FINDINGS

This section of the report presents the results of the effort undertaken in 1999 to estimate the capital investment needs of the nation's approximately 55,000 community water systems and 21,400 not-for-profit noncommunity water systems. Appendix B provides greater detail of the need by State.

Total 20-Year National Need

The Needs Survey found that community water systems and not-for-profit noncommunity water systems need $150.9 billion over the next 20 years to install, upgrade, and replace infrastructure. The survey required that all needs be accompanied by documentation that described the purpose and scope of each project. To be included in the Needs Survey, projects had to meet the eligibility criteria established under the DWSRF program. In general, infrastructure projects were acceptable if they were needed to protect public health or to maintain the transmission and distribution of treated water to homes. Such projects varied greatly in scale, complexity, and cost—from drilling a well to serve a small mobile home court to constructing a high-capacity water treatment plant for a large metropolitan area. The survey excluded projects solely for operation and maintenance, future growth, and fire flow.[1] Projects to rehabilitate or replace deteriorated infrastructure were not considered operation and maintenance and, therefore, were included in the survey.

EPA Region 6

A section of wooden pipe dating from the early 1900s is removed for replacement by iron or PVC pipe. The service life of a water line can range from 10 to 200 years depending on the pipe material, soil type, and climate conditions.

[1] Projects solely for operation and maintenance, dams, reservoirs, future growth, and fire flow are generally ineligible for DWSRF assistance.

The estimate of total national need represents all community water systems and not-for-profit noncommunity water systems in the States, Puerto Rico, the Virgin Islands and the Pacific Island territories, American Indian communities, and Alaska Native Villages.

Exhibit 2 shows the total national need by system size and type, and by current and future need. The nation's 886 largest community water systems (serving more than 50,000 people) account for $61.8 billion, or 41 percent, of the total need. Medium and small community water systems have needs of $43.3 billion and $31.2 billion, respectively. The Virgin Islands and the Pacific Island territories account for $387.5 million of the total community water system need. The survey estimates that not-for-profit non-community water systems have $3.1 billion in needs. Exhibit 3 presents the approximate need by State. American Indian water systems need $1.2 billion in infrastructure improvements, while Alaska Native Villages need $1.1 billion[2] for capital projects. Because public water systems are not expected to have accurate estimates of their capital needs for recently proposed or promulgated regulations, capital costs from appropriate Economic Analysis documents were used to estimate those needs. Proposed or recently promulgated regulations contribute $9.3 billion to the total national need.

Most of the infrastructure needs in the survey represent projects that systems would address as preventive measures to ensure the continued provision of safe drinking water, rather than as corrective actions to address an existing violation of a drinking water standard. Also, it is important to recognize that the majority of the total national need stems from the inherent costs of being a water system—which involves the nearly continual need to install, upgrade, and replace the basic infrastructure that is required to deliver drinking water to consumers.

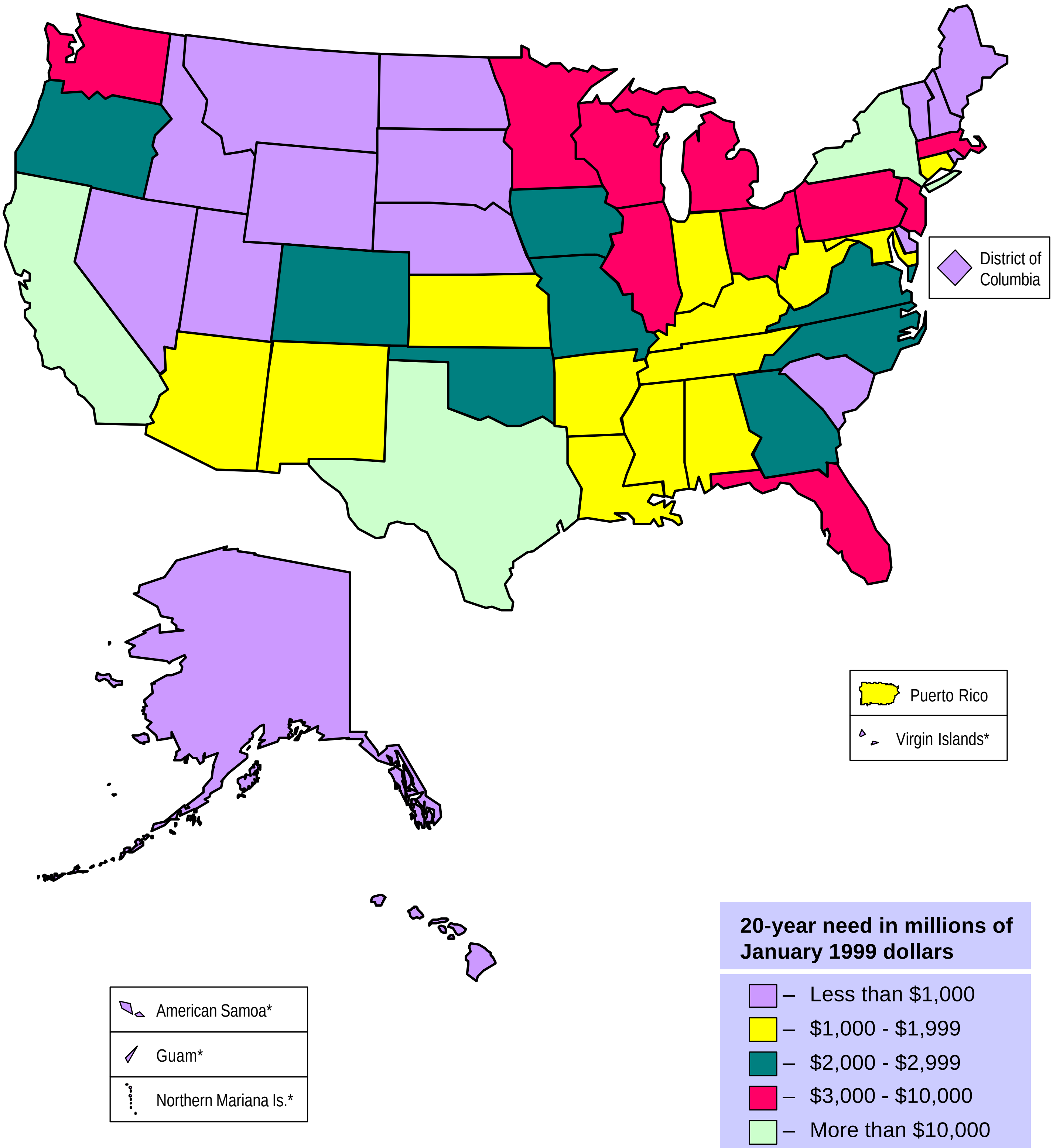
Exhibit 2: Total Need by Current and Future Need (in billions of January 1999 dollars)

