



**Kansas Water Plan Implementation:  
Example 10-Year Aquifer Investment Scenarios**

## Aquifer Investment Areas



**Stand Pat**  
**\$52 Million**



**Move the Needle**  
**\$139.5 Million**



**Game Changer**  
**Stabilizes the Ogallala Aquifer**  
**\$1.84 Billion**

	<b>\$18.5 M</b>	<b>\$72.5 M</b>	<b>\$1.72B</b>
<b>Reduction of Water Use</b>	<b>REDUCTION OF WATER USE THROUGH PURCHASE AND LEASING</b>		
<p><b>Slowing Groundwater Level Decline Through Direct Incentives:</b> Approximately 25,000 water rights draw from the High Plains Aquifer, using 3 million acre-feet of water per year. To reach stable water levels, an approximately 15% reduction in current usage would be needed. For purposes of stabilizing the water table, the amount of water that can be withdrawn on an average basis is referred to as QStable.</p> <p><b>Purchase of Water Rights:</b> Permanent purchase of the water right can reduce the long-term decline of the aquifer. Purchasing of water rights will be focused on the Ogallala Aquifer in the western third of the state.</p> <p><b>Buy Down Usage Through Lease:</b> State buy down of water use through leasing of water rights for a specific period of time can reduce the decline of the aquifer or associated streams in the Great Bend and Equus Beds aquifers in South Central Kansas. Leasing is primarily an option to achieve reduced use while a permanent solution is developed.</p>	<ul style="list-style-type: none"> <li>Reduction of <b>3,000 acre-feet</b> through purchase (Ogallala) (1% of QStable)</li> <li>Reduction of <b>4,000 acre-feet</b> annually through leasing (Big Bend &amp; Equus Beds) (5% of needed for full stream restorations in SC Kansas)</li> </ul>	<ul style="list-style-type: none"> <li>Reduction of <b>15,000 acre-feet</b> through purchase (Ogallala) (3% of QStable)</li> <li>Reduction of <b>10,000 acre-feet</b> annually through leasing (Big Bend &amp; Equus Beds) (12% of needed for full stream restorations in SC Kansas)</li> </ul>	<ul style="list-style-type: none"> <li>Reduction of <b>480,000 acre-feet</b> through purchase (Ogallala) (100% of QStable)</li> <li>Reduction of <b>20,000 acre-feet</b> annually through leasing (Big Bend &amp; Equus Beds) (25% of needed for full stream restorations in SC Kansas)</li> </ul>
<b>Irrigation System Efficiency</b>	<b>\$18 M</b>	<b>\$40 M</b>	<b>\$80 M</b>
<p>There are roughly 20,000 irrigation center pivots in Kansas. Research has shown that water use can be reduced by 15% or more while maintaining the same level of profitability with improved technology and management.</p>	<b>COST SHARE ON TECHNOLOGY UPGRADES FOR IRRIGATION SYSTEMS</b>		
	• <b>3,000 systems</b> (15%)	• <b>6,000 systems</b> (30%)	• <b>10,000 systems</b> (50%)
	<b>IRRIGATION SYSTEM AUDITS</b>		
	• <b>1,500 systems</b> (8%)	• <b>5,000 systems</b> (25%)	• <b>15,000 systems</b> (75%)
<b>Municipal Reuse Systems</b>	<b>\$8 M</b>	<b>\$12 M</b>	<b>\$16 M</b>
<p>Use of treated municipal wastewater can serve as an additional water source in water-limited areas of the state. Systems can range from irrigation of community areas to partnerships with industries, farmers, and other users. Reuse allows for reduced pumping and leaves more water in the aquifer. Roughly 100 municipal systems could be eligible for this type of improvement in Western KS.</p>	<b>COST SHARE TO ASSIST IN DESIGN/IMPLEMENTATION OF WATER REUSE SYSTEMS</b>		
	• <b>20 communities</b> (20%)	• <b>30 communities</b> (30%)	• <b>40 communities</b> (40%)
<b>Feedlot and Stockwater System Upgrades</b>	<b>\$5 M</b>	<b>\$7.5 M</b>	<b>\$12.5 M</b>
<p>Stockwater use can be reduced and efficiency improved through technology, better management and audits of system operations. Reuse of livestock wastewater can extend the life of the aquifer. Just under 60 stockwater facilities could be eligible for this type of improvement in Western KS.</p>	<b>COST SHARE TO ASSIST WITH TECHNOLOGY, WATER MGMT. AND REUSE SYSTEMS</b>		
	• <b>20 feedlots/dairies</b> (35%)	• <b>30 feedlots/dairies</b> (55%)	• <b>50 feedlots/dairies</b> (90%)
<b>Monitoring and Modeling</b>	<b>\$2 M</b>	<b>\$7.5 M</b>	<b>\$15 M</b>
<p>Determination of necessary actions is dependent on accurate information about usage and the aquifer condition. Ongoing and expanded monitoring as well as development of analytical tools is critical to making effective decisions that help achieve sustainability.</p>	<b>MAINTAIN CURRENT MONITORING OF 1,400 ANNUAL WELL MEASUREMENTS, PLUS</b>		
	<ul style="list-style-type: none"> <li>Monitoring of <b>24 index wells</b></li> <li>Groundwater model updates on a <b>10-year rotation</b></li> </ul>	<ul style="list-style-type: none"> <li>Expand to <b>40 index wells</b></li> <li>Groundwater model updates on a <b>5-year rotation</b></li> <li><b>Limited</b> aerial electromagnetic mapping</li> </ul>	<ul style="list-style-type: none"> <li>Expand to <b>750 index wells</b></li> <li><b>Annual</b> groundwater model updates</li> <li>Aerial electromagnetic mapping of <b>entire High Plains Aquifer</b></li> </ul>

