

## Chapter 3

## Key Results

## Need

A water quality or public health problem and an associated abatement cost that is eligible for funding under the CWSRF.

### What are the total needs for the Nation?

The total CWSRF-eligible needs for the Nation as of January 1, 2000, are \$181.2 billion (Table 3-1). Appendix A (Tables A-1 and A-2) presents the total CWSRF-eligible needs for all categories and by State. Unlike the previous two surveys (1992 and 1996), which combined documented and modeled needs, all of the needs presented in this chapter are documented.<sup>1</sup> The needs for wastewater treatment (Categories I and II) are \$57.2 billion, or 31.6 percent of the total needs. Needs for wastewater collection (Categories III and IV) amount to \$54.1 billion, or 29.9 percent of the total needs. Category V (Combined Sewer Overflow Correction) needs are \$50.6 billion (27.9 percent), and Category VI (storm water management programs) needs are \$5.5 billion (3.0 percent). Nonpoint source pollution control needs (Category VII) total \$13.8 billion (7.6 percent). These needs are presented in Figure 3-1. As discussed later, the storm water management program and NPS pollution control needs presented in this report underestimate the Nation's needs because only a limited number of States were able to dedicate resources toward identifying and reporting those needs.

Figure 3-2 displays the geographic distribution of the total documented needs by State. The largest total needs occur in New York and California, which is similar to the results of the 1996 Clean Water Needs Survey. New York has \$20.4 billion in needs, while California has more than \$14.4 billion in needs. New Jersey and Illinois each have needs in excess of \$10 billion.

Three-fourths (75.5 percent) of the total needs reported are concentrated in 16 States, while 22 States and the

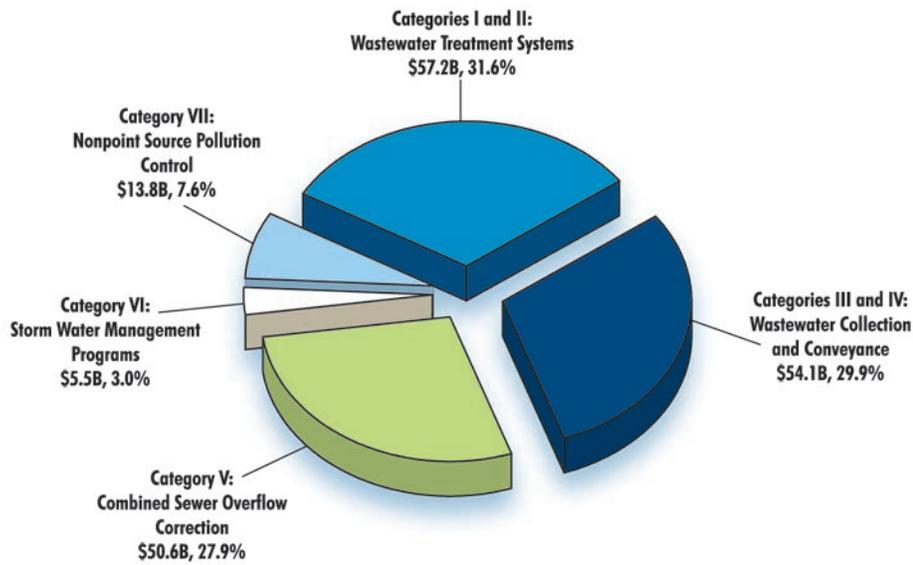
**Table 3-1.** Total Documented Needs Reported in the CWNS 2000 (January 2000 dollars in billions)

Needs Category	Total Needs
<b>Publicly Owned Wastewater Treatment and Collection Systems and Storm Water Management Programs</b>	
I Secondary wastewater treatment	36.8
II Advanced wastewater treatment	20.4
III-A Infiltration/inflow correction	8.2
III-B Sewer replacement/rehabilitation	16.8
IV-A New collector sewers and appurtenances	14.3
IV-B New interceptor sewers and appurtenances	14.8
V Combined sewer overflow correction	50.6
VI Storm water management programs	5.5
<b>Total Categories I-VI</b>	<b>167.4</b>
<b>Nonpoint Source Pollution Control</b>	
VII-A Agriculture (cropland)	0.5
VII-B Agriculture (animals)	0.7
VII-C Silviculture	0.04
VII-D Urban	4.4
VII-E Ground water protection (unknown source)	0.9
VII-F Marinas	0.002
VII-G Resource extraction	0.04
VII-H Brownfields	0.4
VII-I Storage tanks	1.0
VII-J Sanitary landfills	1.8
VII-K Hydromodification	4.1
<b>Total Category VII</b>	<b>13.8</b>
<b>Grand Total</b>	<b>181.2</b>

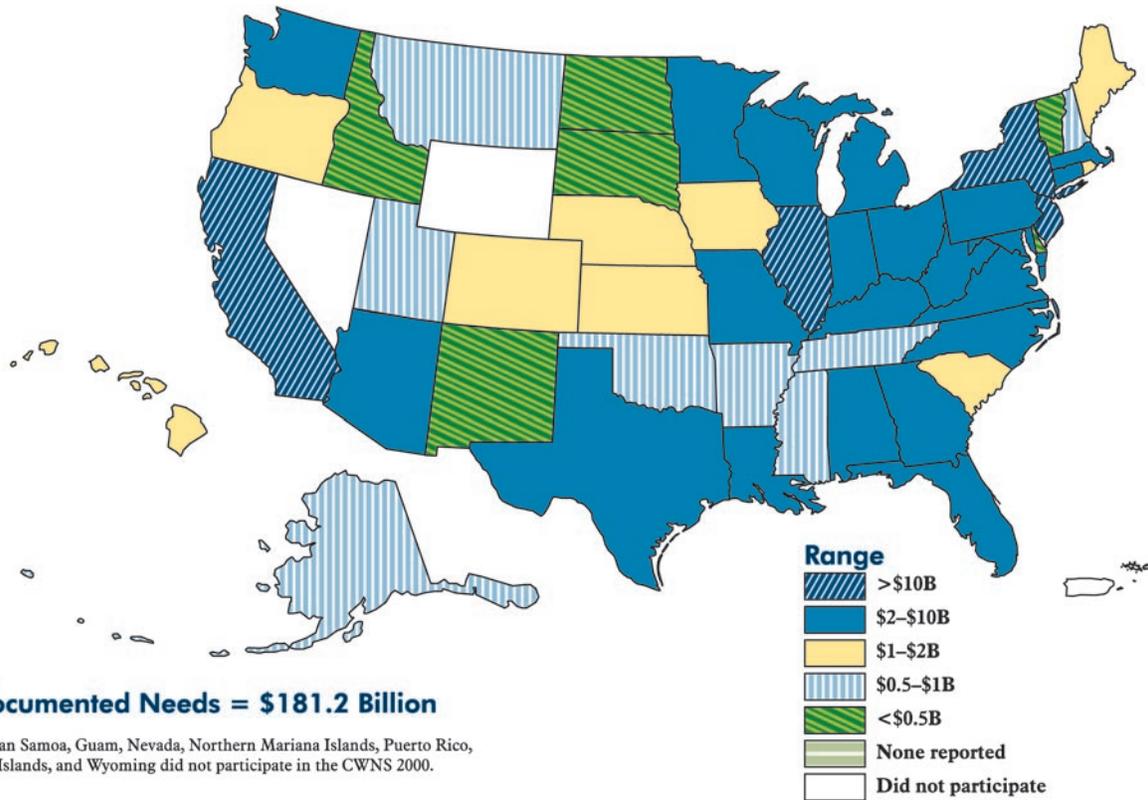
## Notes:

- 1) Nonpoint source pollution control modeled needs are \$21.5 billion in January 2000 dollars (Appendix D).
- 2) Costs for operation and maintenance are not CWSRF-eligible and therefore are not included.
- 3) See Appendix A, Tables A-1 and A-2, for needs by category and State. Needs estimates presented in Table 3-1 may vary slightly from those presented in the text because of rounding.

