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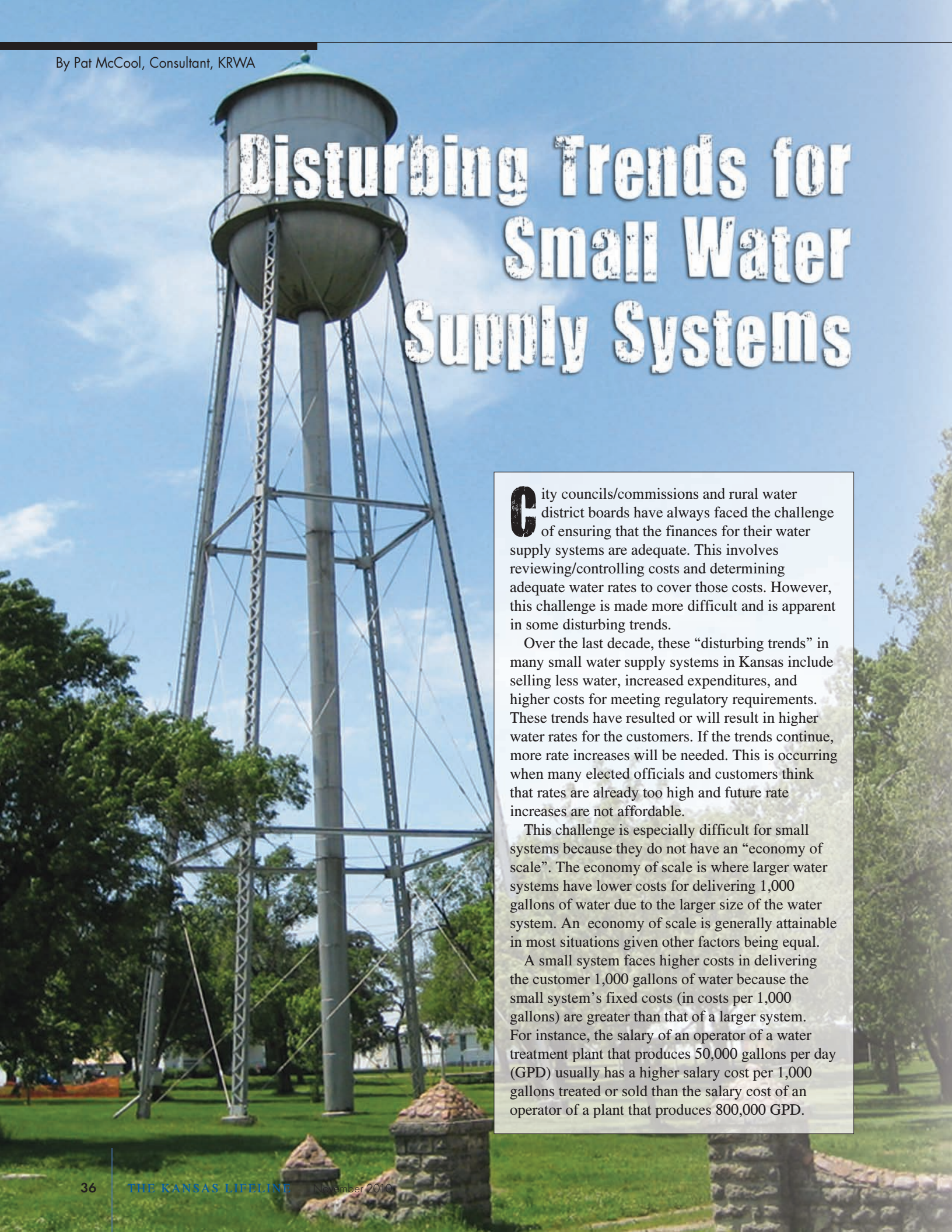
Disturbing Trends for Small Water Supply Systems



City councils/commissions and rural water district boards have always faced the challenge of ensuring that the finances for their water supply systems are adequate. This involves reviewing/controlling costs and determining adequate water rates to cover those costs. However, this challenge is made more difficult and is apparent in some disturbing trends.

Over the last decade, these "disturbing trends" in many small water supply systems in Kansas include selling less water, increased expenditures, and higher costs for meeting regulatory requirements. These trends have resulted or will result in higher water rates for the customers. If the trends continue, more rate increases will be needed. This is occurring when many elected officials and customers think that rates are already too high and future rate increases are not affordable.

