



Gaining Operational and Managerial Efficiencies Through Water System Partnerships

CASE STUDIES



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Drinking water systems, especially small systems serving 3,300 or fewer customers, often face significant challenges in providing safe, reliable drinking water to their customers. These challenges require water system managers to make decisions on a range of issues. Management decisions for water systems should start with the concept of “level of service”—criteria that establish what the system’s customers expect in terms of product quality and service.

Once a level of service has been established, a system can determine which short-term and long-term technical and financial issues it needs to tackle. Short-term issues focus primarily on operations and maintenance (O&M). Longer-term issues are those associated with infrastructure needs, quality of source water, decisions about adequacy of treatment, and questions about the availability of water resources to meet consumer demand. These longer-term issues have often been ignored because of the legacy of capital investment made by previous generations. As infrastructure ages, however, these issues must be addressed. At some point, systems may need to change the way they do business. Forming partnerships with other systems is a proven approach that can provide systems with a wide range of options and benefits.

Partnership options can range from informal arrangements, such as sharing equipment, to transferring ownership of a system through consolidation (see Exhibit 1). Neighboring systems can physically connect and share treatment and infrastructure. For example, small systems whose source water exceeds a maximum contaminant level (MCL) may find it is more cost-effective to connect to a nearby regional system than to install treatment and comply with the MCL. Or, to reduce administrative and operating costs, several systems might agree to create a Joint Powers Agency or to consolidate under common regional ownership or management while maintaining separate infrastructure and treatment.

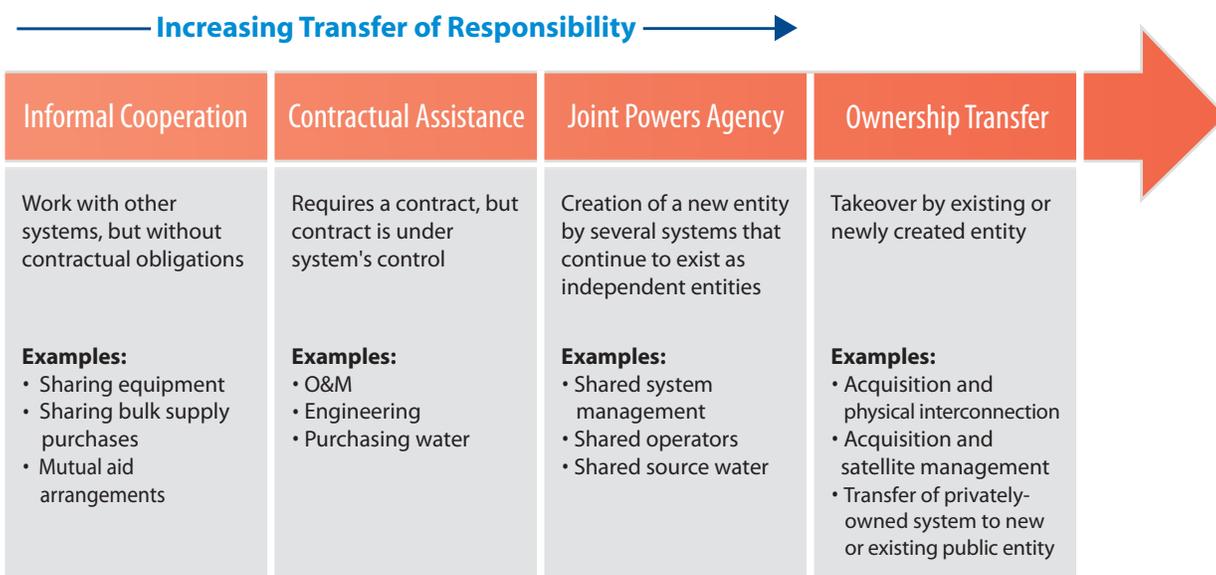


Exhibit 1: The System Partnership Spectrum

The potential benefits of partnerships are numerous and significant:

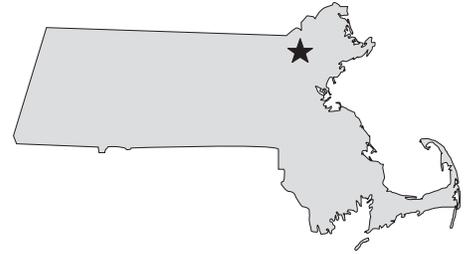
- From an economic perspective, partnerships can help reduce capital and operating costs and prices (per gallon of finished water produced) through increased economies of scale.
- From a financial perspective, partnerships can help raise the capital needed to replace and improve aging water-delivery infrastructure.
- From an engineering perspective, partnerships can improve operational performance through wider use of trained operators and advanced treatment technologies.
- From a natural resource perspective, partnerships can enhance environmental protection, resource conservation, and contingency planning for conditions of scarcity, brought about by natural or other supply emergencies, through increased coordination and integrated planning.

States can also realize important benefits from system partnership activities. For example, partnerships can be an effective means for helping small water systems achieve and maintain technical, managerial, and financial (TMF) capacity, thereby reducing the oversight and resources that the state will need to devote to these systems.

The case studies profiled on the following pages provide examples of the many ways systems can form partnerships, and of the managerial and operational efficiencies and other important benefits that system partnerships can provide.

Northeast/Merrimack Valley Consortium of Water and Wastewater Facilities, Massachusetts

The Northeast/Merrimack Valley Consortium of Water and Wastewater Facilities (MVC) is a group of northeastern Massachusetts communities that informally cooperate to purchase supplies in bulk. It is made up of 35 towns and their water and wastewater systems. The MVC has helped the systems reduce costs by using their combined purchasing power and negotiating lower prices from vendors. The systems also benefit from sharing information and experiences.



FACTORS LEADING TO THE PARTNERSHIP

Before the partnership was formed, the water systems individually negotiated prices for supplies and chemicals. Because each system had relatively limited needs, it paid a high price for water treatment chemicals and laboratory supplies. Consequently, systems spent resources on supplies that could have been used to meet other needs.

KEY PLAYERS AND DRIVERS

While the systems themselves were the drivers of the partnership, the chief operator of the Tewksbury water treatment plant played a leading role in organizing the founding cities and towns. The MVC has evolved over time. It initially focused only on purchasing laboratory supplies in bulk. As the benefits of bulk purchasing became apparent, the consortium quickly expanded its scope to include treatment chemicals and other goods and services.

