Welcome To The Second Quarterly Edwards-Trinity Aquifer Model Stakeholders Advisory Forum

ET SAF 2

August 29, 2001

Texas Water Development Board
Groundwater Availability Modeling
A Groundwater Flow Model for the Edwards-Trinity Aquifer of West-Central, Texas

Roberto Anaya
Texas Water Development Board
Edwards-Trinity Stakeholders Advisory Forum Objectives

- Provide Public Awareness of GAM
- Update Interested Participants
- Solicit Data and Information
- Encourage Comments and Criticism
Spatial Extent Of The Edwards-Trinity Sediments

Subcrop
Outcrop
Stratigraphic Units

Modified From Barker and Ardis, 1996
Surface Geology

From Barker and Ardis, 1996
Vertical Profile Of The Edwards-Trinity Aquifer Sediments

Modified From Barker and Ardis, 1996
Structural Base For Trinity Group

From Barker and Ardis, 1996
Structural Base of Edwards-Trinity

From - USGS unpublished data, 2001
Structural Base For Edwards Group

From Barker and Ardis, 1996
Digital Elevation Model
How about a 15 minute break?
Edwards-Trinity Water Levels

From - USGS unpublished data, 2001
Structural Base of Edwards-Trinity

From - USGS unpublished data, 2001
Edwards-Trinity
Saturated Thickness

From - USGS unpublished data, 2001
Edwards-Trinity Water Level
Brewster County
Edwards-Trinity Water Level
Edwards County

Well 70-21-301  Edwards County
Edwards & Assoc.
Limestones
Edwards-Trinity Water Level
Real County

Edwards & Assoc.
Limestones

Hosston Fm.
Edwards-Trinity Water Level
Pecos County

Well 52-06-501  Pecos County
Well 52-16-602  Pecos County
Well 46-56-404  Pecos County
Edwards-Trinity Water Level
Crockett County

Well 54-01-607  Crockett County

Well 54-23-107  Crockett County

Well 54-19-701  Crockett County

Antlers Fm.

Edwards & Assoc.
Limestones

Trinity Group

Water level elevation (feet m A.S.L. and in.)
Edwards-Trinity Water Level
Sutton County
Edwards-Trinity Water Level
Kimble County

Edwards & Assoc.
Limestones

Hensel Sand Fm.
Edwards-Trinity Water Level
Upton County
Edwards-Trinity Water Level
Reagan County

Antlers Fm.
Edwards-Trinity Water Level
Irion County
Edwards-Trinity Water Level
Tom Green County

Some scattered water levels in the Antlers
but not enough for well hydrographs
Edwards-Trinity Water Level
Concho County

Edwards & Assoc.
Limestones

Edwards & Assoc.
Limestones
Edwards-Trinity Water Level
Ector County

Well 27-60-701 Ector County
Well 27-62-703 Ector County

Antlers Sand Fm.
Edwards-Trinity Water Level
Midland County

Antlers Sand Fm.
Edwards-Trinity Water Level
Glasscock County

Antlers Sand Fm.
Edwards-Trinity Water Level
Sterling County

Well 44-16-901 Sterling County
Antlers Sand Fm.

Well 43-25-302 Sterling County
Edwards-Trinity

Graphs showing water level changes over time for wells in Sterling County.
Edwards-Trinity Water Level
Coke County

Fredericksburg-Trinity
Edwards-Trinity Water Level
Nolan County

Dockum Fm.

Antlers Sand Fm.

Fredericksburg Group
Recharge!

Sunday’s Potential Recharge
Previous Recharge Estimates

all estimates based on baseflow

• 2.0 in/yr (Real) - Long, 1958
• 1.4 in/yr (Kinney) - Bennett and Sayre, 1962
• 0.3 in/yr (Crockett) - Iglehart, 1967
• 1.0 in/yr (Kerr) - Reeves, 1969
• 0.12 to 2.24 in/yr (eastern plateau) - Kuniansky, 1989

(From : Scanlon, 2001 - unpublished report)
NWS Rain Gage Sites
USGS Surface Water Gage Sites
Lunch Time!

90 Minute Break

We will reconvene to discuss a few Edwards-Trinity Aquifer Conceptualization Issues

FOR MORE INFO VISIT...

www.twdb.state.tx.us/gam
Conceptualization Issues

- Estimating recharge and ET?
- Number of model layers?
- Model adjacent minor aquifers?
Recharge and ET

- Use baseflow analysis to estimate recharge
- Allow model to estimate recharge
- Use soil moisture model to estimate ET
- Allow recharge package to include ET
How Many Layers?

