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System Partnership Solutions to Improve Public Health Protection
— Volume II —

The following are examples of case studies designed to show how partnerships can help small systems enhance their ability to provide safe and affordable drinking water

System Capacity Challenges and Partnership Solutions Overview

Water system capacity is the ability to plan for, achieve, and continually provide safe and affordable drinking water to customers, thereby increasing public health protection. Capacity development is the process through which drinking water systems acquire and maintain the technical, managerial, and financial capabilities to consistently provide safe drinking water. All states are currently implementing state-specific capacity development programs tailored to meet their water systems' needs. One tool for building capacity is system partnership solutions.

The case studies featured within this brochure identify successful partnership solutions available to these specific water systems. Partnership solutions may not be appropriate in all cases, but should be considered as an option. Public water systems that may be experiencing similar situations in meeting the challenges towards the provision of safe drinking water may find the ideas highlighted in this brochure useful.

Small System Challenges

Technical

- Inadequate & deteriorated infrastructure
- Limited/poor source quality/quantity
- Lack of operations & maintenance expertise/certified operator

Managerial

- "No time" or limited part time management attention
- Lack of expertise in long-term water system planning/operations
- Lack of focus - providing water is not the system's primary purpose

Financial

- Diseconomies of scale (fewer households = higher costs)
- History of low rates = resistance to full-cost pricing
- Limited knowledge of financing options
- Located in economically disadvantaged areas

System Partnership Solutions

- System partnership solutions can range from informal cooperation, such as mentoring programs, to ownership transfer with managerial and/or physical consolidation

- The following system partnership solutions serve as examples of these capacity building tools and involve changing the operational, managerial or institutional structure of a water system. The changes serve to meet the increasing costs and responsibilities of consistently providing safe water that meets the Safe Drinking Water Act standards

System Partnership Spectrum

Internal Changes	Informal Cooperation	Contractual Assistance	Joint Powers Agencies	Ownership Transfer
Completely self-sufficient, relies mainly on internal organization partnering	Coordinate with other systems, but without contractual obligations	Utilities contract with another system or service provider, but contract is under the system's control	Creation of a new entity designed to serve the systems that form it (Public Service Authority, Regional Water Authority, etc.)	Owned by an existing entity or a newly created entity

Increasing Transfer of Responsibility

System Capacity Challenges and Partnership Solutions Overview

Potential Outcomes

Technical

- Shared, new, or upgraded infrastructure
- Locate higher quality/quantity source water
- Access to a certified operator and additional expertise
- More efficient treatment technologies available

Managerial

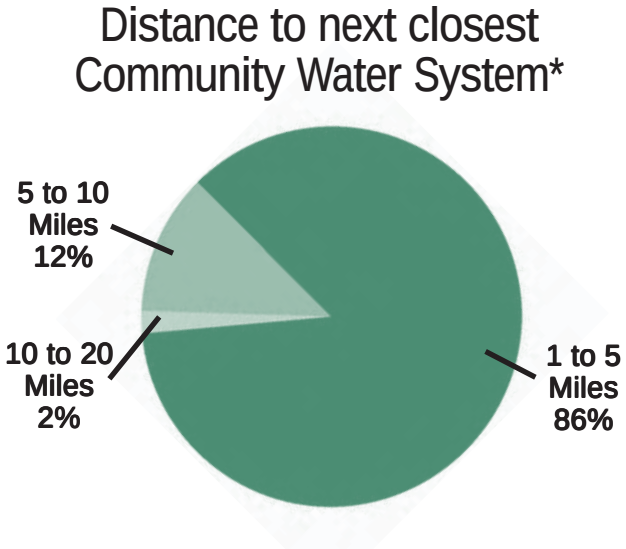
- Expertise in water system planning/operations
- Accelerated path to obtaining the managerial skills and structure required to adequately oversee the water system

Financial

- Reduced costs = safe and affordable water at full cost pricing
- Greater economies of scale achieved through shared services
- Increased access to funds

Opportunities for System Partnerships

- 84% of America's 53,000 community water systems are small systems serving fewer than 3,300 people
- 86% of these small systems are within 5 miles of another system*
- The proximity of these systems to potential partners demonstrates many opportunities for small systems to form cooperative agreements, share services, or join together under common management
- The feasibility of physical interconnection should be analyzed carefully and compared with the economic savings that other partnership solutions may achieve



*__Source:__ "Feasibility of Small System Restructuring to Facilitate SDWA Compliance," AWWA 90720. Denver, CO: American Water Works Association, 1997

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System Capacity Development Case Study

Atoka County Rural Water District #1, Wardville, Oklahoma, 2003 – 2005

Background

The Atoka County Rural Water District (RWD) #1 in Wardville, OK used nearby Wardville Lake as its water source. In 2003, when water levels in the lake began to drop due to a prolonged drought, the system's ability to provide safe drinking water to its 75 customers was jeopardized.

