Clean Watersheds Needs Survey 2004
Report to Congress

January 2008

Acknowledgments

The success of the CWNS 2004 Report to Congress is the result of the hard work and dedication of many persons. Particular recognition goes to the EPA Regional and State Coordinators for their active support, perseverance, and continuing interest in the Clean Watersheds Needs Survey. Members of the CWNS 2004 National Workgroup are denoted by an asterisk.

Region 1 - Katie Connors
Connecticut - Dennis Greci
Maine - David Breau*
Massachussets - Ping Yee*
New Hampshire - Sharon Nall
Rhode Island - Jay Manning*
Vermont - Nopadon Sundarabhaya

Region 2 - Ray Kvalheim*
New Jersey - Katen Patel*
New York - David Geisinger* and Jason Denno
Puerto Rico - Elvin Carrasquillo and Roberto Berrios

Region 3 - Don Neihus*
Delaware - Greg Pope
Maryland - Stella Hajimihalis-Jenkins
Pennsylvania - Ron Mease*
Virginia - Walter Gills
West Virginia - Rosalie Broderson* and Dianna Wallace*

Region 4 - Ben Chen*
Alabama - Cory Price
Florida - Gary Powell*
Georgia - Bob Scott*
Kentucky - Jill Bertelson*
Mississippi - Tom Webb*
North Carolina - Mark Hubbard*
South Carolina - Bridget Clarke*
Tennessee - Felicia Freeman

Region 5 - William Tansey*
Illinois - Heidi Allen*
Indiana - Shelley Love*
Michigan - Martha Waszak *
Minnesota - Jim Anderson*
Ohio - Margaret Klepic*
Wisconsin - Rebecca Scott

Region 6 - Susanne Mann*
Arkansas - Dave Fenter
Louisiana - Robert Lott
New Mexico - Ramona Rael and Jennifer Prada
Oklahoma - Mike Madden
Texas - Alan Williams

Region 7 - Kelly Beard-Tittone*
Iowa - Gabe Lee*
Kansas - Rod Geisler*
Missouri - Doug Garrett* and Kirby Finders*
Nebraska - Susan Hoppel

Region 8 - Adrienne Rivera*
Colorado - Donna Davis*
Montana - Ron Ashton*
North Dakota - Jeff Hauge
South Dakota - James Anderson
Utah - Paul Krauth

Region 9 -Loretta Venegas
Arizona - Jon Bernreuter
California - Jeff Albrecht*
Hawaii - Sina Pruder
Nevada - Kelly Willimas

Region 10 - Michelle Tucker*
Idaho - Nancy Bowser*
Oregon - Jennifer Weaver*
Washington - Eric Luengo*

Contents

TABLES

APPENDIX A SUMMARY OF CWNS 2004 COST ESTIMATES

APPENDIX B SUMMARY OF CWNS 2000 AND CWNS 1996 COST ESTIMATES

Acronyms

BMP	best management practice
BOD_5	5-day biochemical oxygen demand
CAFO	concentrated animal feeding operation
CCMP	Comprehensive Conservation and Management Plan
CSO	combined sewer overflow
CWA	Clean Water Act
CWNS	Clean Watersheds Needs Survey
CWSRF	Clean Water State Revolving Fund
EMS	environmental management systems
EPA	Environmental Protection Agency
GIS	geographic information system
HUC	hydrologic unit code
IHS	Indian Health Service
I/I	infiltration and inflow
ISDS	individual sewage disposal system
IUP	Intended Use Plan
LTCP	[Combined Sewer Overflow] Long-term Control Plan
mgd	million gallons per day
MS4	municipal separate storm sewer system
NEP	National Estuary Program
NPDES	National Pollutant Discharge Elimination System
NPS	nonpoint source
NRCS	Natural Resources Conservation Service
NRI	National Resources Inventory
NWQIR	National Water Quality Inventory Report
O&M	operation and maintenance
PCS	Permit Compliance System
POR	Point of Record
POTW	publicly owned treatment works
QAPP	Quality Assurance Project Plan
RCAP	Rural Community Assistance Partnership
SCC	[Kansas] State Conservation Commission

SRF	State Revolving Fund
SSE	Separate State Estimate
SSES	Sewer System Evaluation Survey
SSO	sanitary sewer overflow
TMDL	Total Maximum Daily Load
WMA	Watershed Management Area
WWTP	wastewater treatment plant

Executive Summary

The total publicly owned treatment works needs for the Nation as of January 1, 2004, are $202.5 billion (Figure ES-1). This figure represents documented needs for up to a 20 year period. In addition to presenting needs, this *Clean Watersheds Needs Survey (CWNS) 2004 Report to Congress* (hereinafter referred to as "this Report") also summarizes technical information such as flow, population and effluent for projects related to publicly owned municipal wastewater collection and treatment, combined sewer overflow (CSO) correction, municipal stormwater management, and recycled water distribution. The data in this Report were summarized from a comprehensive census survey of more than 30,000 water quality programs and projects which are generally eligible for funding under the Clean Water State Revolving Fund (CWSRF) program.[1]

Scope and Methods

This Report was a collaborative effort between 49 States, the District of Columbia, Puerto Rico[2] (collectively referred to as *States* for the remainder of this Report) and EPA. Using recommendations of the CWNS 2004 National Workgroup (whose members are denoted by an asterisk in the acknowledgements), EPA defined a *need* as a project, with associated costs, that addresses a water quality or public health problem.

To be included as a documented need in Chapter 2 of this Report, a need must have existed as of January 1, 2004 and must have met the documentation criteria set forth in Chapter 1. These documentation criteria ensured the legitimacy of needs and the accuracy of cost and technical information in this Report by requiring a description and location of a water quality or public health problem, as well as site-specific pollution abatement measures with detailed cost information. Needs that did not meet these documentation criteria, as well as needs that are not defined in CWA Section 516(b)(1)(B), are included in Appendix A, Tables A-2, A-11, A-12, and A-13.

EPA prepared this Report to meet the requirements set forth in section 516(b)(1) of the Clean Water Act (CWA):

> "The [EPA] Administrator, in cooperation with the States, …shall make….(B) a detailed estimate…of the cost of construction of all needed publicly owned treatment works in all of the States…"

This is the 14th survey. The first occurred in 1972, and the 13th survey addressed needs as of January 1, 2000.

National Results

State Highlights

The largest reported total publicly owned wastewater treatment works needs, both more than $20 billion, occur in New York and California. Florida, Illinois and Ohio each have needs in excess of $10 billion. The States with the largest needs per capita are the District of Columbia ($3,670), Hawaii ($1,660) and West Virginia ($1,400). Over three-fourths (76.8 percent) of the total needs reported are concentrated in

[1] The use of CWSRF eligibility rules in determining eligibility for the CWNS 2004 is independent of, and does not affect, States' annual determinations on which projects are eligible for CWSRF funding. There are some CWSRF-eligible projects that are not captured in the CWNS, as well as a few exceptional needs in CWNS that are not necessarily eligible for CWSRF funding. Although CWSRF eligibility is defined in the CWA and clarified by national EPA guidance, individual States might have policies not to fund certain kinds of projects. If those projects meet national eligibility criteria, however, they may be included in the CWNS.

[2] Alaska, American Samoa, Guam, Northern Mariana Islands and the Virgin Islands did not participate in the CWNS 2004.

18 States; 20 States each reported less than 1 percent of the total needs. Appendix A, Table A-1 presents the total needs for all categories and by State. Figure ES-1 presents the national needs by category.

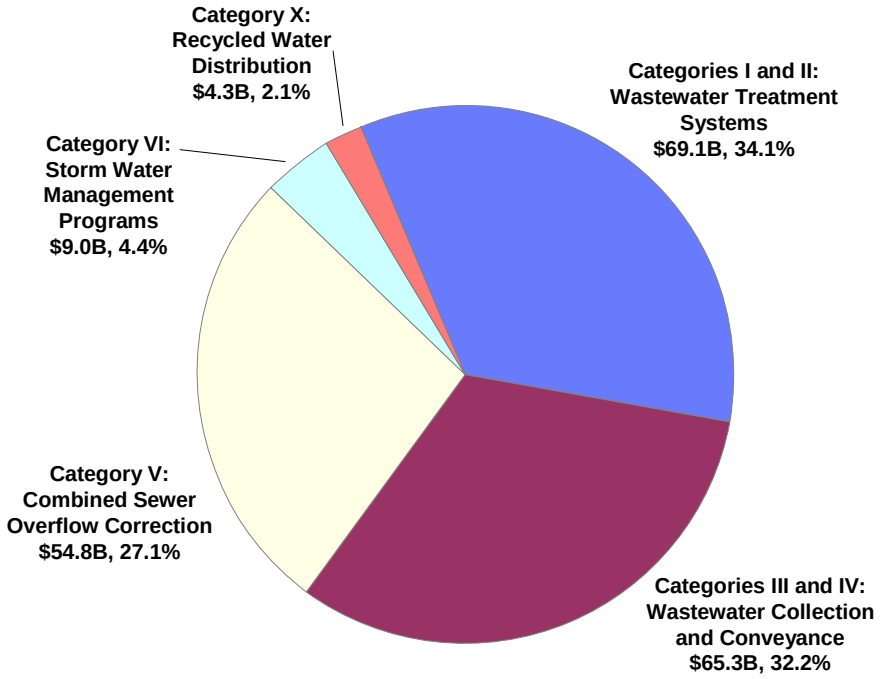

Figure ES-1. CWNS 2004 total documented needs (January 2004 dollars).

Wastewater Treatment, Collection and Conveyance

The national needs for the wastewater treatment and collection categories (Categories I through V) are $189.2 billion. The needs for wastewater treatment (Categories I and II) include the capital costs of replacement, rehabilitation, expansion, upgrade or process improvement of existing treatment plants and construction of new treatment plants. Needs for wastewater collection and conveyance (Categories III and IV) include capital costs for replacement, rehabilitation or expansion of existing collection systems and construction of new collection systems. Needs for CSO (Category V) include measures for preventing or controlling periodic discharges of a mixture of stormwater and untreated wastewater that occur when the capacity of a sewer system is exceeded during a rainstorm.

The largest wastewater treatment and collection needs were reported by New York, California, Illinois and Ohio, each with more than $10 billion. Minnesota, Oklahoma, Idaho, Oregon, Tennessee and Colorado experienced increases in Category I–V needs of more than 50 percent between 2000 and 2004. Notably, Puerto Rico, which did not participate in the CWNS 2000, reported $3.7 billion in Category I–V needs.

Stormwater Management Programs

Twenty-eight States and the District of Columbia reported $9.0 billion in stormwater management program needs (Category VI). These needs include the capital costs for developing and implementing municipal stormwater management programs to meet the requirements of Phases I and II of the National Pollutant Discharge Elimination System (NPDES) municipal separate storm sewer system (MS4)

regulations.[3] These needs generally do not include projects such as installing or rehabilitating storm sewers, some of which are included in the SSEs in Appendix A, Table A-11.

The largest stormwater management program needs were reported by Texas, Florida, Arizona and Minnesota, each with more than $0.9 billion in needs. Florida, Minnesota and Texas experienced the largest increase in these needs.

Recycled Water Distribution

Recycled water distribution (Category X) is a new category designed to report on the increasing trend toward using recycled water for beneficial uses such as irrigation. Fifteen States reported $4.3 billion in recycled water distribution (Category X) needs. California ($1.9 billion) and Florida ($1.7 billion) account for 84 percent of the Category X needs.

Small Community Needs

Small communities[4] have documented needs of approximately $17.0 billion, representing about 9 percent of the $193.5 billion in documented wastewater treatment and collection system needs for the Nation. Small community needs are $5.0 billion for wastewater treatment (Categories I and II); $10.4 billion for collection and conveyance (Categories III and IV), and $1.6 billion for CSO correction (Category V).

Pennsylvania, West Virginia and New York reported small community needs of more than $1.0 billion each. Maryland ($167 million) followed by Colorado ($158 million) reported the largest increases in small community needs. Illinois, Minnesota, Alabama, Wyoming, Ohio and Rhode Island each reported an increase in small community needs ranging from $80 million to $135 million.

Other Documented Needs

Needs that met CWNS documentation requirements but are not defined in CWA Section 516(b)(1)(B) are summarized in Appendix A, Table A-2. This table includes nonpoint source (NPS) pollution control (Category VII) needs that are associated with implementing NPS management programs under section 319 of the Clean Water Act (CWA,) as well as developing and implementing Comprehensive Conservation and Management Plans (CCMPs) for estuaries under section 320 of the CWA.

Separate State Estimates

Needs that did not meet CWNS documentation criteria were recorded as Separate State Estimates (SSEs) in Appendix A, Table A-11. In addition to containing needs in the previously described categories, SSEs also contain needs related to confined animal–point source (Category VIII) and mining–point source (Category IX). Confined animal–point source (Category VIII) summarizes needs to address point source pollution from animal production activities that are subject to the concentrated animal feeding operations (CAFO) regulations. Mining–point source (Category IX) addresses problems caused by point source pollution from mining and quarrying activities. Estuary Management (Category XI) needs include a limited number of estuary management best management practices (BMPs) that were not eligible within

[3] Some example Category VI costs that might be eligible are the cost for development of ordinances to implement erosion and sediment control practices and post-construction storm water management standards, development and production of materials used for public outreach and involvement, and design and construction of stormwater management ponds.

[4] *Small communities* are defined as communities with a population of fewer than 10,000 people and an average daily wastewater flow of less than 1 million gallons.

other needs categories. Florida and New Jersey reported $63 million and $15 million in estuary management (Category XI) needs, respectively.

Concluding Remarks

Changes in Needs Since 2000

This Report reflects an increase since CWNS 2000 in publicly owned treatment works (POTWs) needs of $16.1 billion (8.6 percent). The largest increases in national needs are associated with Category I and II wastewater treatment needs ($5.4 billion increase), Category III-A and III-B sewer repair needs ($3.5 billion increase), and Category VI stormwater management program needs ($2.8 billion). The new Category X, recycled water distribution, accounts for $4.3 billion in needs.

The increases in wastewater treatment needs and in sewer repair needs are due to a variety of factors. These include rehabilitation of aging infrastructure, facility improvements to meet more protective water quality standards, and in some cases, providing additional treatment capacity for handling wet-weather flows. Most (94 percent) of this increase can be attributed to needs increases of more than $100 million each in only 92 of the 10,152 facilities with reported needs. An additional 78 facilities had needs that decreased by at least $100 million each.

The increase in stormwater management program needs is due to greater availability of planning documents (Appendix G lists and describes document types) as well as increased intrastate coordination between various agencies in reporting these needs. However, these needs are still underreported. Only 28 States and the District of Columbia submitted stormwater management program needs data.

Trends in the Nation's Ability to Provide Secondary and Advanced Wastewater Treatment

Although this Report presents increasing needs, the Nation's secondary and advanced wastewater treatment capacity has improved dramatically since the CWA was enacted in 1972 (Figure ES-2). For example, the population receiving secondary or advanced treatment from POTWs increased from 84.1 million to 205.0 million, while the population receiving primary or no treatment from POTWs decreased from 51.9 million to 3.3 million. The increasing ability to provide secondary and advanced wastewater treatment is projected to continue if needs in this Report are met. Approximately 285 million people are projected to receive secondary or advanced treatment by 2024.

Funding the Needs

Although local ratepayers ultimately fund most wastewater treatment needs, the CWSRF is one of many supplementary Federal, State and local funding sources. From July 1, 2000, through June 30, 2004, EPA provided an annual average of $1.3 billion in grants to State CWSRF programs to assist with point and nonpoint source pollution control needs. In the same period, States combined these CWSRF funds with State matching funds, bond proceeds and loan repayments to provide assistance, mostly in the form of loans, of approximately $4.4 billion per year to local communities. The gap between facilities' funding and their total needs is addressed not only by other Federal, State and local funding sources, but also is expected to be increasingly addressed by activities related to EPA's Sustainable Infrastructure Initiative.

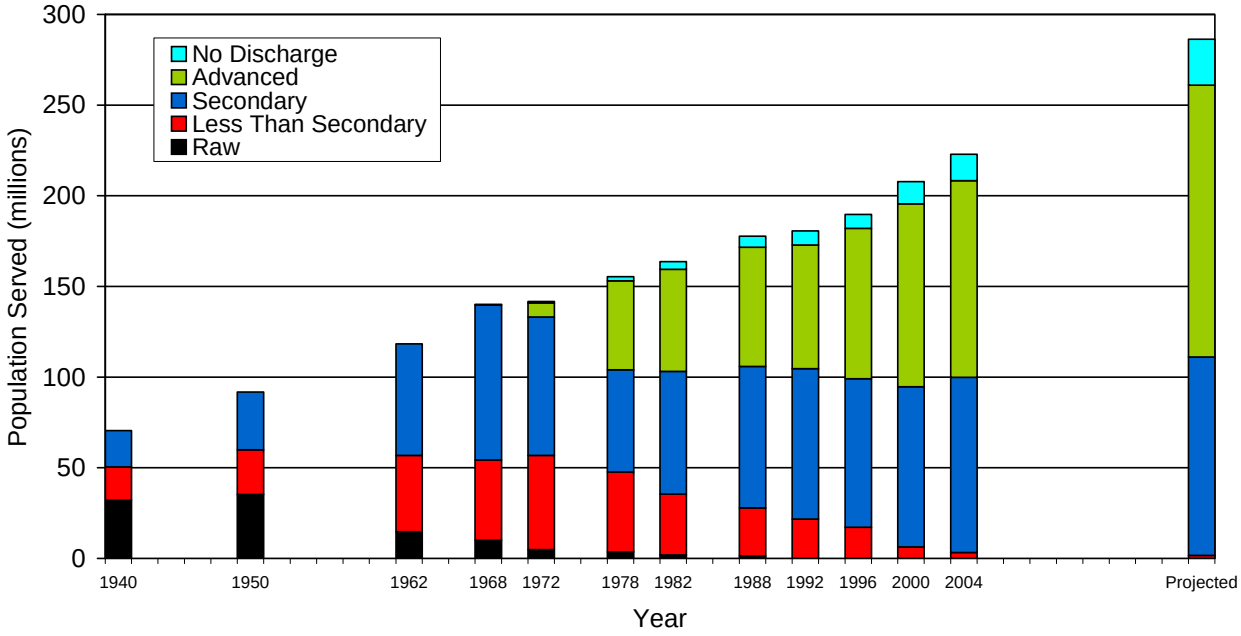

Figure ES-2. Population served by POTWs nationwide for select years between 1940 and 2004 and projected (if all needs are met), organized by wastewater treatment type.
Source: U.S. Public Health Service and USEPA Clean Watersheds Needs Surveys.

Sustainable Infrastructure Initiative

In response to the EPA's Gap Analysis and other recent 20-year estimations of wastewater treatment needs, the EPA Administrator convened a forum in January 2003—*Closing the Gap: Innovative Responses for Sustainable Water Infrastructure*. Using input from industry, government and academia obtained through this forum, EPA developed the Sustainable Infrastructure Initiative. The goal of the initiative is to reduce the infrastructure funding gap through a four part strategy focused on advanced facility management practices, water efficiency promotion, full-cost pricing and a watershed management approach.

The focus on improving CWNS geographic data has made the CWNS 2004 needs and technical data very useful in support of the watershed approach and other aspects of the Sustainable Infrastructure Initiative. With reliable CWNS geographic data, environmental professionals and the public can use CWNS needs and technical data with other environmental data for permitting, impaired water remediation, technology selection, project prioritization and other activities related to cost-efficient, watershed-based protection of water quality and public health.

This trend will continue in future surveys by integrating needs data with emerging efforts such as the CWSRF environmental benefits measurement effort, which seeks to estimate project-specific, water quality benefits. Needs data will also be integrated into Internet-based water quality models and other decision-support tools that support State and local protection of water quality and public health.

Other Future Influences on the Survey

The survey may also evolve in response to individual/decentralized sewage treatment and wastewater treatment plant security needs. EPA's 2003–2008 Strategic Plan recognizes that decentralized systems are a key component of the Nation's wastewater infrastructure. Therefore, EPA will provide national

direction and support to improve the performance of decentralized systems by promoting the concept of continuous management and facilitating upgraded professional standards of practice. The CWNS 2004's focus on improving the overall level of reporting of wet-weather-related needs will also continue.

Chapter 1 Scope and Methods

The United States Environmental Protection Agency (EPA) has prepared the *Clean Watersheds Needs Survey (CWNS) 2004 Report to Congress*, hereinafter referred to as "this Report," in compliance with section 516(b)(1)(B) of the Clean Water Act (CWA). This is the 14th survey. The first occurred in 1972, and the 13th survey addressed needs as of January 1, 2000.

This Report includes a presentation and analysis of the capital investment necessary to meet the Nation's wastewater treatment and collection system needs, as well as its municipal stormwater management program and recycled water distribution needs.

This Report is a collaborative effort between 49 States, the District of Columbia, Puerto Rico[5] (collectively referred to as *States* for the remainder of this Report) and EPA.

The CWNS 2004 National Workgroup (whose members are denoted by an asterisk in the acknowledgements) developed a set of guidelines and criteria for gathering, documenting and entering data. The CWNS 2004 National Workgroup set the primary objective of updating and entering new documented costs using the most current planning documents available. This emphasis on using current documents extends the effort begun in 2000 to rely exclusively on documented needs. Another objective was continuing to expand the use of CWNS as a tool for States to plan, evaluate and set priorities regarding their needs. This objective was supported by previous extensive State efforts and encouraged new efforts to improve geographic, permit and other technical data in the survey. Special emphasis was placed on documenting CSO needs and improving the level of stormwater reporting.

> ***CWNS Report to Congress and the Clean Water Act***
>
> Section 516(b)(1) of the Clean Water Act (CWA):
>
> "The [EPA] Administrator, in cooperation with the States, …shall make …(B) a detailed estimate…of the cost of construction of all needed publicly owned treatment works in all of the States…"

Types of Needs in This Report

Using recommendations of the CWNS 2004 National Workgroup, EPA defined a *need* as a project, with associated costs, that addresses a water quality or public health problem existing as of January 1, 2004. CWNS project eligibility rules are generally based on eligibility rules for project funding under the Clean Water State Revolving Fund (CWSRF) program.[6] Chapter 2 summarizes the national needs for POTWs, as defined in CWA Section 516(b)(1)(B), using CWSRF funding eligibility categories (Table 1-1). Detailed descriptions of the CWNS 2004 needs categories are provided in Appendix F, Table F-1.

[5] Alaska, American Samoa, Guam, Northern Mariana Islands and the Virgin Islands did not participate in the CWNS 2004.

[6] The use of CWSRF eligibility rules in determining eligibility for the CWNS 2004 is independent of, and does not affect, States' annual determinations on which projects are eligible for CWSRF funding. There are some CWSRF-eligible projects that are not captured in the CWNS, as well as a few exceptional needs in CWNS that are not necessarily eligible for CWSRF funding. Although CWSRF eligibility is defined in the CWA and clarified by national EPA guidance, individual States might have policies not to fund certain kinds of projects. If those projects meet national eligibility criteria, however, they may be included in the CWNS. Additionally, the main body of this Report focuses on needs related to POTWs as directed by section 516(b)(1)(B) of the CWA. However, other types of activities, such as NPS, are eligible for CWSRF funding.

Table 1-1. CWNS 2004 Needs Categories

CWA Section 212 Wastewater Treatment & Collection	Category I:	Secondary wastewater treatment[a]
	Category II:	Advanced wastewater treatment[b]
	Category III-A:	Infiltration/inflow correction
	Category III-B:	Sewer replacement/rehabilitation
	Category IV-A:	New collector sewers and appurtenances
	Category IV-B:	New interceptor sewers and appurtenances
	Category X:	Recycled Water Distribution[c]
CWA Section 212 Wet-weather	Category V:	Combined sewer overflow correction
	Category VI:	Stormwater management programs

[a] In previous surveys, Category I included individual septic system and decentralized sewage treatment need
[b] This category may also include additional process units to increase level of treatment to allow for water reuse.
[c] New category for CWNS 2004, previously reported as Categories I, VII-D and VII-E

This Report also summarizes the technical data (e.g., population, flow and effluent data, where applicable) for every facility included in the CWNS 2004. The national-level results and analyses of the needs and technical data are included in Chapter 2. The relationship of CWNS needs to funding is discussed in Chapter 3. CWNS 2004 needs and technical data (e.g., population, flow) are presented in Appendices A and C, respectively. Appendix B summarizes the CWNS 2000 and CWNS 1996 needs information.

This Report, however, does not include all needs related to water quality and public health problems. As in past surveys, information about privately owned wastewater facilities or wastewater treatment facilities that serve privately owned industrial facilities, military installations, national parks or other Federal facilities was not collected. These facilities are not eligible for funding under State CWSRF programs.

Similarly, the CWNS 2004 did not request data for needs and facilities that serve American Indians and native villages, hereinafter referred to as Tribal needs.[7] EPA does not include or report Tribal needs because the Indian Health Service (IHS) conducts a separate survey and provides a report to Congress annually under Public Law 86-121. The IHS reports on wastewater treatment systems, improvement of community drinking water supplies and solid waste disposal facilities. A special set-aside of the CWSRF appropriation provides funding for Tribal needs on the basis of a priority list of projects, updated annually by the IHS.

CWNS History and Relationship to the CWSRF

In 1972 EPA began collecting information about needs to meet the requirements of sections 516(b)(1)(B) and 205(a) of the CWA in support of the Construction Grants Program. EPA conducted 11 biennial surveys between 1972 and 1992. For the duration of the Title II Construction Grants Program, the survey focused on providing an estimate of current capacity and future needs for publicly owned treatment works (POTWs). Between 1972 and 1996, $61.1 billion was awarded to municipalities through EPA's Construction Grants Program.

In 1987 Congress added Title VI to the CWA to extend Federal aid for wastewater treatment plant construction and to provide grants to States to capitalize the CWSRF. The amendments resulted in a transition toward State and local government responsibility for financing clean water projects.

As of June 30, 2004, capitalization grants under the CWSRF Program totaling $21.9 billion had been awarded to State CWSRF programs. States in turn provided assistance of $47.9 billion, mostly in the form of loans to communities.

[7] Needs for 34 of the 562 Federally recognized Tribal facilities were voluntarily reported by States to the CWNS. To avoid confusion with needs reported in IHS annual surveys (www.ihs.gov), Tribal needs are not included in this Report.

Time Frame for Needs in This Report

For inclusion in this Report, a need had to address a water quality or public health problem that existed as of January 1, 2004. This Report compiled short-term and long-term needs that could be documented in accordance with nationally uniform standards.

Unlike wastewater infrastructure planning during the 1970s and 1980s, which primarily used a 20-year planning horizon (as influenced by this requirement of the Title II Construction Grants Program), more recent wastewater infrastructure planning horizons vary considerably across the United States. With greater flexibility granted to States and local communities for managing construction activities, this planning horizon is now as short as 5 years or less and as long as 20 years or more.

This Report does not estimate complete 20-year needs for the Nation, because it relies on State and local documents of varying time horizons rather than a uniform planning horizon. Other recent studies, such as the Water Infrastructure Network Report (WIN 2000), EPA's Gap Analysis (USEPA 2002a), and the Congressional Budget Office's Water Infrastructure Study (CBO 2002) have been developed to estimate a more comprehensive picture of the Nation's needs. For this Report, costs beyond 20 years have been excluded.

Data Entry Procedures

Building on prior surveys, the CWNS 2004 National Workgroup set the following priorities for improving CWNS 2004 data:

- Update existing costs and enter new costs for all categories of needs using the most current planning documents available.
- Emphasize the use of long-term control plans (LTCPs) or other acceptable documentation for CSO needs, especially for facilities with previous CSO cost curve estimates exceeding $120 million.
- Confirm linkages to the Permit Compliance System (PCS) by reviewing the permit data in the CWNS database.
- Identify documented needs related to sanitary sewer overflows (SSOs) by indicating which needs in other categories also address SSOs.
- Improve documentation of stormwater and NPS needs and document all individual sewage disposal system (ISDS) and decentralized treatment needs in the new Category VII-L.
- Continue to expand the CWNS as a tool for States to plan, evaluate and set priorities regarding their needs by maintaining technical data.

EPA and the CWNS 2004 National Workgroup developed data entry guidance and presented this to States at a national start-up meeting in April 2004. EPA also provided data from the CWNS 2000 as a baseline for the CWNS 2004 data entry effort. States entered data into the CWNS 2004 database from May 1, 2004, through February 18, 2005.

To clarify issues raised by States throughout the data entry period, EPA held monthly conference calls, provided additional training opportunities and delivered information to the States through the Internet, e-mail, and written correspondence.

CWNS 2004 Database

The CWNS 2004 database allowed States to enter detailed information about each facility, such as discharge locations, levels of treatment, populations served and funding awards.

The CWNS 2004 database contains information on 33,852 facilities. Of these, 24,268 are existing or projected facilities with centralized wastewater treatment and collection (including 747 combined sewer systems with documented needs), and 1,255 are municipal stormwater management program facilities.

The information gathered by the States is organized by two main categories of data: wastewater treatment/collection systems and stormwater management programs. Detailed descriptions of these categories and a list of data elements are provided in Appendix D.

CWNS Database
States entered and updated their needs data in the CWNS database. The database contains detailed information about each facility, including geographic coordinates, population, flow discharge locations, watershed boundaries and funding information.

States use the database to continually update their data, generate reports and download data into their geographic information systems (GISs) to create maps. These capabilities enable States to use the CWNS database as a dynamic management tool rather than simply a reporting vehicle.

Documentation of Needs

CWNS reports prior to 2000 included needs based on both documents as well as data models. Beginning with the CWNS 2000 report and continuing with this Report, rigorous documentation was required to validate needs and to ensure the quality of cost and technical information. In addition, whereas modeling needs results in only State- and national-level estimates, the documentation of needs provides a rich source of site-specific, high-quality data for EPA, States and the public. This information is useful in a variety of watershed-based analytical tools that support efficient meeting of water quality and public health objectives.

Facility
A location involved in water quality management. A facility can be a wastewater treatment plant, a wastewater sewer system, or a municipal separate storm sewer system. Data in the CWNS 2004 are collected and organized by facility.

Documentation Criteria

EPA, in consultation with the CWNS 2004 National Workgroup, established seven criteria for States to document each need:

1. A description of the water quality impairment and information on the potential source. The problem description should include specific pollutant source information. A general statement about water quality impairment does not meet this criterion.
2. The location of the problem, included as a latitude/longitude point.
3. One or more specific pollution control measures or BMPs used to address the problem.
4. The cost to implement each pollution control measure or BMP. General estimates for the problem area were not permitted; only site-specific data were acceptable to generate the costs.

5. The source of the costs (e.g., an engineer's estimate, facility plan, cost of comparable practices, estimates from equipment suppliers) for each solution.
6. The total costs for all pollution-control measures and BMPs documented for a facility (all costs were converted to January 1, 2004, dollars for this report.)
7. If a facility need was greater than $20 million (January 2004 dollar base), the documentation date had to be January 1, 1998, or more current; for all other facility needs, the documentation date had to be January 1, 1994, or more current.

For criterion 4, CWNS 2004 cost eligibility was based on a subset of CWSRF-eligible[8] costs that meet the definition of a need as addressing an existing water quality or public health problem. *The Clean Water State Revolving Fund Funding Framework* (USEPA 1996) allows CWSRF funding of *capital*-only projects. For point source projects, this term includes activities such as constructing wastewater treatment facilities to meet water quality or NPDES permit requirements. Operation and maintenance (O&M) costs, ineligible for CWSRF funding, were not included in this Report as needs.

Criterion 7 applied to both the cost data and the need justification of a water quality or public health problem. The purpose and benefits of redocumentation of outdated facility information during each survey is to maintain only current project cost information in the CWNS 2004, as well as to purge projects that might have been completed or partially undertaken.

Acceptable Document Types

To maintain quality and consistency in documentation of needs from State to State, the CWNS 2004 National Workgroup approved a list of documentation types (Table 1-2 and Appendix G).

For acceptance of the CWSRF-eligible portions of costs for developing and implementing stormwater management programs for municipal separate storm sewer systems (MS4s),[9] States had to include evidence that they were part of the municipality's MS4 program or a related planning document for achieving the water quality objectives of the NPDES MS4 program.

Cost Curves

Once a State adequately documented a water quality or public health problem, EPA accepted the documentation for the purposes of the CWNS 2004, regardless of whether a documented cost estimate was available. States could use a separate document to justify cost estimates. When information was inadequate for States to document a cost estimate, States could estimate costs by using nationally derived and EPA-approved construction cost curves available in the CWNS 2004 database system. This approach allowed States to use a wide variety of documents to justify needs rather than being restricted to those containing cost data.

Cost curves were available to calculate costs for Categories I and II (new or replacement treatment facility costs for increased capacity and/or increased level of treatment and disinfection), Category IV (sanitary sewer collection system costs for new or expanded collector sewers and interceptor sewers), and Category V (CSO correction costs). Chapter 2 provides additional discussion of the CSO cost curve.

[8] The use of CWSRF eligibility rules in determining eligibility for the CWNS 2004 is independent of, and does not affect, States' annual determinations on which projects are eligible for CWSRF funding. There are some CWSRF-eligible projects that are not captured in the CWNS, as well as a few exceptional needs in CWNS that are not necessarily eligible for CWSRF funding. Although CWSRF eligibility is defined in the CWA and clarified by national EPA guidance, individual States might have policies not to fund certain kinds of projects. If those projects meet national eligibility criteria, however, they may be included in the CWNS.

[9] As required by Phase I and Phase II NPDES permits.

The cost curves were unchanged from those available in the CWNS 2000 except for the adjustment for the base year. The cost curves used technical data in the CWNS 2004 database, such as area multipliers, along with appropriate user-provided input data, such as population served, to estimate a cost for the specified project or need.

Table 1-2. Approved Types of Documentation for Official Needs in CWNS 2004

Document Type Code	Document Type	January 2004 Dollars (billions)	Percentage of Total Need (%)
01	Capital Improvement Plan	87.7	43.3%
02	Infiltration/Inflow Analysis	0.1	< 0.1%
03	Sewer System Evaluation Survey	1.9	0.9%
04	Final Engineer's Estimate	11.9	5.9%
05	Cost of Previous Comparable Construction	0.9	0.4%
06	Facility Plan	35.1	17.3%
07	Plan of Study	< 0.1	< 0.1%
08	Intended Use Plan	9.8	4.8%
09	State Approved Area-Wide or Regional Basin Plan	3.1	1.5%
10	Federal/State Grant or SRF Loan Application Form	4.7	2.3%
11	State Priority List	< 0.1	< 0.1%
12	Diagnostic Evaluation of Wastewater Treatment Plant Demonstrating Need to Construct	< 0.1	< 0.1%
13	Administrative Order/Court Order/Consent Decree	0.1	< 0.1%
14	Sanitary Survey or Certification of a Health Emergency	0.2	0.1%
15	State-Approved Local/County Comprehensive Water & Sewer Plan	2.6	1.3%
17	State Approved Municipal Wasteload Management Plan	0.1	< 0.1%
18	Total Maximum Daily Load (TMDL)	< 0.1	< 0.1%
21	NPDES or State Permit Requirement (w/schedule)	0.1	< 0.1%
22	Municipal Stormwater Management Plan	0.5	0.2%
28	Funding Application (Population < 3,500)	0.2	0.1%
29	State Needs Survey (Population < 3,500)	0.6	0.3%
30	Model Survey (Population < 3,500)	0.6	0.3%
31	Information from Assistance Provider (Population < 3,500)	< 0.1	< 0.1%
36	Long-Term Control Plan (CSO Control Plan)	7.3	3.6%
98	CSO Cost Curve (if LTCP is not available)	29.3	14.5%
99	EPA-HQ Approved	5.7	2.8%
Total		**202.5**	

Additional Documentation Options for Small Communities

In the past, national small community needs tended to be underestimated[10] in CWNS reports because small communities have fewer resources available for monitoring and facility evaluations, which form the basis of the reports used to document needs. In an attempt to more fully capture the needs of small communities, EPA and the CWNS 2004 National Workgroup established guidelines to allow small communities to use alternative forms of documentation that were not acceptable from large communities.

[10] Analysis of small community need reporting levels is included in *Drinking Water and Wastewater Infrastructure in Appalachia: An Analysis of Capital Funding and Funding Gaps* (Hughes et al. 2005)

Small communities with a January 2004 population of fewer than 3,500 people were allowed to use alternative documentation when standard documentation was not available.[11] Alternative documentation 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. This information was submitted on a standardized survey form that required signatures from suitable community and State officials. As with standard documents, if cost estimates were not provided, the State could use construction cost curves for Categories I, II, IV, and V to estimate the costs.

Data Quality Assurance

EPA conducted a quality control and quality assurance review to ensure the precision and accuracy of the data and to minimize the level of uncertainty of data submitted for this Report. To meet this objective, EPA developed a Quality Assurance Project Plan (QAPP) in accordance with EPA's guidelines for review of secondary technical and cost data (EPA Requirements for Quality Assurance Project Plans (EPA QA/R-5, EPA/240/B-01/003)). As part of this QAPP, EPA developed specific and well-defined standard operating procedures for the review of facilities with various degrees of technical data and cost estimates. The QAPP defined processes for EPA to monitor adherence to quality control procedures and quality assurance requirements.

A team of reviewers used the QAPP operating procedures to review the data entered into the CWNS 2004 database by individual States. These procedures included comparing hard copy documentation with data entered in the CWNS 2004 database, as well as ensuring consistency of technical and cost data. Where necessary, the review team consulted with EPA State Revolving Fund experts to clarify CWSRF eligibility requirements.

Other Documented Needs

Needs that met CWNS documentation requirements but are not defined in CWA section 516(b)(1)(B) are summarized in Appendix A, Table A-2. This table includes nonpoint source (NPS) pollution control (Category VII) needs that are associated with implementing NPS management programs under section 319 of the CWA, as well as developing and implementing Comprehensive Conservation and Management Plans (CCMPs) for estuaries under section 320 of the CWA.

Separate State Estimates

In cases where available documentation did not meet all seven basic criteria or where the needs could not be estimated using available cost curves, States could enter needs as Separate State Estimates (SSEs) without EPA review. These estimates are entered for States' purposes other than this Report, such as State level planning as well as communication with State legislatures and other groups involved with addressing and preventing water quality problems.

SSEs are reported separately at the end of Chapter 2 and at the State level in Tables A-11 through A-13 in Appendix A. Technical data (e.g., population, flow, effluent) associated with each SSE facility are included throughout this Report in various tables and charts.

[11] Standard document types are listed in Appendix G, Table G-1, document types 1 through 27. Alternative documents available for communities with current populations of fewer than 3,500 people are listed as document types 28 through 31 in the same table.

This page intentionally left blank

.

Chapter 2 Results: National Needs

Total National Needs and State Highlights

The total reported POTW needs for the Nation as of January 1, 2004, are $202.5 billion (Figure 2-1 and Table 2-1). More than 65 percent of the Nation's needs are for wastewater treatment, collection, and conveyance. As with the CWNS 2000, all the needs presented in this chapter are documented.[12]

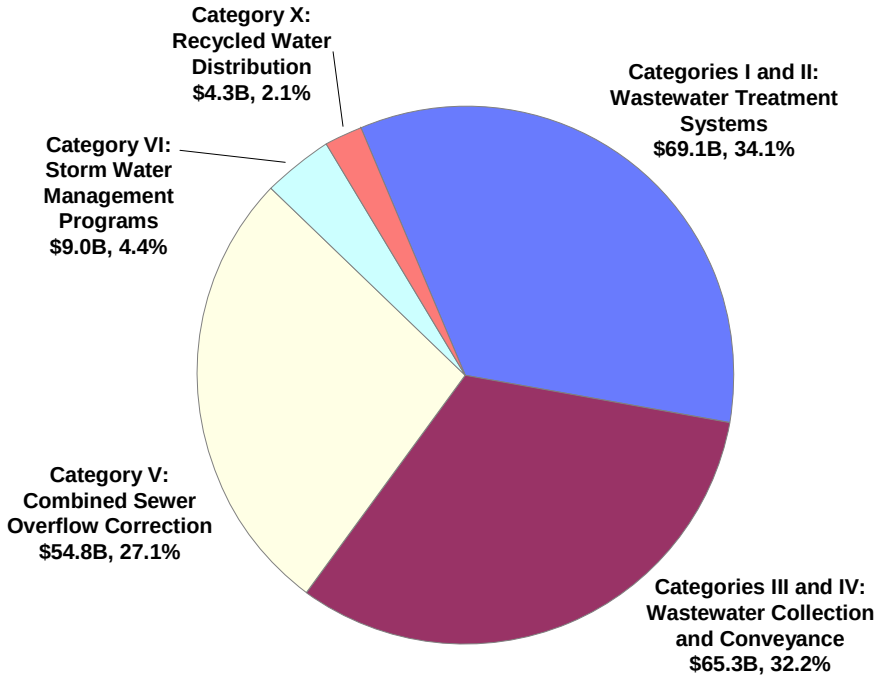

Figure 2-1. CWNS 2004 total documented needs (January 2004 dollars in billions).

