Texas Water Development Board

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AGENDA ITEM MEMO

BOARD MEETING DATE: May 4, 2023

TO: Board Members

THROUGH: Jeff Walker, Executive Administrator
Ashley Harden, General Counsel
Rebecca Trevino, Chief Financial Officer
John T. Dupnik, P.G., Deputy Executive Administrator, Water Science & Conservation

FROM: Antonio Delgado, Team Lead, Agricultural Water Conservation
John Sutton, Manager, Conservation

SUBJECT: Fiscal Year 2023 Agricultural Water Conservation Grants

ACTION REQUESTED

Consider authorizing the Executive Administrator to negotiate and execute contracts for Fiscal Year 2023 Agricultural Water Conservation Grants.

BACKGROUND

The Texas Water Development Board's (TWDB) Agricultural Water Conservation Grants Program annually offers grant funding to state agencies and political subdivisions for activities that promote water conservation in the state. Grant topics vary from year to year to address current issues in agricultural water conservation and to support water management strategies in the 2022 State Water Plan.

On November 17, 2022, the Executive Administrator was authorized to publish a request for applications for Fiscal Year 2023 Agricultural Water Conservation Grants. Approximately, $1.2 million was available for projects that achieve one or more of the following goals:

A. Improve irrigation efficiency through irrigation system improvements, such as the adoption of irrigation scheduling practices and irrigation district interconnections.
B. Enhance resilience to weather extremes and climate variability.
C. Promote innovation in agriculture by incorporating the latest water conservation technological advancements.

To achieve these goals, projects should incorporate the following actions and objectives:

1. Quantify actualized water savings with proven methodology and provide baseline water usage prior to project implementation.
2. Engage agricultural producers and water managers through educational outreach in the form of field days, workshops, seminars, and demonstrations in classroom settings and on farms involved in the projects.
3. Promote the adoption of innovative water conservation practices and technologies that result in improvements to irrigation efficiency and soil health.
4. Identify methods to measure and report water conservation performance metrics such as water savings, soil water holding capacity, and infiltration.
5. Determine the long-term sustainability, feasibility, and profitability of the conservation practice(s) by quantifying the return on investment.
6. Build upon the success of existing water conservation efforts.
7. Leverage funding support from local, state, federal, and private industry partners.

KEY ISSUES

The request for applications was published in the *Texas Register* and on the TWDB website. Ten applications were received in response to the solicitation, with applicants requesting a total of $1,049,118 in grant funding assistance. A technical review panel reviewed and ranked the applications according to the rules contained in 31 Texas Administrative Code Chapter 367. Table 1 shows the 10 applicants, amounts requested, and grant funding recommendations. Additional information on the applications received may be found in Attachment 1, along with a summary of the recommended projects in Attachment 2.

Table 1. Applications and funding recommendations.

Rank	Entity	Amount requested	Funding recommendation
1	Edwards Aquifer Authority	$100,000	$100,000
2	Texas Tech University	$249,548	$249,548
3	Mesquite Groundwater Conservation District	$50,000	$50,000
4	Rolling Plains Groundwater Conservation District	$50,000	$50,000
5	Texas A&M University – Kingsville	$70,834	$70,834
6	Texas A&M University – AgriLife Extension Service	$124,359	$124,359
7	Chambers-Liberty Counties Navigation District	$23,545	$23,545
8	Maverick County Water Control and Improvement District No. 1	$200,000	$200,000
9	Cibolo Creek Municipal Authority	$12,000	$12,000
10	The University of Texas at San Antonio	$168,832	$168,832
	Total	**$1,049,118**	**$1,049,118**

RECOMMENDATION

The Executive Administrator recommends approval of this item, as the projects will further water conservation in the state by supporting the implementation of irrigation conservation water management strategies in the 2022 State Water Plan.