Each year one system serves as the “buying agent” and two other systems provide support so that over the next 2 years, when they become the buying agents, they have the necessary skills and knowledge to negotiate purchase agreements. In this way, all the systems share responsibility and each eventually leads the buying process. This arrangement is designed to maintain institutional knowledge about purchasing and ensure continuity in negotiating with vendors.

The MVC’s members have other opportunities to share information on the wide variety of issues. In a series of five annual meetings the systems determine their needs and then negotiate and finalize agreements with vendors. Each meeting also provides an opportunity for participating systems to share challenges and best practices. Members are expected to meet American Water Works Association standards and honor contracts made through the consortium. The systems cannot pursue vendors independent of the MVC. This informal system of self enforcement has made the partnership a success.

Partnership Snapshot
Informal Cooperation
35 municipal systems negotiate for and purchase laboratory supplies and treatment chemicals together.
Timeline
Mid-1980s: MVC is formed

BENEFITS OF THE PARTNERSHIP

The partnership provides a way for member systems to reduce costs and build operational and managerial efficiencies. Specific benefits are presented below.

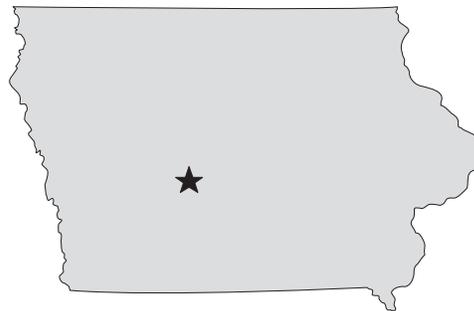
Benefits	
Technical	
✓	Shared service: Purchasing in bulk has enabled the MVC to establish contracts with suppliers and maintain a secure supply of treatment chemicals.
✓	High-quality products and service: The MVC has the power to hold vendors accountable when contractual obligations are not met and can stop doing business with vendors whose goods or services do not meet MVC standards.
Managerial	
✓	Information sharing: Regular meetings provide opportunities for systems to share experiences, challenges, and best practices.
Financial	
✓	Economies of scale: MVC partner communities have reduced the average long-term costs of operating treatment plants by purchasing treatment chemicals in bulk rather than in small quantities.
✓	Economies of scale: MVC partner communities have more vendors competing for their business, which gives them more options when soliciting bids.
✓	Reduced costs: Purchasing in bulk enables the systems to reduce purchasing expenses and allocate those resources to other system needs.

LESSONS LEARNED

The partnership has been so successful it has had to limit membership to communities and systems in a defined geographic area. Since the MVC's initial formation, some systems have left the consortium and formed similar, but smaller, consortiums along Massachusetts' south shore. The MVC's founders succeeded in forming a partnership that meets its members' common needs and provides them with significant financial benefits without requiring communities to give up local control of the water systems.

City of Panora Water System, Iowa

The City of Panora Water System has formed beneficial partnerships with its neighbors in central Iowa through contractual assistance. Panora is a municipal water system that serves 1,200 persons and has 700 connections, most of them residential. It cooperates with nearby public and privately owned water systems and districts. This cooperation has helped Panora improve its water quality by interconnecting to another source, enhancing the capabilities of its staff through training, and reducing its treatment costs.



FACTORS LEADING TO THE PARTNERSHIP

Panora faced technical, managerial, and financial challenges before it reached out to neighboring systems. High nitrate levels during the spring and early summer exceeded the maximum contaminant level by 20 to 40 percent. The system had difficulty retaining operators and came to rely on operators from the Des Moines Water Works (DMWW) to fill in occasionally. Panora lacked the financial resources to pay competitive wages to attract a certified operator and to install nitrate treatment.

KEY PLAYERS AND DRIVERS

To overcome the high nitrate levels, Panora worked with the Lake Panorama Water Company (LPWC) to install a water line between the systems so Panora could buy water to blend with its high-nitrate source water, as needed.

Panora has cooperated with the LPWC and the Xenia Rural Water District to complete a joint water study and assess potential partnerships. Many of the options identified in the study are still being evaluated by the three systems, while plans are being made to implement some of the recommendations. Panora also conducted a pilot test of an arrangement in which the DMWW remotely monitored the Panora treatment plant.

Partnership Snapshot
Contractual Assistance with Interconnection
Panora has partnered with neighboring systems to purchase water and receive training.
Timeline
2002: Panora interconnects with Lake Panorama Water Company
2003: DMWW starts to remotely monitor Panora's treatment plant

BENEFITS OF THE PARTNERSHIP

The informal cooperative created a mechanism for building operational and managerial efficiencies in Panora. Specific benefits are presented below.

Benefits	
Technical	
✓	Shared infrastructure: Panora installed a water line to interconnect its clear well at the treatment plant with the LPWC so Panora can purchase water from the LPWC's low-nitrate source. To overcome the high nitrate levels it faces periodically, Panora simply opens the valve from the new line to mix in LPWC's finished water. The blending reduces the concentration of nitrates to acceptable levels so Panora's finished water meets the nitrate MCL.
Managerial	
✓	Expertise: Panora's operators obtained additional certifications and then worked with DMWW operators to identify ways to streamline operations. This relationship helped Panora quickly build in-house expertise.
✓	Efficiency: The DMWW's remote monitoring of the Panora treatment plant has reduced the demand for on-site operators and freed employees for other duties.
Financial	
✓	Reduced long-term costs: By outsourcing treatment plant monitoring, Panora avoided the cost of installing and operating nitrate treatment and of hiring extra personnel.

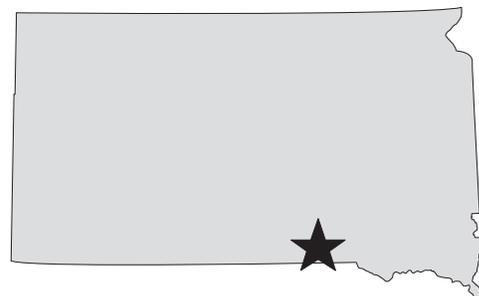
Another benefit of the partnership is a continued dialogue with neighboring systems focusing on water efficiency and determining better ways to treat and distribute water in the region. In hindsight, Panora wishes it had laid two parallel pipes interconnecting to LPWC. If these pipes had been installed, Panora could transport raw water from the LPWC wells, treat it at its water treatment plant, and send the finished water to the LPWC for distribution. The LPWC has its own treatment plant, but it is much older than Panora's, which may be more economical to operate and could provide backup to the LPWC plant.

