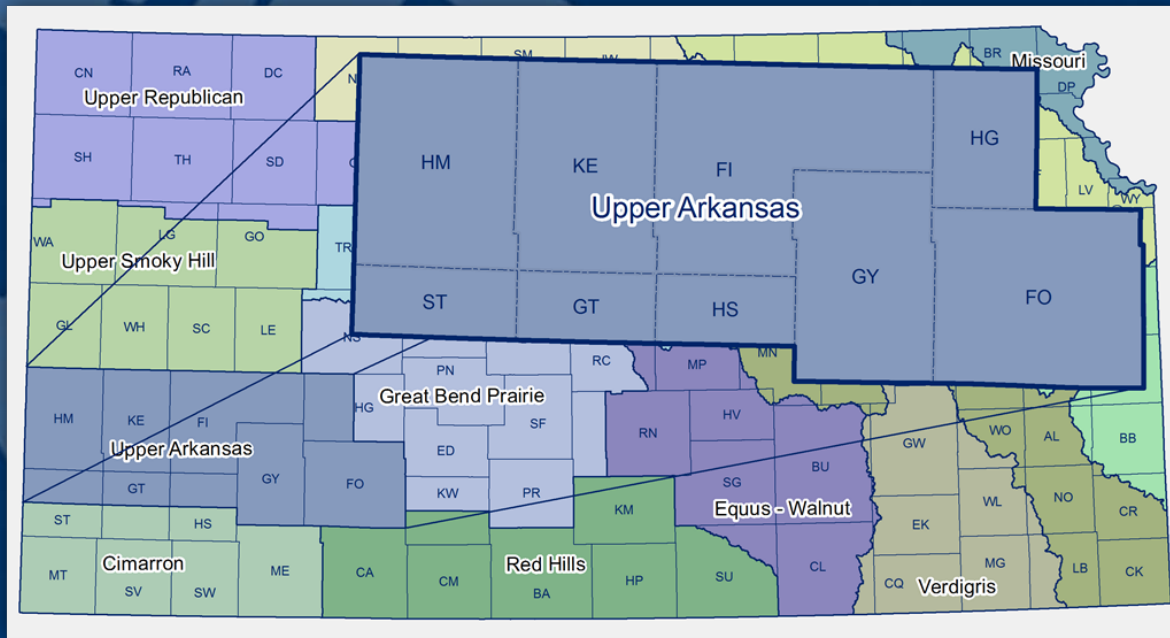


Upper Arkansas Regional Advisory Committee



Committee
Chairman
Fred Jones

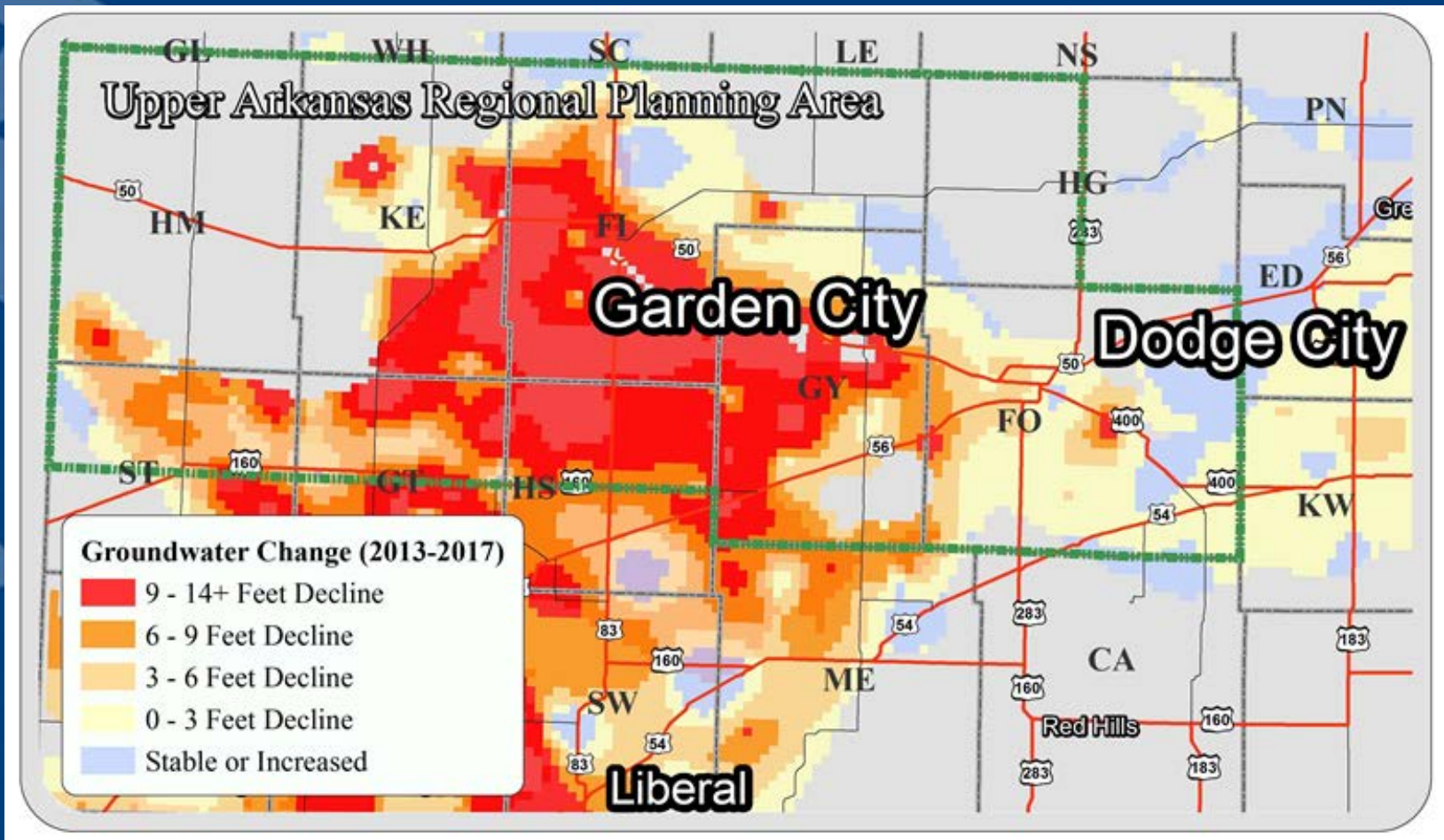
- Upper Arkansas Regional Advisory Committee consists of members representing varied interests
 - 5 agriculture, 3 public, 2 public water supply, 1 conservation/environment, 1 industry/commerce, 1 groundwater management

Upper Arkansas Regional Advisory Committee Goals

- Priority Goal #1: Extend the usable lifetime of the Ogallala Aquifer for at least 25 years in the planning region through the promotion of multiple Local Enhanced Management Areas (LEMAs), Water Conservation Areas (WCAs) and other incentive-based programs.
 - Slow the depletion of the Ogallala Aquifer by 25% in 10 years in the planning region maximizing the opportunity to make use of emerging technologies.
 - Encourage conservation through added flexibility.
 - Find additional sources of water and a place to store water for irrigation and recharge. Increase the opportunity to use wastewater for other beneficial uses.
 - Increase education of aquifer conditions.
- Priority Goal #2: By 2020, continue to re-establish and maintain flows along the Upper Arkansas River in the amount of one cubic feet per second at the USGS gage located at Dodge City
 - maintenance of open channel conveyance through 100% of tamarisk control
 - Ensure we maintain compact compliance and enforce the compact when necessary.




Upper Arkansas Regional Advisory Committee Goals (cont...)

- Priority Goal #3: Maximize available water and promote conservation of municipal use through incentives, education and outreach, reduced water loss, and increased data availability to reduce gallons per capita per day usage.
- Priority Goal #4: Maximize available water and promote conservation of industrial use through incentives, education and outreach, benchmarking efforts, and increased data availability to reduce gallons per production unit usage.