Attachments

1. List of applications
2. Summaries of recommended projects

Attachment 1: List of applications

Entity	Project	Local match	Grant request	Total cost
Chambers-Liberty Counties ND	Sonar Beam Flow Device Project	$29,100	$23,545	$52,645
Cibolo Creek Municipal Authority	Irrigation Pump Equipment Cost-Share Project	$16,838	$12,000	$28,838
Edwards Aquifer Authority	Irrigation Efficiency Improvement Grant Program	$316,500	$100,000	$416,500
Maverick County WCID No. 1	Irrigation Metering Equipment	$100,000	$200,000	$300,000
Mesquite GCD	Irrigation Metering Equipment	$25,000	$50,000	$75,000
Rolling Plains GCD	Irrigation Metering Equipment	$25,000	$50,000	$75,000
Texas A&M University – Agrilife Extension Service	Irrigation Management in Texas Vineyards	$0	$124,359	$124,359
Texas A&M University – Kingsville	Dragon Fruit Water Use Study	$24,000	$70,834	$94,834
Texas Tech University	Study on New Irrigation Technology and Revive Tools	$62,497	$249,548	$312,045
The University of Texas San Antonio	Development of Remote Sensing Agricultural Drought Forecasting System	$0	$168,832	$168,832
	Total	**$598,935**	**$1,049,118**	**$1,648,053**

Notes: GCD – groundwater conservation district; ND – navigation district; WCID – water control and improvement district

Attachment 2: Summaries of recommended projects

Chambers-Liberty Counties Navigation District

Sonar Beam Flow Device Project

TWDB amount requested	$23,545
Local cash or in-kind	$29,100
Total project cost	$52,645
Estimated water savings	5% per year

This project is recommended for TWDB grant funding in an amount not to exceed $23,545. The actual local match and total project amount will be determined duringcontract negotiations.

Participants:
Chambers-Liberty Counties Navigation District (District).

Project area:
The project would occur within the boundaries of the District in the Region H Regional Water Planning Area.

Project summary:
This project will consist of the procurement and installation of three sonar beam type flow devices within the lateral system of the district in Chambers County, Texas. The devices will be used to measure the velocity of the water to determine the volume of the water that is applied to the crawfish operations on the system. Installing and using meters is estimated to yield an average water savings of five percent.

The data will be recorded on a totalizer and collected by the Water Tender on a regular basis. The installation will be performed utilizing the district's equipment and personnel under the supervision of the vender. The data collection will be ongoing for use in management decisions as well as annual reporting to the agencies.

This project supports the implementation of irrigation conservation water management strategies in the 2022 State Water Plan and the 2021 Region H Regional Water Plan. If funded, the project would serve the public interest and further water conservation in the state. The TWDB grant funding would supplement rather than replace the funding of the applicant.

Project duration (to be determined during contract negotiations, if funded):
A six-month installation period followed by five years of reporting on irrigation water use data and water savings information.

Cibolo Creek Municipal Authority

Irrigation Pump Equipment Cost-Share Project

TWDB amount requested	$12,000
Local cash or in-kind	$16,838
Total project cost	$28,838
Estimated water savings	767 acre/feet/year

This project is recommended for TWDB grant funding in an amount not to exceed $12,000. The actual local match and total project amount will be determined during contract negotiations.

Participants:
The Cibolo Creek Municipal Authority (Authority).

Project area:
The project would occur within the boundaries of the Authority in the South Central Texas Regional Water Planning Area (Region L).

Project summary:
The Authority operates an irrigation system using a pump with a 125-horsepower motor. They need to replace the pump, a 1999 Byron Jackson model, but funds were not available in the FY2022 budget. This aging pump will be replaced with a new pump through an equipment cost-share grant. By replacing the pump, the Authority will avoid pump failure and water losses in the irrigation system, which will yield an estimated water savings of 767 acre-feet per year.

This project supports the implementation of irrigation conservation water management strategies in the 2022 State Water Plan and the 2021 South Central Texas Regional Water Plan (Region L). If funded, the project would serve the public interest and further water conservation in the state. The TWDB grant funding would supplement rather than replace the funding of the applicant.

Project duration (to be determined during contract negotiations, if funded):
An estimated three-month installation period followed by five years of reporting on irrigation water use data and water savings information.

Attachment 2: Summaries of recommended projects

Edwards Aquifer Authority

Irrigation Efficiency Improvement Grant Program

TWDB amount requested	$100,000
Local cash or in-kind	$316,500
Total project cost	$416,500
Estimated water savings	99 acre-feet/year

This project is recommended for TWDB grant funding in an amount not to exceed $100,000. The actual local match and total project amount will be determined during contract negotiations.

Participants:
The Edwards Aquifer Authority (EAA).

Project area:
The project would occur within the boundaries of the EAA in the South Central Texas Regional Water Planning area (Region L).

