Texas Water Development Board

Groundwater Availability Model Updates: Guidance for Requesting an Update based on New Data

Groundwater Division
Groundwater Modeling Program

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Introduction

The Texas Water Development Board (TWDB) develops and maintains models for the major and minor aquifer of Texas. Groundwater availability models are regional groundwater flow models approved by the TWDB Executive Administrator. While the TWDB Groundwater Modeling Department schedules updates for existing groundwater availability models (GAMs), new hydrogeologic and groundwater data may be generated prior to the scheduled update of an existing GAM. Groundwater conservation districts may request a GAM update if new data are significant enough to potentially affect joint groundwater planning and groundwater management decisions.

This guidance document provides the requirements and process for requesting an update to the official, regional GAMs developed or maintained by the TWDB Groundwater Modeling Department. This document is not intended to be used by a groundwater conservation district creating a local model, as local models are not used in the joint planning process.

There are two important considerations involved in the process to update a GAM.

1. **Best available science**: GAMs are intended to incorporate and reflect the best available science. To the extent possible and within available resources and constraints, the TWDB will make every effort to ensure that the GAMs are kept up to date to represent the best available scientific principles and data.
2. **Public involvement and transparency**: GAMs are an important tool in the hands of decision-makers responsible for making groundwater management decisions for Texans across the state. Therefore, it is critical that the process to develop and update GAMs be open and transparent to all interested stakeholders and that stakeholders have opportunities to observe and contribute to any model updates.

What new hydrogeologic data may warrant a model update?

A GAM may qualify for an update if there is significant new hydrogeologic data available that will improve the model. This new data must be a robust dataset, and either be 1) spatially located in an area of the model with sparse or no data, or 2) be statistically different from existing data in the current model. Examples of these types of data include:

- water level data,
- stream gage data,
- springflow measurement data,
- evapotranspiration or rooting depth data,
- aquifer property data, such as hydraulic conductivity, transmissivity, specific capacity, or storativity,

- pumping data, or
- subsidence measurement data.

How to request a GAM update

The TWDB will only accept a GAM update request to incorporate new hydrogeologic data from a groundwater conservation district that has been approved by district representatives in the groundwater management area(s) (GMA) within the model boundary.

The following general criteria apply to a groundwater conservation district requesting a GAM update:

- Only a groundwater conservation district may request a GAM update.
- Prior to submitting a request to the TWDB, the request must be discussed and approved in a GMA joint planning meeting. If the GAM is not used for joint planning purposes by a district in a GMA within the model boundary, the requestor must obtain written documentation from that GMA coordinator stating as such.
- A request must be submitted to the TWDB Executive Administrator by a groundwater conservation district in writing (physical or electronic) and include all the required documentation listed in this document.

Required documentation

A groundwater conservation district requesting a GAM update must submit all documentation listed below to the TWDB. All documentation submitted to the TWDB with a request will become public information and non-confidential, subject to the requirements and exceptions of the Public Information Act.

District representatives in a GMA may choose to have a consultant perform a GAM modification and then request an official TWDB update after their work is completed. If the TWDB performs the GAM update, the schedule for the update will be determined by other TWDB groundwater modeling priorities. The required documentation varies depending on whether a consultant or the TWDB will be doing the update work. More specifics on the required documentation in each instance are included in Appendices A and B.

General required documentation and data includes the following:

- Written request for an official GAM update to incorporate new data, addressed to the TWDB Executive Administrator with a copy to the TWDB Groundwater Modeling Manager (physical or electronic).
- Justification statement describing the need for and benefit of the GAM modification request.
- Demonstration that the new hydrogeologic data justify the proposed GAM update.

    - For consultants performing a GAM modification, see Appendix A for additional documentation requirements.
    - For a request for the TWDB to perform a GAM update, see appendix B for additional documentation requirements.
- Written resolutions adopted by two thirds of the district representatives in the groundwater management area(s) within the model boundary.
    - If applicable, written documentation from a coordinator of a GMA within the model boundary that the GAM in question is not used for joint planning purposes.
- A copy of the notice and minutes of the public meeting held by the districts in the groundwater management area(s) within the model boundary at which the districts approved the resolution.

Submittal of incomplete data and information relevant to the GAM update request may impede processing the request. TWDB staff will work with the groundwater conservation district or designated contact to obtain complete data.

TWDB review and update

Once TWDB staff has reviewed the GAM update request and determined that the submittal is complete and appropriate, the TWDB will inform the district representatives in the groundwater management area(s) whether the request was accepted and whether the model update is a minor change (model revision) or a major change (model recalibration).

Once the data are incorporated and changes are made, all model statistics will be analyzed and compared against the existing model statistics. If statistics are within GAM Standards and indicate that the GAM does not need to be recalibrated, then the changes are classified as minor (model revision). If the statistics are not within GAM Standards and indicate the GAM needs to be recalibrated, then the changes are classified as major (model recalibration).

All relevant documents and data will be provided on the TWDB website for a public comment period (30 days for a minor change and 60 days for a major change).

