Desalination and Aquifer Storage and Recovery Potential of the Saline Edwards Aquifer, Central Texas

Brian A. Smith, Ph.D., PG
Brian B. Hunt, PG

South Central GSA
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Previous Saline-Interface Studies

- TWDB (Flores 1990)
- EUWD (Poteet 1992; Schultz)
- SAWS
- USGS (Thomas/Lambert etc.)
- EAA
- UT Austin (Oetting, Banner and Sharp, 1995)
TWDB Regional Facilities Planning Grant

- Feasibility study for desalination and ASR
  - Carollo Engineers
  - ASR Systems (David Pyne)
  - New Gen (financial analysis)

- BSEACD contribution- hydrogeologic characterization with the installation of multiport monitor well
Figure modified from US Geological Survey Hydrologic Atlas 730-E (Ryder, 1996)
Multiport Monitor Well

Long-term data collection:
• Fluid pressure (water levels)
• Hydraulic conductivity (slug testing)
• Sampling (geochemistry)
Drilling

- August 2016
- Depth 1,100 ft
- Entire Edwards Group penetrated
Geophysical Logging

Gamma

Buda Fm
Del Rio
Multiport Well Design

18 total zones
- 4 confining units
- 12 Edwards
- 2 Upper Glen Rose
Multiport Installation
Packers
Purging and Slug Testing

Inertial pump

Aqtesolv
Results: Hydraulic Conductivity (ft/d)

<table>
<thead>
<tr>
<th>Confining Units</th>
<th>Person Fm. (26 to 95 ft/d)</th>
<th>Kainer Fm. (15 to 335 ft/d)</th>
<th>Upper Glen</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00001</td>
<td>26.3</td>
<td>474</td>
<td></td>
</tr>
<tr>
<td>0.0001</td>
<td>243</td>
<td>104.1</td>
<td></td>
</tr>
<tr>
<td>0.001</td>
<td>334.5</td>
<td>145.3</td>
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<td>0.01</td>
<td>136.3</td>
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<td>474</td>
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<td>243</td>
<td>474</td>
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</tr>
</tbody>
</table>
Results: Heads

Saline-Edwards Multiport Well Hydrograph

- Confining Units
  - Edwards Group
  - Upper Glen Rose
- RDM
- Del Rio
- Eagle Ford/Buda

Dates:
- 10.6.16
- 11.14.16
- 1.19.17
Results: Geochemistry

- 13 samples
- Sodium-Chloride facies
- TDS varies from 8,800 to 18,600 mg/L
# Potential Well Yields?

<table>
<thead>
<tr>
<th>Aquifer Interval</th>
<th>thickness (ft)</th>
<th>$T_{avg} \ (ft^2/d)$</th>
<th>Storativity</th>
<th>TDS (mg/L)</th>
<th>Drawdown (ft)</th>
<th>Q (gpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper Edwards (Person)</td>
<td>79</td>
<td>2,477</td>
<td>0.0002</td>
<td>9,094</td>
<td>179</td>
<td>1,300</td>
</tr>
<tr>
<td>Lower Edwards (Kainer)</td>
<td>271</td>
<td>7,141</td>
<td>0.0002</td>
<td>16,707</td>
<td>214</td>
<td>4,300</td>
</tr>
</tbody>
</table>

Kainer Fm.
Q = 4,300 gpm
s = 210 ft
30 days
Kyle Transect

Thomas et al., USGS SIR 2012-5285
Conclusions

- Data provide detailed data on the brackish Edwards
  - TDS 9k-18k mg/L; K 0.001- 474 ft/d
- RDM appears to provide hydrogeologic stratification between Person and Kainer Fms.
- Saline Edwards/Upper Glen Rose appear very transmissive
- High-yielding wells possible
Questions?

Thank you:
- TWDB
- Texas Disposal Systems