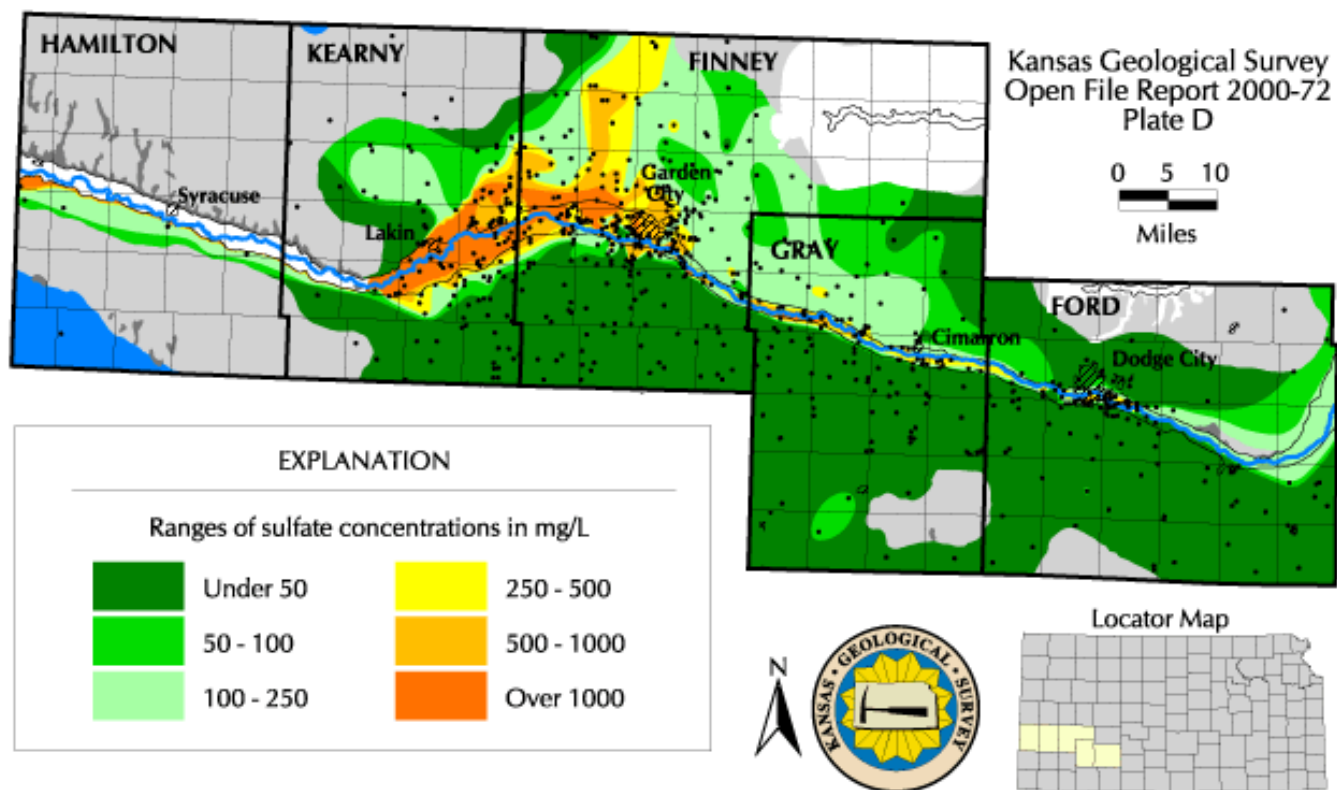
Groundwater level declines for 2013 to 2017, with data from Kansas Geological Survey water level monitoring program.

Region	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	10 Year Change	Average Annual Change (2007-16)
Cimarron	-2.37	-2.90	-1.65	-2.52	-3.93	-3.63	-1.72	-1.90	-0.91	-1.29	-22.81	-2.28
Equus-Walnut	1.87	1.56	0.00	-0.80	-2.96	-1.48	2.44	-1.21	1.38	1.94	2.74	0.27
Great Bend Prairie	3.11	0.59	0.70	-0.46	-2.88	-1.89	0.55	-0.68	-0.26	0.51	-0.69	-0.07
Upper Arkansas	-1.47	-2.29	-1.28	-2.97	-2.64	-2.82	-2.40	-1.85	-0.70	-0.45	-18.86	-1.89
Upper Republican	-0.69	-0.20	0.18	-0.39	-0.42	-1.40	-0.64	-0.39	-0.53	-0.29	-4.77	-0.48
Upper Smoky Hill	-0.87	-0.41	-0.22	-0.52	-1.01	-1.41	-0.63	-0.44	-0.13	-0.32	-5.96	-0.60
ENTIRE HIGH PLAINS AQUIFER REGION	-0.09	-0.60	-0.24	-1.08	-1.93	-1.98	-0.65	-0.93	-0.39	-0.12	-8.00	-0.80

Increase = 
 Decrease = 
 Unchanged = 

Groundwater level changes for 2007 to 2016 by High Plains Aquifer Regional Planning Area. From 2007 through 2016, these water level measurements showed that average groundwater levels declined in every year, with an average annual decline of 1.89 feet and a ten year cumulative decline of 18.86 feet.