<sup>1</sup> A separate discussion of the SSO model is presented in Chapter 4. The NPS pollution control model is described in Appendix D, and the storm water model is discussed in Appendix E.



**Figure 3-1.** CWNS 2000 total documented needs (January 2000 dollars). The figure shows only *documented* needs. Note that nonpoint source pollution control *modeled* needs are \$21.5 billion in January 2000 dollars (Appendix D).



**Figure 3-2.** Geographic distribution of total documented needs (January 2000 dollars in billions).

District of Columbia report less than 1 percent of the total needs each.

### What are the recent trends in the Nation's municipal wastewater treatment infrastructure needs?

In 1972 more than 4,800 facilities were providing less than secondary treatment or discharging raw sewage into the Nation's waters. As a result of the CWA and its associated funding mechanisms, significant progress has been made to improve wastewater treatment across the Nation. Construction Grants provided municipalities with \$61.1 billion from 1972 though 1996 toward meeting the goals of the CWA. In addition, \$16.2 billion had been awarded to States through the CWSRF Program as of January 1, 2000. In turn, the States provided assistance of \$28.2 billion to municipalities, mainly through loans. Tables 3-2 and 3-3 present the current status of the level of treatment based on past needs surveys and the anticipated progress based on the needs reported in this report.<sup>2</sup> To report this progress, the States invest a significant effort in each survey to identify new projects and update previously identified projects. States also examine individual facilities to determine whether proposed projects have been built and whether subsequent planning documents show consolidation or splitting of specific construction projects.

The 1992 Needs Survey reported an inventory of 15,613 operational treatment plants serving approximately 180.6 million people. About 32.2 percent and 26.4 percent of the U.S. population were served by secondary and greater-than-secondary treatment plants, respectively. About 8.4 percent of the population was served by 868 facilities providing less-than-secondary treatment. In 1996 the number of operational facilities increased to 16,024; in 2000, to 16,255. Since 1992 the number of

facilities providing less-than-secondary treatment has declined by 94.5 percent, and the population served by these facilities has been reduced from 21.7 million people to 6.4 million people. In comparison to 1992, an additional 27.2 million people receive centralized collection and wastewater treatment, and 69 percent of the U.S. population is served by municipal wastewater treatment plants that provide secondary or better levels of treatment.

Table 3-3 shows the projected improvements in wastewater treatment infrastructure if the secondary and advanced wastewater treatment needs (Categories I and II) are met. Information for this table was taken from the 1996 Clean Water Needs Survey when States did not have the resources to update data for all their facilities or when States and territories did not participate in the CWNS 2000. The number of facilities providing secondary or more advanced treatment is projected to increase by 8.2 percent from 14,048 to 15,202. Based on the needs presented, EPA projects that a total of 17,674 operational facilities will serve a future population of 269 million people, or 83 percent of the U.S. population. EPA expects that the projected increase in centralized collection and treatment systems might be lower than expected for the next survey as more planning authorities recognize that properly designed, constructed, and operated on-site



Photo by Lynn Betts, courtesy of USDA NRCS

<sup>2</sup> Other related technical data discussed in this section are provided in Appendix C, Table C-4.

**Table 3-2.** Improvements in Treatment Level of the Nation's Municipal Wastewater Treatment Facilities

Level of Treatment	1992 Number of Facilities	1996 Number of Facilities	Change 1992–1996	2000 Number of Facilities	Change 1992–2000	Change 1996–2000
No Discharge <sup>a</sup>	1,981	2,032	2.6%	1,938	-2.2%	-4.6%
Less Than Secondary <sup>b</sup>	868	176	-79.7%	47	-94.5%	-73.3%
Secondary	9,086	9,388	3.3%	9,156	0.8%	-2.5%
Greater Than Secondary	3,678	4,428	20.4%	4,892	33.0%	10.5%
Total Facilities	15,613	16,024	2.6%	16,255 <sup>c</sup>	4.1%	1.4%

Note: A secondary treatment level is defined as meeting an effluent quality of 30 mg/L for biochemical oxygen demand (BOD) and suspended solids.

<sup>a</sup> No discharge refers to facilities that do not discharge effluent to surface waters (e.g., spray irrigation, ground water recharge).

<sup>b</sup> Includes facilities granted section 301(h) waivers from secondary treatment for discharges to marine waters. As of January 1, 2000, waivers for 34 facilities in the CWNS 2000 database had been granted or were pending.

<sup>c</sup> The number of facilities includes 222 facilities that provide partial treatment and whose flow goes to another facility for further treatment.

**Table 3-3.** Projected Infrastructure Improvements If All CWNS 2000 Needs Are Met

Indicator	Existing	Projected <sup>a</sup>	Change
Total number of operational treatment facilities	16,255 <sup>b</sup>	17,674 <sup>b</sup>	8.7%
Treatment facilities providing secondary or more advanced treatment	14,048	15,202	8.2%
Treatment facilities providing less-than-secondary treatment	47	27	-42.6%
Treatment facilities with granted or pending section 301(h) waivers	34	26	-23.5%
Treatment facilities without section 301(h) waivers	13	1	-92.3%
Total design capacity of treatment facilities (in mgd)	45,058	50,041	11.1%
Total population served by wastewater treatment facilities (in millions)	207.8	269.0	29.5%

Note: This table contains information from EPA-reviewed and accepted facilities and information from facilities that were not reviewed by EPA. EPA did not review facilities for which States did not have the resources to update their data or facilities in States and territories that did not participate in the CWNS 2000. In such circumstances, information for this table was taken from the 1996 Clean Water Needs Survey.

<sup>a</sup> Projected infrastructure levels if all needs are met.

<sup>b</sup> These numbers include totals for facilities that are no discharge or provide only partial treatment.

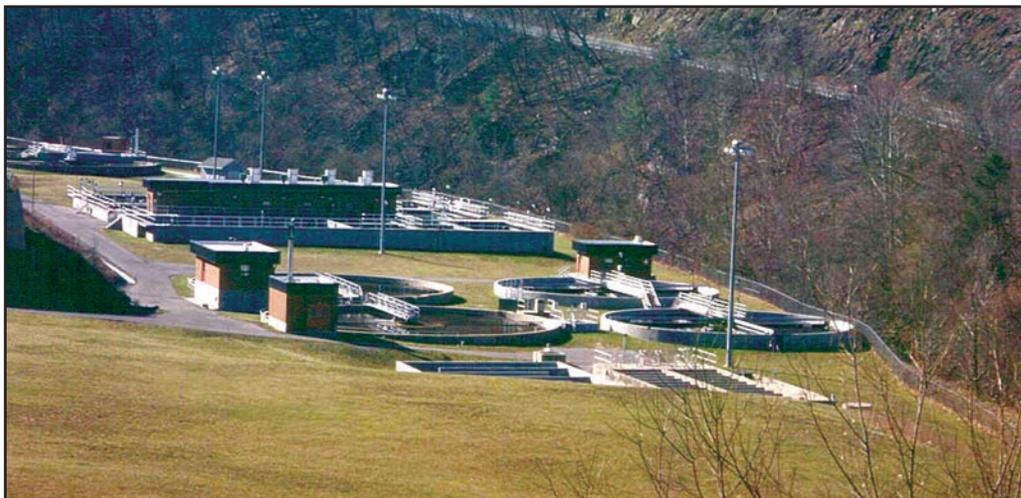


Photo courtesy of Virginia Department of Health

systems should be considered a permanent part of the wastewater infrastructure rather than an interim solution.

The number of facilities that provide less-than-secondary treatment is projected to decline from 47 facilities serving 6.4 million people to 27 facilities serving 3.9 million people, nearly all of whom (99.99 percent) will be served by facilities with section 301(h) waivers. Section 301(h) of the CWA provides an opportunity for a facility that discharges to marine waters to obtain a waiver from the act's secondary treatment requirements, provided the facility can show compliance with a number of stringent criteria intended to ensure that the less-than-secondary discharge will not adversely affect the marine environment.

