It Takes More Than A Village

Collaborative problem solving can help utilities meet water supply and quality needs

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Water allocation and quality issues in the United States have generated controversy from the densely populated East to the arid and fast-growing West. Resolving the conflicts that arise among various stakeholder groups takes dedication and understanding. A key tool for making effective and broadly accepted decisions about water supply and allocation is the use of collaborative processes — a method endorsed by several organizations, including the U.S. Department of the Interior.

Interviews with water utility executives in Arizona, California, Virginia, and Pennsylvania have demonstrated that a variety of utilities can benefit from a taking a consensus-building approach to water supply planning. Collaborative strategies that utilities have used include forums, public involvement efforts, and other innovative approaches.
Across the country, water utilities face difficult allocation decisions.
Collaboration in the West

Historically, water allocation decisions in the West are fraught with conflict. Many utilities are likely to face shortages that require adjustments to their water supply projections and plans. The following case studies illustrate the importance of public input and the complex web of collaborative efforts required to address water supply needs.

Tucson, Ariz.

According to Marie Pearthree, deputy director of Tucson Water, the utility provides retail delivery of potable and reclaimed water to more than 680,000 customers over an approximately 780-km² (300-mi²) service area. The number of customers is expected to double by 2050, which is consistent with National Renewable Energy Laboratory statistics suggesting that Arizona’s population will surge 34% between 2000 and 2020. Meeting customer demand will only become more of a challenge for Tucson Water.

Tucson’s water supply comes primarily from groundwater, Colorado River water, and treated wastewater. The arid climate of the southern Arizona desert, combined with Tucson’s expanding population, has prompted the utility to try reducing its dependence on limited groundwater supplies.

Given the uncertainties inherent in long-range planning, Tucson Water employed a “scenario planning” approach in developing its Long-Range Water Plan 2000–2050. This approach enabled the utility to assess various water resource projects and programs in terms of achieving water resource stability while providing the flexibility to adapt to changing conditions. Planners suggested that the community’s growing needs can be met only if Tucson uses available water resources and aggressively seeks and obtains new resources.

Tucson Water understands that its ability to move forward depends on community outreach, education, and public input creating informed public support for the plan, Pearthree said. In addition to fielding questions from the public, the utility plans to provide customers with information about the issues and the financial and water management implications of the options suggested by Tucson Water.

The long-range plan identifies two critical decisions the utility will make over the next two years with the input of its customers: long-term mineral content of the water supply, followed by how to manage its allotment of Colorado River Water, one of its major sources of supply. The latter decision involves whether to recharge and recover all of its Colorado River allotment or
restore an existing water treatment plant to treat and blend a portion of this supply on the surface. Another set of decisions, to be made in 2014, will focus on how to maximize use of the city’s underutilized effluent resources.

Tucson Water also participates in various local and statewide collaborations to assist the public in decision-making about health and environmental issues. These include collaborations with the Arizona Governor’s Drought Task Force and an effort sponsored by a grant from the U.S. Environmental Protection Agency. In the latter, the utility is collaborating locally with the University of Arizona, county and state agencies, water quality and conservation organizations, local schools and stakeholder groups, and private industry to provide public access to useful, time-relevant, and accurate environmental monitoring data, according to Pearthree.

The director of Tucson Water is a strong proponent of collaboration and is on the board of the Central Arizona Water Conservation District (CAWCD), which manages and sets policy for the Central Arizona Project, which brings Colorado River water to central and southern portions of the state.

“CAWCD strives to be a collaborative, innovative leader in the management and the delivery of water to central and southern Arizona. Because there is a need for utilities and municipalities in southern Arizona to establish a unified voice as they work toward securing water resources for the future,” said Pearthree. “Parties in southern Arizona have initiated conversation about establishing a regional cooperative to help advocate for acquisition of allocations and manage new water resources.”

**Los Angeles**

The Los Angeles Department of Water and Power (DWP) is the largest municipal utility in the United States, according to James McDaniel, chief operating officer. It serves about 3.9 million residents and businesses within the city limits of Los Angeles. In fiscal year 2004, DWP provided treatment and distribution of 851.7 million m³ (690,450 ac-ft) of drinking water through approximately 700,000 water service connections. There is very little native water in the semiarid desert climate, and Los Angeles continues to engage in a variety of collaborative activities to ensure an adequate and stable water supply in spite of variable weather patterns year to year.