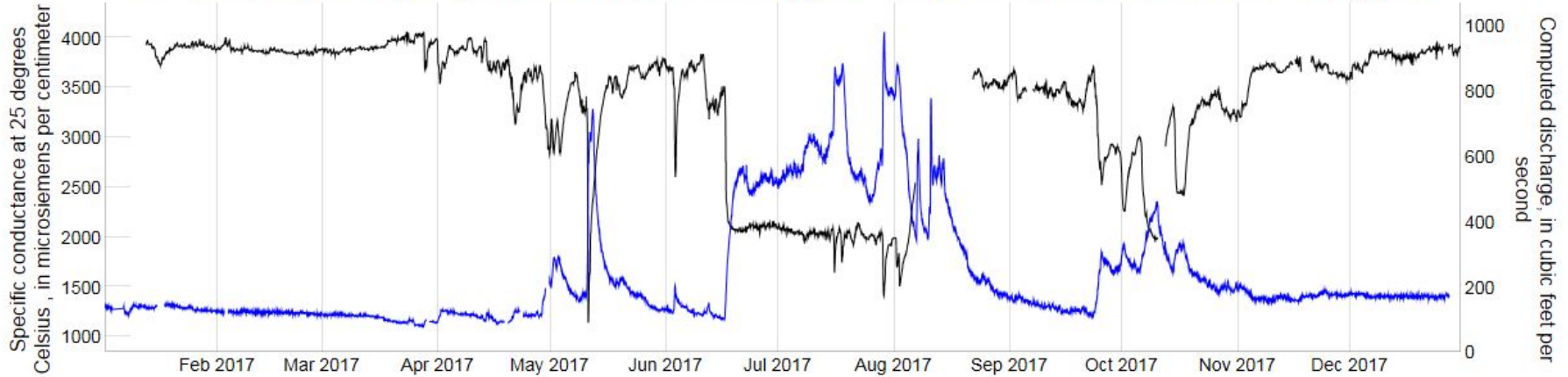
Sulfate Concentration for the High Plains Aquifer in the Upper Arkansas River Corridor in Southwest Kansas



Spread of lower quality water from the Arkansas River into the Ogallala Aquifer.

Kansas Geological Survey OFR 2000-72

Measured instantaneous specific conductance at 25 degrees Celsius in Arkansas River near Coolidge, KS



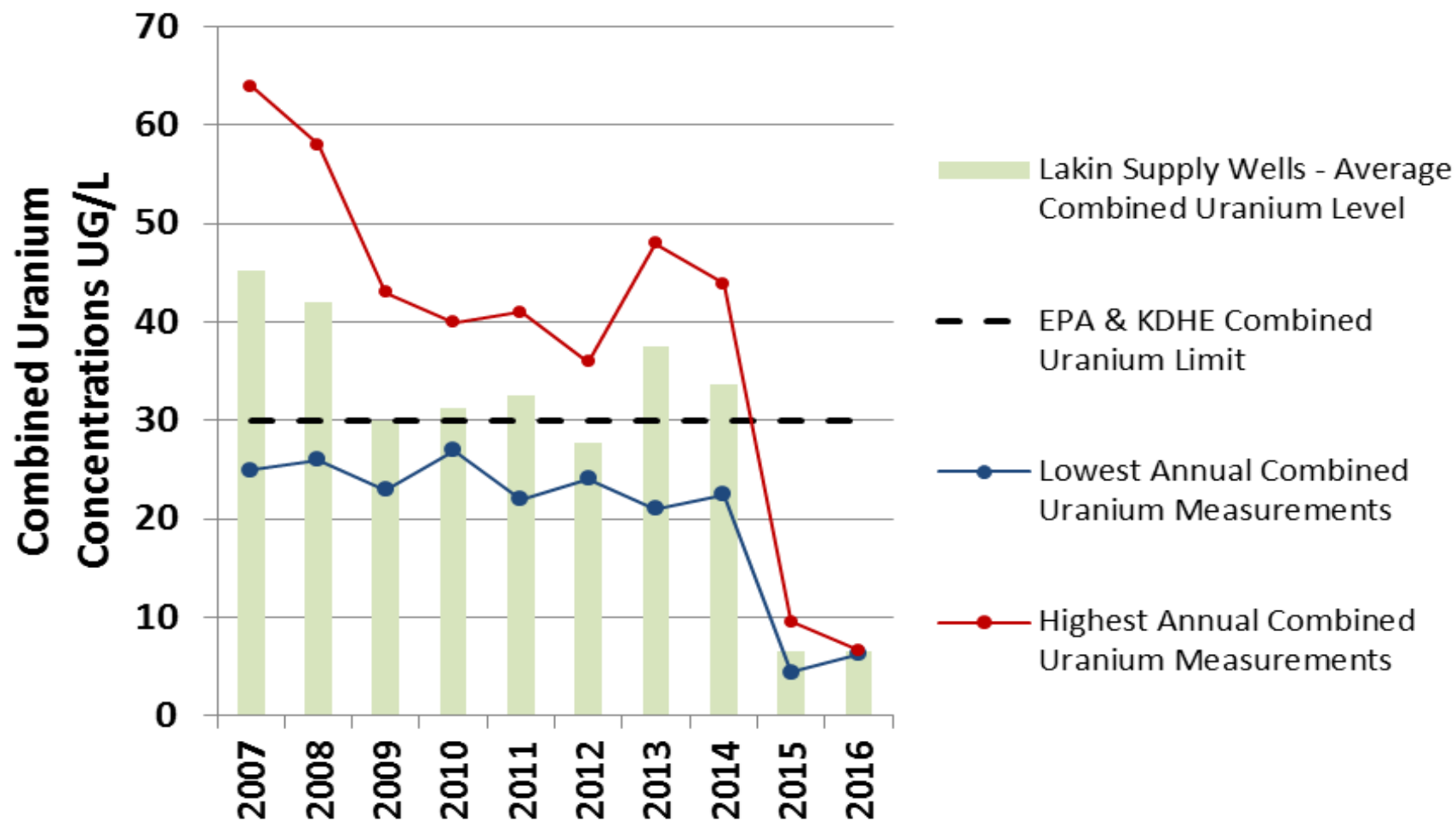
Data pulled 01-12-18 05:37.