System Size and Type	Current Need	Future Need	Total Need
Large Community Water Systems (serving over 50,000 people)	$47.2	$14.6	$61.8
Medium Community Water Systems (serving 3,301 to 50,000 people)	$29.9	$13.4	$43.3
Small Community Water Systems (serving 3,300 and fewer people)	$22.2	$8.9	$31.2
Not-for-Profit Noncommunity Water Systems	$1.1	$2.0	$3.1
American Indian and Alaska Native Village Water Systems	$2.0	$0.2	$2.2
Subtotal National Need	**$102.5**	**$39.1**	**$141.6**
Costs Associated with Proposed or Recently Promulgated Regulations (Taken From EPA Economic Analyses)		$9.3	$9.3
Total National Need	**$102.5**	**$48.4**	**$150.9**

Note: Numbers may not total due to rounding.

[2] These estimates slightly exceed the total $2.2 billion American Indian and Alaska Native Village system need due to rounding.

Exhibit 3: Overview of Need by State†



† Needs for American Indian and Alaska Native Village water systems are not included in this exhibit.
* The need for American Samoa, Guam, the Northern Mariana Islands, and the Virgin Islands is less than $1 billion each.

Exhibit 4: Total Need by Category of Need
(in millions of January 1999 dollars)

System Size and Type	Distribution and Transmission	Treatment	Storage	Source	Other	Total Need
Large Community Water Systems (serving over 50,000 people)	$39,031.1	$13,371.3	$4,575.3	$3,718.6	$1,149.8	**$61,846.1**
Medium Community Water Systems (serving 3,301 to 50,000 people)	$25,526.9	$8,627.6	$6,155.4	$2,519.5	$468.2	**$43,297.7**
Small Community Water Systems (serving 3,300 and fewer people)	$16,980.0	$5,619.9	$5,710.8	$2,617.5	$226.4	**$31,154.7**
Not-for-Profit Noncommunity Water Systems	$387.8	$611.0	$1,477.3	$620.8	$0.7	**$3,097.6**
American Indian and Alaska NativeVillage Water Systems	$1,228.4	$408.1	$447.0	$123.2	$12.4	**$2,219.0**
Subtotal National Need	**$83,154.2**	**$28,637.9**	**$18,365.8**	**$9,599.6**	**$1,857.5**	**$141,615.0**
Costs Associated with Proposed or Recently Promulagted Regulations (Taken From EPA Economic Analyses)		$9,324.3				**$9,324.3**
Total National Need	**$83,154.2**	**$37,962.2**	**$18,365.8**	**$9,599.6**	**$1857.5**	**$150,939.4**

Note: Numbers may not total due to rounding.

Current and Future Needs. Of the total need, $102.5 billion is the current need.

It is important to note that most systems with current needs provide safe drinking water. These systems identified projects that are required as preventive measures to avoid water quality problems. For example, a chlorination unit for deactivating harmful microbial contaminants may function adequately to provide safe drinking water now: although its design life may be exceeded and the system would replace the unit.

That systems require such an enormous investment to meet their current needs reflects the age and deteriorated condition of the nation's infrastructure. Many water systems were constructed 50 to 100 years ago. Operating within resource constraints relative to their needs, some systems have adopted a reactive approach to capital investment that involves replacing or upgrading infrastructure only as it fails. For example, a system may have the funding only to patch a leak in the distribution system, even though its deteriorated condition warrants replacing several miles of pipe to prevent contamination or the disruption of service.

Future needs account for $48.4 billion of the total need. Future needs are projects that water systems would undertake during the 20-year period of the survey to ensure the continued provision of safe drinking water. Future needs address components of a water system that operate adequately now, but will exceed their design-life or performance capabilities within the next 20 years. Examples include a water storage tank that requires rehabilitation and an aging pump that must be replaced because it cannot be rehabilitated.[2]

[2] Capital projects that will be needed for compliance with proposed or recently promulgated SDWA regulations are included in the survey as future needs. The estimated capital cost of each of these regulations is provided in Appendix B.

Total Need by Category

The infrastructure needs of water systems can be grouped into four major categories–source, transmission and distribution, treatment, and storage–each of which fulfills an important function in delivering safe drinking water to the public. Most needs were assigned to one of these categories. An additional "other" category is composed of projects that do not fit into the four categories, such as installing emergency power generators and upgrading facilities to protect against earthquakes and floods. Exhibit 4 shows the total national need by water system size and type and category of need.

Transmission and Distribution. Although the least visible component of a public water system, the buried pipes that comprise a transmission and distribution network generally account for most of a system's capital value. It is not uncommon for even medium-sized systems to have several hundred miles of pipe.

Transmission and distribution projects represent the largest category of need, $83.2 billion over the next 20 years. Of this total, $65.6 billion is needed now. Replacing or refurbishing transmission and distribution mains is critical to providing safe drinking water. Failures in transmission and distribution lines can interrupt the delivery of water. Broken transmission lines can disrupt the treatment process, and deteriorated distribution mains can pose acute health risks from the back-siphonage of contaminated water.