Both "Stand Pat" and "Move the Needle" will result in continued depletion of the aquifer without additional water use regulation. The "Game Changer" option anticipates no additional regulation for water use reductions.



## Kansas Water Plan Implementation: Example 10-Year Water Quality Investment Scenarios



**Stand Pat**  
Current Funding  
**\$190 Million**



**Move the Needle**  
**\$530 Million**



**Game Changer**  
Ensures safe drinking water for 99% of community systems (includes rural water districts) and more than doubles pollution-free water bodies  
**\$1.09 Billion**

### Water Quality Areas

	<b>\$128 M</b>	<b>\$340 M</b>	<b>\$708 M</b>
<b>Drinking Water and Sewer Infrastructure</b>	<b>PROVIDE GRANTS FOR WATER AND SEWER INFRASTRUCTURE IMPROVEMENTS</b>		
<p><b>Small Town Water Infrastructure Grants:</b> There are about 860 community drinking water systems and 720 sewer systems in Kansas. At least 120 communities currently need water and sewer infrastructure improvements to meet health compliance standards. Approximately 20 additional communities experience new compliance issues each year, and many additional communities will need infrastructure upgrades to remain in compliance in the future.</p>	<ul style="list-style-type: none"> <li>Funding for <b>200 communities</b>; known issues addressed within <b>10 years</b></li> </ul>	<ul style="list-style-type: none"> <li>Funding for <b>350 communities</b>; known issues addressed within <b>7 years</b></li> <li>Improved <b>proactive maintenance and systems resiliency</b>, through grants and low-interest loans</li> </ul>	<ul style="list-style-type: none"> <li>Funding for <b>475 communities</b>; known issues addressed within <b>4 years</b></li> <li>Improved <b>proactive maintenance and systems resiliency</b>, through grants and low-interest loans</li> </ul>
	<b>PROVIDE ANALYTIC TESTING OF PFAS IN DRINKING WATER FOR COMMUNITIES AND ASSIST WITH HANDLING PFAS CONTAMINATION IN DRINKING WATER AND SEWER SLUDGE</b>		
<p><b>PFAS Contamination:</b> There is growing concern about the health impacts of plastics [per-and-polyfluoroalkyl substances (PFAS)] including in drinking water supplies. This would allow for ongoing monitoring of PFAS levels in water systems.</p>	<ul style="list-style-type: none"> <li>Test <b>3,000 samples annually</b></li> </ul>	<ul style="list-style-type: none"> <li>Test <b>3,000 samples annually</b></li> <li>Assist <b>50 communities</b> with PFAS contamination</li> </ul>	<ul style="list-style-type: none"> <li>Test <b>3,000 samples annually</b></li> <li>Assist <b>100 communities</b> with PFAS contamination</li> </ul>
	<b>IMPROVE OR REPLACE RESIDENTIAL SEPTIC SYSTEMS AND PRIVATE DRINKING WATER WELLS</b>		
<p><b>Private Water and Sewer Infrastructure:</b> Outside communities with organized drinking water and sewer systems, Kansans largely rely on private drinking water wells and septic systems. There are about 2,000 failing septic systems in the state, which can endanger public health and contaminate groundwater and surface water. There are at least 75,800 private drinking water wells in Kansas, some of which suffer from infiltration of naturally occurring or other contamination, including nitrates, selenium, uranium, arsenic, and petroleum. Investment would greatly assist low-income rural residents.</p>	<ul style="list-style-type: none"> <li>Perform <b>650 repairs/replacements</b></li> </ul>	<ul style="list-style-type: none"> <li>Perform <b>2,000 repairs/replacements</b></li> </ul>	<ul style="list-style-type: none"> <li>Perform <b>5,000 repairs/replacements</b></li> </ul>
