



TEXAS WATER DEVELOPMENT BOARD



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TO: Board Members

FROM: Bill Mullican, Deputy Executive Administrator, Water Science and Conservation
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Robert Mace, Director, Groundwater Resources Division
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Jorge Arroyo, Innovative Water Technologies
Angela Freytag, Program Specialist

DATE: October 20, 2008

SUBJECT: Authorization to Publish a Request for Statements of Qualifications on 2009 Priority Water Research Topics

ACTION REQUESTED

Authorize the Executive Administrator to publish a Request for Statements of Qualifications in the Texas Register to conduct research on fiscal year 2009 Priority Water Research Topics for a total amount not to exceed \$600,000 from the Research and Planning Fund.

BACKGROUND

The Research Team annually requests permission from the Texas Water Development Board (TWDB) to publish a Request for Statements of Qualifications in the Texas Register (see attachment) to conduct research on priority topics. This year, after reviewing 52 potential topics submitted for consideration, the Research Team identified five priority topics where research is needed to assist the state with the conservation and development of its water resources. The five priority research topics identified for consideration are listed under Key Issues. Within the Request for Statements of Qualifications to be published in the Texas Register is a request for an estimate of the budget for each proposed study. This estimate will be used by TWDB staff as an indication of total grant funding requested and will not be used in the evaluation process when selecting applications for consideration of approval for the research proposed. It is also noted that one or more of the topics may not be recommended for funding due to the lack of qualified responses and/or budget.

Our Mission

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

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KEY ISSUES

1. Advancing Water Reuse in Texas

In the recent past, water rights issues have dominated the water reuse discussion in Texas. However, there is growing recognition among key stakeholders that, to achieve the expected supply goals for water reuse strategies, there is an even greater need to develop and implement a common agenda focusing on the science, technology and public awareness aspects of water reuse. The proposed research will examine Texas' rich history on water reuse; assess the state of existing and proposed water reuse supplies; and provide recommendations to inform and guide the state's efforts in research and implementation of water reuse.

2. Assessment of Global Climate Models for Water Resources Planning Applications

Water resource planners and managers need to know what the Global Climate Models (GCMs) are predicting for Texas and how reliable those predictions are. There are at least 17 publically available GCMs, each of which produces different results. These GCMs also provide predictions for a number of future carbon dioxide emission scenarios. This research will use statistical tools to determine which GCMs perform best in Texas and provide some idea of the uncertainty of those predictions.

3. Water Use in the Texas Mining and Oil and Gas Industry

Mining companies in Texas extract a range of resources including oil and natural gas, aggregates (crushed stone, gravel and sand), lignite and coal, clay, marble, limestone, gypsum, granite and uranium. The mining industry in Texas is critical to the state's and the nation's economy. For example, on a national basis, Texas is the fourth largest producer of clay and aggregates, the fifth largest producer of coal, and Texas is the nation's leading producer of crude oil (excluding Federal offshore areas). More than one-fourth of total U.S. natural gas production occurs in Texas, making it the nation's leading natural gas producer. In recent years, extraction of natural gas and oil and other commodities in Texas has risen considerably in response to record markets prices for fuel and minerals.

The availability of adequate water is critical to many mining sectors. Water is often used to not only extract mineral resources but also to process materials on-site. As the state's lead agency for water planning and collection and dissemination of water related data, the TWDB is requesting statements of qualifications for research that will analyze mining water use throughout the state and develop demand projections for the 50-year planning horizon.

4. Characterizing Past Climatic Conditions Using Tree Rings

The thicknesses of tree rings capture past climatic conditions and can be correlated to precipitation and even stream flow. Because trees are hundreds of years old, their rings capture climatic conditions much farther back in time than recorded or measured conditions, which generally only reach 100 years into the past. Understanding past climatic conditions allows us to put the drought of the 1950s into perspective (was it the worse drought?) and to better understand historic climatic variability. This project will focus on summarizing existing tree ring data for Texas and extending tree ring data farther back in time, especially in West, Far West, and Central Texas where there are significant data gaps.