This challenge is especially difficult for small systems because they do not have an "economy of scale". The economy of scale is where larger water systems have lower costs for delivering 1,000 gallons of water due to the larger size of the water system. An economy of scale is generally attainable in most situations given other factors being equal.

A small system faces higher costs in delivering the customer 1,000 gallons of water because the small system's fixed costs (in costs per 1,000 gallons) are greater than that of a larger system. For instance, the salary of an operator of a water treatment plant that produces 50,000 gallons per day (GPD) usually has a higher salary cost per 1,000 gallons treated or sold than the salary cost of an operator of a plant that produces 800,000 GPD.

Likewise, the cost of a chlorinator for both systems is probably about the same but the cost per 1,000 gallons treated or sold for the chlorinator is higher for the smaller system than for the larger system.

Selling less water

During the last decade, many small water supply systems in Kansas have seen a reduction in the yearly amount of water sales. This data can be found in the Municipal Water Use Report submitted yearly by water systems to the Kansas Department of Agriculture, Division of Water Resources.

One example of the reduction in water sales is a rural, four-county area in south-central Kansas. The six largest cities have a population of slightly more than 16,000. Together they serve eighty-four percent of the public water supply meters for the area. The daily average water sales in millions of gallons per day based on annual data for those cities were 2.96, 2.84, and 2.38 MGD for the years 2000, 2004, and 2008, respectively. This represents a reduction in water sales in the year 2008 from the year 2004 of 16.1 percent; compared to 2000, the reduction is 19.5 percent.

	Gallons Per Capita Per Day						
Public Water Supplier	2004	2005	2006	2007	2008	Average	2008 v. 2004
Agra	121	126	106	103	89	108	74%
Alexander	109	113	114	100	78	103	72%
Allen RWD 4	105	96	126	91	64	96	61%
Allen RWD 8	153	172	128	129	119	140	78%
Allen RWD 12	122	110	99	69	66	93	54%
Aurora	103	87	86	86	83	89	81%
Baldwin	111	127	110	100	82	106	74%
Barnard	70	77	69	54	40	62	57%
Bazine	128	139	123	99	97	117	76%
Bel Aire	106	110	122	106	93	107	88%
Belpre	122	142	122	110	109	121	89%
Beverly	117	92	94	88	66	91	56%
Blue Mound	106	100	95	72	62	87	58%
Coolidge	375	286	281	282	279	301	74%
Dighton	254	235	225	233	229	235	90%
Ellinwood	110	120	124	101	100	111	91%
Finney RWD 1	74	81	64	55	61	67	82%
Herndon	453	429	428	389	229	384	51%
Jennings	375	194	233	200	206	242	55%
La Cygne	104	100	113	96	82	99	79%
North Newton	157	135	148	129	95	133	61%
Oberlin	211	207	216	190	187	202	89%
Scandia	188	194	185	167	134	174	71%
Solomon	120	135	119	109	104	117	87%
Stockton	127	132	124	149	114	129	90%

This chart illustrates the trend of reduced water use in various cities and RWDs in Kansas from 2004 to 2008.

Five of the six cities showed a reduction in residential sales and one city held essentially steady. Some of the cities were affected by water rate increases, and drought/wet weather probably had some affect on water sales.

Another example is a large rural water district (RWD) in north-central Kansas. This district has seen a reduction in water sales to its residential/farm/ranch customers. These annual water sales in millions of gallons (MGY) were: 91; 109; 91; 72;

and, 83 MGY for the years 2005 to 2009, respectively. These sales are quite variable but generally, the trend is reduced sales. In this example, increased water rates (2006, 2008), drought (2006), and cattle watering affected the water sales.

There are several factors that can reduce the amount of water sales. These factors include good rainfall during the spring and summer months, loss of population, loss of significant industrial water sales, less cattle watering, water "conservation", and increases in water rates. Whatever the cause, the reduction in water sales will have to be addressed by increasing water rates or decreasing operating expenditures.

The residential water sales in many systems have been decreasing during the last decade. The water conservation movement may be having an impact on water sales. The combination of low-flow toilets, low-flow showerheads, and low water use dishwashers may be significantly reducing water sales. An unintended result of conservation (reduced sales) may be increased water rates. In fact, one major utility has stated that increased water rates have been implemented because the customers were not using enough water and water sales have not increased as the city anticipated.

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Operating expenditures increasing

Operating expenditures in public water systems continue to increase. Over the last decade the cost of chemicals has increased significantly, although these costs have been somewhat steady during the last two years of recession. For systems that only chlorinate well water, the increased cost of chemicals is minimal as compared to other costs.