As the Nation moves into the new millennium, continued improvements in infrastructure might be measured not by population served and improved levels of treatment but by measures of capital infrastructure renewal (that is, projects that focus on rehabilitation, replacement, and process improvement of existing infrastructure). This is a reasonable progression because a significant portion of the Nation's infrastructure has reached, or soon will reach, the end of its projected useful life.

### How have the wastewater treatment and collection needs changed?

The needs reported, in January 2000 dollars, for the wastewater treatment and collection categories (Categories I through V) increased from \$133.7 billion to \$161.9 billion, a \$28.2 billion (or 21.1 percent) increase from the 1996 Clean Water Needs Survey to the CWNS 2000 (Table 3-4). This change reflects, in part, facility improvements for meeting increasingly stringent water quality standards for treatment plant effluents, SSO correction, and maintenance of existing infrastructure. Four needs categories account for the most significant increase in needs since the 1996 Clean Water Needs Survey: Category I increased by \$7.4 billion; Category III-A, by \$4.5 billion; Category III-B, by \$9.1 billion; and Category IV-B, by \$2.9 billion.

### Secondary treatment

A treatment level that meets an effluent quality of 30 mg/L (30-day average) of both BOD<sub>5</sub> and total suspended solids.

### Advanced treatment

A treatment level that is more stringent than secondary or produces a significant reduction in nonconventional pollutants present in the wastewater effluent.

Analysis of the CWNS 2000 needs categories with substantial changes in need from 1996 revealed a distinct pattern. Overall, 125 wastewater treatment and collection system facilities had total needs that increased by more than \$100 million over their total reported needs in 1996. The increased needs from these facilities account for \$38.7 billion (24 percent) of the total wastewater treatment and collection system needs in the CWNS 2000. A small proportion of the facilities analyzed (less than 5 percent) have increases greater than \$100 million in at least one need category from the same category need in the 1996 Clean Water Needs Survey. The impact of these facilities on the overall increase in needs is substantial and disproportionate to the number of facilities reporting needs. For example, the increase of secondary wastewater treatment (Category I) needs from facilities where Category I needs increased by \$100 million accounted for 22.1 percent of the total Category I needs but represented only 0.4 percent of the total number of facilities reporting Category I needs.

About \$19.0 billion in Category I (secondary wastewater treatment) needs and \$13.7 billion in Category II (advanced wastewater treatment) needs are new needs entered for the CWNS 2000. These needs, totaling \$32.7 billion, are a subset of the \$57.2 billion in Category I and II needs reported in Table 3-4. The remaining \$17.8 billion in Category I needs and \$6.7 billion in Category II needs were entered for the same facilities in the 1996 Clean Water Need Survey and updated for the CWNS 2000. These needs are either carried forward or associated with projects that

**Table 3-4.** Comparison of Total Needs for the 1992 Needs Survey, 1996 Clean Water Needs Survey, and CWNS 2000 (January 2000 dollars in billions)

Needs Category		1992 <sup>a</sup>	1996 <sup>a</sup>	2000
<b>Publicly Owned Wastewater Treatment and Collection Systems and Storm Water Management Programs</b>				
I	Secondary wastewater treatment	39.3	29.4	36.8
II	Advanced wastewater treatment	19.4	19.4	20.4
III-A	Infiltration/inflow correction	3.4	3.7	8.2
III-B	Sewer replacement/rehabilitation	4.6	7.7	16.8
IV-A	New collector sewers and appurtenances	22.5	12.0	14.3
IV-B	New interceptor sewers and appurtenances	18.4	11.9	14.8
V	Combined sewer overflow correction	51.7 <sup>b</sup>	49.6	50.6
VI	Storm water management programs	0.1 <sup>b</sup>	8.2 <sup>b</sup>	5.5
<b>Nonpoint Source Pollution Control Projects</b>				
VII-A	Agriculture (cropland)	4.7 <sup>b</sup>	4.2 <sup>b</sup>	0.5
VII-B	Agriculture (animals)	3.4 <sup>b</sup>	2.3 <sup>b</sup>	0.7
VII-C	Silviculture	3.0 <sup>b</sup>	3.9 <sup>b</sup>	0.04
VII-D	Urban	–	1.1	4.4
VII-E	Ground water protection: unknown source	1.4	1.1	0.9
	Estuaries <sup>c</sup>	0.01	0.04	–
	Wetlands <sup>c</sup>	0.04	0.01	–
VII-F	Marinas	–	–	0.002
VII-G	Resource extraction	–	–	0.04
VII-H	Brownfields	–	–	0.4
VII-I	Storage tanks	–	–	1.0
VII-J	Sanitary landfills	–	–	1.8
VII-K	Hydromodification	–	–	4.1
<b>Total Needs</b>		<b>172.0</b>	<b>154.6</b>	<b>181.2</b>
Treatment Categories I and II only		58.7	48.8	57.2
Collection and conveyance Categories III and IV only		48.9	35.3	54.1
Category I to V subtotal		159.3	133.7	161.9

<sup>a</sup> The needs from 1992 and 1996 were inflated to January 2000 dollars for comparison with CWNS 2000 data.

<sup>b</sup> Modeled needs.

<sup>c</sup> Documented needs for estuaries and wetlands were provided by States during the 1992 and 1996 surveys, but they are no longer reported as individual categories.

provided updated cost estimates for Category I or II. Of the \$32.7 billion in new Category I and II needs, 54.4 percent of the needs are from California, New York, Arizona, Texas, Florida, and Maryland.

Approximately 36.1 percent (\$11.8 billion) of the \$32.7 billion is associated with projects that result in infrastructure improvements to improve the performance of the plant, such as increasing the effluent level (e.g., from secondary to advanced treatment), or increasing the plant capacity to keep up with population growth (Table 3-5). Infrastructure improvements also include the construction of new wastewater treatment plants. Capital renewal projects accounted for 32.4 percent (\$10.6 billion) of the \$32.7 billion in new needs. Capital renewal projects sustain the current level of performance of the plant by implementing rehabilitation, refurbishing, or replacing capital assets to restore an asset, facility, or system to its original condition and function, without increasing treatment capacity or effluent level. Examples include replacing coarse bubble diffusers with fine bubble diffusers or switching from disinfection by chlorination to ultraviolet disinfection, or any other project that does not significantly enhance the performance of the plant. Capital renewal does not include costs for routine operation and maintenance at the wastewater treatment plant. The remaining \$10.3 billion (31.5 percent) is associated with projects that represent a combination of infrastructure improvements and capital infrastructure renewal.

Category III-A and III-B needs are for I/I correction and sewer replacement and rehabilitation. I/I occurs when flow from wet weather conditions enters collection systems through various means, such as pipe cracks and broken joints. Sixty-seven percent of the Category III-A needs were reported for facilities that also require rehabilitation or replacement to correct the documented I/I problems. Facilities requiring rehabilitation or replacement of sewers made up \$10.4 billion (62 percent) of the total Category III-B needs of \$16.8 billion. The remainder of the Category III-A and III-B needs are for facilities that require improvements in addition to rehabilitation and replacement, such

**Table 3-5.** Wastewater Treatment (Category I and II) Needs Entered During the CWNS 2000 (January 2000 dollars in billions)

Wastewater Treatment Plant Investment	January 2000 Dollars (billions)	Percent of Total	Number of Facilities
Infrastructure improvements	11.8	36.1	1,942
Capital renewal	10.6	32.4	1,571
Combination of infrastructure improvements and capital renewal	10.3	31.5	492
Total	32.7	100.0	4,005

as replacing worn-out pumps or adding supervisory control and data acquisition (SCADA) computer systems. The increase in Category III-A and III-B needs since the 1996 Clean Water Needs Survey demonstrates that communities are beginning to plan for the correction of problems that are symptomatic of SSOs and, to a lesser extent, CSOs. A total of \$3.5 billion in Category III-A needs was reported for facilities that States identified as having SSO problems. To further investigate the total capital costs of correcting SSOs for the CWNS 2000, EPA developed an SSO model, which is described in Chapter 4.