Transmission and distribution projects include replacing aging and deteriorated water mains, refurbishing pipes to remove build-up on pipe walls, looping dead-end mains to improve water quality, and installing pumping stations to maintain adequate pressure. This category also includes projects to address the replacement of appurtenances, such as valves that are essential for controlling flows and isolating problem areas during repairs, and hydrants to flush the distribution system to maintain water quality.

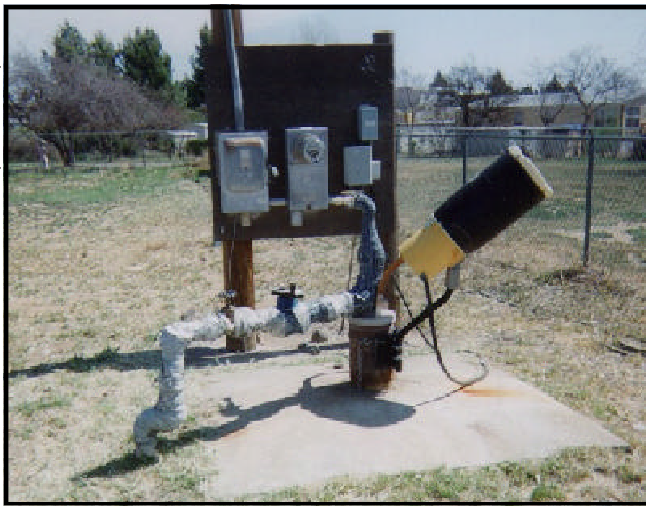
Rehabilitation of Water Mains

Rehabilitating mains has become more common due to technological advancements that provide cost-effective alternatives to unearthing and replacing pipe. For example, the application of a cement lining will prolong the design life of certain types of pipe. Rehabilitation also may involve "pigging" lines to remove internal deposits, known as tubercles, which constrict water flow and impair water quality.

Montauk Services Inc. and U.S. EPA

This pipe shows clear signs of tuberculation, a condition resulting from the accumulation of mineral deposits and debris. Tuberculation can reduce pipe capacity and impair drinking water quality. One method of removing tubercles involves sending a "pig" (insert) through the system to scour the sides of the pipe.

U.S. EPA and Philadelphia Water Department



Water systems differ greatly in size and complexity, from a simple well pump with chlorinator (left) to a large-scale filtration plant.

Many water systems installed new transmission and distribution mains to keep pace with the rapid economic and population growth that followed World War II. The rate at which these pipes deteriorate varies greatly due to soil characteristics, weather conditions, construction methods, and type of pipe. However, it is reasonable to assume that most pipes will require replacement within 50 to 75 years of installation. Consequently, much of the pipe installed in the 1940s may require replacement over the next 20 years. The large need associated with the transmission and distribution category reflects this reality.

Treatment. With $38.0 billion needed over 20 years, treatment is the second largest category of need. Fifty-one percent of this total, $19.4 billion, is a current need. This category includes the installation or rehabilitation of infrastructure to reduce contamination through, for example, filtration, disinfection, corrosion control, and aeration. The majority of the capital costs for proposed and recently promulgated regulations are related to treatment, and thus these costs also are included in this category.

Treatment facilities vary significantly in scale depending on the quality of source water and type of contamination. Treatment systems may consist of a simple chlorinator for disinfection or a complete conventional treatment system with coagulation, flocculation, sedimentation, filtration, disinfection, laboratory facilities, waste handling, and computer automated monitoring and control devices.

Treatment technologies primarily address two general types of contaminants: those with acute health effects and those with chronic health effects.

An acute health effect usually occurs within hours or days after short-term exposure to a contaminant. Acute illnesses are associated mostly with microbial contaminants, although some chemical contaminants, such as copper and nitrate, also can cause acute health effects. Gastrointestinal illness resulting from the ingestion of microbial pathogens is the most common acute health effect.

Chronic health effects develop typically after long-term exposure to low concentrations of chemical contaminants. These effects include cancer and birth defects. The largest need associated with contaminants that pose chronic health effects is treatment for lead. Research has shown that exposure to lead may impair the mental development of children and cause other chronic health effects, such as high blood pressure.

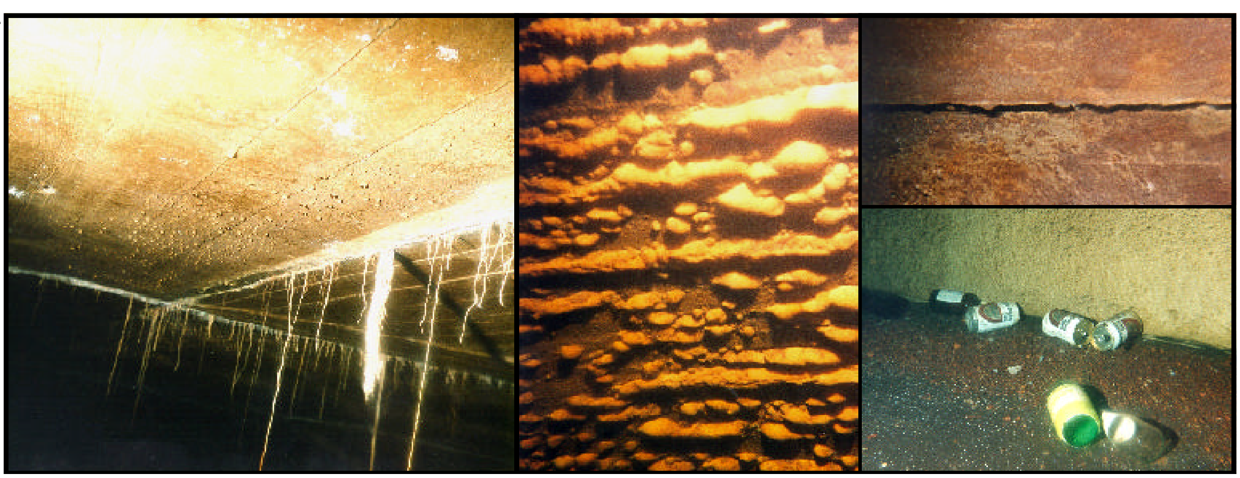
The treatment category also includes projects to remove contaminants that adversely affect the taste, odor, and color of drinking water. Treatment of these “secondary contaminants” usually involves softening the water to reduce manganese and calcium levels or applying chemical sequestrants for iron contamination. Although not a public health concern, the aesthetic problems caused by secondary contaminants may prompt some consumers to seek more palatable, but less safe, sources of water.