[12] The surveys performed in 1992 and 1996 presented a combination of documented and modeled needs.

Table 2-1. Total Documented Needs Reported in the CWNS 2004 (January 2004 Dollars in Billions)

		Total Needs	
Needs Category		**$B**	**Percent**
I	Secondary wastewater treatment[a]	44.6	22.0%
II	Advanced wastewater treatment[b]	24.5	12.1%
III-A	Infiltration/inflow correction	10.3	5.1%
III-B	Sewer replacement/rehabilitation	21.0	10.4%
IV-A	New collector sewers and appurtenances	16.8	8.3%
IV-B	New interceptor sewers and appurtenances	17.2	8.5%
V	Combined sewer overflow correction	54.8	27.1%
VI	Stormwater management programs	9.0	4.4%
X	Recycled water distribution[c]	4.3	2.1%
	Total Categories I–VI and X	**202.5**	**100.0%**

[a] In previous surveys, Category I included individual septic system and decentralized sewage treatment need
[b] This category may also include additional process units to increase level of treatment to allow for water reuse.
[c] New category for CWNS 2004, previously reported as Categories I, VII-D and VII-E
Notes:
Costs for operation and maintenance are not included.
For needs by category and State, see Appendix A, Table A-1,. Needs estimates presented in Table 2-1 might vary slightly from those presented in the text and the appendices because of rounding.

Figure 2-2 displays the geographic distribution of the total documented needs by State. The largest reported total publicly owned treatment work needs occur in New York and California, both with more than $20 billion in needs. Florida, Illinois and Ohio each have needs in excess of $10 billion. The States with the largest increases in publicly owned treatment works needs since 2000 are Florida, California, Ohio, Minnesota, Michigan, Wisconsin, Oregon and Missouri, each with an increase of more than $1 billion. Three-fourths (76.8 percent) of the total needs reported are concentrated in 18 States, while 20 States each reported less than 1 percent of the total needs. Appendix A (Table A-1) presents the total needs for all categories by State.

Figure 2-3 displays per capita needs by State. The highest per capita needs tend to be in States in the Mid-Atlantic and New England, as well as Hawaii, Arizona, Illinois and Ohio. The States with the largest needs per capita are the District of Columbia ($3,670), Hawaii ($1,660) and West Virginia ($1,400). While the District of Columbia, Hawaii, West Virginia and Rhode Island have per capita needs exceeding $1,000 per person, none of these States rank among the 20 States with the highest total needs shown in Figure 2-2.

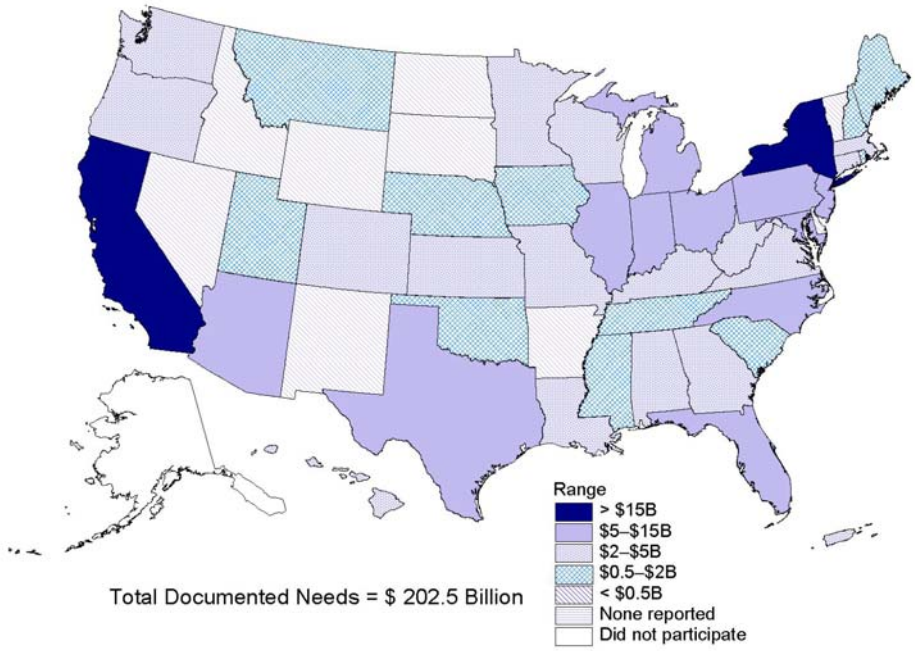

Figure 2-2. Distribution of total documented needs by State (January 2004 dollars in billions).

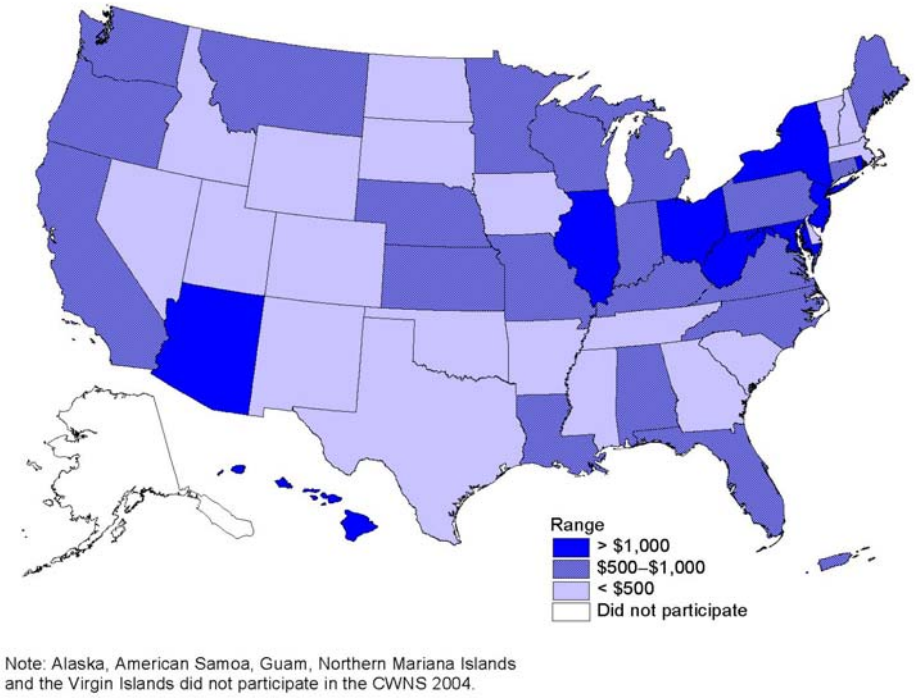

Figure 2-3. Distribution of per capita documented needs by State (January 2004 dollars/person).

Trends and Analyses by CWNS 2004 Category

Wastewater Treatment, Collection, and Conveyance (Categories I through V)

The needs reported (in January 2004 dollars) for the wastewater treatment and collection categories (Categories I through V) increased from $180.2 billion in the CWNS 2000 to $189.2 billion in this Report. This is a $9.0 billion (or 5.0 percent) increase (Figure 2-4 and Table 2-2). Most (94 percent) of this increase can be attributed to needs increases of more than $100 million each in only 92 of the 10,152 facilities with reported needs. An additional 78 facilities had needs that decreased by at least $100 million each.

The most significant increase in needs related to wastewater treatment and collection are the following: Category I, increased by $3.6 billion; Category III-A and III-B, by $3.5 billion; and Category II, by $1.8 billion. The $3.6 billion increase in Category I needs is effectively a $6.6 billion increase considering that the $3.0 billion in individual septic system and decentralized sewage treatment needs, reported under Category I in CWNS 2000, is now reported in Category VII-L. Increases in Categories I and II could be due to a variety of issues. These include rehabilitation of aging infrastructure, facility improvements to meet more protective water quality standards, and in some cases, providing additional treatment capacity for handling wet-weather flows.

New needs (needs reported for the first time) account for $10.0 billion of the Category I needs, $7.6 billion of the Category II needs and $5.6 billion of the Category III-B needs. The amounts for projected facilities are $2.1 billion in Category I needs and $3.6 billion in Category II needs. By definition, Category III-B needs would be entered only for existing facilities.

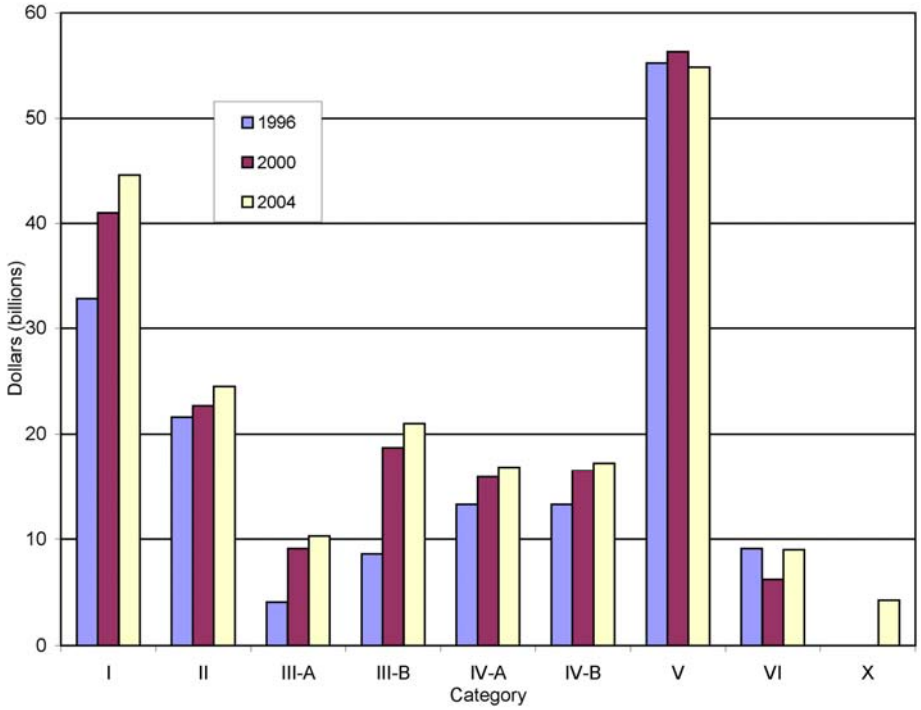

Figure 2-4. Total needs nationwide for the 1996–2004 CWNS organized by category (January 2004 dollars in billions).

Table 2-2. Comparison of Total Needs for the 1996–2004 CWNS (January 2004 Dollars in Billions)

					'00 –'04 change	
Needs Category		**1996[a]**	**2000[a]**	**2004**	**$B**	**%**
Publicly Owned Wastewater Treatment and Conveyance Systems and Stormwater Management Programs						
I	Secondary wastewater treatment[b]	32.8	41	44.6	3.6	8.8%
II	Advanced wastewater treatment[c]	21.6	22.7	24.5	1.8	7.9%
III-A	Infiltration/inflow correction	4.1	9.1	10.3	1.2	13.2%
III-B	Sewer replacement/rehabilitation	8.6	18.7	21.0	2.3	12.3%
IV-A	New collector sewers and appurtenances	13.3	15.9	16.8	0.9	5.7%
IV-B	New interceptor sewers and appurtenances	13.3	16.5	17.2	0.7	4.2%
V	Combined sewer overflow correction	55.2	56.3	54.8	-1.5	-2.7%
VI	Stormwater management programs[d]	9.1	6.2	9.0	2.8	45.2%
X	Recycled water distribution[e]	- -	- -	4.3	4.3	NA
	Total Needs for Categories I-VI and X	158	186.4	202.5	16.1	8.6%
	Treatment Categories I and II only	54.4	63.7	69.1	5.4	8.5%
	Collection and conveyance Categories III and IV only	39.3	60.2	65.3	5.1	8.5%
	Category I to V subtotal	148.9	180.2	189.2	9.0	5.0%

[a] The needs from 1996 and 2000 were inflated to January 2004 dollars for comparison with CWNS 2004 data.
[b] In previous surveys Category I included individual septic system and decentralized sewage treatment need
[c] This category may also include additional process units to increase level of treatment to allow for water reuse.
[d] Modeled needs in 1996.
[e] New category for CWNS 2004, previously reported as Categories I, VII-D and VII-E

Wastewater Treatment

Almost half of the $69.1 billion secondary and advanced wastewater treatment needs were reported by New York ($11.9 billion), California ($11.5 billion), Florida ($4.6 billion), New Jersey ($3.3 billion) and Maryland ($3.0 billion). States with increases of more than 50 percent since 2000 in Categories I and II include Oklahoma (147 percent), Oregon (88 percent), Tennessee (84 percent), Idaho (70 percent), Kansas (65 percent), Washington (64 percent) and Colorado (60 percent). Notably, Puerto Rico, which did not participate in the previous survey, reported $1.0 billion in Category I and II needs.

Table 2-3 shows the total Category I and II needs and their distribution related to infrastructure improvement versus capital renewal for wastewater treatment plants.

The 28.8 percent ($19.9 billion) of projects resulting in infrastructure improvements is a decrease from the 36.1 percent reported in 2000. Capital renewal projects also accounted for 28.8 percent of needs, a decrease from the 32.4 percent reported in 2000.

The remaining $29.3 billion (42.4 percent) is associated with projects that represent a combination of infrastructure improvements and capital infrastructure renewal, an increase from the 31.5 percent reported in 2000.

Infrastructure Improvements
Activities such as increasing the effluent quality level (e.g., from secondary to advanced treatment), increasing the plant capacity to keep up with population growth, and constructing new wastewater treatment plants.

Capital Renewal Projects
Projects that 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. Such projects do not increase treatment capacity or effluent quality level. Examples include replacing coarse bubble diffusers with fine bubble diffusers or switching from disinfection by chlorination to ultraviolet disinfection. Capital renewal does not include costs for routine operation and maintenance at wastewater treatment plants.

Secondary Treatment
A treatment level that will meet an effluent quality of 30 mg/L (30-day average) of both 5-day biochemical oxygen demand (BOD_5) and total suspended solids, although secondary treatment levels required for some lagoon systems might be less stringent. In addition, the secondary treatment must remove 85 percent of BOD_5 and total suspended solids from the influent wastewater.

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

Table 2-3. Category I and II (Wastewater Treatment) Needs (January 2004 Dollars in Billions)

Wastewater Treatment Plant Investment	Jan 2004 ($Billions)	Percentage of Total	Number of Facilities
Infrastructure improvements	19.9	28.8%	2,527
Capital renewal	19.9	28.8%	2,224
Combination of infrastructure improvements and capital renewal	29.3	42.4%	887
Total	69.1	100.0%	5,638

Collection and Conveyance

More than 37 percent of the $65.3 billion in Category III and IV needs was reported by California ($6.4 billion), Florida ($4.4 billion), Ohio ($3.6 billion), Texas ($3.5 billion), New York ($3.3 billion) and North Carolina ($3.1 billion). States with increases of more than 50 percent since 2000 in Category III and IV needs include Minnesota (199 percent), Idaho (144 percent), the District of Columbia (102 percent), North Dakota (100 percent), Tennessee (89 percent), Wisconsin (75 percent) and Oklahoma (73 percent). Notably, Puerto Rico, which did not participate in the previous survey, reported $2.7 billion in Category III and IV needs.

Sewer Rehabilitation and Replacement Needs
Category III-A and III-B needs are for inflow/infiltration (I/I) correction and sewer replacement or rehabilitation. I/I occurs when flow from wet-weather conditions enters collection systems through various means, such as pipe cracks and broken joints.

New Sewer Needs
Category IV-A and IV-B needs are for new collector and interceptor costs.

An assessment similar to the Category I and II needs comparison above was also performed for Category III and IV needs. Category III needs generally represent capital renewal needs. Category IV needs usually represent infrastructure improvement. Exceptions include some needs in Category IV-B that are related to projects (e.g., new relief sewers, sewer separation) traditionally thought of as capital renewal projects.

Of the total Category III and IV needs of $65.3 billion, 47.9 percent of the needs are associated with Category III. This compares with 46.2 and 32.3 percent for the CWNS 2000 and CWNS 1996, respectively.

This pattern of an increasing proportion of Category III needs is further evidence that communities are continuing to plan for the correction of problems related to SSOs,[13] as well as ensuring the reliability of the Nation's existing collection system infrastructure.

[13] Note that in addition to Category IV-B (new interceptor sewer and appurtenances), some needs in Category I (secondary wastewater treatment) and Category II (advanced wastewater treatment) might also address SSO problems.

Combined Sewer Overflows

Of the $54.8 billion in needs to control CSOs, 75 percent was reported by Illinois ($10.1 billion), New York ($6.6 billion), Ohio ($6.3 billion), Indiana ($5.4 billion), Pennsylvania ($4.6 billion), Michigan ($4.3 billion) and New Jersey ($3.8 billion). These reported needs are similar to those of the CWNS 2000, in which the same seven States accounted for 71.7 percent of the total Category V needs. These seven States also account for 550 of the 747 facilities with Category V needs. Twenty-three States and the District of Columbia account for the remaining 197 CSO facilities with $13.7 billion in Category V needs.

> ***Combined Sewer Overflows (CSOs)***
> 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, and 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.

Unlike the increases reported in all other needs categories, the total needs estimate for the control of CSOs decreased by a total of $1.5 billion from the CWNS 2000. The Category V needs for Ohio and Michigan increased by $2.3 billion and $1.6 billion, respectively, whereas the needs for Pennsylvania, Iowa and New Jersey decreased by more than $1 billion each.

Figure 2-5 shows the distribution of Category V needs by State. Appendix C, Table C-4, presents the number of facilities with Category V needs by State and the total Category V needs for the CWNS 2000 (inflated to January 2004 dollars) and the CWNS 2004.

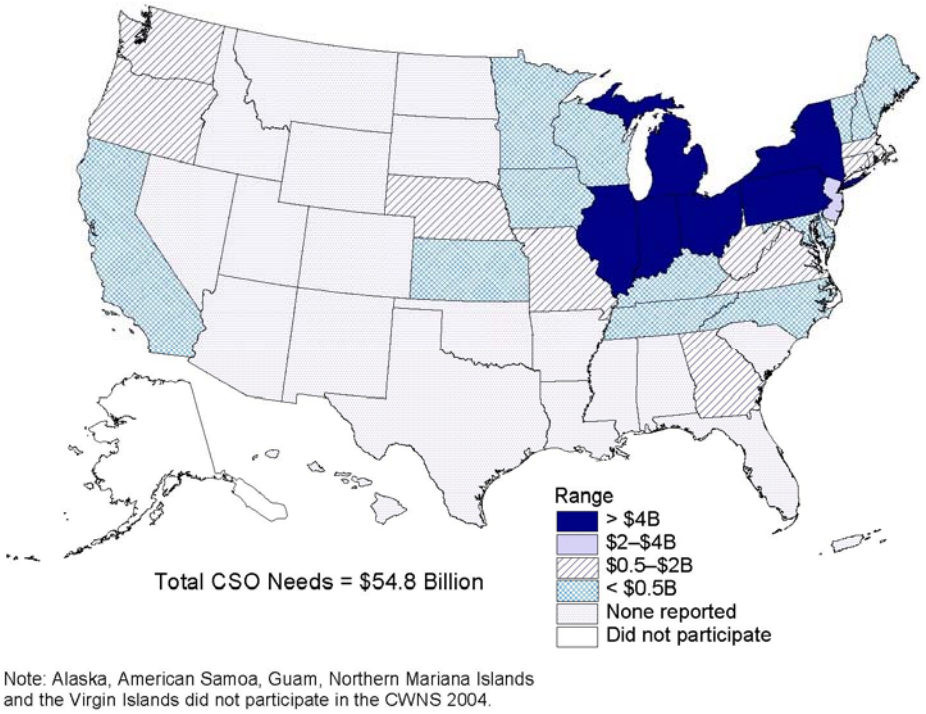

Figure 2-5. Distribution of CSO correction (Category V) needs by State (January 2004 dollars in billions).

As with other needs categories, States were requested to enter documented needs when available. During the CWNS 2004, States increased their use of LTCPs to enter cost estimates. Sixteen States documented CSO (Category V) needs using LTCPs for 144 facilities, up from 34 facilities in the CWNS 2000. Needs documented in LTCPs account for 13.3 percent (up from 7.7 percent) of the Category V needs reported in this survey. LTCPs provide the most reliable estimates for CSO control based on the 1994 CSO Policy. Appendix C, Table C-6, presents a list of 59 facilities, with CSO needs exceeding $120 million, that used cost curves for estimating costs in this Report.

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 the CWNS 2004 was the same as that used for the CWNS 1996 and CWNS 2000. The cost curve is based primarily on the *Presumption Approach* in the 1994 CSO Policy.[14] For the CWNS 1996, 66 percent of the CSO needs were documented by using cost curves. This percentage decreased to 53.4 percent for the CWNS 2004.

In August 2004, EPA released *Report to Congress: Impacts and Control of CSOs and SSOs*, hereinafter called *the CSO/SSO Report*. In the report, EPA documented that 746 communities with CSOs in 31 States and the District of Columbia have been issued 828 CSO NPDES permits that regulate 9,348 CSO discharge points. In many cases, the facility associated with a CSO community or a CSO permit in the CSO/SSO Report is one of the 747 facilities with CSO correction needs reported in the CWNS 2004. 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 with the number of CSO permits or the number of CSO communities reported in the CSO/SSO Report.

Municipal Stormwater Management Programs

Almost 79 percent of the $9.0 billion in needs for developing and implementing municipal stormwater management programs were reported by Texas ($2.8 billion), Florida ($2.2 billion), Arizona ($1.2 billion) and Minnesota ($0.9 billion). Category VI needs increased by $2.8 billion from the CWNS 2000.

Large and medium MS4s account for 77.8 percent, or $7.0 billion, of the total stormwater management program needs. Small MS4s account for the remaining 22.2 percent, or $2.0 billion in stormwater management program needs.

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 apply to systems in incorporated areas or in counties that EPA has identified as having MS4s serving populations of 100,000 or more. They also apply to 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 December 8, 1999. It requires NPDES permit coverage for storm water discharges from *small* MS4s, which are systems in urbanized areas as defined by the U.S. Census Bureau (USEPA 1999).

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 Phase II programs.

[14] Under the 1994 CSO Control Policy *Presumption Approach,* a facility is presumed to provide an adequate level of control if it (1) Has no more than an average of four overflow events per year, with permitting authority ability to allow up to two additional overflow events per year; or (2) Eliminates or captures for treatment no less than 85 percent by volume of the combined sewage collected during precipitation events; or (3) Eliminates or removes no less than the mass of the pollutants, identified as causing water quality impairment through a sewer system characterization, monitoring and modeling effort (USEPA 1994).

The distribution of stormwater management program needs by State is presented in Figure 2-6. Appendix A, Table A-1, presents the stormwater management program needs by State. Appendix C, Table C-5, presents stormwater management program needs by State for large, medium and small MS4s.

Municipal stormwater management program needs in this Report were underreported, though to a significantly lesser extent than for the CWNS 2000. Twenty-eight States and the District of Columbia entered needs for 1,255 municipal stormwater management facilities in this Report. As of January 1, 2004, 1,018 Phase I NDPES MS4 permits, covering 887 municipal entities in 44 States, had been issued. EPA estimates that there are between 5,000 and 6,000 Phase II MS4 entities in the Nation, although only a fraction of those were under permit as of January 1, 2004.

Lack of resources to document stormwater management program needs and the inability of States to obtain the required data from various municipal entities were the main reasons for the States not including their Phase I Stormwater Management Program needs.

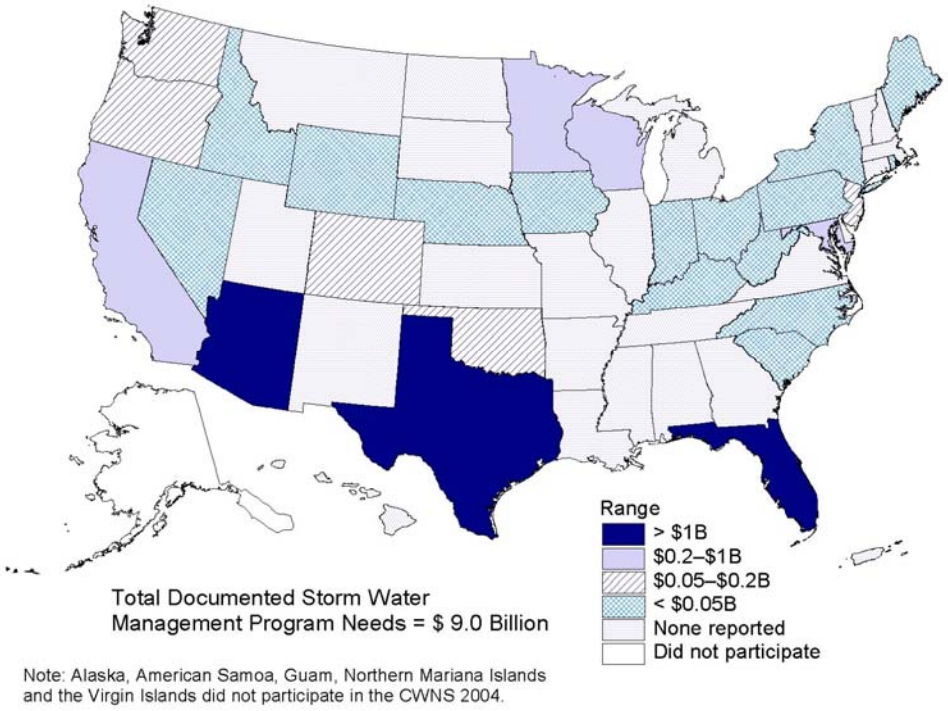

Figure 2-6. Distribution of stormwater management program (Category VI) needs by State (January 2004 dollars in billions).

Recycled Water Distribution

Fifteen States reported $4.3 billion in recycled water distribution (Category X) needs. California ($1.9 billion) and Florida ($1.7 billion) accounted for 84 percent of the Category X needs. With this category being new for this Report, needs in this category are likely to increase in future surveys as identified projects and documentation become more available.

Recycled Water Distribution
These needs include any costs associated with conveyance of the recycled water (wastewater reused after removal of waste contributed by humans) and any associated rehabilitation or replacement needs. The costs of the pipes used to convey treated water from the wastewater facility to the drinking water facility are an example of needs in this category.

Urban and Rural Communities Needs

The breakdown of urban and rural total documented needs is $133.6 billion (66 percent) and $68.9 billion (34 percent), respectively. The total urban needs for Categories I through VI are $130.9 billion; the total rural needs for these categories are about half as much, $67.3 billion.

For urban areas, 80 percent of the needs are in Categories V ($42.6 billion), I ($30.1 billion), III-B ($15.0 billion), II ($13.1 billion) and III-A ($7.1 billion).

For rural areas, 80 percent of the needs are in Categories I ($14.5 billion), V ($12.2 billion), II ($11.4 billion), IV-A ($8.7 billion), and IV-B ($8.2 billion). These numbers convey the greater relative needs for installing new pipes in rural areas versus repairing pipes and addressing CSOs in urban areas.

Urbanized Areas
Data from the CWNS 2004 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 continental United States. An urbanized area, as defined by the U.S. Census Bureau, generally consists of a large central place and adjacent densely settled census blocks (1,000 people per square mile for geographic core of block groups or blocks, or 500 for adjacent block groups and blocks) that together have a total population of at least 2,500 for urban clusters or at least 50,000 for urbanized areas.

Small Community Needs

Small communities have estimated needs of approximately $17.0 billion (see Appendix A, Table A-3), representing about 9 percent of the $193.5 billion documented needs in Categories I-V and X.

Wastewater treatment needs (Categories I and II), conveyance needs (Categories III and IV) and CSO correction needs (Category V) for small communities are $5.0 billion, $10.4 billion and $1.6 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.

Small Communities
Small, rural communities are defined as communities with populations of fewer than 10,000 people and an average daily wastewater flow of less than 1 million gallons. These communities often lack the technical, financial, and managerial capacity to optimally construct, operate, manage and maintain wastewater treatment facilities or systems.

Figure 2-7 shows the distribution of small community needs by State. Pennsylvania ($1.5 billion), West Virginia ($1.4 billion) and New York ($1.1 billion) account for 23.5 percent of the small community needs. Nine additional States report between $0.5 billion and $1.0 billion in small community 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 or more of the facilities in four States (Iowa, Kansas, Nebraska and West Virginia) serve small communities. Moreover, in eight additional States, small community facilities constitute 80 to 90 percent of the publicly owned facilities.

Figure 2-8 shows a comparison of the number of facilities, population served and needs for small and large communities in the Nation. Figure 2-9 shows this information for three ranges of small community populations served.

Although about 70 percent of centralized wastewater treatment and collection facilities serve small communities, those facilities serve only 10 percent (27.2 million people) of the population served by centralized collection. While 60.1 percent of non-small communities have documented needs, only 36.6 percent of small communities have documented needs, indicating potential underreporting.

Of the 1,552 new wastewater treatment facilities identified in the CWNS 2004, 827 facilities will serve small communities where individual onsite systems are expected to be abandoned. The majority (75 percent) of the new small community treatment plants that are replacing individual onsite systems will serve populations of fewer than 1,000 people. The 827 facilities will provide service to approximately 681,715 people and account for $0.6 billion in Category I and II needs and $1.4 billion in Category IV-A and IV-B needs.

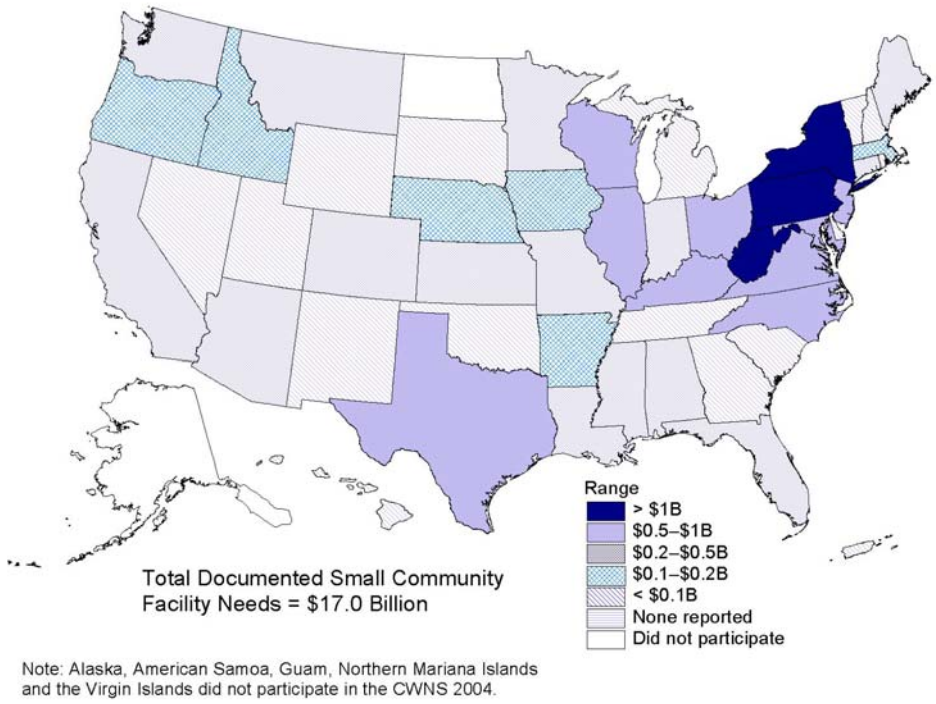

Figure 2-7. Geographic distribution of small community needs (January 2004 dollars in billions).

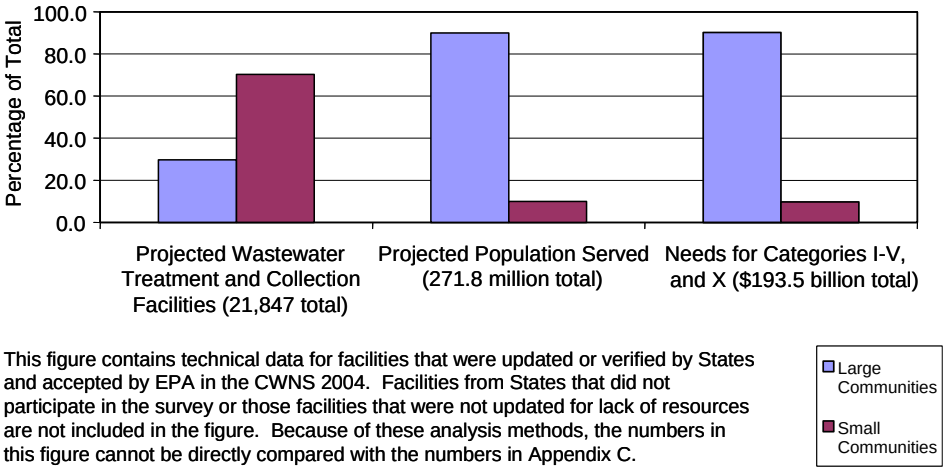

Figure 2-8. Comparison of small versus large community needs and technical information from existing and projected facilities.

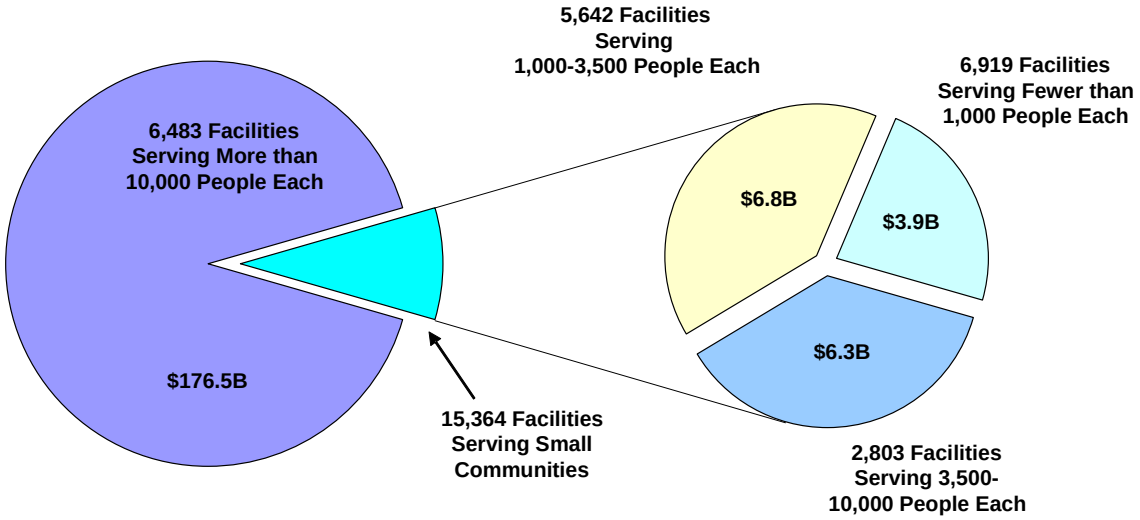

Figure 2-9. Number of projected centralized wastewater treatment and collection facilities by ranges of population served with needs if all documented needs are met.

Other Documented Needs

Appendix A, Table A-2 and Appendix E summarize $38.3 billion in NPS needs that met CWNS documentation requirements and are not defined under CWA section 516(b)(1)(B). This includes $3.0 billion in needs to address failing individual septic and decentralized wastewater treatment systems.[15]

[15] Needs to address failing septic and decentralized wastewater treatment systems were reported in Category I in previous surveys.

Separate State Estimates

Forty-three States reported SSEs of $40.2 billion. SSEs are needs that did not meet CWNS documentation criteria but were entered for State purposes other than this Report, such as State-level planning as well as communication with State legislatures and other groups involved with addressing and preventing water quality problems. Tables A-11, A-12 and A-13 in Appendix A present the total SSEs for each category, State by State.

Chapter 3 Concluding Remarks

Changes in Needs Since 2000

Between January 1, 2000, and January 1, 2004, reported POTW needs increased from $186.4 billion to $202.5 billion, a total increase of $16.1 billion or 8.6 percent. The largest portions of this increase are associated with Category I and II wastewater treatment needs ($5.4 billion increase), Category III-A and III-B sewer repair needs ($3.5 billion increase), and Category VI stormwater management program needs ($2.8 billion). Category X recycled water distribution, a new category in the CWNS 2004, added $4.3 billion in needs.

The increases in wastewater treatment needs and in sewer repair needs are due to a variety of factors. The factors include rehabilitation of aging infrastructure, facility improvements to meet more protective water quality standards and, in some cases, providing additional treatment capacity for handling wet-weather flows. Recycled water distribution, a newly added category, recognizes the greater need for water conservation, recycling and reuse in many States.

The increase in stormwater management program needs is mainly due to increased implementation of the NPDES Stormwater Program and the related greater availability of stormwater management planning documents.

With each survey, a more comprehensive picture of the Nation's needs is developed. Nevertheless, the level of effort that States put forth in reporting their CWNS 2004 data varied considerably. The availability of resources (e.g., staff, time, information) in each State affected the data quality. The data quality, in turn, affected the completeness of the total needs reported nationally in the CWNS 2004.

Trends in the Nation's Ability to Provide Wastewater Treatment

Given the increasing needs presented in this Report and the even larger needs estimated in other reports, one might ask how well the Nation is providing secondary and advanced wastewater treatment. Influenced by CWA goals and associated funding mechanisms, significant progress has been made to improve wastewater treatment across the Nation.

Figure 3-1 shows that although the number of people served by facilities with secondary treatment increased only moderately between 1972 and 2004 (an increase of 10.9 million people), the number of people provided with advanced wastewater treatment increased dramatically (from 7.8 million people in 1972 to 108.5 million people in 2004). Moreover, the population served by less-than-secondary treatment decreased from more than 50 million in 1972 to 3.3 million in 2004.

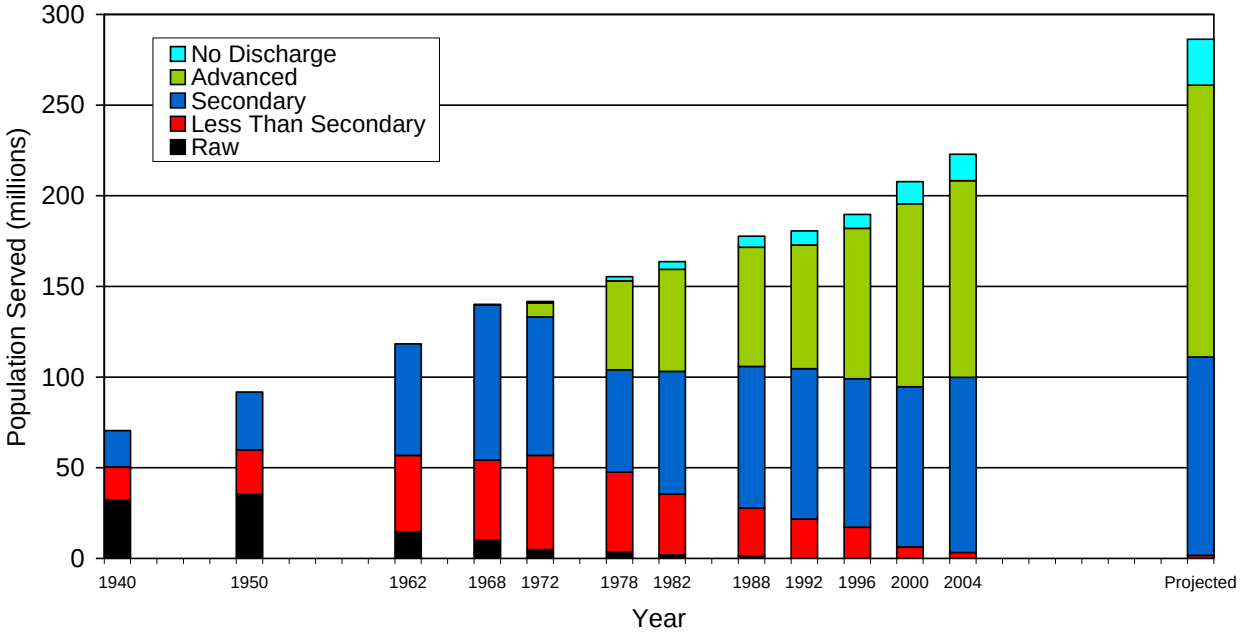

Figure 3-1. Population served by POTWs nationwide for select years between 1940 and 2004 and projected (if all needs are met), organized by wastewater treatment type.
Source: U.S. Public Health Service and USEPA Clean Watersheds Needs Surveys

Table 3-1 presents the current status of the level of treatment based on data presented in this Report and past surveys.[16] In comparison to 2000, an additional 15.0 million people now receive centralized collection and wastewater treatment. Municipal wastewater treatment plants that provide secondary or better levels of treatment serve 219.6 million, or 73.8 percent of the U.S. population. The population served by less-than-secondary treatment has been reduced from 6.4 million people to 3.3 million people. There are now 2,188 non-discharging facilities that serve 14.6 million people, or 4.9 percent of the U.S. population. More details about the change in plant influent and effluent loadings to surface waters are provided in EPA's report *Progress in Water Quality, An Evaluation of the National Investment in Municipal Wastewater Treatment.* See Appendix H of this Report.