Public Health Challenges

Due to frequent turbidity violations, the system was under a boil water order for more than a year. In 2003, the system was placed under a regulatory consent order from the Oklahoma Department of Environmental Quality.

Capacity Issues

Technical	▶ The system's water source was almost depleted. ▶ The system's surface water treatment plant did not have a settling tank, which led to high turbidity. ▶ The treatment plant had not been upgraded since the 1980s. ▶ The treatment plant was designed to process 12,000 gallons per day, but was treating over 20,000 gallons daily. ▶ 40-year old distribution lines caused the system to lose approximately half of its finished water to leaks.
Managerial	▶ A lack of long term planning resulted in no alternative water source being identified until the issue became extremely urgent.
Financial	▶ The system had inadequate rates, no reserve funds, and no access to capital financing.

Actions: Contractual Assistance

✓	The National Guard began to haul drinking water to the community, serving as an emergency water source.
✓	For a longer term solution, Atoka County RWD #1 first considered extending a pipeline to Stringtown, OK's water system. This solution was not pursued because it would have required construction of several miles of 6-inch-diameter water line plus other improvements costing an estimated $680,000.
✓	Atoka County RWD #1 instead chose to build a 4-inch-diameter pipeline that tied into Pittsburg County RWD #11, which had a distribution main only 3 miles away, and entered into an agreement to purchase water from Pittsburg County RWD #11. This alternative cost only $86,000, which was mostly funded through an Oklahoma Water Resources Board emergency grant.
✓	In 2005, three miles of 4-inch-diameter PVC piping was laid to connect the system to Pittsburgh RWD #11. A master meter was installed to measure water usage and assess losses due to leakage.

Outcomes

💧	The agreement to purchase water from the neighboring water system has resolved Atoka County RWD #1's water shortage and ended the system's health violations, providing the system's customers with a reliable source of safe drinking water.
💧	The residents are now paying reasonable rates that will cover the cost of the purchased water and sustain the system.

Questions about Oklahoma's Capacity Development Program? Contact Brad Cook • Oklahoma Department of Environmental Quality • P.O. Box 1677 • Oklahoma City, OK 73101-1677 • (405) 702-4178 • Brad.Cook@deq.state.ok.us

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System Capacity Development Case Study

Region 18 School District, Connecticut, 2004

Background

The Region 18 School District in Connecticut owned and operated three separate non-transient non-community public water systems – Old Lyme High School, Old Lyme Middle School, and Old Lyme Center School – with a combined population of approximately 1,500.

Public Health Challenges

Each school's water system experienced recurring violations of the maximum contaminant level (MCL) for total coliform bacteria. Deficient wells and storage facilities contributed to the recurring water quality violations.

Capacity Issues

Technical	▶ The Old Lyme Middle School and Center School were supplied by dug wells that had several construction defects. ▶ The atmospheric storage tank for the Old Lyme High School did not have access ports for routine cleaning. The quality of the water from the tank was also suspect because the wells supplying the tank tested negative for total coliform. ▶ All schools had limited or no atmospheric storage capacity to meet the average daily water usage demands.
Managerial	▶ The water systems were operated by conditional operators (grandfathered staff) who were not water system professionals with full knowledge of all drinking water regulations. ▶ The systems had several monitoring/reporting violations for failure to submit required water quality samples in a timely fashion.
Financial	▶ The Region 18 School District faced significant cost constraints and could not afford to make the necessary infrastructure improvements to each system.

Actions: Contractual Assistance (and system consolidation)

✓	Through consultations with the Connecticut Department of Public Health, the Region 18 School District entered into a consent order to design and construct a consolidated water system to serve all three schools.
✓	Four new wells were drilled to supply the consolidated water system. The new water system includes a 121,000-gallon storage tank, which meets the needs for potable water and fire protection.
✓	The Region 18 School District was able to secure reimbursement funding from the Connecticut Department of Education to cover approximately 36 percent of the consolidated water system project.

Outcomes

💧	The new Region 18 School District consolidated water system is now in compliance with water quality standards for total coliform bacteria and is capable of meeting the daily demands of all three schools.
💧	The new water system is managed and operated by a professional water utility operations company. The Region 18 School District can now focus on the education of children instead of the daily responsibilities of complying with state and federal drinking water regulations.

