting from precipitation. See Categories of Needs: Category VI.

Total Suspended Solids (TSS)

A measure of the amount of small, particulate solid pollutants that are suspended in wastewater.

Treatment Facility

A structure designed to treat wastewater, storm water, or combined sewer overflows prior to discharging to the environment. Treatment is accomplished by subjecting the wastewater to a combination of physical, chemical, and/or biological processes that reduce the concentration of contaminants.

Urban Runoff

Wet weather runoff from urbanized areas not included in the Phase I Storm Water Permit program. Includes potential Phase II Storm Water discharges, hydromodification, runoff from construction activities, and runoff from marinas.

Wastewater

Dissolved or suspended waterborne waste material. Sanitary or domestic wastewater refers to liquid material collected from residences, offices, and institutions. Industrial wastewater refers to wastewater from manufacturing facilities. Municipal wastewater is a general term applied to any liquid treated in a municipal treatment facility and usually includes a mixture of sanitary and pretreated industrial wastes.

Wastewater Infrastructure

The pipes and appurtenances for the collection, treatment, and disposal of sewage in a community. The level of treatment will depend on the size of the community, the type of discharge, and/or the designated use of the receiving water.

Water Quality Criteria

Specific levels of water quality that, if achieved, are expected to render a body of water suitable for its designated use. The criteria are based on specific levels of pollutants that would make the water harmful if used for drinking, swimming, farming, fish production, or industrial processes.

Glossary

Water Quality Standards

State-adopted and EPA-approved ambient standards for waterbodies. The standards cover the use of the waterbody and the water quality criteria that must be met to protect the designated use or uses.

Watershed

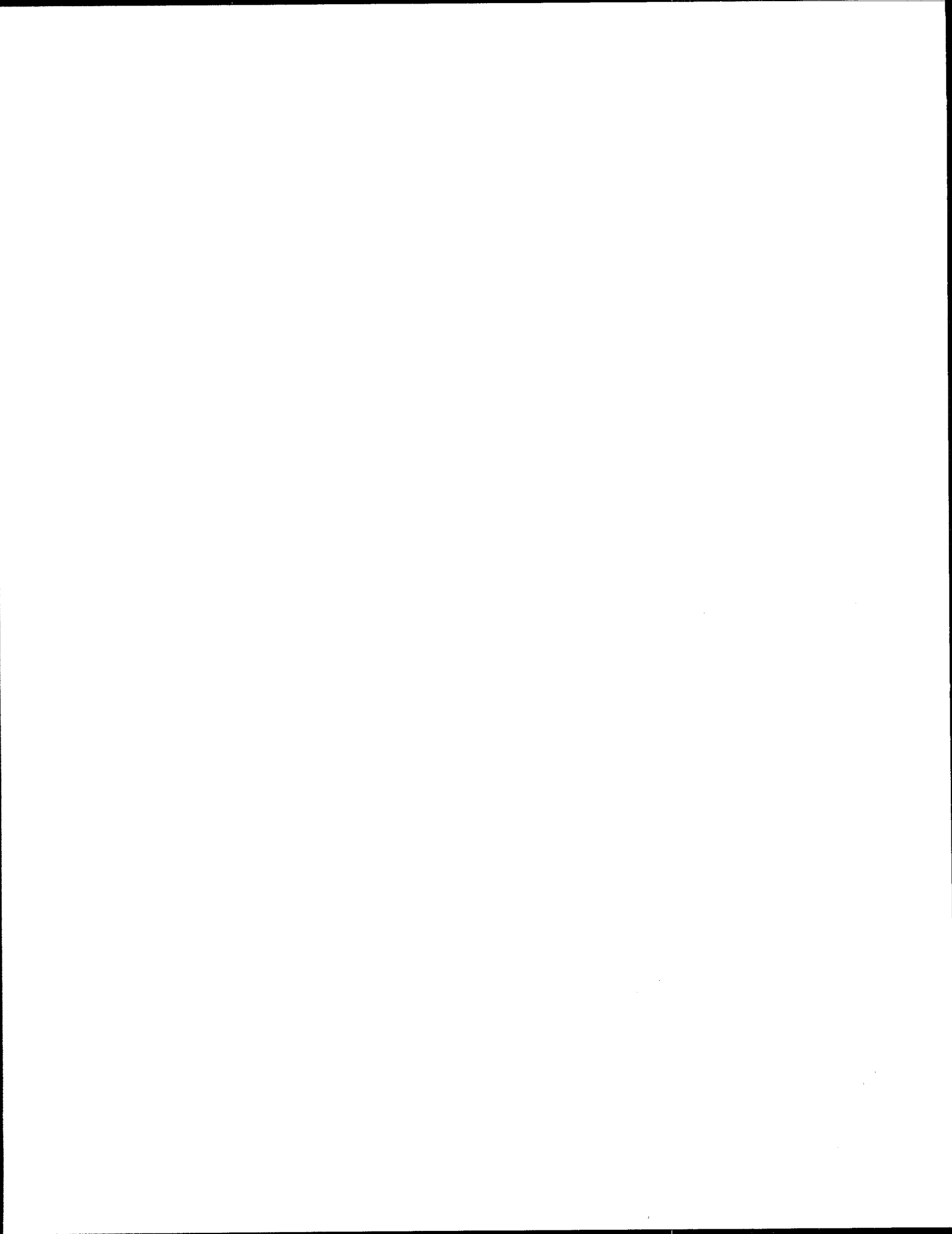
A geographic area in which water, sediments, and dissolved materials drain to a common outlet, typically a point on a larger stream, a lake, an underlying aquifer, an estuary, or an ocean. A watershed is also sometimes referred to as the "drainage basin" of the receiving waterbody.

Wetlands Protection

Activities to protect and restore wetlands that are an integral part of a nonpoint source management program or part of implementation or development of comprehensive estuary conservation and management plans.

List of Acronyms

AU	Animal Unit
BMP	Best Management Practice
BMS	Best Management System
BOD	Biochemical Oxygen Demand
CCMP	Comprehensive Conservation and Management Plan
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CRP	Conservation Reserve Program
CSO	Combined Sewer Overflow
CWA	Clean Water Act
CWNS	Clean Water Needs Survey
CZARA	Coastal Zone Act Reauthorization Amendments
DWNS	Drinking Water Needs Survey
EPA	Environmental Protection Agency
FMU	Forest Management Unit
I/I	Infiltration and Inflow
MCP	Municipal Compliance Plan
mgd	Million Gallons per Day
MS4	Municipal Separate Storm Sewer System
NPDES	National Pollutant Discharge Elimination System
NPS	Nonpoint Source
NRI	National Resources Inventory
O&M	Operation and Maintenance
RCRA	Resource Conservation and Recovery Act
SDWA	Safe Drinking Water Act
SRCS	Sacramento Regional County Sanitation District
SRF	State Revolving Fund
SSE	Separate State Estimate
SSS	Sewer System Evaluation Survey
SSO	Sanitary Sewer Overflow
SW	Storm Water
TSS	Total Suspended Solids
USDA	United States Department of Agriculture
USGS	United States Geological Survey
WQI	Watershed Quality Index



Appendices

These Appendices provide detailed information on costs, operational treatment facilities, and documentation criteria. Appendix A presents cost data by State from the 1996 CWNS. Appendix B contains cost data by State from the 1992 CWNS. Appendix C contains selected technical data from the 1996 CWNS. Appendix D contains a summary of acceptable documentation for the 1996 CWNS.

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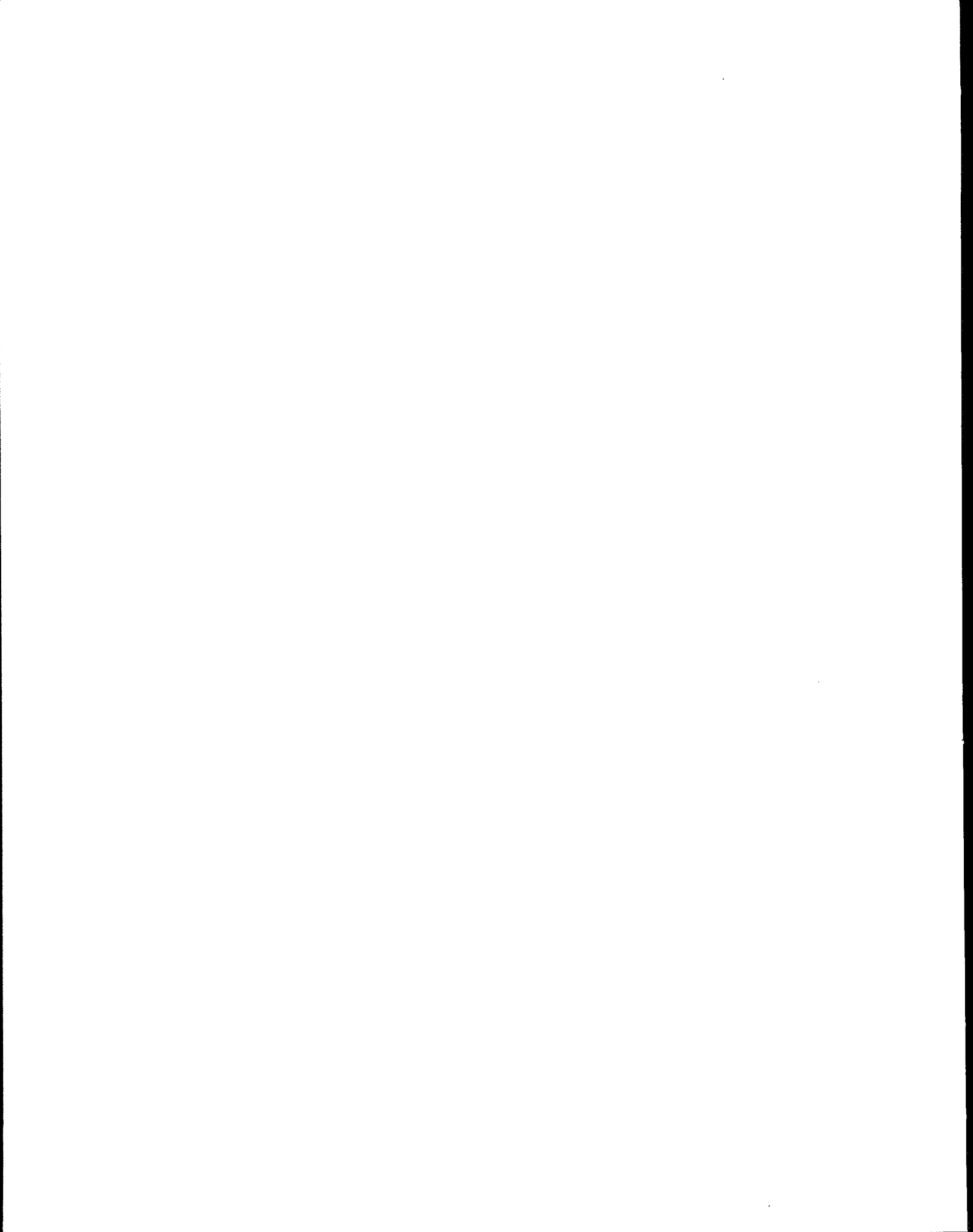
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Appendix A:

Summary of 1996 CWNS Cost Estimates

Table A-1

1996 Clean Water Needs Survey[†]
 Total Documented and Modeled Needs for Publicly Owned Wastewater Treatment Facilities
 And Other SRF Eligibilities
 (January 1996 Dollars in Millions)

Table A-1 summarizes the 1996 EPA assessment of total documented and modeled needs by State for traditional and other SRF eligibilities to satisfy the design year (2016) population. All values are presented in millions of January 1996 dollars.

The total documented and modeled needs represent the capital investment necessary to build publicly owned wastewater treatment facilities (Categories I through V) needed to serve the design year population and satisfy other types of needs eligible for funding under the SRF program. These other eligible needs are storm water (Category VI) and nonpoint source pollution control (Category VII), which includes ground water, estuarine, and wetlands protection. These needs include all planning, design, and construction activities eligible for funding under Title II and Title VI of the Clean Water Act.

Needs estimates presented in Table A-1 may vary slightly from those presented in Figure 1 and in Tables 1, 2, and 3 due to independent rounding and exclusion of modeled needs.

State	Total	Category of Need									Total (I - V)
		I	II	IIIA	IIIB	IVA	IVB	V	VI	VII	
Alabama	1,458	166	98	4	242	145	133	0	327	343	788
Alaska	648	395	0	0*	33	36	0	16	28	140	480
Arizona	2,520	729	551	9	68	607	186	0	136	234	2,150
Arkansas	581	120	20	10	37	45	30	0	36	283	262
California	11,482	4,975	1,824	37	983	230	627	1,094	1,200	512	9,770
Colorado	652	132	221	2	53	24	9	12	107	92	453
Connecticut	1,788	253	693	42	12	173	154	437	10	14	1,764
Delaware	267	22	10	2	1	37	32	112	43	8	216
Dist. of Columbia	624	70	20	0	0	0	0	444	18	72	534
Florida	6,258	1,253	1,603	11	160	879	740	0	1,158	454	4,646
Georgia	2,278	121	766	29	15	28	212	367	454	286	1,538
Hawaii	910	235	0	0	458	69	70	0	51	27	832
Idaho	441	153	16	1	11	54	78	0	9	119	313
Illinois	11,228	486	237	55	364	174	265	9,383	9	255	10,964
Indiana	5,267	130	78	40	25	114	89	4,463	110	218	4,939
Iowa	1,245	137	24	25	31	76	53	475	33	391	821
Kansas	1,669	231	143	126	33	54	260	531	101	190	1,378
Kentucky	2,502	492	26	108	89	404	340	838	71	134	2,297
Louisiana	1,073	164	155	30	164	127	74	0	172	187	714
Maine	901	110	4	23	12	76	45	488	0	143	758
Maryland	1,676	317	219	8	141	205	222	114	302	148	1,226
Massachusetts	3,746	815	51	45	36	400	341	2,023	18	17	3,711
Michigan	5,143	631	12	14	78	151	327	3,723	34	173	4,936
Minnesota	1,125	453	28	34	70	94	75	26	25	320	780
Mississippi	1,138	233	81	83	67	189	133	0	38	314	786
Missouri	3,199	504	29	255	237	135	257	887	162	733	2,304
Montana	303	48	4	6	13	26	10	1	0	195	108

Table A-1 — Continued

1996 Clean Water Needs Survey[†]
 Total Documented and Modeled Needs for Publicly Owned Wastewater Treatment Facilities
 And Other SRF Eligibilities
 (January 1996 Dollars in Millions)

State	Total	Category of Need									Total (I - V)
		I	II	IIIA	IIIB	IVA	IVB	V	VI	VII	
Nebraska	750	112	40	6	6	15	96	245	25	205	520
Nevada	84	9	0	2	3	6	16	0	38	10	36
New Hampshire	765	73	28	8	16	41	161	415	0	23	742
New Jersey	6,958	1,984	257	248	247	745	351	3,016	0	110	6,848
New Mexico	242	47	29	4	27	36	11	0	19	69	154
New York	15,956	3,377	5,955	74	1,166	327	351	3,990	80	636	15,240
North Carolina	4,131	278	1,134	136	81	1,206	918	1	161	216	3,754
North Dakota	238	64	0	0	20	0	1	0	0	153	85
Ohio	7,403	830	248	748	191	358	534	4,199	97	198	7,108
Oklahoma	698	71	76	95	17	13	46	0	199	181	318
Oregon	2,492	605	291	63	109	64	57	682	129	492	1,871
Pennsylvania	6,302	926	161	15	42	701	185	3,978	46	248	6,008
Rhode Island	1,209	125	59	2	24	328	147	517	0	7	1,202
South Carolina	1,753	582	258	15	28	265	376	0	85	144	1,524
South Dakota	304	36	1	0*	26	12	17	14	7	191	106
Tennessee	1,313	143	65	57	138	136	214	99	281	180	852
Texas	6,351	1,366	732	519	873	354	884	0	895	728	4,728
Utah	429	136	0	0	27	81	59	0	32	94	303
Vermont	362	49	53	3	1	35	14	162	0	45	317
Virginia	4,311	740	1,066	155	160	514	577	556	385	158	3,768
Washington	1,710	284	5	81	19	55	136	540	207	383	1,120
West Virginia	1,686	241	23	28	27	300	258	772	0	37	1,649
Wisconsin	2,285	418	102	33	257	259	176	53	30	957	1,298
Wyoming	80	16	9	1	3	5	4	0	0	42	38
Amer. Samoa	41	5	0	0	0	32	4	0	0	0	41
Guam	48	36	0	0*	0	7	5	0	0	0	48
No. Marianas	49	25	0	0	0*	6	18	0	0	0	49
Puerto Rico	1,304	515	3	40	18	335	393	0	0	0	1,304
Virgin Islands	91	70	0	1	20	0	0	0	0	0	91
Total	139,467	26,538	17,508	3,333	6,979	10,788	10,771	44,673	7,368	11,509	120,590

Categories:	I	Secondary Treatment	IVB	New Interceptor Sewers
	II	Advanced Treatment	V	Combined Sewer Overflows
	IIIA	Infiltration/Inflow Correction	VI	Storm Water
	IIIB	Sewer Replacement/Rehabilitation	VII	Nonpoint Sources
	IVA	New Collector Sewers		

† Palau not considered in 1996 CWNS due to free association.