Figure 3-1 and Table 3-1 show the projected improvements in wastewater treatment infrastructure if the secondary and advanced wastewater treatment needs (Categories I and II) specified in this Report are met. The number of non-discharging facilities and facilities that provide secondary or more advanced treatment is projected to increase by 7.8 percent from 16,325 to 17,598. The population being served by these facilities is projected to increase by 29.6 percent.

On the basis of the needs presented, it is projected that a total of 17,851 operational facilities will serve a future population of 286.2 million people, or 81.6 percent of the U.S. population. EPA expects that the projected increase in centralized treatment facilities will not be as large as suggested by the data because more planning authorities are recognizing that properly designed, constructed and operated onsite wastewater treatment systems should be considered a permanent part of the wastewater infrastructure rather than just an interim solution.

[16] Other related technical data discussed in this section are provided in Appendix C, Table C-3.

Table 3-1. Improvements in Treatment Level of the Nation's Municipal Wastewater Treatment Facilities

Level of Treatment	Population Served in Millions (Number of Facilities)				Population Change	Projected Population Change 2004–2024
	1996	2000[a]	2004[a]	2024	2000–2004	
Less than secondary[b]	17.2 (176)	6.4 (47)	3.3 (40)	1.7 (26)	-48.4%	-48.5%
Secondary	81.9 (9,388)	88.2 (9,156)	96.5 (9,221)	109.4 (9,446)	9.4%	13.4%
Greater than secondary	82.9 (4,428)	100.9 (4,892)	108.5 (4,916)	149.9 (5,607)	7.5%	38.2%
No discharge[c]	7.7 (2,032)	12.3 (1,938)	14.6 (2,188)	25.3 (2,545)	18.7%	73.3%
Partial treatment[d]	--	-- (222)	-- (218)	-- (227)	--	--
Total	189.7 (16,024)	207.8 (16,255)	222.8 (16,583)	286.2 (17,851)	7.2%	285%

[a] Where necessary, this table contains best available information from States and Territories that did not have the resources to complete the updating of the data or did not participate in the CWNS 2000 or 2004. In such circumstances, information for this table was taken from previous surveys.
[b] Includes facilities granted section 301(h) waivers from secondary treatment for discharges to marine waters. As of January 1, 2004, waivers for 34 facilities in the CWNS 2004 database had been granted or were pending.
[c] *No discharge* refers to facilities that do not discharge effluent to surface waters (e.g., ground water recharge).
[d] The number of facilities includes facilities that provide partial treatment and that direct partially treated wastewater to another facility for further treatment. The population associated with these facilities is omitted from this table to avoid double counting.

The number of facilities that provide less-than-secondary treatment is projected to decline from 40 facilities serving 3.3 million people to 20 facilities serving 1.7 million people, nearly all of whom will be served by facilities with CWA 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.

With much of the country being served or projected to be served by secondary wastewater treatment or better, continued improvements in infrastructure might be better measured not by population served and improved levels of treatment but by measures of sustainable infrastructure (e.g., condition of infrastructure, sustainability of infrastructure funding strategy). 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.

Funding of Needs

Although local ratepayers ultimately fund most wastewater treatment needs, other funding is available. The CWSRF is one of many supplementary Federal, State and local funding sources. A wide variety of Federal sources are described in EPA's *Catalogue of Federal Funding Sources for Watershed Protection* (http://cfpub.epa.gov/fedfund/).

From July 1, 2000, through June 30, 2004, EPA provided an annual average of $1.3 billion in grants to State CWSRF programs to assist with point and NPS pollution control needs. In the same period, States combined these CWSRF funds with State matching funds, bond proceeds and loan repayments to provide assistance to local communities, mostly in the form of loans. The assistance amounted to approximately $4.4 billion per year.

Sustainable Infrastructure Initiative

Following the release of EPA's 2002 *Clean Water and Drinking Water Infrastructure Gap Analysis* a national meeting was held, titled *Closing the Gap: Innovative Responses for Sustainable Water Infrastructure*, in which participants recognized that current spending and operational practices would need to change to avoid the emergence of a funding gap that would hamper efforts to provide future clean water. The participants further recognized that Federal funding is and will remain limited and that initiatives to adequately address the potential emerging gap will need to focus on improved management and innovative approaches for reducing the cost of infrastructure.

The concept of *sustainable infrastructure*, announced at the January 2003 meeting, consists of *four pillars*:

Full Cost Pricing of Water. There are strong economic arguments for shifting more of the cost of water from taxes to rates, and they are closely linked with efficient water use. Utilities that implement pricing structures that recover the full cost of providing service are promoting economically efficient and environmentally sound water use decisions by customers. The Congressional Budget Office's *Future Investment in Drinking Water and Wastewater Infrastructure* report (November 2002) estimated that future infrastructure investment needs could be paid by ratepayers and that this investment would increase water bills from 0.5 percent of income to 0.9 percent of income, on average. If these rate increases create problems for low-income or fixed-income households, a wide variety of mechanisms are available to mitigate the impacts, such as rate reductions or local subsidies to these households in the form of *life-line* water rates.

Better Management. Proven management methods are available to reduce the cost of providing clean water and improving performance. One of these is **asset management**. This is a data-driven approach to prioritizing investments in infrastructure so that they meet customer expectations. Armed with detailed information on the age, condition and performance of infrastructure, systems would be able to repair or replace infrastructure as needed to meet performance standards. This would optimize investment. Savings from asset management approaches are often in the range of 10 percent of the capital investment. Ten percent of the estimated infrastructure needs in this assessment ($202.5 billion) would be $20.3 billion over 20 years, or $1.0 billion per year. A related method is **environmental management systems** (EMS). This involves comprehensive assessment of the utility's operations for continual improvement, resulting in better performance and lower cost.

Efficient Water Use. Much of the needed investment reported in this Report consists of installing or rehabilitating new collection pipes and treatment plants to meet the needs of the existing U.S. population. These projects are sized to accommodate reasonably anticipated growth. Decreasing water use, however, might reduce the projected increase in design capacity, thereby reducing investment needs. EPA estimates that there could be a 20 percent reduction in water use if simple conservation methods were introduced. This might translate to smaller capacity plants, which in turn would have reduced capital and operating costs.

Watershed Approach. There is great potential for cost savings in what EPA has broadly described as the *watershed approach* to management. This term refers to policies that include broad stakeholder involvement, hydrologically defined geographic boundaries and coordinated management across all policies that affect water. Specific practices may include incentives for pollutant reduction, purchasing easements to minimize or eliminate pollutant sources and converting land uses where such approaches are cost effective.

No single initiative will answer the question of how to pay for the infrastructure needs identified in this assessment. Yet, each has great potential, and none has been fully exploited. Taken together, and used in a

coordinated fashion with the significant levels of financial assistance available at the Federal and State levels, they provide an outline of how to pay for these infrastructure needs.

Relationship of CWNS to the Sustainable Infrastructure Initiative

The CWNS supports the Sustainable Infrastructure Initiative by encouraging the documentation of long-term needs and by providing needs and technical information for each facility. Significant advances have been made in improving the needs geographic data. The improvements enable the use of needs data with water quality standards, NPDES permits, impaired waters and other environmental program data in Internet mapping tools, as well as in off-line analyses. Using CWNS 2004 data in these tools and analyses supports technology and project selection, NPDES permitting, TMDL analyses and other watershed-based projects that support efficient meeting of water quality and public health objectives.

This trend will likely increase in future surveys by integrating needs data with emerging efforts like the CWSRF environmental benefits measurement effort, which seeks to estimate project-specific water quality benefits. Needs data will also be integrated into Internet-based water quality models and other decision support tools that support State and local environmental management. As implementation of the Sustainable Management Initiative activities accelerates over the next few years, the CWNS will likely evolve to further support those efforts.

Other Potential Influences on Future Surveys

Future CWNS data collection will be enhanced by further capitalizing on new Internet data collection and electronic document management technologies, as well as by continuing to integrate CWNS data with other data related to facilities. These efforts are aimed at reducing data collection costs while increasing the quality of the data.

This page intentionally left blank

Glossary

NOTE: Definitions are provided to help the reader understand the terms used throughout this Report. Many of these terms are defined in the Clean Water Act or EPA's implementing regulations, which contain legally binding requirements. The definitions provided in this document are not intended to substitute for the legally binding definitions provided in the Clean Water Act or implementing regulations.

301(h) Waiver from Secondary Treatment for Marine Discharges

A modification of secondary treatment requirements for POTWs that discharge to marine waters as authorized under section 301(h) of the Clean Water Act. The 301(h) waiver requires monitoring and reporting to ensure that balanced indigenous populations of biological communities are maintained in proximity to the discharge, and it allows recreational activities in and on the water.

advanced treatment

A level of treatment that is more stringent than secondary or produces a significant reduction in conventional, nonconventional or toxic pollutants present in the wastewater treated by a facility. See Appendix F, Table F-1, Category II.

asset management system

A set of procedures and management practices designed to help wastewater treatment facilities manage their installations, focusing on activities with major environmental impacts.

best management practice (BMP)

Schedules of activities, prohibitions of practices, maintenance procedures and other management practices to prevent or reduce the pollution of waters of the United States. BMPs also include treatment requirements, operating procedures and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

brownfields

Land that might be contaminated by a hazardous substance or pollutant, which may complicate its expansion, redevelopment or reuse. See Appendix F, Table F-2, Category VII-H.

capital renewal

Practices that 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. Capital renewal does not include costs for routine operation and maintenance at wastewater treatment plants.

Clean Water State Revolving Fund (CWSRF)

A State-managed revolving fund that provides loans for specific water pollution control purposes.

coastal watersheds

Watersheds that drain to the ocean or to an estuary or bay as defined by the National Oceanic and Atmospheric Administration (NOAA) using 8-digit watersheds.

collection system

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

collector sewers

Pipes used to collect and carry wastewater from a sanitary or industrial wastewater source to an interceptor sewer that conveys the wastewater to a treatment facility. See Appendix F, Table F-1, Category IV-A.

combined sewer overflow (CSO)

Discharge of a mixture of stormwater and untreated wastewater that occurs when the capacity of a combined sewer system is exceeded during a rainstorm. See Appendix F, Table F-1, Category V.

combined sewer system

A sewer system designed to convey both domestic sanitary wastewater and stormwater.

community

With respect to wastewater treatment, a group of residences, businesses or industries sharing a common treatment or conveyance facility.

Comprehensive Conservation Management Plan (CCMP)

One purpose of the National Estuary Program conference under section 320 of the Clean Water Act is to develop a Comprehensive Conservation and Management Plan (CCMP). The CCMP recommends priority corrective actions and compliance schedules for addressing point and nonpoint sources of pollution to restore and maintain water quality, recreational activities in the estuary, and assure that the designated uses of the estuary are protected

concentrated animal facility (feedlot)

A facility for the controlled feeding of animals that tends to concentrate large amounts of animal waste which, if they cannot be absorbed by the soil, might be carried to nearby streams or lakes by rainfall runoff. Large facilities (e.g., having more than 1,000 confined cattle) are considered point sources that may be required to have permits under the National Pollutant Discharge Elimination System (NPDES) program. In general, smaller facilities are also considered to be point sources subject to NPDES

permitting if they meet certain criteria for their method of discharge or if they are designated as point sources.

conveyance needs

The cost estimate to construct, expand or upgrade sewer collection systems for transporting wastewater to treatment facilities. See Appendix F, Table F-1, Categories IV-A and IV-B.

decentralized treatment system

Onsite or cluster wastewater system used to treat and dispose of relatively small volumes of wastewater, usually from dwellings and businesses located relatively close together. Onsite and cluster systems are also commonly used in combination.

design year needs

The cost estimate for building publicly owned wastewater treatment facilities eligible for assistance under the Clean Water Act to serve the population expected within 20 years. For the CWNS 2004, the design year is 2024.

documented need

A project that addresses a water quality or public health problem existing as of January 1, 2004, with associated abatement costs that meet CWNS documentation requirements in Chapter 1 of this Report.

drainage basin

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. See ***watershed***.

environmental data systems

Tools that store, manage and deliver descriptive environmental information and allow data analysis. Some of EPA's environmental data management systems are the following:

EnviroFacts: A single point of access to select EPA environmental data. The Web site provides information from several EPA databases containing data on environmental activities that might affect air, water and land anywhere in the United States.

EnviroMapper for Water: A Web-based geographic information system (GIS) application that dynamically displays information about bodies of water in the United States. This interactive tool enables the creation of customized GIS maps that portray the Nation's surface waters along with a collection of environmental data. The application can be used to view environmental information from the national level down to the community level (within 1 mile). It also has the capability to pan, zoom, label and print maps.

Ask WATERS: Part of EPA's WATERS services, which are database and Web-based services that provide user-friendly interfaces to complex analyses. These selected services make extensive use of digital locational information and integrate other WATERS program data. Designed as modular units,

the services are being developed within a common architecture, and each service will be available as it is completed. Ask WATERS generates cross-program calculations and provides insight into overlaps between programs.

BASINS (Better Assessment Science Integrating Point and Nonpoint Sources): A multipurpose environmental analysis system that integrates a GIS, national watershed data, and state-of-the-art environmental assessment and modeling tools into one convenient package.

environmental management systems (EMS)

A set of processes and practices that enable an organization to reduce its environmental impacts and increase its operating efficiency.

estuarine management

Activities necessary to develop and implement Comprehensive Conservation and Management Plans for protecting estuaries under the National Estuary Program created by Clean Water Act section 320. Estuary protection activities focus on restoring and maintaining the chemical, physical and biological integrity of the estuary and controlling nonpoint sources of pollution.

estuary

The thin zone along a coastline in which freshwater systems and rivers meet and mix with a salty ocean (such as a bay, mouth of a river, salt marsh or lagoon).

facility

A project and location involved in water quality management, such as a wastewater treatment plant or sewer system, a municipal separate storm sewer system or a nonpoint source (NPS) pollution control project. Although the term *facility* is typically construed as a wastewater treatment facility or some other structure, for NPS pollution control, it refers to a place. The types of NPS pollution control projects vary considerably, ranging from installing a pumpout system at a single marina to conducting countywide conservation tillage projects on numerous farms. Data in the CWNS 2004 were collected and organized by facility for all types of water pollution control.

facility plan

Any plan or study that directly relates to the construction of treatment works necessary to comply with the Clean Water Act. A facility 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 facility plan. A facility 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.

ground water protection

Activities addressed in a State's ground water protection strategy that are a part of the Nonpoint Source Management Program under section 319(i) of the Clean Water Act to build State institutional capabilities to protect ground water resources from nonpoint sources of contamination. Activities include research, planning, groundwater assessments, 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 municipal wastewater treatment facility, the portion of the facility in which equalization of the influent wastewater occurs.

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 streams, the process whereby a stream channel or bank is eroded by flowing water. Hydromodification includes channelization and channel modification, dams, and stream bank/shoreline erosion, which typically result in the suspension of sediments in the watercourse. Needs to address water quality problems associated with hydromodifications are included in Category VII-K. See Appendix F, Table F-2.

hypoxia

Oxygen deficiency in aquatic ecosystems, which is a symptom of eutrophication. Eutrophication is the process in which a waterbody becomes rich in organic nutrients such as phosphorous and nitrogen from runoff, treatment plant discharges and other sources, thereby promoting the excessive growth of algae. The rapid growth of algae depletes the waterbody of oxygen and impedes the survival of other species.

infiltration/inflow correction

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). See Appendix F, Table F-1, Category III-A.

infrastructure improvement

An upgrade or replacement of wastewater collection and treatment structures and other CWNS-eligible infrastructure.

interceptor sewer

A major sewer line that receives wastewater flows from collector sewers. An interceptor sewer carries wastewater directly to the treatment facility or to another interceptor. See Appendix F, Table F-1, Category IV-B.

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. A lagoon might not have a discharge to surface waters under normal (dry-weather) operation.

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 government entity and used for collecting and conveying stormwater and is not a POTW or a combined sewer. Domestic, industrial and commercial sanitary sewage is collected and conveyed in systems separate from MS4s.

Municipal Stormwater Management Plan

A plan that describes a proposed municipal stormwater management program as part of a municipality's NPDES stormwater 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 is 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, (4) reduce pollutants in construction site runoff that is discharged to municipal separate storm sewers, and (5) enhance municipal maintenance, public education and public involvement.

National Estuary Program

A program established by Congress under section 320 of the Clean Water Act in 1987 to improve the quality of estuaries of national importance. For selected estuaries, the Administrator is to convene a management conference to develop a comprehensive conservation and management plan for the estuary recommending priority corrective actions to restore and maintain water quality of the estuary.

National Pollutant Discharge Elimination System (NPDES)

The national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under sections 307, 402, 318 and 405 of the Clean Water Act. This term includes State or interstate programs that have been approved or authorized by EPA under section 402(b) of the Clean Water Act. See 40 C.F.R. §123.

need

A project that addresses a water quality or public health problem existing as of January 1, 2004, with associated abatement costs.

nonpoint sources

Pollution sources that are diffuse and from which pollutants 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 stormwater runoff. Nonpoint source (NPS) pollution may include runoff from agriculture, silviculture, urban development, mining, construction, dams and channels, inappropriate land disposal of waste, marinas and saltwater intrusion. See Appendix F, Table F-2, Category VII.

nutrient

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

onsite wastewater treatment system

Any combination of unit processes or best management practices designed to receive, treat and dispose of wastewater from individual structures (homes, businesses and so forth). Some examples are septic tanks and holding tanks.

pesticide

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

point source

Any discernible, confined and discrete conveyance from which pollutants are or may be discharged to waters of the United States. The term *point source* does not include return flows from irrigated agriculture or agricultural storm water runoff. Wastewater treatment plant outfalls and combined sewer system overflow points of discharge are typical point sources.

primary treatment

The first major stage of wastewater treatment (i.e., after grit removal), which includes removal of floating debris and solids by screening and sedimentation.

publicly owned treatment works (POTW)

A treatment facility, as defined in section 212 of the Clean Water Act, which is owned by a State or municipality. A POTW includes any devices and systems used in the storage, treatment, recycling and reclamation of municipal sewage or industrial wastes of a liquid nature. It also includes sewers, pipes and other conveyances only if they convey wastewater to a POTW treatment plant.

recycled water distribution

The costs associated with conveyance of the recycled water (wastewater reused after removal of waste contributed by humans) and any associated rehabilitation or replacement needs. See Appendix F, Table F-1, Category X.

redocumentation

The process by which documentation dated before 1994 supporting an individual facility's needs was updated or revised for the CWNS 2004. Facilities with needs in excess of $20 million had to be updated or revised as necessary by documentation dated January 1, 1998, or later. For nonpoint source needs, the above cutoff dates were 1990 and 1994, respectively.

replacement/rehabilitation of sewers

Reinforcement or reconstruction of structurally deteriorating sewers (beyond normal maintenance). See Appendix F, Table F-1, Category III-B.

riparian vegetation

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

sanitary sewer

A municipal sewer designed to carry only domestic sanitary sewage and industrial wastes to a municipal wastewater treatment plant.

sanitary sewer overflow (SSO)

A release of raw domestic sewage (and in some cases, pretreated industrial wastes) from a separate sewer system before the sanitary wastewater reaches the municipal wastewater treatment facility.

secondary wastewater treatment

The minimum level of treatment that must be achieved for discharges from all municipal wastewater treatment facilities except those facilities granted ocean discharge waivers under section 301(h) of the Clean Water Act. 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 5-day biochemical oxygen demand (BOD_5) and total suspended solids, although secondary treatment levels required for some lagoon systems might be less stringent. In addition, the secondary treatment must remove 85 percent of BOD_5 and total suspended solids from the influent wastewater, although adjustments allowing lower percentage removals are authorized in some circumstances. See Appendix F, Table F-1, Category I.

separate sewer system/sanitary sewer system

A sewer system designed to exclude stormwater and used to convey only domestic, industrial and commercial sanitary wastewater (and in some cases, pretreated industrial wastes).

Separate State Estimates (SSE)

Costs that are not included in EPA's needs for the CWNS 2004 because the costs are justified with documents other than the established documentation types or they have no written documentation. These estimates are entered for States' purposes other than this Report, such as State level planning as well as

communication with State legislatures and other groups involved with addressing and preventing water quality problems.

silviculture

The care and cultivation of forest trees (e.g., forestry). See Appendix F, Table F-2, Category VII-C.

small community

A community with a population of fewer than 10,000 people and a total wastewater flow of less than 1 million gallons per day.

storm sewer

A sewer that carries only runoff from storm events.

stormwater

Stormwater runoff, snowmelt runoff, and surface runoff and drainage. See Appendix F, Table F-1, Category VI.

Sustainable Infrastructure Initiative

Initiative developed in response to the Gap Analysis and other recent 20-year estimations of wastewater treatment needs to reduce the infrastructure funding gap. The program was developed using input from industry, government and academia obtained at the January 2003 forum *Closing the Gap: Innovative Responses for Sustainable Water Infrastructure*.

treatment facility

A structure designed to treat wastewater, stormwater or combined sewer overflows before their discharge to the environment. Treatment is accomplished by subjecting the wastewater to a combination of physical, chemical and biological processes that reduce the concentration of contaminants.

urban nonpoint source runoff

Wet-weather runoff from urbanized areas not included in Phase I or Phase II of the Stormwater Permit Program. Includes runoff from construction activities occupying less than 1 acre. See Appendix F, Table F-2, Category VII-D.

urbanized area (UA)

A densely settled territory that contains 50,000 or more people.

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 it 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 depends 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 unsuitable for specific designated uses, such as drinking, swimming, farming, fish production or industrial processes.

water quality standards

State-adopted and EPA-approved or EPA-promulgated ambient standards for waterbodies. Water quality standards consist of a designated use, or goal, for a waterbody; criteria, which are narrative or numeric levels or values necessary to support a particular use; and an antidegradation policy to protect existing uses and high-quality waters.

water reuse

The reuse of wastewater after removal of waste contributed by humans.

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 sometimes referred to as the *drainage basin* of the receiving waterbody.

watershed, hydrologic unit codes

The United States, the District of Columbia, Puerto Rico and the U.S. Territories (including the U.S. Virgin Islands) are divided into 21 major 2-digit hydrologic unit codes or hydrologic regions. These 21 hydrologic regions are subdivided into 222 4-digit watersheds. The contiguous United States contains 204 4-digit watersheds. These 4-digit watersheds are further subdivided into 6- and 8-digit watersheds. In some portions of the United States, further subdivision of 8-digit watersheds to the 10- and 12-digit levels is available.

wetland 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 a Comprehensive Conservation and Management Plan under the Clean Water Act section 320 National Estuary Program. Clean Water Act section 404, which regulates the discharge of dredged or fill material into waters of the United States, is another mechanism for protecting wetlands.

This page intentionally left blank

References

CBO (Congressional Budget Office). 2002. *Future Investment in Drinking Water and Wastewater Infrastructure*. The Congress of the United States, Congressional Budget Office, Washington DC.

Culliton, T.J. 1998. *Population: Distribution, Density and Growth*. In State of the Coast Report. National Oceanic and Atmospheric Administration, Silver Spring, MD.

USDA (U.S. Department of Agriculture). 2004. *2004 Iowa Agricultural Statistics Bulletin*. U.S. Department of Agriculture, National Agricultural Statistics Service, Iowa Filed Office, Des Moines, IA.

USEPA (U.S. Environmental Protection Agency). 1994. *Combined Sewer Overflow Control Policy*. U.S. Environmental Protection Agency, Office of Water, Washington, DC. Fed. Register, April 19, 1994, 59:18688.

USEPA (U.S. Environmental Protection Agency). 1996. *The Clean Water State Revolving Fund Funding Framework*. EPA-832-B-96-005. U.S. Environmental Protection Agency, Office of Water, Washington, DC.

USEPA (U.S. Environmental Protection Agency). 1999. *National Pollutant Discharge Elimination System—Regulations for Revision of the Water Pollution Control Program Addressing Stormwater Discharges*. U.S. Environmental Protection Agency, Office of Water, Washington, DC. Fed. Register., December 8, 1999, 64:68722.

USEPA (U.S. Environmental Protection Agency). 2001b. *National Coastal Condition Report*. EPA-620-R- 01-005. U.S. Environmental Protection Agency, Office of Research and Development/Office of Water, Washington, DC.

USEPA (U.S. Environmental Protection Agency). 2002a. *The Clean Water and Drinking Water Infrastructure Gap Analysis*. EPA-816-R-02-020. U.S. Environmental Protection Agency, Office of Water, Washington, DC.

USEPA (U.S. Environmental Protection Agency). 2002b. *National Water Quality Inventory: 2000 Report*. EPA-841-F-02-001. U.S. Environmental Protection Agency, Office of Water, Washington, DC.

WIN (Water Infrastructure Network). 2000. *Recommendations for Clean and Safe Water in the 21st Century*. <http: //www.amsa-cleanwater.org/advocacy/winreport/ winreport2000.pdf>.

This page intentionally left blank

Appendix A
Summary of CWNS 2004 Cost Estimates

This page intentionally left blank

Table A-1 summarizes by State the CWNS 2004 assessment of total needs for wastewater treatment and conveyance facilities, storm water management programs and recycled water distribution. The needs represent the capital investment necessary to plan, design, build, replace or rehabilitate publicly owned wastewater treatment and collection facilities (Categories I through V) and establish and implement storm water management programs (Category VI). Recycled water distribution (Category X) includes all costs associated with the conveyance of recycled water (wastewater reuse after removal of waste contributed by humans) and any associated rehabilitation/replacement costs criteria, which include the Clean Water State Revolving Fund (CWSRF) program project funding eligibility rules established under Title VI of the CWA. Needs estimates presented in Table A-1 might vary slightly from those presented in Tables 2-1 and 2-2 and the text because of independent rounding.

Table A-1. CWNS 2004 Total Needs (January 2004 Dollars in Millions)

	Category of Need										
State	**Total**	**I**	**II**	**III-A**	**III-B**	**IV-A**	**IV-B**	**V**	**VI**	**X**	**Tot. I-V**
Alabama	3,513	113	1,044	162	1,626	450	118	0	0	0	3,513
Alaska	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Arizona	6,107	1,257	1,131	68	392	869	850	0	1,175	365	4,567
Arkansas	408	32	122	66	2	71	115	0	0	0	408
California	20,503	7,546	3,993	95	3,477	715	2,091	255	391	1,940	18,172
Colorado	2,240	326	1,446	9	157	93	95	0	100	14	2,126
Connecticut	2,598	407	803	97	47	193	212	839	0	0	2,598
Delaware	134	35	27	4	11	31	5	21	0	0	134
District of Columbia	2,030	84	454	0	176	0	0	1,307	9	0	2,021
Florida	12,900	34	4,596	311	960	1,752	1,392	0	2,183	1,672	9,045
Georgia	2,351	68	110	1,107	23	3	18	1,022	0	0	2,351
Hawaii	2,085	655	38	525	491	101	162	0	0	113	1,972
Idaho	463	203	80	6	37	46	72	0	19	0a	444
Illinois	13,405	1,120	148	49	1,615	174	199	10,100	0	0	13,405
Indiana	5,867	86	126	21	180	53	28	5,361	12	0	5,855
Iowa	955	199	96	21	85	26	99	427	2	0	953
Kansas	2,061	711	160	227	25	59	415	464	0	0	2,061
Kentucky	2,842	601	55	193	227	785	773	181	27	0	2,815
Louisiana	3,327	622	128	1,455	410	325	387	0	0	0	3,327
Maine	854	236	12	19	50	128	32	374	3	0	851
Maryland	5,872	857	2,159	165	868	481	480	430	431	1	5,440
Massachusetts	3,158	673	27	31	72	300	250	1,805	0	0	3,158
Michigan	6,015	894	33	98	317	297	42	4,334	0	0	6,015
Minnesota	3,638	1,115	28	122	429	89	935	9	911	0	2,727
Mississippi	993	86	165	67	286	213	176	0	0	0	993
Missouri	4,840	1,010	13	1,245	414	180	519	1,459	0	0	4,840
Montana	540	223	36	21	80	103	77	0	0	0	540
Nebraska	1,328	136	99	11	24	28	82	928	20	0	1,308

Nevada	304	7	117	0	10	26	86	0	11	47	246
New Hampshire	570	136	33	8	59	20	53	261	0	0	570
New Jersey	9,315	2,902	431	340	755	616	332	3,772	94	73	9,148
New Mexico	160	70	5	0a	39	27	19	0	0	0	160
New York	21,841	11,232	700	68	2,415	696	145	6,563	22	0	21,819
North Carolina	5,100	311	1,651	281	281	1,107	1,419	3	1	46	5,053
North Dakota	50	4	0	0	9	0	37	0	0	0	50
Ohio	11,761	1,503	409	1,950	209	856	546	6,284	4	0	11,757
Oklahoma	1,047	243	56	0	278	74	197	0	199	0	848
Oregon	2,949	922	535	17	553	19	3	834	61	5	2,883
Pennsylvania	7,196	781	294	348	151	822	143	4,639	18	0	7,178
Rhode Island	1,166	83	87	16	63	224	52	636	5	0	1,161
South Carolina	713	199	369	4	19	63	44	0	15	0	698
South Dakota	67	17	12	0	3	35	0	0	0a	0	67
Tennessee	1,037	202	26	220	129	80	95	285	0	0	1,037
Texas	8,488	1,584	581	326	1,017	908	1,221	0	2,839	12	5,637
Utah	581	174	64	2	66	113	144	0	0	18	563
Vermont	167	43	39	1	8	42	7	27	0	0	167
Virginia	4,710	672	1,698	124	687	488	529	512	0	0	4,710
Washington	3,939	1,883	35	133	280	170	732	515	179	12	3,748
West Virginia	2,541	348	11	152	38	726	482	767	14	3	2,524
Wisconsin	3,893	948	92	89	1,413	399	317	406	229	0	3,664
Wyoming	189	99	8	25	1	50	5	0	1	0	188
American Samoa	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Guam	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
N. Mariana Islands	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Puerto Rico	3,655	867	97	1	0	1,685	1,005	0	0	0	3,655
Virgin Islands	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Total	**202,466**	**44,559**	**24,479**	**10,300**	**20,964**	**16,811**	**17,237**	**54,820**	**8,975**	**4,321**	**189,170**

Categories

I Secondary wastewater treatment
II Advanced wastewater treatment
III-A Infiltration/inflow correction
III-B Sewer replacement/rehabilitation
IV-A New collector sewers and appurtenances
IV-B New interceptor sewers and appurtenances
V Combined sewer overflow correction
VI Storm water management programs
X Recycled water distribution

Notes:

NR = not reported. Alaska, American Samoa, Guam, the Northern Mariana Islands and the Virgin Islands did not participate in the CWNS 2004. Arizona, California, Georgia, Massachusetts, Michigan, Minnesota, North Dakota and South Dakota did not have the resources to complete the updating of their data. All other states, the District of Columbia and Puerto Rico completed more than 97 percent of the data entry or had fewer than 10 facilities that were not updated.

[a] Estimate is less than $0.5 million.

Table A-2 summarizes the CWNS 2004 assessment of other documented needs for NPS pollution control projects by State. These needs include the capital investment necessary to implement activities in approved State NPS Management Plans under section 319 and to develop and implement a Comprehensive Conservation and Management Plan under section 320 of the Clean Water Act. These needs have met the CWNS documentation and data criteria, which include the Clean Water State Revolving Fund (CWSRF) program project funding eligibility rules established under Title VI of the CWA.

Table A-2. CWNS 2004 Total Needs for NPS Pollution Control Projects (January 2004 Dollars in Millions)

	Category of Need												
State	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**Total**
Alabama	0	0	0	0	0	0	0	0	0	0	0	0	0
Alaska	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Arizona	7	0a	0	65	5	0	7	40	32	28	3	3	190
Arkansas	75	385	4	0a	0	0	7	0	0	0	0a	0	471
California	40	19	0	46	359	0	0	0	0	0	607	5	1,076
Colorado	0	0	0	125	0	0	49	0	0	0	1	2	177
Connecticut	7	6	0	489	0	0	0	6	0	0	300	228	1,036
Delaware	0	0	0	0	0	0	0	0	0	0	0	0	0
District of Columbia	0	0	0	4	0	0	0	0	4	0	2	0	10
Florida	10	1	0	3,933	2,635	0	0	12	0	0	2,676	18	9,285
Georgia	0	0	0	0	0	0	0	0	0	0	0	0	0
Hawaii	0	0	0	0	0	0	0	0	0	0	0	0	0
Idaho	68	28	8	13	0	0a	2	0	0	0	43	0a	162
Illinois	35	0	0	0	0	0	0	0	0	0	17	0a	52
Indiana	4	3	0a	2	0	0	0a	0	0	0	0a	769	778
Iowa	0	0	0	0	0	0	0	0	0	0	0	52	52
Kansas	0	0	0	0	0	0	0	0	0	0	0	0	0
Kentucky	0	0	0	0	0	1	0	0	0	0	0	0	1
Louisiana	0	0	0	2	0	0	0	0	0	0	830	0	832
Maine	0	24	44	18	0	0	0	0	57	0	6	19	168
Maryland	0	0a	0	4	0	0	0	0	8	149	76	8	245
Massachusetts	0	0	0	0	0	0	0	0	0	6	5	0	11
Michigan	36	8	11	107	0	0	0a	0	559	0	257	2	980
Minnesota	274	140	0	0	0	0	0	995	13	105	314	1,017	2,858
Mississippi	61	212	13	0	0	0	0	0	0	0	1,198	79	1,563
Missouri	38	31	1	681	0	0	6	0	531	25	389	1	1,703
Montana	0	0	0	46	0	0	0	0	0	0	0	0	46
Nebraska	0	0	0	17	547	0	0	0	224	13	0	24	825
Nevada	0	0	0	0	0	0	0	0	0	0	2	0	2
New Hampshire	0	0	0	0	0	0	0	0	0	8	0	1	9
New Jersey	2	4	0	181	502	1	0a	474	2	1,026	1,465	67	3,724
New Mexico	1	0	0	0	2	0	0	6	0	0	0	0	9
New York	53	96	111	328	706	7	0	158	13	624	519	22	2,637

North Carolina	0	0a	0	17	0	1	0	0	0	3	49	1	71
North Dakota	0	0	0	0	0	0	0	0	0	0	0	0	0
Ohio	590	30	1	127	0	0	24	0	0	0	115	290	1,177
Oklahoma	0	0	0	0	0	0	0	0	0	0	0	0	0
Oregon	0	0	0	0a	0	0	0	0	0	0	0	1	1
Pennsylvania	269	322	0	5,083	0	0	65	2	0	0	110	0a	5,851
Rhode Island	0	0	0	2	0	0	0	1	0	119	54	14	190
South Carolina	0	0	0	11	0	0	0	0	0	0	2	0	13
South Dakota	4	11	3	1	0	0	0	0	0	0	0	0a	19
Tennessee	0	0	0	0	0	0	0	0	0	0	0	0a	0a
Texas	4	0	0	0	0	0	0	0	0	0	94	331	429
Utah	1	4	0	0a	0	0	0a	0	0	0	1	0	6
Vermont	0	0	0	0	0	0	0	0	0	0	0	5	5
Virginia	0	0	0	0	0	0	0	0	0	0	0	0	0
Washington	2	6	0	10	0a	0	0	0	14	0	6	2	40
West Virginia	0	0	0	0	0	0	0	0	0	0	0	5	5
Wisconsin	79	132	0	1,066	12	0	0	27	0	5	169	18	1,508
Wyoming	3	0	0	0	0	0	0	0	37	26	0	3	69
American Samoa	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Guam	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
N. Mariana Islands	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Puerto Rico	0	0	0	0	0	0	0	0	0	0	0	0	0
Virgin Islands	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Total	**1,663**	**1,462**	**196**	**12,378**	**4,768**	**10**	**160**	**1,721**	**1,494**	**2,137**	**9,310**	**2,987**	**38,286**

Categories

A Agriculture (cropland)
B Agriculture (animals)
C Silviculture
D Urban
E Ground water protection (unknown source)
F Marinas
G Resource extraction
H Brownfields
I Storage tanks
J Sanitary landfills
K Hydromodification
L Individual/decentralized sewage treatment

Notes:
NR = not reported. Alaska, American Samoa, Guam, the Northern Mariana Islands and the Virgin Islands did not participate in the CWNS 2004. Arizona, California, Georgia, Massachusetts, Michigan, Minnesota, North Dakota and South Dakota did not have the resources to complete the updating of their data. All other states, the District of Columbia and Puerto Rico completed more than 97 percent of the data entry or had fewer than 10 facilities that were not updated.

[a] Estimate is less than $0.5 million.

Table A-3 provides a summary of all publicly owned small community wastewater treatment and collection facilities identified in the CWNS 2004 by State. For the purpose of this table, wastewater treatment and collection facilities refer to centralized wastewater treatment plants, centralized wastewater collection systems, decentralized systems, individual onsite system areas and facilities that treat and convey wastewater that do not fit in one of the previous classifications. Tables A-4, A-5 and A-6 provide further breakdown of small community information based on different population ranges. Needs estimates presented in Table A-3 still include the costs for Category VII-L needs and therefore vary slightly from those presented in Figure 2-7. Total in this table may vary from summed totals from Tables A-4, A-5 and A-6 due to independent rounding.
The first column of this table includes information on the projected number of small community wastewater treatment and collection system facilities and the small community percentage of the total number of wastewater treatment and collection system facilities for each State. The number of facilities includes those with documented needs and those that did not report any needs. This percentage represents the small community facilities compared to the total wastewater and collection system facilities in the State. For example, 52 percent of Alabama's projected wastewater treatment and collection system facilities are for small communities. Column 2 depicts only the small community facilities with documented wastewater treatment and collection system needs and reflects a portion of all small community facilities with and without needs presented in Column 1.
Column 3 shows the projected small community population receiving centralized collection and the percentage of the total state population. The last column shows the projected small community wastewater treatment and collection system documented needs as of January 1, 2004, and the respective percentage of the total CWNS 2004 wastewater treatment and collection system documented needs.