Questions about Connecticut's Capacity Development Program? Contact Steve Messer • Connecticut Department of Public Health • 410 Capitol Avenue • Hartford, CT 06134-0308 • (860) 509-7333 • Steve.Messer@po.state.ct.us

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System Capacity Development Case Study

Public Wholesale Water Supply District #23, Kansas, 1997 – 2006

Background

Kansas allows systems to form public wholesale water supply districts (PWWSDs) where members buy water at wholesale rates from the PWWSD while retaining autonomy over their own systems. Representatives of each member system work with the PWWSD Board of Directors to make decisions for the entire PWWSD.

In the late 1990s, various water quality issues, such as drought, confronted many small water systems in southeastern Kansas.

Public Health Challenges

Like many small systems in southeastern Kansas, 20 water systems in and around Fredonia suffer from water shortages made worse by drought. Several of these systems are under consent orders due to noncompliance with the Surface Water Treatment Rule (SWTR). In addition, some systems' finished water exceeds the maximum contaminant levels (MCLs) for trihalomethanes and haloacetic acids.

Capacity Issues

Technical	▶ Many of the surface water systems' treatment plants are outdated and not in compliance with SWTR requirements. ▶ The plant capacity of many of the 20 water systems is not adequate to meet demand.
Financial	▶ Many of the systems did not have the reserves, rate base, or access to capital required to finance the necessary treatment plant upgrades.

Actions: Joint Powers Agencies

✓	Twenty neighboring small systems joined to finance a feasibility study of creating a public wholesale water supply district (PWWSD) to help address their water supply and quality issues.
✓	The study determined that the creation of a PWWSD by the 20 systems was feasible and would help address the systems' issues.
✓	Fredonia's surface water treatment plant, which needed significant upgrades to meet new SWTR requirements, will be purchased by the PWWSD, expanded, and upgraded to provide wholesale water to the entire district. The project has received funding from the U.S. Department of Agriculture's Rural Development Loans and Grants Program.

Outcomes

💧	Completion of this project will result in the expansion and upgrading of Fredonia's surface water treatment plant so it can provide reliable and safe water to all 20 of the district's member systems in a cost-effective manner.
💧	Member systems will be in compliance with the SWTR; outstanding consent orders will be closed.

Questions about Kansas' Capacity Development Program? Contact Cathy Tucker Vogel • Kansas Department of Health and Environment • 1000 SW Jackson St., Suite 420 • Topeka, KS 66612-1367 • (785) 368-7130 • CTuckerv@Kdhe.state.ks.us

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System Capacity Development Case Study

Brookfield and New Milford, Connecticut, 2005

Background

Located along Route 7, one of the state's major transportation and commercial corridors, the western Connecticut towns of Brookfield and New Milford have experienced numerous contamination issues with their water systems. A reliable water supply was needed to satisfy the rapid development and growth of this area, while providing a solution to Brookfield and New Milford's contamination issues.

Public Health Challenges

At one time Brookfield and New Milford had over 300 small public water systems. The contamination issues that plagued many of these systems included *E. coli* and coliform bacteria, volatile organic chemicals, radioactive compounds, and nitrates.

Capacity Issues

Technical	▶ Lack of a water supplier with an adequate residential, commercial, and fire protection supply for the Route 7 corridor in New Milford and Brookfield. ▶ An inordinate amount of point sources of contamination spread across the entire corridor that limited available sites for suitable water supply sources.
Managerial	▶ The Route 7 corridor is divided into three Exclusive Service Areas managed by three separate private entities, complicating the identification of a solution to the issues. (Connecticut assigns an "Exclusive Service Area" to an existing water utility using an area-wide planning approach in which the utility accepts responsibility for all new water systems in its service area.)
Financial	▶ The funds necessary to extend a reliable water supply to New Milford, Brookfield, and the Route 7 corridor were not available under conventional means of financing for the rate-regulated private utilities that were assigned the Exclusive Service Areas.

Actions: Contractual Assistance and Ownership Transfer

✓	The solution to the issues facing Brookfield and New Milford was arrived at after Faith Church, a school and 1,200-seat ministry located on the Brookfield/New Milford border, requested water service.
✓	United Water Connecticut (UWC), Faith Church, and the Connecticut Department of Public Health reached an agreement to extend a United Water main to the church, which would also allow for expanded water service along Route 7 into Brookfield. Faith Church agreed to fund approximately 50 percent of the water main extension.
✓	UWC requested and received approval from the Connecticut Department of Public Utility Control to modify the standard refund agreement for water main extensions, allowing UWC to advance the balance of the funds necessary for the construction of the water main extension.

Outcomes

💧	The Faith Church water main extension, completed in 2005, has allowed for expanded water service along Route 7 and Brookfield.
💧	The development, growth, and fire protection needs of the Route 7 corridor are now being met.
💧	Several small public water systems that had serious contamination issues have been eliminated, with water now being supplied through UWC's distribution system.