* Estimate is less than \$0.5 million.

Table A-2

1996 Clean Water Needs Survey[†]
 Total Documented Needs for Publicly Owned Wastewater Treatment Facilities and Other SRF Eligibilities
 (January 1996 Dollars in Millions)

Table A-2 summarizes the 1996 EPA assessment of total documented needs by State for traditional and other SRF eligibilities to satisfy the design year (2016) population. All values are presented in millions of January 1996 dollars.

The total documented needs represent the capital investment necessary to build publicly owned wastewater treatment facilities (Categories I through V) needed to serve the design year population and satisfy other types of needs eligible for funding under the SRF program. These other eligible needs are storm water (Category VI) and nonpoint source pollution control (Category VII), which includes ground water, estuarine, and wetlands protection. These needs include all planning, design, and construction activities eligible for funding under Title II and Title VI of the Clean Water Act.

Needs estimates presented in Table A-2 may vary slightly from those presented in Figure 1 and in Tables 1, 2, and 3 due to independent rounding and exclusion of modeled needs.

State	Category of Need										Total (I - V)
	Total	I	II	IIIA	IIIB	IVA	IVB	V	VI	VII	
Alabama	788	166	98	4	242	145	133	0	0	0	788
Alaska	486	395	0	0*	33	36	0	16	0	6	480
Arizona	2,231	729	551	9	68	607	186	0	49	32	2,150
Arkansas	262	120	20	10	37	45	30	0	0	0	262
California	11,767	4,975	1,824	37	983	230	627	1,094	1,986	11	9,770
Colorado	456	132	221	2	53	24	9	12	0*	3	453
Connecticut	1,764	253	693	42	12	173	154	437	0	0	1,764
Delaware	216	22	10	2	1	37	32	112	0	0	216
Dist. of Columbia	606	70	20	0	0	0	0	444	0	72	534
Florida	5,363	1,253	1,603	11	160	879	740	0	419	298	4,646
Georgia	1,538	121	766	29	15	28	212	367	0	0	1,538
Hawaii	832	235	0	0	458	69	70	0	0	0	832
Idaho	313	153	16	1	11	54	78	0	0	0	313
Illinois	11,007	486	237	55	364	174	265	9,383	0	43	10,964
Indiana	4,939	130	78	40	25	114	89	4,463	0	0	4,939
Iowa	849	137	24	25	31	76	53	475	28	0	821
Kansas	1,378	231	143	126	33	54	260	531	0	0	1,378
Kentucky	2,306	492	26	108	89	404	340	838	9	0	2,297
Louisiana	714	164	155	30	164	127	74	0	0	0	714
Maine	759	110	4	23	12	76	45	488	0	1	758
Maryland	1,370	317	219	8	141	205	222	114	38	106	1,226
Massachusetts	3,713	815	51	45	36	400	341	2,023	1	1	3,711
Michigan	4,936	631	12	14	78	151	327	3,723	0	0	4,936
Minnesota	807	453	28	34	70	94	75	26	0	27	780
Mississippi	786	233	81	83	67	189	133	0	0	0*	786
Missouri	2,803	504	29	255	237	135	257	887	19	480	2,304
Montana	118	48	4	6	13	26	10	1	3	7	108

Table A-2 — Continued

1996 Clean Water Needs Survey[†]Total Documented Needs for Publicly Owned Wastewater Treatment Facilities and Other SRF Eligibilities
(January 1996 Dollars in Millions)

State	Total	Category of Need									Total (I - V)
		I	II	IIIA	IIIB	IVA	IVB	V	VI	VII	
Nebraska	560	112	40	6	6	15	96	245	35	5	520
Nevada	36	9	0	2	3	6	16	0	0	0	36
New Hampshire	742	73	28	8	16	41	161	415	0	0	742
New Jersey	6,935	1,984	257	248	247	745	351	3,016	0	87	6,848
New Mexico	161	47	29	4	27	36	11	0	0	7	154
New York	15,863	3,377	5,955	74	1,166	327	351	3,990	30	593	15,240
North Carolina	3,931	278	1,134	136	81	1,206	918	1	160	17	3,754
North Dakota	93	64	0	0	20	0	1	0	0*	8	85
Ohio	7,254	830	248	748	191	358	534	4,199	129	17	7,108
Oklahoma	318	71	76	95	17	13	46	0	0	0	318
Oregon	1,919	605	291	63	109	64	57	682	45	3	1,871
Pennsylvania	6,055	926	161	15	42	701	185	3,978	15	32	6,008
Rhode Island	1,208	125	59	2	24	328	147	517	0*	6	1,202
South Carolina	1,539	582	258	15	28	265	376	0	8	7	1,524
South Dakota	128	36	1	0*	26	12	17	14	22	0	106
Tennessee	866	143	65	57	138	136	214	99	0	14	852
Texas	4,728	1,366	732	519	873	354	884	0	0	0	4,728
Utah	307	136	0	0	27	81	59	0	4	0	303
Vermont	317	49	53	3	1	35	14	162	0	0	317
Virginia	3,931	740	1,066	155	160	514	577	556	163	0	3,768
Washington	1,164	284	5	81	19	55	136	540	31	13	1,120
West Virginia	1,649	241	23	28	27	300	258	772	0	0	1,649
Wisconsin	2,024	418	102	33	257	259	176	53	35	691	1,298
Wyoming	38	16	9	1	3	5	4	0	0	0	38
Amer. Samoa	41	5	0	0	0	32	4	0	0	0	41
Guam	48	36	0	0*	0	7	5	0	0	0	48
No. Marianas	49	25	0	0	0*	6	18	0	0	0	49
Puerto Rico	1,304	515	3	40	18	335	393	0	0	0	1,304
Virgin Islands	91	70	0	1	20	0	0	0	0	0	91
Total	126,406	26,538	17,508	3,333	6,979	10,788	10,771	44,673	3,229	2,587	120,590

Categories:	I	Secondary Treatment	IVB	New Interceptor Sewers
	II	Advanced Treatment	V	Combined Sewer Overflows
	IIIA	Infiltration/Inflow Correction	VI	Storm Water
	IIIB	Sewer Replacement/Rehabilitation	VII	Nonpoint Sources (see Table A-3 for totals by subcategory)
	IVA	New Collector Sewers		

[†] Palau not considered in 1996 CWNS due to free association.

* Estimate is less than \$0.5 million.

Table A-3

1996 Clean Water Needs Survey[†]
 Documented Needs for Nonpoint Source SRF-Eligible Projects
 (January 1996 Dollars in Millions)

Table A-3 summarizes the 1996 EPA assessment of documented needs for the Nonpoint Source (NPS) SRF eligibilities by State. All values are presented in millions of January 1996 dollars.

The documented needs for the SRF-eligible projects represent the capital investment necessary to implement activities in approved State NPS Management Plans under Section 319 and to develop and implement conservation and management plans under Section 320 (National Estuary Program) of the Clean Water Act. These needs have met the established documentation criteria and are eligible for funding under Title VI of the Clean Water Act.

Needs estimates presented in Table A-3 may vary slightly from those presented in Figure 1 and in Tables 1, 2, and 3 due to independent rounding and exclusion of modeled needs.

State	<u>Category VII Needs</u>							Total
	A	B	C	D	E	F	G	
Alabama	0	0	0	0	0	0	0	0
Alaska	0	0	0	0	6	0	0	6
Arizona	22	1	0*	5	0*	0	4	32
Arkansas	0	0	0	0	0	0	0	0
California	0	0	0	0	11	0	0	11
Colorado	1	0*	0	2	0	0	0	3
Connecticut	0	0	0	0	0	0	0	0
Delaware	0	0	0	0	0	0	0	0
Dist. of Columbia	0	0	0	72	0	0	0	72
Florida	0	0	0	298	0	0	0	298
Georgia	0	0	0	0	0	0	0	0
Hawaii	0	0	0	0	0	0	0	0
Idaho	0	0	0	0	0	0	0	0
Illinois	43	0	0	0	0	0	0	43
Indiana	0	0	0	0	0	0	0	0
Iowa	0	0	0	0	0	0	0	0
Kansas	0	0	0	0	0	0	0	0
Kentucky	0	0	0	0	0	0	0	0
Louisiana	0	0	0	0	0	0	0	0
Maine	0	0	0	1	0	0	0	1
Maryland	0	0	0	1	105	0	0	106
Massachusetts	0	0	0	1	0	0	0	1
Michigan	0	0	0	0	0	0	0	0
Minnesota	14	10	0	1	1	0	1	27
Mississippi	0	0	0	0*	0	0	0	0*
Missouri	6	15	5	4	450	0	0*	480
Montana	0	0	0	0	7	0	0	7

1996 Clean Water Needs Survey[†]
Documented Needs for Nonpoint Source SRF-Eligible Projects
(January 1996 Dollars in Millions)

	Category VII Needs							
State	A	B	C	D	E	F	G	Total
Nebraska	0	0	0	0*	5	0	0	5
Nevada	0	0	0	0	0	0	0	0
New Hampshire	0	0	0	0	0	0	0	0
New Jersey	0*	0	0	67	4	16	0	87
New Mexico	0	0	0	0	7	0	0	7
New York	12	12	168	1	400	0	0	593
North Carolina	0	0	0	6	0	11	0	17
North Dakota	0	0	0	5	3	0	0	8
Ohio	7	8	1	1	0*	0	0	17
Oklahoma	0	0	0	0	0	0	0	0
Oregon	0	0	0	0*	0*	0	3	3
Pennsylvania	16	16	0	0	0	0	0	32
Rhode Island	0	0	0	2	4	0	0	6
South Carolina	0	0	0	6	0	0	1	7
South Dakota	0	0	0	0	0	0	0	0
Tennessee	13	1	0	0	0	0	0	14
Texas	0	0	0	0	0	0	0	0
Utah	0	0	0	0	0	0	0	0
Vermont	0	0	0	0	0	0	0	0
Virginia	0	0	0	0	0	0	0	0
Washington	0	0	0	8	0*	5	0	13
West Virginia	0	0	0	0	0	0	0	0
Wisconsin	60	97	0	523	9	0	2	691
Wyoming	0	0	0	0	0	0	0	0
Amer. Samoa	0	0	0	0	0	0	0	0
Guam	0	0	0	0	0	0	0	0
No. Marianas	0	0	0	0	0	0	0	0
Puerto Rico	0	0	0	0	0	0	0	0
Virgin Islands	0	0	0	0	0	0	0	0
Total	194	160	174	1,004	1,012	32	11	2,587

- A Agriculture (cropland)
- B Agriculture (confined animal facilities)
- C Silviculture
- D Urban Runoff

E	Ground Water
F	Estuaries
G	Wetlands

* Estimate is less than \$0.5 million.

Table A-4

1996 Clean Water Needs Survey
Modeled Needs for Storm Water
(January 1996 Dollars in Millions)

Table A-4 summarizes the 1996 EPA assessment of modeled needs estimates, by State, for the Phase I Storm Water Program.

The modeled needs for Storm Water represent the estimated capital investment necessary for municipalities of the nation to meet the requirements of the Phase I Storm Water Program.

Needs estimates presented in Table A-4 may vary slightly from those presented in Figure 1 and in Tables 1 and 3 due to independent rounding.

State	Category VI Modeled Needs	State	Category VI Modeled Needs
Alabama	327	Nevada	38
Alaska	28	New Hampshire	*
Arizona	136	New Jersey	*
Arkansas	36	New Mexico	19
California	1,200	New York	80
Colorado	107	North Carolina	161
Connecticut	10	North Dakota	*
Delaware	43	Ohio	97
Dist. of Columbia	18	Oklahoma	199
Florida	1,158	Oregon	129
Georgia	454	Pennsylvania	46
Hawaii	51	Rhode Island	*
Idaho	9	South Carolina	85
Illinois	9	South Dakota	7
Indiana	110	Tennessee	281
Iowa	33	Texas	895
Kansas	101	Utah	32
Kentucky	71	Vermont	*
Louisiana	172	Virginia	385
Maine	*	Washington	207
Maryland	302	West Virginia	*
Massachusetts	18	Wisconsin	30
Michigan	34	Wyoming	*
Minnesota	25	Amer. Samoa	*
Mississippi	38	Guam	*
Missouri	162	No. Marianas	*
Montana	*	Puerto Rico	*
Nebraska	25	Virgin Islands	*
		Total	7,368

* States and territories with no municipal separate storm sewer systems regulated under Phase I of the NPDES Storm Water Program.

Table A-5

1996 Clean Water Needs Survey
Modeled Needs for Nonpoint Source Pollution Control
(Agriculture, Confined Animal Facilities, and Silviculture)
(January 1996 Dollars in Millions)

Table A-5 summarizes modeled estimates of needs by State for controlling nonpoint source pollution from agricultural land, confined animal facilities, and silviculture.

NPS needs estimates presented in Table A-5 may vary slightly from those presented in Figure 1 and in Tables 1, 3, and 6 due to independent rounding.

State	Agri-cultural Land	Confined Animal Facilities	Silvi-culture	Total	State	Agri-cultural Land	Confined Animal Facilities	Silvi-culture	Total
Alabama	39	21	283	343	Nevada	9	1	0*	10
Alaska	0	0*	134	134	New Hampshire	1	3	19	23
Arizona	208	3	14	225	New Jersey	16	5	2	23
Arkansas	79	31	173	283	New Mexico	46	4	12	62
California	142	92	267	501	New York	53	112	70	235
Colorado	70	13	7	90	North Carolina	49	34	116	199
Connecticut	3	6	5	14	North Dakota	127	18	0*	145
Delaware	4	4	0*	8	Ohio	102	75	20	197
Dist. of Columbia	—	—	—	—	Oklahoma	89	28	64	181
Florida	29	21	106	156	Oregon	218	18	253	489
Georgia	45	32	209	286	Pennsylvania	52	131	65	248
Hawaii	24	3	0	27	Rhode Island	0*	1	0*	1
Idaho	47	15	57	119	South Carolina	19	12	106	137
Illinois	158	84	13	255	South Dakota	142	45	4	191
Indiana	135	66	17	218	Tennessee	50	39	91	180
Iowa	183	205	3	391	Texas	495	87	146	728
Kansas	147	42	1	190	Utah	84	8	2	94
Kentucky	65	47	22	134	Vermont	5	20	20	45
Louisiana	49	22	116	187	Virginia	37	31	90	158
Maine	4	7	131	142	Washington	54	32	284	370
Maryland	16	20	6	42	West Virginia	15	7	15	37
Massachusetts	3	6	7	16	Wisconsin	74	274	75	423
Michigan	53	58	62	173	Wyoming	28	3	11	42
Minnesota	127	144	46	317	Amer. Samoa	—	—	—	—
Mississippi	48	21	245	314	Guam	—	—	—	—
Missouri	139	85	55	279	No. Marianas	—	—	—	—
Montana	113	7	68	188	Puerto Rico	—	—	—	—
Nebraska	132	67	1	200	Virgin Islands	—	—	—	—
Total						3,827	2,110	3,513	9,450

* Estimate is less than \$0.5 million.