Table A-3. CWNS 2004 Comparison of Small Community Facilities' Needs and Total Needs (January 2004 Dollars in Millions)

	All Projected Small Community Facilities		Projected Small Community Facilities With Documented Needs		Projected Small Community Populations		Documented Needs for Small Communities	
State	Number	Percent	Number	Percent	Number	Percent	$ Million	Percent
Alabama	151	52	114	50	305,749	10	201	6
Alaska	NR	NR	NR	NR	NR	NR	NR	NR
Arizona	169	63	158	63	306,216	4	440	9
Arkansas	443	83	107	84	663,831	26	170	42
California	301	43	69	25	696,390	2	353	2
Colorado	325	72	204	75	495,966	10	408	19
Connecticut	115	52	36	29	436,456	17	252	9
Delaware	37	67	10	59	91,842	11	51	38
District of Columbia	0	0	0	0	0	0	0	0
Florida	116	28	73	24	384,253	2	370	3
Georgia	61	52	7	30	180,450	3	8	<1
Hawaii	18	53	6	29	79,913	6	41	2
Idaho	229	83	54	67	259,759	19	164	37
Illinois	714	68	157	44	1,585,004	12	732	5
Indiana[a]	433	76	134	61	1,665,837	35	1,064	16
Iowa	920	91	192	81	849,013	30	231	23
Kansas[a]	799	92	192	76	871,720	31	283	14
Kentucky	300	75	235	72	599,723	15	673	24
Louisiana	311	74	136	62	558,030	14	216	6
Maine	165	77	73	63	421,299	50	262	30
Maryland	274	76	188	70	310,340	7	671	12
Massachusetts	141	52	40	31	526,137	10	195	6
Michigan	24	32	19	28	81,455	1	79	1
Minnesota[a]	298	78	242	78	1,091,692	27	1,443	39
Mississippi	660	88	360	87	822,226	30	413	39
Missouri	866	83	203	72	982,667	16	305	6
Montana	208	89	92	79	234,988	28	218	40
Nebraska[a]	522	94	169	91	429,856	28	171	13
Nevada	57	63	6	26	104,273	5	75	26
New Hampshire	87	66	31	47	308,479	39	75	13
New Jersey	503	61	358	58	1,582,516	18	573	6
New Mexico	40	56	26	55	97,502	6	40	25

New York	1,100	75	318	59	2,825,600	17	1,119	5
North Carolina	440	56	196	53	783,772	13	835	16
North Dakota	0	0	0	0	0	0	0	0
Ohio	1,050	77	466	71	1,425,458	14	991	8
Oklahoma	437	86	73	82	589,033	20	78	9
Oregon	209	73	49	63	394,802	11	188	7
Pennsylvania	1,626	80	401	73	3,446,528	32	1,503	21
Rhode Island	14	29	9	26	64,923	8	95	8
South Carolina	92	45	31	40	239,645	6	71	10
South Dakota	11	79	11	79	18,311	3	17	25
Tennessee	223	65	52	47	501,433	11	72	7
Texas	1,629	73	429	67	3,635,461	13	772	13
Utah	193	52	22	20	162,404	5	35	6
Vermont	84	74	36	60	207,489	51	64	37
Virginia	286	69	149	61	556,134	7	672	14
Washington	222	55	55	39	472,553	7	220	6
West Virginia	625	91	238	84	780,204	49	1,431	57
Wisconsin	907	85	489	77	1,248,271	26	729	20
Wyoming	120	74	74	75	135,906	20	94	49
American Samoa	NR	NR	NR	NR	NR	NR	NR	NR
Guam	NR	NR	NR	NR	NR	NR	NR	NR
N. Mariana Islands	NR	NR	NR	NR	NR	NR	NR	NR
Puerto Rico	3	7	3	7	19,279	1	48	1
Virgin Islands	NR	NR	NR	NR	NR	NR	NR	NR
Total	**18,558**	**74**	**6,792**	**63**	**34,530,788**	**12**	**19,211**	**10**

Notes:
NR = not reported. Alaska, American Samoa, Guam, the Northern Mariana Islands and the Virgin Islands did not participate in the CWNS 2004. Arizona, California, Georgia, Massachusetts, Michigan, Minnesota, North Dakota and South Dakota did not have the resources to complete the updating of their data. All other states, the District of Columbia and Puerto Rico completed more than 97 percent of the data entry or had fewer than 10 facilities that were not updated.

[a] Individual onsite and decentralized systems might be reported at the county level and therefore a single facility might represent one or more communities that are considered small communities for the purposes of the CWNS. As a result, it is likely that the number of small communities in these states are under-reported.

Table A-4 provides the subset of Table A-3 data for the needs for small community facilities estimated to be serving populations in the range of 3,500 to 10,000 people if all documented needs are met.

Table A-4. CWNS 2004 Comparison of Small Community Facilities' Needs and Total Needs: Facilities Serving Populations of 3,500 to 10,000 People (January 2004 Dollars in Millions)

	All Projected Small Community Facilities		Projected Small Community Facilities With Documented Needs		Projected Small Community Populations		Documented Needs for Small Communities	
State	Number	Percent	Number	Percent	Number	Percent	$ Million	Percent
Alabama	23	8	18	8	125,802	4	33	1
Alaska	NR	NR	NR	NR	NR	NR	NR	NR
Arizona	24	9	23	9	128,662	2	164	3
Arkansas	56	11	18	14	304,677	12	27	7
California	70	10	13	5	405,627	1	87	<1
Colorado	42	9	26	10	216,039	4	121	6
Connecticut	55	25	21	17	336,743	13	179	6
Delaware	13	24	5	29	65,890	8	29	22
District of Columbia	0	0	0	0	0	0	0	0
Florida	47	11	26	9	270,170	1	187	2
Georgia	21	18	3	13	106,939	2	3	<1
Hawaii	12	35	4	19	70,998	6	33	2
Idaho	22	8	10	12	95,552	7	73	16
Illinois	146	14	46	13	846,708	6	410	3
Indiana[a]	101	18	64	29	1,241,446	26	839	13
Iowa	45	4	7	3	237,101	8	20	2
Kansas[a]	55	6	25	10	296,367	10	132	6
Kentucky	60	15	50	15	309,809	8	259	9
Louisiana	51	12	25	11	270,518	7	76	2
Maine	42	20	25	22	235,798	28	86	10
Maryland	27	7	24	9	152,224	3	239	4
Massachusetts	66	24	22	17	412,674	8	87	3
Michigan	7	9	7	10	53,686	1	20	<1
Minnesota[a]	93	24	87	28	825,191	21	1,011	27
Mississippi	71	9	31	8	378,838	14	91	8
Missouri	78	8	28	10	391,953	6	92	2
Montana	17	7	14	12	86,680	10	93	17
Nebraska[a]	21	4	15	8	119,945	8	56	4
Nevada	9	10	2	9	51,041	3	46	16
New Hampshire	40	30	17	26	245,201	31	62	11
New Jersey	206	25	125	20	1,272,678	14	351	4
New Mexico	9	13	7	15	51,224	3	22	14
New York	301	21	81	15	1,636,338	10	398	2
North Carolina	69	9	36	10	358,270	6	232	5
North Dakota	0	0	0	0	0	0	0	0
Ohio	115	8	62	10	603,952	6	275	2
Oklahoma	43	8	10	11	227,981	8	14	2
Oregon	34	12	9	12	196,241	5	49	2
Pennsylvania	360	18	103	19	1,900,783	18	493	7

Rhode Island	9	19	5	14	59,279	7	76	7
South Carolina	29	14	9	12	151,178	4	29	4
South Dakota	1	7	1	7	3,879	1	8	12
Tennessee	44	13	11	10	257,806	6	21	2
Texas	378	17	108	17	2,004,565	7	390	7
Utah	15	4	7	6	97,774	3	8	1
Vermont	22	19	13	22	113,585	28	41	24
Virginia	54	13	30	12	278,884	4	212	5
Washington	48	12	12	9	267,946	4	104	3
West Virginia	70	10	44	15	306,444	19	555	22
Wisconsin	94	9	71	11	537,272	11	198	5
Wyoming	9	6	9	9	48,166	7	33	17
American Samoa	NR	NR	NR	NR	NR	NR	NR	NR
Guam	NR	NR	NR	NR	NR	NR	NR	NR
N. Mariana Islands	NR	NR	NR	NR	NR	NR	NR	NR
Puerto Rico	2	5	2	5	16,637	1	30	1
Virgin Islands	NR	NR	NR	NR	NR	NR	NR	NR
Total	**3,226**	**13**	**1,411**	**13**	**18,673,161**	**6**	**8,094**	**4**

Notes:
NR = not reported. Alaska, American Samoa, Guam, the Northern Mariana Islands and the Virgin Islands did not participate in the CWNS 2004. Arizona, California, Georgia, Massachusetts, Michigan, Minnesota, North Dakota and South Dakota did not have the resources to complete the updating of their data. All other states, the District of Columbia and Puerto Rico completed more than 97 percent of the data entry or had fewer than 10 facilities that were not updated.

[a] Individual onsite and decentralized systems might be reported at the county level and therefore a single facility might represent one or more communities that are considered small communities for the purposes of the CWNS. As a result, it is likely that the number of small communities in these states are under-reported. Also, county-level facilities serving more than 10,000 people are included in this table.

Table A-5 provides the subset of Table A-3 data for the needs for small community facilities estimated to be serving populations in the range of 1,000 to 3,500 people if all documented needs are met.

Table A-5. CWNS 2004 Comparison of Small Community Facilities' Needs and Total Needs: Facilities Serving Populations of 1,000 to 3,500 People (January 2004 Dollars in Millions)

	All Projected Small Community Facilities		Projected Small Community Facilities With Documented Needs		Projected Small Community Populations		Documented Needs for Small Communities	
State	Number	Percent	Number	Percent	Number	Percent	$ Million	Percent
Alabama	82	28	64	28	149,201	5	122	3
Alaska	NR	NR	NR	NR	NR	NR	NR	NR
Arizona	62	23	60	24	141,782	2	170	3
Arkansas	151	28	47	37	259,349	10	92	23
California	118	17	33	12	240,295	1	197	1
Colorado	109	24	74	27	210,608	4	184	9
Connecticut	42	19	9	7	89,032	4	49	2
Delaware	10	18	3	18	21,075	2	16	12
District of Columbia	0	0	0	0	0	0	0	0
Florida	51	12	33	11	102,664	<1	156	1
Georgia	30	25	3	13	66,206	1	3	<1
Hawaii	5	15	2	10	8,515	1	7	<1
Idaho	66	24	24	30	108,835	8	41	9
Illinois	308	29	69	20	585,165	4	242	2
Indiana[a]	177	31	46	21	330,364	7	184	3
Iowa	196	19	79	33	346,593	12	123	12
Kansas[a]	211	24	62	24	397,073	14	79	4
Kentucky	119	30	99	30	223,283	6	247	9
Louisiana	122	29	58	26	223,063	5	77	2
Maine	80	37	38	33	167,267	20	140	16
Maryland	53	15	44	16	102,505	2	215	4
Massachusetts	45	17	15	12	94,506	2	105	3
Michigan	13	17	8	12	26,275	<1	54	1
Minnesota[a]	99	26	81	26	207,423	5	264	7
Mississippi	155	21	90	22	280,828	10	150	14
Missouri	208	20	48	17	382,079	6	99	2
Montana	57	24	34	29	102,083	12	81	15
Nebraska[a]	109	20	60	32	181,245	12	73	5
Nevada	22	24	4	17	43,796	2	28	10
New Hampshire	26	20	8	12	54,423	7	10	2
New Jersey	129	16	86	14	276,496	3	168	2
New Mexico	20	28	11	23	40,586	2	13	8
New York	530	36	152	28	1,051,420	6	503	2
North Carolina	175	22	85	23	329,600	5	341	7
North Dakota	0	0	0	0	0	0	0	0
Ohio	313	23	139	21	581,033	6	371	3
Oklahoma	137	27	23	26	248,707	9	38	4
Oregon	83	29	25	32	155,565	4	94	3

Pennsylvania	658	32	135	24	1,250,475	12	643	9
Rhode Island	4	8	4	11	5,194	1	18	2
South Carolina	40	20	8	10	81,186	2	29	4
South Dakota	5	36	5	36	12,353	2	7	10
Tennessee	103	30	29	26	199,177	4	40	4
Texas	692	31	186	29	1,345,946	5	291	5
Utah	8	2	4	4	14,788	<1	9	2
Vermont	41	36	18	30	81,027	20	17	10
Virginia	122	29	59	24	227,502	3	263	6
Washington	83	21	27	19	157,398	2	90	2
West Virginia	187	27	93	33	323,841	20	552	22
Wisconsin	273	26	180	28	493,041	10	303	8
Wyoming	34	21	21	21	62,561	9	30	16
American Samoa	NR	NR	NR	NR	NR	NR	NR	NR
Guam	NR	NR	NR	NR	NR	NR	NR	NR
N. Mariana Islands	NR	NR	NR	NR	NR	NR	NR	NR
Puerto Rico	1	2	1	2	2,642	<1	18	<1
Virgin Islands	NR	NR	NR	NR	NR	NR	NR	NR
Total	**6,364**	**25**	**2,486**	**23**	**12,086,071**	**4**	**7,046**	**4**

Notes:
NR = not reported. Alaska, American Samoa, Guam, the Northern Mariana Islands and the Virgin Islands did not participate in the CWNS 2004. Arizona, California, Georgia, Massachusetts, Michigan, Minnesota, North Dakota and South Dakota did not have the resources to complete the updating of their data. All other states, the District of Columbia and Puerto Rico completed more than 97 percent of the data entry or had fewer than 10 facilities that were not updated.

[a] Individual onsite and decentralized systems might be reported at the county level and therefore a single facility might represent one or more communities that are considered small communities for the purposes of the CWNS. As a result, it is likely that the number of small communities in these states are under-reported.

Table A-6 provides the subset of Table A-3 data for the needs for small community facilities estimated to be serving populations of fewer than 1,000 people if all documented needs are met.

Table A-6. CWNS 2004 Comparison of Small Community Facilities' Needs and Total Needs: Facilities Serving Populations of Fewer Than 1,000 People (January 2004 Dollars in Millions)

	All Projected Small Community Facilities		Projected Small Community Facilities With Documented Needs		Projected Small Community Populations		Documented Needs for Small Communities	
State	Number	Percent	Number	Percent	Number	Percent	$ Million	Percent
Alabama	46	16	32	14	30,746	1	44	1
Alaska	NR	NR	NR	NR	NR	NR	NR	NR
Arizona	83	31	75	30	35,772	<1	105	2
Arkansas	236	44	42	33	99,805	4	53	13
California	113	16	23	8	50,468	<1	69	<1
Colorado	174	38	104	38	69,319	1	104	5
Connecticut	18	8	6	5	10,681	<1	26	1
Delaware	14	25	2	12	4,877	1	6	4
District of Columbia	0	0	0	0	0	0	0	0
Florida	18	4	14	5	11,419	<1	29	<1
Georgia	10	8	1	4	7,305	<1	1	<1
Hawaii	1	3	0	0	400	<1	0	0
Idaho	141	51	20	25	55,372	4	50	11
Illinois	260	25	42	12	153,131	1	82	1
Indiana[a]	155	27	24	11	94,027	2	43	1
Iowa	679	67	106	45	265,319	10	88	9
Kansas[a]	533	61	105	41	178,280	6	73	4
Kentucky	121	30	86	26	66,631	2	166	6
Louisiana	138	33	53	24	64,449	2	65	2
Maine	43	20	10	9	18,234	2	37	4
Maryland	194	54	120	45	55,611	1	216	4
Massachusetts	30	11	3	2	18,957	<1	2	<1
Michigan	4	5	4	6	1,494	<1	6	<1
Minnesota[a]	106	28	74	24	59,078	1	171	5
Mississippi	434	58	239	58	162,560	6	173	16
Missouri	580	56	127	45	208,635	3	117	2
Montana	134	57	44	38	46,225	6	45	8
Nebraska[a]	392	71	94	51	128,666	8	41	3
Nevada	26	29	0	0	9,436	<1	0	0
New Hampshire	21	16	6	9	8,855	1	3	1
New Jersey	168	21	147	24	33,342	<1	53	1
New Mexico	11	15	8	17	5,692	<1	5	3
New York	269	18	85	16	137,842	1	218	1
North Carolina	196	25	75	20	95,902	2	262	5
North Dakota	0	0	0	0	0	0	0	0
Ohio	622	45	265	41	240,473	2	344	3
Oklahoma	257	50	40	45	112,345	4	26	3
Oregon	92	32	15	19	42,996	1	44	2

Pennsylvania	608	30	163	29	295,270	3	366	5
Rhode Island	1	2	0	0	450	<1	0	0
South Carolina	23	11	14	18	7,281	<1	12	2
South Dakota	5	36	5	36	2,079	<1	2	3
Tennessee	76	22	12	11	44,450	1	13	1
Texas	559	25	135	21	284,950	1	93	2
Utah	170	46	11	10	49,842	2	19	3
Vermont	21	18	5	8	12,877	3	6	3
Virginia	110	26	60	24	49,748	1	197	4
Washington	91	23	16	11	47,209	1	25	1
West Virginia	368	53	101	36	149,919	9	325	13
Wisconsin	540	51	238	37	217,958	5	230	6
Wyoming	77	48	44	44	25,179	4	30	16
American Samoa	NR	NR	NR	NR	NR	NR	NR	NR
Guam	NR	NR	NR	NR	NR	NR	NR	NR
N. Mariana Islands	NR	NR	NR	NR	NR	NR	NR	NR
Puerto Rico	0	0	0	0	0	0	0	0
Virgin Islands	NR	NR	NR	NR	NR	NR	NR	NR
Total	**8,968**	**36**	**2,895**	**27**	**3,771,556**	**1**	**4,085**	**2**

Notes:
NR = not reported. Alaska, American Samoa, Guam, the Northern Mariana Islands and the Virgin Islands did not participate in the CWNS 2004. Arizona, California, Georgia, Massachusetts, Michigan, Minnesota, North Dakota and South Dakota did not have the resources to complete the updating of their data. All other states, the District of Columbia and Puerto Rico completed more than 97 percent of the data entry or had fewer than 10 facilities that were not updated.

[a] Individual onsite and decentralized systems might be reported at the county level and therefore a single facility might represent one or more communities that are considered small communities for the purposes of the CWNS.

Table A-7a summarizes the CWNS 2004 assessment of total needs for small communities by State for wastewater treatment and collection facilities (Categories I through V) and Recycled Water Distribution (Category X). Tables A-8a, A-9a, and A-10a provide further breakdown of small community information based on different population ranges.

Table A-7a. CWNS 2004 Total Small Community Needs (January 2004 Dollars in Millions)

State	Total Need	Percent of Total U.S. Need	Category of Need								
			I	II	III-A	III-B	IV-A	IV-B	V	X	Tot. I-V
Alabama	201	0.1	16	21	30	55	72	7	0	0	201
Alaska	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Arizona	438	0.2	61	75	20	5	225	51	0	1	437
Arkansas	170	0.1	10	25	20	1	60	54	0	0	170
California	348	0.2	145	32	5	49	86	29	0	2	346
Colorado	406	0.2	169	67	5	37	73	54	0	1	405
Connecticut	212	0.1	42	27	6	2	79	56	0	0	212
Delaware	51	<0.1	4	11	2	3	31	0	0	0	51
District of Columbia	0	0	0	0	0	0	0	0	0	0	0
Florida	370	0.2	4	132	16	24	164	28	0	2	368
Georgia	8	<0.1	1	3	0a	0	2	2	0	0	8
Hawaii	41	<0.1	17	10	0	3	11	0	0	0	41
Idaho	164	0.1	71	1	5	13	33	41	0	0	164
Illinois	732	0.4	128	23	17	18	105	32	409	0	732
Indiana	295	0.1	27	6	5	7	46	11	193	0	295
Iowa	179	0.1	87	33	5	14	17	4	19	0	179
Kansas	283	0.1	94	20	25	3	27	114	0	0	283
Kentucky	673	0.3	136	12	30	33	376	86	0	0	673
Louisiana	216	0.1	34	35	15	24	73	35	0	0	216
Maine	243	0.1	87	5	15	13	50	19	54	0	243
Maryland	663	0.3	114	163	36	59	137	116	38	0	663
Massachusetts	195	0.1	18	3	2	26	127	19	0	0	195
Michigan	77	<0.1	20	0	2	4	29	0	22	0	77
Minnesota	451	0.2	192	7	53	64	56	79	0	0	451
Mississippi	354	0.2	53	17	39	41	158	46	0	0	354
Missouri	304	0.2	83	6	4	19	144	48	0	0	304
Montana	218	0.1	101	3	10	38	43	23	0	0	218
Nebraska	147	0.1	61	34	3	10	26	13	0	0	147
Nevada	75	<0.1	0	25	0	0	5	45	0	0	75
New Hampshire	74	<0.1	32	8	1	9	8	16	0	0	74
New Jersey	513	0.3	44	56	59	167	125	55	5	2	511
New Mexico	40	<0.1	8	0a	0a	11	17	4	0	0	40

New York	1,098	0.5	297	33	30	105	424	62	147	0	1,098
North Carolina	835	0.4	68	64	54	63	386	194	0	6	829
North Dakota	0	0	0	0	0	0	0	0	0	0	0
Ohio	970	0.5	169	63	39	8	318	143	230	0	970
Oklahoma	78	<0.1	33	22	0	12	11	0	0	0	78
Oregon	187	0.1	104	3	7	61	12	0a	0	0	187
Pennsylvania	1,503	0.7	207	55	23	34	741	100	343	0	1,503
Rhode Island	83	<0.1	31	1	0a	7	36	8	0	0	83
South Carolina	71	<0.1	5	13	0a	3	37	13	0	0	71
South Dakota	17	<0.1	11	0	0	3	3	0	0	0	17
Tennessee	72	<0.1	20	1	16	3	29	3	0	0	72
Texas	688	0.3	152	43	50	60	225	157	0	1	687
Utah	35	<0.1	7	0	0	1	9	18	0	0	35
Vermont	62	<0.1	17	11	0	6	23	5	0	0	62
Virginia	672	0.3	131	89	13	21	293	125	0	0	672
Washington	220	0.1	106	0a	20	31	25	20	18	0	220
West Virginia	1,428	0.7	161	7	29	13	635	423	157	3	1,425
Wisconsin	711	0.4	232	25	31	147	227	49	0	0	711
Wyoming	91	<0.1	31	1	11	1	42	5	0	0	91
American Samoa	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Guam	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
N. Mariana Islands	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Puerto Rico	48	<0.1	36	0	0	0	9	3	0	0	48
Virgin Islands	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Total	**17,010**	**8.4**	**3,677**	**1,291**	**753**	**1,331**	**5,890**	**2,415**	**1,635**	**18**	**16,992**

Categories

I Secondary wastewater treatment
II Advanced wastewater treatment
III-A Infiltration/inflow correction
III-B Sewer replacement/rehabilitation
IV-A New collector sewers and appurtenances
IV-B New interceptor sewers and appurtenances
V Combined sewer overflow correction
X Recycled water distribution
VII-L Individual/decentralized sewage treatment

Notes:
NR = not reported. Alaska, American Samoa, Guam, the Northern Mariana Islands and the Virgin Islands did not participate in the CWNS 2004. Arizona, California, Georgia, Massachusetts, Michigan, Minnesota, North Dakota and South Dakota did not have the resources to complete the updating of their data. All other states, the District of Columbia and Puerto Rico completed more than 97 percent of the data entry or had fewer than 10 facilities that were not updated.

[a] Estimate is less than $0.5 million.

Table A-7b summarizes the CWNS 2004 assessment of total other documented needs for small communities by State for Individual/Decentralized Sewage Treatment (Category VII-L), Tables A-8b, A-9b, and A-10b provide further breakdown of small community information based on different population ranges.

Table A-7b. CWNS 2004 Total Other Documented Small Community Needs (January 2004 Dollars in Millions)

State	Category of Need VII-L
Alabama	0
Alaska	NR
Arizona	2
Arkansas	0
California	5
Colorado	2
Connecticut	40
Delaware	0
District of Columbia	0
Florida	0
Georgia	0
Hawaii	0
Idaho	0a
Illinois	0a
Indiana[b]	769
Iowa	52
Kansas[b]	0
Kentucky	0
Louisiana	0
Maine	19
Maryland	8
Massachusetts	0
Michigan	2
Minnesota[b]	992
Mississippi	59
Missouri	1
Montana	0
Nebraska[b]	24
Nevada	0
New Hampshire	1
New Jersey	60
New Mexico	0

New York	21
North Carolina	0
North Dakota	0
Ohio	21
Oklahoma	0
Oregon	1
Pennsylvania	0a
Rhode Island	12
South Carolina	0
South Dakota	0a
Tennessee	0a
Texas	84
Utah	0
Vermont	2
Virginia	0
Washington	0a
West Virginia	3
Wisconsin	18
Wyoming	3
American Samoa	NR
Guam	NR
N. Mariana Islands	NR
Puerto Rico	0
Virgin Islands	NR
Total	**2,201**

Notes:
NR = not reported. Alaska, American Samoa, Guam, the Northern Mariana Islands and the Virgin Islands did not participate in the CWNS 2004. Arizona, California, Georgia, Massachusetts, Michigan, Minnesota, North Dakota and South Dakota did not have the resources to complete the updating of their data. All other states, the District of Columbia and Puerto Rico completed more than 97 percent of the data entry or had fewer than 10 facilities that were not updated.

[a] Estimate is less than $0.5 million.

[b] Individual onsite and decentralized systems might be reported at the county level and therefore a single facility might represent one or more communities that are considered small communities for the purposes of the CWNS.

Table A-8a provides the subset of Table A-7a data for the needs for small community facilities estimated to be serving populations in the range of 3,500 to 10,000 people.

Table A-8a. CWNS 2004 Total Small Community Needs: Facilities Serving Populations of 3,500 to 10,000 People (January 2004 Dollars in Millions)

	Category of Need									
State	**Total**	**I**	**II**	**III-A**	**III-B**	**IV-A**	**IV-B**	**V**	**X**	**Tot. I-V**
Alabama	33	4	4	1	7	15	2	0	0	33
Alaska	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Arizona	164	27	32	19	1	74	10	0	1	163
Arkansas	27	2	7	7	1	5	5	0	0	27
California	87	31	15	0	13	28	0	0	0	87
Colorado	121	45	34	0a	8	19	15	0	0	121
Connecticut	142	26	20	2	1	55	38	0	0	142
Delaware	29	2	4	2	3	18	0	0	0	29
District of Columbia	0	0	0	0	0	0	0	0	0	0
Florida	187	4	57	11	15	83	15	0	2	185
Georgia	3	0	3	0	0	0a	0	0	0	3
Hawaii	33	12	10	0	3	8	0	0	0	33
Idaho	73	38	0	5	3	7	20	0	0	73
Illinois	410	55	16	9	10	4	16	300	0	410
Indiana	70	2	3	2	1	14	5	43	0	70
Iowa	20	6	6	0	4	0	4	0	0	20
Kansas	132	33	7	4	0a	4	84	0	0	132
Kentucky	259	42	1	15	20	153	28	0	0	259
Louisiana	76	10	12	2	8	25	19	0	0	76
Maine	81	29	5	6	5	12	7	17	0	81
Maryland	239	29	66	13	40	39	37	15	0	239
Massachusetts	87	5	1	1	0	67	13	0	0	87
Michigan	18	9	0	2	3	3	0	1	0	18
Minnesota	114	47	4	20	22	12	9	0	0	114
Mississippi	85	2	12	11	20	30	10	0	0	85
Missouri	92	29	2	2	8	33	18	0	0	92
Montana	93	35	2	1	14	26	15	0	0	93
Nebraska	47	8	18	0a	0a	17	4	0	0	47
Nevada	46	0	10	0	0	4	32	0	0	46
New Hampshire	62	27	8	1	7	5	14	0	0	62
New Jersey	334	31	25	39	128	66	43	0	2	332

New Mexico	22	4	0a	0	5	9	4	0	0	22
New York	392	104	5	13	25	151	23	71	0	392
North Carolina	232	4	20	16	34	99	57	0	2	230
North Dakota	0	0	0	0	0	0	0	0	0	0
Ohio	273	39	16	14	3	68	35	98	0	273
Oklahoma	14	8	2	0	4	0	0	0	0	14
Oregon	49	21	1	1	23	3	0	0	0	49
Pennsylvania	493	60	36	12	21	165	44	155	0	493
Rhode Island	75	28	0	0	4	35	8	0	0	75
South Carolina	29	5	9	0a	0a	15	0	0	0	29
South Dakota	8	8	0	0	0	0	0	0	0	8
Tennessee	21	2	0	7	3	8	1	0	0	21
Texas	322	65	23	28	30	100	76	0	0	322
Utah	8	0a	0	0	1	1	6	0	0	8
Vermont	41	7	11	0	4	17	2	0	0	41
Virginia	212	58	40	5	10	57	42	0	0	212
Washington	104	45	0	4	18	9	10	18	0	104
West Virginia	555	72	5	6	3	250	168	51	0	555
Wisconsin	198	73	5	12	54	45	9	0	0	198
Wyoming	33	15	1	4	0	11	2	0	0	33
American Samoa	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Guam	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
N. Mariana Islands	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Puerto Rico	30	22	0	0	0	6	2	0	0	30
Virgin Islands	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Total	**6,275**	**1,230**	**558**	**297**	**587**	**1,875**	**952**	**769**	**7**	**6,268**

Categories

I Secondary wastewater treatment
II Advanced wastewater treatment
III-A Infiltration/inflow correction
III-B Sewer replacement/rehabilitation
IV-A New collector sewers and appurtenances
IV-B New interceptor sewers and appurtenances
V Combined sewer overflow correction
X Recycled water distribution

Notes:
NR = not reported. Alaska, American Samoa, Guam, the Northern Mariana Islands and the Virgin Islands did not participate in the CWNS 2004. Arizona, California, Georgia, Massachusetts, Michigan, Minnesota, North Dakota and South Dakota did not have the resources to complete the updating of their data. All other states, the District of Columbia and Puerto Rico completed more than 97 percent of the data entry or had fewer than 10 facilities that were not updated.

[a] Estimate is less than $0.5 million.

Table A-8b provides the subset of Table A-7b data for the other documented needs for small community facilities estimated to be serving populations in the range of 3,500 to 10,000 people.

Table A-8b. CWNS 2004 Total Other Documented Small Community Needs: Facilities Serving Populations of 3,500 to 10,000 People (January 2004 Dollars in Millions)

	Category of Need
State	**VII-L**
Alabama	0
Alaska	NR
Arizona	0
Arkansas	0
California	0
Colorado	0
Connecticut	37
Delaware	0
District of Columbia	0
Florida	0
Georgia	0
Hawaii	0
Idaho	0a
Illinois	0
Indiana[b]	769
Iowa	0
Kansas[b]	0
Kentucky	0
Louisiana	0
Maine	5
Maryland	0
Massachusetts	0
Michigan	2
Minnesota[b]	897
Mississippi	6
Missouri	0
Montana	0
Nebraska[b]	9
Nevada	0

New Hampshire	0
New Jersey	17
New Mexico	0
New York	6
North Carolina	0
North Dakota	0
Ohio	2
Oklahoma	0
Oregon	0
Pennsylvania	0
Rhode Island	1
South Carolina	0
South Dakota	0
Tennessee	0
Texas	68
Utah	0
Vermont	0
Virginia	0
Washington	0
West Virginia	0
Wisconsin	0
Wyoming	0
American Samoa	NR
Guam	NR
N. Mariana Islands	NR
Puerto Rico	0
Virgin Islands	NR
Total	**1,819**

Notes:
NR = not reported. Alaska, American Samoa, Guam, the Northern Mariana Islands and the Virgin Islands did not participate in the CWNS 2004. Arizona, California, Georgia, Massachusetts, Michigan, Minnesota, North Dakota and South Dakota did not have the resources to complete the updating of their data. All other states, the District of Columbia and Puerto Rico completed more than 97 percent of the data entry or had fewer than 10 facilities that were not updated.

[a] Estimate is less than $0.5 million.

[b] Individual onsite and decentralized systems might be reported at the county level and therefore a single facility might represent one or more communities that are considered small communities for the purposes of the CWNS. County-level facilities serving more than 10,000 people are included in this table.

Table A-9a provides the subset of Table A-7a data for the needs for small community facilities estimated to be serving populations in the range of 1,000 to 3,500 people.

Table A-9a. CWNS 2004 Total Small Community Needs: Facilities Serving Populations of 1,000 to 3,500 People (January 2004 Dollars in Millions)

	Category of Need									
State	**Total**	**I**	**II**	**III-A**	**III-B**	**IV-A**	**IV-B**	**V**	**X**	**Tot. I-V**
Alabama	122	8	12	26	35	38	3	0	0	122
Alaska	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Arizona	170	22	28	0a	4	91	25	0	0	170
Arkansas	92	4	14	12	0a	33	29	0	0	92
California	197	83	14	0a	30	45	24	0	1	196
Colorado	184	82	19	2	26	28	26	0	1	183
Connecticut	49	14	4	2	0	17	12	0	0	49
Delaware	16	2	7	0	0	7	0	0	0	16
District of Columbia	0	0	0	0	0	0	0	0	0	0
Florida	156	0	64	5	7	70	9	0	1	155
Georgia	3	1	0	0a	0	1	1	0	0	3
Hawaii	7	5	0	0	0	2	0	0	0	7
Idaho	41	20	1	0a	6	6	8	0	0	41
Illinois	242	51	7	8	7	63	10	96	0	242
Indiana	184	17	2	2	3	21	5	134	0	184
Iowa	102	51	20	3	7	2	0a	19	0	102
Kansas	79	36	13	18	2	5	5	0	0	79
Kentucky	247	54	7	10	7	135	34	0	0	247
Louisiana	77	10	16	9	11	21	10	0	0	77
Maine	131	38	0	9	5	32	11	36	0	131
Maryland	215	45	80	14	16	27	10	23	0	215
Massachusetts	105	11	3	1	25	59	6	0	0	105
Michigan	54	8	0	0	0	25	0	21	0	54
Minnesota	172	80	2	14	21	29	26	0	0	172
Mississippi	131	21	3	21	16	56	14	0	0	131
Missouri	99	28	3	2	10	44	12	0	0	99
Montana	81	43	0	4	14	13	7	0	0	81
Nebraska	60	28	14	1	4	5	8	0	0	60
Nevada	28	0	15	0	0	0a	13	0	0	28
New Hampshire	10	3	1	0	2	2	2	0	0	10
New Jersey	154	8	31	18	37	49	6	5	0	154

New Mexico	13	3	0a	0a	6	4	0a	0	0	13
New York	503	147	23	14	35	205	22	57	0	503
North Carolina	341	39	34	22	21	145	76	0	4	337
North Dakota	0	0	0	0	0	0	0	0	0	0
Ohio	365	74	27	17	3	90	41	113	0	365
Oklahoma	38	14	17	0	6	1	0	0	0	38
Oregon	93	69	2	6	15	1	0	0	0	93
Pennsylvania	643	89	13	10	10	316	31	174	0	643
Rhode Island	7	3	1	0a	2	1	0	0	0	7
South Carolina	29	0a	4	0	2	10	13	0	0	29
South Dakota	7	1	0	0	3	3	0	0	0	7
Tennessee	40	12	1	8	0	17	2	0	0	40
Texas	277	64	19	16	28	84	65	0	1	276
Utah	9	2	0	0	0	2	5	0	0	9
Vermont	17	8	1	0	1	5	2	0	0	17
Virginia	263	55	44	6	2	108	48	0	0	263
Washington	90	49	0a	11	10	11	9	0	0	90
West Virginia	552	71	2	16	7	212	135	106	3	549
Wisconsin	301	100	11	14	65	95	16	0	0	301
Wyoming	30	8	0a	6	0a	15	1	0	0	30
American Samoa	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Guam	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
N. Mariana Islands	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Puerto Rico	18	14	0	0	0	3	1	0	0	18
Virgin Islands	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Total	**6,844**	**1,595**	**579**	**327**	**511**	**2,254**	**783**	**784**	**11**	**6,833**

Categories

I Secondary wastewater treatment
II Advanced wastewater treatment
III-A Infiltration/inflow correction
III-B Sewer replacement/rehabilitation
IV-A New collector sewers and appurtenances
IV-B New interceptor sewers and appurtenances
V Combined sewer overflow correction
X Recycled water distribution

Notes:

NR = not reported. Alaska, American Samoa, Guam, the Northern Mariana Islands and the Virgin Islands did not participate in the CWNS 2004. Arizona, California, Georgia, Massachusetts, Michigan, Minnesota, North Dakota and South Dakota did not have the resources to complete the updating of their data. All other states, the District of Columbia and Puerto Rico completed more than 97 percent of the data entry or had fewer than 10 facilities that were not updated.

[a] Estimate is less than $0.5 million.

Table A-9b provides the subset of Table A-7b data for the other documented needs for small community facilities estimated to be serving populations in the range of 1,000 to 3,500 people.

Table A-9b. CWNS 2004 Total Other Documented Small Community Needs: Facilities Serving Populations of 1,000 to 3,500 People (January 2004 Dollars in Millions)

	Category of Need
State	VII-L
Alabama	0
Alaska	NR
Arizona	0
Arkansas	0
California	0
Colorado	0
Connecticut	0
Delaware	0
District of Columbia	0
Florida	0
Georgia	0
Hawaii	0
Idaho	0
Illinois	0
Indiana[b]	0a
Iowa	21
Kansas[b]	0
Kentucky	0
Louisiana	0
Maine	9
Maryland	0
Massachusetts	0
Michigan	0a
Minnesota[b]	92
Mississippi	19
Missouri	0
Montana	0
Nebraska[b]	13
Nevada	0

New Hampshire	0a
New Jersey	14
New Mexico	0
New York	0a
North Carolina	0
North Dakota	0
Ohio	6
Oklahoma	0
Oregon	1
Pennsylvania	0
Rhode Island	11
South Carolina	0
South Dakota	0
Tennessee	0
Texas	14
Utah	0
Vermont	0
Virginia	0
Washington	0a
West Virginia	0
Wisconsin	2
Wyoming	0
American Samoa	NR
Guam	NR
N. Mariana Islands	NR
Puerto Rico	0
Virgin Islands	NR
Total	**202**

Notes:
NR = not reported. Alaska, American Samoa, Guam, the Northern Mariana Islands and the Virgin Islands did not participate in the CWNS 2004. Arizona, California, Georgia, Massachusetts, Michigan, Minnesota, North Dakota and South Dakota did not have the resources to complete the updating of their data. All other states, the District of Columbia and Puerto Rico completed more than 97 percent of the data entry or had fewer than 10 facilities that were not updated.

[a] Estimate is less than $0.5 million.

[b] Individual onsite and decentralized systems might be reported at the county level and therefore a single facility might represent one or more communities that are considered small communities for the purposes of the CWNS.

Table A-10a provides the subset of Table A-7a data for the needs for small community facilities estimated to be serving populations of fewer than 1,000 people.

Table A-10a. CWNS 2004 Total Small Community Needs: Facilities Serving Populations of Fewer Than 1,000 People (January 2004 Dollars in Millions)

	Category of Need									
State	**Total**	**I**	**II**	**III-A**	**III-B**	**IV-A**	**IV-B**	**V**	**X**	**Tot. I-V**
Alabama	44	3	4	3	12	20	2	0	0	44
Alaska	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Arizona	103	12	14	0	0a	60	17	0	0	103
Arkansas	53	5	4	1	0a	22	21	0	0	53
California	64	31	3	5	6	13	5	0	1	63
Colorado	102	42	15	2	3	26	13	0	1	101
Connecticut	23	3	3	2	1	8	6	0	0	23
Delaware	6	0	0	0	0	6	0	0	0	6
District of Columbia	0	0	0	0	0	0	0	0	0	0
Florida	29	0	11	0a	2	12	4	0	0a	29
Georgia	1	0	0	0	0	0	1	0	0	1
Hawaii	0	0	0	0	0	0	0	0	0	0
Idaho	50	13	0	0a	4	20	13	0	0	50
Illinois	82	23	1	0	1	38	5	14	0	82
Indiana	43	8	2	2	3	11	1	16	0	43
Iowa	56	30	7	2	3	14	0a	0	0	56
Kansas	73	25	1	3	1	18	25	0	0	73
Kentucky	166	40	4	4	6	88	24	0	0	166
Louisiana	65	14	7	4	6	28	6	0	0	65
Maine	32	21	0	0	3	6	1	1	0	32
Maryland	208	40	17	9	4	70	68	0	0	208
Massachusetts	2	1	0	0a	1	0a	0	0	0	2
Michigan	6	3	0	0	1	2	0	0	0	6
Minnesota	168	65	1	20	21	16	45	0	0	168
Mississippi	138	30	2	7	5	72	22	0	0	138
Missouri	116	26	2	0a	2	67	19	0	0	116
Montana	45	23	1	5	10	5	1	0	0	45
Nebraska	40	25	2	2	5	4	2	0	0	40
Nevada	0	0	0	0	0	0	0	0	0	0
New Hampshire	2	2	0	0a	0	0	0	0	0	2
New Jersey	25	6	0	2	2	9	6	0	0	25

New Mexico	5	1	0	0a	0a	4	0	0	0	5
New York	203	46	5	3	44	68	17	20	0	203
North Carolina	262	25	10	16	8	142	61	0	0	262
North Dakota	0	0	0	0	0	0	0	0	0	0
Ohio	331	57	20	7	2	159	67	19	0	331
Oklahoma	26	11	3	0	2	10	0	0	0	26
Oregon	44	13	0	0	22	9	0a	0	0	44
Pennsylvania	366	58	5	2	3	260	24	14	0	366
Rhode Island	0	0	0	0	0	0	0	0	0	0
South Carolina	12	0	0	0	0	12	0	0	0	12
South Dakota	2	2	0	0	0	0a	0	0	0	2
Tennessee	13	7	0	2	0	4	0	0	0	13
Texas	91	23	2	6	2	41	17	0	0	91
Utah	19	6	0	0	0a	6	7	0	0	19
Vermont	4	1	0	0	1	1	1	0	0	4
Virginia	197	18	5	2	8	128	36	0	0	197
Washington	25	12	0	5	2	5	1	0	0	25
West Virginia	322	18	0a	7	4	173	120	0	0	322
Wisconsin	214	59	10	5	28	88	24	0	0	214
Wyoming	27	8	0a	1	1	16	1	0	0	27
American Samoa	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Guam	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
N. Mariana Islands	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Puerto Rico	0	0	0	0	0	0	0	0	0	0
Virgin Islands	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Total	**3,905**	**856**	**161**	**129**	**229**	**1,761**	**683**	**84**	**2**	**3,903**

Categories

I Secondary wastewater treatment
II Advanced wastewater treatment
III-A Infiltration/inflow correction
III-B Sewer replacement/rehabilitation
IV-A New collector sewers and appurtenances
IV-B New interceptor sewers and appurtenances
V Combined sewer overflow correction
X Recycled water distribution

Notes

NR = not reported. Alaska, American Samoa, Guam, the Northern Mariana Islands and the Virgin Islands did not participate in the CWNS 2004. Arizona, California, Georgia, Massachusetts, Michigan, Minnesota, North Dakota and South Dakota did not have the resources to complete the updating of their data. All other states, the District of Columbia and Puerto Rico completed more than 97 percent of the data entry or had fewer than 10 facilities that were not updated.