	<b>PROVIDE GRANTS TO COMMUNITIES FOR INITIAL ASSESSMENT AND WELLHEAD PROTECTION</b>		
<p><b>Addressing Nitrates:</b> Currently, 139 communities have increasing nitrate concentrations in their drinking water. Each year, about 10 cities discover increasing nitrate concentrations and investment would allow them to prevent or decrease infiltration. This would also enhance wellhead protection by potentially acquiring/managing property surrounding drinking water supply wells.</p>	<ul style="list-style-type: none"> <li>Funding for <b>40 communities</b></li> </ul>	<ul style="list-style-type: none"> <li>Funding for <b>120 communities</b></li> </ul>	<ul style="list-style-type: none"> <li>Funding for <b>240 communities</b></li> </ul>
<b>Lake, River, Stream, and Wetland Protection</b>	<b>\$25 M</b>	<b>\$54 M</b>	<b>\$112 M</b>
	<b>RETURN WATERBODIES TO “CLEAN FOR ALL USES” STATUS, PROVIDE GRANTS FOR CONSERVATION PRACTICES, &amp; CONDUCT TARGETED WATER SAMPLING IN PROTECTED WATERSHEDS</b>		
<p><b>Watershed Protection:</b> Provides financial assistance to landowners for conservation practices that help restore watersheds and protect water quality from pollution from stormwater runoff. These practices include vegetated buffer strips, cover crops, and tillage practices. There are currently 1.5 million acres in the state and federal surface water protection programs. The state has approximately 46 million acres of cropland.</p>	<ul style="list-style-type: none"> <li><b>150 waterbodies</b> returned to “clean for all uses”</li> <li>Grants for <b>1.5 million acres annually</b></li> <li>Sample <b>14 protected watersheds</b></li> </ul>	<ul style="list-style-type: none"> <li><b>250 waterbodies</b> returned to “clean for all uses”</li> <li>Grants for <b>3.5 million acres annually</b></li> <li>Sample <b>36 protected watersheds</b></li> </ul>	<ul style="list-style-type: none"> <li><b>400 waterbodies</b> returned to “clean for all uses”</li> <li>Grants for <b>8 million acres annually</b></li> <li>Sample <b>36 protected watersheds</b></li> </ul>



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## Water Quality Areas

**Stream and Lake Restoration:** Evaluate restoration of targeted water bodies where water quality standards are not met. Data from frequent monitoring can provide confirmation that uses of state water bodies are fully achieved. There are 2,000 waterbodies in the state that are currently contaminated and have restricted uses.

**Harmful Algal Bloom Monitoring and Treatment:** Harmful algal blooms affect Kansas waters each year. Blooms can cause illness in humans, pets, and livestock. The 2014 closure of Milford Lake due to an algal bloom reduced recreational use by more than 1/3, hurting the local economy. This funding would provide treatment for lakes and reservoirs to curtail algal bloom development. Lakes most at risk would be targeted.

**Surface Water Trash Program:** Funding to partner with local governments/civic groups to organize trash cleanups in and around streams/lakes to prevent litter from reaching waterways.

### Groundwater Quality Protection

**Contamination Remediation Program:** There are currently 144 orphan sites contaminated with hazardous substances and other pollutants that need to be addressed to protect water sources.

**Arkansas River Ditch Lining Program:** This would line irrigation ditches located in Hamilton, Kearny and Finney counties where uranium is carried from the Arkansas River into agricultural ditches and then infiltrates soil and groundwater. This lining would protect the groundwater and conserve surface water for irrigation.