Storage. The total 20-year need for storage projects is $18.4 billion, of which $10.2 billion is current need. This category includes projects to construct or rehabilitate finished water storage tanks.

A water system that has sufficient storage can provide an adequate supply of treated water to the public even during periods of peak demand. This enables the system to sustain the minimum pressure required to prevent the intrusion of contaminants into the distribution network. Moreover, many States require that systems have the storage capacity to provide a nearly 2-day supply of water in the event of an emergency, such as a water source being temporarily unusable.

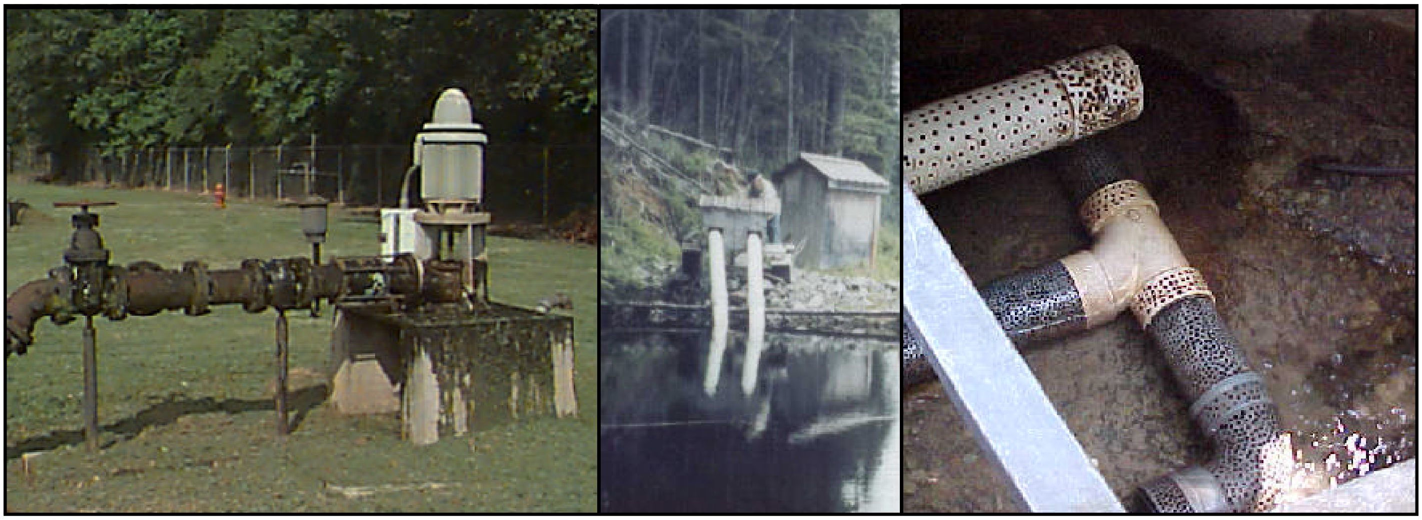
A system’s optimal storage capacity generally depends on the population it serves. For example, a water system operated by a small homeowners association may need a 2,000-gallon hydropneumatic (pressurized) storage tank to provide sufficient water pressure and to prevent the operation of pumping facilities each time a consumer opens a faucet. By contrast, a larger system serving a metropolitan area may need several hundred million gallons of storage to satisfy similar operational requirements.

John Conrady



Storage tanks must be regularly drained, sandblasted, and coated with epoxy paint. Such rehabilitation is necessary to maintain the tanks’ structural integrity and to prevent the intrusion of contaminants. Water systems commonly use underwater divers to inspect the inside of their tanks. These pictures, taken by a diver, show (left) stalactites formed by the leaching of calcium from a tank’s roof, (middle) deep corrosion nearly requiring the tank’s replacement, (upper right) a wide crack causing the loss of 5,000 gallons of water per day, and (lower right) discarded litter.

U.S. EPA and Dan Fraser



Approximately 89 percent of the nation's water systems use ground water as a primary source, although these systems generally serve far fewer people than do surface water systems. Examples of different types of source-related infrastructure include a vertical pump to extract well water (left), an intake structure to pump surface water (middle), and a perforated pipe to collect spring water (right).

Source. The total 20-year need for source water infrastructure is $9.6 billion. Of this total, $5.8 billion is a current need. The source category includes needs for constructing or rehabilitating surface water intake structures, raw water pumping facilities, drilled wells, and spring collectors.

Drinking water is obtained from either ground water or surface water sources. Wells are considered ground water sources, and rivers, lakes, and other open bodies of water are considered surface water sources. Whether drinking water originates from ground or surface water sources, its quality is an important component in protecting public health. A high quality water supply can minimize the possibility of microbial or chemical contamination and may eliminate the need to install expensive treatment facilities. Many source water needs relate to constructing new surface water intake structures or drilling new well fields to obtain improved raw water quality.

A water source also should provide enough water under all operating conditions to enable the water system to maintain minimum pressures. Low water pressure may result in the intrusion of contaminants into the distribution system through back-siphonage. The survey includes projects to expand the capacity of intake structures and wells to address supply deficiencies.

Other Needs. Needs not included in the previous categories are labeled "other" needs. These needs account for $1.9 billion of the total 20-year need. Examples of "other" projects include laboratory equipment to test water for chemical and microbiological contaminants, emergency power generators to provide continued pumping or treatment during power outages, and upgrades to protect infrastructure against floods or earthquakes.