5. An Assessment of Aquifer Storage and Recovery in Texas

In 1995 the Texas Legislature passed House Bill 1989 which recognized Aquifer Storage and Recovery (ASR) as a beneficial use of water which, among other attributes, enhances conservation, reduces environmental impacts, and protects groundwater resources. ASR involves injecting or infiltrating water into an aquifer and then pumping it out when it is needed. For example, the City of Kerrville treats and injects excess water from the Guadalupe River into the Trinity Aquifer for later extraction in peak demand times. San Antonio Water System banks excess water from the Edwards Aquifer in the Carrizo-Wilcox Aquifer for extraction during droughts.

Given the obvious benefits of ASR and its wide-scale use in other western states, it is surprising that ASR is not used more in Texas. The purpose of this research is to (1) review past ASR studies (a number of which were supported by the TWDB), (2) summarize the results of these studies and discuss why the project was not implemented, and (3) recommend policy changes or technical studies that might encourage ASR implementation in the future.

RECOMMENDATION

Staff requests authorizing the Executive Administrator to publish a Request for Statements of Qualifications in the Texas Register to conduct research on fiscal year 2009 Priority Water Research Topics for a total amount not to exceed \$600,000 from the Research and Planning Fund.

This proposed action has been reviewed by legal counsel and is in compliance with applicable statutes and TWDB rules.

Kenneth L. Petersen
General Counsel

Attachment: Request for Statements of Qualifications to be published in Texas Register

ATTACHMENT

(To be published in the Texas Register)

Request for Statements of Qualifications Water Research Study Priority Topics

The Texas Water Development Board (board) requests the submission of Statements of Qualifications (SOQs) from interested applicants leading to the possible award of contracts for state fiscal year 2009 to conduct water research on five priority topics. The total amount of the grants awarded by the board shall not exceed \$600,000 from the Research and Planning Fund. Rules governing the Research and Planning Fund (31 Texas Administrative Code, Chapter 355) are available upon request from the board, or may be found at the Secretary of State's Internet address: {<http://www.sos.state.tx.us/tac/>}; then sequentially select, "TAC Viewer," "Title 31," "Part 10," "Chapter 355," and "Subchapter A." Guidelines for responding to the SOQ, which include an application form and detailed information on the research topic, will be available at the board's website at: http://www.twdb.state.tx.us/publications/requestforproposals/requestforproposals_index.asp, or will be provided upon request.

Description of the Research Objectives and Purpose

Statements of Qualifications are requested for the following five priority research topics.

1. Advancing Water Reuse in Texas

Water reuse is a recommended water management strategy in 14 of the 16 2006 regional water plans. The 2007 State Water Plan reports that water reuse will account for 1.3 million acre-feet per year of new supplies by 2060.

In the recent past, water rights issues have dominated the water reuse discussion in Texas. However, there is a growing recognition among key stakeholders that, to achieve the expected supply goals for water reuse strategies, there is an even greater need to develop and implement a common agenda focusing on the science, technology and public awareness aspects of water reuse.

A foundational aspect for a Texas Water Reuse agenda will be researching and documenting the history and achievements of the water reuse industry in Texas, as well as examining the current state of existing and proposed water reuse supplies in Texas.

The study shall also discuss the state of the water reuse technology; identify and discuss exemplary cases of water reuse programs; identify technological, regulatory and financial challenges to implementing water reuse projects in Texas; and discuss available resources and opportunities for partnerships to support and implement needed research on water reuse.

A key component of this study will be a process to solicit and incorporate information from local and national authorities on the science, technology and implementation of water reuse programs and projects.

The outcome of this study will serve to prioritize and guide the specific areas of needed research appropriate for the state to integrate into existing research programs, and implementation of water reuse in Texas.