— Not modeled (Puerto Rico and the territories were not modeled because of the lack of information on the cost of nonpoint source controls in these unique climates).

Table A-6

1996 Clean Water Needs Survey[†]
Comparison of Small Community Facilities and Needs to the Nation
(January 1996 Dollars in Millions)

Table A-6 provides a summary of all publicly owned small community wastewater collection and treatment facilities identified in the 1996 CWNS by State, and the capital investment needed to satisfy the design year (2016) population served by these facilities, as well as any associated Separate State Estimates (SSEs).

The facilities summary presents the total number of facilities that will serve small communities when all documented needs are met, the total number of these facilities reporting documented needs, and their respective percentage of the relative total facilities within each State. The needs summary presents the total documented needs (Categories I - VII) for these small community wastewater treatment and collection facilities, and their reported SSEs. The small community percentages are derived from the total documented and SSEs needs reported for each State, including needs for SRF-eligible projects unassociated with treatment and collection facilities.

Needs estimates presented in Table A-6 may vary slightly from those presented in Figures 6 and 9 due to independent rounding.

State	<u>Facilities</u>				<u>Needs</u>			
	Small Community Percent of Total Facilities When All Documented Needs Are Met		Small Community Percent of Total Facilities with Documented Needs		Small Community Documented Needs as Percent of Total Documented Needs		Small Community Separate State Estimates as Percent of Total SSEs	
	Number	Percent	Number	Percent	\$ Million	Percent	\$ Million	Percent
Alabama	357	71%	233	81%	253	32%	0	0%
Alaska	165	91%	135	94%	257	53%	12	48%
Arizona	325	61%	75	36%	192	9%	2	1%
Arkansas	676	87%	151	86%	145	55%	423	59%
California	526	54%	182	52%	340	3%	78	3%
Colorado	269	64%	107	68%	124	27%	1	2%
Connecticut	92	42%	25	25%	79	4%	0	0%
Delaware	75	71%	19	53%	37	17%	53	41%
Dist. of Columbia	0	0%	0	0%	0	0%	0	0%
Florida	96	20%	25	12%	49	1%	0	0%
Georgia	582	73%	88	49%	84	5%	33	6%
Hawaii	11	32%	4	24%	17	2%	103	8%
Idaho	210	85%	55	66%	74	24%	126	77%
Illinois	811	63%	358	55%	616	6%	17	2%
Indiana	396	75%	281	73%	647	13%	72	8%
Iowa	897	91%	63	63%	71	8%	1	4%
Kansas	614	89%	183	75%	135	10%	17	27%
Kentucky	359	73%	219	70%	377	16%	171	50%
Louisiana	439	75%	201	78%	245	34%	117	22%
Maine	164	76%	67	61%	205	27%	74	10%
Maryland	212	49%	112	40%	96	7%	0*	0%
Massachusetts	96	34%	46	25%	169	5%	205	9%
Michigan	512	65%	126	59%	294	6%	5	19%
Minnesota	676	82%	230	77%	254	31%	63	39%
Mississippi	640	87%	298	84%	309	39%	58	25%
Missouri	788	70%	218	54%	244	9%	178	16%
Montana	196	84%	52	70%	64	54%	24	69%

Table A-6 — Continued

1996 Clean Water Needs Survey[†]
 Comparison of Small Community Facilities and Needs to the Nation
 (January 1996 Dollars in Millions)

State	<u>Facilities</u>				<u>Needs</u>			
	Small Community Percent of Total Facilities When All Documented Needs Are Met		Small Community Percent of Total Facilities with Documented Needs		Small Community Documented Needs as Percent of Total Documented Needs		Small Community Separate State Estimates as Percent of Total SSEs	
	Number	Percent	Number	Percent	\$ Million	Percent	\$ Million	Percent
Nebraska	480	91%	77	72%	41	7%	7	4%
Nevada	55	66%	18	64%	14	39%	17	3%
New Hampshire	65	51%	39	45%	60	8%	72	17%
New Jersey	359	52%	180	45%	492	7%	283	26%
New Mexico	88	66%	25	60%	65	40%	0	0%
New York	1,004	73%	388	65%	699	4%	653	24%
North Carolina	439	53%	316	67%	781	20%	152	4%
North Dakota	372	97%	56	85%	20	22%	0	0%
Ohio	959	70%	426	71%	1,499	21%	288	29%
Oklahoma	449	83%	92	74%	74	23%	23	14%
Oregon	182	67%	42	42%	93	5%	3	14%
Pennsylvania	1,624	75%	596	76%	1,430	24%	906	27%
Rhode Island	4	11%	2	8%	12	1%	0	0%
South Carolina	184	51%	63	35%	82	5%	25	36%
South Dakota	346	96%	70	84%	40	31%	3	33%
Tennessee	247	62%	77	50%	107	12%	204	21%
Texas	1,377	68%	515	67%	589	12%	296	16%
Utah	242	54%	19	35%	36	12%	71	9%
Vermont	96	76%	41	65%	115	36%	41	56%
Virginia	378	68%	202	66%	589	15%	256	62%
Washington	247	63%	82	59%	121	10%	15	2%
West Virginia	632	90%	331	88%	950	58%	931	91%
Wisconsin	868	72%	436	64%	555	27%	53	7%
Wyoming	88	62%	16	53%	8	21%	23	32%
Amer. Samoa	0	0%	0	0%	0	0%	0	0%
Guam	3	43%	0	0%	0	0%	0	0%
No. Marianas	2	40%	2	40%	3	6%	0	0%
Puerto Rico	0	0%	0	0%	0	0%	0	0%
Virgin Islands	9	75%	9	75%	9	10%	0	0%
Total	20,983	71%	7,673	63%	13,861	11%	6,155	18%

[†] Palau not considered in 1996 CWNS due to free association.

* Estimate is less than \$0.5 million.

Table A-7

1996 Clean Water Needs Survey[†]
 Comparison of Small Community Facilities and Needs to the Nation
 (Facilities Serving Populations from 3,500 to 10,000 Persons)
 (January 1996 Dollars in Millions)

Table A-7 provides the subset of Table A-6 data for the needs for small community facilities estimated to be serving populations in the range of 3,500 to 10,000 persons when all documented needs are met.

State	<u>Facilities</u>				<u>Needs</u>			
	Small Community Percent of Total Facilities When All Documented Needs Are Met		Small Community Percent of Total Facilities with Documented Needs		Small Community Documented Needs as Percent of Total Documented Needs		Small Community Separate State Estimates as Percent of Total SSEs	
	Number	Percent	Number	Percent	\$ Million	Percent	\$ Million	Percent
Alabama	48	10%	25	9%	43	5%	0	0%
Alaska	6	3%	5	3%	4	1%	0	0%
Arizona	44	8%	24	12%	126	6%	0*	0%
Arkansas	56	7%	24	14%	34	13%	86	12%
California	123	13%	44	13%	113	1%	38	1%
Colorado	23	5%	5	3%	9	2%	0	0%
Connecticut	43	20%	12	12%	51	3%	0	0%
Delaware	12	11%	6	17%	14	6%	16	12%
Dist. of Columbia	0	0%	0	0%	0	0%	0	0%
Florida	35	7%	11	5%	24	0%	0	0%
Georgia	94	12%	36	20%	41	3%	10	2%
Hawaii	8	24%	3	18%	17	2%	98	7%
Idaho	22	9%	13	16%	19	6%	106	65%
Illinois	131	10%	61	9%	203	2%	3	0%
Indiana	41	8%	29	8%	213	4%	20	2%
Iowa	41	4%	2	2%	2	0%	0	0%
Kansas	31	5%	22	9%	39	3%	1	2%
Kentucky	60	12%	47	15%	128	6%	16	5%
Louisiana	81	14%	30	12%	79	11%	36	7%
Maine	42	19%	19	17%	94	12%	54	7%
Maryland	24	6%	7	2%	24	2%	0	0%
Massachusetts	53	19%	33	18%	129	3%	128	5%
Michigan	118	15%	17	8%	46	1%	0	0%
Minnesota	63	8%	19	6%	45	6%	27	17%
Mississippi	54	7%	38	11%	82	10%	26	11%
Missouri	68	6%	20	5%	52	2%	31	3%
Montana	10	4%	3	4%	6	5%	0	0%

Table A-7 — Continued

1996 Clean Water Needs Survey[†]
 Comparison of Small Community Facilities and Needs to the Nation
 (Facilities Serving Populations from 3,500 to 10,000 Persons)
 (January 1996 Dollars in Millions)

State	<u>Facilities</u>				<u>Needs</u>			
	Small Community Percent of Total Facilities When All Documented Needs Are Met		Small Community Percent of Total Facilities with Documented Needs		Small Community Documented Needs as Percent of Total Documented Needs		Small Community Separate State Estimates as Percent of Total SSEs	
	Number	Percent	Number	Percent	\$ Million	Percent	\$ Million	Percent
Nebraska	21	4%	11	10%	13	2%	2	1%
Nevada	6	7%	1	4%	1	3%	2	0%
New Hampshire	19	15%	16	18%	29	4%	25	6%
New Jersey	188	27%	102	25%	316	5%	194	18%
New Mexico	10	7%	6	14%	16	10%	0	0%
New York	254	19%	91	15%	193	1%	210	8%
North Carolina	99	12%	78	16%	304	8%	63	2%
North Dakota	11	3%	6	9%	1	1%	0	0%
Ohio	156	11%	59	10%	702	10%	140	14%
Oklahoma	59	11%	15	12%	20	6%	4	3%
Oregon	25	9%	11	11%	36	2%	3	14%
Pennsylvania	364	17%	132	17%	491	8%	233	7%
Rhode Island	3	8%	1	4%	11	1%	0	0%
South Carolina	25	7%	11	6%	18	1%	8	11%
South Dakota	11	3%	5	6%	4	3%	2	22%
Tennessee	49	12%	21	14%	44	5%	47	5%
Texas	308	15%	117	15%	220	5%	173	10%
Utah	18	4%	3	6%	7	2%	21	3%
Vermont	19	15%	11	17%	53	17%	20	27%
Virginia	64	12%	45	15%	192	5%	51	12%
Washington	47	12%	13	9%	28	2%	0	0%
West Virginia	34	5%	25	7%	229	14%	112	11%
Wisconsin	48	4%	26	4%	62	3%	16	2%
Wyoming	7	5%	5	17%	3	8%	3	4%
Amer. Samoa	0	0%	0	0%	0	0%	0	0%
Guam	2	29%	0	0%	0	0%	0	0%
No. Marianas	0	0%	0	0%	0	0%	0	0%
Puerto Rico	0	0%	0	0%	0	0%	0	0%
Virgin Islands	1	8%	1	8%	1	1%	0	0%
Total	3,179	11%	1,367	11%	4,631	4%	2,025	6%

[†] Palau not considered in 1996 CWNS due to free association.

* Estimate is less than \$0.5 million.

Table A-8

1996 Clean Water Needs Survey[†]
 Comparison of Small Community Facilities and Needs to the Nation
 (Facilities Serving Populations from 1,000 to 3,500 Persons)
 (January 1996 Dollars in Millions)

Table A-8 provides the subset of Table A-6 data for the needs for small community facilities estimated to be serving populations in the range of 1,000 to 3,500 persons when all documented needs are met.

State	<u>Facilities</u>				<u>Needs</u>			
	Small Community Percent of Total Facilities When All Documented Needs Are Met		Small Community Percent of Total Facilities with Documented Needs		Small Community Documented Needs as Percent of Total Documented Needs		Small Community Separate State Estimates as Percent of Total SSEs	
	Number	Percent	Number	Percent	\$ Million	Percent	\$ Million	Percent
Alabama	152	30%	89	31%	110	14%	0	0%
Alaska	11	6%	6	4%	4	1%	0	0%
Arizona	60	11%	25	12%	45	2%	1	1%
Arkansas	155	20%	61	35%	61	23%	150	21%
California	215	22%	76	22%	170	1%	39	1%
Colorado	102	24%	42	27%	85	19%	0	0%
Connecticut	36	17%	7	7%	16	1%	0	0%
Delaware	20	19%	7	19%	14	6%	12	9%
Dist. of Columbia	0	0%	0	0%	0	0%	0	0%
Florida	50	11%	12	6%	23	0%	0	0%
Georgia	176	22%	34	19%	31	2%	14	3%
Hawaii	3	9%	1	6%	0*	0%	5	0%
Idaho	59	24%	20	24%	28	9%	7	4%
Illinois	334	26%	140	22%	215	2%	12	1%
Indiana	189	36%	143	37%	351	7%	43	5%
Iowa	190	19%	15	15%	45	5%	1	4%
Kansas	165	24%	78	32%	67	5%	14	22%
Kentucky	127	26%	89	28%	153	7%	63	18%
Louisiana	175	30%	75	29%	87	12%	65	12%
Maine	79	37%	35	32%	99	13%	20	3%
Maryland	48	11%	12	4%	13	1%	0	0%
Massachusetts	29	10%	9	5%	32	1%	46	2%
Michigan	258	33%	69	32%	179	4%	3	12%
Minnesota	190	23%	50	17%	77	10%	24	15%
Mississippi	144	20%	83	23%	108	14%	26	11%
Missouri	183	16%	57	14%	77	3%	6	1%
Montana	50	21%	22	30%	35	30%	3	9%

Table A-8 — Continued

1996 Clean Water Needs Survey[†]
 Comparison of Small Community Facilities and Needs to the Nation
 (Facilities Serving Populations from 1,000 to 3,500 Persons)
 (January 1996 Dollars in Millions)

State	<u>Facilities</u>				<u>Needs</u>			
	Small Community Percent of Total Facilities When All Documented Needs Are Met		Small Community Percent of Total Facilities with Documented Needs		Small Community Documented Needs as Percent of Total Documented Needs		Small Community Separate State Estimates as Percent of Total SSEs	
	Number	Percent	Number	Percent	\$ Million	Percent	\$ Million	Percent
Nebraska	117	22%	24	22%	14	3%	4	2%
Nevada	19	23%	6	21%	5	14%	14	3%
New Hampshire	25	20%	16	18%	25	3%	44	10%
New Jersey	135	20%	60	15%	158	2%	82	8%
New Mexico	34	25%	8	19%	7	4%	0	0%
New York	414	30%	162	27%	316	2%	246	9%
North Carolina	188	23%	135	28%	305	8%	64	2%
North Dakota	62	16%	27	41%	15	16%	0	0%
Ohio	337	25%	169	28%	544	7%	97	10%
Oklahoma	170	31%	44	35%	37	12%	8	5%
Oregon	68	25%	15	15%	33	2%	0	0%
Pennsylvania	727	34%	263	34%	693	11%	470	14%
Rhode Island	0	0%	0	0%	0	0%	0	0%
South Carolina	87	24%	40	22%	56	4%	16	23%
South Dakota	61	17%	25	30%	18	14%	1	11%
Tennessee	114	28%	41	27%	52	6%	127	13%
Texas	598	30%	208	27%	230	5%	64	4%
Utah	53	12%	7	13%	19	6%	40	5%
Vermont	50	40%	23	37%	53	17%	21	29%
Virginia	184	33%	93	30%	297	8%	134	33%
Washington	111	28%	34	24%	56	5%	9	1%
West Virginia	187	27%	98	26%	372	23%	387	38%
Wisconsin	267	22%	129	19%	272	13%	21	3%
Wyoming	24	17%	7	23%	3	8%	9	13%
Amer. Samoa	0	0%	0	0%	0	0%	0	0%
Guam	1	14%	0	0%	0	0%	0	0%
No. Marianas	2	40%	2	40%	3	6%	0	0%
Puerto Rico	0	0%	0	0%	0	0%	0	0%
Virgin Islands	5	42%	5	42%	7	8%	0	0%
Total	7,240	24%	2,898	24%	5,715	5%	2,412	7%

[†] Palau not considered in 1996 CWNS due to free association.

* Estimate is less than \$0.5 million.