DWP’s 25-year Urban Water Management Plan, mandated by the California Water Code, identifies short- and long-term management measures to meet water needs under various supply conditions. The recently updated plan outlines a wide array of conventional and alternative measures that DWP is taking to ensure adequate water supplies, including water recycling, a highly successful conservation program, research and development of new conjunctive use facilities, and water transfers.

For several years, DWP has been working closely with the City of Los Angeles Department of Public Works Bureau of Sanitation on the development of a water–wastewater Integrated Resources Plan (IRP). The IRP was developed with the active input and involvement of diverse stakeholders, including environmental groups, churches, government, community and homeowners associations, businesses, public agencies, universities and other interested groups and individuals. It takes into consideration the complex interrelationships among all of the City agency service functions (water supply; water conservation, wastewater collection; treatment and reuse; biosolids generation and application; stormwater quality; water quality issues). A Final Environmental Impact Report is being prepared to be approved by the Los Angeles City Council later this year. By combining water and wastewater planning, the City of Los Angeles will see the expansion of water conservation, water recycling, and stormwater management projects.

LADWP also is collaborating with several other agencies on projects to support research and development of seawater desalination technology and to help lower capital and operating costs. For instance, LADWP has partnered with the Long Beach (Calif.) Water Department and the U.S. Bureau of Reclamation in constructing an 1135-m³/d (300,000-gal/d) prototype seawater desalination facility to further test the Water Department’s proprietary, two-stage nanofiltration process.

McDaniel also noted that the utility is formally collaborating with other utilities, governmental agencies, environmental groups, and other stakeholders to develop an Integrated Regional Water Management Plan (IRWMP) for the Greater Los Angeles County Region. The IRWMP covers an area comprised of five subregions, including portions of both Ventura County to the north and Orange County to the south, representing approximately nine million people and more than 2200 square miles. Funds for the IRWMP Grant Program are appropriated through California Proposition 50, the Water Security, Clean Drinking Water, Coastal and Beach Protection Act.

“We need projects that protect communities
from drought, protect and improve water quality, and improve local water security by reducing dependence on imported water,” said Thomas Erb, director of water resources at LaDWP.


Newport News Waterworks (NNW) is the water utility serving most of the rapidly growing Lower Peninsula of Virginia, providing drinking water on a retail basis to approximately 400,000 customers through 125,000 metered connections. The utility serves the cities of Newport News, Hampton, and Poquoson, most of York County and a portion of James City County (Bulk raw water is sold to City of Williamsburg on an as-needed basis). NNW’s supply comes primarily from the Chickahominy River and the Diascund Reservoir, with smaller contributions from a few creeks and reservoirs. Groundwater from the Middle and Upper Potomac aquifers is desalinated and blended with the surface water from two treatment complexes.

The utility has a 10% to 15% cushion between existing supply potential and demand, which should be enough to meet needs for 10 to 15 years. However, Director Brian Ramaley noted that the population of the service area continues to grow, and the projects built to meet the water needs of its customer base could exceed supply in the relatively near future.

NNW has initiated a variety of activities to address potential water shortages. For example, in the late 1980s the utility formed the Regional Raw Water Study Group, composed of all of the water utilities east of Richmond, Va., on the Lower Peninsula, including smaller utilities owned and operated by York County, Williamsburg, and James City County. Member utilities collaborated to assess the region’s water needs and develop strategies to address them, including development of additional groundwater supplies, enhanced conservation efforts, and construction of a regional reservoir in King William County. Moreover, NNW and James City County constructed groundwater desalination plants, and the U.S. Army Corps of Engineers recently issued its notice of intent to issue the required federal permit for construction of the reservoir and intake. “The agency agrees on the need for more water and the proposed reservoir—intake is the least environmentally damaging, practicable project,” Ramaley said.