2. Assessment of Global Climate Models for Water Resources Planning Applications

There are at least 17 publically available Global Climate Models (GCM) available for water resources studies. The models may perform well when considered on a global scale, but when analyzed at the watershed scale may not adequately represent the observed climate in that region. Statistical downscaling is a process whereby local meteorological observations are used to improve the spatial resolution of GCM outputs. The process usually involves adjusting the GCM output such that the statistics of the modeled data match observations for the overlapping period of record. A further advantage to the statistical downscaling process is that you end up with a dataset appropriate for water resources studies on the watershed or aquifer scale.

Water planners need to know which GCMs perform best in Texas. They also need an assessment of the uncertainty in the GCM climate projections for this state. The first question could be answered by determining how much each GCM needs to be adjusted in the downscaling process described above. Obviously, the ones that need the least adjustment are already performing well in this part of the world and would probably provide more reliable climate predictions. The second question can be answered by looking at the range in the projections of the GCMs for Texas - a large range indicating that there remains significant uncertainty in future climate, a narrow range meaning that the climate models are generally in agreement on a future trend.

The researcher chosen should also provide a description of the downscaling techniques available and a recommendation on the appropriateness of statistically downscaled GCMs versus dynamically downscaled GCMs for hydrological studies in Texas.

3. Water Use in the Texas Mining and Oil and Gas Industry

Mining companies in Texas extract a range of resources including oil and natural gas, aggregates (crushed stone, gravel and sand), lignite and coal, clay, marble, limestone, gypsum, granite and uranium. The mining industry in Texas is critical to the state's and the nation's economy. For example on a national basis, Texas is the fourth largest producer of clay and aggregates, the fifth largest producer of coal, and Texas is the nation's leading producer of crude oil (excluding Federal offshore areas). More than one-fourth of total U.S. natural gas production occurs in Texas, making it the nation's leading natural gas producer. In recent years, extraction of natural gas and oil and other commodities in Texas has risen considerably in response to record markets prices for fuel and minerals.

The availability of adequate water is critical to many mining sectors. Water is often used to not only extract mineral resources but also to process materials on-site. As the state's lead agency for water

planning and collection and dissemination of water related data, the Texas Water Development Board is requesting statements of qualifications for research that will analyze mining water use throughout the state. The selected research team should:

- identify major mining operations in Texas including onshore oil and gas well fields (including secondary and tertiary recovery methods), aggregates, coal and lignite, industrial sand, uranium and other major non-fuel minerals;
- analyze how and why different types of mining operations rely on water using what type of technology;
- estimate the amounts of water they “use,” characterizing use as either water as withdrawals, diversions, make-up water, discharges, dewatering and consumptive use; and identify the source and nature (i.e., fresh, saline or salt) of water for each operation;
- develop a baseline current estimate of water use for each county in the state, for each regional water planning area and for the state as a whole;
- develop long-term (50 year) water demand projections on a county level for each major category of mining resources considering factors such as population and economic growth, trends in market demand and prices, changes in technology and expectations regarding the amounts of recoverable reserves in a given location; and
- prepare and submit draft and final reports along with copies of electronic databases of information gathered during the study for review and supporting GIS data.

The selected research team should solicit industry experts through trade organizations or other means to serve as steering committee members and reviewers of draft findings of the study.

4. Characterizing Past Climatic Conditions Using Tree Rings

The thicknesses of tree rings captures past climatic conditions and can be correlated to precipitation and even stream flow. Because trees are hundreds of years old, their rings capture climatic conditions much farther back in time than recorded conditions or measured conditions, which generally only reach 100 years into the past. Understanding past climatic conditions allows us to put the drought of the 1950s into perspective (was it the worse drought?) and to better understand historic climatic variability. The purpose of this project is to (1) summarize existing tree ring data for Texas and what that data suggests about drought, (2) extend, where appropriate and possible, tree ring information in a part or parts of the state, and (3) recommend future tree ring work in Texas. The goal of the project is to characterize past climatic variability and to place the drought of the 1950s into context with a longer historical period.