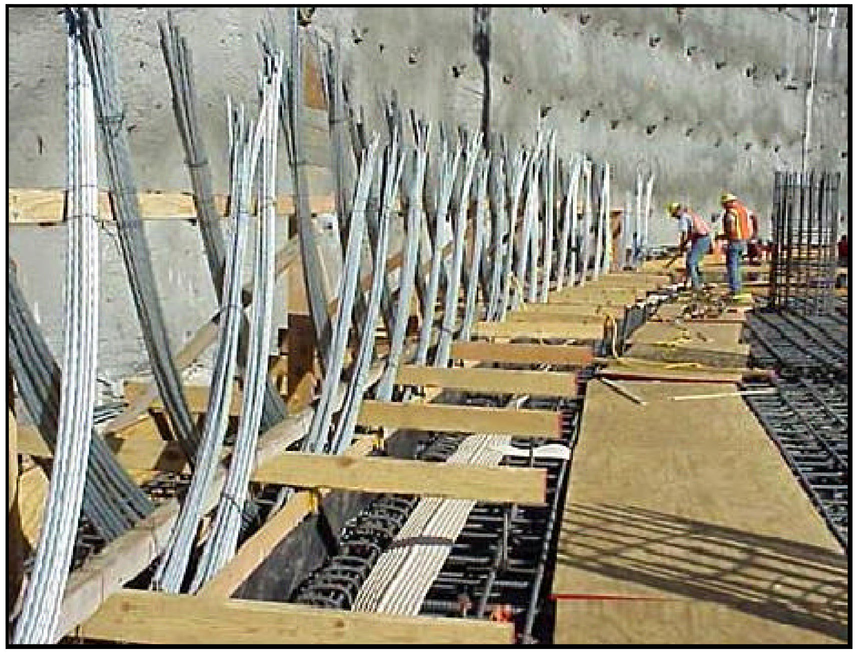
The Regulatory Need

Although all of the projects in the survey are needed to attain or maintain compliance with the SDWA regulations, some projects are directly attributable to specific regulations under the Act. These projects are collectively referred to as the "regulatory need." Most of the regulatory need involves the upgrade, replacement, or installation of treatment technologies.

Of the total national need, 21 percent, or $31.2 billion, is for compliance with current, new, and proposed SDWA regulations. This statistic reveals that most of the total need derives from the costs of installing, upgrading, and replacing the basic infrastructure that is required to deliver drinking water to consumers—costs that water systems would face independent of any SDWA regulations. However, for a project to be included in the survey, it must be required to protect public health. Therefore, if a system fails to address a need, then a health-based violation eventually may occur.

Also, by requiring systems to conduct routine monitoring of a contaminant, a SDWA regulation could prompt a system to identify a need that otherwise would have eluded detection until water quality or service became impaired. Thus, SDWA regulations, most notably the Total

Los Angeles Department of Water and Power



At a storage facility near Los Angeles, workers install seismic cables to provide structural resiliency for earthquake protection

Exhibit 5: 20-Year Total Need and Regulatory Need (in January 1999 dollars)

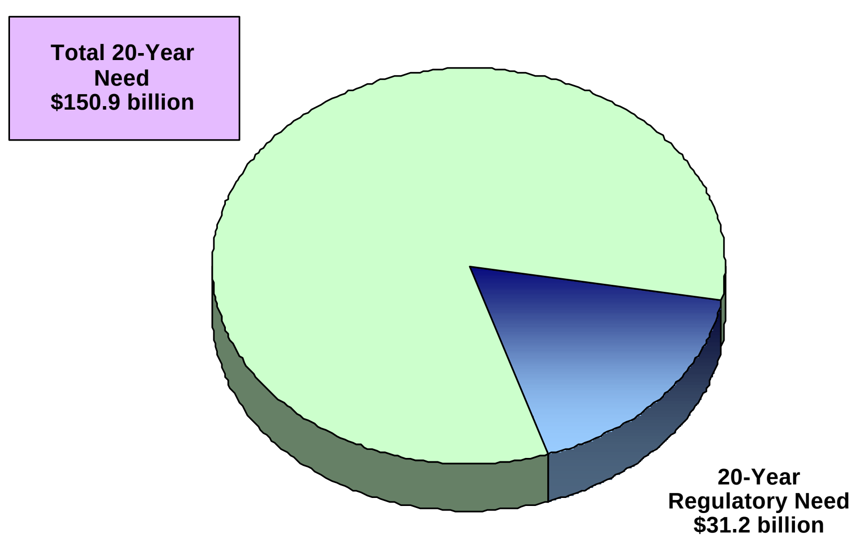


Exhibit 6: 20-Year Regulatory Need (in billions of January 1999 dollars)

Regulations	Total Need
Existing SDWA Regulations	
Surface Water Treatment Rule[1]	$19.4
Total Coliform Rule[1]	$0.5
Nitrate/Nitrite Standard[1]	$0.2
Lead and Copper Rule	$1.2
Total Trihalomethanes Standard	$0.1
Other Regulations[2]	$0.5
Subtotal National Need	**$21.9**
Costs Associated with Proposed or Recently Promulgated Regulations (Taken From EPA Economic Analyses)[3]	$9.3
Total National Need	**$31.2**

Note: Numbers may not total due to rounding.

[1] Regulations for contaminants that cause acute health effects.

[2] Includes regulated VOCs, SOCs, IOCs, and Radionuclides.

[3] Includes regulations for contaminants that cause acute and/or chronic health effects. In the Economic Analyses, the compliance costs with some regulations are given as a range. In calculating the $9.3 billion need, the survey used EPA's lead option, unless one was not available in which case the survey used the more conservative estimate.

Coliform Rule, may enhance a system's awareness of the condition of its infrastructure and, consequently, increase the reporting of needs.