LESSONS LEARNED

System-driven efforts to reach out and cooperate with neighboring systems can lead to more efficient uses of limited personnel resources. In this case, the small system of Panora was able to significantly reduce its costs and improve capacity. By diversifying water sources, the Panora system addressed technical treatment challenges presented by its original source. Overcoming what would otherwise be an expensive challenge can be easily accomplished when systems are able to work together and make small, mutually beneficial changes. The systems discussed here have learned to continue a dialogue to anticipate and work together to meet future needs.

Tripp County Water User District, South Dakota

The Tripp County Water User District (TCWUD) comprises eight interconnected, independent systems serving over 2,700 customers in southern South Dakota. The water systems operate and maintain their own distribution systems. The partnership has helped the systems overcome water shortages and improve water quality by interconnecting and distributing water from a higher quality source.



FACTORS LEADING TO THE PARTNERSHIP

Before the partnership was formed, the area communities faced technical challenges related to water quantity and quality. For example, two of the seven wells in the town of Burke became infected with iron-eating bacteria and no longer met drinking water standards. Many of the other systems had nitrate concentrations approaching the maximum contaminant level. Four counties experienced water shortages and contamination problems.

KEY PLAYERS AND DRIVERS

TCWUD's expansion was started by a request from the nearby Rosebud Sioux Tribe to extend service to one of its communities. During the planning and proposal phase, additional rural farmsteads and communities that depend on confined aquifers or limited surface water opted to interconnect and buy water from the TCWUD. The project eventually grew to include the original Sioux area and seven additional communities.

State funding sources and South Dakota's governor were key supporters of the TCWUD's interconnection project. In 2002, the state approved \$3,648,000 in Drinking Water State Revolving Fund (DWSRF) loans for the TCWUD to expand its rural water systems and extend its service line to connect with seven other communities in the area. The funds made a major contribution toward the over \$6 million total estimated cost of the expansion and consolidation. To encourage consolidation, the state DWSRF gives a significant point value in its funding priority rating system to proposals that include the expansion of rural water systems. In the context of state project review, consolidation aimed at improving overall system efficiency or viability is encouraged.

The TCWUD effort was also supported by the state Consolidated Water Facilities Construction Program. The program provides funding for water, wastewater, and watershed projects across South Dakota. In 2006, the TCWUD received a \$350,000 grant from the program to expand to a system serving 155 customers. This project also received support from top elected officials when Governor Mike Rounds endorsed it.

Partnership Snapshot	
Interconnection of stand-alone systems	The systems served by TCWUD continue to operate and maintain their own distribution systems without TCWUD's involvement.
Timeline	2002: The state approves funding for interconnections between seven systems 2006: The state approves funding for interconnection to an additional system

BENEFITS OF THE PARTNERSHIP

The interconnection of the eight stand-alone systems created a mechanism for building operational and managerial efficiencies in the area. Specific benefits are presented below.

Benefits	
Technical	
✓	Higher quantity source water: Systems connected to the TCWUD are able to meet their projected maximum demands for the future.
✓	Higher quality source water: Partner communities now receive treated water from wells drilled into the Ogallala aquifer and no longer need to deal with nitrate problems. TCWUD nitrate concentrations for all communities are less than 50 percent of the maximum contaminant level.
✓	Shared infrastructure: All of the communities benefit from TCWUD’s treatment plant, and five communities share a transmission pipeline that runs along a local highway.
Managerial	
✓	Expertise: The partnership has created a forum for the systems to share expertise and to work together to solve common problems.
Financial	
✓	Economies of scale: The TCWUD decreases long-term average maintenance and monitoring costs, which has helped reduce labor costs.
✓	Reduced costs: The TCWUD has helped partner systems cut operating expenses. Some systems save about \$3,000 a year in water testing.
✓	Reduced cost: Burke, a town with a population of 680, opted to hook up to TCWUD and avoid an upfront investment of roughly \$90,000 to dig replacement wells.

Another benefit of the partnership is a shift to sustainable water management. Many of the communities in the area spend slightly more per gallon of water than they did as independent systems. However, the TCWUD provides a consistent supply of higher quality water, and the higher rates represent a move toward full-cost pricing.

LESSONS LEARNED

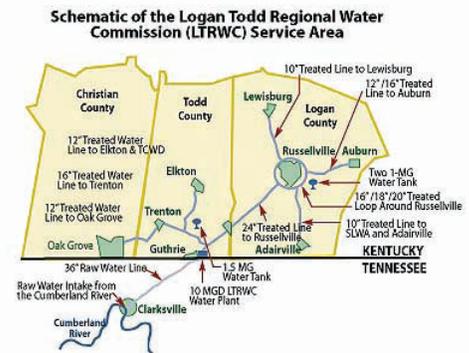
The TCWUD has been successful because it has received support from local groups and top elected officials. This broad base of support helped the TCWUD secure funding from the state. Despite the large upfront costs, the partnership, and associated infrastructure, was the most cost-effective alternative compared to each system solving source water problems alone.



At the TCWUD Open House

Logan-Todd Regional Water Commission, Kentucky

The Logan-Todd Regional Water Commission (LTRWC) is a Joint Powers Agency in southwest Kentucky, bordering Tennessee. LTRWC is made up of a dozen municipal and county water systems, with all but one located in Logan and Todd counties. Each system serves between 395 and 3,300 customers (meters), and 7 of the 12 serve fewer than 1,000 customers. The partnership has helped the systems overcome water supply shortages by teaming together to develop a new surface water supply and regional distribution system.



FACTORS LEADING TO THE PARTNERSHIP

Before the partnership was formed, the systems suffered from a variety of technical issues related to water quantity and quality. A drought in 1988 prompted Russellville (Logan County) and its neighboring communities to start looking for new water supplies after water shortages became a problem. The search for alternatives gained momentum in 1990 when a poultry company was willing to locate a processing plant in Russellville if the city could deliver one million gallons of water to the plant each day. At this time, several other water systems in Logan and Todd counties were struggling with poor raw water quality. Oak Grove (Christian County) was searching for an alternative water supply after realizing that the spring feeding its supply was also vulnerable to drought. The combined technical issues were most effectively addressed by building partnerships between the affected systems.