We expect applications to (1) demonstrate the applicant’s experience and capabilities with dendrochronology, and (2) propose a work plan to extend current tree ring chronology.

5. An Assessment of Aquifer Storage and Recovery in Texas

In 1995 the Texas Legislature passed House Bill 1989 which recognized Aquifer Storage and Recovery (ASR) as a beneficial use of water which, among other attributes, enhances conservation, reduces environmental impacts, and protects groundwater resources. ASR involves injecting or infiltrating water into an aquifer and then pumping it out when it is needed. For example, the City of Kerrville treats and injects excess water from the Guadalupe River into the Trinity Aquifer for later extraction in peak demand times. San Antonio Water System banks excess water from the Edwards Aquifer in the Carrizo-Wilcox Aquifer for extraction during droughts.

Given the obvious benefits of ASR, it is surprising that ASR is not used more in Texas. The purpose of this research is to (1) review past ASR studies (a number of which were supported by the state), (2) summarize the results of these studies and discuss why the project was not implemented, and (3) recommend policy changes or technical studies that might encourage ASR implementation in the future. The final report needs to thoroughly discuss any policy, legal, and technical issues that hamper the implementation of ASR in Texas. This research will focus on how obstacles to ASR projects can be overcome in order to pave the way to a more extensive use of ASR throughout the state.

Description of Applicant Criteria

The applicant should: (1) demonstrate prior experience in the priority research topic; (2) be able to review, research, analyze, evaluate, and interpret data and research findings; and (3) have excellent oral presentation and writing abilities. An estimate of the total cost and a basic budget for the study is requested. This estimate is to be used by the board for an indication of total grant funding requested, will not be considered as a bid for the study, and will not be used in the evaluation process when selecting applications for consideration of approval for the research proposed. The board reserves the right to not accept any or all submissions based on availability of funding and its evaluation of the qualifications as submitted.

If the applicant is short-listed, the applicant should be prepared to make an oral presentation to board staff. The scope of work, schedule, and contract amount will be negotiated after the board selects the most qualified applicant. Failure to reach a negotiated contract may result in subsequent negotiations with the next most-qualified applicant; however, a negotiation will not occur with applicants who are determined by the board to be unqualified or otherwise unsuited to perform the requested research. Applicants selected to conduct the research may be required to present the results of their research at one or more of the board's monthly public meetings.

Deadline for Submittal, Review Criteria and Contact Person for Additional Information

Historically Underutilized Businesses (HUBs) are encouraged to submit Statements of Qualifications and/or participate as subcontractors in the water research program. As instructed at Texas Administrative Code (TAC) 2161.252 and TAC 111.14, if the anticipated cost of the study is to exceed \$100,000, the applicant must complete a HUB Subcontracting Plan according to:

<http://www.tbpc.state.tx.us/communities/procurement/prog/hub/hub-subcontracting-plan>.

All applicants must obtain the board's guidelines for responding to the Statements of Qualifications.
The guidelines are available at
http://www.twdb.state.tx.us/publications/requestforproposals/requestforproposals_index.asp.

Ten double-sided, double-spaced copies of a completed Statements of Qualifications must be filed with the board prior to 12:00 P.M., Tuesday, January 13, 2009. Respondents to this request shall limit their Statement of Qualifications to the size previously mentioned, excluding the resumes of the project team members.

Statements of Qualifications can be directed either in person to Mr. David Carter, Texas Water Development Board, Stephen F. Austin Building, Room 535, 1700 North Congress Avenue, Austin, Texas 78701; or by mail to Mr. David Carter, Texas Water Development Board, P.O. Box 13231--Capitol Station, Austin, Texas 78711-3231.

Requests for information and questions relating to the Statements of Qualifications should be directed by e-mail to david.carter@twdb.state.tx.us.

Kenneth L. Petersen
General Counsel
Texas Water Development Board