### What are the needs for the correction of combined sewer overflows?

Wet weather events are known to cause a variety of water quality problems throughout the Nation. Under various circumstances, precipitation in the form of snow or rain generates runoff that can be contaminated by a number of different pollutant sources (e.g., industrial operations, roadways, land use practices). Where combined sewer systems are in use, wet weather contributes to CSOs. CSOs contain not only storm water but also untreated human and industrial waste, toxic materials, and debris. These materials can be a major water pollution concern for cities with combined sewer systems.

In December 2001 EPA released a report to Congress titled *Implementation and Enforcement of the Combined*



Photo courtesy of USEPA OWM

*Sewer Overflow Control Policy*, hereinafter called the CSO Report. In the CSO Report, EPA documented that 772 communities with CSOs in 31 States and the District of Columbia have been issued 859 CSO NPDES permits that regulate 9,471 CSO discharge points (USEPA, 2001a). In many cases, the facility associated with a CSO community or a CSO permit in the CSO Report is one of the 799 facilities from 33<sup>3</sup> states and the District of Columbia with CSO correction needs reported in the CWNS 2000. However, because of the complexity associated with permitting CSOs and the varied ownership, in particular for satellite collection systems, the number of facilities reported here cannot be directly compared to either the number of CSO permits or the number of CSO communities reported in the CSO Report.

As with other needs categories, States were requested to enter documented needs when available. During the CWNS 2000, States began to enter cost estimates from Long-Term Control Plans (LTCPs). Thirty-four facilities from 10 states documented CSO (Category V) needs using LTCPs. Needs documented in LTCPs account for 7.7 percent of the Category V needs reported in this survey. LTCPs provide the most reliable estimates for the CSO control “Presumption Approach” in the 1994 CSO Policy. (See explanation in the following paragraph.)

When LTCPs or other engineering and planning documents were not available, States could use cost

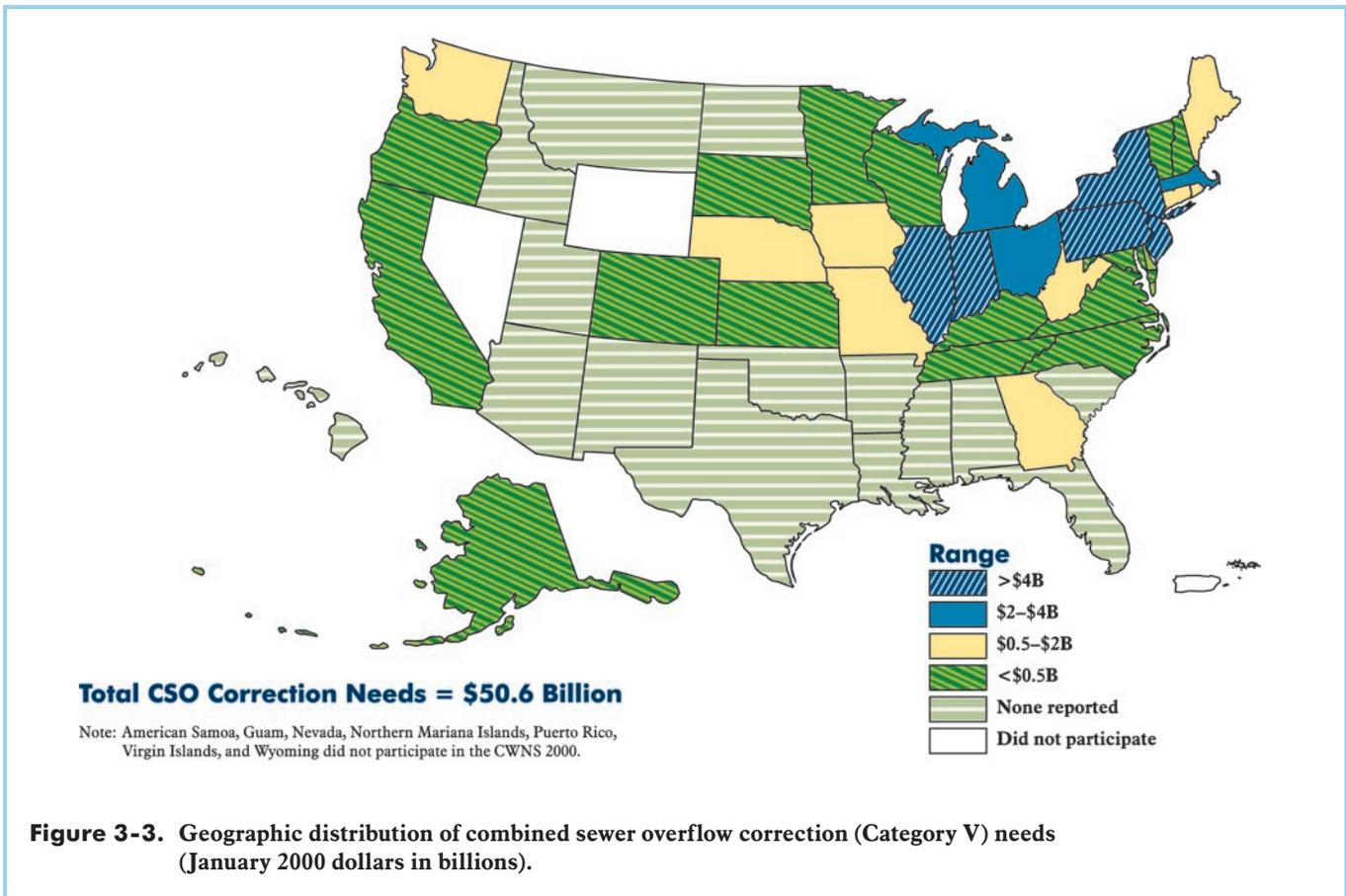
curves to estimate Category V needs. The cost curve methodology for CWNS 2000 was the same as that used in the 1996 Clean Water Needs Survey. The cost curves are based on the approach in the 1994 CSO Policy. The approach calls for capturing 85 percent of the flows that enter the combined sewer system during wet weather events and providing those flows with the equivalent of primary clarification, solids and floatables disposal, and disinfection of the effluent (USEPA, 1994).

EPA is reporting a documented need of \$50.6 billion for control of CSOs. As indicated above, this estimate is based primarily on the “Presumption Approach” in the 1994 CSO Policy. Figure 3-3 shows the geographic distribution of Category V needs. In the CWNS 2000, 799 facilities in 33 states and the District of Columbia reported Category V needs. The largest Category V needs continue to be concentrated in Illinois, Indiana, Massachusetts, Michigan, New Jersey, New York, Ohio, and Pennsylvania. These eight States account for 76.3 percent of the total Category V needs. These results are similar to those of the 1996 Clean Water Need Survey, in which the same eight States accounted for 77.8 percent of the total Category V needs. Appendix C, Table C-5, presents the number of facilities with Category V needs by State and the total Category V needs for the 1996 Clean Water Needs Survey (inflated to January 2000 dollars) and the CWNS 2000.

### What are the needs for municipal storm water management programs?

In response to the 1987 Amendments to the CWA, EPA published regulations implementing Phase I of the NPDES Storm Water Program in 1990. Under Phase I, EPA required NPDES permit coverage for storm water discharges from “medium” and “large” MS4s. The Phase I MS4 requirements are applicable to systems located in incorporated areas or in counties that EPA has identified as having MS4s serving populations of more than 100,000 and systems that the EPA Administrator or the State has designated. The Phase II Final Rule, also a result of the 1987 CWA Amendments, was published in the *Federal Register* on

<sup>3</sup> Colorado and North Carolina are not listed in the *Implementation and Enforcement of the Combined Sewer Overflow Control Policy* (December 2001); however, they have identified Category V needs for CSO correction in the CWNS 2000.



**Figure 3-3. Geographic distribution of combined sewer overflow correction (Category V) needs (January 2000 dollars in billions).**

December 8, 1999. It requires NPDES permit coverage for storm water discharges from “small” MS4s, defined as systems serving populations ranging from 99,999 people to a lower limit based on the U.S. Census Bureau’s definition of an urbanized area (USEPA, 1999).<sup>4</sup>

Twenty States reported \$5.5 billion in needs for developing and implementing municipal storm water management programs (Category VI) under Phases I and II during the CWNS 2000. Appendix A, Table A-1, presents the storm water management program needs by State.

