Welcome to the Edwards and Trinity Regional Aquifer Modeling Project Stakeholder Advisory Forum

Thank you for signing in early.
The meeting will begin at 10:00 am, Central Daylight Time
Please stay muted during the meeting and use the chat box to submit questions
Agenda

Update on Edwards and Trinity Regional Modeling Project

- Program Overview
- Project Team
- Proposed study area
- Data needs/schedule

Introduction to the TWDB Springs Program

Question and Answer
Stakeholders Advisory Forum
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Edwards and Trinity Regional Groundwater Availability Model

Presented by
Cindy Ridgeway, P.G. Manager, Groundwater Availability Modeling
Ki Cha, Ph.D. Lead Modeler, Groundwater Availability Modeling
Update on Edwards and Trinity Regional Model

Program Overview
GAM Program Overview

**Aim**: Develop groundwater flow models for the major and minor aquifers of Texas.

**Purpose**: Tools that can be used to aid in groundwater resources management by stakeholders.

**Public process**: Stakeholder involvement during model development process.

**Models**: Freely available, standardized, thoroughly documented. Reports available over the internet.

**Living tools**: Periodically updated.
GAMs for Major Aquifers

*Ogallala (northern part) V4.01
*Ogallala (southern part) V3.01
Seymour V1.01 plus local
Trinity (northern part) V2.01
Edwards-Trinity (Plateau) V2.01 plus 2 alternatives
Trinity (Hill Country) V1.01
Edwards (San Antonio segment) V1.01
Carrizo-Wilcox (northern part) V2.01
Carrizo-Wilcox (central part) V3.01
Gulf Coast (northern part) V3.01
Edwards (northern segment) V1.01
Gulf Coast (central part) V1.01 plus alternative
Gulf Coast (southern part) V2.01 plus alternative

Note: The Edwards-Trinity (Plateau) and Pecos Valley aquifers are included in the same model.
*Ogallala now combined in High Plains Aquifer System model

Updated June 2019
Why Stakeholder Advisory Forums?

- Keep stakeholders updated about progress of the model
- Inform how the groundwater model can, should, and should not be used
- Provide stakeholders with the opportunity to provide input and data to assist with model development
Update on Edwards and Trinity Regional Model

Project Team
Project Team

Ki Cha
- Project management and Model development

Stephen Bond, Grayson Dowlearn and Daryn Hardwick
- GIS Support, Data collection and analysis, Geodatabase and 3D framework

Roberto Anaya, Ian Jones and Radu Boghici
- Senior support

Cindy Ridgeway and Larry French
- Management oversight
Update on Edwards and Trinity Regional Model

Proposed Study Area
Proposed Study Area

- Over 53,000 mi²
- 60 Counties
- 43 GCDs
Edwards-Trinity Plateau and Pecos Valley aquifers
Objectives/Goals

<table>
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<tr>
<th>Objective</th>
<th>Description</th>
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<tr>
<td>Update the MODFLOW code</td>
<td>Original Models developed in older MODFLOW code</td>
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<td>Better understand Intraformational Flow</td>
<td>Important for updates to local models</td>
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<tr>
<td>Explore better ways to model surface water/groundwater interactions</td>
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<tr>
<td>Provide updates on local models</td>
<td>Newer MODFLOW is more robust, easier to link models or refine areas of interest.</td>
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Update on Edwards and Trinity Regional Model

Data needs and schedule
We need data

1. **Well information** - log/location/construction
2. **Groundwater data** - level/pumping/water quality
3. **Aquifer data** - testing/study
4. **Surface water information** – Groundwater Diversion/Interaction
5. **Not currently publicly available/ May be a great study we need to consider.**
When do we need data?

• No later the day before **Thanksgiving** (Nov. 25, 2020)
Modeling Timeline

• Conceptual Model
  – Gather data & Construct the Framework
  – Gather data & Develop Conceptual model

• Numerical Model
  – Model code
    • MODFLOW Un-Structured Grid (USG)/6
    • Variable Grid Sizes (Quadtree)
  – Start updates to localized models;
    • Trinity – (Hill Country portion)
    • Edwards (Balcones Fault Zone) – Barton Springs segment
**Project Schedule**

**Project Start**
(Jan. 2020)
- SAF Meeting
  - Apr. 2020

**Conceptual Model**
(Jan. 2020 ~ Nov. 2021)
- Conceptual Model Report
  - Oct. 2021
- SAF Meeting
  - Oct. 2021

**Numerical Model**
(Sep. 2021 ~ Dec. 2022)
- Steady-State Model
  - Sep. 2021~Mar. 2022
- Transient Model
  - Apr. 2022~Nov. 2022
- SAF Meeting
  - Dec. 2022
- Numerical Model Report (Draft)
  - Dec. 2022