Resources

GAM Downloads
GAM Standards
GAM File Geodatabase Template and Metadata Standards

Statutes and rules

Texas Water Code § 16.012(l)
31 Texas Administrative Code § 356.10(12)

For questions, contact:

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Appendix A: Required process and documentation for a consultant performing a modification to a groundwater availability model (GAM)

The following process and documentation requirements apply if groundwater conservation district representatives within a groundwater management area (GMA) choose to have a consultant modify a GAM and then request an official update from the TWDB.

Expectations

The TWDB expects a consultant chosen by district representatives within a GMA to

1. modify the model with new information and data,
2. run the model,
3. generate statistics,
4. compare statistics against the existing model statistics, and
5. visually assess model results for reasonably expected model behavior (water levels fluctuate according to inputs, land surface does not flood, etc.)

If the modified model statistics are within GAM Standards, the change is considered a minor change (model revision). If the modified model statistics are not within GAM Standards, the model needs to be recalibrated and the change is considered a major change (model recalibration).

Minor change (model revision) documentation and process

To obtain approval from the TWDB for a model revision performed by a consultant, a groundwater conservation district must submit the following to the TWDB:

1. A cover letter addressed to the TWDB Executive Administrator that includes:
    a. the formal request for a GAM update,
    b. a justification statement describing the need for and benefit of the GAM modification request, and
    c. a list of technical staff (consultant) and contact information.
2. Written resolutions adopted by two thirds of the district representatives in the GMA(s) within the model boundary.
    a. If applicable, written documentation from a coordinator of a GMA within the model boundary that the GAM in question is not used for joint planning purposes.
3. A copy of the notice and minutes of the public meeting held by the districts in the GMA(s) within the model boundary at which the districts approved the resolution.
4. An accessible[1] document sealed by a P.E. or P.G. that demonstrates that the new hydrogeologic data justifies the proposed GAM update and includes:

[1] The TWDB has a guidance document on how to check a PDF for accessibility.

   a. an executive summary,
   b. maps (include date and a copy of the TWDB grid file),
   c. a summary of data added or adjusted,
   d. a comparison table of statistics from the existing model and proposed modified model, and
   e. any supporting reports or studies as appendices.
5. All raw data stored in a current standard GAM File geodatabase with metadata.
6. MODFLOW model files and all documented programs used to analyze statistics. All scripting or programming tools that were used for the model update should be included with the supporting information.

Once TWDB staff has reviewed the GAM update request and determined that the submittal is complete and appropriate, the TWDB will inform the district representatives in the groundwater management area(s) whether the request was accepted. If accepted, all materials submitted to the TWDB will be posted to the TWDB website for a 30-day stakeholder review and comment period. Stakeholders will be informed via email. A stakeholder meeting hosted by the TWDB will be scheduled at the end of the review period to address comments and questions. This will be a joint meeting coordinated by the TWDB with the district representatives within each applicable GMA and the consultant(s).

The TWDB may request a meeting(s) with the technical contacts provided for any clarification(s) or additional information.

If the minor change (model revision) is approved, the TWDB Executive Administrator will release a new version of the model to the applicable groundwater conservation districts, regional water planning groups, and river authorities. The model version number will increment by 0.01. For example, version 3.01 will become version 3.02.

Major change (model recalibration) documentation and process

To obtain approval from the TWDB for a model recalibration performed by a consultant, a groundwater conservation district must submit the following to the TWDB:

1. A cover letter addressed to the TWDB Executive Administrator that includes:
    a. the formal request for a GAM update,
    b. a justification statement describing the need for and benefit of the GAM modification request, and
    c. a list of technical staff (consultant) and contact information.
2. Written resolutions adopted by two thirds of the district representatives in the GMA(s) within the model boundary.
    a. If applicable, written documentation from a coordinator of a GMA within the model boundary that the GAM in question is not used for joint planning purposes.
3. A copy of the notice and minutes of the public meeting held by the districts in the GMA(s) within the model boundary at which the districts approved the resolution.
4. Consultant(s) will work with the TWDB to develop an approach for recalibration. TWDB staff may require a sensitivity analysis on various model inputs and predictive model runs within specifications provided by Groundwater Modeling staff to the consultant(s).
5. An accessible[2] numerical model report, sealed by a P.E. or P.G., that follows GAM Standards.
6. All raw data stored in a current standard GAM File geodatabase with metadata.
7. MODFLOW model files and all documented programs used to analyze statistics. All scripting or programming tools that were used for the model update should be included with the supporting information.

Once TWDB staff has reviewed the GAM update request and determined that the submittal is complete and appropriate, the TWDB will inform the district representatives in the GMA(s) whether the request was accepted. If accepted, all materials submitted to the TWDB will be posted to the TWDB website for a 60-day stakeholder review and comment period. Stakeholders will be informed via email. A stakeholder meeting hosted by the TWDB will be scheduled at the end of the review period to address comments and questions. This will be a joint meeting coordinated by the TWDB with the district representatives within each applicable GMA and the consultant(s).

The TWDB may request a meeting(s) with the technical contacts provided for any clarification(s) or additional information.

[2] The TWDB has a guidance document on how to check a PDF for accessibility.