[a] Estimate is less than $0.5 million.

Table A-10b provides the subset of Table A-7b data for the other documented needs for small community facilities estimated to be serving populations of fewer than 1,000 people.

Table A-10b. CWNS 2004 Total Other Documented Small Community Needs: Facilities Serving Populations of Fewer Than 1,000 People (January 2004 Dollars in Millions)

	Category of Need
State	VII-L
Alabama	0
Alaska	NR
Arizona	2
Arkansas	0
California	5
Colorado	2
Connecticut	3
Delaware	0
District of Columbia	0
Florida	0
Georgia	0
Hawaii	0
Idaho	0
Illinois	0a
Indiana[b]	0
Iowa	32
Kansas[b]	0
Kentucky	0
Louisiana	0
Maine	5
Maryland	8
Massachusetts	0
Michigan	0
Minnesota[b]	3
Mississippi	35
Missouri	1
Montana	0
Nebraska[b]	1
Nevada	0
New Hampshire	1

New Jersey	28
New Mexico	0
New York	15
North Carolina	0
North Dakota	0
Ohio	13
Oklahoma	0
Oregon	0
Pennsylvania	0a
Rhode Island	0
South Carolina	0
South Dakota	0a
Tennessee	0a
Texas	2
Utah	0
Vermont	2
Virginia	0
Washington	0
West Virginia	3
Wisconsin	16
Wyoming	3
American Samoa	NR
Guam	NR
N. Mariana Islands	NR
Puerto Rico	0
Virgin Islands	NR
Total	**180**

Notes
NR = not reported. Alaska, American Samoa, Guam, the Northern Mariana Islands and the Virgin Islands did not participate in the CWNS 2004. Arizona, California, Georgia, Massachusetts, Michigan, Minnesota, North Dakota and South Dakota did not have the resources to complete the updating of their data. All other states, the District of Columbia and Puerto Rico completed more than 97 percent of the data entry or had fewer than 10 facilities that were not updated.

[a] Estimate is less than $0.5 million.

[b] Individual onsite and decentralized systems might be reported at the county level and therefore a single facility might represent one or more communities that are considered small communities for the purposes of the CWNS.

Table A-11 summarizes the total SSEs, which are the needs that the States believe to be legitimate but that either were justified with documents outside the established documentation criteria of the CWNS 2004 or had no written documentation. The SSEs are optional and are in addition to the documented needs.

Table A-11. CWNS 2004 Total Separate State Estimates (January 2004 Dollars in Millions)

	Category of SSE													
State	**Total**	**I**	**II**	**III-A**	**III-B**	**IV-A**	**IV-B**	**V**	**VI**	**VII**	**VIII**	**IX**	**X**	**Tot. I-V**
Alabama	4	0	0	0	4	0	0	0	0	0	0	0	0	4
Alaska	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Arizona	432	41	34	0	1	4	5	0	339	0a	0	0	8	85
Arkansas	0	0	0	0	0	0	0	0	0	0	0	0	0	0
California	1,274	20	12	1	195	0	145	0	892	7	0	0	2	373
Colorado	66	0	0	0	0	0	0	0	66	0	0	0	0	0
Connecticut	65	0	0	0	1	31	11	0	0	22	0	0	0	43
Delaware	49	0	0	0	49	0	0	0	0	0	0	0	0	49
District of Columbia	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Florida	0	0	0a	0	0	0	0	0	0	0	0	0	0	0a
Georgia	285	17	239	2	0	1	26	0	0	0	0	0	0	285
Hawaii	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Idaho	0	0	0	0	0	0	0	0	0	0a	0	0	0	0
Illinois	19	4	2	5	5	3	0	0	0	0	0	0	0	19
Indiana	42	12	4	8	0	0	0	0	0	18	0a	0	0	24
Iowa	11,159	0	0	0	0	0	0	0	0	11,159	0	0	0	0
Kansas	3,648	0	0	0a	0	0	0	0	35	3,613	0	0	0	0a
Kentucky	0	0	0	0	0	0a	0a	0	0	0	0	0	0	0a
Louisiana	30	13	0	7	2	2	6	0	0	0	0	0	0	30
Maine	42	4	0	7	0	18	9	0	0	4	0	0	0	38
Maryland	791	243	137	9	87	144	93	0	48	30	0	0	0	713
Massachusetts	11	0	0	1	1	3	6	0	0	0	0	0	0	11
Michigan	39	0	0	17	0	0	3	0	0	19	0	0	0	20
Minnesota	629	130	12	11	26	19	24	0	16	391	0	0	0	222
Mississippi	35	3	14	4	5	1	8	0	0	0	0	0	0	35
Missouri	22	10	0	0	0	7	1	0	0	4	0	0	0	18
Montana	2	1	0	1	0a	0a	0a	0	0	0	0	0	0	2
Nebraska	3	1	0	0	0	0	0a	0	0	2	0	0	0	1
Nevada	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Hampshire	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Jersey	11,077	637	30	3	168	68	10	397	147	9,531	78	8	0a	1,313
New Mexico	58	47	0	6	0	2	3	0	0	0	0	0	0	58
New York	1,001	15	0	0	44	4	0	0	0	933	5	0	0	63
North Carolina	672	21	185	9	28	265	164	0	0	0	0	0	0	672
North Dakota	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ohio	83	23	8	1	22	8	0a	0	0	21	0	0	0	62
Oklahoma	3	0	2	0	0	0	1	0	0	0	0	0	0	3
Oregon	5	3	0a	0	2	0	0	0	0	0	0	0	0	5

Pennsylvania	131	53	15	1	6	21	14	3	0	18	0	0	0	113
Rhode Island	186	0	0	0a	4	144	22	0	0	16	0	0	0	170
South Carolina	5	0	5	0	0	0	0a	0	0	0	0	0	0	5
South Dakota	21	0	0	0	0	0	0	0	21	0	0	0	0	0
Tennessee	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Texas	233	48	0	0	0	10	0a	0	173	0	2	0	0	58
Utah	248	61	83	1	23	38	42	0	0	0a	0	0	0	248
Vermont	26	3	13	0	0	0	0	10	0	0	0	0	0	26
Virginia	6,542	0	0	0	0	0	0	0	0	6,542	0	0	0	0
Washington	94	0	0	0	0	0	0	0	94	0	0	0	0	0
West Virginia	887	114	6	7	4	273	224	13	0	246	0	0	0a	641
Wisconsin	250	75	4	0a	45	67	7	0	42	10	0	0	0	198
Wyoming	24	0	0	0	0	0	0	0	24	0	0	0	0	0
American Samoa	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Guam	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
N. Mariana Islands	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Puerto Rico	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Virgin Islands	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Total	**40,193**	**1,599**	**805**	**101**	**722**	**1,133**	**824**	**423**	**1,897**	**32,586**	**85**	**8**	**10**	**5,607**

Categories

I Secondary wastewater treatment
II Advanced wastewater treatment
III-A Infiltration/inflow correction
III-B Sewer replacement/rehabilitation
IV-A New collector sewers and appurtenances
IV-B New interceptor sewers and appurtenances
V Combined sewer overflow correction
VI Storm water management programs
VII NPS Pollution Control Projects
VIII Confined animals–point source
IX Mining–point source
X Recycled water distribution
XI Estuary management

NR = not reported. Alaska, American Samoa, Guam, the Northern Mariana Islands and the Virgin Islands did not participate in the CWNS 2004. Arizona, California, Georgia, Massachusetts, Michigan, Minnesota, North Dakota and South Dakota did not have the resources to complete the updating of their data. All other states, the District of Columbia and Puerto Rico completed more than 97 percent of the data entry or had fewer than 10 facilities that were not updated.

[a] Estimate is less than $0.5 million.

Table A-12 summarizes CWNS 2004 SSEs for NPS-related activities.

Table A-12. CWNS 2004 Total Separate State Estimates for NPS Pollution Control Projects (January 2004 Dollars in Millions)

	Other Documented Category of SSE												
State	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**Total**
Alabama	0	0	0	0	0	0	0	0	0	0	0	0	0
Alaska	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Arizona	0	0	0	0	0	0	0	0a	0a	0	0	0	0a
Arkansas	0	0	0	0	0	0	0	0	0	0	0	0	0
California	0	0	0	1	0	0	0	0	0	0	6	0	7
Colorado	0	0	0	0	0	0	0	0	0	0	0	0	0
Connecticut	0	0	0	0	0	0	0	0	0	0	0	22	22
Delaware	0	0	0	0	0	0	0	0	0	0	0	0	0
District of Columbia	0	0	0	0	0	0	0	0	0	0	0	0	0
Florida	0	0	0	0	0	0	0	0	0	0	0	0	0
Georgia	0	0	0	0	0	0	0	0	0	0	0	0	0
Hawaii	0	0	0	0	0	0	0	0	0	0	0	0	0
Idaho	0	0a	0	0a	0	0	0	0	0	0	0	0	0a
Illinois	0	0	0	0	0	0	0	0	0	0	0	0	0
Indiana	9	0	0	0	0	0	9	0	0	0	0	0	18
Iowa	11,145	14	0	0	0	0	0	0	0	0	0	0	11,159
Kansas	1,911	831	0	0	0	0	0	0	0	0	373	498	3,613
Kentucky	0	0	0	0	0	0	0	0	0	0	0	0	0
Louisiana	0	0	0	0	0	0	0	0	0	0	0	0	0
Maine	0	0	0	0	0	0	0	0	0	0	0	4	4
Maryland	0	0	0	0	0	0	0	0	0	28	0	2	30
Massachusetts	0	0	0	0	0	0	0	0	0	0	0	0	0
Michigan	1	0a	0	3	0	0	0	0	0	0	15	0	19
Minnesota	94	72	0	0	0	0	0	0	14	11	200	0a	391
Mississippi	0	0	0	0	0	0	0	0	0	0	0	0	0
Missouri	0	0	0	0	0	0	0	0	0	0	0	4	4
Montana	0	0	0	0	0	0	0	0	0	0	0	0	0
Nebraska	0	0	0	2	0	0	0	0	0	0	0	0	2
Nevada	0	0	0	0	0	0	0	0	0	0	0	0	0
New Hampshire	0	0	0	0	0	0	0	0	0	0	0	0	0
New Jersey	1,338	75	129	5,363	2,272	0	0	58	276	20	0a	0a	9,531
New Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0
New York	12	0	0	500	0	0	0	0	0	0a	421	0	933
North Carolina	0	0	0	0	0	0	0	0	0	0	0	0	0
North Dakota	0	0	0	0	0	0	0	0	0	0	0	0	0

Ohio	3	2	0a	13	0	0	1	0	0	0	2	0	21
Oklahoma	0	0	0	0	0	0	0	0	0	0	0	0	0
Oregon	0	0	0	0	0	0	0	0	0	0	0	0	0
Pennsylvania	9	9	0	0	0	0	0	0	0	0	0	0	18
Rhode Island	0	0	0	0	0	0	0	1	0	15	0	0	16
South Carolina	0	0	0	0	0	0	0	0	0	0	0	0	0
South Dakota	0	0	0	0	0	0	0	0	0	0	0	0	0
Tennessee	0	0	0	0	0	0	0	0	0	0	0	0	0
Texas	0	0	0	0	0	0	0	0	0	0	0	0	0
Utah	0	0	0	0	0	0	0	0	0	0	0a	0	0a
Vermont	0	0	0	0	0	0	0	0	0	0	0	0	0
Virginia	410	187	2	5,796	0	0	0	0	0	0	77	70	6,542
Washington	0	0	0	0	0	0	0	0	0	0	0	0	0
West Virginia	3	14	0	97	0	0	0	0	0	0	2	130	246
Wisconsin	0	0	0	7	0	0	0	0	0	0	0	3	10
Wyoming	0	0	0	0	0	0	0	0	0	0	0	0	0
American Samoa	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Guam	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
N. Mariana Islands	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Puerto Rico	0	0	0	0	0	0	0	0	0	0	0	0	0
Virgin Islands	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Total	**14,935**	**1,204**	**131**	**11,782**	**2,272**	**0**	**10**	**59**	**290**	**74**	**1,096**	**733**	**32,586**

Categories

A Agriculture (cropland)
B Agriculture (animals)
C Silviculture
D Urban
E Ground water protection (unknown source)
F Marinas
G Resource extraction
H Brownfields
I Storage tanks
J Sanitary landfills
K Hydromodification
L Individual/decentralized sewage treatment

NR = not reported. Alaska, American Samoa, Guam, the Northern Mariana Islands and the Virgin Islands did not participate in the CWNS 2004. Arizona, California, Georgia, Massachusetts, Michigan, Minnesota, North Dakota and South Dakota did not have the resources to complete the updating of their data. All other states, the District of Columbia and Puerto Rico completed more than 97 percent of the data entry or had fewer than 10 facilities that were not updated.

[a] Estimate is less than $0.5 million.

Table A-13 summarizes the SSEs for small communities. These needs are shown by category of need in each State and U.S. Territory. The SSE needs are optional and are in addition to the documented needs.

Table A-13. CWNS 2004 Total Separate State Estimates for Small Community Facilities (January 2004 Dollars in Millions)

State	Total Need	Percent of Total U.S. SSEs	Category of SSE									
			I	II	III-A	III-B	IV-A	IV-B	V	VII-L	X	Tot. I-V
Alabama	0	0	0	0	0	0	0	0	0	0	0	0
Alaska	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Arizona	0	0	0	0	0	0	0	0	0	0	0	0
Arkansas	0	0	0	0	0	0	0	0	0	0	0	0
California	0	<0.1	0a	0a	0	0	0	0	0	0	0a	0a
Colorado	0	0	0	0	0	0	0	0	0	0	0	0
Connecticut	0	0	0	0	0	0	0	0	0	0	0	0
Delaware	0	0	0	0	0	0	0	0	0	0	0	0
District of Columbia	0	0	0	0	0	0	0	0	0	0	0	0
Florida	0	<0.1	0	0a	0	0	0	0	0	0	0	0a
Georgia	1	<0.1	0a	0	0a	0	0	1	0	0	0	1
Hawaii	0	0	0	0	0	0	0	0	0	0	0	0
Idaho	0	0	0	0	0	0	0	0	0	0	0	0
Illinois	1	<0.1	0a	0	0	0	1	0	0	0	0	1
Indiana[b]	5	<0.1	2	1	2	0	0	0	0	0	0	5
Iowa	0	0	0	0	0	0	0	0	0	0	0	0
Kansas[b]	498	1	0	0	0a	0	0	0	0	498	0	0a
Kentucky	0	<0.1	0	0	0	0	0a	0a	0	0	0	0a
Louisiana	1	<0.1	0a	0	0	0	1	0a	0	0	0	1
Maine	36	0	4	0	2	0	17	9	0	4	0	32
Maryland	29	0	4	0	0	1	13	9	0	2	0	27
Massachusetts	0	0	0	0	0	0	0	0	0	0	0	0
Michigan	0	0	0	0	0	0	0	0	0	0	0	0
Minnesota[b]	85	0	38	8	7	14	11	7	0	0a	0	85
Mississippi	27	0	1	13	3	5	1	4	0	0	0	27
Missouri	10	<0.1	4	0	0	0	1	1	0	4	0	6
Montana	1	<0.1	0a	0	1	0	0a	0a	0	0	0	1
Nebraska[b]	1	<0.1	1	0	0	0	0	0a	0	0	0	1
Nevada	0	0	0	0	0	0	0	0	0	0	0	0
New Hampshire	0	0	0	0	0	0	0	0	0	0	0	0
New Jersey	32	0	9	6	0	7	9	1	0	0a	0	32
New Mexico	0	0	0	0	0	0	0	0	0	0	0	0
New York	3	<0.1	0	0	0	0	3	0	0	0	0	3
North Carolina	68	0	5	0	2	1	47	13	0	0	0	68

North Dakota	0	0	0	0	0	0	0	0	0	0	0	0
Ohio	12	<0.1	5	0	1	0a	6	0a	0	0	0	12
Oklahoma	0	0	0	0	0	0	0	0	0	0	0	0
Oregon	2	<0.1	1	0	0	1	0	0	0	0	0	2
Pennsylvania	56	0	15	2	0	4	21	14	0	0	0	56
Rhode Island	0	0	0	0	0	0	0	0	0	0	0	0
South Carolina	0	0	0	0	0	0	0	0	0	0	0	0
South Dakota	0	0	0	0	0	0	0	0	0	0	0	0
Tennessee	0	0	0	0	0	0	0	0	0	0	0	0
Texas	1	<0.1	0	0	0	0	1	0a	0	0	0	1
Utah	15	<0.1	1	0	0a	1	6	7	0	0	0	15
Vermont	1	<0.1	0	1	0	0	0	0	0	0	0	1
Virginia	1	<0.1	0	0	0	0	0	0	0	1	0	0
Washington	0	0	0	0	0	0	0	0	0	0	0	0
West Virginia	736	2	108	6	5	3	258	213	13	130	0a	606
Wisconsin	85	0	7	0a	0	1	67	7	0	3	0	82
Wyoming	0	0	0	0	0	0	0	0	0	0	0	0
American Samoa	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Guam	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
N. Mariana Islands	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Puerto Rico	0	0	0	0	0	0	0	0	0	0	0	0
Virgin Islands	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Total	**1,707**	**4**	**205**	**37**	**23**	**38**	**463**	**286**	**13**	**642**	**0a**	**1,065**

Categories

I Secondary wastewater treatment
II Advanced wastewater treatment
III-A Infiltration/inflow correction
III-B Sewer replacement/rehabilitation
IV-A New collector sewers and appurtenances
IV-B New interceptor sewers and appurtenances
V Combined sewer overflow correction
VII-L Individual/decentralized sewage treatment
X Recycled water distribution

NR = not reported. Alaska, American Samoa, Guam, the Northern Mariana Islands and the Virgin Islands did not participate in the CWNS 2004. Arizona, California, Georgia, Massachusetts, Michigan, Minnesota, North Dakota and South Dakota did not have the resources to complete the updating of their data. All other states, the District of Columbia and Puerto Rico completed more than 97 percent of the data entry or had fewer than 10 facilities that were not updated.

[a] Estimate is less than $0.5 million.

[b] Individual onsite and decentralized systems might be reported at the county level and therefore a single facility might represent one or more communities that are considered small communities for the purposes of the CWNS.

Appendix B
Summary of CWNS 2000 and CWNS 1996 Cost Estimates

This page intentionally left blank

Table B-1 summarizes the results of the CWNS 2000 of documented needs by State. All values from the CWNS 2000 have been adjusted to millions of January 2004 dollars. These design year needs were derived from those documented during the CWNS 2000. This table is provided for use in comparing the results of the CWNS 2000 and 2004.

In general, Table B-1 is comparable to Table A-1 for categories I-V. In addition, Category II has been expanded to include additional process units to increase the level of treatment to allow for water reuse and in 2000 Category I included individual septic system and decentralized sewage treatment need. It should be noted that Percent Change (2000-2004) is a comparison of total CWNS 2000 needs (categories I through VI) to total CWNS 2004 needs (categories I through VI and X).

For nonpoint source pollution control needs (Category VII) see Table B-2.

Table B-1. CWNS 2000 Total Needs (January 2004 Dollars in Millions)

		Percent Change	Category of Need								
State	Total	2000-2004	I	II	III-A	III-B	IV-A	IV-B	V	VI	Total I-V
Alabama	3,029	16	15	1,059	151	1,301	430	73	0	0	3,029
Alaska	622	NA	341	8	7	72	182	7	5	0	622
Arizona	6,803	-10	808	2,636	141	267	355	1,203	0	1,393	5,410
Arkansas	347	18	41	131	24	27	45	79	0	0	347
California	15,145	35	4,360	4,173	124	3,468	91	2,063	475	391	14,754
Colorado	1,436	56	204	904	5	199	18	41	11	54	1,382
Connecticut	2,510	4	444	1,028	95	18	190	179	556	0	2,510
Delaware	319	-58	37	26	0	75	64	4	113	0	319
District of Columbia	1,642	24	339	41	16	71	0	0	1,134	41	1,601
Florida	7,489	72	333	3,176	144	626	1,326	1,127	0	757	6,732
Georgia	2,601	-10	126	229	1,118	28	10	68	1,022	0	2,601
Hawaii	1,941	7	640	21	525	491	98	166	0	0	1,941
Idaho	232	100	133	33	3	20	21	22	0	0	232
Illinois	13,186	2	885	115	30	1,341	106	188	10,521	0	13,186
Indiana	8,035	-27	697	191	72	467	324	196	6,088	0	8,035
Iowa	2,177	-56	268	24	26	88	40	21	1,708	2	2,175
Kansas	1,580	30	415	112	237	2	72	301	441	0	1,580
Kentucky	3,112	-9	728	113	215	311	842	659	241	3	3,109
Louisiana	2,639	26	457	162	1,300	241	268	211	0	0	2,639
Maine	1,084	-21	196	8	3	34	98	18	727	0	1,084
Maryland	5,050	16	1,379	932	104	823	453	411	440	508	4,542
Massachusetts	5,196	-39	974	277	66	102	737	452	2,588	0	5,196
Michigan	4,555	32	932	81	120	341	335	33	2,713	0	4,555
Minnesota	1,514	140	735	113	46	313	51	116	6	134	1,380
Mississippi	952	4	103	143	174	169	204	159	0	0	952
Missouri	3,825	27	807	24	801	331	335	214	1,313	0	3,825
Montana	522	3	189	78	16	61	111	67	0	0	522
Nebraska	1,330	-0.2	166	62	8	13	12	84	958	27	1,303
Nevada	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

New Hampshire	936	-39	141	53	8	37	7	150	540	0	936
New Jersey	11,163	-17	3,137	410	377	679	1,121	457	4,882	100	11,063
New Mexico	223	-28	105	17	10	47	20	24	0	0	223
New York	21,154	3	10,970	864	84	2,307	599	192	6,120	18	21,136
North Carolina	6,590	-23	471	1,934	324	228	1,920	1,709	3	1	6,589
North Dakota	57	-12	30	0a	3	19	0	1	0	4	53
Ohio	9,013	30	1,358	435	1,662	124	807	593	4,034	0	9,013
Oklahoma	649	61	94	27	1	230	36	50	0	211	438
Oregon	1,644	79	601	172	5	728	18	37	83	0	1,644
Pennsylvania	8,792	-18	941	227	135	133	1,072	219	6,047	18	8,774
Rhode Island	1,539	-24	122	125	13	58	384	132	705	0	1,539
South Carolina	1,455	-51	614	372	1	14	315	139	0	0	1,455
South Dakota	139	-52	18	33	0	49	14	7	2	16	123
Tennessee	673	54	73	51	54	119	64	40	272	0	673
Texas	10,144	-16	2,237	905	262	1,473	686	2,104	0	2,477	7,667
Utah	933	-38	386	82	0a	108	109	242	0	6	927
Vermont	163	2	51	36	1	1	37	3	34	0	163
Virginia	3,920	20	810	865	124	399	575	635	512	0	3,920
Washington	3,049	29	1,113	57	251	151	220	580	677	0	3,049
West Virginia	2,817	-10	332	13	149	53	770	532	968	0	2,817
Wisconsin	2,478	57	654	157	60	407	289	514	380	17	2,461
Wyoming	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
American Samoa	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Guam	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
N. Mariana Islands	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Puerto Rico	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Virgin Islands	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Total	**186,404**	**9**	**41,010**	**22,735**	**9,095**	**18,664**	**15,881**	**16,522**	**56,319**	**6,178**	**180,226**

Categories

I Secondary wastewater treatment
II Advanced wastewater treatment
III-A Infiltration/inflow correction
III-B Sewer replacement/rehabilitation
IV-A New collector sewers and appurtenances
IV-B New interceptor sewers and appurtenances
V Combined sewer overflow correction
VI Storm water management programs

Notes:

NR = not reported. American Samoa, Guam, Nevada, the Northern Mariana Islands, Puerto Rico, the Virgin Islands and Wyoming did not participate in the CWNS 2000. California, Colorado, New York and South Dakota did not have the resources to complete the updating of these data.

NA = not available in 2004. Alaska, American Samoa, Guam, the Northern Mariana Islands and the Virgin Islands did not participate in the CWNS 2004.

[a] Estimate is less than $0.5 million.

Table B-2 summarizes the results of the CWNS 2000 of documented NPS pollution control projects by State. All values from the CWNS 2000 have been adjusted to millions of January 2004 dollars. These design year needs were derived from those documented during the CWNS 2000. This table is provided for use in comparing the results of the CWNS 2000 and 2004.

Table B-2 is comparable to Table A-2 for all categories of needs. Note, that individual/decentralized treatment costs are now reported in Category VII-L instead of Categories I, VII-D and VII-E.

Table B-2. CWNS 2000 Total Needs for NPS Pollution Control Projects (January 2004 Dollars in Millions)

	Category of Need											
State	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**Total VII**
Alabama	0	0	0	0	0	0	0	0	0	0	0	0
Alaska	0	0	0	0	0	0	0	0	0	0	0	0
Arizona	26	3	0a	68	0a	0	0	0	0	0	1	98
Arkansas	60	125	0	15	0	0	7	0	0	0	4	211
California	40	49	0	29	323	0	5	0	0	0	446	892
Colorado	0	0	0	56	2	0	0	0	0	0	0	58
Connecticut	5	3	0	50	0	0	0	6	0	0	42	106
Delaware	0	0	0	0	0	0	0	0	0	0	0	0
District of Columbia	0	0	0	0	0	0	0	0	0	0	2	2
Florida	0	0	0	2,708	0	0	0	0	0	0	900	3,608
Georgia	0	0	0	0	0	0	0	0	0	0	0	0
Hawaii	0	0	0	0	0	0	0	0	0	0	0	0
Idaho	0	0	0	0	0	0	0	0	0	0	0	0
Illinois	35	0	0	0	0	0	0	0	0	0	15	50
Indiana	3	1	0	2	1	0	0	0	0	0	0	7
Iowa	0	0	0	0	0	0	0	0	0	0	0	0
Kansas	0	0	0	0	0	0	0	0	0	0	0	0
Kentucky	0	0	0	0	0	1	0	0	0	0	0	1
Louisiana	0	0	0	2	0	0	0	0	0	0	0	2
Maine	0	24	48	8	0	0	0	0	57	0	6	143
Maryland	0	0a	0	2	0	0	0	0	8	196	63	269
Massachusetts	0	0	0	0	0	0	0	0	0	6	5	11
Michigan	0	0	0	0	0	0	0	0	0	0	0	0
Minnesota	11	187	0	11	0a	0	0	324	533	0	2	1,068
Mississippi	0	0	0	0	0	0	0	0	0	0	0	0
Missouri	9	16	0a	226	0	0	6	0	531	26	924	1,738
Montana	0	0	0	53	0	0	0	0	0	0	0	53
Nebraska	0	0	0	0	0	0	0	0	0	0	0	0
Nevada	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
New Hampshire	0	0	0	0	0	0	0	0	0	73	0	73
New Jersey	2	4	0	165	479	0	0a	11	0	994	1,463	3,118

New Mexico	0	0	0	0	2	0	0	6	0	0	0	8
New York	66	128	0	115	141	1	0	29	5	697	400	1,582
North Carolina	0	0	0	8	0	0	0	0	0	0	0	8
North Dakota	0	0	0	1	0a	0	0	0	0	0	0	1
Ohio	190	29	1	392	5	0	24	0	0	0	57	698
Oklahoma	0	0	0	0	0	0	0	0	0	0	0	0
Oregon	0	0	0	0	0	0	0	0	0	0	0	0
Pennsylvania	9	9	0	164	0	0	0	0	0	0	0	182
Rhode Island	0	0	0	0	2	0	0	0	0	34	0	36
South Carolina	0	0	0	0	0	0	0	0	0	0	3	3
South Dakota	4	12	0	2	0a	0	0	0	0	0	2	20
Tennessee	0	0	0	0	0	0	0	0	0	0	0	0
Texas	0	0	0	46	0a	0	0	0	0	0	0	46
Utah	2	5	0	1	0	0	1	0	0	0	3	12
Vermont	0	0	0	2	0	0	0	0	0	0	0	2
Virginia	0	0	0	0	0	0	0	0	0	0	0	0
Washington	0	0	0	3	0	0	0	0	0	0	0	3
West Virginia	0	0	0	0	0	0	0	0	0	0	0	0
Wisconsin	77	131	0	790	12	0	0	20	0	13	194	1,237
Wyoming	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
American Samoa	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Guam	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
N. Mariana Islands	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Puerto Rico	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Virgin Islands	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Total	**539**	**726**	**49**	**4,919**	**967**	**2**	**43**	**396**	**1,134**	**2,039**	**4,532**	**15,346**

Categories

A Agriculture (cropland)
B Agriculture (animals)
C Silviculture
D Urban
E Ground water protection (unknown source)
F Marinas
G Resource extraction
H Brownfields
I Storage tanks
J Sanitary landfills
K Hydromodification

Notes:
NR = not reported. American Samoa, Guam, Nevada, the Northern Mariana Islands, Puerto Rico, the Virgin Islands and Wyoming did not participate in the CWNS 2000. California, Colorado, New York and South Dakota did not have the resources to complete the updating of these data.

[a] Estimate is less than $0.5 million.

Table B-3 summarizes the States' 2000 assessments of needs that either were justified with documents outside the established documentation criteria of the CWNS 2000 or had no written documentation. The SSEs were optional and were in addition to the documented needs (see Tables B-1 and B-2). All values from the CWNS 2000 have been adjusted to millions of January 2004 dollars. This table is provided for use in comparing the results of the CWNS 2000 and 2004.

In general, Table B-3 is comparable to Table A-11 for all categories of needs. Category II has been expanded to include additional process units to increase the level of treatment to allow for water reuse. Note, that individual/decentralized treatment costs are now reported in Category VII-L instead of Categories I, VII-D and VII-E.

Table B-3. CWNS 2000 Total Separate State Estimates (January 2004 Dollars in Millions)

	Category of Need											
State	**Total**	**I**	**II**	**III-A**	**III-B**	**IV-A**	**IV-B**	**V**	**VI**	**VII**	**VIII**	**Total I-V**
Alabama	0	0	0	0	0	0	0	0	0	0	0	0
Alaska	33	14	0	0	1	16	2	0	0	0	0	33
Arizona	0	0	0	0	0	0	0	0	0	0	0	0
Arkansas	0	0	0	0	0	0	0	0	0	0	0	0
California	4	1	0	1	0	0	0	0	0	2	0	2
Colorado	28	0	28	0	0	0	0	0	0	0	0	28
Connecticut	74	0	2	0	0	47	25	0	0	0	0	74
Delaware	0	0	0	0	0	0	0	0	0	0	0	0
District of Columbia	0	0	0	0	0	0	0	0	0	0	0	0
Florida	0	0	0	0	0	0	0	0	0	0	0	0
Georgia	642	62	379	8	3	11	179	0	0	0	0	642
Hawaii	0	0	0	0	0	0	0	0	0	0	0	0
Idaho	1	1	0	0	0	0	0	0	0	0	0	1
Illinois	3	3	0a	0	0	0	0	0	0	0	0	3
Indiana	40	14	8	16	0a	0	1	0	0	1	0	39
Iowa	0	0	0	0	0	0	0	0	0	0	0	0
Kansas	0a	0a	0	0a	0	0	0	0	0	0	0	0a
Kentucky	0a	0	0	0	0	0a	0a	0	0	0	0	0a
Louisiana	5	0	0	3	2	0	0	0	0	0	0	5
Maine	58	9	0	8	0	27	10	0	0	4	0	54
Maryland	559	83	84	8	99	123	73	0	48	41	0	470
Massachusetts	31	2	0	20	0	3	6	0	0	0	0	31
Michigan	32	4	0	18	7	0	3	0	0	0	0	32
Minnesota	320	204	7	40	16	2	30	0	0	21	0	299
Mississippi	88	19	5	17	0	16	31	0	0	0	0	88
Missouri	17	15	0	0	0	0	2	0	0	0	0	17
Montana	9	5	0	0	0a	4	0a	0	0	0	0	9
Nebraska	0a	0	0	0	0	0	0	0	0a	0	0	0
Nevada	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
New Hampshire	1	0	0	0	0	1	0a	0	0	0	0	1

New Jersey	318	0	0	0a	8	0	0	23	8	277	2	31
New Mexico	0	0	0	0	0	0	0	0	0	0	0	0
New York	511	9	0	0	2	0	0	0	0	500	0a	11
North Carolina	76	12	32	10	2	10	10	0	0	0	0	76
North Dakota	12	0	0	4	8	0	0	0	0	0	0	12
Ohio	873	80	48	38	26	24	22	67	0	568	0	305
Oklahoma	6	0	5	0	0	0	1	0	0	0	0	6
Oregon	119	57	15	26	6	7	5	0	0	3	0	116
Pennsylvania	474	191	43	4	6	132	74	6	0	18	0	456
Rhode Island	0a	0	0	0	0a	0	0	0	0	0	0	0a
South Carolina	0	0	0	0	0	0	0	0	0	0	0	0
South Dakota	0a	0	0	0	0	0	0a	0	0	0	0	0a
Tennessee	0	0	0	0	0	0	0	0	0	0	0	0
Texas	20	1	0a	3	0	2	12	0	0	0	2	18
Utah	20	2	11	0	0	4	3	0	0	0	0	20
Vermont	1	0	1	0	0	0	0	0	0	0	0	1
Virginia	0	0	0	0	0	0	0	0	0	0	0	0
Washington	0a	0a	0	0	0	0a	0	0	0	0	0	0a
West Virginia	747	245	8	7	4	252	231	0a	0	0	0	747
Wisconsin	9	0	0	0	0	5	2	0	0	2	0	7
Wyoming	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
American Samoa	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Guam	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
N. Mariana Islands	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Puerto Rico	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Virgin Islands	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Total	**5,131**	**1,033**	**676**	**231**	**190**	**686**	**722**	**96**	**56**	**1,437**	**4**	**3,634**

Categories

I Secondary wastewater treatment
II Advanced wastewater treatment
III-A Infiltration/inflow correction
III-B Sewer replacement/rehabilitation
IV-A New collector sewers and appurtenances
IV-B New interceptor sewers and appurtenances
V Combined sewer overflow correction
VI Storm water management programs
VII NPS pollution control
VIII Confined animals–point source

NR = not reported. American Samoa, Guam, Nevada, the Northern Mariana Islands, Puerto Rico, the Virgin Islands and Wyoming did not participate in the CWNS 2000. California, Colorado, New York and South Dakota did not have the resources to complete the updating of these data.

[a] Estimate is less than $0.5 million.

Table B-4 summarizes the results of the CWNS 1996 of documented and modeled needs by State. All values have been adjusted to millions of January 2004 dollars. In general, Table B-4 is comparable to Table A-1 for categories I-V. In addition, Category II has been expanded to include additional process units to increase the level of treatment to allow for water reuse. Also, for the 1996 survey, Category VI needs were based on modeled estimates. It should be noted that Percent Change (1996-2004) is a comparison of total CWNS 1996 needs (categories I through VI) to total CWNS 2004 needs (categories I through VI and X).

Table B-4. CWNS 1996 Total Documented and Modeled Needs (January 2004 Dollars in Millions)

		Percent Change	Category of Need								
State	**Total**	**1996-2004**	**I**	**II**	**III-A**	**III-B**	**IV-A**	**IV-B**	**V**	**VI**	**Tot. I-V**
Alabama	1,378	155	205	121	5	299	179	165	0	404	974
Alaska	628	NA	488	0	0a	41	44	0	20	35	593
Arizona	2,826	116	901	681	11	85	750	230	0	168	2,658
Arkansas	369	11	148	25	13	46	56	37	0	44	325
California	13,555	51	6,147	2,254	45	1,215	284	775	1,352	1,483	12,072
Colorado	693	223	163	274	2	66	30	11	15	132	561
Connecticut	2,190	19	312	857	52	14	214	190	539	12	2,178
Delaware	318	-58	27	12	2	1	46	39	138	53	265
District of Columbia	681	198	86	24	0	0	0	0	549	22	659
Florida	7,172	80	1,548	1,981	14	198	1,086	914	0	1,431	5,741
Georgia	2,461	-4	149	946	36	18	35	262	454	561	1,900
Hawaii	1,091	91	291	0	0	566	85	86	0	63	1,028
Idaho	396	17	189	19	1	14	66	96	0	11	385
Illinois	13,560	-1	600	293	68	449	215	328	11,596	11	13,549
Indiana	6,239	-6	160	96	50	31	141	110	5,515	136	6,103
Iowa	1,056	-10	169	30	31	38	94	66	587	41	1,015
Kansas	1,825	13	286	176	155	40	66	321	656	125	1,700
Kentucky	2,928	-3	608	32	134	110	499	421	1,036	88	2,840
Louisiana	1,095	204	203	191	37	203	157	91	0	213	882
Maine	938	-9	136	5	29	15	94	56	603	0	938
Maryland	1,889	211	392	271	10	174	254	274	141	373	1,516
Massachusetts	4,609	-31	1,007	63	56	45	494	422	2,500	22	4,587
Michigan	6,142	-2	780	15	17	97	187	403	4,601	42	6,100
Minnesota	996	265	560	35	42	86	117	93	32	31	965
Mississippi	1,020	-3	288	101	102	83	234	165	0	47	973
Missouri	3,047	59	622	36	315	293	167	318	1,096	200	2,847
Montana	132	309	59	5	7	16	32	12	1	0	132
Nebraska	672	98	138	50	8	7	18	118	302	31	641

Nevada	91	234	11	0	3	4	7	19	0	47	44
New Hampshire	919	-38	91	35	10	20	51	199	513	0	919
New Jersey	8,463	10	2,452	317	306	306	921	434	3,727	0	8,463
New Mexico	213	-25	58	36	5	33	45	13	0	23	190
New York	18,931	15	4,173	7,359	91	1,441	404	433	4,931	99	18,832
North Carolina	4,838	5	343	1,401	169	101	1,490	1,134	1	199	4,639
North Dakota	105	-52	79	0	0	25	0	1	0	0	105
Ohio	8,902	32	1,025	306	924	235	443	660	5,189	120	8,782
Oklahoma	637	64	88	93	117	21	16	56	0	246	391
Oregon	2,470	19	747	359	78	135	79	70	843	159	2,311
Pennsylvania	7,479	-4	1,144	199	18	52	866	228	4,915	57	7,422
Rhode Island	1,484	-21	155	73	2	29	405	182	638	0	1,484
South Carolina	1,988	-64	719	319	18	35	327	465	0	105	1,883
South Dakota	140	-52	44	1	0a	32	15	21	18	9	131
Tennessee	1,401	-26	177	80	71	171	168	264	123	347	1,054
Texas	6,949	22	1,688	905	641	1,079	437	1,093	0	1,106	5,843
Utah	415	40	169	0	0	33	100	73	0	40	375
Vermont	392	-57	60	66	4	1	43	18	200	0	392
Virginia	5,132	-8	914	1,318	191	198	635	713	687	476	4,656
Washington	1,643	140	351	7	101	24	68	168	668	256	1,387
West Virginia	2,038	25	298	28	35	34	370	319	954	0	2,038
Wisconsin	1,640	137	516	126	41	318	320	217	65	37	1,603
Wyoming	47	302	20	11	1	4	6	5	0	0	47
American Samoa	51	NA	6	0	0	0	40	5	0	0	51
Guam	60	NA	45	0	0a	0	9	6	0	0	60
N. Mariana Islands	60	NA	31	0	0	0a	7	22	0	0	60
Puerto Rico	1,611	127	637	4	49	22	413	486	0	0	1,611
Virgin Islands	113	NA	87	0	2	24	0	0	0	0	113
Total	**158,118**	**28**	**32,790**	**21,636**	**4,119**	**8,627**	**13,329**	**13,307**	**55,205**	**9,105**	**149,013**

Categories

I Secondary wastewater treatment
II Advanced wastewater treatment
III-A Infiltration/inflow correction
III-B Sewer replacement/rehabilitation
IV-A New collector sewers and appurtenances
IV-B New interceptor sewers and appurtenances
V Combined sewer overflow correction
VI Storm water management programs

Notes:

NA = not available in 2004. Alaska, American Samoa, Guam, the Northern Mariana Islands and the Virgin Islands did not participate in the CWNS 2004.