Large and medium MS4s account for \$4.9 billion, or 89 percent of the total storm water management program needs. Small MS4s account for the remaining 11 percent or \$0.6 billion in storm water management program needs, and these needs may include both Phase I and Phase II costs.<sup>5</sup> The geographic distribution of storm water management program needs is presented in

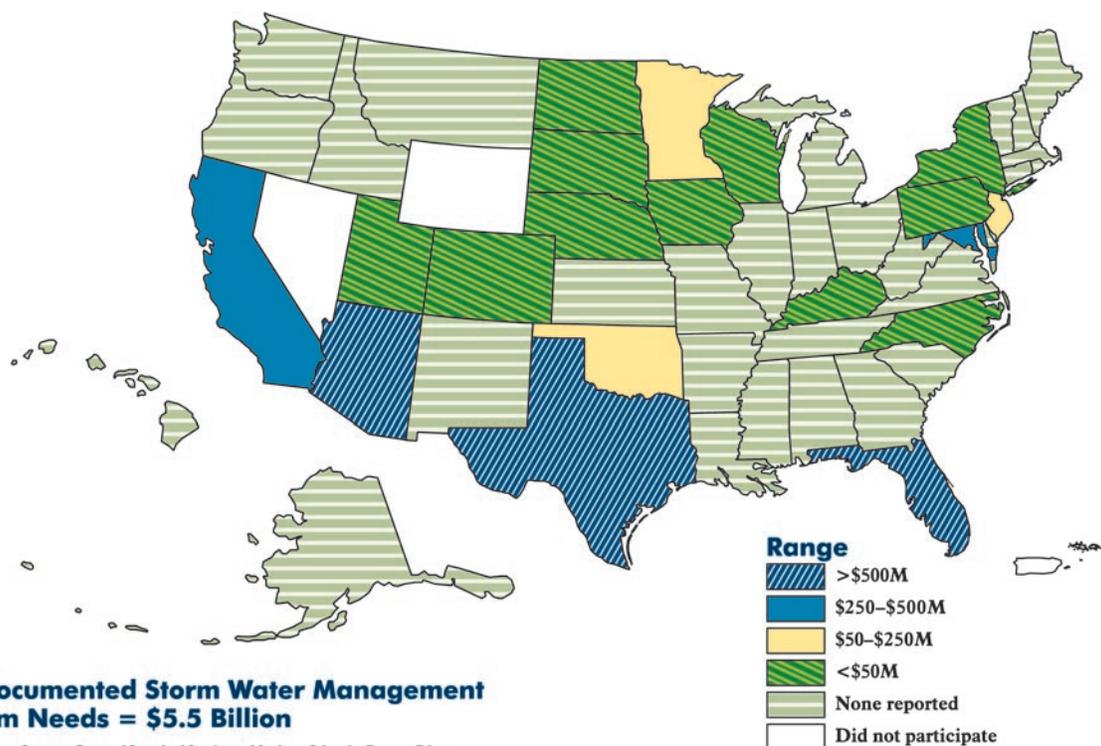
Figure 3-4. Texas, Arizona, Florida, Maryland, and California reported \$2.23 billion, \$1.25 billion, \$0.68 billion, \$0.46 billion, and \$0.35 billion in storm water management program needs, respectively. These five States, from a total of 20 States reporting documented storm water needs, account for 90.3 percent of the total



Photo courtesy of the City of San Diego, CA

<sup>4</sup> The U.S. Census Bureau currently defines *urbanized area* as a densely settled territory that contains 50,000 or more people.

<sup>5</sup> Phase I regulations are applicable to large and medium MS4s, as well as some small MS4s (serving populations of fewer than 100,000 people) that participated in Phase I for various reasons. Some small MS4s are included in the Phase I program as “co-permittees” because they are interconnected with nearby medium or large MS4s. Small MS4s already in the Phase I program will not be required to develop a Phase II program.



**Figure 3-4. Geographic distribution of storm water management program (Category VI) needs (January 2000 dollars in millions).**

storm water management program needs documented in the CWNS 2000.

As of February 2000 approximately 1,017 Phase I MS4 storm water program NPDES permits, covering 886 municipal entities (USEPA, 2000a) in 43 states, had been issued or were in the final stages of being issued. A total of 119 municipal entities in 14 States have documented Phase I storm water management needs in the CWNS 2000. Moreover, 19 additional Phase I municipal entities in some of those 14 States and 5 additional States documented their needs (\$2.5 billion, January 2000 dollars) for storm water management programs during the 1996 Clean Water Needs Survey. The storm water facilities in the CWNS 2000 represents 16 percent of the 886 municipal entities covered by Phase I NPDES permits, indicating that not all of the Phase I needs have been fully captured by this survey. Lack of resources to document storm water management program needs in the format required for the CWNS 2000 and the inability of States to obtain the required data from various municipal

entities are possible reasons for the 745 municipal entities' not including their Phase I storm water management needs in either the 1996 survey or the CWNS 2000.

In addition to the lack of documented needs for Phase I storm water management programs, it is likely that some States did not have documentation of Phase II storm water management program needs available for submission as part of the CWNS 2000 because the deadline for permit coverage for MS4s under the Phase II program is March 10, 2003.

### What are the documented needs for nonpoint source pollution control?

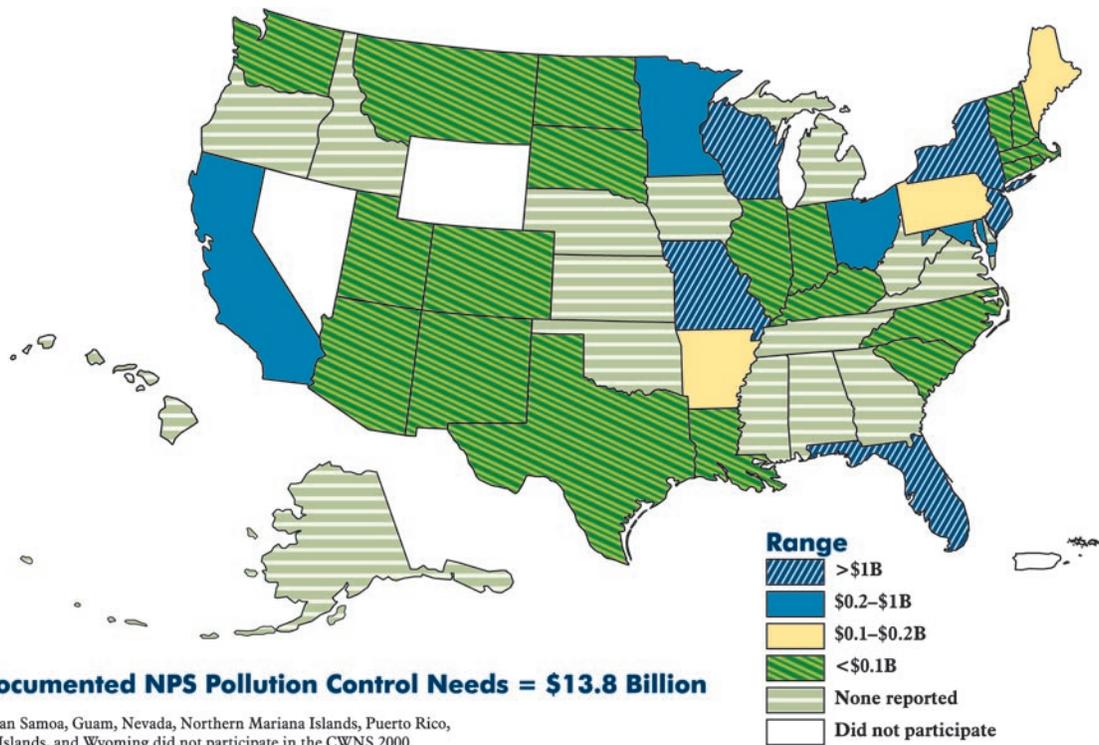
The States have reported for many years that NPS pollution is the most significant source of remaining water quality impairment in the United States. In EPA's most recently published *National Water Quality Inventory*, which summarizes the State water quality reports submitted to the Agency under section 305(b) of the Clean Water Act, the States have, for example,

identified agriculture as causing or contributing to 48 percent of remaining water body impairments in the United States (USEPA, 2002b). The States have also listed hydrologic modification, habitat modification, urban runoff, forestry, and resource extraction as top contributors of water quality impairment. NPS pollution is also a significant contributor to impairments of lakes and coastal estuaries. Nevertheless, despite the evident significance of NPS pollution, the cost of remediating NPS pollution has remained difficult to quantify.