**Aquifer Recharge Program:** This would develop a system of aquifer recharge wells, which increase surface water infiltration into an aquifer to be stored. The State is currently piloting the use of recharge wells. It's estimated that during a 3-inch rainfall, one recharge well operating on a drainage area of about 320 acres could capture nearly 9.5 million gallons of water. An estimated 5,000 recharge well systems would be ideal for maximizing use of precipitation.

**Statewide Aquifer Monitoring Program:** This would allow development of a statewide groundwater quality monitoring program and enhanced analysis of this data. Increased understanding and knowledge of groundwater flow and transport of contaminants allows for efficiencies in all other areas of groundwater investment.

### PERFORM STATEWIDE SAMPLING OF ALL WATERBODIES

- Quarterly monitoring allows for **150 waterbodies** returned to "clean for all uses"

- Bimonthly monitoring allows for **250 waterbodies** returned to "clean for all uses"

- Monthly monitoring allows for **400 waterbodies** returned to "clean for all uses"

### PERFORM PREVENTATIVE ALGAL TREATMENTS & PROTECT RESERVOIRS FROM ALGAL BLOOMS

- Protect **3 smaller lakes/reservoirs** annually

- Protect **1 federal reservoir and 1 - 2 lakes** annually

- Protect **3 federal reservoirs, 1 - 2 lakes, and 3 smaller lakes/reservoirs** annually

### ORGANIZE ANNUAL PARTNER-LED TRASH CLEANUPS

- 2 cleanups**

- 4 cleanups**

- 8 cleanups**

**\$39 M**

**\$132 M**

**\$265 M**

- Remediate **15 contaminated sites**

- Remediate **50 sites**

- Remediate **100 sites**

- Line 20 miles of ditches per year, preventing **21 million gallons** of contaminated water from reaching the Ogallala Aquifer

- Line 100 miles of ditches per year, preventing **105 million gallons** of contaminated water from reaching the Ogallala Aquifer

- Line all ditches annually, preventing **168 million gallons** of contaminated water from reaching the Ogallala Aquifer

- 500** recharge well systems

- 2,000** recharge well systems

- 5,000** recharge well systems

### PERFORM ANNUAL GROUNDWATER QUALITY SAMPLING, BUILD PUBLICLY ACCESSIBLE GROUNDWATER QUALITY DATABASE, AND CONDUCT REGIONAL GROUNDWATER QUALITY STUDIES

- 150 to 300** samples annually
- Build database
- 1 regional study** annually

- 150 to 300** samples annually
- Build database
- 2-3 regional studies** annually

- 150 to 300** samples annually
- Build database
- 2-3 regional studies** annually, plus predictive modeling



**Kansas Water Plan Implementation:  
Example 10-Year Reservoir  
Investment Scenarios**



**Stand Pat**  
Current Funding  
**\$156.9 Million**



**Move the Needle**  
**\$621.4 Million**



**Game Changer**  
Secures enough drinking water and improved  
drought/ flood resiliency for 2+ million  
Kansans who rely on reservoirs  
**\$948.3 Million**

