California Department of Health Services Drinking Water Program

Emergency repairs to this transmission main make it possible to continue providing water. However, replacement is needed soon to avoid failure and the possibility of a water outage.

Overview

This report discusses the findings of the first national survey of drinking water infrastructure needs. The survey, sponsored by EPA, was conducted over a two-year period, with data collection beginning in November 1994. As part of this effort, 4,000 community water systems joined the States, American Indian and Alaska Native representatives, IHS, and EPA in identifying their total infrastructure needs. Needs were documented by water systems' capital improvement plans and engineering reports.

What the Survey Covers

The survey was designed to identify the capital infrastructure needs faced by the nation's publicly and privately-owned community water systems. Results of the survey were used to show SDWA compliance needs, as well as general needs for infrastructure improvements which are not associated with the SDWA.

The survey identifies both current needs and future needs for the 20-year period from January 1995 through December 2014. Current needs address infrastructure improvements needed now to protect public health. Future needs are planned projects that are necessary to continue providing safe drinking water over the next 20 years.

The needs included in this report are conservative because many systems were not able to identify all of their needs for the full 20-year period. In some cases, systems were unable to document all of their identified needs. Also, the survey examined only the needs of community water systems; non-community water systems were not surveyed. Needs associated with future growth were not included in the survey.

This report is intended to meet the requirements of SDWA Sections 1452(h) and 1452(i)(4).

In this report, drinking water capital infrastructure needs are grouped into four general categories. These categories are source, treatment, storage, and transmission and distribution.

Source. A dependable, high-quality source is essential to providing safe water. To maintain adequate supply, systems must develop new sources or

Types of Water Systems

Public water systems are categorized as community water systems or non-community water systems. This report includes needs for community water systems only.

Community Water Systems have at least 15 service connections used year-round by residents or regularly serve at least 25 residents year-round. Examples of this type of water system include cities, towns, and communities such as retirement homes.

Non-community Water Systems do not meet the definition of community water systems, but serve an average of at least 25 individuals 60 days of the year. Examples include schools and churches with their own water systems.

return older sources to their full potential. Surface water is often collected behind dams, in impoundments, or in reservoirs. These structures protect public health and improve water quality by allowing solids to settle out of the water. Where supply is reliable, water systems sometimes use river intakes.

Water systems also use ground water sources where water is taken from underground aquifers through drilled wells.

Some communities must store source water because their sources are unreliable. Flow may be variable in quantity and quality and, in some cases, the threat of chemical spills upstream makes source water storage essential.

Treatment. Source water quality determines the level of treatment required. As a general rule, surface water sources need more treatment than ground water sources because surface water is more exposed to contaminants, such as those from agricultural run-off and wastewater treatment plant effluent.

Most treatment needs are for microbiological contaminants, which can lead to gastrointestinal illness and, in extreme cases, death. Treatment for microbiological contaminants usually consists of disinfection or both disinfection and filtration. Treatment is also needed for contaminants that cause chronic health effects. These contaminants include inorganic chemicals such as lead and organic chemicals such as tetrachloroethylene, a component of dry cleaning fluid. Over a lifetime, exposure to low levels of these contaminants poses a health risk. In addition, some water systems must treat for secondary (aesthetic) contaminants that cause water to look, taste, or smell bad.

Storage. Adequate storage is important because it ensures the positive water pressure necessary to prevent contaminants from entering the system. Periodic rehabilitation of storage facilities is necessary to

Safe Drinking Water Act Needs

A portion of each category of need is associated with the SDWA. The SDWA sets minimum standards for all drinking water provided by public water systems. States must establish drinking water standards that are at least as stringent as those required by the SDWA. Many States establish standards that are more stringent.

Wisconsin Department of Natural Resources

Redwood storage tanks can last for many years. However, like all tanks, redwood tanks can allow entry and growth of microbiological contaminants when they exceed their useful service life.

prevent entry and growth of microbiological contaminants and to maintain structural integrity. Storage is also necessary because it allows systems to provide water during periods of peak usage.