KEY PLAYERS AND DRIVERS

Local government was a key driver leading to the formation of the LTRWC. In 1990, the water supply shortage and its potential to limit future economic development led the Logan County Chamber of Commerce to form a committee and develop a long-term study of water in the region. This action provided key information about the area and helped lay a path to the formation of the LTRWC.

A new water source was needed to address the short- and long-term quantity and quality issues faced by the area’s systems. Shortly after its creation, the LTRWC determined that the Cumberland River in Clarksville, Tennessee, was the best available source of water. But in order for the river to be a viable supply option, several infrastructure projects were necessary, including a treatment plant at the source, a transmission line, and interconnections between the water systems. The scale of these projects created a major obstacle: funding.

The Kentucky Drinking Water State Revolving Fund and the state rural development agency each had a limit of \$1.5 million on its loans. However, the prospective benefits of the LTRWC project created an incentive for the state funding agencies to change their approach. Additionally, the United States Department of Agriculture Rural Development Office offered significant support by committing to long-term financing in the amount of \$49.8 million. By dividing the project into multiple phases, and funding each phase separately, the entire \$77.5

Partnership Snapshot	
Joint Powers Agency with	Interconnection
12 autonomous water systems	maintain ownership, and operating and maintenance responsibility for their distribution infrastructure.
Timeline	
1988:	Drought prompts systems to consider alternative water sources
1990:	Long-term water study is commissioned by local chamber of commerce
1995:	Logan-Todd Regional Water Commission is formed
2000:	Construction begins
2003:	Water delivery begins

million project was eventually funded. In addition, the governor provided state budget surplus grants to the project in 1998 and 2000. These grants were an important source of early funding for the LTRWC. The state, therefore, played an important role in making the project a reality.

As the project began and the transmission line was being developed, Oak Grove became the twelfth and most recent addition to the LTRWC. Although the city had planned to build a new treatment plant for its current source, it recognized that the source was inadequate. As a result, Oak Grove decided to join the LTRWC in order to meet its water needs more effectively.

BENEFITS OF THE PARTNERSHIP

The Joint Powers Agency created by the 12 systems created a mechanism for building operational and managerial efficiencies. Specific benefits are presented below.

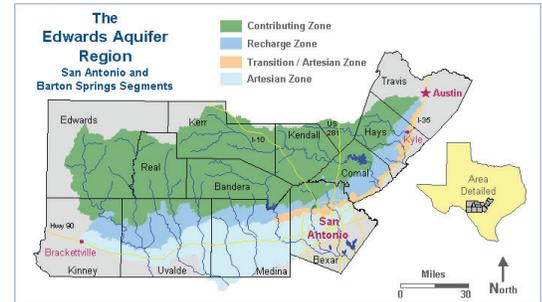
Benefits	
Technical	
✓	Higher quality/quantity source water: The LTRWC serves its customers water from the Cumberland River in Clarksville, Tennessee, which is a higher quality and more sustainable water source.
✓	Shared infrastructure: The LTRWC installed an 85-mile transmission line to provide its customers with an ample, high-quality supply.
✓	Better treatment technologies: The LTRWC built and operates a state-of-the-art filtration plant that uses membrane micro-filtration after conventional pre-treatment.
Managerial	
✓	Efficiency: The partnership eliminates the unnecessary duplication of services and provides for a more efficient use of resources.
✓	Efficiency: The LTRWC now relies on a single large water source instead of nine smaller and lower quality sources as its members did in the past. This situation allows each system to focus more on distribution instead of treatment.
✓	Retaining local control: Each distribution system addresses unique local issues (and bears the burden of solving local problems), including how to decommission unneeded treatment plants, and how to retire any remaining debt on those facilities.
Financial	
✓	Economies of scale: The LTRWC has decreased long-term average costs associated with purchasing supplies, contracting/allocating resources to construction, and creating operational improvements.
✓	Reduced long-term costs: Each partner distribution system pays the same wholesale rate for water regardless of size or location. This arrangement reduces predicted future water costs compared to other alternatives.

LESSONS LEARNED

The success of the LTRWC was driven by local initiative and involvement. It would not have started had several water systems failed to realize they shared common goals and then found a way to develop a common solution. The local efforts were supported by state water officials, as well as by top elected officials, and their support led to innovative funding strategies that helped make the project a reality. The LTRWC could not have been possible without a broad coalition of partners, including the 12 communities that benefited from the successful outcome.

Canyon Regional Water Authority, Texas

The Canyon Regional Water Authority (CRWA) is a Joint Powers Agency composed of 11 water systems in south-central Texas. The CRWA serves over 135,000 persons in an area covering 618 square miles. The partner systems are municipal and regional systems under both public and private ownership. The partnership has helped the systems limit unsustainable aquifer withdrawals by developing alternative water sources, purchasing water in bulk, and planning for long-term sustainability.



FACTORS LEADING TO THE PARTNERSHIP

The overriding challenge facing the area before the partnership was the over-pumping of the Edwards Aquifer. Systems in the area were withdrawing water faster than the aquifer was being recharged. As a result, withdrawals needed to be limited and alternative sources of water needed to be developed for consumers not directly over the aquifer.

KEY PLAYERS AND DRIVERS

The state, through the Texas Water Development Board, was the driving force behind the development of the CRWA. Responding to the unsustainable use of the aquifer, the Texas Water Development Board and the Edwards Underground Water District pushed the state legislature to form an entity that would help manage the regional resource. In 1989, the state legislature formed the CRWA.

Besides pushing for the formation of the CRWA, the Texas Water Development Board has helped finance projects in the area. Upon the CRWA's creation, the Texas Water Development Board awarded the system a 50 percent matching fund grant to develop a regional plan to adequately supply the area in the future and to focus on alternative water sources outside the Edwards Aquifer. In 2000, the Texas Water Development Board approved a \$10 million loan from the Texas Water Development Fund to help CRWA improve its distribution system.

Partnership Snapshot

Joint Powers Agency with Interconnection

CRWA is responsible for acquiring, treating, and distributing drinking water for the six partner systems.