The chart is interactive: you can mouse over to highlight individual values. You can click and drag to zoom. Double-clicking will zoom you back out. Shift-drag will pan.

EXPLANATION

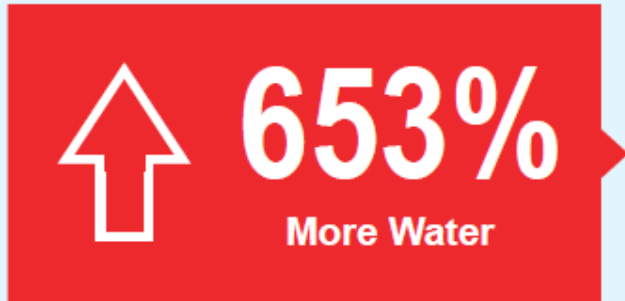
- Discharge
- Measured or computed water-quality constituent
- ▭ 90-percent prediction interval for computed value
- Value obtained from discrete sampling and analysis
- Load calculated using laboratory analysis and discharge
- ⋯ Water-quality criteria

2017 stateline gage showing relationship of Arkansas River flow and water quality. Higher river flows and corresponding concentration reduction in water.



Lower quality water impacting local municipal water supplies, requiring Lakin community investment in water treatment systems.

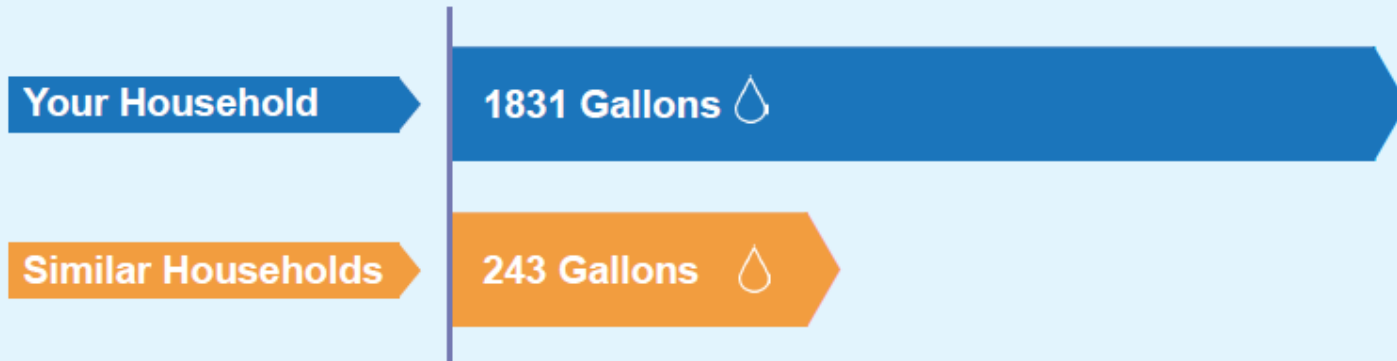
Water Report for 100 N Main St
January 1, 2017 - January 1, 2018



Based on your water usage in 2017, you are projected to use **653% More Water** per day in 2018 than similar households in Garden City. Your annual water cost for 2018 could be **\$1710 More** than similar households.