Transmission and distribution. Transmission pipes bring water from the source to treatment or from treatment to the distribution system. Distribution pipes deliver water to the customer. Sound transmission and distribution systems are critical to guarding against public health risks.

When distribution pipe begins to deteriorate, disinfectants are less effective in controlling microbiological growth. If pressure is lost or if negative pressure is induced, contaminated water or sewage can be pulled back into the system through leaks. Transmission mains must be in good condition because the failure of a transmission main could leave a community without water until the main is repaired or replaced. Such an outage is not just an inconvenience, but also a public health threat because sewage cannot be flushed away and safe water is unavailable.

How the Survey Was Conducted

In 1994, a workgroup was convened to develop an approach for estimating the drinking water infrastructure need for community water systems nationwide. The workgroup included staff from State drinking water agencies, American Indian and Alaska Native representatives, IHS staff, and EPA staff. The workgroup developed the survey methodology and designed this report.

Dave Schultz

The stainless steel bands on some of these deteriorated pipes show where previous leaks were repaired. The pipes' condition demonstrates that replacement has been postponed too long. When they are not replaced, pipes such as these present a health threat.

The workgroup's methodology called for different approaches for community water systems in the States and for American Indian and Alaska Native systems. Systems in the States were divided into three size classifications: those serving more than 50,000 people (large systems); those serving from 3,301 to 50,000 people (medium systems); and those serving 3,300 and fewer people (small systems).

All 794 large community water systems received mailed questionnaires. Needs for medium and small community water systems were estimated using statistical surveys. Needs of the sampled systems were extrapolated to estimate total need for medium

EPA thanks the following organizations for contributing to the survey's success:

Alaska Native Health Board
American Water Works Association
Association of Metropolitan Water Agencies
Association of State Drinking Water Administrators
International City Managers Association
National Association of Counties
National Association of Towns and Townships
National Association of Water Companies
National Rural Water Association
National Utility Contractors Association
Native American Water Association
Navajo Nation Environmental Protection Agency

and small systems. Of the 6,800 medium-sized community water systems, a sample of 2,760 systems was surveyed by mailed questionnaire. To identify the needs of the 46,500 small drinking water systems nationwide, EPA staff and contractors made on-site determinations of need for a sample of 537 small systems. In most cases, State representatives accompanied EPA staff and contractors on these visits. Exhibit 1 shows the locations of the small systems included in the survey.

For American Indian and Alaska Native water systems, existing IHS databases provided baseline information on needs. The workgroup developed an approach to adjust the IHS data to include all needs allowed in the Needs Survey. Under this approach all 15 medium American Indian systems reported their needs on a mailed questionnaire. Of the 869 small American Indian and Alaska Native systems, needs were assessed for 77 representative systems. Findings from these assessments were used to adjust the IHS data to derive total needs for American Indian and Alaska Native systems.

Documentation

- The most common form of documentation was a system's capital improvement plan.
- Systems also frequently submitted detailed engineering reports that described capital improvements necessary to provide safe water.
- Where capital improvement plans and engineering reports were unavailable, detailed explanations of systems' needs were accepted.
- For small systems, documentation was compiled on-site by State, EPA, IHS, and contractor staff.