## Reservoir Areas

	<b>\$2M</b>	<b>\$92.5M</b>	<b>\$141.5M</b>
<p><b>Reduce sedimentation</b></p> <p>Sedimentation reduces water storage capacity at reservoirs. For example, Tuttle Creek Reservoir has lost 46% of its original storage capacity due to sedimentation. More than 45% of Kansans depend on the flood control and water supply benefits of Tuttle Creek Reservoir. In addition, 5,455 megawatts of power generation rely on reservoirs to meet water needs.</p>	<ul style="list-style-type: none"> <li>Tuttle Creek Water Injection Dredging Pilot</li> </ul>	<ul style="list-style-type: none"> <li><b>50% sediment reduction at:</b> <ul style="list-style-type: none"> <li><b>Kansas Basin (Supports 1.1 million people)</b> <ul style="list-style-type: none"> <li>Tuttle Creek Lake beginning 2030</li> <li>Perry Lake beginning 2032</li> </ul> </li> <li><b>Neosho Basin (Supports 106,000 people)</b> <ul style="list-style-type: none"> <li>Council Grove Lake beginning 2032</li> <li>John Redmond Reservoir beginning 2031</li> </ul> </li> <li><b>Smoky Hill Saline Basin (Supports 96,000 people)</b> <ul style="list-style-type: none"> <li>Kanopolis Lake beginning 2031</li> </ul> </li> <li><b>Verdigris Basin (Supports 50,000 people)</b> <ul style="list-style-type: none"> <li>Elk City Lake beginning 2032</li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li><b>100% sediment reduction at:</b> <ul style="list-style-type: none"> <li><b>Kansas Basin (Supports 1.1 million people)</b> <ul style="list-style-type: none"> <li>Tuttle Creek Lake beginning 2030</li> <li>Perry Lake beginning 2032</li> </ul> </li> <li><b>Neosho Basin (Supports 106,000 people)</b> <ul style="list-style-type: none"> <li>Council Grove Lake beginning 2032</li> <li>John Redmond Reservoir beginning 2031</li> </ul> </li> <li><b>Smoky Hill Saline Basin (Supports 96,000 people)</b> <ul style="list-style-type: none"> <li>Kanopolis Lake beginning 2031</li> </ul> </li> <li><b>Verdigris Basin (Supports 50,000 people)</b> <ul style="list-style-type: none"> <li>Elk City Lake beginning 2032</li> </ul> </li> </ul> </li> </ul>
<p><b>Incentivize interconnection and regionalization</b></p> <p>An interconnection joins two existing water sources or supply systems to move water between the two. This allows more water sharing across the watersheds of the state so areas are more drought resilient.</p>	<ul style="list-style-type: none"> <li>Operation and maintenance costs for state-owned storage in U.S. Army Corps of Engineers reservoirs</li> </ul>	<ul style="list-style-type: none"> <li><b>Secure water supply for up to 350,000 people</b> through <b>regional interconnection projects</b> for rural water districts, water assurance or access districts, and small to mid-sized cities to avoid water crises during times of drought and ensure capacity for economic development.</li> </ul>	<ul style="list-style-type: none"> <li><b>Implement large-scale interconnection projects in existing reservoir and surface water systems</b> to improve drought resiliency and prevent water crises for <b>1 million+ people</b>.</li> <li><b>Increased drought resiliency with public water supply</b> intake &amp; well modifications within critical basins.</li> <li><b>Purchase remaining available reservoir storage</b> where available to increase drought water supply and support economic development potential.</li> </ul>
<p><b>Watershed protection</b></p> <p><b>Reduce runoff from sedimentation in reservoir watersheds:</b> Implementing watershed conservation practices, such as streambank stabilization, tillage practices and restoration of vegetative buffers can reduce erosion and sedimentation rates in downstream reservoirs. Streambank stabilization is also a critical watershed protection practice for reservoir protection. State funding can be augmented with federal funding to improve storage capacity and water quality.</p>	<p><b>IMPLEMENT WATERSHED CONSERVATION PRACTICES THROUGH KS RESERVOIR PROTECTION INITIATIVE AND IMPLEMENT STREAMBANK STABILIZATION PROJECTS</b></p>		
	<ul style="list-style-type: none"> <li>Targeted water supply reservoirs</li> <li><b>Maintain the Initiative</b> in Kanopolis, Fall River, John Redmond, Tuttle Creek, Perry, Pomona, and Hillsdale reservoirs</li> <li><b>Maintain stabilization projects</b> around Perry, Tuttle Creek, John Redmond</li> </ul>	<ul style="list-style-type: none"> <li>All federal reservoirs</li> <li><b>Expand the Initiative</b> to Cedar Bluff, Cheney, Keith Sebelius, Kirwin, Lovewell, Waconda, Webster, Big Hill, Clinton, Council Grove, El Dorado, Marion, Melvern, Milford, Wilson, and Wabaunsee lakes</li> <li><b>Expand stabilization to 14 watersheds</b></li> </ul>	<ul style="list-style-type: none"> <li>All public reservoirs</li> <li><b>Expand the Initiative</b> to Banner Creek, Horsethief, Elk City, La Cygne, and the state fishing lakes</li> <li><b>Expand stabilization to 32 watersheds</b></li> </ul>
<p><b>Dam construction/rehabilitation:</b> There are roughly 2,600 regulated dams in Kansas. Rehab is costly and often beyond the financial capacity of owners. Maintenance of dams is important to public safety and private business.</p>	<p><b>COST SHARE FOR CONSTRUCTION AND/OR REHABILITATION OF DAMS</b></p>		
	<ul style="list-style-type: none"> <li><b>120+ dams</b></li> </ul>	<ul style="list-style-type: none"> <li><b>240+ dams</b></li> </ul>	<ul style="list-style-type: none"> <li><b>400+ dams</b></li> </ul>