During the 1992 and 1996 surveys, the documentation of NPS pollution control (Category VII) needs was very limited; EPA reported modeled needs in those surveys for three need categories (Table 3-4). For the CWNS 2000, EPA and the States made a concerted effort to report documented NPS pollution control needs. As with previous surveys, documenting NPS pollution control projects for this survey presented a challenge to the States. The States found that obtaining information

to justify water quality or public health problems for individual projects and providing acceptable estimates of the costs to alleviate the pollution problem were often difficult or that the available information did not meet the CWNS 2000 documentation requirements.

Thirty-three States provided documented needs totaling \$13.8 billion for NPS pollution control (7.6 percent of total needs), which is an increase of \$10.9 billion from the \$2.9 billion (January 2000 dollars) in documented needs reported in the 1996 Clean Water Needs Survey. This shows that an increasing number of States are succeeding in their efforts to document NPS pollution control needs. The number of States reporting NPS pollution control needs increased from 28 States in the previous survey to 33 States in this survey. Figure 3-5 shows the geographic distribution of NPS pollution control needs. Florida and New Jersey had the largest NPS pollution control needs, with \$3.2 billion and \$2.8 billion, respectively. Missouri, Wisconsin, and New York also had more than \$1 billion



**Figure 3-5.** Geographic distribution of nonpoint source pollution control (Category VII-A through VII-K) needs (January 2000 dollars in billions).



Photo courtesy of USDA NRCS

each in NPS pollution control needs, and four other States (Maryland, Minnesota, California, and Ohio) each had NPS pollution control needs of greater than \$0.2 billion. NPS pollution control needs in the urban, hydromodification, sanitary landfills, and storage tanks categories account for approximately 82.3 percent of the total needs reported for Category VII (Table 3-6). Less than \$1 billion in needs was reported for the remaining NPS pollution control categories (Table 3-6). Appendix A, Table A-2, presents the NPS pollution control needs by State and NPS pollution control category.

Only five NPS pollution control need categories with identical characteristics were reported for both the 1996 Clean Water Needs Survey and the CWNS 2000:

- Agriculture–Cropland (Category VII-A)
- Agriculture–Animals (Category VII-B)
- Silviculture (Category VII-C)
- Urban (Category VII-D)
- Ground Water Protection–Unknown Source (Category VII-E)

NPS pollution control needs for these five categories increased by \$4.1 billion in the CWNS 2000. The increase in NPS pollution control needs can be attributed, in part, to an increase of \$0.3 billion for Category VII-A, \$0.5 billion for Category VII-B, and \$3.5 billion for Category VII-D. Needs for Category VII-C, however, decreased by \$0.16 billion between the

**Table 3-6.** NPS Pollution Control Needs Reported in the CWNS 2000 (January 2000 dollars in billions).

NPS Pollution Control Need Category	Total Needs	Percent of Total
Agriculture–Cropland (VII-A)	0.5	3.5
Agriculture–Animals (VII-B)	0.7	4.7
Silviculture (VII-C)	0.04	0.3
Urban (VII-D)	4.4	32.0
Ground Water Protection–Unknown Source (VII-E)	0.9	6.3
Marinas (VII-F)	0.002	0.01
Resource Extension (VII-G)	0.04	0.3
Brownfields (VII-H)	0.4	2.6
Storage Tanks (VII-I)	1.0	7.4
Sanitary Landfills (VII-J)	1.8	13.3
Hydromodification (VII-K)	4.1	29.5
Total	13.8	

1996 Clean Water Needs Survey and the CWNS 2000; Category VII-E needs remained the same.

### What are the needs for urban and rural communities?

Geographic data from the CWNS 2000 and information on urbanized areas from the U.S. Census Bureau were used to determine the breakdown of needs in urban and rural areas in the contiguous United States.<sup>6</sup>

An urbanized area, as currently defined by the U.S. Census Bureau, consists of densely settled territory that contains 50,000 or more people. The breakdown of urban and rural total<sup>7</sup> documented needs is \$118.1



Photo by Jeff Vanuga, courtesy of USDA NRCS

<sup>6</sup> Urbanized areas from the U.S. Census Bureau were delineated to provide a better separation of urban and rural territory, population, and housing in the vicinity of large places. The geographic coordinates of needs locations were intersected with the urbanized area coverage.

<sup>7</sup> The total urban and rural documented needs (\$118.1 billion) do not equal the total documented needs (\$181.2 billion) because of geographic data limitations in the CWNS 2000. Thus, a difference of \$63.1 billion is not accounted for in the urban and rural documented needs.

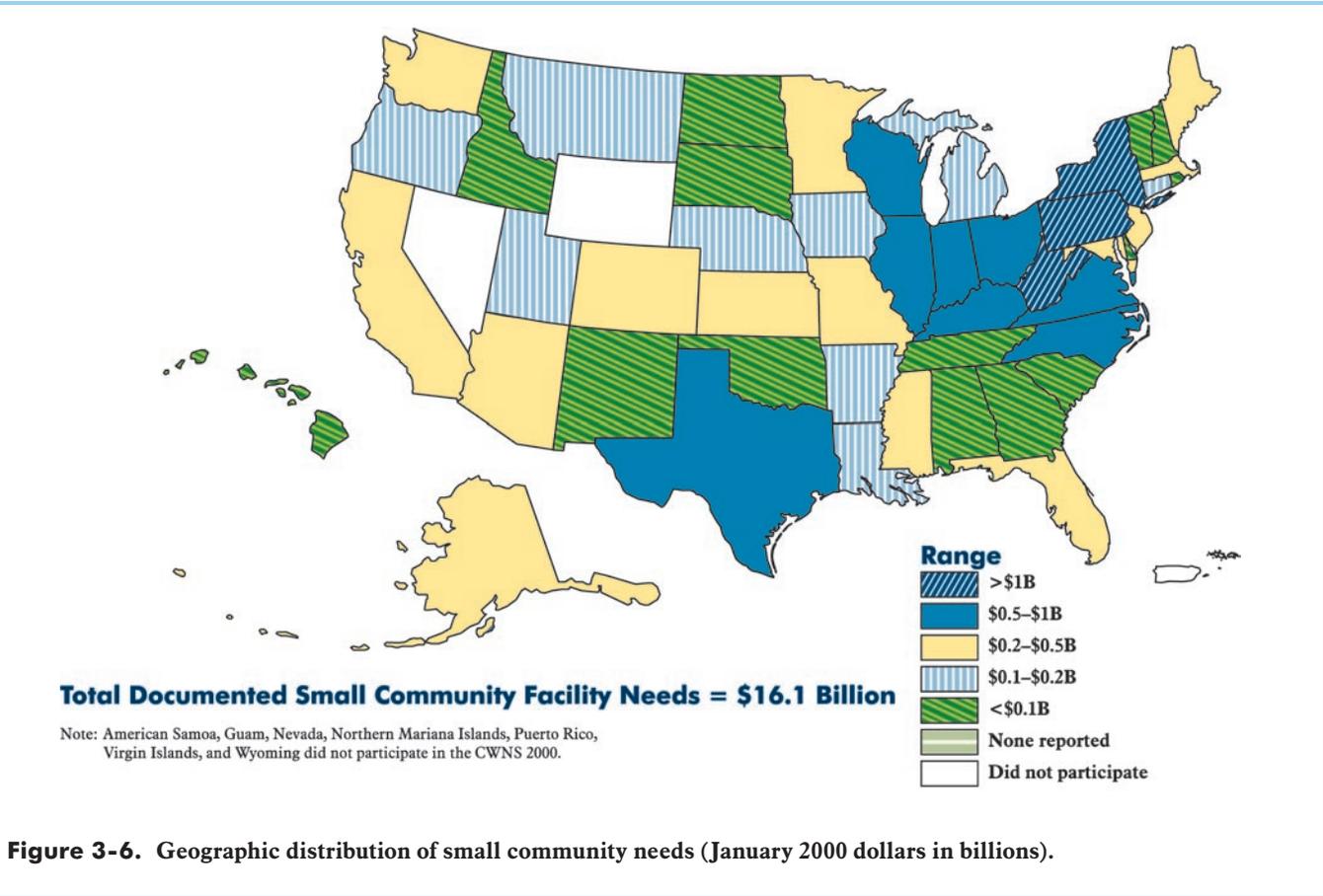
billion (67.1 percent) and \$57.8 billion (32.9 percent) respectively. The total urban needs for Categories I through VI are \$112.4 billion; the total rural needs for these categories are less than half as much, \$53 billion. For urban areas, a majority of the needs are under Categories V (\$40.8 billion), I (\$24.8 billion), III-B (\$13.1 billion), and II (\$11.2 billion). Categories III-A, IV-A and B, and VI each have less than \$10 billion in urban area needs. A majority of the needs for rural areas are in Category I, \$11.5 billion; Categories II, IV-A, and V each have approximately \$9 billion in needs. Almost equal amounts of NPS pollution control needs were documented for urban and rural areas: urban areas account for \$5.6 billion, and rural areas account for \$4.6 billion in needs.