The cost (per 1,000 gallons pumped) for electricity for pumping water has been steady without significant increases. However, if the U.S. Congress passes so-called "Cap and Trade" legislation, then the cost of pumping and fuels is likely to increase significantly.

Most wages, payroll taxes, and employee benefits have increased modestly in most systems. These costs can be in the range of twenty percent to forty percent of the total expenditures so the reduction in water sales puts pressure on these costs too. Unfortunately, many systems already have reduced staff and further reductions will likely adversely affect operations.

For water supply systems purchasing water from the State Water Marketing Program, the costs for raw water from the reservoirs are increasing. The cost for 1,000 gallons in 2011 will be $0.33048, which is an increase over the $0.25527 in 2010. This rate is projected to increase until 2014 to $0.4393 before decreasing in subsequent years. The cost of purchasing water through the Marketing Program is a significant expenditure for many systems.

The costs of compliance with regulatory requirements are the big, big unknown to many small water supply systems. Continued and increasing monitoring requirements and record keeping are small when compared to possible treatment plant construction to meet water quality requirements.

For instance, the new Ground Water Rule may require additional testing if an E. coli-contaminated sample occurs in distribution system sampling. For those water systems that do not provide 4-log disinfection and associated record keeping and reporting, a contaminated sample from distribution system monitoring will require sampling of the water supply wells for E. coli. If E.coli is found in the wells, additional corrective actions are required.

The cost of regulatory sampling can be very significant especially to the very small systems. For instance, the KDHE-required, yearly sampling/analyses costs for a RWD with only eight or thirteen residential connections can be as high as $709. This is a very high cost based on the

number of meters and is a large portion of the total operating costs. That is an incredible cost per residential meter of $4.54 per month for just water testing.

More significantly, those small systems using well water and not presently meeting a maximum contaminant level (MCL) for a regulated contaminant will incur significant, additional costs. Such contaminants include nitrate, arsenic, combined uranium, and combined radium.

Locating an alternative, uncontaminated well is costly. But those systems that cannot find better groundwater are faced with very high construction costs for a treatment plant to remove the contaminant. An engineer's estimate for a nitrate removal plant for a town of approximately 500 was $2 million. The council would have to increase the customers' water rates by $7 per 1,000 gallons if the town received a $1 million grant. The city superintendent stated that the city customers could not afford that increase. For small systems, when does water become unaffordable?

Addressing the trends

Many elected officials and staff of water systems have begun to more closely monitor the situation. Monthly review of records of expenditures, income, and the quantity of water sales should be monitored. The monthly and yearly quantity of water sales should be compared to those values for the proceeding four to five years to determine trends and possible future shortages in revenue.

The city's or RWD's governing body should consider ways to cut expenditures and increase sales if needed. A RWD has the option of consolidating with another RWD or several other RWDs. This has occurred and is occurring in Kansas. Three RWDs in southeast Kansas are consolidating this year. This combined operation will have less expenditures than the sum of the three RWDs would have otherwise had. They will be benefiting from the economy of scale.

The future

The two disturbing trends for many small systems are the reduction in total water sales and the steady or increasing expenditures. The two trends at some time will necessitate an increase in the water rates or a decrease in expenditures. With the global and U.S. economy in slow growth, the elected officials and staff need to be vigilant in monitoring and controlling costs wherever possible. If inflation rears its ugly head, then this matter will become increasingly worse.

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It may be time for some small systems to consider reducing water rates especially for the high water purchasing customers. This would encourage more water sales or forestall water sales reductions from those wanting to reduce their water payments. This has already been done by some water systems in taking on high water usage customers at reduced rates for 1,000 gallons. If fact, it has been beneficial financially to those water systems. Once the fixed costs are covered, then the "profit" can be significant in increased water sales even at the reduced water rate as only the variable costs need to be "covered" in the additional water.

Kansas Rural Water Association staff have the experience to help any system, large or small, to analyze its operations and give pointers on how to reduce costs. Those interested in this service are encouraged to call KRWA at 785-336-3760 or email me directly at pat@krwa.net. And be assured, this topic will be a focus of several sessions at the 2011 conference in Wichita, March 29 – 31.

Pat McCool has been with KRWA since January 2004. He previously worked for KDHE for thirty years. Pat has a B.S. in Chemical Engineering and a M.S. in Environmental Engineering from the University of Kansas. He is a registered Professional Engineer in Kansas.