[a] Estimate is less than $0.5 million.

Appendix C

Summary of CWNS 2004 Technical Information

This page intentionally left blank

Table C-1 summarizes the number of treatment facilities and collection systems in operation in 2004 in each State and U.S. Territory and the number of treatment facilities and collection systems projected to be in operation in each State and U.S. Territory if all documented needs are met.

Table C-1. Number of Operational Treatment Facilities and Collection Systems in 2004 and Number of Operational Treatment Facilities and Collection Systems If All Documented Needs Are Met[a]

State	Operational in 2004		Operational If All Documented Needs Are Met	
	Treatment Facilities	Collection Systems	Treatment Facilities	Collection Systems
Alabama	275	278	281	286
Alaska	45	46	50	51
Arizona	113	130	234	255
Arkansas	349	387	368	418
California	619	852	666	911
Colorado	315	393	330	436
Connecticut	91	141	96	159
Delaware	19	49	19	53
District of Columbia	1	1	1	1
Florida	322	372	346	399
Georgia	350	404	347	405
Hawaii	21	21	27	27
Idaho	182	227	186	237
Illinois	721	1,016	770	1,076
Indiana	411	488	418	501
Iowa	730	760	744	775
Kansas	634	674	665	720
Kentucky	244	279	308	376
Louisiana	353	380	366	411
Maine	139	177	143	186
Maryland	155	210	176	286
Massachusetts	128	235	135	255
Michigan	396	665	404	674
Minnesota	514	662	518	685
Mississippi	317	374	411	533
Missouri	730	813	755	896
Montana	199	206	210	219
Nebraska	468	476	475	486
Nevada	55	61	60	73
New Hampshire	86	117	87	120
New Jersey	155	562	166	585
New Mexico	63	72	65	75
New York	580	937	641	1,027
North Carolina	455	594	486	686
North Dakota	282	285	282	287
Ohio	780	1,046	852	1,253
Oklahoma	493	499	496	505
Oregon	213	262	213	265
Pennsylvania	849	1,610	970	1,838
Rhode Island	20	33	21	37
South Carolina	173	192	168	204
South Dakota	272	276	283	287
Tennessee	243	288	249	297
Texas	1,379	1,729	1,454	1,857
Utah	101	168	121	192
Vermont	84	100	85	103
Virginia	225	304	250	383
Washington	239	376	242	379
West Virginia	215	303	405	631
Wisconsin	595	869	619	990
Wyoming	121	141	121	141
American Samoa	2	2	2	2
Guam	7	7	6	7
N. Mariana Islands	2	2	4	4
Puerto Rico	41	41	42	42
Virgin Islands	12	12	12	12
Total[b]	16,583	21,604	17,851	23,999

Notes:

[a] Alaska, American Samoa, Guam, the Northern Mariana Islands and the Virgin Islands did not participate in the CWNS 2004. Arizona, California, Georgia, Massachusetts, Michigan, Minnesota, North Dakota and South Dakota did not have the resources to complete the updating of their data. All other states, the District of Columbia and Puerto Rico completed more than 97 percent of the data entry or had fewer than 10 facilities that were not updated.

[b] Totals include best available information from States and Territories that did not have the resources to complete the updating of the data or did not participate in the CWNS 2004 in order to maintain continuity with previous Reports to Congress. Forty operational treatment plants and 43 projected treatment plants were excluded from this table because the data related to population, flow and effluent levels were not complete.

Table C-2 shows, for five flow ranges, the number of treatment facilities in operation in 2004 and the number projected to be in operation if 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.

Table C-2. Number of Treatment Facilities by Flow Range

Treatment Facilities in Operation in 2004[a]			
Existing Flow Range (mgd)	**Number of Facilities**	**Total Existing Flow (mgd)**	**Present Design Capacity (mgd)**
0.000 to 0.100	6,830	298	580
0.101 to 1.000	6,431	2,327	3,923
1.001 to 10.000	2,771	8,766	13,225
10.001 to 100.000	503	13,233	17,769
100.001 and greater	41	9,033	10,939
Other[b]	7	-	2
Total[c]	16,583	33,657	46,438

Treatment Facilities in Operation If All Documented Needs Are Met[a]		
Existing Flow Range (mgd)	**Number of Facilities**	**Total Future Design Flow Capacity (mgd)**
0.000 to 0.100	6,107	295
0.101 to 1.000	7,252	2,795
1.001 to 10.000	3,638	12,566
10.001 to 100.000	778	20,293
100.001 and greater	68	15,697
Other[b]	8	-
Total[c]	17,851	51,646

Notes:

[a] Alaska, American Samoa, Guam, the Northern Mariana Islands and the Virgin Islands did not participate in the CWNS 2004. Arizona, California, Georgia, Massachusetts, Michigan, Minnesota, North Dakota and South Dakota did not have the resources to complete the updating of their data. All other states, the District of Columbia and Puerto Rico completed more than 97 percent of the data entry or had fewer than 10 facilities that were not updated.

[b] Flow data for these facilities were unavailable.

[c] Totals include best available information from States and Territories that did not have the resources to complete the updating of the data or did not participate in the CWNS 2004 in order to maintain continuity with previous Reports to Congress. Forty operational and 43 projected treatment plants were excluded from this table because the data related to population, flow and effluent levels were not complete.

Table C-3 shows, by level of treatment, the number of treatment facilities in operation in 2004 and the number projected to be in operation if 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. The population served number is then presented as a percentage of the total 2004 and 2024 U.S. population, respectively.

Table C-3. Number of Treatment Facilities by Level of Treatment

Treatment Facilities in Operation in 2004[a]					
Level of Treatment	**Number of Facilities**	**Existing Flow (mgd)**	**Present Design Capacity (mgd)**	**Number of People Served**	**Percent of U.S. Population**
Less than Secondary[b]	40	441	570	3,306,921	1.1
Secondary	9,221	14,622	19,894	96,469,710	32.4
Greater than Secondary	4,916	16,522	23,046	108,506,467	36.5
No Discharge[c]	2,188	1,565	2,296	14,557,817	4.9
Partial Treatment[d]	218	507	632	-	-
Total[e]	16,583	33,657	46,438	222,840,915	74.9

Treatment Facilities in Operation If All Documented Needs Are Met[a]				
Level of Treatment	**Number of Facilities**	**Future Design Capacity (mgd)**	**Number of People Served**	**Percent of U.S. Population**
Less than Secondary[b]	26	313	1,656,716	0.5
Secondary	9,446	20,607	109,360,794	31.2
Greater than Secondary	5,607	26,822	149,943,142	42.7
No Discharge[c]	2,545	3,059	25,269,984	7.2
Partial Treatment[d]	227	845	-	-
Total[e]	17,851	51,646	286,230,636	81.6

[a] Alaska, American Samoa, Guam, the Northern Mariana Islands and the Virgin Islands did not participate in the CWNS 2004. Arizona, California, Georgia, Massachusetts, Michigan, Minnesota, North Dakota and South Dakota did not have the resources to complete the updating of their data. All other states, the District of Columbia and Puerto Rico completed more than 97 percent of the data entry or had fewer than 10 facilities that were not updated.

[b] Less-than-secondary facilities include facilities granted or pending section 301(h) waivers from secondary treatment for discharges to marine waters.

[c] No-discharge facilities do not discharge treated wastewater to the Nation's waterways. These facilities dispose of wastewater via methods such as industrial reuse, irrigation or evaporation.

[d] These facilities provide some treatment to wastewater and discharge their effluents to other wastewater facilities for further treatment and discharge. The population associated with these facilities is omitted from this table to avoid double accounting.

[e] Totals include best available information from States and Territories that did not have the resources to complete the updating of the data or did not participate in the CWNS 2004 in order to maintain continuity with previous Reports to Congress. Forty operational and 43 projected treatment plants were excluded from this table because the data related to population, flow and effluent levels were not complete.

Table C-4 presents the number of CSO facilities with documented needs identified during the CWNS 2000 and CWNS 2004.

Table C-4. Number of Facilities With CSO Correction Needs and Total CSO Correction Needs: 2000 and 2004 (January 2004 dollars in millions)

State	Number of Facilities with CSO Needs in 2000	Number of Facilities with CSO Needs in 2004	2000 CSO Needs ($ Millions)	2004 CSO Needs ($ Millions)
Alabama	0	0	0	0
Alaska	1	NR	5	NR
Arizona	0	0	0	0
Arkansas	0	0	0	0
California	1	3	475	255
Colorado	1	0	11	0
Connecticut	6	5	556	839
Delaware	1	1	113	21
District of Columbia	1	1	1,134	1,307
Florida	0	0	0	0
Georgia	2	2	1,022	1,022
Hawaii	0	0	0	0
Idaho	0	0	0	0
Illinois	105	111	10,521	10,100
Indiana	107	107	6,088	5,361
Iowa	14	7	1,708	427
Kansas	3	3	441	464
Kentucky	12	8	241	181
Louisiana	0	0	0	0
Maine	48	42	727	374
Maryland	8	10	440	430
Massachusetts	25	19	2,588	1,805
Michigan	21	18	2,713	4,334
Minnesota	1	1	6	9
Mississippi	0	0	0	0
Missouri	7	8	1,313	1,459
Montana	0	0	0	0
Nebraska	2	2	958	928
Nevada	0	0	0	0

New Hampshire	4	4	540	261
New Jersey	39	37	4,882	3,772
New Mexico	0	0	0	0
New York	83	75	6,120	6,563
North Carolina	1	1	3	3
North Dakota	0	0	0	0
Ohio	109	105	4,034	6,284
Oklahoma	0	0	0	0
Oregon	2	2	83	834
Pennsylvania	123	97	6,047	4,639
Rhode Island	3	3	705	636
South Carolina	0	0	0	0
South Dakota	1	0	2	0
Tennessee	2	2	272	285
Texas	0	0	0	0
Utah	0	0	0	0
Vermont	4	2	34	27
Virginia	3	3	512	512
Washington	11	27	677	515
West Virginia	45	38	968	767
Wisconsin	3	3	380	406
Wyoming	0	0	0	0
American Samoa	NR	NR	NR	NR
Guam	NR	NR	NR	NR
N. Mariana Islands	NR	NR	NR	NR
Puerto Rico	0	0	0	0
Virgin Islands	NR	NR	NR	NR
Total	**799**	**747**	**56,319**	**54,820**

NR = not reported. Alaska, American Samoa, Guam, the Northern Mariana Islands and the Virgin Islands did not participate in the CWNS 2004. Arizona, California, Georgia, Massachusetts, Michigan, Minnesota, North Dakota and South Dakota did not have the resources to complete the updating of their data. All other states, the District of Columbia and Puerto Rico completed more than 97 percent of the data entry or had fewer than 10 facilities that were not updated.

Table C-5 presents the number of storm water facilities with needs identified in the CWNS 2004 by the size of the MS4.

Table C-5. Number of Facilities With MS4 Storm Water Management Program Needs and Total MS4 Storm Water Management Program Needs (January 2004 dollars in millions)

	Small MS4 Facilities (<100,000 people)		Medium MS4 Facilities (100,000 through 249,999 people)		Large MS4 Facilities (>250,000 people)	
State	Number of Facilities[a]	Needs ($ Millions)	Number of Facilities[a]	Needs ($ Millions)	Number of Facilities[a]	Needs ($ Millions)
Alabama	0	0	0	0	0	0
Alaska	NR	NR	NR	NR	NR	NR
Arizona	12	95	4	135	6	944
Arkansas	0	0	0	0	0	0
California	14	167	6	66	7	158
Colorado	19	72	12	28	0	0
Connecticut	0	0	0	0	0	0
Delaware	0	0	0	0	0	0
District of Columbia	0	0	0	0	1	9
Florida	88	286	20	546	43	1,351
Georgia	0	0	0	0	0	0
Hawaii	0	0	0	0	0	0
Idaho	1	19	0	0	0	0
Illinois	0	0	0	0	0	0
Indiana	97	10	2	2	0	0
Iowa	1	2	0	0	0	0
Kansas	0	0	0	0	0	0
Kentucky	0	0	0	0	1	27
Louisiana	0	0	0	0	0	0
Maine	2	3	0	0	0	0
Maryland	1	1	6	63	5	367
Massachusetts	0	0	0	0	0	0
Michigan	0	0	0	0	0	0
Minnesota	190	911	0	0	0	0
Mississippi	0	0	0	0	0	0
Missouri	0	0	0	0	0	0

Montana	0	0	0	0	0	0
Nebraska	0	0	1	20	0	0
Nevada	0	0	0	0	2	11
New Hampshire	0	0	0	0	0	0
New Jersey	563	87	8	0b	16	7
New Mexico	0	0	0	0	0	0
New York	9	8	0	0	2	14
North Carolina	0	0	2	1	0	0
North Dakota	0	0	0	0	0	0
Ohio	5	4	0	0	0	0
Oklahoma	0	0	0	0	2	199
Oregon	0	0	0	0	2	61
Pennsylvania	8	12	1	6	0	0
Rhode Island	3	5	0	0	0	0
South Carolina	1	15	0	0	0	0
South Dakota	0	0	1	0b	0	0
Tennessee	0	0	0	0	0	0
Texas	0	0	1	63	31	2,776
Utah	0	0	0	0	0	0
Vermont	0	0	0	0	0	0
Virginia	0	0	0	0	0	0
Washington	6	41	7	113	1	26
West Virginia	2	14	0	0	0	0
Wisconsin	38	208	1	15	2	5
Wyoming	2	1	0	0	0	0
American Samoa	NR	NR	NR	NR	NR	NR
Guam	NR	NR	NR	NR	NR	NR
N. Mariana Islands	NR	NR	NR	NR	NR	NR
Puerto Rico	0	0	0	0	0	0
Virgin Islands	NR	NR	NR	NR	NR	NR
Total	**1,062**	**1,961**	**72**	**1,058**	**121**	**5,955**

Notes:
NR = not reported. Alaska, American Samoa, Guam, the Northern Mariana Islands and the Virgin Islands did not participate in the CWNS 2004. Arizona, California, Georgia, Massachusetts, Michigan, Minnesota, North Dakota and South Dakota did not have the resources to complete the updating of their data. All other states, the District of Columbia and Puerto Rico completed more than 97 percent of the data entry or had fewer than 10 facilities that were not updated.

[a] The number of facilities on this table does not reflect the number of MS4s in a particular state. The number of facilities reflects how many records were entered into the CWNS 2004 database, and one facility can cover multiple MS4s or multiple facilities can cover one MS4.

[b] Estimate is less than $0.5 million.

Table C-6 presents the facilities represented in the CWNS 2004 that use the CSO cost curve to document a CSO need greater than $120 million. Collectively, the CSO needs in these 59 facilities represent $18.6 billion of the total $54.8 billion (34 percent) in documented CSO needs that are reported in the CWNS 2004.

Table C-6. Facilities With CSO Cost Curve Needs Exceeding $120 Million

State	Facility Name	Responsible Entity	County
Illinois	Arlington Hts. Col. Sys.1	Arlington Heights, Vil. Of	Cook
Illinois	Aurora Col. Sys.	Aurora, City Of	Kane
Illinois	Chicago Central Col. Sys.	Chicago, City Of	Cook
Illinois	Chicago Northside Col. Sys.	Chicago, City Of	Cook
Illinois	Chicago South Col. Sys.	Chicago, City Of	Cook
Illinois	Des Plaines Col. Sys.	Des Plaines, City Of	Cook
Illinois	East St. Louis Sewers	City Of East St. Louis	St. Clair
Illinois	Elgin Sewers	City Of Elgin	Kane
Illinois	Joliet - Eastside STP	Joliet, City Of	Will
Illinois	Peru WWTP	Peru, City of	La Salle
Illinois	Rock Island Main STP	Rock Island, City Of	Rock Island
Illinois	Skokie CS	Skokie, Village of	Cook
Illinois	Springfield Sd Spring Cr.	Springfield Sanitary Dist	Sangamon
Indiana	East Chicago STP	East Chicago, City Of	Lake
Indiana	Eastside WWTP	Evansville, City Of	Vanderburgh
Indiana	Evansville Westside WWTP	Evansville, City of	Vanderburgh
Indiana	Fort Wayne WPCP	Fort Wayne Board Of Public	Allen
Indiana	Gary Sanitary District	Gary Sanitary District	Lake
Indiana	Lafayette WWTP	Lafayette, City Of	Tippecanoe
Indiana	Michigan City STP	Michigan City	La Porte
Indiana	Moss Island Road Plant	Anderson, City Of	Madison
Indiana	South Bend WWTP	South Bend Board of Public	St. Joseph
Indiana	Southport WWTP	Indianapolis San. Dist.	Marion
Iowa	Burlington WWTP	Burlington, City of	Des Moines
Iowa	Muscatine WWTP	Muscatine, City Of	Muscatine
Kansas	KCK WWTP #1-KP WWTP	Kansas City, City of	Wyandotte
Kansas	Topeka Oakland WWTP	Topeka, City of	Shawnee
Maryland	Back River WWTP	Baltimore, City Of	Baltimore
Michigan	Lansing WWTP	City Of Lansing	Ingham
Michigan	Saginaw STP	Saginaw DPW	Saginaw

Missouri	St Joseph WWTP	St Joseph, City Of	Buchanan
Nebraska	Missouri River STP	Omaha, City of	Douglas
New Jersey	Bergen County Utilities Authority	Bergen County Utilities Authority	Bergen
New Jersey	Camden County MUA	Camden Co MUA	Camden
New Jersey	Elizabeth City CSO	Elizabeth, City Of, Public Works	Union
New Jersey	Jersey City Mun. Util. Auth.	Jersey City MUA	Hudson
New Jersey	Joint Meeting Of Essex & Union	J M Of Essex & Union	Union
New Jersey	Newark City CSO - PVSC	Passaic Valley S.C.	Essex
New Jersey	Paterson Cs.	Paterson, City Of	Passaic
New York	Albany (C) San & Comb. Sewers	Albany, City Of (Albany MWF Authority)	Albany
New York	New York (C) - Bowery Bay WPCP	NYC DEP	Queens
New York	New York (C) - Coney Island WPCP	NYC DEP	Kings
New York	New York (C) - Hunts Point WPCP	NYC DEP	Bronx
New York	New York (C) - Jamaica WPCP	NYC DEP	Queens
New York	New York (C) - Newton Creek WPCP	NYC DEP	Kings
New York	New York (C) - North River WPCP	NYC DEP	New York
New York	New York (C) - Oakwood Beach WPCP	NYC DEP	Richmond
New York	New York (C) - Owls Head WPCP	NYC DEP	Kings
New York	New York (C) - Port Richmond WPCP	NYC DEP	Richmond
New York	New York (C) - Tallman Island WPCP	NYC DEP	Queens
New York	New York (C) - Wards Island WPCP	NYC DEP	New York
New York	Utica (C) San S. & CSO Outfall	Utica, City Of	Oneida
Ohio	Youngstown WWTP & Sewer System	City Of Youngstown	Mahoning
Pennsylvania	Bethlehem City STP	Bethlehem Authority, City	Northampton
Pennsylvania	Harrisburg Authority STP	Harrisburg Authority	Dauphin
Pennsylvania	Philadelphia Water Dept (NE)	Philadelphia Water Dept - WPC Division	Philadelphia
Pennsylvania	Philadelphia Water Dept (SE)	Philadelphia Water Dept - WPC Division	Philadelphia
Pennsylvania	Philadelphia Water Dept (SW)	Philadelphia Water Dept	Philadelphia
Wisconsin	Milwaukee, City of - CS	Milwaukee, City of	Milwaukee

Table C-7 shows, by treatment level, the number of facilities in operation in 2004 and the population served at the State level. The number of facilities and population served are shown for each level of treatment and for each State and U.S. Territory.

Table C-7. Number of Treatment Facilities and Population Served per State by Level of Treatment for Year 2004

	Number of Facilities Providing Listed Effluent Level[a]				Population Served by Listed Effluent Level[a]			
State	Less than Secondary[b]	Secondary	Greater than Secondary	No Discharge[c]	Less than Secondary[b]	Secondary	Greater than Secondary	No Discharge[c]
Alabama	0	131	129	7	0	751,759	1,996,926	6,651
Alaska	5	30	0	9	207,994	108,879	0	21,920
Arizona	0	16	19	74	0	116,384	3,257,943	1,551,600
Arkansas	0	118	221	9	0	725,025	852,736	12,155
California	3	186	84	334	1,942,488	17,829,141	8,731,071	3,876,394
Colorado	0	221	42	36	0	1,333,330	2,303,870	14,437
Connecticut	0	43	42	6	0	1,062,280	1,010,189	2,645
Delaware	0	2	13	4	0	8,822	666,349	25,444
District of Columbia[d]	0	0	1	0	0	0	1,298,601	0
Florida	0	0	111	209	0	0	6,586,411	6,309,507
Georgia	0	203	96	41	0	1,594,624	2,881,293	114,309
Hawaii	1	5	3	12	344,706	139,609	207,958	89,512
Idaho	0	113	7	59	0	583,756	299,893	56,724
Illinois	0	417	297	2	0	707,927	10,077,113	2,257
Indiana	0	127	274	0	0	389,859	3,654,009	0
Iowa	0	716	10	1	0	2,092,494	194,071	209
Kansas	0	356	79	196	0	670,941	1,255,624	101,710
Kentucky	0	149	91	1	0	1,566,266	912,458	435
Louisiana	0	173	173	1	0	2,248,137	971,231	207
Maine	12	115	2	10	9,303	626,778	16,038	7,215
Maryland	0	75	73	5	0	949,514	2,040,001	3,920
Massachusetts	1	77	35	10	19,762	4,372,683	859,775	25,025
Michigan	0	204	120	68	0	1,277,066	6,227,896	108,121
Minnesota	1	425	80	4	25	1,166,010	2,219,811	3,513
Mississippi	0	208	84	3	0	1,132,063	641,674	1,272
Missouri	0	629	79	19	0	3,694,485	431,110	2,482
Montana	0	108	6	83	0	399,771	92,390	57,617
Nebraska	0	255	23	188	0	947,956	206,946	82,587
Nevada	0	8	3	44	0	245,905	916,572	300,957
New Hampshire	1	67	4	11	20,617	590,051	34,878	6,838
New Jersey	0	91	57	1	0	6,553,273	1,209,075	34,307
New Mexico	1	39	3	19	1,626	894,678	7,150	216,866
New York	0	387	156	31	0	12,140,214	3,133,991	110,284
North Carolina	0	270	142	37	0	914,904	2,697,631	118,428

North Dakota	0	254	1	27	0	559,545	21,531	5,909
Ohio	0	172	604	3	0	1,267,225	7,454,278	1,074
Oklahoma	0	238	54	200	0	1,661,004	818,547	149,803
Oregon	0	133	31	48	0	1,822,176	977,731	105,085
Pennsylvania	0	419	420	7	0	5,871,941	4,156,749	9,371
Rhode Island	0	18	2	0	0	700,818	10,184	0
South Carolina	1	105	51	11	4,000	1,700,794	696,221	50,361
South Dakota	0	234	9	29	0	271,567	168,006	13,002
Tennessee	0	157	78	7	0	2,007,226	1,519,925	10,646
Texas	2	506	667	182	1,070	2,509,633	16,761,753	679,461
Utah	0	47	5	49	0	1,800,130	200,925	161,259
Vermont	0	49	31	4	0	99,181	208,843	1,792
Virginia	0	154	63	1	0	2,360,084	2,506,387	1,067
Washington	0	198	7	31	0	3,683,763	1,054,599	47,319
West Virginia	2	143	64	2	861	623,922	375,042	1,117
Wisconsin	0	292	265	37	0	692,285	3,452,096	42,691
Wyoming	0	89	3	14	0	306,246	84,439	8,037
American Samoa	2	0	0	0	5,511	0	0	0
Guam	2	2	0	2	62,639	9,236	0	4,275
N. Mariana Islands	0	2	0	0	0	0	0	0
Puerto Rico	5	35	1	0	666,788	630,056	146,477	0
Virgin Islands	1	10	1	0	19,531	58,294	50	0
Total[e]	**40**	**9,221**	**4,916**	**2,188**	**3,306,921**	**96,469,710**	**108,506,467**	**14,557,817**

Notes:

[a] Alaska, American Samoa, Guam, the Northern Mariana Islands and the Virgin Islands did not participate in the CWNS 2004. Arizona, California, Georgia, Massachusetts, Michigan, Minnesota, North Dakota and South Dakota did not have the resources to complete the updating of their data. All other states, the District of Columbia and Puerto Rico completed more than 97 percent of the data entry or had fewer than 10 facilities that were not updated.

[b] Less-than-secondary facilities include facilities granted or pending section 301(h) waivers from secondary treatment for discharges to marine waters.

[c] No-discharge facilities do not discharge treated wastewater to the Nation's waterways. These facilities dispose of wastewater via methods such as industrial reuse, irrigation or evaporation.

[d] The reported population served for the District of Columbia includes populations from Maryland and Virginia that receive wastewater treatment at the Blue Plains facility in the District of Columbia.

[e] Totals include best available information from States and Territories that did not have the resources to complete the updating of the data or did not participate in the CWNS 2004 in order to maintain continuity with previous Reports to Congress. Forty operational treatment plants were excluded from this table because the data related to population, flow and effluent levels were not complete.

Table C-8 shows, by treatment level, the number of facilities that will be in operation if all documented needs are met and the population served at State level. The number of facilities and population served are shown for each level of treatment and for each State and U.S. Territory.

Table C-8. Number of Treatment Facilities and Population Served per State by Level of Treatment If All Documented Needs Are Met

	Number of Facilities Providing Listed Effluent Level[a]				Population Served by Listed Effluent Level[a]			
State	Less than Secondary[b]	Secondary	Greater than Secondary	No Discharge[c]	Less than Secondary[b]	Secondary	Greater than Secondary	No Discharge[c]
Alabama	0	128	136	9	0	868,468	2,321,466	12,483
Alaska	5	31	0	13	346,571	211,131	0	42,808
Arizona	0	8	31	191	0	334,851	4,122,257	3,961,730
Arkansas	0	120	233	11	0	1,073,936	1,422,597	26,244
California	1	177	108	372	76,400	20,886,580	12,337,759	5,327,451
Colorado	0	218	57	38	0	1,744,660	3,000,234	27,865
Connecticut	0	10	78	8	0	113,845	2,393,873	17,975
Delaware	0	2	12	5	0	11,165	796,144	39,024
District of Columbia[d]	0	0	1	0	0	0	1,446,672	0
Florida	0	0	115	227	0	0	9,608,736	11,400,195
Georgia	0	191	109	41	0	1,807,604	4,591,246	168,255
Hawaii	1	5	3	18	420,000	225,800	390,258	237,979
Idaho	0	109	10	63	0	779,924	450,905	96,523
Illinois	0	441	317	6	0	947,039	12,163,555	3,497
Indiana	0	129	279	0	0	459,540	4,203,758	0
Iowa	0	725	14	1	0	2,547,242	242,392	192
Kansas	0	342	114	205	0	573,540	2,073,467	117,511
Kentucky	0	196	101	4	0	2,381,558	1,572,554	1,927
Louisiana	0	139	224	1	0	2,796,891	1,320,391	220
Maine	10	111	8	12	12,269	745,622	63,850	19,502
Maryland	0	73	87	14	0	308,731	3,364,222	19,838
Massachusetts	1	74	43	13	35,923	3,983,629	1,132,686	51,384
Michigan	0	208	122	70	0	1,361,675	6,717,059	124,612
Minnesota	1	405	101	8	25	1,213,299	2,666,868	5,417
Mississippi	0	297	96	2	0	1,005,136	1,679,237	702
Missouri	0	648	87	18	0	5,261,042	750,536	3,490
Montana	0	109	8	90	0	562,216	168,113	92,171
Nebraska	0	236	44	194	0	870,485	566,677	96,699
Nevada	0	8	3	47	0	451,211	1,129,160	455,472
New Hampshire	1	60	11	14	24,075	628,720	112,417	9,903
New Jersey	0	76	73	10	0	6,356,941	2,370,312	97,956
New Mexico	0	36	7	21	0	1,057,283	113,452	235,359
New York	0	404	187	42	0	12,107,809	3,745,768	307,620

North Carolina	0	245	172	62	0	816,516	4,838,052	325,392
North Dakota	0	252	3	27	0	677,369	33,978	6,834
Ohio	0	173	674	5	0	1,457,966	8,844,799	1,672
Oklahoma	0	222	66	207	0	1,827,399	911,938	173,411
Oregon	0	129	34	50	0	2,203,257	1,356,819	186,310
Pennsylvania	0	496	459	8	0	5,753,995	4,854,311	13,177
Rhode Island	0	15	6	0	0	596,673	196,658	0
South Carolina	0	94	60	11	0	2,381,001	1,479,333	112,284
South Dakota	0	240	11	32	0	321,189	328,011	14,676
Tennessee	0	161	77	8	0	2,514,147	1,909,373	20,025
Texas	0	521	720	186	0	3,479,870	24,393,691	937,880
Utah	0	43	10	67	0	1,860,710	912,394	335,314
Vermont	0	43	37	5	0	119,752	282,414	3,352
Virginia	0	160	73	7	0	2,911,238	4,288,677	9,667
Washington	0	199	8	31	0	4,942,843	1,331,252	51,513
West Virginia	0	308	94	0	0	1,056,031	501,509	0
Wisconsin	0	287	276	55	0	720,245	4,047,263	60,001
Wyoming	0	87	5	14	0	431,386	106,408	11,927
American Samoa	2	0	0	0	39,200	0	0	0
Guam	0	4	0	2	0	112,910	0	4,545
N. Mariana Islands	0	4	0	0	0	0	0	0
Puerto Rico	4	37	1	0	702,253	1,443,854	247,855	0
Virgin Islands	0	10	2	0	0	54,870	39,786	0
Total[e]	**26**	**9,446**	**5,607**	**2,545**	**1,656,716**	**109,360,794**	**149,943,142**	**25,269,984**

Notes:

[a] Alaska, American Samoa, Guam, the Northern Mariana Islands and the Virgin Islands did not participate in the CWNS 2004. Arizona, California, Georgia, Massachusetts, Michigan, Minnesota, North Dakota and South Dakota did not have the resources to complete the updating of their data. All other states, the District of Columbia and Puerto Rico completed more than 97 percent of the data entry or had fewer than 10 facilities that were not updated.

[b] Less-than-secondary facilities include facilities granted or pending section 301(h) waivers from secondary treatment for discharges to marine waters.

[c] No-discharge facilities do not discharge treated wastewater to the Nation's waterways. These facilities dispose of wastewater via methods such as industrial reuse, irrigation or evaporation.

[d] The reported population served for the District of Columbia includes populations from Maryland and Virginia that receive wastewater treatment at the Blue Plains facility in the District of Columbia.

[e] Totals include best available information from States and Territories that did not have the resources to complete the updating of the data or did not participate in the CWNS 2004 in order to maintain continuity with previous Reports to Congress. Forty-three projected treatment plants were excluded from this table because the data related to population, flow and effluent levels were not complete.

Table C-9 presents the treatment facilities represented in the CWNS 2004 as having less than secondary effluent discharges and no 301(h) waivers from secondary treatment for discharges to marine waters. The present and future effluent levels, design flow and population receiving treatment are shown for each facility, in addition to the Category I needs for the facility. Technical data are of January 1, 2004.

Table C-9. Technical Data and Costs for Facilities With Less-Than-Secondary Effluent Levels That Do Not Have 301(h) Waivers

State	Facility Name	Present Effluent	Future Effluent	Present Design Flow (mgd)	Future Design Flow (mgd)	Present Population Receiving Treatment	Future Population Receiving Treatment	Documented Category I Needs (January 2004 $ millions)
MN	Barry Imhoff Tank	Primary (45mg/l< BOD)	Primary (45mg/l< BOD)	0.01	0.01	25	25	-
NM	Springer Treatment Plang	Primary (45mg/l< BOD)	Secondary	0.26	0.26	1,626	2,036	0.1
SC	BJWSA/Shell Point	Primary (45mg/l< BOD)	Secondary	0.4	0.4	4,000	4,000	0.1
TX	Rio Del Sol WWTP	Primary (45mg/l< BOD)		0.08	0	540	-	-
TX	Taft ISD - San Antonio Water System	Primary (45mg/l< BOD)		0.9	0	530	-	-
WV	Brushfork Area Collection System	Primary (45mg/l< BOD)		0.196	0	55	-	-
WV	Chattaroy PSD STP	Primary (45mg/l< BOD)		0.17	0	806	-	-
VI	St. Thomas WWTF	Primary (45mg/l< BOD)	Secondary	3.4	3.5	22,831	26,212	37.0

Appendix D
CWNS Database

This page intentionally left blank

CWNS Database

The CWNS 2004 database is a centralized, relational database that resides on EPA's computers in Research Triangle Park, North Carolina. States can enter data into the database through a customized data entry system and retrieve data through Web-based reports or queries using their own software. The CWNS 2004 database is also integrated with other EPA data systems such as EnviroMapper, AskWATERS and WebRIT.

Table D-1 lists the data elements that could be entered for each facility in the CWNS 2004 database. (Detailed data element definitions are available at www.epa.gov/EDR.) Descriptions of the data gathered for four broad categories follow.

Table D-1. Data Elements in the CWNS 2004

Facility Summary[a]
- Authority/Facility (A/F) Number (CWNS 2004 Number)
- Facility Name
- Natures[b] (Present and/or Projected) and Changes
- System Name[c]
- "Privately Owned" Flag
- "Interim Treatment Plant" Flag[c]
- Discharges to Another Facility
- Facility Identification Number (FIN)

Needs[a]
- Needs Category
- Eligible Needs
- Documentation Information
- Separate State Estimates[c]
- Operation and Maintenance Costs[c]

Geographic[a]
- Latitude and Longitude "Point of Record" (POR)
- POR County
- Watershed
- Congressional District
- Boundaries (includes a category for estuaries designated under the National Estuary Program)

Technical
- Population (and "Small Community Exception" Flag)[d]
- Flow Capacities of Treatment Plants[d]
- Discharge Method(s) and Location(s)[d]
- Effluent Data[d] and Concentration Details
- Unit Process or BMP Descriptions[c]
- Combined Sewer Details[d]
- Responsible Entity Information (and "Tribal" Flag)
- Permit Numbers and Types[e]
- Biosolids Handling Data
- Pollution Problem Descriptions [f]
- Miscellaneous Comments

[a] Unless otherwise indicated, data elements under these categories were required for every facility in the CWNS 2004.
[b] Natures define the main components of a facility (e.g., wastewater treatment plant, collection sewer, agriculture–cropland).
[c] Data elements that were not mandatory for the CWNS 2004. The States entered data for these fields voluntarily.
[d] Data elements that were required for wastewater treatment and collection systems, when applicable.
[e] Data element that was required for facilities with stormwater management program needs and facilities discharging to surface waters.
[f] States identified costs for addressing SSO problems under this data element.

Wastewater Treatment and Collection Systems. The CWNS 2004 includes data on the documented capital costs required to meet the needs of the Nation's publicly owned wastewater collection and treatment infrastructure in accordance with section 212 of the CWA. Eligible costs include the replacement, rehabilitation, or expansion of collection systems and treatment facilities; construction of new treatment facilities; correction or elimination of CSOs; and construction of decentralized treatment systems. In addition to the needs, technical data such as flow and treatment levels for treatment facilities, population, unit process, discharge location and geographic data were collected on each wastewater treatment facility, collection system or decentralized system included in the CWNS 2004.

The CWNS 2004 does not have a distinct needs category for SSOs. To effectively control SSOs, one or more of the following are needed: building storage facilities to contain wet-weather flows during wet-

weather events, reducing sewer infiltration/inflow (I/I) through sewer replacement/rehabilitation, or building additional treatment facilities to treat wet-weather flows. Therefore, some of the needs in the following categories are related to SSO needs: needs for secondary wastewater treatment (Category I), advanced wastewater treatment (Category II), sewer replacement/rehabilitation and I/I correction (Category III) and new sewers and appurtenances (Category IV). States could voluntarily designate cost information from needs Categories I through IV that specifically address SSO problems.

Stormwater Management Programs. The documented eligible needs for this category include the capital costs for meeting requirements of the MS4 component of the Stormwater Phase I and II NPDES regulations. Only costs to establish and implement programmatic areas and specific projects under municipal stormwater management programs required by an NPDES permit are eligible needs under this category. Examples of appropriate costs are public education, outreach and involvement programs and specific projects that increase public awareness of stormwater quality issues; illicit discharge identification and elimination programs and specific projects; construction and post-construction programs and specific BMPs; and municipal pollution prevention program development and implementation activities. Examples of stormwater activities that are not allowable Category VI needs are flood control projects that do not have a water quality enhancement component and the installation of new storm sewers or the rehabilitation of existing storm sewers that are not specifically identified as addressing a program element in a municipality's stormwater management program. Stormwater management facilities were required to have geographic location and permit data entered in addition to needs information. Because some Phase II MS4 permits had not been issued by the close of data entry for CWNS 2004, States were allowed to use a placeholder NPDES permit number to include data for such MS4s as necessary to complete Category VI needs entry in the CWNS 2004 database.

Nonpoint Source Control Projects. Although not required by section 516(b)(1)(B) of the CWA, States submitted documented needs for implementing NPS management programs under section 319 and implementing CCMPs for estuaries under section 320 of the CWA. NPS pollution control projects are generally CWSRF-eligible[17] and must have been included under a State's approved Nonpoint Source Management Plan (section 319) or in an approved CCMP (section 320). CWSRF financing is available for a broad range of NPS pollution control activities, such as implementing agricultural BMPs, removing and abating leaking underground storage tanks, and replacing or rehabilitating failed septic systems with new onsite systems or other decentralized systems serving one or more properties. In addition, section 320 allows financing of a broader range of activities found in CCMPs, such as habitat restoration. For each NPS pollution control facility in the CWNS 2004, EPA required a geographic location along with the needs data. NPS control project needs were held to the same documentation criteria as traditional wastewater treatment and collection system needs. The seven basic documentation criteria are described in Chapter 2 of this Report.

Estuary Management. Although not required by section 516(b)(1)(B) of the CWA, States submitted documented needs for most activities within in CCMPs prepared for estuaries designated under section 320 of the CWA. However, many activities that were considered point or NPS technologies were included in the appropriate needs category rather than in Category XI. Category XI was initiated to track a limited number of estuary management activities that may not be appropriately included in other needs categories. Typical estuary BMPs are habitat protection for aquatic species, fisheries/oyster bed/shellfish restocking or restoration and fish ladders, rejuvenation of submerged aquatic vegetation, artificial reef

[17] The use of CWSRF eligibility rules in determining eligibility for the CWNS 2004 is independent of, and does not affect, States' annual determinations on which projects are eligible for CWSRF funding. There are some CWSRF-eligible projects that are not captured in the CWNS, as well as a few exceptional needs in CWNS that are not necessarily eligible for CWSRF funding. Although CWSRF eligibility is defined in the CWA and clarified by national EPA guidance, individual States might have policies not to fund certain kinds of projects. If those projects meet national eligibility criteria, however, they may be included in the CWNS.

establishment, control of invasive introduced vegetative and aquatic species, and water control structures for flow regime and salinity.