Timeline

- 1989: CRWA was created by the state legislature
- 2000: CRWA received a loan to improve its distribution system

BENEFITS OF THE PARTNERSHIP

The Joint Powers Agency created a mechanism for building operational and managerial efficiencies in the 11 systems in the area over the aquifer. Specific benefits are presented below.

Benefits	
Technical	
✓	Shared infrastructure: CRWA operates the Lake Dunlap Water Treatment Plant (16.4 MGD) and the Hays/Caldwell Water Treatment Plant on the San Marcos River (6 MGD).
✓	Shared infrastructure: CRWA operates 37 miles of transmission mains, 4.0 and 3.0 MG ground storage tanks, a booster pump station, as well as 1.5 MG and 2.0 MG elevated storage tanks.
Managerial	
✓	Expertise: CRWA maintains a larger staff and has more expertise than the independent systems did. Consequently, the CRWA can offer better customer service, manage assets more effectively, and plan for the future.
Financial	
✓	Economies of scale: CRWA is working with its members to acquire future water rights from groundwater and surface water in the Cibolo, Guadalupe, San Antonio and San Marcos river basins. CRWA is also working with its members to develop a well field in the Carrizo/Wilcox Aquifer in Gonzales and Guadalupe counties.
✓	Economies of scale (bulk purchasing): CRWA is a major purchaser of raw water stored by the Guadalupe Blanco River Authority at Canyon Lake, which CRWA diverts to Lake Dunlap for treatment. CRWA also purchases water from Springs Hill Water Supply Corporation.

Another benefit of the partnership is a shift to sustainable water management. CRWA is mandated to encourage water conservation, reduce reliance on an uncertain future supply of groundwater, and protect, preserve, and restore the purity of water in the area. CRWA takes a watershed approach to water management in the area, and it helps limit withdrawals from the Edwards Aquifer to promote its sustainable use, which is especially important during droughts.

LESSONS LEARNED

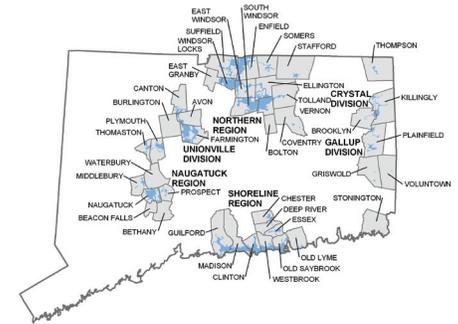
State-driven efforts can lead to a sustainable use of a common resource. Using its authority, the state was able to bring together the relevant systems and create a mechanism that has helped systems in the area provide high-quality water in the short run and plan for the long run. This type of regional management may not have been achievable by the independent systems alone.

Ellsworth Estates Water Company / The Connecticut Water Company, Connecticut

The Ellsworth Estates Water Company was a small privately-owned groundwater system serving 82 homes in north-central Connecticut. The system transferred its ownership to the Connecticut Water Company (CWC) as part of a state-mandated process in which it was first operated as a satellite system and later connected to CWC. The ownership transfer helped Ellsworth overcome its lack of managerial capacity and improved its water quality through the interconnection.

FACTORS LEADING TO THE PARTNERSHIP

Prior to transferring its ownership to the CWC, Ellsworth was confronted with several managerial and technical issues. The greatest challenge was a lack of managerial capacity stemming from the loss of one of the two owner/operators in 1991. The remaining elderly owner notified the State of Connecticut that he was unable to run the system on his own and petitioned the State for a transfer of ownership. A closer examination of the system by the state revealed old and undersized piping, pressure switches, tanks, and booster and well pumps. The system also lacked an air compressor or air control, blow-off valves, meters, hydrants, and standby power equipment. The system's pressure tanks were also water logged. As a whole, the system suffered from inadequate volume and pressure, and the wells had never been yield tested. Because the system failed to provide adequate water pressure to its customers, it was in violation of state regulations.



Connecticut Water Company Service Area Map

KEY PLAYERS AND DRIVERS

The State of Connecticut was the key driving force behind the ownership transfer and resulting satellite management. In the 1980s, Connecticut developed a comprehensive approach to compel troubled small systems to consolidate with larger well run systems. The state also adopted regulations to ensure that any new small systems being developed were done so in accordance with strict guidelines, in an effort to enhance their long-term viability. To address the Ellsworth situation, representatives of the two relevant state agencies—the Department of Public Health (DPH) and the Department of Public Utility Control (DPUC)—formed the “authority” responsible for determining what water company or municipal system was best suited to acquire Ellsworth. By law, the authority was required to consider the technical, managerial, and financial capacity of the acquiring system. The authority was also required to consider rate differences and the impact of rate changes.

The state authority determined that the acquiring system would need to address the low pressure problem at Ellsworth and make improvements needed due to the age of the system. In addition, the acquiring system needed to have the capacity to provide for future growth in the area. The state authority chose the CWC to acquire Ellsworth as a satellite system from among five water systems because the CWC met the outlined criteria, including being in close proximity to the Ellsworth system and having the financial capacity to make necessary improvements.

Partnership Snapshot
Ownership Transfer with Interconnection
The State of Connecticut mandated the ownership transfer. CWC first operated Ellsworth as a satellite system, but later interconnected with the system because of water quality problems.
Timeline
1991: One of two system owner/operators is lost
1993: Ownership transferred to CWC
1994: Ellsworth interconnected to CWC

After the ownership transfer in 1993, the CWC ran the Ellsworth system as a satellite. However, the next year the CWC detected nitrate levels nearing the MCL in one of Ellsworth’s wells. Since the distribution system did not ensure adequate dilution, CWC took the well offline as a precaution. Because of this water quality problem, the CWC requested and received state approval for the interconnection.

BENEFITS OF THE PARTNERSHIP

The state-mandated ownership transfer created a mechanism for building operational and managerial efficiencies at Ellsworth. Specific benefits are presented below.

