## Introduction

### The Groundwater Commons
- Agriculture is responsible for the majority of groundwater withdrawals worldwide (Famiglietti, 2014).
- Groundwater depletion has significant implications for U.S. agriculture (Haacker et al., 2015).

### Localized Groundwater Management
Between 2007 and 2020, the state of Kansas and the federal government jointly spent more than $66 million to permanently retire 239 wells with annual groundwater appropriations of approximately 55,000 acre feet.
U.S. acres of irrigated land by county, 2017

U.S. total = 58,013,907 acres

Kansas Groundwater Management Districts
Updating Official Management Program

Official Management Program
Southwest Kansas Groundwater Management District Number 3 (GMD3)

2009 E. Spruce Street, Garden City, Kansas 67846 (620) 275-7147
URL: HTTP://www.gmd3.org

12/08/2021

The activities of this management program add to the success of all stakeholders. Policy and methods expressed herein are adopted to advise and assist all in the management of water resources in the District. They are not considered enforceable apart from Kansas statute and administrative rules. Supporting program implementation plans, and other supporting reference documents are to be posted on the website.

2021-2022 Board of Directors:

Bret Roesky, President – Mitchell County
Fred Jesse, Vice President – Munson at Ingo
Gracie Love, Secretary – Gove County
Mike O’Brien, Treasurer – Finney County

Dave Cameron, Director – Butler County
Harmon Key, Director – Morton County
Kent Dunn, Director – Sedgwick County
Bret Amos, Director – Meade County
Zachary Gla, Director – Hamilton County

Kent M. Wetter, Director – Sumner County
Margaret Johnson, Director – Stevens County
Seth McCrane, Director – Finney County
Darin Schramm, Director – Finney County

Southwest Kansas Groundwater – Conserving Every Day Since 1976

December 8, 2021
Active areas of the Management Program

- Water Rights Policy Assistance
- Water Conservation
- Water Quality Protection
- Models and Research
- Ark River Management
- Outreach and advocacy
## GMD3 Funding Data

Table 1. Eligible land for assessment and appropriations for a water user fee (2018).

<table>
<thead>
<tr>
<th>County</th>
<th>Total Assessable Acres</th>
<th>Assessed Acres</th>
<th>Excluded Acres</th>
<th>Wells</th>
<th>Authorized Acre Feet</th>
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</thead>
<tbody>
<tr>
<td>Finney</td>
<td>625,637.27</td>
<td>624,438.81</td>
<td>1,198.46</td>
<td>1,085</td>
<td>581,233.00</td>
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<tr>
<td>Ford</td>
<td>662,719.10</td>
<td>662,006.70</td>
<td>712.40</td>
<td>660</td>
<td>200,531.00</td>
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<td>Grant</td>
<td>357,715.95</td>
<td>357,570.35</td>
<td>145.60</td>
<td>642</td>
<td>328,266.00</td>
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<tr>
<td>Gray</td>
<td>536,554.15</td>
<td>536,063.78</td>
<td>490.37</td>
<td>1,303</td>
<td>420,880.00</td>
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<tr>
<td>Hamilton</td>
<td>71,209.95</td>
<td>71,209.95</td>
<td>0.00</td>
<td>73</td>
<td>40,871.00</td>
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<td>Haskell</td>
<td>359,790.37</td>
<td>359,696.36</td>
<td>94.01</td>
<td>907</td>
<td>461,581.00</td>
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<tr>
<td>Kearny</td>
<td>449,230.77</td>
<td>448,767.60</td>
<td>463.17</td>
<td>494</td>
<td>233,298.00</td>
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<td>Meade</td>
<td>399,646.59</td>
<td>399,449.21</td>
<td>197.38</td>
<td>553</td>
<td>278,636.00</td>
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<tr>
<td>Morton</td>
<td>481,659.65</td>
<td>481,414.11</td>
<td>245.54</td>
<td>307</td>
<td>129,058.00</td>
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<tr>
<td>Seward</td>
<td>381,891.63</td>
<td>381,566.10</td>
<td>325.53</td>
<td>501</td>
<td>281,904.00</td>
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<tr>
<td>Stanton</td>
<td>439,975.96</td>
<td>439,848.76</td>
<td>127.20</td>
<td>625</td>
<td>333,354.00</td>
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<tr>
<td>Stevens</td>
<td>467,219.07</td>
<td>467,018.89</td>
<td>200.18</td>
<td>705</td>
<td>383,949.00</td>
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<tr>
<td><strong>GMD3 totals</strong></td>
<td><strong>5,233,250.46</strong></td>
<td><strong>5,229,050.62</strong></td>
<td><strong>4,199.84</strong></td>
<td><strong>7,855</strong></td>
<td><strong>3,673,561.00</strong></td>
</tr>
</tbody>
</table>
Kansas is data strong

• Data on economy, groundwater supply and water rights drive water management decisions
Kansas Water Policy
K.S.A. 82a-711.