It is important to note that the regulatory need includes only those projects that systems identified and documented as being directly associated with a SDWA regulation. For projects to be counted as a regulatory need, systems had to submit documentation, such as a laboratory slip, showing an exceedance or imminent violation of an MCL or treatment technique requirement. A project without this documentation, even if it promotes compliance with a SDWA regulation, would not be counted as a regulatory need. For example, a ground water system may identify the need to replace an aging chlorinator used to inactivate microbial pathogens, but may lack the documentation to attribute the project to a specific regulation (in this case the Total Coliform Rule). The project would be included in the survey, but not as a regulatory need. The stringent documentation criteria, therefore, likely result in an understatement of the true regulatory need. However, the documentation is necessary to ensure that the regulatory need estimate has credibility.

The total regulatory need is divided into two broad categories: existing SDWA regulations ($21.9 billion), and recently promulgated or proposed regulations ($9.3 billion). Exhibit 6 displays the regulatory need by type of existing regulation.

The SDWA was enacted to protect consumers from the harmful effects of contaminated drinking water by requiring that public water systems meet national standards. Pursuant to the SDWA, EPA has set standards for 81 inorganic, organic, and microbial contaminants. EPA also requires water systems to install particular types of treatment, known as treatment techniques, to protect the public health from an additional 9 contaminants.

Existing Regulations: Microbial Contaminants. The Surface Water Treatment Rule (SWTR) and the Total Coliform Rule are the SDWA regulations that address microbial contamination. Projects directly attributable to these regulations account for $19.8 billion, or 91 percent, of the total existing regulatory need.

The SWTR accounts for almost all of the microbial contaminant-related need and most of the total regulatory need. This statistic reflects the fact that the majority of the nation's large municipal systems use surface water sources. Under the SWTR, all systems using surface water sources must install treatment to minimize microbial contamination. In most cases, this means installing filtration plants to inactivate or remove microbial pathogens, such as the bacterium *E. coli*, the virus Hepatitis A, and the protozoan *Giardia lamblia*. Projects associated with this regulation also include rehabilitating and upgrading existing treatment facilities.

Existing Regulations: Chemical Contaminants. Existing SDWA regulations to minimize chemical contamination accounts for $2.1 billion of the total regulatory need. This estimate includes projects attributable to the Nitrate/Nitrite Standard, Lead and Copper Rule, Total Trihalomethane standard, and the other regulations that set MCLs or treatment techniques for organic and inorganic chemicals. Examples of projects include aerating water to remove volatile organic compounds, such as tetrachloroethylene, and applying corrosion inhibitors to reduce the leaching of lead from pipes in home plumbing. This category includes over 80 inorganic or organic chemicals for which infrastructure projects may be needed.

Most chemical contaminants are associated with chronic health effects including cancer, reproductive difficulties, and liver or kidney problems. However, nitrate levels above the health-based standard can cause an acute illness, known as "blue baby syndrome," in which infants are deprived of oxygen in the bloodstream. Also, excessive copper levels can induce acute gastrointestinal illness.

Proposed or Recently Promulgated Regulation Infrastructure Needs. The total need to comply with proposed or recently promulgated regulations is $9.3 billion. Of this total, $2.6 billion is to address microbial contaminants that have acute health effects. This estimate is derived from the Economic Analyses (EAs) that EPA published when proposing each regulation. Water systems can readily identify the infrastructure needs required for compliance with existing regulations, but most systems have not yet determined the infrastructure needed to attain compliance with future or recently promulgated regulations. Relying on systems to identify the costs of complying with these regulations would significantly

Current and Future Regulatory Needs

Of the $31.2 billion total regulatory need, $16.6 billion is the current need for maintaining and attaining compliance with existing regulations. Most water systems with current regulatory needs are presently not in violation of any health-based standard. Rather, these systems identified needs that would enable them to continue to maintain compliance with existing regulations. Future regulatory needs include projects in which systems will need to invest due mostly to the routine rehabilitation or replacement of infrastructure. For example, most conventional filtration plants require the refurbishment of pumps, filters, chemical feed units, and other components within a 20-year period. All of the costs associated with the proposed or recently promulgated regulations are included as future regulatory needs.

Philadelphia Water Department

Workers repair a water main break in Philadelphia. Deteriorated distribution pipe is susceptible to microbiological contamination and can disrupt water service.

understate the true need of compliance. Therefore, the survey used EAs to estimate these compliance costs.

The 1999 survey differs from the first needs survey in the allocation of the costs associated with proposed or recently promulgated regulations. Although the method for calculating the capital costs of these regulations is unchanged, the costs are not apportioned to each State due to the regional occurrence of some contaminants. Applying the EAs on a state-level might over- or understate some States' actual needs for compliance.[3]

The regulations addressed by this category include the Interim Enhanced Surface Water Treatment Rule (IESWTR), Stage 1 Disinfectants/Disinfection Byproducts Rule (DBPR), Arsenic Rule, Radon Rule, Groundwater Rule, Filter Backwash Recycling Rule, Long Term 1 Enhanced Surface Water Treatment Rule, and the Radionuclides Rule. The total costs of these regulations are included in the survey as future regulatory needs. Capital cost estimates for each of these rules are provided in Appendix B.