This page intentionally left blank

Appendix E

Nonpoint Source Pollution Control Documented Needs and Modeled Estimates

This page intentionally left blank

Documented Nonpoint Source Pollution Control Needs

While NPS needs are not within the scope of CWA section 516(b)(1)(B), 41 States and the District of Columbia documented $38.3 billion in NPS needs. This is an increase from the 33 States and the District of Columbia that documented $15.3 billion in NPS needs in the CWNS 2000. Figure E-1 shows the distribution of NPS pollution control needs by State. Table E-1 summarizes the national NPS pollution control needs, while Appendix A, Table A-2, presents these needs by State.

More than 63 percent of the $38.3 billion for NPS pollution control needs were documented by Florida ($9.3 billion), Pennsylvania ($5.9 billion), New Jersey ($3.7 billion), Minnesota ($2.9 billion) and New York ($2.6 billion). Seven States—Missouri, Mississippi, Wisconsin, Ohio, California, Connecticut and Michigan—documented from $1 billion to $1.7 billion each in NPS pollution control needs. Each of 11 other States documented NPS pollution control needs of greater than $0.1 billion.

In some cases, plans already exist to address the documented NPS needs through other Federal or State funding mechanisms.

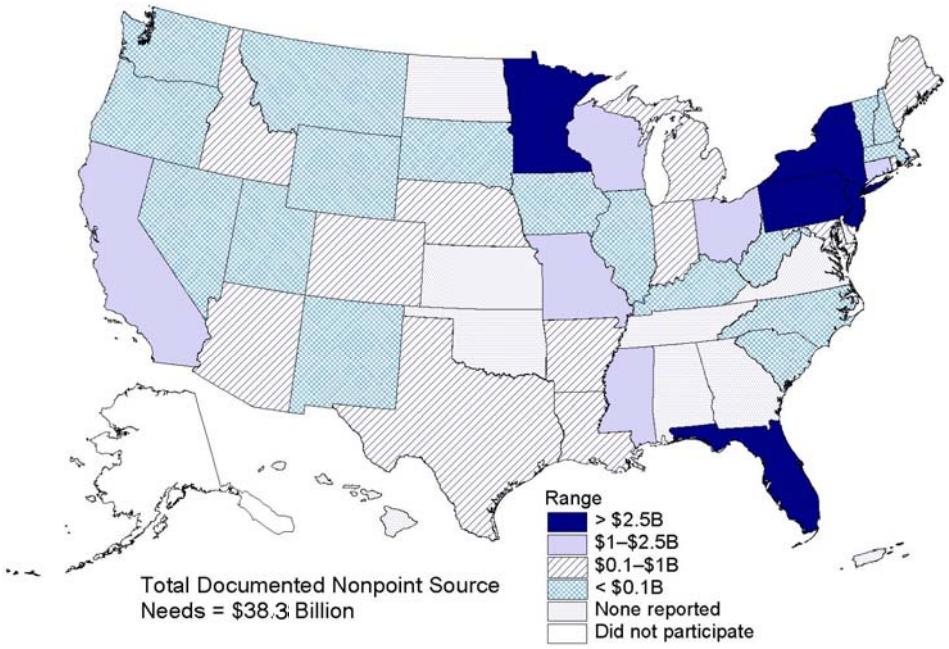

Figure E-1. Distribution of nonpoint source pollution control (Category VII) needs by State (January 2004 dollars in billions).

Urban ($12.4 billion), hydromodification ($9.3 billion), ground water protection ($4.8 billion) and individual/decentralized sewage treatment ($3.0 billion) needs account for 76.8 percent of the total documented NPS needs.

Of the $3.0 billion reported Category VII-L needs, $2.2 billion is for small communities with populations fewer than 10,000 people. Twenty-one new decentralized systems are planned for small communities where abandonment of individual onsite systems is expected. These 21 facilities will serve approximately 19,734 people. Communities are finding that decentralized wastewater systems sometimes prove to be the

least-cost permanent solution to protect water quality and public health. Alternatively, communities are also implementing hybrid solutions, which consist of a conventional system for the most concentrated developed areas and decentralized systems for the less densely developed areas. EPA's 2003–2008 Strategic Plan states that decentralized systems are a key component of the Nation's wastewater infrastructure. EPA will provide national direction and support to improve the performance of such systems by promoting the concept of continuous management and facilitating upgraded professional standards of practice.

In addition to the needs reported for individual/decentralized sewage treatment, $5.7 billion of the centralized collection and wastewater treatment plant needs (Categories I through V) are associated with solving individual/decentralized sewage treatment and other NPS problems. Ohio ($1.1 billion), West Virginia ($0.9 billion), Pennsylvania ($0.6 billion) and Arizona ($0.4 billion) account for more than one-half of these needs. Although the $5.7 billion represents only 5.5 percent of the national needs in Categories I, II, IV-A and IV-B, eight States—West Virginia (59 percent), Arkansas (44 percent), Ohio (34 percent), Mississippi (33 percent), Delaware (32 percent), Pennsylvania (31 percent), Nevada (31 percent) and Montana (25 percent)—indicated that more than 25 percent of their Category I, II, IV-A and IV-B needs are associated with solving NPS problems.

In previous surveys, because of the limited availability of NPS needs documentation, EPA developed and applied national models to estimate NPS needs. In the CWNS 1996, EPA reported modeled needs for cropland agriculture, animal agriculture and silviculture. These models relied on data from the National Resources Inventory, the Census of Agriculture and other data sources for estimating the level of needs.

For the CWNS 2000, EPA and the States made a concerted effort to report documented NPS pollution control needs. This effort included identifying six new NPS pollution control needs categories: marinas, resource extraction, brownfields, storage tanks, sanitary landfills and hydromodification. EPA reported only documented NPS needs. However, EPA included in appendices supplementary modeled estimates of NPS needs for urban, marinas, resource extraction and hydromodification in addition to the categories modeled in 1996.

Table E-1. NPS Pollution Control Needs Documented for CWNS 2004 (January 2004 Dollars in Billions)

NPS Pollution Control Need Category	Total Needs ($ B)	Percentage of Total
Agriculture (cropland) (VII-A)	1.7	4.4%
Agriculture (animals) (VII-B)	1.5	3.9%
Silviculture (VII-C)	0.2	0.5%
Urban (VII-D)	12.4	32.3%
Ground water protection: unknown source (VII-E)	4.8	12.5%
Marinas (VII-F)	0.01	< 0.1%
Resource extraction (VII-G)	0.2	0.5%
Brownfields (VII-H)	1.7	4.4%
Storage tanks (VII-I)	1.5	3.9%
Sanitary landfills (VII-J)	2.1	5.5%
Hydromodification (VII-K)	9.3	24.2%
Individual/decentralized sewage treatment (VII-L)	3.0	7.8%
Total NPS needs	**38.3**	

For CWNS 2004, States used a variety of document types to identify needs and costs for NPS projects. The most common document types were Capital Improvement Plans, Intended Use Plans, Final

Engineering Estimates, and Approved State 319 Project Workplans or Implementation Plans. A few States were able to identify needs and costs based on Total Maximum Daily Load (TMDL) Reports and TMDL Implementation Plans. Needs for Category VII-L NPS individual/decentralized sewage treatment were documented through facility plans and engineering reports. States also used community surveys that identified the number of failing septic systems and the average repair and replacement costs. Several States used existing State databases of specific NPS problems (such as miles of streams affected by acid mine drainage, number of leaking storage tanks, or the State 303(d) list) to identify needs. Costs were determined from unit costs developed by State engineers or from State standardized BMP costs.

For this Report, with the exception of agriculture (cropland and animals) and resource extraction, the documented needs now exceed previously modeled estimates from the CWNS 2000. Table E-2 shows a comparison of CWNS 1996 and CWNS 2000 NPS needs with CWNS 2004 documented needs.

Table E-2. Comparison of Total Other Needs for the 1996–2004 CWNS (January 2004 Dollars in Billions)

					'00–'04 change	
Needs Category		**1996[a]**	**2000[a]**	**2004**	**$B**	**%**
VII-A	NPS - Agriculture (cropland)[b]	4.7	0.5	1.7	1.2	240%
VII-B	NPS - Agriculture (animals)[b]	2.6	0.7	1.5	0.8	114%
VII-C	NPS - Silviculture[b]	4.3	0.05	0.2	0.15	300%
VII-D	NPS - Urban	1.2	4.9	12.4	7.5	153%
VII-E	NPS - Ground water protection: unknown source	1.3	1	4.8	3.8	380%
	Estuaries[c]	0.04	--	--	--	NA
	Wetlands[c]	0.01	--	--	--	NA
VII-F	NPS - Marinas	--	0.002	0.01	0.008	400%
VII-G	NPS - Resource extraction	--	0.04	0.2	0.16	400%
VII-H	NPS - Brownfields	--	0.4	1.7	1.3	325%
VII-I	NPS - Storage tanks	--	1.1	1.5	0.4	36.40%
VII-J	NPS - Sanitary landfills	--	2	2.1	0.1	5.00%
VII-K	NPS - Hydromodification	--	4.5	9.3	4.8	107%
VII-L	NPS - Individual/decentralized sewage treatment	--	--	3	3	NA
VIII	Confined animal–point source[d]	--	0	0	0	0%
IX	Mining–point source[d]	--	0	0	0	0%
XI	Estuary management	--	--	0.1	0.1	NA
	Total Needs for Other Categories	14.2	15.2	38.5	23.3	153.5%
	Category VII only	14.2	15.2	38.3	23.2	152.6%

[a] The needs from 1996 and 2000 were inflated to January 2004 dollars for comparison with CWNS 2004 data.
[b] Modeled needs in 1996.
[c] Documented needs for estuaries and wetlands were provided by States during the CWNS 1996, but they are no longer reported as individual categories.
[d] Needs in Categories VIII and IX include activities related to implementing CCMPs.

Although good progress has been made in documenting NPS pollution control projects, there is still significant underreporting, illustrated by the following issues related to individual/decentralized sewage treatment needs. Although the current individual septic system population reported in the CWNS has nearly doubled from 7.7 million in 2000 to 15.6 million in 2004, this represents only approximately one-fifth of the current U.S. population being served by onsite systems. In addition to likely underreporting of

septic system needs by local communities, States had difficulty obtaining or using documents that met the CWNS 2004 documentation criteria.

State Modeled Nonpoint Source Pollution Control Estimates

During the CWNS 2004, Iowa, Kansas, Virginia and West Virginia submitted documents supporting the use of various large-scale basin models to justify statewide needs and costs for NPS pollution control and abatement activities. Each State used a unique approach which continues to underscore the significant underreporting of the actual NPS needs in the United States. In addition to these four States, New Jersey used estimated costs for developing and implementing watershed management plans based on available data from completed watershed plans in the State. Each model, while having some interesting technical merit, has aspects such as information that is not site-specific or activities that are not CWSRF eligible, that warrant classifying these approaches as modeled estimates instead of documented needs.

EPA went to great lengths to encourage State CWNS 2004 coordinators to work with their NPS counterparts in the States to document NPS needs. By categorizing these needs as modeled estimates, EPA does not seek to discourage the States from such initiatives and collaboration in identifying NPS needs.

EPA expects that during the preparatory stages for the CWNS 2008, the CWNS National Workgroup will address the issue of States using modeled needs for NPS pollution abatement for future surveys. To that end, strong consideration will be given to improving the methodologies and data sources used in these State efforts to meet CWNS documentation criteria.

The following sections of this appendix present the methodologies that the five States used in estimating their NPS needs. The needs presented here from the five States are reported as Separate State Estimates (SSEs) in Appendix A, Tables A-11 and A-12.

Iowa's Nonpoint Source Needs

Introduction

Iowa is an agriculturally rich State. Over 60 percent of its land is in intensive row crop production, and over 90 percent is in some type of agricultural production, including forage and pastureland. Iowa also leads the Nation in the production of hogs and ranks as one the top 10 States for cattle and poultry production (USDA 2004).

Because of Iowa's naturally rich soils and intensive agricultural production, its streams, rivers and lakes have high levels of nutrients and sediment. Monitoring conducted over the past 5 years showed that 132 of Iowa's larger, publicly owned lakes had median summer total nitrogen (TN), total phosphorus (TP) and chlorophyll *a* levels of 1,550, 89 and 21 parts per billion (ppb), respectively. As a basis of comparison, the EPA Region 7 Regional Technical Advisory Group recommended values of 700, 35 and 8 ppb for TN, TP and chlorophyll *a*, respectively, for lake water quality standards. Monitoring for streams and rivers showed similar results: median all-season values for TN, TP and chlorophyll *a* were nearly three times the criteria recommendations in EPA's ecoregion-based criteria guidance documents.

Iowa's nutrient budget, conducted as part of a multiyear nutrient management strategy, showed that over 90 percent of the nitrogen and over 80 percent of the phosphorus carried by Iowa's streams and rivers come from nonpoint sources, with agriculture being the major nonpoint source. Iowa has also been identified as a major contributor to the Mississippi River nitrogen loads, believed to be a factor in the size of the Gulf of Mexico's hypoxic zone. Sediment also poses a significant water quality problem. The median total suspended solids concentration for 80 monitoring sites on Iowa's streams and rivers is nearly 30 parts per million. Sediment has consistently been identified as a major pollutant for lakes, as well as streams and rivers, and soil erosion from crop fields is closely linked to phosphorus transport to waterbodies.

Full implementation of agricultural BMPs across the State to reduce nitrogen, phosphorus and sediment loading is key to improving Iowa's water quality. This has been recognized for many decades. However, the questions of what BMPs are needed to actually improve water quality statewide and what resources are needed to implement these practices have not been answered with any accuracy.

Methodology

The Iowa Department of Natural Resources (DNR) contracted with Iowa State University's Center for Agriculture and Rural Development (CARD) to assess the level of resources needed to fully implement a suite of common agricultural BMPs across the State and estimate the water quality benefits of the practices. In concept, this approach is similar to the CWA's technology-based approach used for point sources in that the BMPs selected for evaluation were those considered practicable and economically achievable.

CARD combined economic models and data on land use and conservation practices with the Soil and Water Assessment Tool (SWAT), a watershed-based water quality model, to provide estimates of the resources needed and the nutrient and sediment reduction benefits of the BMPs. The BMPs included land set-aside, terraces, no-till and conservation till, contour farming, grassed waterways and nutrient management. Criteria for implementing the BMPs on the land based on practical, realistic expectations of what is achievable were developed. For instance, it was determined that land set-aside would be used to *retire* cropland in riparian corridors and highly erodible areas but that the total set-aside acres would not exceed 10 percent of the total cropland acres because this was thought to be a threshold of public acceptance and economic achievability. All cropland with slopes exceeding 2 percent that were not retired were then placed in conservation tillage (over 30 percent residue) or no till (over 60 percent residue).

The water quality benefits of the BMPs placed on the landscape were estimated using SWAT. Reductions of between 6 to 20 percent for nitrogen, 28 to 59 percent for phosphorus and 6 to 65 percent for sediment from existing baseline conditions were targeted for the 13 watersheds in Iowa. Costs for the various practices were obtained from a variety of sources, such as the Natural Resources Conservation Service's (NRCS) Environmental Quality Incentives Program contracts and NRCS construction contracts. Three types of costs were included in the economic model: (1) incentive costs, which are payments to producers, normally limited to 1 to 3 years, to encourage them to adopt certain practices, especially if the practices involve some perceived economic risk; (2) actual construction costs of the various *hard* practices, such as terraces and waterways; and (3) land set-aside costs for the producer to take land out of row crop production and place it in perennial grasses or other non-crop uses.

An implementation period of 10 years was chosen as a realistic goal to achieve full implementation of the identified set of BMPs. The annualized program costs were then converted to a net present value using an 8 percent discount rate (Table E-3).

Table E-3. Modeled Nonpoint Source Needs Identified for Iowa (January 2004 Dollars)

Facility Name[a]	Total NPS Needs ($K)	VII-A ($K)
98 facilities in 13 large watersheds throughout Iowa	11,145,050	11,145,050

[a] Because needs presented in the CWNS 2004 Database are identical for all 98 facilities, it is not possible to aggregate the dollar amount in a reasonable manner at the 8- or 6-digit HUC level.

Kansas' Nonpoint Source Needs

Introduction

Kansas has a land area of 81,407 square miles and is drained by 12 major river basins. Land use in the State is primarily agricultural, with 64,414 farmsteads throughout the State. Approximately 47,227,944 acres of land is in farms, and the average farm size is 733 acres. Unfortunately, geolocational and NPS needs data are not available for most of the farmsteads in Kansas. However, some needs survey information was compiled on a countywide basis. Subsequently, the Kansas Department of Health and Environment (KDHE), Bureau of Water, Watershed Management Section, used existing data to complete needs surveys for each of the 105 counties in Kansas. Statewide totals were also estimated. The following is a summary of inventory categories, associated data sources and assumptions used to complete this survey.

Methodology

Acres of Crop, Pasture and Range Land Needing Treatment. Approximately 58 percent of the total land acres in Kansas are used for row crop agriculture. Row crop agriculture contributes a significant amount of silt, pesticides and nutrients into the State's surface waterbodies. In 1997 the NRCS updated the National Resources Inventory (NRI), which quantifies the number of acres of cropland. Agricultural experts in Kansas determined the percentage of land reported in the NRI needing treatment for a given county. The Kansas State Conservation Commission (SCC) administers a portion of the State Water Plan Fund for cost sharing on certain conservation practices. As part of the cost-share program, the SCC tracks land treatment costs by county. Land *treatments* may include conservation measures such as terraces, grass waterways, and buffer strips. According to the SCC, the average cost to treat an acre of land is approximately $125.

The NRI also quantifies the number of acres of pasture and rangeland. Agricultural experts in Kansas determined the percentage of pasture and rangeland reported in the NRI needing treatment. Many BMPs and water quality protection measures can help improve the quality of runoff from rangeland and pasture land. According to the SCC, the most common treatment for rangeland and pastureland is the creation of alternative water supplies. The SCC estimates that the average cost to provide alternative water supplies in Kansas is approximately $25 per acre.

Livestock Facilities Requiring Treatment. The Watershed Management Section focused on quantifying the nonpoint source abatement needs for cow/calf, beef cow and milk cow (dairy) operations. The nonpoint source abatement needs for these types of facilities are extremely diverse. Some small livestock facilities might need only a grass filter strip or alternative water supply, whereas other facilities might require a total waste containment system (lagoon) or change in management practices. There is no accurate statewide inventory of nonpoint source abatement needs for livestock facilities. The NRI, however, does include a county-specific inventory of cow/calf, beef cow and milk cow farms. To conservatively account for livestock facilities in this needs inventory, it was assumed that each livestock facility in a given county required at least one water quality protection measure, structure, or BMP to abate nonpoint source pollution. According to the SCC, $12,000 is the average cost to treat large livestock facilities. It is assumed that large livestock facilities will require a structural waste containment system or a lagoon. Often small livestock facilities can be treated by changing management practices, adding buffer strips, or both. The average cost to treat small livestock facilities can vary dramatically. Nemaha County has estimated that small livestock facilities could be treated at an average cost of $3,000. To account for all livestock facilities (regardless of size) that need treatment, the Nonpoint Source Section decided to average SCC's treatment costs, which is $7,500.

Failing Septic Systems. To complete this needs inventory, the following protocol was developed for estimating the number of failing septic systems in a given county. U.S. Census data were reviewed to determine the rural population in a given county. The U.S. Census data also indicated that there are approximately three persons per rural household. By dividing the rural population by three, the number of rural households was estimated for a given county. It was assumed that most of rural households use septic systems. On the basis of Local Environmental Protection (LEP) program data, it was also assumed that there is a statewide average septic system failure rate of 40 percent. The total number of septic systems (equal to the number of rural households) was then multiplied by 0.40 to determine the number of failing septic systems in a given county. According to the KDHE's LEP program, the statewide average cost to upgrade or replace a failing septic system is approximately $4,500 per household.

Hydromodification (Stream Miles Needing Treatment). Hundreds of miles of Kansas stream and river corridors are in a degraded condition. Many factors can degrade the condition of a stream corridor, including lack of riparian vegetation, development and increased runoff within the watershed, and farming up to the edge of the stream. For this needs inventory, the Nonpoint Source Section assumed that approximately one-eighth of the State's stream miles are degraded and in need of treatment. *Treatment* for degraded streams may include stream bank stabilization structures and riparian enhancement and restoration. GIS data were used to calculate the total number of perennial stream miles in a given county, and then that number was divided by 8 to determine the number of stream miles needing treatment. Both the SCC and KDHE's Watershed Management Section have programs that focus on riparian restoration and protection. On the basis of past project experience, the SCC estimates that stream banks can be stabilized at an estimated average cost of $15 per linear foot. Thus, it would cost approximately $79,200 to treat one mile of stream.

Table E-4 presents the nonpoint source needs identified for the different CWNS 2004 cost categories for Kansas.

Table E-4. Modeled Nonpoint Source Needs Identified for Kansas (January 2004 Dollars)

Watershed	VII-A ($K)	VII-B ($K)	VII-K ($K)	VII-L ($K)
Missouri-Nishnabotna	36,827	24,633	9,132	16,329
Republican	173,753	68,206	37,825	21,633
Smoky Hill	363,558	148,691	79,280	57,700
Kansas River Basin, excluding the Big Blue, Republican and Smoky Hill River Basins	85,624	94,927	38,515	90,540
Big Blue River Basin	32,966	27,778	12,924	21,429
Osage River Basin	57,406	66,995	20,852	36,509
Middle Arkansas	663,919	148,342	70,429	129,747
Upper Cimarron	203,891	30,699	10,079	14,335
Arkansas-Keystone	120,931	64,109	28,436	30,239
Verdigris River Basin	35,443	53,452	23,525	21,773
Neosho River Basin	136,744	103,197	41,620	58,058
Total	**1,911,062**	**831,029**	**372,617**	**498,292**

New Jersey's Nonpoint Source Needs

Introduction

Over the past several years, EPA has issued guidance on the development of complete watershed-based plans throughout the Nation. For a watershed-based plan to be considered complete, it must contain at least nine predefined components. Those components are the foundation on which NPS pollution control needs can be determined and implemented for the given watershed.

The specific needs for implementing watershed-based plans in New Jersey were taken from the *Strategic Water Quality Improvement Plan for Surface Water Quality Impairments of the Long Swamp Creek Watershed*, prepared in April 2003. This approved plan for the Long Swamp Creek watershed (LSCW) is the most thorough approved plan that New Jersey has available at this time. Many other plans were carefully perused and considered. However, no other plans provided sufficient detail on projects that need to be implemented (type and number) to enable making the necessary determinations on a statewide level.

Methodology

New Jersey estimated the costs to develop watershed-based plans on the basis previously funded watershed-based planning efforts, such as Regional Stormwater Management Plan grants funded under the SFY 2004 section 319(h) pass-through grant program and proposals for watershed-based plans received for the SFY 2005 319(h) pass-through grant program. These plans included the nine minimum components specified in EPA's *Supplemental Guidelines for the Award of Section 319 Nonpoint Source Grants to States and Territories in FY 2000.* The total project cost, including in-kind match, was divided by the number of square miles covered by the project to obtain the cost per square mile. The costs per square mile for all the projects were then averaged to obtain the cost per square mile to develop a watershed-based plan. Once the average cost per square mile was determined, the cost was applied to the square mileage of each Watershed Management Area (WMA) in the State.

New Jersey estimated the costs to implement previously approved watershed-based plans that do not meet all of EPA's watershed-based planning requirements but are robust enough for determining NPS pollution control needs. The most thorough approved plan was used as the basis for the specific needs for implementation of watershed-based plans. The watersheds in New Jersey differ in NPS needs and the methods used to address the needs. Consequently, some needs shown in the selected plan do not exist in all watersheds throughout the State. However, those watersheds have needs specific to them that are not reflected in the selected plan. Therefore, the unique needs for the selected plan can be taken into consideration and costs applied across the State without compromising the accuracy of the cost estimates.

Nine categories of projects identified from the selected plan address NPS pollution control. They are Inlet Filters, Riparian Buffer Development, Education & Outreach Activities, Open Space and Riparian Corridor Preservation, Stormwater BMPs, Oil Skimmers, Sampling/monitoring, Goose Management, and Stream bank Stabilization. To determine the cost to implement a previously approved watershed-based plan, the costs for each project category were added. The result was a cost of $5,996,534. The selected plan addresses an area of 6.3 square miles. Therefore, the cost per square mile, rounded to the nearest hundred, is $951,800.

Because watershed-based plans do not precisely fit into any one NPS category used for the CWNS 2004, the best categories in which to place these needs are VII-A NPS agriculture (cropland), VII-D NPS urban, and VII-E NPS ground water, depending on the land use types present. The most recently available New Jersey Department of Environmental Protection (NJDEP) GIS land use coverages for each WMA were used to separate land uses into urban, agricultural, and ground water categories. Any non-agricultural land uses were combined into the urban category. All land uses in the Pinelands area were placed in the ground

water category, but no land uses outside the Pinelands were included in this category. The WMAs with significant sections in the Pinelands are WMAs 13, 14, 15, 16, 17, 19 and 20. An assumption was made that an equal amount of agricultural and urban land uses in each WMA are within the Pinelands. For example, if half of the WMA is in the Pinelands, it is assumed that half of the agriculture land use in that WMA is in the Pinelands and half of the urban land use in the WMA is in the Pinelands.

To extrapolate the plan implementation costs to the State level, GIS coverages were used to determine the square miles in each WMA. Thus, the cost for plan implementation in the entire WMA could be determined. Table E-5 provides the costs to implement a watershed-based plan in each WMA and breaks the costs down into the CWNS 2004 categories of VII-A NPS agriculture (cropland), VII-D NPS urban, and VII-E NPS ground water.

Table E-5. Estimated Nonpoint Source Needs Identified for New Jersey (January 2004 Dollars)

Name of Watershed Management Area (WMA)	VII-A ($K)	VII-D ($K)	VII-E ($K)
WMA 1 - Upper Delaware	159,780	567,142	
WMA 2 - Wallkill	42,277	160,876	
WMA 3 - Pompton, Pequannock, Wanaque, Ramapo	1,485	230,386	
WMA 4 - Lower Passaic, Saddle	369	183,387	
WMA 5 - Hackensack, Hudson, Pascack	481	160,405	
WMA 6 - Upper & Mid Passaic, Whippany, Rockaway	10,109	342,266	
WMA 7 - Arthur Kill	154	174,866	
WMA 8 - North & South Branch Raritan	136,675	319,826	
WMA 9 - Lower Raritan, South River, Lawrence	36,604	306,164	
WMA 10 - Millstone	95,770	181,656	
WMA 11 - Central Delaware	98,525	166,539	
WMA 12 - Monmouth	56,165	397,130	
WMA 13 - Barnegat Bay	9,443	425,197	333,499
WMA 14 - Mullica	7,108	185,042	553,694
WMA 15 - Great Egg Harbor	10,088	114,143	487,123
WMA 16 - Cape May	16,008	235,538	74,549
WMA 17 - Maurice, Salem, Cohansey	289,603	779,369	133,203
WMA 18 - Lower Delaware	138,825	242,666	
WMA 19 - Rancocas	6,698	58,510	276,770
WMA 20 - Assiscunk, Crosswicks, Doctors	81,329	103,901	61,378
Total	**1,197,496**	**5,335,009**	**1,920,216**

Virginia's Nonpoint Source Needs

Introduction

Approximately 52 percent of the Commonwealth of Virginia's land mass lies within the Chesapeake Bay basin, representing 34 percent of the entire basin. Four major river basins—the Shenandoah–Potomac, Rappahannock, York, and James—as well as the bayside rivers and creeks of the Eastern Shore (the Delmarva Peninsula) make up the bay's drainage area within Virginia. Consistent with the objective of reducing nutrients and sediments in the five tributary basins of the Chesapeake Bay watershed in Virginia, the EPA's Chesapeake Bay Program and the Commonwealth of Virginia developed a model to estimate the cost for implementing nonpoint source controls. It is anticipated that a successful nutrient and sediment reduction strategy will have significant beneficial effects on water quality in the creeks, streams, rivers and coastal embayments that feed the lower Chesapeake Bay and result in healthy and abundant populations of fish, shellfish, aquatic plants and other organisms. A total of $6.5 billion in capital costs were estimated using the modeling approach among the following NPS cost categories: agriculture (cropland) (VII-A), agriculture (animals) (VII-B), silviculture (VII-C), urban (VII-D), hydromodification (VII-K) and individual/decentralized sewage treatment (VII-L).

Methodology

Using the Chesapeake Bay Watershed and Water Quality Models, nutrient and sediment load reduction goals were determined for the Bay to meet new water quality criteria. Virginia's new allocations for nitrogen and phosphorus are 51.4 million and 6 million pounds per year, respectively. These allocations compare with the estimated nitrogen and phosphorus loadings in 2002 of 77.8 and 9.84 million pounds per year. Sediment loadings were set to 1.94 million tons per year, in comparison to the 2.38 million tons estimated in 2002. To meet these allocations, several pollution control management actions that integrated point and NPS controls were analyzed with the models. Separate guidelines were developed to achieve the reductions in nutrient and sediment originating from point and NPSs. This analysis included an assessment of BMP implementation through 2002 (i.e., cropland acreage with nutrient management plans) and the 2010 BMP implementation goal to achieve the reduction goals. The difference between the 2010 BMP goal and the 2002 progress is the basis for estimating costs. The NPS control strategy calls for installing and maintaining BMPs on 92 percent of all available agricultural lands, 85 percent of all mixed open lands, 74 percent of all urban lands and 60 percent of all septic systems within the Virginia portion of the Chesapeake Bay watershed. For example, on the 2.87 million acres of treatable agricultural acres (hay, pasture and cropland), the plan calls for an additional 0.4 million acres of tree planting or implementation of forested buffers along streams. Multiplying this acreage by the unit cost information yielded $0.37 billion in capital costs. Similarly, 1.70 million acres of urban land and 1.55 million acres of mixed open acres were identified within the Bay area for the installation of selected BMPs.

Table E-6 presents the NPS needs identified for the four major river basins and bayside rivers and creeks of the Eastern Shore. Note that a portion of the modeled cost estimates for urban runoff also includes costs associated with municipalities covered by EPA's MS4 program and would not be tracked as an NPS need.

Table E-6. Modeled NPS Needs Identified for the Chesapeake Bay Watershed within Virginia (January 2004 Dollars)

River Basin Name	Total NPS Needs ($K)	VII-A ($K)	VII-B ($K)	VII-C ($K)	VII-D[a] ($K)	VII-K ($K)	VII-L ($K)
Shenandoah/Potomac Basin	2,494,886	157,039	75,731	187	2,197,992	28,395	35,542
Rappahannock Basin	487,234	27,824	31,262	187	412,474	8,940	6,547
York Basin	460,860	25,635	10,631	374	412,474	4,263	7,483
James Basin	3,043,008	193,571	69,255	935	2,731,122	28,483	19,642
Eastern Shore Watershed	56,159	5,889	502	37	42,089	6,800	842
Total	**6,542,147**	**409,958**	**187,381**	**1,720**	**5,796,151**	**76,881**	**70,056**

[a] Includes costs associated with municipalities covered by EPA's MS4 program.

West Virginia's Nonpoint Source Needs

Introduction

The Chesapeake Bay drainage area of West Virginia contains the counties of Berkeley, Grant, Hampshire, Hardy, Jefferson, Mineral, Morgan, Pendleton, Preston and Tucker. Berkley, Jefferson and Morgan counties on the eastern side of the State cover a land area of 763 square miles in the fastest growing region in the State. Much of this area is being rapidly transformed into a bedroom community of the Washington-Baltimore Metropolitan region. To the west, the five-county area of Hampshire, Hardy, Grant, Mineral and Pendleton counties, with a land area of 2,722 square miles, is dominated by agriculture. Large-scale poultry production and processing facilities, as well as a robust beef and cattle market, predominate Preston and Tucker counties and contribute less than 0.5 percent of West Virginia's total potential nutrient and sediment load.

The Potomac River forms portions of the Maryland–West Virginia boundary (east-west boundary). The North Branch of the Potomac makes up the western half of the boundary until it combines with the South Branch, which is almost entirely in West Virginia, except for its headwaters. The watershed of the North Branch and the combined Potomac River are split between Maryland and West Virginia. The Chesapeake Bay Program has determined that the Potomac River is one of the many rivers that contribute excess nutrient and sediment loads to the bay. To correct this problem nitrogen, phosphorus and sediment loading allocations for each State were evaluated, negotiated and finally agreed upon by each of the Chesapeake Bay watershed States.

The West Virginia Department of Environmental Protection, in partnership with West Virginia Conservation Agency and West Virginia Department of Agriculture, developed the West Virginia Potomac Tributary Strategy to achieve the desired load reductions in nutrients and sediments. Together with other partner States in the Chesapeake Bay Watershed, West Virginia has targeted load reductions of 33 percent for nitrogen, 35 percent for phosphorus and 6 percent for sediment between 2003 and 2010.

Methodology

A watershed-based model, developed for achieving predetermined load reductions for nitrogen, phosphorus and sediment, together with performance data for BMPs in place in West Virginia, is used to determine the type and number of BMPs necessary to achieve the targeted reductions. To reduce the amount of sediment and nutrient loading from urban and mixed open sources, the West Virginia Potomac Tributary Strategy proposed to implement urban nutrient management for 40 percent of urban and 25 percent of mixed open lands by 2010. Cost estimates were developed for the different CWNS 2004 NPS cost categories.

Table E-7 presents the NPS needs identified for the Potomac Tributary.

Table E-7. Modeled NPS Needs for the Chesapeake Bay Watershed within West Virginia (January 2004 Dollars)

Watershed	VII-A ($K)	VII-B ($K)	VII-D ($K)	VII-K ($K)
Potomac River Tributary	2,780	13,863	96,610	1,701

This page intentionally left blank

Appendix F
CWNS 2004 Needs Categories

This page intentionally left blank

Table F-1. CWNS 2004 Needs Categories

Category	Name	Description
I	Secondary Wastewater Treatment	The minimum level of treatment that must be maintained by all treatment facilities except those facilities granted waivers of secondary treatment for marine discharges under section 301(h) of the Clean Water Act. 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 BOD_5 and total suspended solids, 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 BOD_5 and total suspended solids from the influent wastewater. Needs necessary to achieve a secondary treatment level should be included in this category. Needs to address failing septic and decentralized wastewater treatment systems were reported in Category I in previous surveys.
II	Advanced Wastewater Treatment	A level of treatment that is more stringent than secondary treatment or produces a significant reduction in nonconventional or toxic 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. Advanced treatment may include additional process units to increase the level of treatment to the level of potable, or less than potable but greater than that normally associated with surface discharge needs. For 2004, this category may also include additional process units to increase level of treatment to allow for water reuse.
III-A	Infiltration/Inflow (I/I) Correction	Control of the problem of penetration into a sanitary or combined sewer system of water 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.
III-B	Sewer Replacement/Rehabilitation	Reinforcement or reconstruction of structurally deteriorating sanitary or combined 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.
IV-A	New Collector Sewers and Appurtenances	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.
IV-B	New Interceptor Sewers and Appurtenances	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. Costs for relief sewers should be included in this category.

Table F-1. CWNS 2004 Needs Categories (continued)

Category	Name	Description
V	Combined Sewer Overflow (CSO) Correction	Measures used to achieve water quality objectives by preventing or controlling periodic discharges of a mixture of stormwater and untreated wastewater (CSOs) 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 stormwater in separate storm and drainage systems.
VI	Stormwater Management Program	Stormwater is defined as runoff water resulting from precipitation. This needs category includes activities to plan and implement municipal stormwater management programs pursuant to National Pollutant Discharge Elimination System permits for discharges from municipal separate storm sewer systems. 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 discharged to municipal separate storm sewers. Included is the control of stormwater pollution from diffuse sources that is ultimately discharged via a municipal separate storm sewer.
X	Recycled Water Distribution	This was a new category for the CWNS 2004. It includes costs associated with conveyance of the recycled water (wastewater reused after removal of waste contributed by humans) and any associated rehabilitation/replacement needs. Examples are costs for pipes to convey treated water from the wastewater facility to the property of the drinking water facility (either the drinking water distribution system or the drinking water treatment facility) and the purchase of the equipment for application of the effluent if the land on which it is to be applied is publicly owned. The costs associated with additional process units to increase the level of treatment to the level of potable, or less than potable but greater than that normally associated with surface discharge needs, are reported in Category II.

Table F-2. CWNS 2004 Other Documented Needs Categories

Category	Name	Description
VII-A	NPS Control: Agriculture (Cropland)	All costs that address nonpoint source pollution control needs associated with agricultural activities such as plowing, pesticide spraying, irrigation, fertilizing, planting and harvesting. Some typical best management practices that could be used to address agriculture (cropland) needs are conservation tillage, nutrient management, irrigation water management, and structural best management practices (e.g., terraces, waterways).
VII-B	NPS Control: Agriculture (Animals)	All costs that address NPS pollution control needs associated with agricultural activities related to animal production such as confined animal facilities and grazing. Some typical best management practices that could be used to address agriculture (animal) needs are animal waste storage facilities, animal waste nutrient management, composting facilities and planned grazing. If the facility has a National Pollutant Discharge Elimination System permit, these needs are classified as Category VIII, Confined Animal–Point Source.
VII-C	NPS Control: Silviculture	All costs that address NPS pollution control needs associated with forestry activities, such as removal of streamside vegetation, road construction and use, timber harvesting, and mechanical preparation for the planting of trees. Some typical best management practices that could be used to address silviculture needs are preharvest planning, streamside buffers, road management, revegetation of disturbed areas and structural practices, and equipment (e.g., sediment control structures, timber harvesting equipment).
VII-D	NPS Control: Urban	All costs that address NPS pollution control needs associated with new or existing development in urban or rural settings, such as erosion, sedimentation and discharge of pollutants (e.g., inadequately treated wastewater, oil, grease, road salts and toxic chemicals) into water resources from construction sites, roads, bridges, parking lots and buildings. Some typical best management practices that could be used to address urban needs are wet ponds, construction site erosion and sediment controls, sand filters and detention basin retrofit. Needs related to Federal or State highways generally would be reported under this category because State and Federal highways are State-owned. Needs associated with the portions of a road that go through an MS4 should be reported in Category VI, Stormwater Management Program. Costs associated with managing urban runoff in areas not covered by applicable phase I or II stormwater NPDES permits should be reported in this category.
VII-E	NPS Control: Ground Water Protection (Unknown Source)	All costs that address ground water protection NPS pollution control needs such as wellhead and recharge area protection activities. Any need that can be attributed to a specific cause of ground water pollution, such as leaking storage tanks, soil contamination in a brownfield or leachate from a sanitary landfill, should be reported in that more specific category.

Table F-2. CWNS 2004 Other Documented Needs Categories (continued)

Category	Name	Description
VII-F	NPS Control: Marinas	All costs that address NPS pollution control needs associated with boating and marinas, such as poorly flushed waterways, boat maintenance activities, discharge of sewage from boats, and the physical alteration of shoreline, wetlands and aquatic habitat during the construction and operation of marinas. Some typical best management practices that could be used to address needs at marinas are bulkheading, pumpout systems and oil containment booms.
VII-G	NPS Control: Resource Extraction	All costs that address NPS pollution control needs associated with mining and quarrying activities. Some typical best management practices that could be used to address resource extraction needs are detention berms, adit closures and seeding or revegetation. Any costs associated with facilities or measures that address point source discharges from mining and quarrying activities that have an identified owner should be included in Category IX, Mining–Point Source.
VII-H	NPS Control: Brownfields	All costs that address NPS pollution control needs associated with land that was developed for industrial purposes and then abandoned, which might have residual contamination. All costs for work at brownfields should be included in Category VII-H regardless of the activity. Some typical best management practices that could be used to address needs at brownfields are ground water monitoring wells, in situ treatment of contaminated soils and ground water, and capping to prevent stormwater infiltration.
VII-I	NPS Control: Storage Tanks	All costs that address NPS pollution control needs associated with tanks designed to hold gasoline or other petroleum products or chemicals. The tanks may be located above or below ground level. Some typical best management practices that could be used to address storage tank needs are spill containment systems; in situ treatment of contaminated soils and ground water; and upgrade, rehabilitation or removal of petroleum/chemical storage tanks. If these facilities or measures are part of addressing NPS needs at abandoned, idle and underused industrial sites (brownfields), the costs go in Category VII-H, Brownfields.
VII-J	NPS Control: Sanitary Landfills	All costs that address NPS pollution control needs associated with sanitary landfills. Some typical best management practices that could be used to address needs at landfills are leachate collection, on-site treatment, gas collection and control, capping and closure.