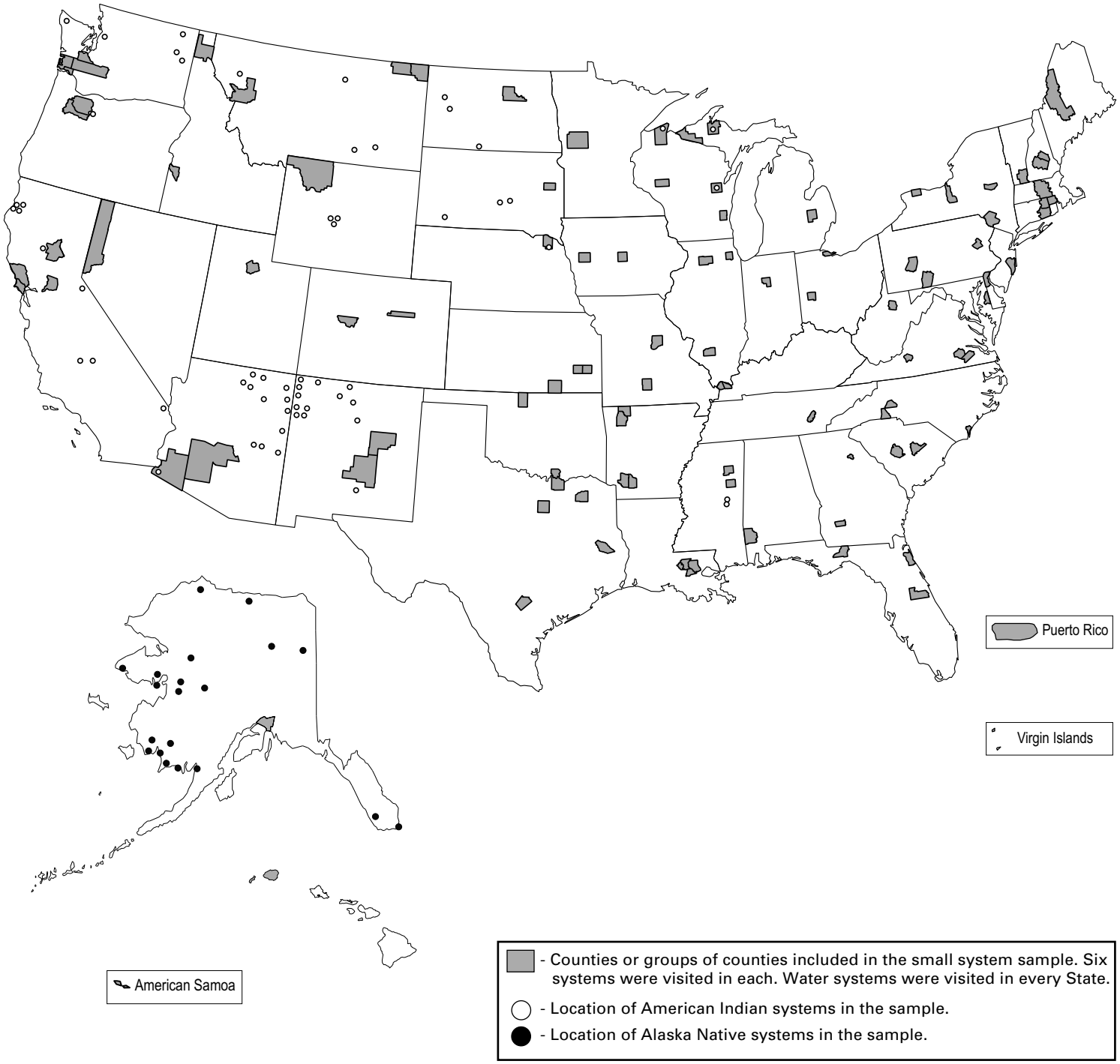
To ensure the validity and accuracy of survey responses, the workgroup required documentation and set strict guidelines defining criteria for acceptable documentation. State and EPA Regional staff evaluated needs identified by the systems to ensure that the documentation met survey requirements. Following this review, questionnaires were forwarded to EPA Headquarters for final review before the needs were entered into a national database.

Project costs were derived from data collected in the survey. Many large and medium drinking water systems provided documented cost estimates for infrastructure needs in their capital improvement plans or engineering reports. EPA used these cost estimates, supplemented by cost data from States, consulting engineers, and equipment vendors, to develop cost models for all surveyed systems. These models were used to estimate project costs for respondents who documented infrastructure needs to protect public health, but did not have accurate cost estimates.

Water systems do not have cost estimates for recently promulgated and proposed regulations or for other regulations that EPA may promulgate in the future. Therefore, costs for these regulations were taken from preambles to the proposed regulations and from draft economic analyses.

A detailed discussion of survey methodology and a list of the types of documentation that were used to justify needs and costs is located in Appendix A.

Exhibit 1: Small Drinking Water Systems in the Needs Survey Sample



Not to scale