If the major change (model recalibration) is approved, the TWDB Executive Administrator will release a new version of the model to the applicable groundwater conservation districts, regional water planning groups, and river authorities. The model version number will increment by 0.10. For example, version 3.10 will become version 3.20.

Appendix B: Required process and documentation for a groundwater conservation district to request a GAM update from the TWDB

The following process and documentation requirements apply if groundwater conservation district representatives within a groundwater management area (GMA) choose to request an official GAM update from the TWDB.

Minor change (model revision) documentation and process

To obtain approval for a model revision performed by the TWDB, a groundwater conservation district must submit the following to the TWDB:

1. A cover letter addressed to the TWDB Executive Administrator that includes:
    a. the formal request for a GAM update, and
    b. a justification statement describing the need for and benefit of the GAM modification request.
2. Written resolutions adopted by two thirds of the district representatives in the GMA(s) within the model boundary.
    a. If applicable, written documentation from a coordinator of a GMA within the model boundary that the GAM in question is not used for joint planning purposes.
3. A copy of the notice and minutes of the public meeting held by the districts in the GMA(s) within the model boundary at which the districts approved the resolution.
4. The request and presentation from the GMA coordinator should provide enough information for Groundwater Modeling staff to review. Sufficient information and data may include
    a. water level data,
    b. stream gage data,
    c. springflow measurement data,
    d. evapotranspiration or rooting depth data,
    e. aquifer property data, such as hydraulic conductivity, transmissivity, specific capacity, or storativity,
    f. pumping data, or
    g. subsidence measurement data.

Once TWDB staff has reviewed the GAM update request and determined that the submittal is complete and appropriate, the TWDB will inform the district representatives in the GMA(s) whether the request was accepted.

The TWDB will determine an appropriate schedule based on current staff workloads to complete the update. The TWDB will maintain communication with the requestor and the applicable GMA(s) to ensure modifications meet the needs of the GMA(s).

If accepted and after a schedule is determined by the TWDB, the TWDB will update the model with the new information, run the model, analyze model statistics, and compare those statistics with the statistics from the existing GAM. The TWDB will document model revisions in a draft GAM Task Report.

The draft GAM Task Report will be posted to the TWDB website for 30-day stakeholder review and comment period. Stakeholders will be informed via email. A stakeholder meeting hosted by the TWDB will be scheduled at the end of the review period to address comments and questions. This will be a joint meeting coordinated by the TWDB with the district representatives within each applicable GMA.

If the minor change (model revision) is approved, the TWDB Executive Administrator will release a new version of the model to the applicable groundwater conservation districts, regional water planning groups, and river authorities. The model version number will increment by 0.01. For example, version 3.01 will become version 3.02. The model is updated to appropriate version number, which will increment by 0.01. For example, model version 3.01 will become version 3.02.

Major change (model recalibration) documentation and process

To obtain approval for a model recalibration performed by the TWDB, a groundwater conservation district must submit the following to the TWDB:

1. A cover letter addressed to the TWDB Executive Administrator that includes:
    a. the formal request for a GAM update, and
    b. a justification statement describing the need for and benefit of the GAM modification request.
2. Written resolutions adopted by two thirds of the district representatives in the GMA(s) within the model boundary.
    a. If applicable, written documentation from a coordinator of a GMA within the model boundary that the GAM in question is not used for joint planning purposes.
3. A copy of the notice and minutes of the public meeting held by the districts in the GMA(s) within the model boundary at which the districts approved the resolution.
4. The request and presentation from the GMA coordinator should provide enough information for Groundwater Modeling staff to review. Sufficient information and data may include
    a. water level data,
    b. stream gage data,
    c. springflow measurement data,
    d. evapotranspiration or rooting depth data,
    e. aquifer property data, such as hydraulic conductivity, transmissivity, specific capacity, or storativity,
    f. pumping data, or
    g. subsidence measurement data.

Once TWDB staff has reviewed the GAM update request and determined that the submittal is complete and appropriate, the TWDB will inform the district representatives in the GMA(s) whether the request was accepted.

The TWDB will determine an appropriate schedule based on current staff workloads to complete the update. The TWDB will maintain communication with the requestor and the applicable GMA(s) to ensure modifications meet the needs of the GMA(s).

If accepted and after a schedule is determined by the TWDB, the TWDB will update the model with the new information, run the model, analyze model statistics, compare those statistics with the statistics from the existing GAM, and provide a comparison of model results using the model files for the most recently adopted desired future conditions. The TWDB will document model revisions in a draft GAM Numerical Model Report

The draft GAM Numerical Model Report will be posted to the TWDB website for a 60-day stakeholder review and comment period. Stakeholders will be informed via email. A stakeholder meeting hosted by the TWDB will be scheduled at the end of the review period to address comments and questions. This will be a joint meeting coordinated by the TWDB with the district representatives within each applicable GMA.

If the major change (model recalibration) is approved, the TWDB Executive Administrator will release a new version of the model to the applicable groundwater conservation districts, regional water planning groups, and river authorities. The model version number will increment by 0.10. For example, version 3.10 will become version 3.20.