### What are the needs for small communities?

Small communities, defined as communities with populations of fewer than 10,000 people and an average daily wastewater flow of less than 1 million gallons,

have estimated needs of approximately \$16 billion (see Appendix A, Table A-3), representing about 10 percent of the \$161.9 billion documented wastewater treatment and collection system (Categories I through V) needs for the country. Wastewater treatment needs (Categories I and II), conveyance needs (Categories III and IV), and CSO correction needs (Category V) for small communities are \$4.8 billion, \$9.4 billion, and \$1.9 billion, respectively. State-by-State presentations of various aspects of small community needs are provided in Tables A-3 through A-10 and Table A-13 in Appendix A.

Figure 3-6 shows the geographic distribution of small community needs by State. Two-thirds of the wastewater treatment and collection facilities with documented needs are for serving small communities. Thirty-four percent of small communities have documented needs. With few exceptions, small community facilities are a large majority of the total number of publicly owned facilities in each State. It is noteworthy that 90 percent



**Figure 3-6.** Geographic distribution of small community needs (January 2000 dollars in billions).

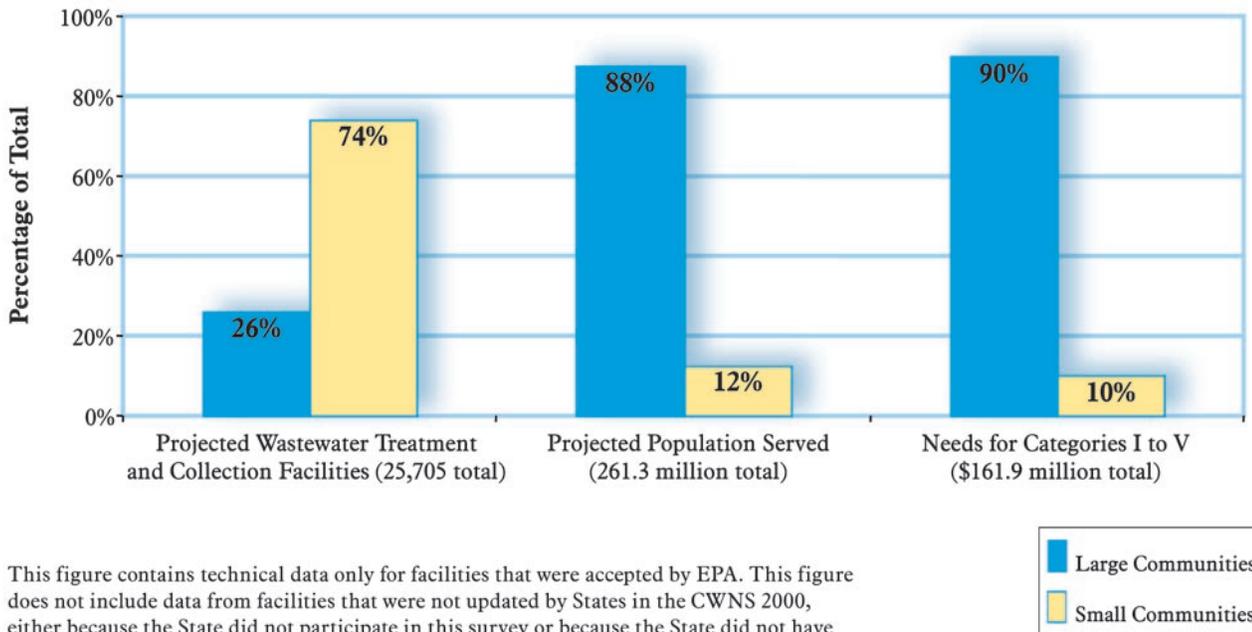
or more of the facilities in five States (Alaska, Kansas, Nebraska, North Dakota, and West Virginia) serve small communities. Moreover, in 10 additional States small community facilities constitute 80 to 90 percent of the publicly owned facilities.

Figure 3-7 shows a comparison of the number of facilities, population served, and needs for small and large communities in the Nation. About 74 percent of wastewater treatment and collection facilities serve small communities, yet those facilities serve only 12 percent (32 million people) of the total population.

Approximately 13 percent of the facilities that will serve small communities (2,514 out of 19,036 facilities) are not projected to have centralized collection and treatment systems. These communities will be served mostly by individual on-site systems. For communities with populations of fewer than 1,000 people, the percentage of facilities that are not projected to have centralized collection and treatment systems

increases to approximately 21 percent. For the other small community levels (between 1,000 and 3,500 and between 3,500 and 10,000 people), 6 percent and 5 percent of the facilities are not projected to have centralized treatment and collection systems.

Of the 1,687 new treatment facilities identified in the CWNS 2000, 843 facilities will serve small communities where abandonment of individual on-site system is expected to occur. The majority (75 percent) of the new small community treatment plants that are replacing individual on-site systems will serve populations of fewer than 1,000 people. The 843 facilities will provide service to approximately 707,000 people and account for \$0.6 billion in Category I and II needs and \$1.2 billion in Category IV-A and IV-B needs. Twenty-one new decentralized systems are planned for small communities where abandonment of individual on-site system is expected to occur. These 21 facilities will serve approximately 20,000 people



This figure contains technical data only for facilities that were accepted by EPA. This figure does not include data from facilities that were not updated by States in the CWNS 2000, either because the State did not participate in this survey or because the State did not have resources to update the facilities. Because of these analysis methods, numbers in this figure cannot be directly compared to Appendix C or Table 3-3.

**Figure 3-7. Small versus large community comparison for documented needs and technical information from projected facilities, if these needs are met.**

and account for \$0.04 billion in needs (Categories I, II, IV-A, and IV-B).

Approximately 37 percent of the facilities in the Nation serve communities with populations of fewer than 1,000 people (Figure 3-8). The documented need for wastewater treatment and collection systems for these facilities is \$3.8 billion, constituting 24 percent of the total documented need of \$16 billion for all small communities. For communities serving between 1,000 and 3,500 people, the documented need for wastewater treatment and collection systems is \$6.6 billion, which represents 41 percent of the total documented need for small communities. Finally, for communities that serve between 3,500 and 10,000 people, the documented need is \$5.7 billion, or 35 percent of the total need for small communities.

