Updates on the Kansas High Plains Aquifer

Upper Smoky Hill RAC Meeting
April 6th, 2021

Kansas Geological Survey
University of Kansas
2021 Cooperative Water Level Program

Upper Smoky Hill RAC
- 157 wells measured
- Average 2020 to 2021 water level change = -0.64 ft
*Results are based only on the cooperative network (KGS and KDA-DWR) and do not include sub-regional networks from the KDA-DWR, KGS, or local GMDs. 2021 water levels are provisional.
Interpolated Change in Feet, Cooperative Water Level Network, 2020 to 2021*

*Results are based only on the cooperative network (KGS and KDA-DWR) and do not include sub-regional networks from the KGS, KDA-DWR or local GMDs.
Interpolated Change in Feet, Cooperative Water Level Network, 2016 to 2021*

- **Decline greater -40**
- **-30 to -40**
- **-20 to -30**
- **-10 to -20**
- **-5 to -10**
- **-2.5 to -5**
- **0 to -2.5**
- **0 to 2.5**
- **Rise over 2.5**

*Results are based only on the cooperative network (KGS and KDA-DWR) and do not include sub-regional networks from the KGS, KDA-DWR or local GMDs.
2020 Total Precipitation

January 01, 2020 Annual Observed Precipitation

Created on: January 27, 2021 - 22:02 UTC
Valid on: January 01, 2021 12:00 UTC
Percent Departure from Normal Precipitation

January 01, 2020 Annual Percent Precipitation

Created on: January 27, 2021 - 22:01 UTC
Valid on: January 01, 2021 12:00 UTC
Kansas Index Well Program

- First wells installed in 2007 through the Kansas Water Plan Fund
- Continuous, real-time water-level recordings
- Characterizations at the local scale
Simple Water Balance - Isolating Water Use and Water-level Change

Water Volume Change in Aquifer = Net Inflow - Pumping

- Average use 176,620 AF, Average decline -0.48 ft
- Slope gives use specific yield 7.8 %
- Net inflow average 1.35 inches
- 25% reduction in average use to match stabilized water levels
- Relationship should hold for the next decade or two
Questions???

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Visit our site at
http://www.kgs.ku.edu
Top Secret Old Preliminary GMD4 Model Results
2020 to 2030

2020 to 2040

2020 to 2050

Status Quo

20% Reduction

30% Reduction

Status Quo

20% Reduction

30% Reduction

Status Quo

20% Reduction

30% Reduction

Status Quo

20% Reduction

30% Reduction

Status Quo

20% Reduction

30% Reduction

Status Quo

20% Reduction

30% Reduction
Status quo scenario - budget

- Recharge relatively static with slight declining trend (~63% higher than predevelopment levels)
- Lateral inflows end in 2057
- Reducing aquifer storage
- Declining rates of ET and pumping
Reduce pumping 20% scenario - budget

- Recharge relatively static but at lower rates (~60% higher than predevelopment levels)
- Lateral inflows end in 2068
- Reducing aquifer storage
- Higher but still declining rates of ET with static levels pumping
Reduce pumping 30% scenario - budget

- Recharge relatively static but at lower rates (~58% higher than predevelopment levels)
- Lateral inflows end in 2074
- Reducing aquifer storage
- Higher but still declining rates of ET with static levels pumping