Table A-9

1996 Clean Water Needs Survey[†]
 Comparison of Small Community Facilities and Needs to the Nation
 (Facilities Serving Populations Under 1,000 Persons)
 (January 1996 Dollars in Millions)

Table A-9 provides the subset of Table A-6 data for the needs for small community facilities estimated to be serving populations under 1,000 persons when all documented needs are met.

State	<u>Facilities</u>				<u>Needs</u>			
	Small Community Percent of Total Facilities When All Documented Needs Are Met		Small Community Percent of Total Facilities with Documented Needs		Small Community Documented Needs as Percent of Total Documented Needs		Small Community Separate State Estimates as Percent of Total SSEs	
	Number	Percent	Number	Percent	\$ Million	Percent	\$ Million	Percent
Alabama	157	31%	119	41%	100	13%	0	0%
Alaska	148	82%	124	86%	249	51%	12	48%
Arizona	221	41%	26	13%	21	1%	1	1%
Arkansas	465	60%	66	38%	50	19%	187	26%
California	188	19%	62	18%	57	0%	1	0%
Colorado	144	34%	60	38%	30	7%	1	2%
Connecticut	13	6%	6	6%	12	1%	0	0%
Delaware	43	41%	6	17%	9	4%	25	19%
Dist. of Columbia	0	0%	0	0%	0	0%	0	0%
Florida	11	2%	2	1%	2	0%	0	0%
Georgia	312	39%	18	10%	12	1%	9	2%
Hawaii	0	0%	0	0%	0	0%	0	0%
Idaho	129	52%	22	27%	27	9%	13	8%
Illinois	346	27%	157	24%	198	2%	2	0%
Indiana	166	31%	109	28%	83	2%	9	1%
Iowa	666	67%	46	46%	24	3%	0*	0%
Kansas	418	61%	83	34%	29	2%	2	3%
Kentucky	172	35%	83	26%	96	4%	92	27%
Louisiana	183	31%	96	37%	79	11%	16	3%
Maine	43	20%	13	12%	12	2%	0	0%
Maryland	140	32%	93	33%	59	4%	0*	0%
Massachusetts	14	5%	4	2%	8	0%	31	1%
Michigan	136	17%	40	19%	69	1%	2	8%
Minnesota	423	51%	161	54%	132	16%	12	7%
Mississippi	442	60%	177	50%	119	15%	6	3%
Missouri	537	48%	141	35%	115	4%	141	13%
Montana	136	58%	27	36%	23	19%	21	60%

Table A-9 — Continued

1996 Clean Water Needs Survey[†]
 Comparison of Small Community Facilities and Needs to the Nation
 (Facilities Serving Populations Under 1,000 Persons)
 (January 1996 Dollars in Millions)

State	<u>Facilities</u>				<u>Needs</u>			
	Small Community Percent of Total Facilities When All Documented Needs Are Met		Small Community Percent of Total Facilities with Documented Needs		Small Community Documented Needs as Percent of Total Documented Needs		Small Community Separate State Estimates as Percent of Total SSEs	
	Number	Percent	Number	Percent	\$ Million	Percent	\$ Million	Percent
Nebraska	342	65%	42	39%	14	3%	1	1%
Nevada	30	36%	11	39%	8	22%	1	0%
New Hampshire	21	17%	7	8%	6	1%	3	1%
New Jersey	36	5%	18	4%	18	0%	7	1%
New Mexico	44	33%	11	26%	42	26%	0	0%
New York	336	24%	135	23%	190	1%	197	7%
North Carolina	152	18%	103	22%	172	4%	25	1%
North Dakota	299	78%	23	35%	4	4%	0	0%
Ohio	466	34%	198	33%	253	3%	51	5%
Oklahoma	220	41%	33	26%	17	5%	11	7%
Oregon	89	33%	16	16%	24	1%	0	0%
Pennsylvania	533	25%	201	26%	246	4%	203	6%
Rhode Island	1	3%	1	4%	1	0%	0	0%
South Carolina	72	20%	12	7%	8	1%	1	1%
South Dakota	274	76%	40	48%	18	14%	0	0%
Tennessee	84	21%	15	10%	11	1%	30	3%
Texas	471	23%	190	25%	139	3%	59	3%
Utah	171	38%	9	17%	10	3%	10	1%
Vermont	27	21%	7	11%	9	3%	0	0%
Virginia	130	23%	64	21%	100	3%	71	17%
Washington	89	23%	35	25%	37	3%	6	1%
West Virginia	411	59%	208	55%	349	21%	432	42%
Wisconsin	553	46%	281	42%	221	11%	16	2%
Wyoming	57	40%	4	13%	2	5%	11	15%
Amer. Samoa	0	0%	0	0%	0	0%	0	0%
Guam	0	0%	0	0%	0	0%	0	0%
No. Marianas	0	0%	0	0%	0	0%	0	0%
Puerto Rico	0	0%	0	0%	0	0%	0	0%
Virgin Islands	3	25%	3	25%	1	1%	0	0%
Total	10,564	36%	3,408	28%	3,515	3%	1,718	5%

[†] Palau not considered in 1996 CWNS due to free association.

* Estimate is less than \$0.5 million.

Table A-10

1996 Clean Water Needs Survey[†]
 Total Small Community Documented Needs for Publicly Owned Wastewater Treatment Facilities
 And Other SRF Eligibilities
 (January 1996 Dollars in Millions)

Table A-10 summarizes the 1996 EPA assessment of documented design year needs for small communities by State. The assessment includes needs for traditional eligibilities (Categories I-V), storm water control (Category VI), and nonpoint sources (Category VII) to satisfy the design year (2016) population living in small communities. The small community needs shown are derived by EPA from the total documented design year needs using criteria as defined in the report section, "What Are the Needs for Small Communities?". All values are presented in millions of January 1996 dollars.

These small community design year needs have met the established documentation criteria and represent the capital investment necessary to build all publicly owned wastewater treatment facilities needed to serve the estimated design year population of small communities. These are the funds necessary to provide adequate wastewater treatment systems and storm water control in compliance with the Clean Water Act for those small communities that could document their needs.

State	Total	Category of Need									Total (I - V)
		I	II	IIIA	IIIB	IVA	IVB	V	VI	VII	
Alabama	253	50	29	1	5	116	52	0	0	0	253
Alaska	257	247	0	0	1	6	0	0	0	3	254
Arizona	192	79	44	0*	12	46	11	0	0	0	192
Arkansas	145	63	13	2	0*	41	26	0	0	0	145
California	340	180	6	11	3	96	43	0	1	0	339
Colorado	124	90	20	2	4	0	8	0	0	0	124
Connecticut	79	15	1	1	0	36	26	0	0	0	79
Delaware	37	5	0	0	0*	20	12	0	0	0	37
Dist. of Columbia	0	0	0	0	0	0	0	0	0	0	0
Florida	49	15	4	6	0	19	5	0	0	0	49
Georgia	84	28	18	5	2	13	18	0	0	0	84
Hawaii	17	11	0	0	2	4	0	0	0	0	17
Idaho	74	38	0	0*	5	14	17	0	0	0	74
Illinois	616	161	10	16	62	143	53	171	0	0	616
Indiana	647	78	39	12	7	96	50	365	0	0	647
Iowa	71	15	0*	0*	2	8	2	44	0	0	71
Kansas	135	61	9	21	4	18	22	0	0	0	135
Kentucky	377	85	14	15	9	132	78	44	0	0	377
Louisiana	245	77	24	2	2	96	44	0	0	0	245
Maine	205	50	2	6	5	33	27	82	0	0	205
Maryland	96	45	5	2	2	14	16	12	0	0	96
Massachusetts	169	54	13	3	0*	74	24	0	0	1	168
Michigan	294	106	3	2	3	127	30	23	0	0	294
Minnesota	254	140	8	14	12	46	14	0	0	20	234
Mississippi	309	79	11	35	13	100	71	0	0	0*	309
Missouri	244	61	0	5	7	102	41	28	0	0	244
Montana	64	30	4	2	9	14	5	0	0*	0	64

Table A-10 — Continued

1996 Clean Water Needs Survey[†]
 Total Small Community Documented Needs for Publicly Owned Wastewater Treatment Facilities
 And Other SRF Eligibilities
 (January 1996 Dollars in Millions)

State	Total	Category of Need									Total (I - V)
		I	II	IIIA	IIIB	IVA	IVB	V	VI	VII	
Nebraska	41	33	3	1	0	2	2	0	0*	0	41
Nevada	14	5	0	2	2	2	3	0	0	0	14
New Hampshire	60	14	3	3	1	26	13	0	0	0	60
New Jersey	492	172	34	31	33	139	49	14	0	20	472
New Mexico	65	16	16	1	2	28	2	0	0	0	65
New York	699	241	21	30	19	184	89	99	0	16	683
North Carolina	781	59	136	32	23	338	186	0	1	6	774
North Dakota	20	10	0	0	8	0	1	0	0*	1	19
Ohio	1,499	183	48	299	7	222	120	620	0	0	1,499
Oklahoma	74	27	17	5	1	10	14	0	0	0	74
Oregon	93	45	16	5	6	14	7	0	0	0*	93
Pennsylvania	1,430	350	51	9	9	573	118	320	0	0	1,430
Rhode Island	12	0*	0	0	0	12	0	0	0	0	12
South Carolina	82	34	4	1	2	21	20	0	0	0	82
South Dakota	40	22	1	0*	2	4	3	0*	8	0	32
Tennessee	107	19	5	16	12	28	27	0	0	0	107
Texas	589	234	50	12	5	166	122	0	0	0	589
Utah	36	11	0	0	2	19	4	0	0	0	36
Vermont	115	14	21	4	0*	30	9	37	0	0	115
Virginia	589	116	52	28	1	246	146	0	0	0	589
Washington	121	53	1	14	4	21	23	0	4	1	116
West Virginia	950	181	14	19	17	250	193	276	0	0	950
Wisconsin	555	211	42	8	11	222	61	0	0	0	555
Wyoming	8	6	0	0	1	0*	1	0	0	0	8
Amer. Samoa	0	0	0	0	0	0	0	0	0	0	0
Guam	0	0	0	0	0	0	0	0	0	0	0
No. Marianas	3	3	0	0	0	0*	0*	0	0	0	3
Puerto Rico	0	0	0	0	0	0	0	0	0	0	0
Virgin Islands	9	4	0	0*	5	0	0	0	0	0	9
Total	13,861	3,926	812	683	344	3,971	1,908	2,135	14	68	13,779

Categories:	I	Secondary Treatment	IVB	New Interceptor Sewers
	II	Advanced Treatment	V	Combined Sewer Overflows
	IIIA	Infiltration/Inflow Correction	VI	Storm Water
	IIIB	Sewer Replacement/Rehabilitation	VII	Nonpoint Sources
	IVA	New Collector Sewers		

† Palau not considered in 1996 CWNS due to free association.

* Estimate is less than \$0.5 million.

Table A-11

1996 Clean Water Needs Survey[†]
 Total Small Community Documented Needs for Publicly Owned Wastewater Treatment Facilities
 And Other SRF Eligibilities (Facilities Serving Populations from 3,500 to 10,000 Persons)
 (January 1996 Dollars in Millions)

Table A-11 provides the subset of Table A-10 data for the needs for small community facilities estimated to be serving populations in the range of 3,500 to 10,000 persons.

State	Total	Category of Need									Total (I - V)
		I	II	IIIA	IIIB	IVA	IVB	V	VI	VII	
Alabama	43	10	6	0*	2	15	10	0	0	0	43
Alaska	4	1	0	0	1	2	0	0	0	0	4
Arizona	126	55	41	0	8	17	5	0	0	0	126
Arkansas	34	21	7	1	0*	2	3	0	0	0	34
California	113	41	6	0*	2	49	15	0	0	0	113
Colorado	9	7	0	2	0	0	0	0	0	0	9
Connecticut	51	11	1	0	0	22	17	0	0	0	51
Delaware	14	2	0	0	0*	9	3	0	0	0	14
Dist. of Columbia	0	0	0	0	0	0	0	0	0	0	0
Florida	24	11	2	1	0	6	4	0	0	0	24
Georgia	41	11	8	4	2	6	10	0	0	0	41
Hawaii	17	11	0	0	2	4	0	0	0	0	17
Idaho	19	9	0	0*	1	4	5	0	0	0	19
Illinois	203	16	1	8	25	19	10	124	0	0	203
Indiana	213	16	15	2	1	28	10	141	0	0	213
Iowa	2	2	0*	0	0	0	0	0	0	0	2
Kansas	39	12	5	2	3	6	11	0	0	0	39
Kentucky	128	21	4	9	5	47	32	10	0	0	128
Louisiana	79	22	19	2	1	25	10	0	0	0	79
Maine	94	10	2	3	4	11	5	59	0	0	94
Maryland	24	3	5	1	0	1	4	10	0	0	24
Massachusetts	129	40	11	3	0*	59	16	0	0	0	129
Michigan	46	18	0*	1	2	19	2	4	0	0	46
Minnesota	45	25	1	6	6	7	0	0	0	0	45
Mississippi	82	19	2	12	3	20	26	0	0	0*	82
Missouri	52	7	0	2	3	4	8	28	0	0	52
Montana	6	0*	2	0	2	1	1	0	0*	0	6

Table A-11 — Continued

1996 Clean Water Needs Survey[†]
 Total Small Community Documented Needs for Publicly Owned Wastewater Treatment Facilities
 And Other SRF Eligibilities (Facilities Serving Populations from 3,500 to 10,000 Persons)
 (January 1996 Dollars in Millions)

State	Total	Category of Need									Total (I - V)
		I	II	IIIA	IIIB	IVA	IVB	V	VI	VII	
Nebraska	13	10	3	0	0	0	0*	0	0*	0	13
Nevada	1	0	0	0	0	0*	1	0	0	0	1
New Hampshire	29	6	3	1	0	9	10	0	0	0	29
New Jersey	316	108	12	20	19	92	42	8	0	15	301
New Mexico	16	7	0	1	0*	7	1	0	0	0	16
New York	193	34	9	8	5	43	23	65	0	6	187
North Carolina	304	12	76	18	14	111	73	0	0	0	304
North Dakota	1	1	0	0	0*	0	0	0	0	0	1
Ohio	702	23	10	287	4	36	25	317	0	0	702
Oklahoma	20	4	7	3	1	0*	5	0	0	0	20
Oregon	36	19	8	2	2	4	1	0	0	0	36
Pennsylvania	491	109	31	2	6	148	40	155	0	0	491
Rhode Island	11	0	0	0	0	11	0	0	0	0	11
South Carolina	18	6	4	0*	0	4	4	0	0	0	18
South Dakota	4	1	0	0*	0*	0*	2	0	1	0	3
Tennessee	44	8	2	6	5	5	18	0	0	0	44
Texas	220	93	33	5	1	48	40	0	0	0	220
Utah	7	2	0	0	0	4	1	0	0	0	7
Vermont	53	4	9	1	0*	24	4	11	0	0	53
Virginia	192	34	3	15	0	73	67	0	0	0	192
Washington	28	12	1	3	0	5	3	0	4	0	24
West Virginia	229	26	4	6	4	32	32	125	0	0	229
Wisconsin	62	34	12	3	1	7	5	0	0	0	62
Wyoming	3	2	0	0	1	0	0	0	0	0	3
Amer. Samoa	0	0	0	0	0	0	0	0	0	0	0
Guam	0	0	0	0	0	0	0	0	0	0	0
No. Marianas	0	0	0	0	0	0	0	0	0	0	0
Puerto Rico	0	0	0	0	0	0	0	0	0	0	0
Virgin Islands	1	0	0	0	1	0	0	0	0	0	1
Total	4,631	956	365	440	137	1,046	604	1,057	5	21	4,605

Categories:	I	Secondary Treatment	IVB	New Interceptor Sewers
	II	Advanced Treatment	V	Combined Sewer Overflows
	IIIA	Infiltration/Inflow Correction	VI	Storm Water
	IIIB	Sewer Replacement/Rehabilitation	VII	Nonpoint Sources
	IVA	New Collector Sewers		

† Palau not considered in 1996 CWNS due to free association.

* Estimate is less than \$0.5 million.