Table F-2. CWNS 2004 Other Documented Needs Categories (continued)

Category	Name	Description
VII-K	NPS Control: Hydromodification	Costs that address NPS pollution control needs associated with best management practices for any alteration of the hydrologic characteristics of coastal and noncoastal waters, which in turn could cause degradation of water resources. Examples of such activities include channelization and channel modification, dams, and stream bank and shoreline erosion. In the case of a stream channel, hydromodification is the process whereby a stream bank is eroded by flowing water, typically resulting in the suspension of sediments in the watercourse. Some typical best management practices that could be used to address hydromodification needs are conservation easements, swales, filter strips, shore erosion control, wetland development or restoration and bank or channel (grade) stabilization. Any work involving wetland or riparian area protection or restoration is included under this category.
VI-L	NPS Control: Individual/Decentralized Sewage Treatment	Costs associated with the rehabilitation or replacement of individual or community sewage disposal systems and the treatment portion of other decentralized sewage disposal technologies. Costs related to the development and implementation of on-site management districts may be included (but not the costs of ongoing operations of such districts). If a publicly owned centralized collection and treatment system is constructed or if sewers are installed to connect the service area to an existing collection system, the costs should be separately reported in Categories I and IV-A, respectively. Public ownership is not required for decentralized systems. Costs could include the limited collection systems associated with the decentralized system. This was a new category for CWNS 2004, costs were previously reported as Categories I, VII-D and VII-E
VIII	Confined Animal–Point Source	Costs that address a combination of unit processes or best management practices designed to address water quality or public health problems caused by point source pollution from animal production activities that are subject to the concentrated animal feeding operations (CAFO) regulations.
IX	Mining–Point Source	Costs that address a combination of unit processes or best management practices designed to address water quality and/or public health problems caused by point source pollution from mining and quarrying activities.
XI	Estuary Management	This was a new category for the CWNS 2004. It includes costs associated with a limited number of estuary management activities that may not be appropriately included in other needs categories. Some typical estuary best management practices are habitat protection for aquatic species, fisheries/oyster bed/shellfish restocking or restoration, fish ladders, rejuvenation of submerged aquatic vegetation, artificial reef establishment, control of invasive introduced vegetative and aquatic species, and water control structures for flow regime and salinity. Most activities included in Comprehensive Conservation and Management Plans prepared for estuaries designated under section 320 would be considered point or nonpoint source technologies and should be included in the appropriate category.

This page intentionally left blank

Appendix G
List of Acceptable Documentation Types

This page intentionally left blank

Table G-1 lists the document types that were acceptable for justifying needs or costs for the CWNS 2004. It also provides the percentage of total needs that were documented with each document type.

Table G-1. CWNS 2004 List of Acceptable Documentation Types

Documentation Type	Allowable for Justification of		Percent of Total Documented Needs in Table A-1
	Need	Cost	
1. Capital Improvement Plan A capital improvement plan is a fiscal planning document used by cities that usually spans 1 to 20 years. It contains project- and cost-specific information and is sometimes referred to as a Master Plan. The capital improvement plan must adequately address why the project is needed and provide costs that are project-specific.	Yes	Yes	43.3
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 in a facility plan, a sewer system evaluation survey or a combined sewer overflow report.	Yes	Yes	< 0.1
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 combined sewer overflow study is placed in this category.	Yes	Yes	0.9
4. Final Engineer's Estimate The final engineer's report is typically submitted as a result of a detailed facility design. It contains a specific description of the project scope and a list of work to be done with detailed itemized costs.	Yes	Yes	5.9
5. Cost of Previous Comparable Construction This estimate of cost must be based on the cost of a recently completed project that is similar in size, scope and location and for which detailed construction cost data are available. This document may be used to justify costs if stringent guidelines are followed and the costs are project-specific.	No	Yes	0.4
6. Facility Plan Excerpts from a facility plan are acceptable forms of documentation to justify a need and to update cost estimates. The facility plan contains project-specific information, and typically several alternatives are presented, including one recommended alternative. Only information covering the recommended alternative may be used to document a need and a cost estimate.	Yes	Yes	17.3
7. Plan of Study This documentation type must be an official project description. Any type of preliminary engineering study done before more detailed planning to assess the scope and feasibility of the project is categorized as a Plan of Study. It may be used only to document the need.	Yes	No[a]	< 0.1

Table G-1. CWNS 2004 List of Acceptable Documentation Types (continued)

Documentation Type	Allowable for Justification of Need	Allowable for Justification of Cost	Percent of Total Documented Needs in Table A-1
8. Intended Use Plan (IUP) The IUP, which is prepared annually, uses State-assigned criteria to rank projects for which Federal funding assistance is being sought during the current Federal fiscal year. The primary purpose of the IUP is to identify proposed annual intended uses of the amounts available to the CWSRF. A section 212 project listed in the IUP must be on the State Priority List to be eligible for CWSRF funding; a section 319 or 320 activity is not required to be on the State Priority List unless the activity is considered to be *nontraditional* NPS pursuant to the Funding Framework; however, such activities must be listed on a State's IUP for funding to occur.	Yes	Yes	4.8
9. State-Approved Area-wide or Regional Basin Plan The Clean Water Act's section 208 and 303 Regional Basin Plans are broad-based water quality management plans written to identify future planning for areas in a State. Only section 208 and 303 documents that contain site-specific information and a description of a need may be accepted as documentation of need. Documentation of cost is assessed case by case depending on the amount of detail reported and the source of the information.	Yes	Yes[b]	1.5
10. Grant Applications and CWSRF Loan Applications Federal or equivalent State grant applications or CWSRF applications may be used to document needs and to update costs for the categories in which the grant or loan money is requested. Applications should contain sufficient clearly written narrative that defines the specific project and the water quality or public health problem. If an equivalent State grant program application is used as documentation, the form must be submitted.	Yes	Yes	2.3
11. State Project Priority List The State Priority List ranks projects by State-assigned criteria for which Federal funding assistance is being sought. States may select projects from the State Priority List for inclusion in the Intended Use Plan (IUP) regardless of the rank of the project on the State Priority List. States are not required to develop a new CWSRF priority list each year; they may develop a single multiyear CWSRF priority list, which could be considered their current list and the list need not be updated annually. Because the *fundable* portion of the State Priority List is usually included in a State's IUP and there is ambiguity in defining the *fundable* and *planning* portion of the State Priority List, as well as the State-to-State variability in the lists, only the State's current State Priority List may be used to justify need (and not cost).	Yes	No	< 0.1
12. Diagnostic Evaluation 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	< 0.1
13. Administration Order/Court Order/Consent Decree These official documents are usually issued as the result of continued violation of a National Pollutant Discharge Elimination System permit or other pollution control requirements. The order or decree must state a need for construction to correct the violation to document the need. Cost curves may be used to calculate associated costs.	Yes	No	< 0.1

Table G-1. CWNS 2004 List of Acceptable Documentation Types (continued)

Documentation Type	Allowable for Justification of: Need	Allowable for Justification of: Cost	Percent of Total Documented Needs in Table A-1
14. Sanitary Survey A Sanitary Survey is a logical, investigative approach to gather information to evaluate the condition of existing onsite 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) to document a need. The documentation must clearly state that onsite failures are contributing to a water pollution or health-related problem. EPA reviews this documentation case by case.	Yes	No	0.1
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[b]	1.3
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 used to determine the level of treatment required by a specific project, which is ultimately translated into an effluent limitation or BMP for the National Pollutant Discharge Elimination System permit. These plans may 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 may be used to document a need and may be used to update costs if the project descriptions identify specific costs.	Yes	Yes[b]	< 0.1
18. Total Maximum Daily Load (TMDL) A TMDL is an estimation of the maximum amount of a pollutant that a waterbody (one listed on a State's 303(d) list) can receive and still meet water quality standards, and it includes an allocation of the allowable pollutant discharge amount to different point and nonpoint sources. Project-specific needs should be identified. If used to justify costs, TMDL Reports or TMDL Implementation Plans containing cost data will be reviewed case by case.	Yes	No[c]	< 0.1
21. National Pollutant Discharge Elimination System (NPDES) or State Permit Requirements (with Schedule) NPDES is a permitting program implemented under authority of the Clean Water Act and designed to control point source discharges of pollution. Facilities not meeting effluent limitations and compliance schedules or facilities *required* to plan because they are at or near plant capacity may submit documentation under documentation type 21.	Yes	No	< 0.1
22. Municipal Stormwater Management Plan A Municipal Stormwater Management Plan is a plan that describes a proposed municipal stormwater management program as part of a municipality's NPDES stormwater 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 is 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, (4) reduce pollutants in construction site runoff that is discharged to municipal separate storm sewers, and (5) enhance municipal maintenance, public education and public involvement.	Yes	No[c]	0.2

Table G-1. CWNS 2004 List of Acceptable Documentation Types (continued)

Documentation Type	Allowable for Justification of: Need	Allowable for Justification of: Cost	Percent of Total Documented Needs in Table A-1
23. Nonpoint Source Management Plan/Assessment Report A Nonpoint Source Management Plan is a 4-year plan developed by a State to address nonpoint source pollution problems. Elements of the plan 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 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 Clean Water Act 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 States' surveys, case by case.	Yes	No[c]	-
24. Nonpoint Source Management Plan/Ground Water Protection Strategy States may use a Comprehensive Ground Water Protection Strategy to document nonpoint source 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 Safe Drinking Water Act 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 for leaking underground storage tanks, goals in the Comprehensive Environmental Response, Compensation, and Liability Act for contaminated ground water sites, and State grant programs in the Clean Water Act for ground water protection activities are covered by this strategy.	Yes	No[c]	-
25. Nonpoint Source Management Plan/Wellhead Protection Program and Plan A Wellhead Protection Plan may be used to document nonpoint source needs if it is part of a Nonpoint Source Management Program. As part of its overall ground water protection strategy, each State must delineate wellhead protection areas for wells or well fields used for public water supply. Contaminant sources within the wellhead 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.	Yes	No[c]	-
26. Nonpoint Source Management Plan/Delegated Underground Injection Control Program Plan A State may document needs to address nonpoint source 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]	-

Table G-1. CWNS 2004 List of Acceptable Documentation Types (continued)

Documentation Type	Allowable for Justification of: Need	Allowable for Justification of: Cost	Percent of Total Documented Needs in Table A-1
27. Estuary Comprehensive Conservation Management Plan (CCMP) A CCMP is a management plan developed for an estuary that has been nominated for the Clean Water Act 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 (*applicable only for communities with populations of fewer than 3,500*) 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 State Revolving Funds are acceptable for need. The application is acceptable for cost if an engineering report is reviewed by qualified State project staff.	Yes	Yes	0.1
29. State Needs Surveys (*applicable only for communities with populations of fewer than 3,500*) All State Needs Surveys are acceptable for documenting *need* 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 Needs Surveys are acceptable for documenting *cost* 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 it 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	0.3
30. Model Survey (*applicable only for communities with populations of fewer than 3,500*) Use of a standard or *model* survey form is acceptable for documenting need (and cost) as long as appropriate signatures are included. If costs are not included, cost curves may be used.	Yes	Yes	0.3
31. Information from an Assistance Provider (*applicable only for communities with populations of fewer than 3,500*) A statement of need from a technical assistance provider (e.g., State training center, health department, circuit rider) along with a soils/geologic report may document need for communities. Local official and provider signatures must be included. Cost curves may be used to document costs.	Yes	No	< 0.1
32. Vulnerability Assessments for Homeland Security Needs This document may be used to assess needs and might have information that can be used to justify costs. Cost justification for Categories I–VII must be project-specific and distributable among categories. The document should be submitted to the contractor to determine whether the costs are eligible.	Yes	No[c]	-

Table G-1. CWNS 2004 List of Acceptable Documentation Types (continued)

Documentation Type	Allowable for Justification of		Percent of Total Documented Needs in Table A-1
	Need	Cost	
35. New State or Federal Regulation This documentation is for new State or Federal regulations, not future or proposed ones. New regulation documentation documents a need but not cost. It is expected that states use cost documentation such as Cost of Previous Comparable Construction or, when appropriate, CWNS 2004 cost curves to develop costs. Note that State-generated general cost factors applied to all affected facilities are not acceptable for documenting costs.	Yes	No	-
36. Combined Sewer Overflow Long-Term Control Plan (LTCP) A plan, comparable to a facility plan, that describes long-term control measures for combined sewer overflows. Quality may vary across States. Documentation must be submitted.	Yes	Yes	3.6
40. Approved State Annual 319 Workplans These are Nonpoint Source Management Program workplans approved for section 319(h) funding.	Yes	No[c]	-
41. Approved State 319 Project Implementation Plans These are Nonpoint Source Management Program project implementation plans approved for section 319(h) funding.	Yes	Yes	-
98. Combined Sewer Overflow Cost Curves Though not actually a document, these cost curves are an approximation of costs to control combined sewer overflows. Because combined sewer overflows are public health threats, the needs to control them are automatically justified.	NA	Yes	14.5
99. EPA-HQ Approved These are documents preapproved by EPA headquarters. Some examples are Nutrient Reduction Technology Cost Estimations for Point Sources in the Chesapeake Bay Watershed, 2001-2003 Community Preservation Plan for the Town of Southampton and Blackstone River Fisheries Restoration Plan	Yes	Yes	2.8

NA = not applicable.

[a] Cost curves or other allowable documents for cost justification may be used to justify costs.

[b] EPA will review documentation to make sure that costs are within acceptance ranges.

[c] Documentation might have information that may be used to justify cost. Cost must be project-specific and distributable among Categories.

Appendix H
Pollutant Loading Changes

This page intentionally left blank

Pollutant Loading Changes

From 1940 to the present day, the combination of advancing wastewater treatment technology, increased public concern, various State wastewater treatment regulations, and, finally, the 1972 CWA secondary treatment mandate resulted in an increased number of POTWs with at least secondary and, in many cases, greater than secondary levels of treatment. The total population in the United States grew rapidly in the latter half of the 20th century, increasing from around 140 million people in 1940 to about 297 million in 2004. This population growth meant POTWs not only had to upgrade their treatment processes to increase pollutant removal efficiency, but they had to accomplish it while dealing with increasing influent wastewater loads. To view the steady increase in population served by centralized collection and treatment, see Figure 3-1. This section examines trends concerning the Nation's expansion and upgrades of POTWs and analyzes how increased use of secondary and greater than secondary treatment after the 1972 CWA affected the rate of effluent BOD loading to the Nation's waterways.

This analysis focuses on $CBOD_5$, the BOD at 5 days that includes only the carbonaceous component of oxygen consumption, as well as BOD_u, the ultimate BOD of the carbonaceous and nitrogenous components of oxygen consumption at completion of both the carbonaceous decomposition and nitrification processes. Including both $CBOD_5$ and BOD_u is important becaue the oxygen consumed in nitrification is about 30 percent of the oxygen consumed in carbonaceous oxidation of pure organic matter (Chapra 1997).

The information sources for this analysis uses municipal wastewater inventories published by the U.S. Public Health Service from 1940 through 1968 (USPHS 1951; NCWQ 1976; USEPA 1974) and USEPA's Clean Watersheds Needs Surveys conducted since 1973. The results presented here are based on the work presented by USEPA (2000) and updated through the data reported in Appendix C of this report.

To compute influent and effluent loadings, numerous assumptions are needed related on influent concentrations, removal efficiencies and conversion factors. Major assumptions are provided in the text box to the right. Designed-based BOD_5 removal efficiencies are minimum requirements typically assigned by NPDES permits according to the treatment process and treatment plant design assumptions (Metcalf and Eddy 1991). Generally, they represent conservative estimates of BOD_5 removal efficiencies. Many modern POTWs report a higher rate of BOD_5 removal than their permitted rate. This study, however, focuses on designed-based BOD_5 removal efficiencies because it is assumed that these conservative rates would provide a more effective and consistent comparison of BOD_5 removal over the entire historical period of record used in the analysis. For more information justifying the assumptions used in these calculations or the detailed calculations themselves, see USEPA 2000.

Municipal Wastewater Inventories

- 1940–1968: U.S. Public Health Service
- 1972–2004: USEPA CWNS

Key Assumptions

- Flow rate: 165 gallons per capita per day (gpcd)
- Influent $CBOD_5$ concentration: 215 mg/L
- Influent TKN concentration: 30.3 mg/L
- Influent NBOD loading: 0.191 lb per capita per day
- $NBOD_u = 4.57$ [TKN]
- $BOD_u = [CBOD_u] + [NBOD_u]$
- $[CBOD_u] / [CBOD_5]$ conversion ratios
  - Raw: 1.2
  - Less than Secondary: 1.6
  - Secondary: 2.84
  - Greater than Secondary: 2.9
- $CBOD_5$ removal efficiency
  - Raw: 0.0%
  - Less than Secondary: 42.5%
  - Secondary: 85.0%
  - Greater than Secondary: 92.5%

Trends in Influent Loading. Figure H-1a is a bar chart that presents a comparison of the total influent $CBOD_5$ and BOD_u loading from 1940 to 2004. Figures H-1b and H-1c display influent $CBOD_5$ and BOD_u loading data, respectively, organized by wastewater treatment type. The key observations from Figure H-1 include the following:

- Influent BOD loading to the Nation's POTWs more than tripled from 1940 to 2004, reflecting population growth, increases in the number of facilities, and expanding service areas.
- Influent $CBOD_5$ loading increased from 9,508 metric tons per day in 1940 to 18,814 metric tons per day in 1968. By 2004, influent $CBOD_5$ loading stood at 29,925 metric tons per day, a 59 percent increase from 1968.
- Influent BOD_u loading increased from 17,532 metric tons per day in 1940 to 34,693 metric tons per day in 1968. By 2004, influent BOD_u loading stood at 55,183 metric tons per day, a 59 percent increase from 1968.
- In 1940 72 percent of influent BOD_u loading nationwide was being treated by facilities with less than secondary treatment (12,555 of 17,532 metric tons per day of BOD_u). By 1968 39 percent of influent BOD_u loading nationwide was being treated by facilities with less than secondary treatment (13,422 of 34,693 metric tons per day of BOD_u). Thirty-two years after the 1972 CWA, only 1.5 percent of influent BOD_u loading was being treated by facilities with less than secondary treatment (819 of 55,183 metric tons per day of BOD_u).

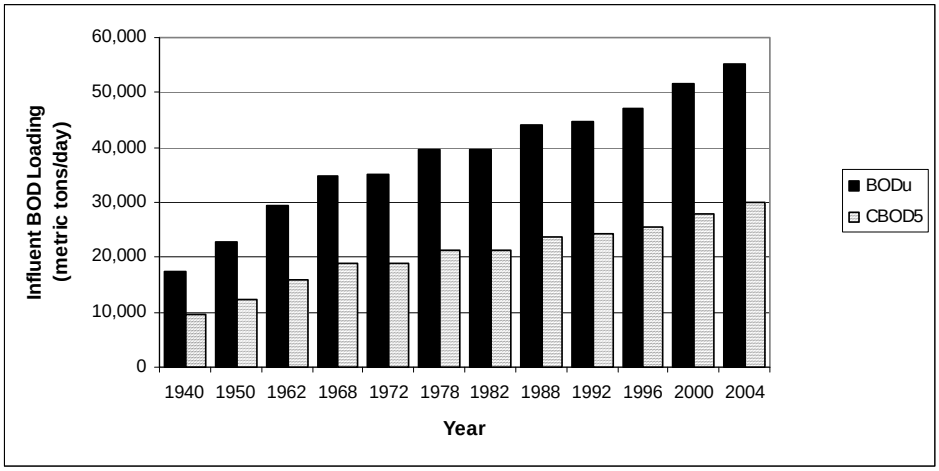

Figure H-1a. Influent loading of total BOD_u and $CBOD_5$ nationwide for select years between 1940 and 2004.

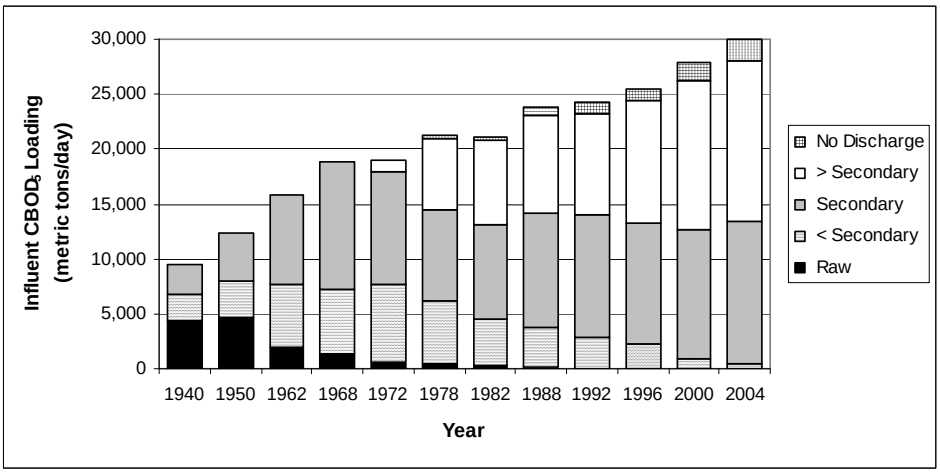

Figure H-1b. Influent loading of $CBOD_5$ to POTWs nationwide for select years between 1940 and 2004 organized by wastewater treatment type.

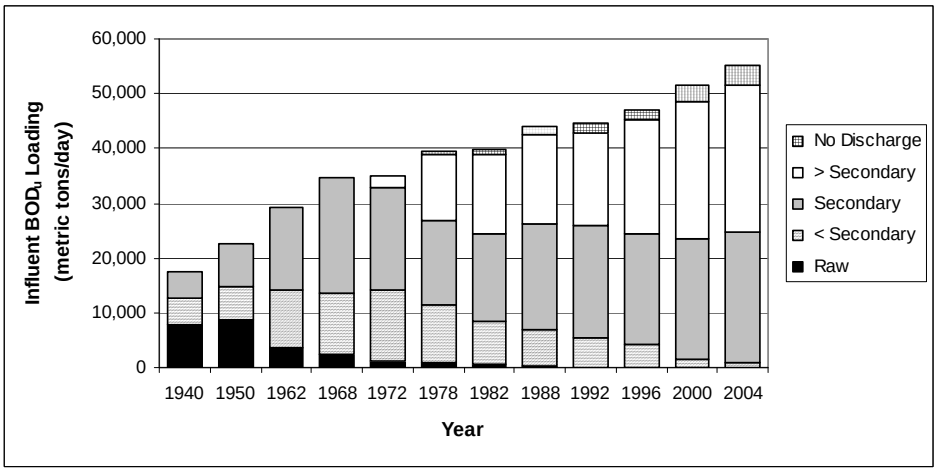

Figure H-1c. Influent loading of BOD_u to POTWs nationwide for select years between 1940 and 2004 organized by wastewater treatment type.

Trends in Effluent Loading. Figure H-2a is a bar chart that presents a comparison of the total effluent $CBOD_5$ and BOD_u loading from 1940 to 2004. Figures H-2b and H-2c display effluent $CBOD_5$ and BOD_u loading data, respectively, organized by wastewater treatment type. The key observations from Figure H-2 include the following:

- Effluent BOD loading from POTWs was significantly reduced between 1968 and 2004. In 1968, 4 years before the 1972 CWA, effluent $CBOD_5$ and BOD_u loadings were 6,932 and 21,281 metric tons per day, respectively. By 2004 $CBOD_5$ and BOD_u loadings were reduced to 3,291 and 16,499 metric tons per day, respectively. This represents a 53 percent decline in $CBOD_5$ and a 22 percent decline in BOD_u between 1968 and 2004. Notably, these declines were achieved even though influent $CBOD_5$ and BOD_u loading to POTWs each increased by 59 percent during the same time period.
- The proportion of effluent $CBOD_5$ loading attributable to raw and less than secondary wastewater treatment was reduced from about 94 percent in 1940 to 8 percent in 2004 (Figure H-2b). The

proportion of effluent BOD_u loading attributable to raw and less than secondary wastewater treatment was reduced from about 84 percent in 1940 to 4 percent in 2004 (Figure H-2(c).

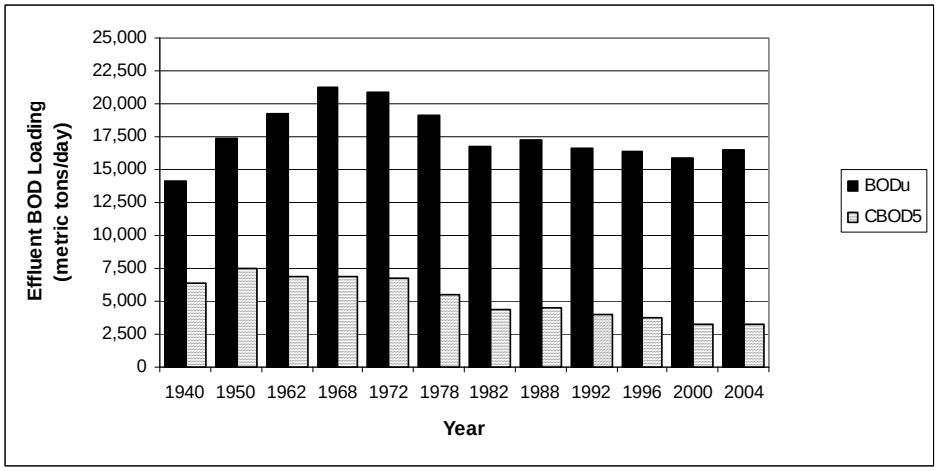

Figure H-2a. Effluent loading of total BOD_u and $CBOD_5$ from POTWs nationwide for select years between 1940 and 2004.

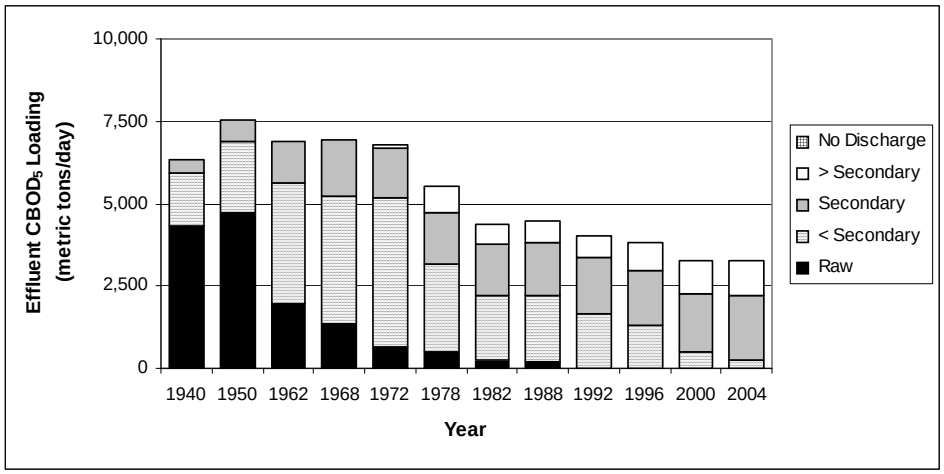

Figure H-2b. Effluent loading of $CBOD_5$ from POTWs nationwide for select years between 1940 and 2004 organized by wastewater treatment type.

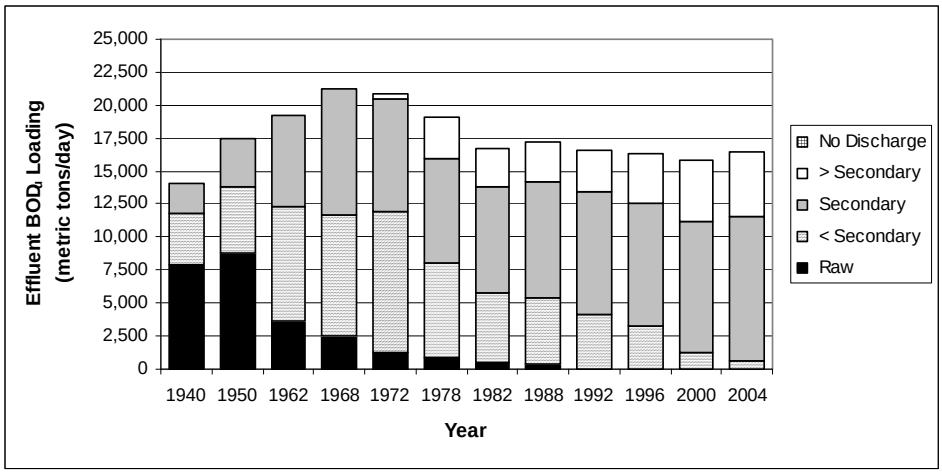

Figure H-2c. Effluent loading BOD_u from POTWs nationwide for select years between 1940 and 2004 organized by wastewater treatment type.

The analysis above indicates that tremendous progress was achieved between 1968 and 2004 in reducing effluent BOD loading from POTWs into the Nation's waterways. Notably, this reduction occurred at the same time the number of people served by POTWs was increasing rapidly. Figures H-3 and H-4 present influent and effluent loadings together with removal efficiencies for $CBOD_5$ and BOD_u, respectively. Key observations from Figures H-3 and H-4 include the following:

- BOD removal efficiency nationwide significantly increased between 1940 and 2004. In 1940 the aggregate national removal efficiency stood at about 33 percent for $CBOD_5$ and 20 percent for BOD_u. By 1968 removal efficiencies had increased to 63 percent for $CBOD_5$ and 39 percent for BOD_u. By 2004 they had further increased to 89 percent for $CBOD_5$ and 70 percent for BOD_u.
- The BOD removal efficiency increased substantially between 1972 and 1978, the 6-year period after the passage of the CWA (from 64 to 74 percent for $CBOD_5$ and from 41 to 52 percent for BOD_u). Between 1978 and 2004 removal efficiency increased an additional 15 percent for $CBOD_5$ and 18 percent for BOD_u. Those larger increases in BOD_u removal efficiency reflect the ever-increasing role of greater than secondary POTWs over this time period.

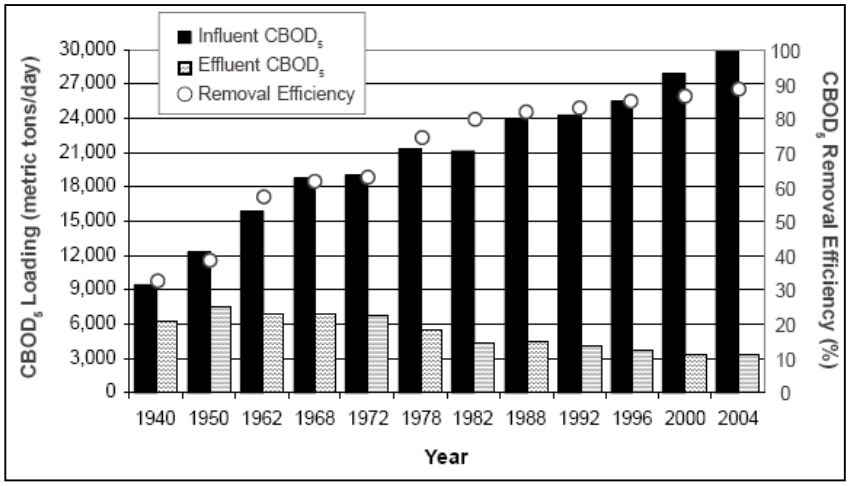

Figure H-3. Total POTW influent and effluent $CBOD_5$ loading and corresponding $CBOD_5$ removal efficiency for select years.

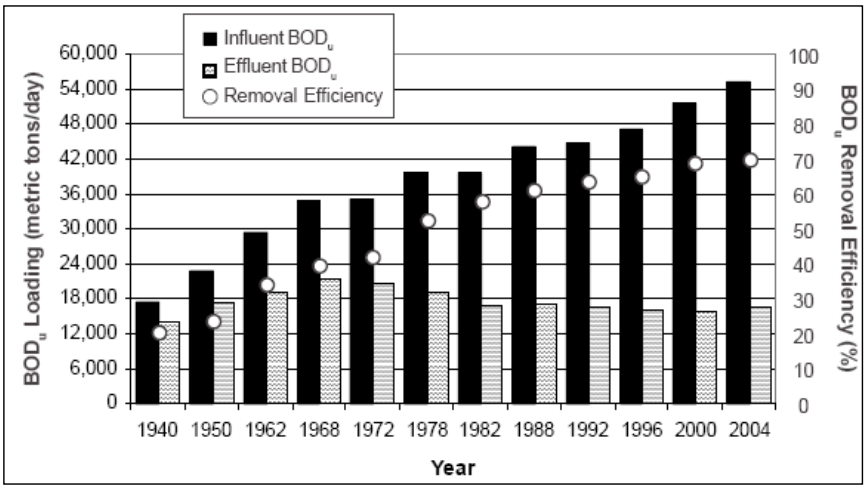

Figure H-4. Total POTW influent and effluent BOD_u loading and corresponding BOD_u removal efficiency for select years between 1940 and 2004.

Future Trends in BOD Effluent Loading. As shown in Chapter 4 (Figure 4-1), the population served by secondary treatment facilities declined sharply between 1968 (85.6 million) and 1978 (56.3 million) and then leveled off at about 82 million in the 1990s. In contrast, the number of people served by greater than secondary treatment surged between 1968 and 1978 (0.3 to 49.1 million) and then increased steadily to about 108.5 million in 2004. Unlike secondary treatment, advanced wastewater treatment enhances biological processes to incorporate nitrification (ammonia removal) and denitrification (nitrate removal), thus reducing the NBOD fraction of effluent BOD_u loading.

The data presented in the previous sections indicate that the increase in BOD removal efficiency between 1940 and 2004 resulted in significant reductions in BOD effluent loading to the Nation's waterways even though the number of people served by POTWs greatly increased. *Given that the population served by POTWs is projected to continue to increase, what might the effluent BOD loadings be in the future?*

Using the population projections provided in Appendix C (Table C-4), projections in influent and effluent BOD loading rates and BOD removal efficiencies for 2004 and corresponding projections can be made. Figure H-5 is a bar chart that extends the influent and effluent BOD_u loading totals and POTW removal efficiencies originally presented in Figure H-4 well into the 21st century by adding columns for the years 2016 and 2025 to the chart. These projections are based on the following assumptions:

- USEPA CWNS 1996 (USEPA 1997) estimates that 275 million people will be served by POTWs in the year 2016. This figure is based on middle-level population projections from the Census Bureau (USBC 1996) and the assumption that 88 percent of the population will be served by POTWs in 2016. Assuming that 88 percent of the population projected for 2025 is also served by POTWs, about 295 million people will be served by POTWs.
- Design-based BOD_u removal efficiency will increase from a nationwide average of 70 percent in 2004 to 71 percent by 2016 on the basis of projections of population served by the different categories of POTWs. This removal efficiency is assumed to remain at that level through 2025.
- Influent wastewater flow will remain a constant 165 gpcd and influent BOD_u concentration will remain a constant 396.5 mg/L for the projection period from 2004 to 2025.

Key observations from Figure H-5 include the following:

- Population growth from 2004 to 2016 will increase influent BOD_u loading nationwide to 68,030 metric tons per day, an increase of 23 percent. By 2025 influent loading will be about 73,179 metric tons per day, a 33 percent increase from 2004.
- Although the BOD_u removal efficiency is projected to increase from 70 to 71 percent by 2016, it is predicted that effluent BOD_u loadings will increase from 16,499 metric tons per day in 2004 to 19,607 metric tons per day in 2016, an increase of 19 percent.
- By 2025 the projected effluent BOD_u loading will be 21,090 metric tons per day, an increase of 28 percent from 2004.
- By 2016 the overall BOD_u removal efficiency of 71 percent and increases in population will result in a 19 percent increase of effluent loads relative to the 2004 loading rate. To maintain an effluent BOD_u loading rate comparable to 1996 conditions through 2016, the national aggregate removal efficiency would have to be increased from 71 to 77 percent. This would be equivalent to shifting the projected population served from secondary to advanced secondary and advanced wastewater treatment facilities.

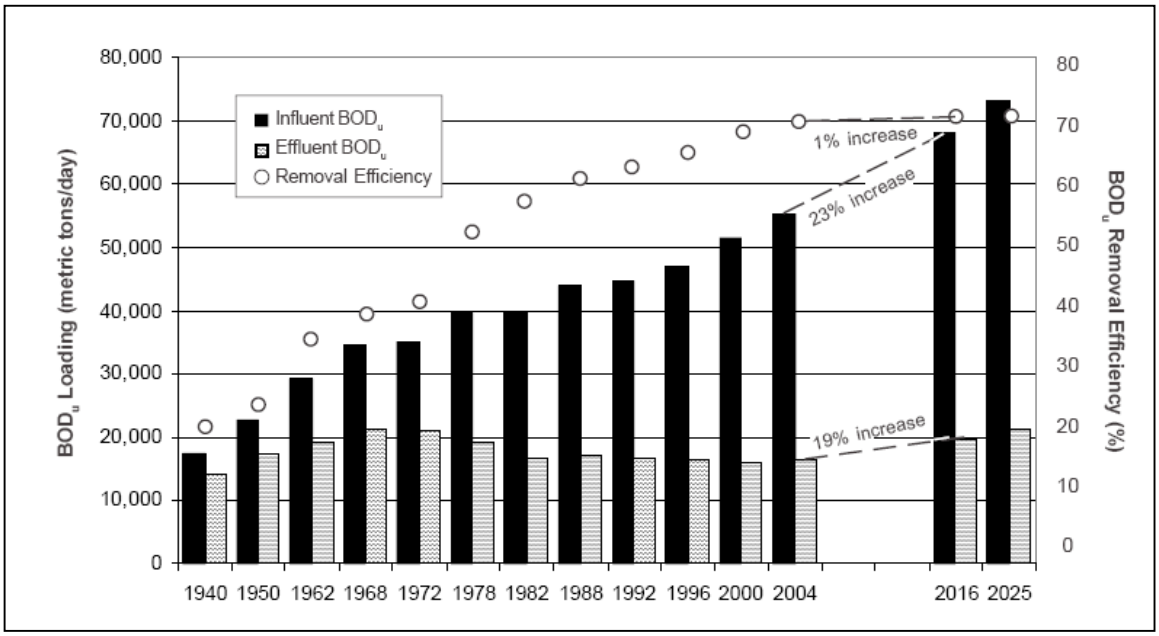

Figure H-5. POTW influent and effluent BOD_u loading and removal efficiency for select years between 1940 and 2000 and projected POTW influent and effluent BOD_u loading and removal efficiency for 2016 and 2025.

References

Chapra, S.C. 1997. *Surface Water Quality Modeling*. McGraw Hill, Inc., New York, NY.

Hughes, J., R. Whisnant, L. Weller, S. Eskaf, M. Richardson, S. Morrissey, and B. Altz-Stamm. 2005. *Drinking Water and Wastewater Infrastructure in Appalachia: An Analysis of Capital Funding and Funding Gaps*. The University of North Carolina Environmental Finance Center, School of Government, Chapel Hill, NC.

Metcalf and Eddy. 1991. *Wastewater engineering: Treatment, Disposal and Reuse*. McGraw-Hill Series in Water Resources and Environmental Engineering, New York, NY.

NCWQ (National Commission on Water Quality). 1976. *Staff Report to the National Commission on Water Quality*. U.S. Government Printing Office, Washington, DC.

USEPA(U.S. Environmental Protection Agency). 1974. *National water quality inventory, 1974*. EPA-440/9-74-001. U.S. Environmental Protection Agency, Office of Water Planning and Standards, Washington, DC.

USEPA (U.S. Environmental Protection Agency). 2000. *Progress in Water Quality: An Evaluation of the National Investment in Municipal Wastewater Treatment*. EPA-832-R-00-008. U.S. Environmental Protection Agency, Office of Water, Washington, DC.

USPHS (U.S. Public Health Service). 1951. *Water pollution in the United States*. A report on the polluted conditions of our waters and what is needed to restore their quality. U.S. Federal Security Agency, Public Health Service, Washington, DC.