• 1 Layer, 2 layers, 3 layers … more?
• Enough water level data for more …
• However, the structure data is better suited for two layers … Edwards and Trinity
Areal Extent of the Edwards-Trinity Sediments

- Ogallala
- Pecos Alluvium
- Upper Cretaceous
To Model the Pecos Alluvium or ...
...Not to Model the Pecos Alluvium?
Current Project Status

• Completed Literature Review
• Continued Collection of Hydrogeologic Data
• Continued Data Processing and Analysis
• Completed 21 of 39 New Pumping Tests
Anticipated Project Status For Next Quarter

• Complete Water Level Analysis
• Complete Recharge Analysis
• Finalize the Geologic Structure
• Complete New Pumping Tests
• Begin Hydraulic Properties Analysis
• Access Surface Water-Groundwater Interactions
Topics For ET SAF 3

• Update on Hydrogeologic Data Sets
  – for Structural Geometry
  – Water Levels and Well Hydrographs
  – for Recharge Estimates
  – for Hydraulic Properties
  – for Surface Water-Groundwater Interactions

• Finalize Conceptual Model for the Edwards-Trinity Aquifer System
Primary Literature Sources

Questions or Comments?

15 Minute Break!
We will reconvene for the Specific Capacity Test Workshop by Dr. Robert Mace ...

FOR MORE INFO VISIT...

www.twdb.state.tx.us/gam
Edwards-Trinity GAM Stakeholders Advisory Forum 2  
August 29, 2001 – Sonora, Texas  
List of Attendees

<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliation</th>
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<tr>
<td>Cindy Cawley</td>
<td>Plateau UWCD</td>
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<tr>
<td>Scott Holland</td>
<td>Sterling County UWCD / Irion County Water Conservation District</td>
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<tr>
<td>Cameron Cornett</td>
<td>Headwaters UWCD</td>
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<tr>
<td>Winton Milliff</td>
<td>Coke County UWCD</td>
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<tr>
<td>Stan Reinhard</td>
<td>Hickory UWCD NO. 1</td>
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<td>Virgil Poloeek</td>
<td>Sutton County UWCD</td>
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<tr>
<td>Allan Lange</td>
<td>Lipan-Kickapoo Water Conservation District</td>
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<tr>
<td>Dennis Clark</td>
<td>Emerald UWCD</td>
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<tr>
<td>Wendell Moody</td>
<td>Private Citizen</td>
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<td>Rick Harston</td>
<td>Glasscock County UWCD</td>
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<td>Ferrel Wheeler</td>
<td>Garza County UFWCD</td>
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<tr>
<td>Cindy Weatherby</td>
<td>Santa Rita UWCD</td>
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<tr>
<td>Robert Mace</td>
<td>Texas Water Development Board</td>
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<td>Roberto Anaya</td>
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About 15 people attended the second quarterly Edwards-Trinity Aquifer Groundwater Availability Modeling Stakeholders Advisory Forum, held August 29, 2001 at the 4-H Civic Center in Sonora, Texas. All of the stakeholders present were from 13 local groundwater conservation districts.

Roberto Anaya presented an update on the geologic structure, water levels, recharge methodology, and conceptualization issues for some of the boundary conditions of the Edwards-Trinity model. The stakeholders were pleased that the Edwards limestones and the Trinity Group sediments would be modeled as two separate, but hydraulically connected layers. The stakeholders also agreed that the entire Cenozoic Pecos Alluvium aquifer should be included in the model to more accurately represent the hydraulic boundary conditions between the Pecos Alluvium and the Edwards-Trinity. The stakeholders were very enthusiastic about providing TWDB with any additional data and information that they could find at their local district offices. Robert Mace ended the meeting with a brief workshop on the use of Specific Capacity Tests.

The next SAF meeting was tentatively scheduled for mid-January in Ozona, Texas. Topics for the next forum include 1) final results from water level analysis and baseflow/recharge relationships; 2) a more complete picture of the geologic structure and of the hydraulic connectivity between the Edwards-Trinity aquifer system and other major and minor aquifer systems; and 3) initial findings on groundwater-surface water interactions and from pumping tests and specific capacity tests within the Edwards-Trinity.

Primary Stakeholder Issues Follow:

1) A couple of stakeholders are still concerned about the ability to accurately model flow through karst portions of the aquifer.

ANSWER: Individual conduits will not be modeled, instead, the model will average out the effects of conduit flow within 1 X 1 mile model grid cells.

2) Several stakeholders are still concerned that the model would infer the existence of large volumes of groundwater being available based on saturated thickness when in reality the aquifer more often than not has poor production yields.

ANSWER: The model will not generate groundwater availability, but instead provide a tool for quantifying availability based on the model users definition of availability.

3) One stakeholder was concerned about how domestic pumping would be distributed within the model.

ANSWER: Domestic pumping will be spatially distributed based on population density derived from US Census data as opposed to the uniform distribution over county/basin units as done for the Trinity Hill Country model.

-Roberto Anaya, 08/30/01