Table A-12

1996 Clean Water Needs Survey[†]
 Total Small Community Documented Needs for Publicly Owned Wastewater Treatment Facilities
 And Other SRF Eligibilities (Facilities Serving Populations from 1,000 to 3,500 Persons)
 (January 1996 Dollars in Millions)

Table A-12 provides the subset of Table A-10 data for the needs for small community facilities estimated to be serving populations in the range of 1,000 to 3,500 persons.

State	Total	Category of Need									Total (I - V)
		I	II	IIIA	IIIB	IVA	IVB	V	VI	VII	
Alabama	110	18	15	1	3	52	21	0	0	0	110
Alaska	4	2	0	0	0	0	0	0	0	2	2
Arizona	45	16	3	0*	4	17	5	0	0	0	45
Arkansas	61	27	4	1	0*	18	11	0	0	0	61
California	170	110	0*	9	1	30	19	0	1	0	169
Colorado	85	60	19	0*	3	0	3	0	0	0	85
Connecticut	16	2	0	1	0	8	5	0	0	0	16
Delaware	14	2	0	0	0	7	5	0	0	0	14
Dist. of Columbia	0	0	0	0	0	0	0	0	0	0	0
Florida	23	4	2	5	0	11	1	0	0	0	23
Georgia	31	12	7	1	0	5	6	0	0	0	31
Hawaii	0*	0*	0	0	0	0	0	0	0	0	0*
Idaho	28	14	0	0*	2	5	7	0	0	0	28
Illinois	215	54	9	7	31	53	21	40	0	0	215
Indiana	351	43	20	10	4	40	26	208	0	0	351
Iowa	45	4	0	0*	0*	1	1	39	0	0	45
Kansas	67	32	4	18	1	3	9	0	0	0	67
Kentucky	153	36	5	5	3	45	25	34	0	0	153
Louisiana	87	25	5	0*	1	37	19	0	0	0	87
Maine	99	34	0*	3	1	19	19	23	0	0	99
Maryland	13	9	0	1	2	1	0*	0	0	0	13
Massachusetts	32	10	0*	0*	0	14	8	0	0	0	32
Michigan	179	58	1	1	1	77	22	19	0	0	179
Minnesota	77	48	4	4	5	10	5	0	0	1	76
Mississippi	108	25	7	15	7	31	23	0	0	0	108
Missouri	77	21	0	2	3	39	12	0	0	0	77
Montana	35	18	2	2	2	8	3	0	0	0	35

Table A-12 — Continued

1996 Clean Water Needs Survey[†]
 Total Small Community Documented Needs for Publicly Owned Wastewater Treatment Facilities
 And Other SRF Eligibilities (Facilities Serving Populations from 1,000 to 3,500 Persons)
 (January 1996 Dollars in Millions)

State	Total	Category of Need									Total (I - V)
		I	II	IIIA	IIIB	IVA	IVB	V	VI	VII	
Nebraska	14	13	0*	1	0	0	0*	0	0*	0	14
Nevada	5	2	0	1	0	1	1	0	0	0	5
New Hampshire	25	4	0	2	1	16	2	0	0	0	25
New Jersey	158	60	21	10	12	41	5	6	0	3	155
New Mexico	7	4	0	0	2	1	0	0	0	0	7
New York	316	122	6	17	13	88	27	34	0	9	307
North Carolina	305	28	36	11	9	146	68	0	1	6	298
North Dakota	15	6	0	0	7	0	1	0	0	1	14
Ohio	544	89	24	11	3	81	49	287	0	0	544
Oklahoma	37	14	10	2	0*	6	5	0	0	0	37
Oregon	33	18	4	2	1	6	2	0	0	0	33
Pennsylvania	693	168	14	7	3	300	54	147	0	0	693
Rhode Island	0	0	0	0	0	0	0	0	0	0	0
South Carolina	56	24	0*	1	2	14	15	0	0	0	56
South Dakota	18	12	0	0	1	1	1	0	3	0	15
Tennessee	52	9	3	9	5	18	8	0	0	0	52
Texas	230	91	14	6	4	67	48	0	0	0	230
Utah	19	6	0	0	2	9	2	0	0	0	19
Vermont	53	8	11	3	0*	3	2	26	0	0	53
Virginia	297	55	40	11	1	135	55	0	0	0	297
Washington	56	22	0	8	0*	11	15	0	0*	0*	56
West Virginia	372	45	3	10	12	87	83	132	0	0	372
Wisconsin	272	98	22	3	7	112	30	0	0	0	272
Wyoming	3	2	0	0	0*	0*	1	0	0	0	3
Amer. Samoa	0	0	0	0	0	0	0	0	0	0	0
Guam	0	0	0	0	0	0	0	0	0	0	0
No. Marianas	3	3	0	0	0	0*	0*	0	0	0	3
Puerto Rico	0	0	0	0	0	0	0	0	0	0	0
Virgin Islands	7	4	0	0*	3	0	0	0	0	0	7
Total	5,715	1,591	315	201	162	1,674	750	995	5	22	5,688

Categories:	I	Secondary Treatment	IVB	New Interceptor Sewers
	II	Advanced Treatment	V	Combined Sewer Overflows
	IIIA	Infiltration/Inflow Correction	VI	Storm Water
	IIIB	Sewer Replacement/Rehabilitation	VII	Nonpoint Sources
	IVA	New Collector Sewers		

† Palau not considered in 1996 CWNS due to free association.

* Estimate is less than \$0.5 million.

Table A-13

1996 Clean Water Needs Survey[†]
 Total Small Community Documented Needs for Publicly Owned Wastewater Treatment Facilities
 And Other SRF Eligibilities (Facilities Serving Populations under 1,000 Persons)
 (January 1996 Dollars in Millions)

Table A-13 provides the subset of Table A-10 data for the needs for small community facilities estimated to be serving populations of less than 1,000 persons.

State	Total	<u>Category of Need</u>									Total (I - V)
		I	II	IIIA	IIIB	IVA	IVB	V	VI	VII	
Alabama	100	22	8	0*	0*	49	21	0	0	0	100
Alaska	249	244	0	0	0	4	0	0	0	1	248
Arizona	21	8	0*	0	0*	12	1	0	0	0	21
Arkansas	50	15	2	0	0	21	12	0	0	0	50
California	57	29	0*	2	0*	17	9	0	0	0	57
Colorado	30	23	1	0	1	0	5	0	0	0	30
Connecticut	12	2	0*	0	0	6	4	0	0	0	12
Delaware	9	1	0	0	0	4	4	0	0	0	9
Dist. of Columbia	0	0	0	0	0	0	0	0	0	0	0
Florida	2	0*	0*	0	0	2	0*	0	0	0	2
Georgia	12	5	3	0*	0	2	2	0	0	0	12
Hawaii	0	0	0	0	0	0	0	0	0	0	0
Idaho	27	15	0	0	2	5	5	0	0	0	27
Illinois	198	91	0*	1	6	71	22	7	0	0	198
Indiana	83	19	4	0*	2	28	14	16	0	0	83
Iowa	24	9	0	0*	2	7	1	5	0	0	24
Kansas	29	17	0*	1	0*	9	2	0	0	0	29
Kentucky	96	28	5	1	1	40	21	0	0	0	96
Louisiana	79	30	0*	0*	0*	34	15	0	0	0	79
Maine	12	6	0*	0*	0	3	3	0	0	0	12
Maryland	59	33	0*	0*	0	12	12	2	0	0	59
Massachusetts	8	4	2	0	0	1	0	0	0	1	7
Michigan	69	30	2	0*	0	31	6	0	0	0	69
Minnesota	132	67	3	4	1	29	9	0	0	19	113
Mississippi	119	35	2	8	3	49	22	0	0	0	119
Missouri	115	33	0	1	1	59	21	0	0	0	115
Montana	23	12	0	0*	5	5	1	0	0*	0	23

Table A-13 — Continued

1996 Clean Water Needs Survey[†]
 Total Small Community Documented Needs for Publicly Owned Wastewater Treatment Facilities
 And Other SRF Eligibilities (Facilities Serving Populations under 1,000 Persons)
 (January 1996 Dollars in Millions)

State	Category of Need										Total (I - V)
	Total	I	II	IIIA	IIIB	IVA	IVB	V	VI	VII	
Nebraska	14	10	0*	0	0*	2	2	0	0*	0	14
Nevada	8	3	0	1	2	1	1	0	0	0	8
New Hampshire	6	4	0	0	0*	1	1	0	0	0	6
New Jersey	18	4	1	1	2	6	2	0	0	2	16
New Mexico	42	5	16	0	0	20	1	0	0	0	42
New York	190	85	6	5	1	53	39	0	0	1	189
North Carolina	172	19	24	3	0*	81	45	0	0	0	172
North Dakota	4	3	0	0	1	0	0	0	0*	0*	4
Ohio	253	71	14	1	0*	105	46	16	0	0	253
Oklahoma	17	9	0*	0	0*	4	4	0	0	0	17
Oregon	24	8	4	1	3	4	4	0	0	0*	24
Pennsylvania	246	73	6	0*	0*	125	24	18	0	0	246
Rhode Island	1	0*	0	0	0	1	0	0	0	0	1
South Carolina	8	4	0*	0*	0	3	1	0	0	0	8
South Dakota	18	9	1	0	1	3	0*	0*	4	0	14
Tennessee	11	2	0*	1	2	5	1	0	0	0	11
Texas	139	50	3	1	0*	51	34	0	0	0	139
Utah	10	3	0	0	0	6	1	0	0	0	10
Vermont	9	2	1	0	0	3	3	0	0	0	9
Virginia	100	27	9	2	0*	38	24	0	0	0	100
Washington	37	19	0	3	4	5	5	0	0	1	36
West Virginia	349	110	7	3	1	131	78	19	0	0	349
Wisconsin	221	79	8	2	3	103	26	0	0	0	221
Wyoming	2	2	0	0*	0*	0	0	0	0	0	2
Amer. Samoa	0	0	0	0	0	0	0	0	0	0	0
Guam	0	0	0	0	0	0	0	0	0	0	0
No. Marianas	0	0	0	0	0	0	0	0	0	0	0
Puerto Rico	0	0	0	0	0	0	0	0	0	0	0
Virgin Islands	1	0	0	0	1	0	0	0	0	0	1
Total	3,515	1,379	132	42	45	1,251	554	83	4	25	3,486

Categories:	I	Secondary Treatment	IVB	New Interceptor Sewers
	II	Advanced Treatment	V	Combined Sewer Overflows
	IIIA	Infiltration/Inflow Correction	VI	Storm Water
	IIIB	Sewer Replacement/Rehabilitation	VII	Nonpoint Sources
	IVA	New Collector Sewers		

† Palau not considered in 1996 CWNS due to free association.

* Estimate is less than \$0.5 million.

Table A-14

1996 Clean Water Needs Survey[†]
 Separate State Estimates
 (January 1996 Dollars in Millions)

Table A-14 summarizes the States' assessment of needs to satisfy the design year (2016) population for selected wastewater treatment facilities that the States believe to be legitimate but that either were justified with documents outside the established documentation criteria of the 1996 Clean Water Needs Survey or had no written documentation. The Separate State Estimates are optional and in addition to the EPA estimates. All values are presented in millions of January 1996 dollars.

These needs are shown in Table A-14 by category of need in each State and U.S. Territory.

State	Total	Category of Need									Total (I - V)
		I	II	IIIA	IIIB	IVA	IVB	V	VI	VII	
Alabama	17	5	9	1	0	0	2	0	0	0	17
Alaska	25	6	0	0	0	9	5	0	0	5	20
Arizona	152	23	14	0	0*	20	70	0	10	15	127
Arkansas	715	190	70	113	98	128	114	2	0	0	715
California	2,629	1,561	4	26	391	124	412	0	111	0	2,518
Colorado	52	1	50	0	0	0	1	0	0	0	52
Connecticut	757	97	481	3	0	7	4	165	0	0	757
Delaware	130	45	0	4	0	53	26	0	2	0	128
Dist. of Columbia	0	0	0	0	0	0	0	0	0	0	0
Florida	2	0	0	0	0*	0	2	0	0	0	2
Georgia	549	90	149	33	20	89	124	44	0	0	549
Hawaii	1,343	364	0	172	467	178	162	0	0	0	1,343
Idaho	163	126	3	4	7	11	12	0	0	0	163
Illinois	963	86	34	8	18	10	49	1	0	757	206
Indiana	879	89	47	16	7	33	30	657	0	0	879
Iowa	27	13	0	0	0	0	14	0	0	0	27
Kansas	63	1	33	0	0	0	29	0	0	0	63
Kentucky	341	69	25	31	53	119	41	3	0	0	341
Louisiana	537	126	40	17	22	147	157	0	28	0	509
Maine	759	7	0	3	0	22	10	717	0	0	759
Maryland	5	1	0	0	0	0	0	0	4	0	1
Massachusetts	2,353	171	61	98	8	408	231	14	1,300	62	991
Michigan	26	20	0	0*	1	4	1	0	0	0	26
Minnesota	161	77	13	9	10	22	30	0	0	0	161
Mississippi	229	51	47	37	34	46	12	0	2	0*	227
Missouri	1,127	93	0	0	0*	72	55	519	0	388	739
Montana	35	16	0	0	4	4	3	0	7	1	27

Table A-14 — Continued

1996 Clean Water Needs Survey[†]
 Separate State Estimates
 (January 1996 Dollars in Millions)

State	Total	Category of Need									Total (I - V)
		I	II	IIIA	IIIB	IVA	IVB	V	VI	VII	
Nebraska	189	5	1	1	0*	8	0*	160	14	0	175
Nevada	503	354	71	0*	1	17	60	0	0*	0	503
New Hampshire	426	24	16	15	9	170	92	100	0	0	426
New Jersey	1,068	326	0	6	264	39	113	285	5	30	1,033
New Mexico	0	0	0	0	0	0	0	0	0	0	0
New York	2,740	1,097	510	72	132	325	296	274	34	0	2,706
North Carolina	3,788	114	432	53	29	306	192	0	2,661	1	1,126
North Dakota	0	0	0	0	0	0	0	0	0	0	0
Ohio	1,008	174	102	68	35	275	132	180	42	0*	966
Oklahoma	160	24	99	20	3	2	12	0	0	0	160
Oregon	22	0	0	10	11	1	0	0	0	0	22
Pennsylvania	3,329	422	144	7	12	505	267	1,925	0	47	3,282
Rhode Island	0	0	0	0	0	0	0	0	0	0	0
South Carolina	70	36	5	3	0	9	17	0	0*	0	70
South Dakota	9	4	0	0	2	1	0*	0	2	0	7
Tennessee	973	234	34	130	125	218	216	0	16	0	957
Texas	1,815	598	250	45	118	174	630	0	0	0	1,815
Utah	750	136	0	0	19	500	91	0	4	0	746
Vermont	73	33	7	0	0	16	8	8	1	0	72
Virginia	411	136	30	24	12	93	65	1	50	0	361
Washington	741	98	26	76	55	53	309	123	1	0	740
West Virginia	1,024	254	1	21	37	290	389	32	0	0	1,024
Wisconsin	714	74	23	0	0	38	7	0	572	0	142
Wyoming	71	38	12	7	10	2	2	0	0*	0	71
Amer. Samoa	0	0	0	0	0	0	0	0	0	0	0
Guam	0	0	0	0	0	0	0	0	0	0	0
No. Marianas	0	0	0	0	0	0	0	0	0	0	0
Puerto Rico	228	79	1	5	1	68	74	0	0	0	228
Virgin Islands	0	0	0	0	0	0	0	0	0	0	0
Total	34,151	7,588	2,844	1,138	2,015	4,616	4,568	5,210	4,866	1,306	27,979

Categories:	I	Secondary Treatment	IVB	New Interceptor Sewers
	II	Advanced Treatment	V	Combined Sewer Overflows
	IIIA	Infiltration/Inflow Correction	VI	Storm Water
	IIIB	Sewer Replacement/Rehabilitation	VII	Nonpoint Sources (see Table A-15
	IVA	New Collector Sewers		For totals by subcategory)

[†] Palau not considered in 1996 CWNS due to free association.

* Estimate is less than \$0.5 million.