Project summary:
The Irrigation Efficiency Improvement Grant Program improves water efficiency by implementing water conservation strategies among permitted Edwards Aquifer users. The program solicits applications from irrigation permit holders for the purchase and installation of more efficient irrigation systems and technologies such as linear sprinkler systems, center pivot sprinkler systems, and subsurface drip irrigation systems. The EAA is requesting $100,000 from the TWDB to continue the Irrigation Efficiency Improvement Grant Program. The EAA will match with $316,500, thus providing a total of $416,500 for efficient irrigation projects. The application deadline is May 31, 2023, and project selection will be based on irrigation efficiency improvement, adherence to request for application requirements, cost per acre-foot of water saved, cash match, and project completion by November 30, 2023. With this continued funding, the water efficiency improvements funded by this program will yield an estimated water savings of 99 acre-feet per year of groundwater in the Edwards Aquifer.

This project supports the implementation of irrigation conservation water management strategies in the 2022 State Water Plan and the 2021 South Central Texas Regional Water Plan (Region L). If funded, the project would serve the public interest and further water conservation in the state. The TWDB grant funding would supplement rather than replace the funding of the applicant.

Project duration (to be determined during contract negotiations, if funded):
An estimated two-year installation period followed by five years of reporting on irrigation water use data and water savings information.

Maverick County Water Control and Improvement District No.1

Irrigation Metering Equipment

TWDB amount requested	$200,000
Local cash or in-kind	$100,000
Total project cost	$300,000
Estimated water savings	Currently unavailable

This project is recommended for TWDB grant funding in an amount not to exceed $200,000. The actual local match and total project amount will be determined during contract negotiations.

Participants:
Maverick County Water Control and Improvement District No.1 (District).

Project area:
The project would occur within the boundaries of the District in the Rio Grande Regional Water Planning Area (Region M).

Project summary:
The District intends to assist farmers with tracking their water usage and with making necessary adjustments to their irrigation systems to improve efficiency and conserve water. Meters provide precise readings, allowing farmers to monitor their water usage and make informed decisions about water management practices. The District is currently experiencing water waste and soil degradation and understands that the use of meters will help mitigate these issues.

The District plans to provide the amount of water being used for agricultural purposes with the TWDB to determine actual water savings. The data gathered from these meters will also be used to comply with water usage regulations and to support current and future water resource planning and management efforts. Due to the condition of current equipment, no water cost-saving estimates are available at this time.

This project supports the implementation of irrigation conservation water management strategies in the 2022 State Water Plan and the 2021 Rio Grande Regional Water Plan (Region M). If funded, the project would serve the public interest and further water conservation in the state. The TWDB grant funding would supplement rather than replace the funding of the applicant.

Project duration (to be determined during contract negotiations, if funded):
A two-year installation period followed by five years of reporting on irrigation water use data and water savings information.

Attachment 2: Summaries of recommended projects

Mesquite Groundwater Conservation District

Irrigation Metering Equipment

TWDB amount requested	$50,000
Local cash or in-kind	$25,000
Total project cost	$75,000
Estimated water savings	800 acre/feet/year

This project is recommended for TWDB grant funding in an amount not to exceed $50,000. The actual local match and total project amount will be determined during contract negotiations.

Participants:
Mesquite Groundwater Conservation District (District) and agricultural producers.

Project area:
The project would occur within the boundaries of the District in the Panhandle Regional Water Planning Area (Region A) and the Llano Estacado Regional Water Planning Area (Region O).

Project summary:
The District plans to serve the public interest by promoting the conservation of groundwater within the district. Groundwater sources are limited in the district in areal extent, quantity, and quality. Meters promote conservation and will help address the limitations on water quantity within the district. Providing cost share to producers for metering equipment encourages the use of that equipment. Producers then have the data to know how much water was actually applied to a crop as opposed to just using the "doing what we always did" mentality. The goals to be achieved by this project are promotion of conservation through metering and educational outreach. The district estimates 60 meters to be installed but it is dependent on interest from farmers and the price of the type of meter installed. Water savings are estimated to be 800 acre-feet per year, dependent on the number of meters actualized. Meters provide precise readings, allowing farmers to monitor their water usage and make informed decisions about water management practices.