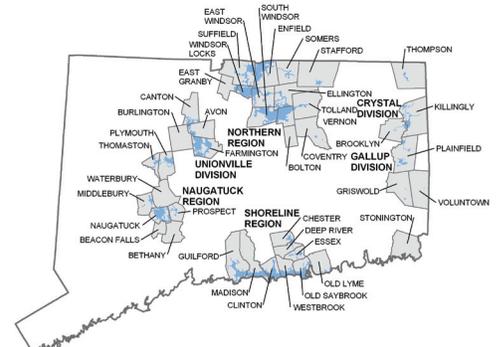
Benefits	
Technical	
✓	Shared infrastructure: After initially running Ellsworth as a satellite system, the CWC built a 6,400-foot interconnection to Ellsworth from the CWC’s northern region. That region had an average daily demand of 10.0 MGD and a total supply of 15.25 MGD, which left a sufficient surplus for Ellsworth and for future growth.
✓	Trained and certified operators: With more than 30 highly trained and certified operators, the CWC had the technical personnel to take over and operate Ellsworth as soon as ownership was transferred.
Managerial	
✓	Expertise: The CWC has the technical and managerial expertise to ensure reliable and efficient service to current Ellsworth customers and enough staff capacity to serve additional customers in the future.
Financial	
✓	Better access to funds: The CWC was chosen because it had the financial resources to make all of the necessary improvements to Ellsworth.
✓	Reduced costs: Ellsworth’s customers paid an average of \$31 per quarter prior to the partnership. If the 82 Ellsworth customers were required to bear the cost of the necessary capital improvements alone, their water bills would have risen to an average of \$250 per quarter. After the consolidation, the Ellsworth customers paid the existing CWC rate of approximately \$80 per quarter.
✓	Economies of scale: After the consolidation, costs for the interconnection and upgrades were spread over a larger consumer base. The rate increase needed to pay for the improvements was applied to all 59,540 CWC customers as well as to the customers of the former Ellsworth Estates Water Company.
✓	Economies of scale: The CWC also reduced costs associated with operating Ellsworth by connecting the satellite to the main system. The CWC received an engineering bid of \$272,000 for the interconnection, compared with the estimated cost of capital improvements for running Ellsworth as a satellite system of between \$290,000 and \$416,000, depending on treatment needs. In addition, the annual cost of operating Ellsworth as a satellite system could have reached \$81,000, while the annual cost of maintaining the interconnection was approximately \$1,011.

LESSONS LEARNED

The success of Ellsworth/CWC shows that state-led ownership transfers can benefit all parties. CWC gained customers through the ownership transfer and expanded its service area with the interconnection. Ellsworth customers now receive safe drinking water at a reasonable cost, and the owner of the Ellsworth system was able to retire. This was possible because of the state’s approach and its legal framework, which facilitated a straightforward solution.

White Sand Beach Water Company, Inc./ The Connecticut Water Company, Connecticut

The White Sand Beach Water Company (WSBWC) was a small, privately owned water system serving 148 seasonal customers in south-central Connecticut. The Connecticut Water Company (CWC) is the second-largest investor-owned water system in Connecticut, currently serving over 286,000 persons in 41 communities. The ownership transfer and interconnection of the WSBWC to the CWC helped the WSBWC overcome water shortages and financial limitations by linking to a system with greater production capacity and by increasing rates to more accurately reflect the cost of providing safe, reliable water.



Connecticut Water Company Service Area Map

FACTORS LEADING TO A PARTNERSHIP

Before ownership was transferred, the WSBWC faced several technical problems related to water quality and quantity. Water pressure throughout the system depended to a great extent on the number of users. During periods of peak consumption, especially around the Fourth of July holiday, WSBWC customers experienced pressure problems. WSBWC customers were sometimes exposed to health risks associated with high sodium levels, nitrates, and possible contamination from saltwater intrusion and the proximity of supply wells to nearby septic systems. Although the WSBWC had long maintained a positive revenue stream, system maintenance and upgrades had historically been deferred and as a consequence the system generally failed to meet current standards designed to protect public health.

KEY PLAYERS AND DRIVERS

The WSBWC determined that the best way to solve its technical and financial problems was for it to be sold to a large system. The CWC operated the nearby Sound View Water System as a satellite system and was interested in acquiring the WSBWC. In 2000, the companies jointly approached the state and received approval for the sale and interconnection of the WSBWC to the CWC.

Partnership Snapshot
Interconnection to a Satellite System
Confronted with technical and financial challenges, WSBWC sold itself to CWC.
Timeline
2000: The state approved the sale and interconnection

BENEFITS OF THE PARTNERSHIP

The sale and interconnection to the CWC satellite system built operational and managerial efficiencies at the WSBWC. Specific benefits are presented below.

Benefits	
Technical	
✓	Shared infrastructure: After the sale, the CWC completed a \$412,000 infrastructure improvement project and installed 7,800 feet of 8-inch main to connect the WSBWC to the CWC satellite system.
✓	High quality/quantity water: Customers now have access to a safe and adequate water supply in addition to improved fire protection services along the new main, which ensures the community's safety.
Managerial	
✓	Expertise: The CWC offers 24-hour customer service, possesses an inventory of repair and replacement parts, and staffs knowledgeable and experienced engineers, activities that were beyond the capacity of the independent system.
Financial	
✓	Access to funds: The CWC has the financial and managerial resources necessary to implement a capital improvement program to meet growing demand and ensure future regulatory compliance.

Another benefit of the partnership is a shift to sustainable water management by bringing the former WSBWC system closer to achieving full-cost pricing. Prior to the transfer in ownership, customers of the WSBWC were paying \$109.44 a year for water service between April and November. With the consolidation, customers' rates were raised to \$302.61 a year for seasonal use. The rate hike was necessary to ensure a continued safe supply of water, complete necessary infrastructure improvements, and provide WSBWC customers with increased service.

LESSONS LEARNED

Interconnecting to a larger satellite system overcame the challenge faced by a system that was too small to effectively address its water quality and infrastructure issues. The ownership transfer has helped spread the cost of making improvements to the system.

Prairieon Water Company/ Indiana American Water Company, Indiana

The Prairieon Water Company was a small private water system serving 675 persons in western Indiana. The Indiana American Water Company (IAWC) is privately owned and serves over 700,000 persons in 35 cities and towns across the state. The ownership transfer and interconnection of Prairieon to IAWC helped overcome Prairieon's water quality problems by linking to a system that has greater production capacity and a higher quality water source.

FACTORS LEADING TO THE PARTNERSHIP

Before the interconnection with IAWC, Prairieon was challenged by diminishing source water quality. Routine monitoring between 1997 and 2000 found nitrate levels in excess of the Maximum Contaminant Level. The system received citations for each of these violations, but did not have the financial capacity to address the issue.