How Does Your Home Compare?

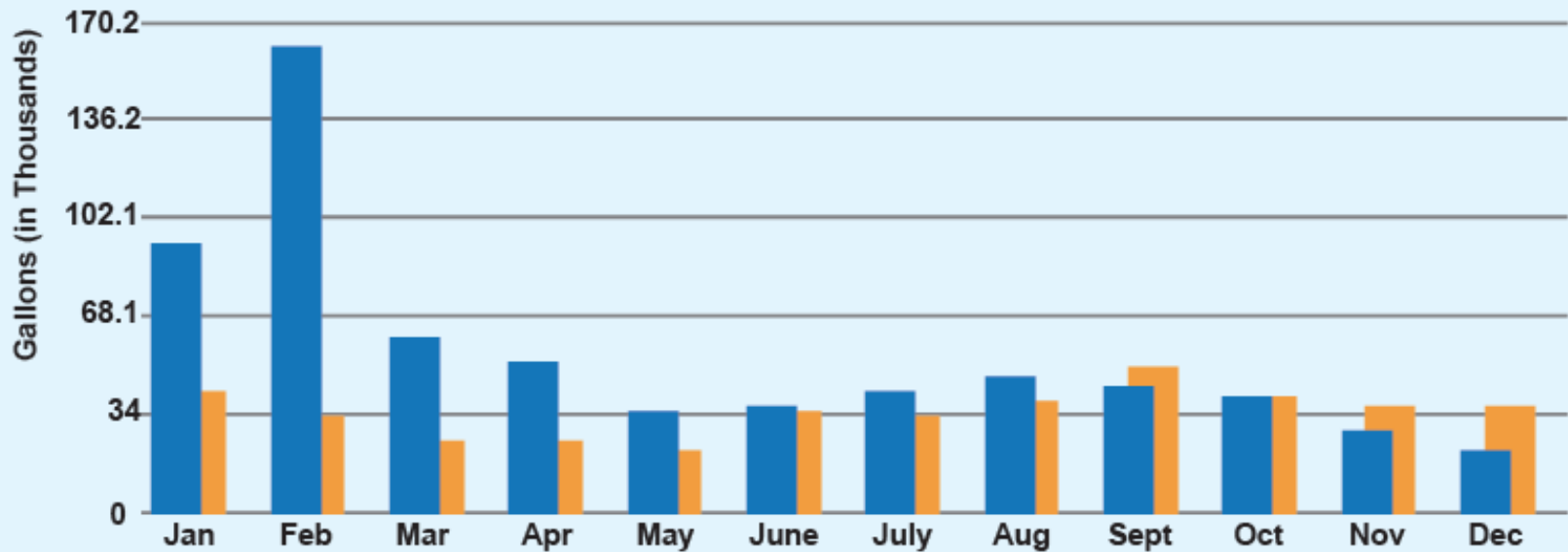
Here's how your average daily water usage stacked up against households like yours in the past year.



Water Usage Over Time

Your average daily water usage in 2016 compared to your average daily water usage in 2017.

■ Your Household 2017
■ Your Household 2016



Garden City residential water use information and education of municipal water users.

T&O Farms Water Technology Farm



Two Water Technology Farms active in the Upper Arkansas area.

T&O Farms Water Technology Farm south of Garden City

- 2017 saved 39% of water allocation for future use with Water Conservation Area



Roth Water Technology Farm Northwest of Garden City

- Used 45% of 2017 water allocation, banked 55% for future use with water conservation area in a wet 2017.
- 2017 yield of 241 bushels/acre with 5.78" irrigation 21.65" precip (19.76" avg).
- Pictured above is the Soil Moisture Probe demonstration day at Roth Water Technology Farm.

Upper Arkansas Needs

- Financial and technological support for voluntary incentive programs to increase water use efficiency.
- Funding for water conservation education including demonstration projects and evaluation of the technologies and tools available.
- Gather data to quantify the reduction in water use needed to reduce the depletion rate by at least 25% in 10 years and extend the life of the Ogallala in the region for at least 25 years. Use data to determine problem areas for focusing efforts.

Upper Arkansas Needs

What can be done to address the water situation in this region?