

**TEXAS
WATER
DEVELOPMENT
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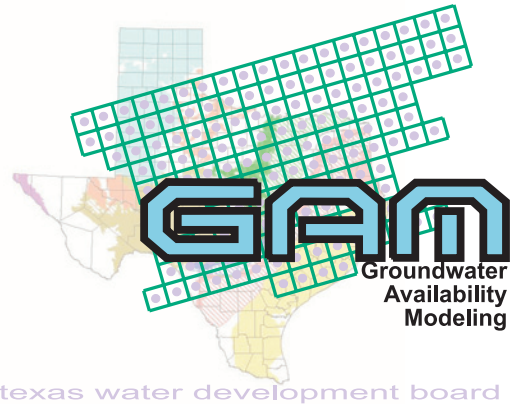
**Texas Natural Resources
Information System (TNRIS)
<http://www.tnr.is.state.tx.us>**

**Borderlands Information Center
(BIC)
<http://www.bic.state.tx.us>**

**Water Information Integration and
Dissemination
(TWDB WIID System)
<http://wiid.twdb.state.tx.us/>**



HOW TO USE GAM



Groundwater Availability Modeling, or GAM, is the process of using computer models as management tools to help assess groundwater availability. The Legislature tasked the Texas Water Development Board (TWDB) with obtaining or developing Groundwater Availability Models (GAMs) for the State's major and minor aquifers. As legislatively mandated, the TWDB attained GAMs for the nine major aquifers by October 1, 2004. There is no deadline for developing GAMs for the 21 minor aquifers, although TWDB staff will obtain or develop these models as soon as possible.

AM I REQUIRED TO USE GAM?

Groundwater Conservation Districts are required by statute to use GAM information when it is available in the development of their groundwater management plans. More specifically, GAMs and the data used to develop the GAMs are useful tools for evaluating some of the parameters currently required in groundwater management plans, such as:

- the annual amount of recharge from precipitation, if any, to the groundwater resources within the district;
- for each aquifer, the annual volume of water that discharges from the aquifer to springs and any surface water bodies, including lakes, streams, and rivers; and
- the annual volume of flow into and out of the district within each aquifer and between aquifers in the district.

In addition, GAMs will serve a key role when TWDB staff develop or verify managed available groundwater estimates that will be used in groundwater management plans and regional water plans.



HOW CAN GAM INFORMATION BE USED?

GAM information can be used in many different ways. There are two primary types of GAM information: the model itself and the information in the model. The model can be used to predict water levels and flows in response to pumping and drought. For example, if a new well field is planned, GAM can be used to predict possible effects of the well field on water levels in the aquifer. The information inside a GAM may also be very useful. For example, GAMs require information on recharge, aquifer geometry (depth and thickness), and aquifer properties (transmissivity, hydraulic conductivity, storativity, and water levels). Aquifer geometry and property information can be used to calculate water in storage and drawdown around individual wells.

GAM information can be used in many ways to estimate managed available groundwater depending on the desired future conditions of an aquifer. The desired future condition of an aquifer is defined by groundwater conservation districts within a groundwater management area as part of the joint planning process. The desired future condition is the quantified condition of the groundwater resources at a specified time or times in the future or in perpetuity. A couple of examples include:

- Example 1: The desired future condition of the aquifer is equal to the volume of water in the aquifer. GAM information can be used to estimate the volume of water in an aquifer for a specified area at a specified time under specified conditions.
- Example 2: The desired future condition of the aquifer is equal to an average water elevation, springflow, or baseflow level. GAM can be used to assess effects of pumping and drought on water levels, springflow, and baseflow. For example, the Barton Springs/Edwards Aquifer Conservation District has used the GAM to assess the possible effects of increased pumping on water levels and spring flows.

GAMs are particularly suited to investigating the effects of well fields, changes in pumping and pumping patterns, and changes in climate such as droughts. Therefore, GAMs can be used in these cases as they affect availability estimates. Because they are regional models, GAMs themselves cannot be used to accurately assess the impacts of individual wells. However, the collective effect of individual wells can be assessed. GAM information can be retrieved for use with analytical models to predict water-level declines around individual wells.

WHAT IF I HAVE BETTER INFORMATION THAN WHAT IS IN THE GAM?

The TWDB has developed the best possible GAMs with the available information, time, and budget. While the accuracy of GAM information should be adequate for most areas, there will be cases where site-specific information is better than GAM information. GAMs are tools that can and will be improved over time. The TWDB encourages groundwater conservation districts and regional water planning groups to share new information so it can be included as the GAMs are routinely updated and refined. The TWDB plans to update GAMs every five years with new information.

HOW DO I REQUEST A GAM RUN?

TWDB staff will access information from the GAMs or run the GAMs for groundwater conservation districts and regional water planning groups. Groundwater conservation districts and regional water planning groups need to contact Mr. Richard Smith at (512) 936-0877 or richard.smith@twdb.state.tx.us for more information.

For more information about GAM, please visit www.twdb.state.tx.us/GAM

Our Mission

Provide leadership, planning, financial assistance, information, and education for the conservation and responsible development of water for Texas.

EQUAL OPPORTUNITY EMPLOYER

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