Table A-15

1996 Clean Water Needs Survey[†]
 Separate State Estimates for Nonpoint Source Projects
 (January 1996 Dollars in Millions)

Table A-15 summarizes States' 1996 estimated needs for nonpoint source related activities. The subcategory totals provided here are summarized in the Category VII column of Table A-14.

State	Category VII Needs							Total
	A	B	C	D	E	F	G	
Alabama	0	0	0	0	0	0	0	0
Alaska	0	0	0	0	5	0	0	5
Arizona	5	0*	0*	8	1	0	1	15
Arkansas	0	0	0	0	0	0	0	0
California	0	0	0	0	0	0	0	0
Colorado	0	0	0	0	0	0	0	0
Connecticut	0	0	0	0	0	0	0	0
Delaware	0	0	0	0	0	0	0	0
Dist. of Columbia	0	0	0	0	0	0	0	0
Florida	0	0	0	0	0	0	0	0
Georgia	0	0	0	0	0	0	0	0
Hawaii	0	0	0	0	0	0	0	0
Idaho	0	0	0	0	0	0	0	0
Illinois	757	0	0	0	0	0	0	757
Indiana	0	0	0	0	0	0	0	0
Iowa	0	0	0	0	0	0	0	0
Kansas	0	0	0	0	0	0	0	0
Kentucky	0	0	0	0	0	0	0	0
Louisiana	0	0	0	0	0	0	0	0
Maine	0	0	0	0	0	0	0	0
Maryland	0	0	0	0	0	0	0	0
Massachusetts	0	12	0*	50	0	0	0	62
Michigan	0	0	0	0	0	0	0	0
Minnesota	0	0	0	0	0	0	0	0
Mississippi	0	0	0	0	0*	0	0	0*
Missouri	0	0	0	0	388	0	0	388
Montana	0	0	0	0	1	0	0	1

Table A-15 — Continued

1996 Clean Water Needs Survey[†]
 Separate State Estimates for Nonpoint Source Projects
 (January 1996 Dollars in Millions)

State	Category VII Needs							Total
	A	B	C	D	E	F	G	
Nebraska	0	0	0	0	0	0	0	0
Nevada	0	0	0	0	0	0	0	0
New Hampshire	0	0	0	0	0	0	0	0
New Jersey	0	0	0	30	0*	0	0	30
New Mexico	0	0	0	0	0	0	0	0
New York	0	0	0	0	0	0	0	0
North Carolina	0	0	0	1	0	0	0	1
North Dakota	0	0	0	0	0	0	0	0
Ohio	0*	0	0	0	0	0	0	0*
Oklahoma	0	0	0	0	0	0	0	0
Oregon	0	0	0	0	0	0	0	0
Pennsylvania	7	40	0	0	0	0	0	47
Rhode Island	0	0	0	0	0	0	0	0
South Carolina	0	0	0	0	0	0	0	0
South Dakota	0	0	0	0	0	0	0	0
Tennessee	0	0	0	0	0	0	0	0
Texas	0	0	0	0	0	0	0	0
Utah	0	0	0	0	0	0	0	0
Vermont	0	0	0	0	0	0	0	0
Virginia	0	0	0	0	0	0	0	0
Washington	0	0	0	0	0	0	0	0
West Virginia	0	0	0	0	0	0	0	0
Wisconsin	0	0	0	0	0	0	0	0
Wyoming	0	0	0	0	0	0	0	0
Amer. Samoa	0	0	0	0	0	0	0	0
Guam	0	0	0	0	0	0	0	0
No. Marianas	0	0	0	0	0	0	0	0
Puerto Rico	0	0	0	0	0	0	0	0
Virgin Islands	0	0	0	0	0	0	0	0
Total	769	52	0*	89	395	0	1	1,306

Category VII Subcategories:

A	Agriculture (cropland)	E	Ground Water
B	Agriculture (confined animal facilities)	F	Estuaries
C	Silviculture	G	Wetlands
D	Urban Runoff		

† Palau not considered in 1996 CWNS due to free association.

* Estimate is less than \$0.5 million.

Table A-16

1996 Clean Water Needs Survey[†]
 Separate State Estimates for Small Community Facilities
 (January 1996 Dollars in Millions)

Table A-16 summarizes the States' assessment of needs to satisfy the design year (2016) population living in small communities. The small community needs shown in Table A-16 were derived by EPA from the total Separate State Estimates using criteria as defined in the report section, "What Are the Needs for Small Communities?". These needs are shown by category of need in each State and U.S. Territory.

Separate State Estimates reported by the States are optional and are for selected wastewater treatment facilities that the States believe to be legitimate but that either were justified with documents outside the established criteria of the 1996 Clean Water Needs Survey or had no written documentation. All values are presented in millions of January 1996 dollars.

State	Total	Category of Need									Total (I - V)
		I	II	IIIA	IIIB	IVA	IVB	V	VI	VII	
Alabama	0	0	0	0	0	0	0	0	0	0	0
Alaska	12	4	0	0	0	5	2	0	0	1	11
Arizona	2	2	0	0	0*	0*	0*	0	0	0	2
Arkansas	423	146	44	39	23	104	67	0	0	0	423
California	78	10	0	0	0	45	23	0	0	0	78
Colorado	1	1	0	0	0	0	0*	0	0	0	1
Connecticut	0	0	0	0	0	0	0	0	0	0	0
Delaware	53	4	0	0	0	33	16	0	0	0	53
Dist. of Columbia	0	0	0	0	0	0	0	0	0	0	0
Florida	0	0	0	0	0	0	0	0	0	0	0
Georgia	33	3	8	1	5	7	9	0	0	0	33
Hawaii	103	40	0	0	2	35	26	0	0	0	103
Idaho	126	115	0	0	2	5	4	0	0	0	126
Illinois	17	9	0*	0*	0	7	1	0	0	0	17
Indiana	72	20	4	9	3	14	18	4	0	0	72
Iowa	1	1	0	0	0	0	0	0	0	0	1
Kansas	17	1	16	0	0	0	0	0	0	0	17
Kentucky	171	52	12	6	7	74	20	0	0	0	171
Louisiana	117	21	16	1	4	41	34	0	0	0	117
Maine	74	0	0	0*	0	12	7	55	0	0	74
Maryland	0*	0	0	0	0	0	0	0	0*	0	0
Massachusetts	205	51	19	4	1	98	32	0	0	0	205
Michigan	5	1	0	0	0	4	0*	0	0	0	5
Minnesota	63	20	14	6	3	9	11	0	0	0	63
Mississippi	58	6	2	11	11	23	5	0	0	0	58
Missouri	178	67	0	0	0	64	47	0	0	0	178
Montana	24	14	0	0	4	3	3	0	0*	0	24

Table A-16 — Continued

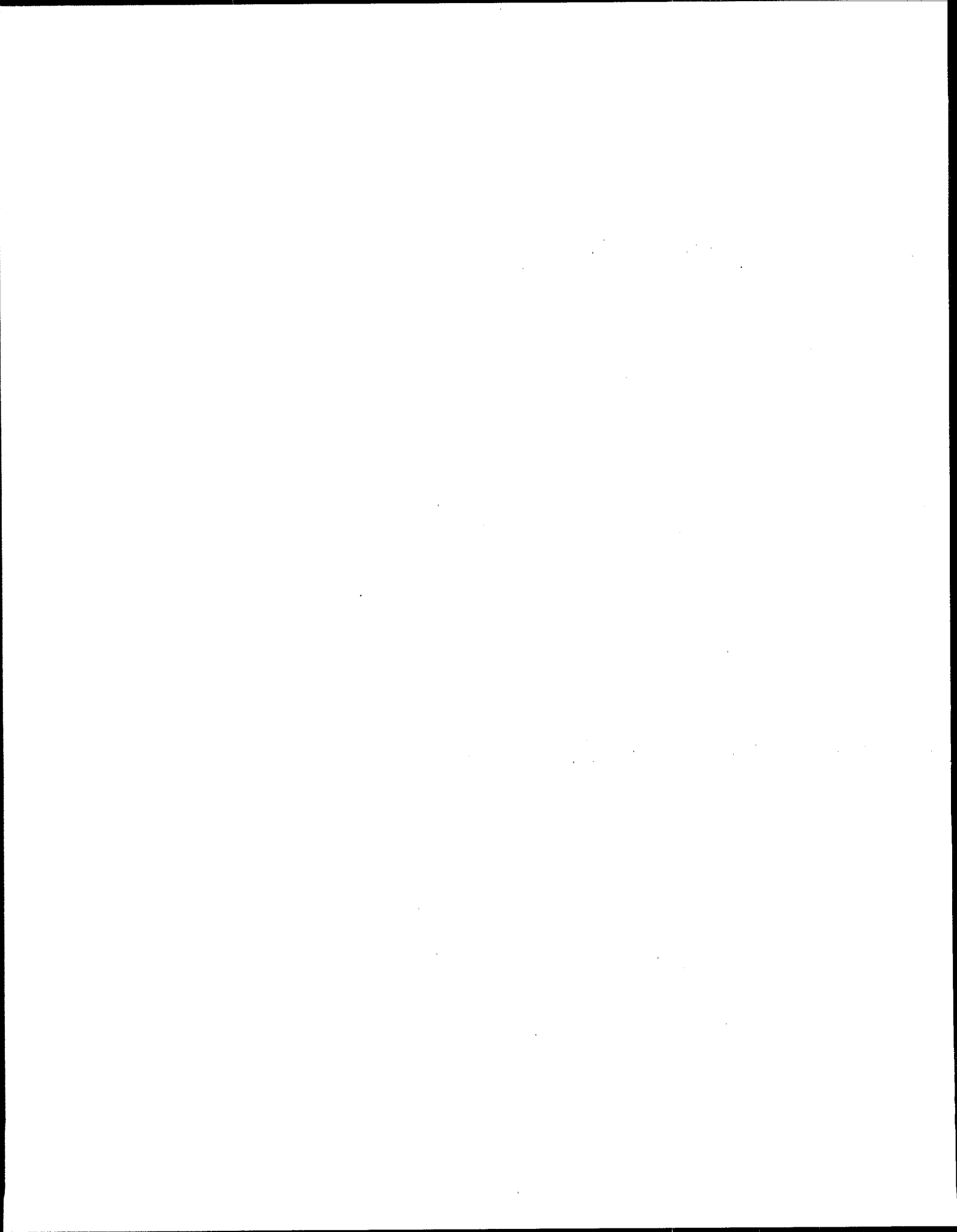
1996 Clean Water Needs Survey[†]
 Separate State Estimates for Small Community Facilities
 (January 1996 Dollars in Millions)

State	Category of Need										Total (I - V)
	Total	I	II	IIIA	IIIB	IVA	IVB	V	VI	VII	
Nebraska	7	4	1	1	0*	0*	0*	0	1	0	6
Nevada	17	10	2	0*	1	3	1	0	0*	0	17
New Hampshire	72	13	1	3	1	32	22	0	0	0	72
New Jersey	283	270	0	1	0	0	0	0	0	12	271
New Mexico	0	0	0	0	0	0	0	0	0	0	0
New York	653	260	13	17	17	174	144	28	0	0	653
North Carolina	152	16	30	9	3	66	28	0	0*	0	152
North Dakota	0	0	0	0	0	0	0	0	0	0	0
Ohio	288	65	18	20	12	123	35	15	0	0	288
Oklahoma	23	17	5	0	0*	0*	1	0	0	0	23
Oregon	3	0	0	1	1	1	0	0	0	0	3
Pennsylvania	906	301	87	5	6	417	79	11	0	0	906
Rhode Island	0	0	0	0	0	0	0	0	0	0	0
South Carolina	25	10	1	0*	0	8	6	0	0*	0	25
South Dakota	3	1	0	0	1	0	0*	0	1	0	2
Tennessee	204	67	9	22	31	43	32	0	0	0	204
Texas	296	91	15	2	6	88	94	0	0	0	296
Utah	71	23	0	0	2	41	5	0	0	0	71
Vermont	41	6	7	0	0	16	8	3	1	0	40
Virginia	256	93	22	16	2	76	47	0	0	0	256
Washington	15	1	0	0	0	8	6	0	0*	0	15
West Virginia	931	247	2	17	24	261	360	20	0	0	931
Wisconsin	53	17	1	0	0	32	3	0	0	0	53
Wyoming	23	18	0	0	5	0*	0*	0	0	0	23
Amer. Samoa	0	0	0	0	0	0	0	0	0	0	0
No. Marianas	0	0	0	0	0	0	0	0	0	0	0
Guam	0	0	0	0	0	0	0	0	0	0	0
Puerto Rico	0	0	0	0	0	0	0	0	0	0	0
Virgin Islands	0	0	0	0	0	0	0	0	0	0	0
Total	6,155	2,118	349	191	177	1,972	1,196	136	3	13	6,139

Categories:	I	Secondary Treatment	IVB	New Interceptor Sewers
	II	Advanced Treatment	V	Combined Sewer Overflows
	IIIA	Infiltration/Inflow Correction	VI	Storm Water
	IIIB	Sewer Replacement/Rehabilitation	VII	Nonpoint Sources
	IVA	New Collector Sewers		

[†] Palau not considered in 1996 CWNS due to free association.

* Estimate is less than \$0.5 million.



Appendix B:

Summary of 1992 CWNS Cost Estimates

Table B-1

1992 Clean Water Needs Survey
Total Documented Needs for Publicly Owned Wastewater Treatment Facilities and Other SRF Eligibilities
(January 1996 Dollars in Millions)

Table B-1 summarizes the results of EPA's 1992 CWNS of documented needs by State for the design year (2012) population. All values from the 1992 CWNS have been adjusted to millions of January 1996 dollars.

These design year needs were derived from those documented during the 1992 CWNS. This table is provided as a convenience to those who wish to compare the 1992 and 1996 CWNS results. Table B-1 is comparable to Table A-2.

Needs presented in Table B-1 are not comparable for all categories as presented in Table 3 which also includes modeled needs.