KEY PLAYERS AND DRIVERS

The State of Indiana played a key role in the interconnection and ownership transfer. In an effort to overcome the technical challenge and financial shortcomings at Prairieon, the state helped facilitate discussions between the system and the IAWC. Prairieon and the IAWC eventually agreed on the transfer of ownership and on plans to interconnect and retire the old, low-quality well field.

The state helped fund the interconnection with a \$500,000 Drinking Water State Revolving Fund (DWSRF) loan, the first time DWSRF funds had been issued to a private water company. Prairieon qualified for the lowest available loan rate, 2.9 percent, because its median household income was only \$11,973. With the loan, Prairieon was able to abandon its plant and connect to the IAWC.

Partnership Snapshot
Ownership Transfer with Interconnection
Ownership of Prairieon was transferred to IAWC and the systems were interconnected.
Timeline
1999: Prairieon violates Nitrate Rule
2000: Prairieon, IAWC, and the state work out an agreement
2001: Ownership transfer and interconnection complete

BENEFITS OF THE PARTNERSHIP

The ownership transfer created a mechanism for the systems to build operational and managerial efficiencies. Specific benefits are listed in the box below.

Benefits	
Technical	
✓	New infrastructure: The IAWC spent \$961,205 to construct a pipeline and connect to the Prairieton system.
✓	Improved infrastructure: Since the ownership transfer, the IAWC has replaced miles of water mains and installed meters at each customer connection.
✓	High quality water source: The IAWC delivers high-quality drinking water not otherwise available to Prairieton customers.
Managerial	
✓	Expertise: The IAWC offers a level of managerial expertise that ensures more reliable and more efficient service to customers in the area.
Financial	
✓	Economies of scale: Prairieton customers were able to reduce long-term average costs by interconnecting to a larger system, instead of developing and maintaining their own water supply.
✓	Reduced cost: The IAWC was able to increase its customer base along the transmission line at reduced cost because of the infrastructure built for the Prairieton interconnection.

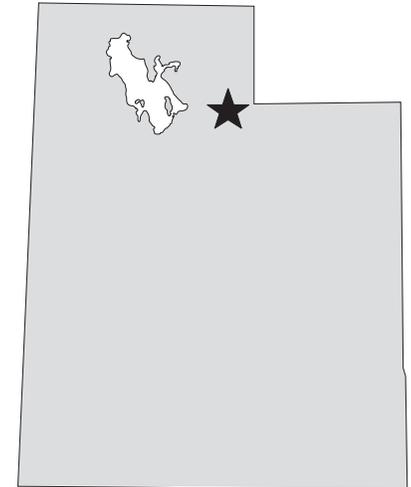
Another benefit of the partnership is a shift toward full-cost pricing. The transfer in ownership created an opportunity to install water meters and change the rate structure. Before the interconnection, customers paid a flat fee for water. With water meters installed, the IAWC was able to charge customers based on use. Although the rates for Prairieton customers did rise, especially for high-volume water users, the rates now more accurately reflect the cost of providing high-quality water to the area. This shift toward full-cost pricing helped customers see how they were using water and created an incentive for them to use water more efficiently.

LESSONS LEARNED

The success of the Prairieton interconnection rests in large part with the state. Ultimately the interconnection was the most cost-effective method for improving water quality. Through the state's facilitation of the discussions between the system and the IAWC and its financial support in the form of the DWSRF loan, the interconnection and ownership transfer were successfully completed and resulted in public health benefits for customers in the area.

Mountain Regional Water Special Service District, Utah

The Mountain Regional Water Special Service District (MRWSSD) is an example of ownership transfer with interconnection, or regionalization, in northeastern Utah. The MRWSSD is made up of more than 12 systems serving nearly 4,000 connections over most of Summit County. The systems were owned by a combination of entities. Some of the systems were small private companies set up by a housing developer to serve individual developments, two of the systems were public, and two were large private systems. The partnership has helped the systems improve water quality, reduce shortages, and improve management by building redundancy into a shared regional system and employing a team of trained and certified operators.



FACTORS LEADING TO THE PARTNERSHIP

Before the MRWSSD was formed in 2000, the systems faced significant management and technical challenges. Many of the small systems had histories of litigation over shared water resources and competition in common service areas. Many of the water quality and quantity issues facing the systems stemmed from housing development patterns. To make new developments feasible, developers needed access to a water source. Frequently, the developer-established sources were wells drilled into shallow bedrock aquifers, not the high-capacity alluvial aquifers found in the region. As a result, both water quantity and quality diminished over time. Many of these small systems were also understaffed and could afford only one part-time employee.

KEY PLAYERS AND DRIVERS

The State of Utah was one of the key drivers leading to the formation of the MRWSSD. The state's Regional Management Plan initiative led the development of regional plans, which were authorized by planning committees composed of local volunteers who were recruited by a regional coordinator. Consultants helped the regions analyze the technical and financial capacity of existing water systems, and helped the committees prepare the regional plans that discussed the prospects for sharing equipment, operators, managers, and facilities among water systems. Systems were able to comment on the draft regional plan, and their comments were incorporated into the final regional management plan. The MRWSSD is a product of this state effort to establish regional plans.

The MRWSSD was established with three goals focused on correcting the technical and managerial problems affecting the systems. The first goal was to fix water problems in the western side of Summit County by regionalizing the small and struggling water systems into the MRWSSD and using economies of scale to improve the long-term level of service in the area. The second and third goals were to help the systems in the area import water, and to organize water conservation efforts.

Two individuals also stood out as key players in the formation of the MRWSSD by acting as local champions of the effort. As a product of their efforts, Marti Gee and Doug Evans were asked by the Summit County Commissioners to leave their existing jobs and assist Summit County in the regionalization of the western side of the county. Both continue their efforts today as parts of the MRWSSD management team.

Partnership Snapshot
Ownership Transfer with Interconnection
MRWSSD combined more than 12 small systems to utilize economies of scale and improve the long term level of service in the area.
Timeline
1998: Regional Management Plan is developed
2000: MRWSSD is formed

BENEFITS OF THE PARTNERSHIP

The Special Services District created through the annexation of the 12 systems provided a mechanism for building operational and managerial efficiencies. Specific benefits are presented below.