• This policy is intended to maximize the use of Kansas limited water supply for as many beneficial purposes as possible while meeting the state’s interstate delivery obligations.

• Beneficial purpose means that water must be used for legitimate, documentable needs and cannot be hoarded by those without an existing need for it.

• The Chief Engineer has a statutory mandate to “enforce and administer” the provisions of the KWA Act (K.S.A. 82a-706). Therefore, the decision whether to approve or disapprove a new or change application ultimately rests with the Chief Engineer. No “GMD fox” guarding the proverbial hen house.
GMD3 Conservation activity includes:

- Flowmeters. First GMD to mandate on all permitted wells.
- Water user technical assistance
- Conservation Innovation demonstrations.
- Required Conservation Plans are approved by the GMD.
- Assist member water groups – i.e. RAC’s, and Finney County Sustainability group.
- Promote voluntary conservation
  - WCA plan review and recommendations.
  - I-CARE – Irrigation Climate And Resource Evaluation mailings to member.
  - GIVE - Groundwater Incentivized Voluntary Easement
- Eliminate need to “waste pump” to preserve water right use record.
  - Conserve-to-preserve calculations for the record.
Monitoring Services & Agreements

Flow tests, seals, tags and field data

Check out:
SW Kansas
Groundwater Productions

Chris Law
Director of Field Services GMD3
Well Pumping Rates

Distribution of observed_rate

Statistics

<table>
<thead>
<tr>
<th></th>
<th>Dataset</th>
<th>Selection</th>
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<tbody>
<tr>
<td>Mean</td>
<td>533.2</td>
<td>491.0</td>
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<tr>
<td>Median</td>
<td>401</td>
<td>499</td>
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<tr>
<td>Std. Dev.</td>
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<td>254.8</td>
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<td>Rows</td>
<td>11,967</td>
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<td>2,300</td>
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<td>Nulls</td>
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<td>0</td>
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<tr>
<td>Min</td>
<td>1.2</td>
<td>2.36</td>
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<tr>
<td>Max</td>
<td>4,235</td>
<td>1,721</td>
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<tr>
<td>Sum</td>
<td>6,380,587</td>
<td>1,129,367.9</td>
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<td>Skewness</td>
<td>1.4</td>
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<tr>
<td>Kurtosis</td>
<td>8.9</td>
<td>3.7</td>
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</table>
SW Kansas groundwater depletion trends

- We can get to near stable groundwater levels if we reduce and/or replace consumption by about 700,000 acre-feet annually (KGS).

![Graph showing trends in annual water use vs. average water level change](image-url)

- **GMD3**
  - 2005-2016
  - $R^2 = 0.83$

- **Pumping reduction for zero water-level change = 31%**
I-CARE activity, Finney County

Overlay Other Features
- Ditch Service Area
- Geology
  - Loess (~north of river)
  - Ark River Alluvium
  - Sand Hills (~south of river)

Irrigation-Climate And Resource Evaluation
Start with basic water use data.
R² = 0.927  P < 0.00001
Average Q stable % reduction = 23.9%
Drought (2011) % reduction = 47.9%
Fantastic relationship (statistically speaking)
  - Provided by KGS Assistance
Drip line on first three towers saves up to 38% on those acres.
Conservation Projects improve water management systems
The quality of water affects how the water can be used.

Arkansas River basin functions as a closed basin in SW Kansas.
Surface water flow in rivers of the U.S. for available high flows & Water West
Feast and Famine: Securing Kansas Water Needs
Award Winning Documentary

Kansas water users and officials describe water supply problems and discuss the dire need to collaborate now on water transportation projects before it’s too late.

- Garden City Co-op
- Skyland Grain
- GMD3

See: Kansasaqueductcoalition.com
Water transport
POC 2020
Missouri River to dry Ark River

An interstate transport POC into Colorado is planned in 2022
Wichita County aquifer release site in area that is suffering groundwater rationing
Replenish a depleting groundwater supply.

Project map here is percent loss in saturated thickness since pre-development.
Central Colorado Water Conservancy District
Aquifer recharge sites
GMD3 Mission

Act on a shared commitment to conserve and develop water supply to grow the social, economic, and natural resources well-being of the district for current members and future generations in the public interest.

Questions?

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O 620-275-7147