State	Total	Category of Need									Total (I - V)
		I	II	IIIA	IIIB	IVA	IVB	V	VI	VII	
Alabama	958	161	173	57	41	376	150	0	0	0	958
Alaska	230	80	0	6	0	24	120	0	0	0	230
Arizona	1,420	792	78	2	2	205	341	0	0	0	1,420
Arkansas	257	128	25	31	3	38	32	0	0	0	257
California	9,489	6,089	163	145	798	773	886	628	7	0	9,482
Colorado	620	146	223	0*	1	28	28	0*	0	194	426
Connecticut	2,478	383	735	36	26	390	232	676	0	0	2,478
Delaware	211	64	2	0	9	89	45	2	0	0	211
Dist. of Columbia	251	0	138	0	0	0	0	90	0	23	228
Florida	7,836	1,504	879	34	37	3,415	962	5	1,000	0	6,836
Georgia	2,198	215	1,006	50	40	89	539	259	0	0	2,198
Hawaii	308	150	4	0	0	79	75	0	0	0	308
Idaho	286	78	59	0*	2	81	66	0	0	0	286
Illinois	3,560	664	345	93	400	201	276	1,581	0	0	3,560
Indiana	2,011	218	167	59	30	395	141	1,001	0	0	2,011
Iowa	93	39	18	0	0*	1	29	6	0	0	93
Kansas	699	95	72	43	57	57	357	18	0	0	699
Kentucky	1,472	230	40	89	22	663	393	35	0	0	1,472
Louisiana	1,390	482	56	57	40	460	295	0	0	0	1,390
Maine	408	168	0*	25	12	91	56	56	0	0	408
Maryland	1,702	272	826	26	79	275	190	34	0	0	1,702
Massachusetts	8,736	3,699	28	67	33	846	989	3,074	0	0	8,736
Michigan	4,175	920	7	192	31	623	587	1,815	0	0	4,175
Minnesota	1,099	646	147	20	28	50	68	140	0	0	1,099
Mississippi	745	239	80	84	67	127	148	0	0	0	745
Missouri	1,540	241	2	115	86	81	140	871	0	4	1,536
Montana	72	22	0	0	1	33	16	0	0	0	72

Table B-1 — Continued

1992 Clean Water Needs Survey
Total Documented Needs for Publicly Owned Wastewater Treatment Facilities and Other SRF Eligibilities
(January 1996 Dollars in Millions)

State	Total	Category of Need									Total (I - V)
		I	II	IIIA	IIIB	IVA	IVB	V	VI	VII	
Nebraska	278	109	1	1	35	3	44	69	14	2	262
Nevada	186	88	44	2	3	26	23	0	0	0*	186
New Hampshire	965	118	11	11	5	318	235	267	0	0	965
New Jersey	5,379	2,213	304	256	370	455	311	1,458	8	4	5,367
New Mexico	140	49	0*	1	19	38	33	0	0	0	140
New York	26,146	5,676	6,408	201	613	2,608	2,044	7,962	621	13	25,512
North Carolina	4,569	358	1,723	126	53	1,211	1,028	1	22	47	4,500
North Dakota	43	17	0	0	26	0	0*	0	0	0	43
Ohio	5,755	1,412	280	407	393	709	418	1,844	128	164	5,463
Oklahoma	521	199	119	15	14	36	138	0	0	0	521
Oregon	1,649	485	416	14	158	330	124	122	0*	0	1,649
Pennsylvania	3,454	676	147	13	21	1,094	184	1,319	0	0	3,454
Rhode Island	1,060	161	65	2	10	292	161	369	0	0	1,060
South Carolina	767	277	123	20	5	149	193	0	0	0	767
South Dakota	123	41	0	1	33	15	26	2	5	0	118
Tennessee	2,086	251	375	165	53	355	475	318	47	47	1,992
Texas	5,257	2,038	717	221	100	533	1,648	0	0	0	5,257
Utah	258	128	0	0	0	96	34	0	0	0	258
Vermont	184	69	22	1	1	19	8	64	0	0	184
Virginia	3,849	519	1,212	142	189	529	579	516	163	0	3,686
Washington	3,418	1,092	28	159	97	578	750	690	0	24	3,394
West Virginia	1,364	405	47	33	34	510	311	24	0	0	1,364
Wisconsin	1,199	512	144	62	2	284	189	6	0	0	1,199
Wyoming	1,579	5	0	1	1	14	1	0	0	1,557	22
Amer. Samoa	41	5	0	0	0	32	4	0	0	0	41
Guam	52	37	0	0*	0	10	5	0	0	0	52
No. Marianas	49	25	0	0	0*	6	18	0	0	0	49
Palau	18	17	0	0	0	0	1	0	0	0	18
Puerto Rico	1,750	616	6	46	18	539	499	26	0	0	1,750
Virgin Islands	81	60	2	1	18	0	0	0	0	0	81
Total	126,464	35,383	17,467	3,132	4,116	20,279	16,645	25,348	2,015	2,079	122,370

Categories:	I	Secondary Treatment	IVB	New Interceptor Sewers
	II	Advanced Treatment	V	Combined Sewer Overflows
	IIIA	Infiltration/Inflow Correction	VI	Storm Water
	IIIB	Sewer Replacement/Rehabilitation	VII	Nonpoint Sources [†]
	IVA	New Collector Sewers		

* Estimate is less than \$0.5 million.

† Sum of 1992 CWNS subtotals for NPS and other SRF eligibilities newly defined in the 1987 CWA amendments.

Table B-2

1992 Clean Water Needs Survey
 Separate State Estimates
 (January 1996 Dollars in Millions)

Table B-2 summarizes the States' 1992 assessment of needs to satisfy the design year (2012) population for selected wastewater treatment facilities that the States believe to be legitimate, but that either were justified with documents outside the established documentation criteria of the 1992 CWNS or had no written documentation. The Separate State Estimates were optional and were in addition to the EPA estimates (see Table B-1).

All values from the 1992 CWNS have been adjusted to January 1996 dollars in millions. These estimates are provided as a convenience to those who wish to compare the 1992 and 1996 CWNS results. See Table A-14 for comparable 1996 estimates for Categories I-VI (SSE Category VII needs were not reported in 1992).

State	Total	Category of Need								Total (I - V)
		I	II	IIIA	IIIB	IVA	IVB	V	VI	
Alabama	10	0	10	0	0	0	0	0	0	10
Alaska	0	0	0	0	0	0	0	0	0	0
Arizona	87	23	0	0	0	0	64	0	0	87
Arkansas	802	215	79	128	111	142	125	2	0	802
California	781	533	42	0	163	36	7	0	0	781
Colorado	15	1	0	0	0	0	1	0	13	2
Connecticut	887	137	551	0	0	8	5	186	0	887
Delaware	0	0	0	0	0	0	0	0	0	0
Dist. of Columbia	113	0	113	0	0	0	0	0	0	113
Florida	0	0	0	0	0	0	0	0	0	0
Georgia	129	1	19	11	2	1	45	50	0	129
Hawaii	1,305	989	0	0	0	174	142	0	0	1,305
Idaho	173	134	0	5	7	13	14	0	0	173
Illinois	81	53	9	1	2	10	5	1	0	81
Indiana	70	29	20	4	4	0	2	11	0	70
Iowa	3	3	0	0	0	0	0	0	0	3
Kansas	77	1	72	4	0	0	0	0	0	77
Kentucky	300	88	30	1	1	122	55	3	0	300
Louisiana	126	30	32	0	1	33	30	0	0	126
Maine	819	5	0	0*	0	4	0*	810	0	819
Maryland	8	1	0	0	0	1	0	0	6	2
Massachusetts	508	114	66	17	0	182	129	0	0	508
Michigan	22	18	0	0	0	4	0*	0	0	22
Minnesota	254	113	1	22	31	25	14	48	0	254
Mississippi	6	0	0	0	2	0	2	0	2	4
Missouri	703	68	0	0	0	35	14	586	0	703
Montana	25	11	0*	0	0*	8	3	0	3	22

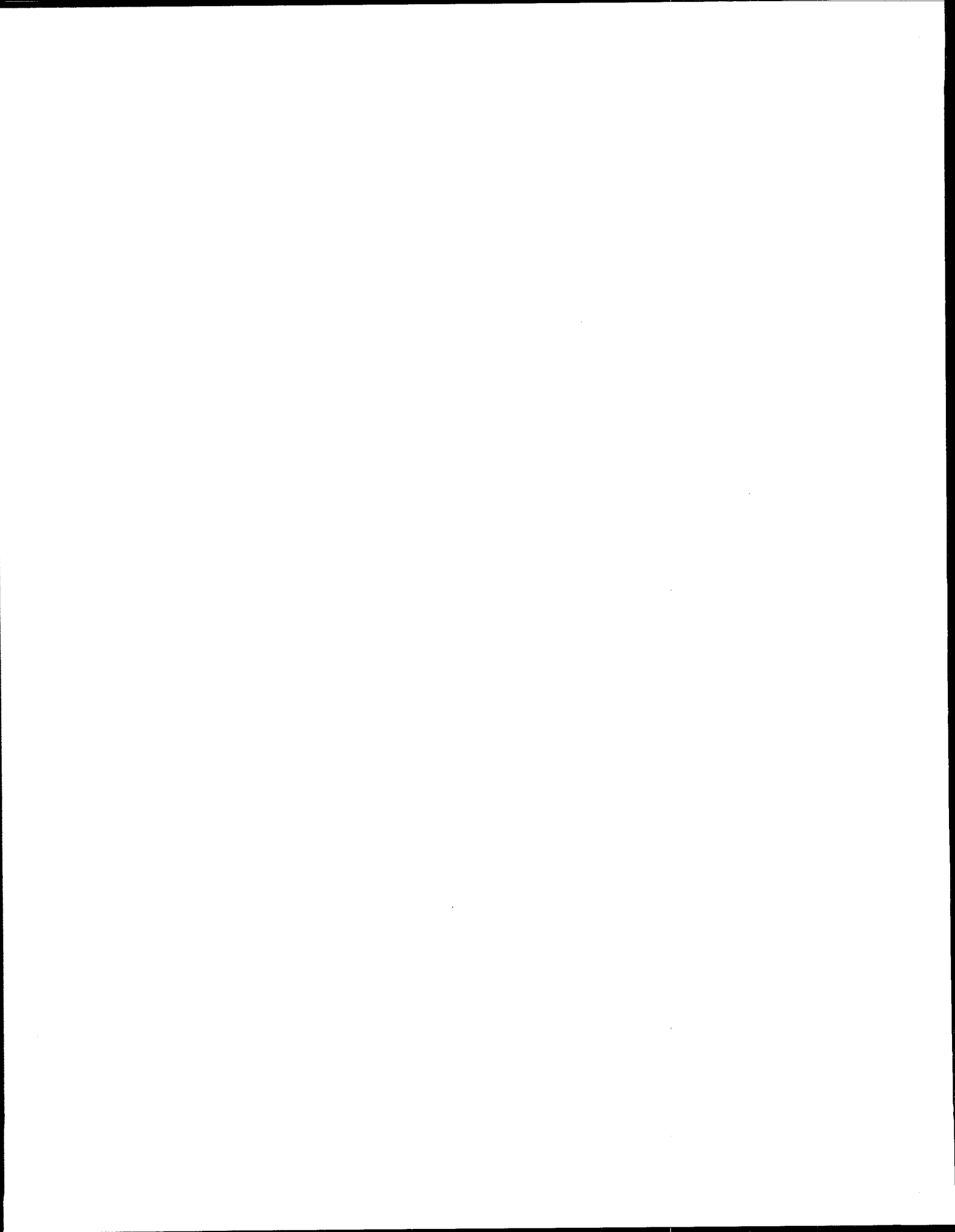
Table B-2 — Continued

1992 Clean Water Needs Survey
 Separate State Estimates
 (January 1996 Dollars in Millions)

State	Total	Category of Need								Total (I - V)
		I	II	IIIA	IIIB	IVA	IVB	V	VI	
Nebraska	361	17	32	0*	0*	0*	1	294	17	344
Nevada	621	426	117	0*	1	17	60	0	0*	621
New Hampshire	238	37	19	16	9	28	23	106	0	238
New Jersey	332	313	0	0	0	0	0	19	0	332
New Mexico	0	0	0	0	0	0	0	0	0	0
New York	2,904	1,225	480	77	133	349	288	314	38	2,866
North Carolina	3,434	46	250	10	0	68	55	0	3,005	429
North Dakota	0	0	0	0	0	0	0	0	0	0
Ohio	1,243	87	51	54	41	135	500	372	3	1,240
Oklahoma	0	0	0	0	0	0	0	0	0	0
Oregon	26	0	0	12	13	1	0	0	0	26
Pennsylvania	2,362	478	154	7	12	547	274	890	0	2,362
Rhode Island	0	0	0	0	0	0	0	0	0	0
South Carolina	21	8	0	2	0	6	5	0	0*	21
South Dakota	14	6	0	0	6	0	0*	0	2	12
Tennessee	1,649	666	67	119	43	229	190	287	48	1,601
Texas	925	344	100	31	31	115	304	0	0	925
Utah	1,106	206	0	0	0	862	38	0	0	1,106
Vermont	36	4	8	0	0	15	2	6	1	35
Virginia	363	136	23	20	4	72	50	1	57	306
Washington	149	55	0*	2	0	0	91	0	1	148
West Virginia	1,127	267	10	3	22	522	258	36	9	1,118
Wisconsin	673	7	1	0	0	15	3	0	647	26
Wyoming	93	38	23	10	12	2	2	0*	6	87
Amer. Samoa	0	0	0	0	0	0	0	0	0	0
Guam	0	0	0	0	0	0	0	0	0	0
No. Marianas	0	0	0	0	0	0	0	0	0	0
Palau	0	0	0	0	0	0	0	0	0	0
Puerto Rico	0	0	0	0	0	0	0	0	0	0
Virgin Islands	0	0	0	0	0	0	0	0	0	0
Total	24,981	6,933	2,379	556	651	3,781	2,801	4,022	3,858	21,123

Categories:	I	Secondary Treatment	IVA	New Collector Sewers
	II	Advanced Treatment	IVB	New Interceptor Sewers
	IIIA	Infiltration/Inflow Correction	V	Combined Sewer Overflows
	IIIB	Sewer Replacement/Rehabilitation	VI	Storm Water

* Estimate is less than \$0.5 million.



Appendix C:

Summary of 1996 Technical Information

NOTE: Some States did not update all of the technical data used to generate Tables C-1 through C-5.

Table C-1

1996 Clean Water Needs Survey
Number of Operational Treatment Facilities and
Collection Systems in 1996

Table C-1 summarizes the number of treatment facilities and collection systems in operation in 1996 in each State and U.S. Territory.

State	Treatment Facilities	Collection Systems	State	Treatment Facilities	Collection Systems
Alabama	273	310	Nevada	55	58
Alaska	49	54	New Hampshire	84	115
Arizona	144	157	New Jersey	145	516
Arkansas	315	359	New Mexico	106	118
California	588	793	New York	517	929
Colorado	300	354	North Carolina	485	574
Connecticut	91	135	North Dakota	297	302
Delaware	17	35	Ohio	685	927
Dist. of Columbia	1	1	Oklahoma	497	514
Florida	268	317	Oregon	208	240
Georgia	379	486	Pennsylvania	740	1,410
Hawaii	25	25	Rhode Island	20	29
Idaho	166	191	South Carolina	207	246
Illinois	726	1,005	South Dakota	281	284
Indiana	393	447	Tennessee	246	310
Iowa	726	759	Texas	1,311	1,576
Kansas	576	608	Utah	108	182
Kentucky	236	288	Vermont	92	102
Louisiana	309	364	Virginia	242	345
Maine	141	174	Washington	258	329
Maryland	164	219	West Virginia	204	278
Massachusetts	122	216	Wisconsin	592	787
Michigan	391	645	Wyoming	103	120
Minnesota	511	634	Amer. Samoa	2	2
Mississippi	301	344	Guam	7	7
Missouri	652	708	No. Marianas	2	2
Montana	175	182	Puerto Rico	30	30
Nebraska	449	516	Virgin Islands	12	12
			Total	16,024	20,670

Table C-2

1996 Clean Water Needs Survey
Number of Operational Treatment Facilities and Collection Systems
When All Documented Needs Are Met

Table C-2 summarizes the number of treatment facilities and collection systems planned to be in operation in each State and U.S. Territory when all documented needs are met.

State	Treatment Facilities	Collection Systems	State	Treatment Facilities	Collection Systems
Alabama	436	483	Nevada	65	69
Alaska	58	61	New Hampshire	88	124
Arizona	184	206	New Jersey	153	553
Arkansas	370	430	New Mexico	116	132
California	643	869	New York	652	1,128
Colorado	315	382	North Carolina	543	741
Connecticut	104	161	North Dakota	297	302
Delaware	19	49	Ohio	797	1,137
Dist. of Columbia	1	1	Oklahoma	501	533
Florida	292	345	Oregon	216	253
Georgia	343	495	Pennsylvania	977	1,794
Hawaii	33	33	Rhode Island	22	33
Idaho	189	219	South Carolina	234	289
Illinois	819	1,125	South Dakota	290	293
Indiana	434	510	Tennessee	254	331
Iowa	739	773	Texas	1,540	1,849
Kansas	600	648	Utah	122	208
Kentucky	317	392	Vermont	96	110
Louisiana	426	492	Virginia	298	447
Maine	161	198	Washington	271	353
Maryland	189	322	West Virginia	452	631
Massachusetts	137	257	Wisconsin	644	982
Michigan	441	740	Wyoming	103	120
Minnesota	532	665	Amer. Samoa	2	2
Mississippi	373	470	Guam	6	7
Missouri	716	842	No. Marianas	4	4
Montana	193	211	Puerto Rico	30	30
Nebraska	454	525	Virgin Islands	12	12
			Total	18,303	24,371

Table C-3

**1996 Clean Water Needs Survey
Number of Treatment Facilities by Flow Range**

Table C-3 shows, for five flow ranges, the number of treatment facilities in operation in 1996 and projected to be in operation when all documented needs are met. The number of facilities and their cumulative flow (in millions of gallons per day) are shown for each of the flow ranges.