**Completion**
(Feb. 2023)
- Numerical Model Report (Final)
  ~Feb. 2023
- Groundwater Model For Edwards and Trinity Region
  ~Feb. 2023

*Schedule is Tentative*
Additional Information

Web information:

http://www.twdb.texas.gov/groundwater/models/gam/eddtp/eddtr.asp
Spring Monitoring Program and Data Needs for Groundwater Availability Modeling

Edwards Trinity Regional GAM Stakeholder Advisory Forum
April 28, 2020
Presented by Cody Bjornson and Donald Karr
TWDB Spring Monitoring History

No permanent monitoring program

Some water quality samples

Few flow measurements
TWDB Spring Monitoring Data

Field measurements

WQ analyses by lab

Atrazine (TCEQ)
TWDB Spring Monitoring Program

Systematically implement routine data collection, inventory and analysis on the springs of Texas.

Current goals:
16-20 springs sampled with flow rates in March & April (TWDB water quality season). Repeat on annual basis.

Future goals:
Monitor 30+ springs per year.
TWDB Spring Monitoring Program: Selection Criteria

Springs are added to the program based on several criteria.
Selection Criteria: Significance to Ground/Surface Water Interaction Studies

Devils River – Big Satan Canyon and Dolan Creek are prime examples.

Nueces and Frio Rivers.

Other sites to be determined.
Selection Criteria: Endangered Species Habitat

Diamond Y Draw – Pecos Co.
Habitat for critically endangered pupfish

Caroline Spring – Terrell Co.
Habitat for endangered Darter species, adds significant flow to lower Pecos River
Selection Criteria: Areas of Cultural/Other Significance

Springs threatened by population growth, increased drilling activities, or that have cultural or recreational significance will also be considered for the program.
TWDB Spring Monitoring Program

Measuring Flow Rate

To measure the flow rate of a large spring, such as Gorman Spring, a flow meter is used to determine the rate in Cubic Feet/Second.
To measure the flow rate of small springs the Bag and Cylinder Method is used. Discharge is gathered in a large plastic bag over a period of time and then measured in a graduated cylinder. Convert from Cubic Centimeters/Second to Cubic Feet/Second.
Spring Data and Groundwater Availability Modeling

Flow rate: Estimating aquifer discharge

Water quality: Aquifer boundaries and fresh/salt water divides

Isotopes: Groundwater age, source, flow paths
Edwards Trinity Regional Groundwater Availability Model (GAM) Study Area

The study area for this model includes the Edwards-Trinity (Plateau), Pecos Valley, Trinity (Hill Country), and Edwards BFZ Aquifers.
Inventoried Springs in the Edwards Trinity Regional Groundwater Availability Model (GAM) Study Area

The study area for this model includes the Edwards Plateau, Pecos Valley, Trinity (Hill Country), and Edwards BFZ Aquifers.
Data Gaps and Needs

Areas where springs are less common or lacking data

Data specific to modeling needs
Inventoried Springs with Water Quality Data in the Edwards Trinity Regional Groundwater Availability Model (GAM) Study Area

The study area for this model includes springs from the Edwards-Trinity (Plateau), Pecos Valley, Trinity (Hill Country), and Edwards BFZ Aquifers.
Inventoried Springs with Isotope Data in the Edwards Trinity Regional Groundwater Availability Model (GAM) Study Area

The study area for this model includes springs from the Edwards-Trinity (Plateau), Pecos Valley, Trinity (Hill Country), and Edwards BFZ Aquifers.

The information on this map is believed to be accurate and reliable; however, the TWDB cannot guarantee the accuracy or currency of the contents of this map. Users are responsible for checking the accuracy, currency and suitability of all information themselves.
Modeling Project Contacts

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Q&A

Questions?
Q&A

• Question #1: How do you handle the boundary/domain in Mexico and New Mexico?
  Answer #1: The boundaries in Mexico and New Mexico will be no-flow boundaries. During the model calibration process those area could be clipped out for better matching.

• Question #2: What is the smallest grid size you anticipate having?
  Answer #2: We have not set the smallest grid size for this model. We will keep investigating and studying the best number to make the model perform well with reasonable simulation time.

• Question #3: The webpage for the project says that this model will replace the current GAM for ETP and PV aquifers. It appears that this updated regional GAM will not replace the Hill Country GAM or the BFZ GAM. Will those two be updated after this regional GAM is completed?
  Answer #3: Yes. The regional model will better handle the flow between Edwards-Trinity (Plateau), Trinity (Hill Country) and Edwards (Balcones Fault Zones). Then local model will be updated with consistent flow boundary.

• Question #4: Are you covering the flowing wells in far West Texas, some of them creates artificial "springs or ponds"?
  Answer #4: We have not looked into that. We will to follow up to discuss more with the person who questioned.
# List of Attendees

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<td>Alex Mayer</td>
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