Economic Challenges Faced by Small Water Systems

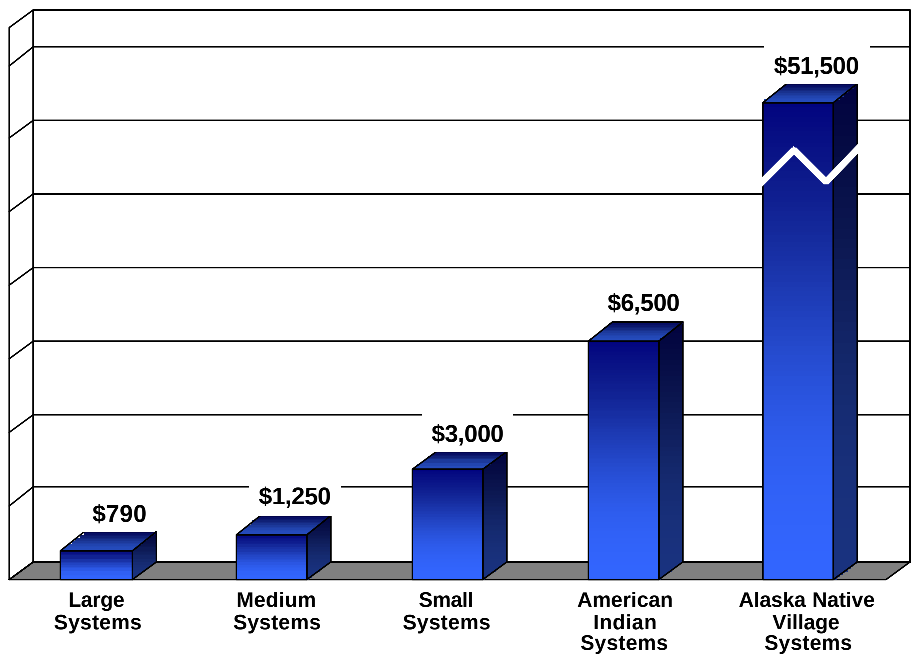
Approximately 45,000 of the nation's 55,000 community water systems serve fewer than 3,300 people. Small water systems vary widely in size and complexity. In general, systems serving more than 500 people have a configuration typical of larger public water systems: a water source, several miles of transmission and distribution piping, multiple storage tanks, and a treatment system. Systems serving fewer than 500 people are usually much simpler in design and consist of a ground water well, a small storage tank, and a few hundred feet of pipe. Some small systems purchase treated water from larger public water systems, and therefore lack the source water and treatment components of a complete water system.

Regardless of their size and configuration, small water systems face many unique challenges in providing safe drinking water to consumers. The substantial capital investments required to rehabilitate, upgrade, or install infrastructure represent one such challenge. Although the total small system need may seem

[3] See the section in Appendix A, "Estimating the Costs for Future and Recently Promulgated Regulations," for a more detailed discussion.

minor relative to the needs of larger systems, the per-household costs borne by small systems are significantly higher than those of larger systems. Exhibit 7 compares the average 20-year per-household need for water systems of different sizes and for American Indian and Alaska Native Village water systems.

Exhibit 7: Average 20-Year Per-Household Need (in January 1999 dollars)



Does not include the costs associated with proposed and recently promulgated SDWA regulations.

The per-household cost for infrastructure improvements is almost 4-fold higher for small systems than for large systems. Small systems lack the economies of scale that allow larger systems to spread the costs of capital improvements among their many consumers. For example, the installation of a new 1.2 MGD conventional treatment plant designed to serve a community of 1,000 people may cost approximately $2.5 million, whereas a 20 MGD plant serving 100,000 people may cost $30.3 million. The cost per-household is approximately 88 percent higher for the smaller community. Moreover, larger systems usually purchase material in quantities that result in significant savings on a unit basis.[4]

Community Water Systems Serving Fewer Than 10,000 People

Small water systems face considerable economic challenges in delivering safe drinking water. The SDWA targets water systems serving fewer than 10,000 people for special consideration by the DWSRF program. States must provide a minimum of 15 percent of the available funds for loans to small systems. Through June 2000, States have exceeded this requirement by providing approximately 41 percent of their funds to small water systems.

The survey estimates that systems serving fewer than 10,000 people represent 35 percent of the total national need for community water systems. In many States, these systems' needs comprise well over 50 percent of the total need. Appendix C presents the 20-year needs for small systems serving fewer than 10,000 people by State.

[4] These estimates are derived from the cost models. See Appendix A—"Methods and Cost Modeling" for a discussion of how the cost models were developed.

Total Need Compared to the 1995 Drinking Water Infrastructure Needs Survey

The 1995 Needs Survey estimate of $152.6 billion[5] exceeds the findings of this survey by $1.7 billion. A comparison of the surveys is complicated by the slightly different methods and project eligibility criteria used to calculate the needs. The 1995 Needs Survey, for example, included the $5.2 billion capital need associated with dams and untreated water reservoirs. After EPA completed the first Needs Survey, these needs were determined to be ineligible for DWSRF assistance and were consequently excluded from the 1999 survey. Conversely, unlike the 1995 survey, the 1999 survey includes $3.1 billion in needs of not-for-profit noncommunity water systems that are eligible for DWSRF funding. The varying estimates of costs associated with the proposed and recently promulgated regulations also contributes to the difference between the surveys.

Despite these slight variations, the fundamental methods used to collect and evaluate needs in 1999 remained largely unchanged from the 1995 survey. Most importantly, the 1999 survey retained the stringent documentation and eligibility requirements of the 1995 survey.

Conservative Estimate of Needs

The methods developed for the survey yield a conservative estimate of need. Despite the large magnitude of the total national need, the survey likely underestimates the true need due to the stringent documentation criteria and the use of a questionnaire to identify the needs of medium and large systems. Also, the scope of the survey is limited to those needs eligible to receive DWSRF assistance–thus excluding capital projects related solely to dams, raw water reservoirs, future growth, and fire protection. For example, a transmission project to extend service to an area where the construction of new homes is expected would be considered future growth and, therefore, omitted from the survey.

Site visits are the most effective method to collect information on infrastructure projects. To accommodate the limited resources of personnel and documentation available to most small systems serving 3,300 and fewer people, site visits were used to estimate the needs of small community water systems and not-for-profit noncommunity water systems. The site visitors assessed every major component of a water system from source to service line for inclusion in the survey. They also generated the documentation necessary to support each need and cost. Each site visit resulted in a thorough identification and documentation of needs over 20 years.

[5] The 1995 Needs Survey reported the total need as $138.4 billion. Adjusted to 1999 dollars this amount is $152.6 billion.

Resource constraints prevented the use of site visits to assess the needs of the 3,667 medium and large systems in the survey. Instead, these systems were asked to complete survey questionnaires and provide documentation for all projects.