TREATMENT FACILITIES IN OPERATION IN 1996

Existing Flow Range (mgd)	Number of Facilities	Total Existing Flow (mgd)
0.000 to 0.100	6,444	287
0.101 to 1.000	6,476	2,323
1.001 to 10.000	2,573	7,780
10.001 to 100.000	446	11,666
100.001 and greater	47	10,119
Other*	38	—
Total	16,024	32,175

TREATMENT FACILITIES IN OPERATION WHEN ALL DOCUMENTED NEEDS ARE MET

Design Flow Range (mgd)	Number of Facilities	Total Future Design Flow Capacity (mgd)
0.000 to 0.100	6,449	320
0.101 to 1.000	7,522	2,794
1.001 to 10.000	3,528	11,478
10.001 to 100.000	727	19,093
100.001 and greater	69	15,102
Other*	8	—
Total	18,303	48,787

*Note: Flow data were unavailable for these facilities.

Table C-4

**1996 Clean Water Needs Survey
Number of Treatment Facilities by Level of Treatment**

Table C-4 shows, by level of treatment, the number of treatment facilities in operation in 1996 and projected to be in operation when all documented needs are met. The number of facilities, their cumulative capacities (in millions of gallons per day), and the population served are shown for each level of treatment.

TREATMENT FACILITIES IN OPERATION IN 1996

Level of Treatment	Number of Facilities	Present Design Capacity (mgd)	Number of People Served	Percent of U.S. Population
Less than Secondary Treatment	176	3,054	17,177,492	6.5
Secondary Treatment	9,388	17,734	81,944,349	31.0
Greater than Secondary Treatment	4,428	20,016	82,928,182	31.4
No Discharge	2,032	1,421	7,660,876	2.9
Total	16,024	42,225	189,710,899	71.8

TREATMENT FACILITIES IN OPERATION WHEN ALL DOCUMENTED NEEDS ARE MET

Level of Treatment	Number of Facilities	Future Design Capacity (mgd)	Number of People Served	Percent of U.S. Population
Less than Secondary Treatment	61	601	5,513,147	1.8
Secondary Treatment	9,738	17,795	102,321,429	32.9
Greater than Secondary Treatment	6,135	28,588	152,724,017	49.0
No Discharge	2,369	1,803	14,163,722	4.5
Total	18,303	48,787	274,722,315	88.2

Table C-5

1996 Clean Water Needs Survey
Number of Combined Sewer Facilities

Table C-5 presents the number of combined sewer facilities identified during the 1996 CWNS.

State	Number of Facilities	State	Number of Facilities
Alabama	0	Nevada	0
Alaska	1	New Hampshire	5
Arizona	0	New Jersey	37
Arkansas	0	New Mexico	0
California	4	New York	64
Colorado	1	North Carolina	1
Connecticut	10	North Dakota	0
Delaware	2	Ohio	110
Dist. of Columbia	1	Oklahoma	0
Florida	0	Oregon	5
Georgia	6	Pennsylvania	110
Hawaii	0	Rhode Island	3
Idaho	0	South Carolina	0
Illinois	104	South Dakota	3
Indiana	119	Tennessee	3
Iowa	16	Texas	0
Kansas	3	Utah	0
Kentucky	24	Vermont	20
Louisiana	0	Virginia	4
Maine	46	Washington	16
Maryland	8	West Virginia	57
Massachusetts	28	Wisconsin	3
Michigan	48	Wyoming	0
Minnesota	2	Amer. Samoa	0
Mississippi	0	Guam	0
Missouri	12	No. Marianas	0
Montana	1	Puerto Rico	0
Nebraska	3	Virgin Islands	0
		Total	880

Appendix D:

Summary of 1996 CWNS Documentation Types

Table D-1

1996 Clean Water Needs Survey
List of Acceptable Documentation Types

Table D-1 lists the 31 document types that were acceptable for justifying needs and/or costs for the 1996 Clean Water Needs Survey.

DOCUMENTATION TYPE	Allowable for Justification of	
	Need	Cost
1. Capital Improvement Plan A capital plan must adequately address why the project is needed and provide costs which are project specific.	Yes	Yes ^a
2. Infiltration/Inflow (I/I) Analysis An I/I analysis is a document that identifies excessive flow problems due to infiltration or inflow into the sewage conveyance system. The I/I analysis itself may be contained within a Facility Plan, a Sewer System Evaluation Survey, or a Combined Sewer Overflow Report.	Yes	Yes
3. Sewer System Evaluation Survey (SSES) An SSES is a document that contains the results of a sewer system survey, manhole inspection, smoke testing, and flow monitoring. It is used to evaluate the physical condition of a sewer system and identifies areas of combined sewers, downspout connections, and locations where the sewer system is at capacity. In many cases a CSO study is placed in this category.	Yes	Yes
4. Final Engineer's Estimate The final engineer's report is typically submitted as a result of a detailed facility design.	Yes	Yes
5. Cost of Previous Comparable Construction This document may be used to justify costs if stringent guidelines are followed and the costs are project specific.	No	Yes ^a
6. Facilities Plan Excerpts from a facilities plan are acceptable forms of documentation to justify a need and to update cost estimates.	Yes	Yes
7. Plan of Study This documentation type must be an official project description. A plan of study precedes a facilities plan.	Yes	No

Table D-1 — Continued

1996 Clean Water Needs Survey
List of Acceptable Documentation Types

DOCUMENTATION TYPE	Allowable for Justification of	
	Need	Cost
8. State Priority List/Intended Use Plan The 1-year fundable plus 4-year planning portion of the FY1996 or 1997 list may be used to document need as long as it was accepted by the Region. The cost estimate report on the priority list may be used to document a cost estimate for the facility if the project is in the fundable portion of the priority list. Projects on the fundable portion of the current intended use plan may also be used for cost estimates.	Yes	See Note b
9. State-Approved Area-Wide or Regional Basin Plan CWA Section 208 and 303 Regional Basin Plans are broad-based water quality management plans written to identify future planning for areas within a State. Only Section 208 and 303 documents that contain site-specific information and a description of a need can be accepted as documentation of need. Documentation of cost is assessed on a case-by-case basis depending on the amount of detail reported and the source of the information.	Yes	Yes ^a
10. Federal or State Grant Application Form or SRF Loan Application Federal or equivalent State grant applications or SRF applications may be used to document needs and to update costs for the categories in which the grant money is requested. Applications should contain sufficient clearly written narrative that defines the specific project and the water quality and/or public health problem. If an equivalent State grant program application is used as documentation, <i>the form must be submitted</i> .	Yes	Yes
11. Municipal Compliance Plan (MCP) A MCP is developed when a municipality needs to construct a wastewater treatment facility to achieve compliance. The MCP should describe the necessary treatment technology and estimated cost, outline the proposed sources and methods of financing the proposed facility (both construction and operation and maintenance), and provide a schedule for achieving compliance as soon as possible.	Yes	Yes
12. Diagnostic Evaluation Results of Municipal Wastewater Treatment Plants Demonstrating Need for Construction A diagnostic evaluation is usually performed when a facility cannot achieve effluent discharge permit limits or when it experiences design, operational, analytical, or financial problems that limit the performance of the facility. This type of evaluation may be used to document a need if the results indicate that construction is necessary to achieve compliance.	Yes	No

Table D-1 — Continued

1996 Clean Water Needs Survey
List of Acceptable Documentation Types

DOCUMENTATION TYPE	Allowable for Justification of	
	Need	Cost
13. Administration Order / Court Order / Consent Decree Demonstrating Need to Construct These official documents are usually issued as the result of continued violation of an NPDES permit or other pollution control requirements. The order or decree must state a need for construction to correct the violation in order to document the need. Cost curves will be used to calculate associated costs.	Yes	No
14. Sanitary Survey or Certification from a Health Official A Sanitary Survey is a logical, investigative approach to gather information to evaluate the condition of existing on-site wastewater systems. The sanitary survey must document high area-wide failure rates that are considered serious enough to be a health hazard (such as ground water contamination caused by malfunctioning septic tanks) in order to document a need. The documentation must clearly state that on-site failures are contributing to a water pollution or health-related problem. This documentation will be reviewed by EPA on a case-by-case basis.	Yes	No
15. State-Approved Local/County Comprehensive Water and Sewer Plans These plans are similar to State-Approved Area-Wide Basin Plans. These local plans also cover fairly large areas and might not contain project-specific information. These local plans must clearly identify a water quality or health-related problem and must be project specific to be acceptable as documentation.	Yes	Yes ^a
16. State Certification of Excessive Flow This document may be used to demonstrate that a need exists for infiltration/inflow correction.	Yes	No
17. State Approved Municipal Wasteload Allocation Plan A Municipal Wasteload Allocation Plan is a water quality analysis done to determine the level of treatment required by a specific project, which is ultimately translated into an effluent limitation for the NPDES permit. These plans can be used to justify the need for a treatment plant enlargement or upgrade as long as the study identifies a specific sewage treatment point source and appropriate design flows and treatment levels. This plan can be used to document a need and may be used to update costs if the project descriptions identify specific costs.	Yes	Yes ^a
18. For EPA Use Only States should not use this documentation code.	Not Available for State Use	Not Available for State Use

Table D-1 — Continued
 1996 Clean Water Needs Survey
 List of Acceptable Documentation Types

DOCUMENTATION TYPE	Allowable for Justification of	
	Need	Cost
19. Full Grant/Loan Award and	--	--
20. Partial Grant/Loan Award		
The costs in the CWNS database should be reduced based on the grant awards or SRF loans. If the total needs have been satisfied, the needs should be reduced to zero and a "19" entered in the documentation type. If only a part of the needs have been satisfied, the needs estimate should be reduced by the grant or loan amount, with the difference entered in the correct needs category and a "20" (partial grant/loan award) entered as the documentation type.		
21. NPDES or State Permit Requirements (with Schedule)	Yes	No
The National Pollutant Discharge Elimination System (NPDES) is a permitting program implemented under authority of the CWA that is designed to control point source discharges of pollution. Facilities not meeting effluent limitations and on compliance schedules or facilities <i>required</i> to plan because they are at or near plant capacity may submit documentation under documentation type 21.		
22. Municipal Storm Water Management Plan	Yes	No ^c
A Municipal Storm Water Management Plan is a plan submitted as a proposed municipal storm water management program as part of a municipality's NPDES storm water permit application. It includes a description of structural and source control measures that are to be implemented to (1) reduce pollutants in runoff from commercial and residential areas that are discharged from the storm sewer, (2) detect and remove illicit discharges and improper disposal into storm sewers, (3) monitor pollutants in runoff from industrial facilities that discharge to municipal separate storm sewers, and (4) reduce pollutants in construction site runoff that is discharged to municipal separate storm sewers.		
23. Nonpoint Source Management Plan/Assessment Report	Yes	No ^c
A Nonpoint Source Management Plan is a 4-year plan developed by a State to address nonpoint source pollution problems. Elements in the program include: identification of the best management practices and measures to reduce pollutant loading; programs to achieve implementation; a schedule with annual milestones, costs, and identification (text continued on next page)		

Table D-1 — Continued

1996 Clean Water Needs Survey
List of Acceptable Documentation Types

DOCUMENTATION TYPE	Allowable for Justification of	
	Need	Cost
23. Nonpoint Source Management Plan/Assessment Report — Continued	Yes	No ^c
of specific projects; certification that the laws of the State will provide adequate authority to implement the plan; and sources of funding and assistance. A Nonpoint Source Assessment Report assesses the extent of pollution due to diffuse or nonpoint sources within a State. The report identifies navigable waters that require nonpoint source controls to achieve CWA water quality standards, sources and amounts of such pollution, and State and local control programs. It also describes the process that will be used to identify best management practices. EPA will consider other documentation, such as nonpoint source grant applications and State's surveys, on a case-by-case basis.		
24. Nonpoint Source Management Plan/Ground Water Protection Strategy	Yes	No ^c
States can use a Comprehensive Ground Water Protection Strategy to document NPS needs if the strategy is part of a Nonpoint Source Management Program. The goals of this major Federal initiative addressing ground water protection are to strengthen State ground water programs; deal with significant, poorly addressed ground water problems; create a policy framework within EPA for the guidance of ground water policy; and strengthen the ground water organization within EPA. Included in such a strategy are programs established under the SDWA such as regulation of the injection of wastes into deep wells, the Wellhead Protection Program, and the Sole Source Aquifer program. Provisions in the Resource Conservation and Recovery Act (RCRA) for leaking underground storage tanks, goals in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) for contaminated ground water sites, and State grant programs in the CWA for ground water protection activities are covered by this strategy.		
25. Nonpoint Source Management Plan/Well-Head Protection Program and Plan	Yes	No ^c
A well-head Protection Plan can be used to document NPS needs if it is part of a Nonpoint Source Management Program. As part of its overall ground water protection strategy, each State must delineate well-head protection areas for wells or well fields used for public water supply. Contaminant sources within the well-head protection area must be identified and a management plan developed to protect the water supply in that area from contamination. Contingency plans for each public water supply system must be developed to ensure an appropriate response in the event that contamination occurs, and standards must be established for locating new wells so as to minimize the potential for contamination of the water supply.		

Table D-1 — Continued

1996 Clean Water Needs Survey
List of Acceptable Documentation Types

DOCUMENTATION TYPE	Allowable for Justification of	
	Need	Cost
26. Nonpoint Source Management Plan/Delegated Underground Injection Control Program Plan States can document needs to address NPS aspects of a Delegated Underground Injection Control Program Plan if it is part of the State's Nonpoint Source Management Program. As part of the Safe Drinking Water Act, EPA and State Underground Injection Control Programs were established to protect potential underground sources of drinking water from contamination by injection wells.	Yes	No ^c
27. Estuary Comprehensive Conservation Management Plan A Comprehensive Conservation Management Plan (CCMP) is a management plan developed for an estuary that has been nominated for the CWA section 320 National Estuary Program. The CCMP summarizes findings, identifies and establishes a priority for addressing problems, determines environmental quality goals and objectives, identifies action plans and compliance schedules for pollution control and resource management, and ensures that designated uses of the estuary are protected.	Yes	No ^c
28. Funding Applications (<i>applicable only for communities with populations <3,500</i>) All applications for funding (with signed agency review sheets, e.g., Rural Economic and Community Development - formerly Farmers Home Administration, Community Development Block Grant - Housing and Urban Development) other than SRF are acceptable for need. The application is acceptable for cost if an engineering report is reviewed by qualified state project staff. (See documentation type 10 for SRF loan applications.)	Yes	Yes
29. State Needs Surveys (<i>applicable only for communities with populations <3,500</i>) All State Needs Surveys are acceptable <i>for documenting need</i> if: • A local government official's signature is included ("local" means city, community, town, borough, village, or county). • Information describing the problem is attached. • Information describing prior or ongoing planning efforts and descriptions of the cost-effective control option are offered. State Need Surveys are acceptable <i>for documenting cost</i> if a cost estimate that has been prepared and signed by an engineer or engineer circuit rider is attached. The cost estimate need not be as detailed as that found in a facility plan, but must include the engineer's rationale for the estimate. Qualified state project staff must also sign a statement of cost reasonableness after reviewing the estimate.	Yes	Yes
30. Model Survey (<i>applicable only for communities with populations <1,000</i>) Use of a standard or "model" survey form (only for populations <1,000) is acceptable for documenting need (and cost) as long as signatures are included. If costs are not included, cost curves will be used.	Yes	Yes

Table D-1 — Continued

1996 Clean Water Needs Survey
List of Acceptable Documentation Types

DOCUMENTATION TYPE	Allowable for Justification of	
	Need	Cost
31. Information from an Assistance Provider (<i>applicable only for communities with populations <3,500</i>) A statement of need from a technical assistance provider (State training center, health department, circuit rider, etc.) with soils/geologic report would document need for communities. Local official and provider signatures must be included. Cost curves will be used to document costs. Remember that cost curves are based on simple regressions of data in the CWNS and represent "comparable costs" even though the cost curves might not include <i>all</i> allowable costs.	Yes	No
a Documentation will be reviewed by the contractor to make sure that costs are within acceptance ranges. b Only the 1-year fundable portion can be used to justify cost. c Documentation may have information that can be used to justify cost. Cost justification for Categories I-VII must be project specific, and distributable among Categories I-VII.		