During the past several years, NNW also has participated in a state-facilitated process to develop a standard approach to water supply planning for localities. The goals of the process are to develop a State Water Supply Plan and state regulatory criteria for local and regional plans. The Virginia Department of Environmental Quality (DEQ) established several technical advisory committees to further these goals. The committees included representatives from local governments, the water supply community, planning district commissions, and environmental groups such as the Chesapeake Bay Foundation (Annapolis, Md.). Proposed regulations for water supply establish a planning process and criteria that all local governments will use in the development of local or regional water plans. Plans will be reviewed by Environmental Quality Department and will be revisited every 5 years to assess adequacy with significant changes requiring submission of an amended plan.

Philadelphia

As director of the office of watersheds in the Philadelphia Water Department (PWD), Howard Neukrug knows the growth challenges facing the city. PWD provides integrated water, wastewater, and stormwater services to the greater Philadelphia region from three plants that treat nearly 1.1 million m$^3$/d (300 mgd) of water from the Delaware and Schuylkill rivers. There also are three plants cleaning more than 1.7 million m$^3$/d (450 mgd) of wastewater, as well as a 29.5-ha (73-ac) biosolids recycling facility, all of which also contribute wholesale water and wastewater services to surrounding counties.

Neukrug said that while this is a manageable undertaking today, it might not be feasible forever. “The rapid growth of suburbs affects the groundwater table and the river recharge, throwing off balance the many supply assumptions made in the past,” he said. “Furthermore, the recent trends of hotter summers and shorter, more intense rainstorms may also contribute to unbalancing the water supply equation for the Delaware Valley.”

PWD is involved in several collaborative planning processes that address water quality and quantity. The most ambitious is the Water Management Plan developed under the auspices of the Delaware River Basin Commission (Trenton, N.J.).

While the City of Philadelphia has its own water department, water supply issues are addressed within the much larger, more complex context of the 35,000-km$^2$ (13,539-mi$^2$) Delaware River watershed. The Delaware River Basin Commission — formed in 1961 by compact between U.S. President John F. Kennedy and the
governors of Delaware, New Jersey, Pennsylvania, and New York — is a regional body with the force of law that oversees the management of the river system without regard to political boundaries. This agreement marked the first time that five separate governmental bodies, each with its own sovereign powers, agreed to work together on an equal footing to manage a common resource. The Delaware River Basin Compact has withstood the test of time, and while droughts and changing reservoir operational criteria have created occasional regional water issues and crises, the current focus is more on the impact of flows in the watershed’s tributary streams — both high storm flows (causing erosion and flooding) and low base flows (causing increased pollutant concentrations and loss of beneficial uses).

To develop a collaborative 30-year water resources management plan, PWD joined 45 other stakeholders at a forum convened by the Delaware River Basin River Commission. Although stakeholders came to the table with widely disparate points of view, Neukrug noted that the group quickly came together on a key point: the need for a comprehensive plan that addresses land management and nonpoint source pollution control, two areas typically considered outside the purview of a “water-centric” committee.

Guided by consensus principles, the plan contains five key result areas supported by a set of goals recognizing the need for
• sustainable use and supply,
• waterway corridor management,
• linked land and water resource management,
• institutional coordination and cooperation,
• education and involvement.

The plan specifies coordination among overlapping jurisdictions and sets up an implementation team representing the involved organizations to achieve the vision and goals. While acknowledging that the hard work of implementation lies ahead, Neukrug and other parties to the agreement are optimistic that the plan will result in the Delaware River continuing to meet human and wild resource needs for generations to come.

Collaborative Problem Solving Tools for Water Utilities

These case studies illustrate how utilities can benefit from collaboration in the context of water planning and management.
• Tucson Water’s planners explicitly recognized the importance of consulting with the public on critical decisions and formally incorporated this into the structure of the utility’s long-range plan.
• Los Angeles DWP has found collaboration to be a key to leveraging resources, both for research and development of new technology and for integrated water management planning and project development.
• Collaboration can lead to conceptual innovations, such as the standardization of metrics (for defining a water shortage) and methods (for projecting water supply) among Virginia utilities to facilitate regional planning.
• The Delaware River Basin Commission’s planning effort illustrates the same point on a larger scale — in this case, recognizing the need to incorporate land use planning and pollution control efforts into water management planning.

As different as they are, these four communities share the recognition that outreach, ongoing consultation, and building agreement among affected parties can lead to a better understanding of stakeholders’ interests and, therefore, development of creative water planning and management solutions that have widespread technical and political support.

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