This project supports the implementation of irrigation conservation water management strategies in the 2022 State Water Plan and the 2021 Panhandle Regional Water Plan (Region A) and the 2021 Llano Estacado Regional Water Plan (Region O). If funded, the project would serve the public interest and further water conservation in the state. The TWDB grant funding would supplement rather than replace the funding of the applicant.

Project duration (to be determined during contract negotiations, if funded):
A two-year installation period followed by five years of reporting on irrigation water use data and water savings information.

Rolling Plains Groundwater Conservation District

Irrigation Metering Equipment

TWDB amount requested	$50,000
Local cash or in-kind	$25,000
Total project cost	$75,000
Estimated water savings	800 acre/feet/year

This project is recommended for TWDB grant funding in an amount not to exceed $50,000. The actual local match and total project amount will be determined during contract negotiations.

Participants:
Rolling Plains Groundwater Conservation District (District).

Project area:
This project would occur within the boundaries of the District in Region B and Brazos G Regional Water Planning areas.

Project summary:
The District proposed plans to incentivize meter use in agriculture and provide up to 60 additional meters. Groundwater sources are limited in the district and meters will help promote conservation. Meters provide precise readings, allowing farmers to monitor their water usage and make informed decisions about water management practices. The grant funds will be used to reimburse producers in a 50/50 cost share ratio. Producers will purchase and install meters upfront and then seek reimbursement from the District.

The District will monitor water use data and report usage annually to the TWDB. In addition, this meter data will allow them to make informed decisions regarding the current state of the aquifer, how much water is consumed, and the impacts of production on water levels.

This project supports the implementation of irrigation conservation water management strategies in the 2022 State Water Plan and the 2021 Brazos Regional Water Plan (Region G). If funded, the project would serve the public interest and further water conservation in the state. The TWDB grant funding would supplement rather than replace the funding of the applicant.

Project duration (to be determined during contract negotiations, if funded):
A two-year installation period followed by a five years of reporting on irrigation water use data and water savings information.

Texas A&M Agrilife Extension Service

Irrigation Management in Texas Vineyards

TWDB amount requested	$124,359
Local cash or in-kind	$0
Total project cost	$124,359
Estimated water savings	20% per year

This project is recommended for TWDB grant funding in an amount not to exceed $124,359. The actual local match and total project amount will be determined during contract negotiations.

Participants:
Texas A&M AgriLife Extension Service, Rustic Spur Vineyards, Kerrville Hills Vineyard and Winery, and Hidden Hangar Vineyard and Winery.

Project area:
This project would occur in three replicated trial sites in the three most active Texas wine regions, High Plains, Hill Country, and North Texas.

Project summary:
The proposed project will focus on irrigation management and soil health in Texas vineyards. Vineyards in Texas are exposed to inconsistent weather conditions and depleted soils, and these conditions often lead to inefficient water use, added stress, and reduction in resiliency of grapevines. Texas A&M AgriLife Extension Service will partner with five industry associations to evaluate grape resiliency in three separate trial sites across three American Viticultural Areas within Texas. Specific objectives include:

1. evaluating three irrigation regimes (current/standard, deficit, cover crop strategy),
2. reporting results and recommendations to wine industry constituents,
3. posting project survey to determine current and projected irrigation strategies, annual water use per acre, and proposed irrigation scheduling,
4. publishing free fact sheet on optimizing water use in vineyards, and
5. developing irrigation water use estimates and associated cost savings for vineyards.

This project supports the implementation of irrigation conservation water management strategies in the 2022 State Water Plan. If funded, the project would serve the public interest and further water conservation in the state. The TWDB grant funding would supplement rather than replace the funding of the applicant.

Project duration (to be determined during contract negotiations, if funded):
A one-year research and demonstration period followed by a three-year reporting and outreach period.

Texas A&M Kingsville

Dragon Fruit Water Use Study

TWDB amount requested	$70,834
Local cash or in-kind	$24,000
Total project cost	$94,834
Estimated water savings	To be determined

This project is recommended for TWDB grant funding in an amount not to exceed $70,834. The actual local match and total project amount will be determined during contract negotiations.

Participants:
Texas A&M Kingsville (TAMUK).

Project area:
This project would occur in the Lower Rio Grande Valley Region in the Rio Grande Regional Water Planning Area (Region M).