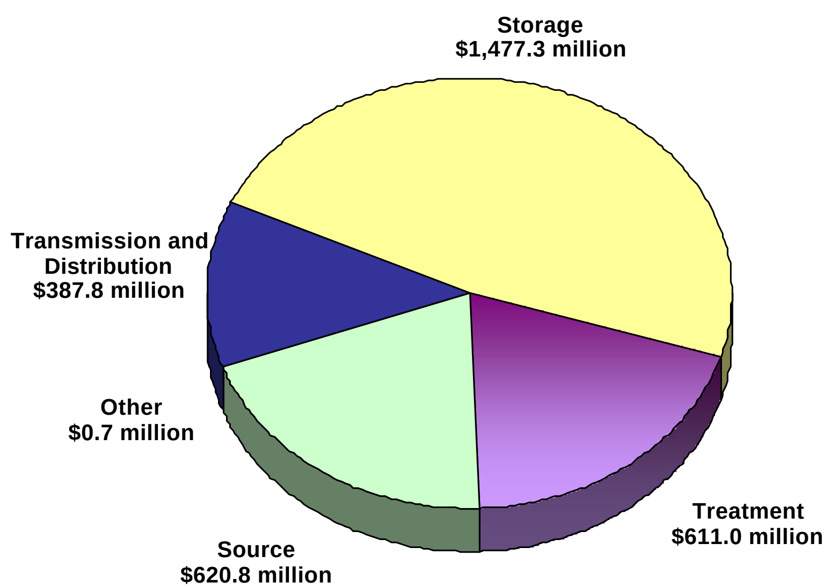
In completing the questionnaire, many medium and large systems relied exclusively on planning documents, such as Capital Improvement Plans (CIPs), that often covered just one to five years, rather than the 20-year scope of the survey. Thus, these systems likely overlooked eligible projects that will be needed beyond the timeframe of their planning documents. For example, many systems used CIPs to identify the need to replace sections of old and leaking pipe. In reality, the amount of pipe that may need to be replaced over a 20-year period may greatly exceed that portion identified in the CIPs. In addition, planning documents usually reflect the financial resources available to systems. Therefore, even though a system may need to replace most of its deteriorated distribution network over the next 20 years, the CIP may include a much smaller portion owing to the projected availability of funds. Despite measures taken to minimize underreporting, the continued reliance on medium and large systems to identify and document their needs produced a conservative estimate of need, particularly because these systems represent most of the total national need.

Not-for-Profit Noncommunity Water Systems

The survey estimates that not-for-profit noncommunity water systems need to invest $3.1 billion in infrastructure improvements over the next 20 years. Of this total, $1.1 billion is needed now to ensure the continued protection of public health. Exhibit 8 presents the noncommunity need by category.

Noncommunity water systems are either transient or nontransient systems. Transient noncommunity systems serve at least 25 of the same persons for no more than 6 months of the year. Examples include gas stations, campgrounds, and roadside rest areas. Nontransient noncommunity systems serve at least 25 of the same people for more than 6 months per year, but less than year-round. Examples include factories, schools, and office buildings.

Exhibit 8: Total 20-Year for Not-for-Profit Noncommunity Water Systems Need by Category (in January 1999 dollars)



Does not include the costs associated with proposed SDWA regulations.

The scope of the survey was restricted to the approximately 21,400 not-for-profit noncommunity water systems that are eligible to receive DWSRF assistance. EPA estimates that approximately 10 percent of transient noncommunity systems and 50 percent of nontransient noncommunity systems are not-for-profit systems.

The needs of noncommunity systems comprise a small proportion of the total national need. This result reflects the limited infrastructure required for a noncommunity system compared to a community water system. The lower needs of noncommunity systems is due mostly to their relative lack of transmission and distribution infrastructure. Many noncommunity systems consist of so few buildings–often just one–that the miles of pipe typically required for even the smaller-sized community water systems are unnecessary.

With respect to the other categories of need, noncommunity systems have fewer sources, limited storage requirements, and smaller treatment facilities than most community water systems. The absence

Infrastructure Needs of the U.S. Pacific Islands and the Virgin Islands

The SDWA established a 0.33 percent set-aside of the DWSRF to provide grants to community water systems in American Samoa, the Commonwealth of Northern Mariana Islands (CNMI), Guam, and the U.S. Virgin Islands. As it did with the States, EPA used a combination of questionnaires and site visits to assess the needs of water systems on the islands. These systems face many challenges in delivering safe drinking water. The expense of transporting materials to the islands, the limited availability of water resources, and pervasive salt water intrusion require capital investments that are substantial, particularly when considered on a per-household basis.

In America Samoa and CNMI, the primary source of drinking water is a thin layer of groundwater which lies above the seawater. High salinity levels have forced many water systems to shut-down wells or install expensive reverse osmosis units to remove the saltwater.

Drinking water in Guam is obtained from ground water and surface water sources. The main municipal water supplier in Guam has difficulties meeting the treatment performance standards of the Surface Water Treatment Rule that protect against microbial contamination.

Dan Fraser

A water distillation plant, operated by the Virgin Islands Water and Power Authority, is shut down and disassembled for repair. Seawater is pumped through screens, then distilled to remove the salts and make the water potable. This facility also uses an ion separation process to extract chlorine from the seawater for use as a disinfectant.

of a full-time population accounts for these reduced infrastructure needs. In addition, noncommunity systems generally do not experience the peak demands in use–associated with morning showers, watering lawns, and meal preparation–with which community water systems must contend in designing their facilities.

The noncommunity need should not be discounted because of its modest contribution to the total national need. The rapid turnover of consumers at transient systems and the sensitive populations at some nontransient systems, such as schools and day care centers, mean that the infrastructure needs of these systems have an important public health dimension.

Separate State Estimates

In response to the Needs Survey workgroup's request, EPA provided States with the opportunity to prepare separate estimates of needs which were not included in the survey due to DWSRF ineligibility. EPA also invited States to submit needs that the States felt were underestimated by the survey. Four States submitted separate estimates, which are provided in Appendix D.

Dave Clark

The expense of burying pipe leads some systems to develop expedient but precarious solutions such as the one pictured here. Water service will be disrupted if pipes are not buried or otherwise adequately protected.