Benefits	
Technical	
✓	Shared Infrastructure: Because water varies seasonally and spatially, the District provides for more redundancy of water source, storage, and distribution elements. When systems have shortages/problems, adjoining or interconnected partners can make up the shortfall. The interconnections enable each system to continue providing safe water and fire protection and to protect against events that it could not have in the past. The flows to and among systems are managed by a computer control system that monitors the entire basin and delivers the right amount of water, at the right time.
✓	Higher quality water: The district is a more viable public entity and can more easily meet current and future EPA and state rules and regulations that the small, independent systems could not.
Managerial	
✓	Expertise: Small water systems that could only employ one operator at most now have the full resources of the MRWSSD, which grew from one employee in 1999 to 14 in 2001.
✓	Expertise: All of the District's operators and management staff have extensive training. Mountain Regional's operational crews more effectively repair leaks and make major repairs than could the independent systems.
✓	Expertise: The District's operators and management together have over 130 years of combined water experience.
Financial	
✓	Access to funds: The District created a mechanism to pool resources and share the cost of initiating a major water importation project.
✓	Economies of scale: It is easier and more cost effective to manage a pool of assets as a whole instead of at a smaller scale. (MRWSSD operates 26 wells and springs, 19 large storage reservoirs, pumping and disinfection stations, and hundreds of miles of pipelines.)

Another benefit of the partnership is a shift to sustainable water management. A larger regional project and strategy were the only way to manage water sustainability and make infrastructure investments of real value. Although state and federal funding agencies were funding water improvements of nearly \$15 million to as many as 10 small private and public systems prior to the formation of the MRWSSD, source improvements still could not provide the needed capacity to individual systems. Under the MRWSSD, projects are scaled to make all investments count.

LESSONS LEARNED

The success of the MRWSSD was driven by a state regionalization effort and local champions who helped lead the effort. The State Regional Management Plan Initiative provided a framework for local systems to see where there was potential for building capacity by forming partnerships. Together, these two factors brought systems together in the MRWSSD. Developers are only responsible for providing water to a development, but such a narrow focus can often limit a community's ability to find, secure, and maintain sustainable sources of water. Sustainable water management only started to become a reality with the formation of the regionally focused MRWSSD.



Summit County, Utah

Possum Kingdom Water Supply Corporation, Texas

The Possum Kingdom Water Supply Corporation (PKWSC) is a consolidation of more than 60 small, privately owned community and non-community water systems in north-central Texas, approximately 90 miles west of Dallas-Fort Worth. The PKWSC serves over 1,900 connections in this popular vacation area. This full consolidation, with ownership transfers and interconnection of all the partner systems, has helped address water quality issues in the area by pooling resources for a shared treatment plant and distribution system.



FACTORS LEADING TO THE PARTNERSHIP

Before the partnership was formed, area water systems faced several technical and compliance issues. These small systems included trailer camps and individual restaurants spread across the region. Many of the systems drew water from a surface reservoir that had high levels of total dissolved solids, but the systems did not adequately address this issue. Most systems treated their water with small pressure filtration systems and chlorination, despite state regulations that require coagulation and flocculation be used to treat surface water as well. As a result, the systems were in violation of current regulations.

KEY PLAYERS AND DRIVERS

The state helped initiate the formation of the PKWSC by focusing attention on the local systems' water problems. Recognizing their common shortcomings, the small systems teamed together to form the PKWSC and create a water system they could share. Through this effort, the non-compliant systems were consolidated, and effectively replaced by a single regional distribution system.

State and federal funding sources helped make the PKWSC treatment and distribution project a reality. In 1998, the PKWSC received \$6.5 million in U.S. Department of Agriculture (USDA) Rural Development funds and \$4.7 million from the Drinking Water State Revolving Fund (DWSRF). Together, these loans helped finance the new water treatment plant and the first three phases of interconnections between systems. In 2005, the fourth interconnection phase was funded by another \$1.7 million loan and \$900 thousand grant from USDA. The interconnections were completed in 2006.

In 2006, the Texas Water Development Board authorized a \$1.6 million DWSRF loan to help finance additional improvements to the PKWSC system. Although construction is yet to begin, the PKWSC will use the loan to expand water treatment capacity, purchase support equipment, and extend service to a housing development and a state park.

Partnership Snapshot
Ownership Transfer with Interconnection
Over 60 non-compliant systems were consolidated into PKWSC and supplied water from the single distribution system.
Timeline
1992: PKWSC was formed
1998: PKWSC secures federal and state funding for a new treatment plant and interconnection
2005: PKWSC secures funding for additional interconnections
2006: PKWSC secures state funding for additional treatment and continued expansion

BENEFITS OF THE PARTNERSHIP

Consolidating the systems was an effective mechanism for building operational and managerial efficiencies in the area. Specific benefits are presented below.

Benefits	
Technical	
✓	Shared infrastructure: The PKWSC maintains a 1.0 MGD surface water treatment plant and more than 325 miles of distribution pipe. The treatment plant consists of two modular water treatment trains containing 0.5 MGD reverse osmosis units each. The third module will soon be added so the plant will operate at almost 90 percent capacity.
✓	Quality and Quantity: PKWSC customers now have access to a safe and reliable water supply.
Managerial	
✓	Expertise: The PKWSC maintains a larger staff and has more expertise than the independent systems. This situation enables the PKWSC to offer better customer service, manage assets more effectively, and plan for the future.
Financial	
✓	Economies of scale: With greater purchasing power than the individuals systems had, the PKWSC has decreased long-term average costs associated with treatment and distribution by pooling financial and technical resources.

Another benefit of the partnership is a significant gain in public health protection. In 2006, the PKWSC was awarded the DWSRF Award for Sustainable Public Health Protection because of its significant technical improvements that give area residents safe, high-quality drinking water.

LESSONS LEARNED

A realization that many small systems in the area were non-compliant and too small to effectively address water quality issues made the PKWSC possible. The consolidation has helped pool financial resources and spread the cost of installing state-of-the art technology. This resulted in a cost-effective solution to water quality issues in the area. State and federal funding sources were also critical to getting the project started.



Steel Standpipe at Possum Kingdom Water Supply Corporation

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CONTACT INFORMATION

The following system representatives have graciously provided their contact information for readers who would like more information about their system's partnership approaches and experiences.

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Visit the EPA website at www.epa.gov/safewater

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