Texas Groundwater Management: Joint Planning Process

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Groundwater Management in Texas

• 1904 – Rule of Capture
  – Pumping a well and drying up a neighbors well results in no liability

• 1949 – Groundwater Conservation Districts
  – Can alter, modify or discard Rule of Capture

• 1997 – SB 1
  – Groundwater Conservation districts are the preferred method of groundwater management
Groundwater Management in Texas

• 2001 – Groundwater Management Areas
  – Part of SB 2
• 2005 – Joint Planning
  – HB 1763
Groundwater Conservation Districts

- Local management of groundwater resources
- Preferred method of groundwater management
- Can limit, modify or discard the Rule of Capture
- Currently – 96 districts
Groundwater Management Areas

- SB 2 (2001)
  - TWDB designated 16 GMAs
  - Groundwater Conservation Districts (GCD) share management plans
  - Voluntary joint planning (if a GCD called for it)
Groundwater Management Areas (GMAs)
Seymour
GMA 6
Edwards-Trinity Plateau

GMA 7 (3,4,9)
19 Minor Aquifers
HB 1763 (2005)

• Regionalized groundwater planning
• Required annual review of management plans and accomplishments
• Required joint planning
Joint Planning

• GCDs within a GMA required to establish desired future conditions (DFC) by September 1, 2010

• Each GCD has one vote
  – 2/3 majority to adopt a DFC
Groundwater Conservation Districts in Each GMA
Joint Planning

• Desired Future Condition (DFC)
  – Adopted by Groundwater Conservation Districts (GCD) within a Groundwater Management Area (GMA)

• Managed Available Groundwater (MAG)
  – Calculated by Texas Water Development Board
  – Pumping that will achieve a DFC
Desired Future Condition (DFC)

- Quantified conditions of groundwater resources
- Specified time or times in the future
- Broad Policy Goal
  - Drawdown
  - Spring flow
  - Storage volumes
- Updated at least every 5 years
Managed Available Groundwater (MAG)

- TWDB calculates based on DFC
  - Models
  - Water budget calculations
  - District provided data and information
- Will be included in GCD Management Plans
- To be used in permitting decisions
Groundwater Availability = DFC + MAG
Groundwater Availability = Policy + Science

Groundwater Availability = DFC + MAG
Groundwater Availability Models (GAMs)

• Program started in 2000 to model all aquifers in Texas
• Stakeholder involvement
• Continuous improvement of the models
• Tools for Joint Planning Process
Groundwater Modeling

- Approximations of reality
- Objective driven
- Simulate groundwater flow
  - Pumping and recharge are key inputs
  - Groundwater levels, spring flows are two examples of output
GAMs and Joint Planning Process

- 24 models developed
- One GMA has no districts (GMA 5)
  - 2 models cover GMA 5
- 22 developed models available for use in process
GAMs Used in Support of Joint Planning Process

• 18 out of 22 GAMs were used as developed
• 4 GAMs were only used as foundations for improved models
  – Dockum
  – Edwards-Trinity (Plateau) and Pecos Valley
  – Edwards BFZ (Barton Springs Segment)
  – Gulf Coast (Southern)
5 “Non-GAMs” Used in Joint Planning Process

• Developed in-house by TWDB
• 3 represent recalibrations of existing GAMs
  – Better address proposed DFCs (calibration time period, boundary conditions)
• 2 represent combined existing GAMs
Model Runs

• Simulations of changes in:
  – Groundwater pumping and/or
  – Drought conditions

• Output examples:
  – Drawdown
  – Spring Flows
  – Storage Volumes
Model Runs

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Desired Future Conditions

• Deadline to adopt initial DFCs was September 1, 2010
• 74 DFCs adopted
  – First = December 17, 2007
  – Last = August 30, 2010
• Submittal to TWDB complete
  – All have been found to be administratively complete
DFCs
Adopted

N/A
Summary of DFCs

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<th>Category</th>
<th>Count</th>
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<td>Drawdown</td>
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<tr>
<td>Spring Flow</td>
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<tr>
<td>Volume</td>
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<td>Minimum Groundwater Elevation</td>
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<tr>
<td>Hybrid (Drawdown and Volume)</td>
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<tr>
<td>Hybrid (Drawdown and Spring Flow)</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>74</strong></td>
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Summary of DFCs

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<thead>
<tr>
<th>Groundwater Management Area (GMA)</th>
<th>19</th>
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<tbody>
<tr>
<td>County</td>
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<td>District</td>
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<tr>
<td>Area</td>
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<td>Hybrid (County and District)</td>
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<tr>
<td>Hybrid (GMA and County)</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>74</td>
</tr>
</tbody>
</table>
Recharge Assumption Summary

- 4 DFCs considered drought conditions
- 70 DFCs assumed “average” recharge conditions
DFCs in GMA 7

- Edwards-Trinity (Plateau) Aquifer
- 7 feet of drawdown in 2060 (GMA 7 Average)
- Summary of how DFC was established
GMA 7 “Vision”

- Minimize drawdown in east (headwaters area)
- Provide for irrigation demands in west (significant drawdown)
GMA 7 “Vision”

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Is this compatible?
“Request” Pumping

- County-by-county pumping (27 counties)
- Total GMA 7 “request” = 530,000 AF/yr
  - 2005 GMA 7 pumping = 400,000 AF/yr
- Assumed average recharge
- Estimate drawdown in 2060
Request Pumping

- < 10,000 AF/yr
- 10,000 to 50,000 AF/yr
- 50,000 to 100,000 AF/yr
- 100,000 to 250,000 AF/yr
Six Initial Scenarios

• Scenario 0 (2005 Pumping)
• Scenario 1 ("Request" Pumping)
• Scenario 2 (110% of Request Pumping)
• Scenario 3 (120% of Request Pumping)
• Scenario 4 (130% of Request Pumping)
• Scenario 5 (140% of Request Pumping)
Pumping and Drawdown Summary

- Scenario 0 400,000 AF/yr 4 feet
- Scenario 1 530,000 AF/yr 6 feet
- Scenario 2 586,000 AF/yr 7 feet
- Scenario 3 639,000 AF/yr 8 feet
- Scenario 4 692,000 AF/yr 9 feet
- Scenario 5 746,000 AF/yr 10 feet
July 28, 2010 GMA 7 Meeting

• Discussed “request pumping” scenario
• Compare and contrast with continuation of 2005 pumping
• Compare and contrast with incremental increases
• GCD representatives developed 5 new scenarios (individual county adjustments)
  – Model runs completed at meeting
Pumping and Drawdown Summary

- Scenario 6: 548,000 AF/yr, 7 feet
- Scenario 7: 550,000 AF/yr, 7 feet
- Scenario 8: 566,000 AF/yr, 7 feet
- Scenario 9: 571,000 AF/yr, 7 feet
- Scenario 10: 571,000 AF/yr, 7 feet
GMA 7 Adopted Scenario 10

- 7 feet of drawdown in 2060 (GMA Average)
- Pumping = 571,000 AF/yr
  - “Request pumping” of 530,000 AF/yr
- Met predefined “vision”
Next Steps

• TWDB developing Managed Available Groundwater values
  – Over half have been delivered in draft form
• Model improvement continuing
  – Preparing for “next” round of DFCs
• Legislative session begins January 2011
  – Potential changes to the process
Questions?

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