“Houston, we have a groundwater problem!”
Hydrogeology of the Gulf Coast Aquifer System
Hydrogeology of the Gulf Coast Aquifer System
Hydrogeology of the Gulf Coast Aquifer System
Conroe-Area Jasper Aquifer Groundwater Levels

- ~200’ decline 50 years
- ~200’ decline 13 years
Estimated Subsidence 1906-2000

Developed through the comparison of historical topographic information and level surveys conducted by the District in 2000.

Shows broad area of about 6 feet of subsidence encompassing most of the City of Houston and Harris County.

In comparison the amount and breadth of subsidence in the northern and western parts of Harris County just showing the beginning signs of Subsidence.

This data was developed by Bob Gabrysch and pushed at the fifth international symposium on subsidence
Annual Subsidence Rate 2013-2017

The highest subsidence rates observed today in the region are located in Southern Montgomery County, Northern and Western Harris County, North-eastern Fort Bend County.

The City of Houston in cooperation with the Regional Water Authorities are currently undertaking the largest water infrastructure project in the US to supply alternative water to these areas.

Subsidence has generally ceased in areas where conversion has been completed and groundwater use has been reduced.

8/28/2018
Estimated Subsidence 1906-2016

Developed through the assumption that current subsidence rates (2011-2016) remained constant from 2000-2016. Estimated total subsidence was then added to the 1906-2000 surface.

Little change is noted in the areas to the east of downtown Houston, where full conversion has completed.

The area of subsidence expands to include Montgomery and Waller counties. Western Harris County, Northern Fort Bend County, Northern Harris county show change from the 1906-2000 comparison.

This data was developed by the Subsidence District

This map is preliminary and subject to revision.
Groundwater Pumping in Surrounding Counties

Data Source: Texas Water Development Board
Montgomery County Groundwater Pumping
Current LSGCD “Run D” Proposal Results in Additional Groundwater Decline
HGSD May 2018 Report on Jasper Subsidence

Investigation of the Brackish Groundwater Resources in the Gulf Coast Aquifer and the Determination of Potential Subsidence Risk Due to Resource Development

EXECUTIVE SUMMARY

The results of this study confirm the potential for compaction in the Jasper aquifer and subsidence to occur from brackish groundwater development particularly in up-dip areas near where the Jasper is being used for freshwater supply.
Background Slides
Explanation

- Red: Water-Level Decline
- Green: No Change
- Blue: Water-Level Rise

-120 to 200 CI = 20'

Explanation

- Water-Level Decline
- No Change
- Water-Level Rise

-340 to 260
CI = 20'

USGS
Drawdown for Evangeline: 10-Year Steps, 2000 to 2050
Drawdown for Jasper: 10-Year Steps, 2000 to 2050
Catahoula
Down-Dip Extent of Freshwater and Slightly Saline Sands Based on Analysis of Geophysical Logs

Preliminary Results Associated with Work in Progress
SJRA Well 39

Water Well No. 39
11482 W. Branch Crossing Drive
### Well 39 Participants

<table>
<thead>
<tr>
<th>Organization</th>
<th>Responsibilities</th>
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</thead>
<tbody>
<tr>
<td><strong>SJRA</strong></td>
<td>Project management and coordination</td>
</tr>
<tr>
<td><strong>Weisinger Incorporated</strong></td>
<td>Constructed well</td>
</tr>
<tr>
<td></td>
<td>Conducted water sampling and analysis (Envirodyne)</td>
</tr>
<tr>
<td><strong>LBG-Guyton Associates</strong></td>
<td>Provided basic construction phase services</td>
</tr>
<tr>
<td></td>
<td>Reviewed test hole geophysical logs</td>
</tr>
<tr>
<td></td>
<td>Recommended sands from which to sample</td>
</tr>
<tr>
<td></td>
<td>Reviewed/interpreted results received to date</td>
</tr>
<tr>
<td><strong>USGS</strong></td>
<td>Reviewed test hole geophysical logs</td>
</tr>
<tr>
<td></td>
<td>Conducted water sampling</td>
</tr>
<tr>
<td></td>
<td>Conducting water analysis</td>
</tr>
<tr>
<td></td>
<td>Reviewing/interpreting results</td>
</tr>
<tr>
<td><strong>Thornhill Group, Inc.</strong></td>
<td>third party funded</td>
</tr>
<tr>
<td></td>
<td>Reviewed plan</td>
</tr>
<tr>
<td></td>
<td>Observed process/procedures</td>
</tr>
<tr>
<td></td>
<td>Conducted sampling</td>
</tr>
<tr>
<td></td>
<td>Reviewed results received to date</td>
</tr>
</tbody>
</table>
Test Hole Boring

Chicot Aquifer
Evangeline Aquifer
Burkeville Confining
Jasper Aquifer
Catahoula Aquifer

Natural Ground

Upper Catahoula Sands Sampled (2270’ – 2300’ depth)
Lower Catahoula Sands Sampled (3555’ to 3595’ depth)
Bottom of Boring (4006’ depth)
Test Well Drilling Equipment
USGS Water Sampling Operations
Upper Catahoula Sands (2,270’ – 2,300’)

San Jacinto River Authority
www.SJRA.org
Field Measurement of 61,499 uS/cm or about 41,000 mg/l TDS from Lower Catahoula Sands (3,555’ – 3,595’).
USGS Field Participation
Well 39 Sample Results

• Lower Catahoula Sands - 3555’ to 3595’ depth
  – Water Temperature  115 – 120°F
  – Significant Methane in water
  – TDS  41,204 mg/l (limit* = 500 mg/l)
  – Chloride  25,000 mg/l (limit* = 250 mg/l)
  – Iron  12.1 mg/l (limit* = 0.3 mg/l)
  – Aluminum  6.080 mg/l (limit* = 0.05 to 0.2 mg/l)
  – Manganese  1.43 mg/l (limit* = 0.05 mg/l)

• Upper Catahoula Sands - 2270’ to 2300’ depth
  – Water Temperature  105°F
  – Methane in water
  – TDS  2,590 mg/l (limit* = 500 mg/l)
  – Chloride  1,060 mg/l (limit* = 250 mg/l)
  – Iron  1.53 mg/l (limit* = 0.3 mg/l)
  – Aluminum  0.937 mg/l (limit* = 0.05 to 0.2 mg/l)
  – Manganese  0.102 mg/l (limit* = 0.05 mg/l)

*Secondary Standards