Questions about Connecticut's Capacity Development Program? Contact Steve Messer • Connecticut Department of Public Health • 410 Capitol Avenue • Hartford, CT 06134-0308 • (860) 509-7333 • Steve.Messer@po.state.ct.us

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System Capacity Development Case Study

Isle of Pines Water System, South Carolina, 2000 – 2006

Background

Isle of Pines is a small water system with 18 connections in Lexington County, SC. In 2000, the owner of the system for 20 years died and left the operation of the system to his widow, who faced many challenges in operating the failing system.

Public Health Challenges

Along with a poor-quality groundwater source that was not monitored for contaminants, distribution line breaks were common. This led to constant interruptions in service and numerous boil water orders, and resulted in the system's customers relying on purchasing bottled water for drinking.

Capacity Issues

Technical	▶ Low-quality water source. ▶ Frequent distribution line breaks. ▶ Leaking storage tank.
Managerial	▶ The widowed operator was unable to comply with relevant drinking water regulations. ▶ No properly trained and certified operator.
Financial	▶ Insufficient revenue, reserves, and access to capital needed to replace aging infrastructure.

Actions: Ownership Transfer

✓	The owner petitioned the South Carolina Public Service Commission (PSC) to abandon the system and was told to find a replacement owner.
✓	South Carolina Capacity Development staff coordinated two community meetings to explore the failing water system's options and to assess the possibility of connecting with the nearby town of Chapin.
✓	In 2004, the Lexington County Public Works Department received a $106,000 Drinking Water State Revolving Fund (DWSRF) loan to extend drinking water service to the Isle of Pines system from the town of Chapin.
✓	In 2005, Lexington County installed over 4,000 feet of drinking water lines to connect the smaller system to the town of Chapin, which operates the system and will assume ownership once the DWSRF loan has been repaid.

Outcomes

💧	Through the combined efforts of town, county, state, and PSC staff, the system now has a high-quality water source and is operated by a properly trained and certified operator.
💧	Customers have consistent, high-quality drinking water, and boil water orders have been eliminated.

Questions about South Carolina's Capacity Development Program? Contact David Price • South Carolina Department of Health and Environmental Control • 2600 Bull Street • Columbia, SC 29201 • (803) 898-3993 • PRICEDC@adhec.sc.gov

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System Capacity Development Case Study

Eastern Wyoming Public Service District, West Virginia, 2000 – 2008

Background

Many drinking water systems in eastern Wyoming County, WV, were built by coal companies during the first half of the 20th century. Residents struggled to keep these water systems viable after the mining companies left the area and turned over control of the systems. Many systems were maintained by local volunteers, resulting in erratic service, deteriorating infrastructure, and potentially unsafe drinking water. The Eastern Wyoming Public Service District (EWPSD) is a new regional water system formed by the county commission that will eventually consolidate 15 of these systems with a total population of about 6,500 persons.

Public Health Challenges

The 15 aging water systems suffered from serious microbiological contamination, irregular water service, inadequate disinfection, and aging distribution systems subject to frequent line breaks. The systems had numerous health-based and monitoring and reporting violations, and several systems had been under boil water orders for years. Recent flooding exacerbated many of the public health challenges facing these systems.

Capacity Issues

Technical	▶ Aging distribution systems and treatment plants. ▶ Frequent distribution line breaks. ▶ Inadequate raw water treatment.
Managerial	▶ After mining companies left, the systems had no certified or properly trained operators to oversee operations.
Financial	▶ Inadequate rates and bill delinquency led to a lack of funds to rehabilitate the aging systems.

Actions: Ownership Transfer

✓	In 2000, the Public Service Commission of West Virginia placed five systems into receivership. Neighboring Logan County Public Service District assumed the operation of the five systems.
✓	The West Virginia Capacity Development team assessed the five systems and four others close by and recommended physical consolidation of the systems to address their capacity issues.
✓	EWPSD was formed to consolidate the 15 drinking water systems through physical interconnection and construction of a single regional water treatment plant. Funding includes $3.5 million from the Drinking Water State Revolving Fund (DWSRF). EWPSD has established a more appropriate rate structure and pricing.
✓	The first phase of the consolidation, interconnecting seven systems and constructing a new regional treatment plant, is under way and scheduled for completion in fall 2006.

Outcomes

💧	Upon completion, the EWPSD will replace 15 small, failing water systems with a single larger, viable water system providing 6,500 eastern Wyoming County residents safe, reliable drinking water.
💧	The EWPSD will also extend drinking water service to several previously unincorporated areas.

Questions about West Virginia's Capacity Development Plan? Contact Richard Watson • West Virginia Bureau for Public Health • Capitol and Washington Streets • 1 Davis Square, Suite 200 • Charleston, WV 25301-1798 • (304) 558-6747 • richardwatson@wvdhhr.org

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