Project summary:
The proposed project will quantify the water use and productivity of dragon fruit planted in South Texas for two different varieties and at three irrigation rates. The objectives will be to measure water applied to each treatment, monitor soil moisture, root density, plant vigor, yield, and fruit quality. Water use from the dragon fruit crop will then be compared to known citrus water usage. TAMUK expects to see a 50 percent decrease in demand for water compared to known citrus. Goals for this project include:

1. improving irrigation efficiency by developing an irrigation baseline for dragon fruit in South Texas,
2. enhancing resilience to weather extremes and climate variability by promoting dragon fruit as a viable crop, and
3. developing and expanding dragon fruit production in South Texas.

This project supports the implementation of irrigation conservation water management strategies in the 2022 State Water Plan and the 2021 Rio Grande Regional Water Plan (Region M). If funded, the project would serve the public interest and further water conservation in the state. The TWDB grant funding would supplement rather than replace the funding of the applicant.

Project duration (to be determined during contract negotiations, if funded):
A two-year research and demonstration period followed by a three-year reporting and outreach period.

Texas Tech University

Study on New Irrigation Technology and Revive Tools

TWDB amount requested	$249,548
Local cash or in-kind	$62,498
Total project cost	$312,046
Estimated water savings	To be determined

This project is recommended for TWDB grant funding in an amount not to exceed $249,548. The actual local match and total project amount will be determined during contract negotiations.

Participants:
Texas Tech University and Texas Alliance for Water Conservation (TAWC).

Project area:
This project would occur in the Southern Texas High Plains region in the Llano Estacado Regional Water Planning Area (Region O).

Project summary:
The proposed project will demonstrate economically viable methods of soil and crop management that focus on conservation of irrigated water and improve capture and storage of water. The study will focus on evaluating the water use and economics of multiple species, reduced tillage, and method of termination of cover crops. The specific objectives include:

1. monitoring soil water balance on select fields where minimum tillage, crop rotation, and multi-species cover crops are compared with conventional practices,
2. comparing benefits related to water conservation and soil health in cotton/sorghum rotation versus multi-species cover crops,
3. demonstrating new irrigation technologies by expanding autonomous pivots with cameras and sensors,
4. reviving the TAWC tools using the expanded West Texas Mesonet Network,
5. analyzing economic returns, and
6. demonstrating and disseminating results.

This project supports the implementation of irrigation conservation water management strategies in the 2022 State Water Plan and the 2021 Llano Estacado Regional Water Plan (Region O). If funded, the project would serve the public interest and further water conservation in the state. The TWDB grant funding would supplement rather than replace the funding of the applicant.

Project duration (to be determined during contract negotiations, if funded):
One-year research and demonstration period followed by a three-year reporting period.

The University of Texas at San Antonio

Development of Remote Sensing Agricultural Drought Forecasting System

TWDB amount requested	$168,832
Local cash or in-kind	$0
Total project cost	$168,832
Estimated water savings	To be determined

This project is recommended for TWDB grant funding in an amount not to exceed $168,832. The actual local match and total project amount will be determined during contract negotiations.

Participants:
The University of Texas at San Antonio.

Project area:
This project would occur at Camp Bullis, a U.S. Department of Defense training facility in northern Bexar County, Texas. This area overlays the Edwards and Trinity aquifers.

Project summary:
The proposed project will integrate in-situ sensor observations, remote sensing data, and weather forecasts to improve short term dry conditions forecasts. These technologies will be used to develop a method of drought monitoring that incorporates high-resolution real-time meteorological and soil moisture data. This data will support better prediction of agricultural drought at almost real-time conditions, which will inform the producers irrigation decision making, planting, and harvesting. The specific objectives include:

1. identifying the best relevant and reliable remote sensing products and variables that complement in-situ sensor observations,
2. developing informative agricultural drought indices using atmospheric and sub-surface data, and
3. developing a parsimonious agricultural drought forecasting model to provide information at near real time intervals and on short-term horizons.

Once the project is complete, the proposed model and products will be ready for application and deployment anywhere across Texas.

This project supports the implementation of irrigation conservation water management strategies in the 2022 State Water Plan. If funded, the project would serve the public interest and further water conservation in the state. The TWDB grant funding would supplement rather than replace the funding of the applicant.

Project duration (to be determined during contract negotiations, if funded):
A two-years of research and demonstration period followed by a two-year reporting period.