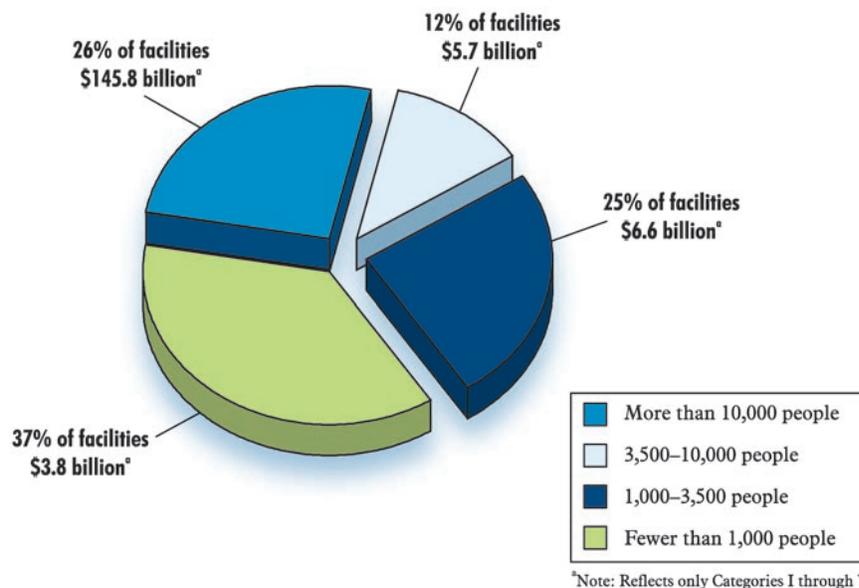
### What are the Separate State Estimates?

To maintain national consistency when documenting needs, the CWNS National Workgroup established strict standards governing the form and content of

acceptable need documentation, as described previously in Chapter 2. In those instances in which EPA determined that State documentation did not meet the required criteria, the needs were reported as SSEs. In other cases, States themselves recognized that fully acceptable documentation was simply not available, but they still wished to have their needs recognized as being a potential demand on State resources; such estimates also were reported as SSEs.

Nearly all of the States reported some needs that did not meet the documentation criteria established by the CWNS National Workgroup. The types of needs reported for the CWNS 2000 as SSEs in this report generally fall into the following groups:

- Documentation that did not meet the criteria for acceptable documentation as per the CWNS 2000 guidelines.
- Unsewered communities where a public health or water quality problem has not been properly identified and documented.



**Figure 3-8.** Percentage of projected facilities, if all documented needs are met, by population range, and their documented needs.

## Separate State Estimate

Needs that have not met the CWNS 2000 documentation requirements described in Chapter 2.

- NPS pollution control, CSO correction, and storm water control problems for which formal studies documenting a water quality or public health problem have not yet been completed.
- Upgrade or expansion of wastewater treatment systems based on *anticipated* changes to State regulations or water quality standards.

The level of effort put forth by each State to include SSEs in the CWNS 2000 was voluntary. Therefore, the reported SSEs do not represent the total need that would be reported if State resources permitted a more thorough assessment. The States could report SSEs for all of the categories (I through VII). Tables A-11, A-12, and A-13 in Appendix A provide a State-by-State presentation of the total SSEs for each category. The SSEs represent a total of \$4.6 billion in addition to those needs meeting the EPA documentation criteria. The largest SSEs are for Category VII (\$1.3 billion) and for Category I (\$0.9 billion); these two categories make up 48 percent of the SSEs. The smallest reported SSEs are for Categories V and VI, which account for only \$0.09 billion and \$0.05 billion of the total \$4.6 billion in SSEs. The other categories with SSEs are Categories II (\$0.61 billion), III-A (\$0.21 billion), III-B (\$0.17 billion), IV-A (\$0.62 billion), and IV-B (\$0.65 billion). Category VIII, Confined Animal–Point Source, and Category IX, Mining–Point Source, were added to the CWNS 2000 to enhance the States' ability to monitor their pollution control efforts. Needs related to Categories VIII and IX are recorded as SSEs in the CWNS 2000 database because those categories are not CWSRF-eligible.

Realizing that documentation criteria for NPS pollution control activities continue to evolve, EPA encouraged

the States to submit all NPS pollution control documentation for review, including the cases where needs would be reported as SSEs. As a result, 11 States reported \$1.3 billion in NPS pollution control needs as SSEs, in addition to the \$13.8 billion in NPS pollution control needs that satisfied the required documentation criteria. As individual States progress in developing their NPS pollution control programs, it is anticipated that more detailed, specific documentation and cost data will become available, thus increasing both documented needs and SSEs for NPS pollution control in the future.

The State of New York submitted a proposed project for dredging and disposal of polychlorinated biphenyl (PCB)-contaminated sediments from the Hudson River costing \$0.45 billion for inclusion as an eligible NPS category need in the CWNS 2000. These needs were not included in the CWNS 2000 NPS needs because this project had already been included under the Superfund priority list; however, these needs were included as an SSE need for Category VII-D. Moreover, a nonmunicipal entity was identified as a potentially responsible party for the cleanup. EPA's decision regarding the current policy of including projects from the Superfund priority list was made too late to include these needs in the CWNS 2000. EPA plans to address this issue with the National Workgroup as part of the planning process for the next needs survey.

Twenty-nine States reported SSEs totaling \$1.6 billion for small communities. This estimate is 10 percent of the total documented need for small communities, \$16.1 billion. In comparison, the total amount of SSEs for small and non-small communities is \$4.6 billion and constitutes less than 3 percent of the total documented need of \$181.2 billion. Details of the preceding estimates for individual categories at the State level are presented in Appendix A, Table A-13.

### How does the Clean Watersheds Needs Survey compare with other needs initiatives?

Determining estimated costs for the necessary investment in the Nation's clean water infrastructure is

an activity that has recently been undertaken by EPA's Office of Water, as well as by associations of water and wastewater service providers, local governments and their ratepayers, and other interested parties. The following discussion of these other "needs" assessment activities is intended to provide additional background and context for this report to Congress.

***Water Infrastructure Network Report.*** The Water Infrastructure Network (WIN) is a broad-based coalition of local elected officials; drinking water and wastewater service providers; state environmental and health administrators; and engineering, construction, and environmental associations. The WIN projected the needs for a 20-year period from 2000 through 2019. The wastewater need reported by the WIN is \$386 billion in 2001 dollars, which is equivalent to \$377 billion in January 2000 dollars (WIN, 2000).

***The Clean Water and Drinking Water Infrastructure Gap Analysis.*** EPA conducted a study to identify whether there is a gap between the projected investment needed over the next 20 years (2000 through 2019) and current levels of spending for wastewater and drinking water (USEPA, 2002a). The purpose of the study was to gain a better understanding of the full range of financial challenges faced by the wastewater and drinking water industry. The scope of the report was limited to a description of the characteristics of the water and wastewater industry

and a discussion of methods for calculating the capital and operation and maintenance gaps. The analysis found that a significant funding gap could develop if the Nation's wastewater and drinking water systems continue to maintain current spending and operation practices. The gap largely disappears if municipalities increase spending at a real rate of growth of 3 percent (above the rate of inflation) per year. The Gap Analysis estimated wastewater needs ranging from \$331 billion to \$450 billion. The resulting midpoint is a need of \$388 billion (\$379 billion in January 2000 dollars).

The approaches used in the Gap Analysis and the WIN Report are similar. Both started with numbers from the 1996 Clean Water Needs Survey and subtracted the amounts for Categories III and IV. An early estimate for SSO correction (\$81.9 billion) was added. Also added were estimated needs for renewal and replacement of existing infrastructure based on a number of different assumptions. The WIN Report used a value of 1/30 of the Net Capital Stock as a forecast of the costs associated with renewal and replacement of the existing system. The Gap Analysis presents several alternative scenarios to address the amount of overlap between SSO and replacement needs. The Gap Analysis also includes a range of estimates for the rate of replacement of the existing capital stock, then takes the midpoint estimate from the range. The estimates for renewal and replacement in both reports were not supported by the type of documentation EPA requires for CWNS estimates.

