

TO: Board Members

THROUGH: Kevin Patteson, Executive Administrator
Robert E. Mace, Ph.D., P.G., Deputy Executive Administrator, Water Science and Conservation
Les Trobman, General Counsel

FROM: Ruben S. Solis, Director, Surface Water Resources Division

DATE: December 1, 2015

SUBJECT: Studies of Environmental Flows in the Nueces River and Corpus Christi and Baffin Bays Basin and Bay Area

ACTION REQUESTED

Authorize the Executive Administrator to a) negotiate and execute two contracts in a total amount not to exceed \$95,000 with the University of Texas Marine Science Institute; and b) publish a Request for Qualifications for four studies of environmental flows in the Nueces River and Corpus Christi and Baffin Bays basin and bay area.

BACKGROUND

Senate Bill 3 (80th Texas Legislature, 2007) created a stakeholder-driven process for identifying and quantifying flows needed to maintain sound rivers and estuaries in Texas. The process led to the adoption of flow standards between 2011 and 2014 by the Texas Commission on Environmental Quality (TCEQ) for seven major basin and bay areas in Texas. The Senate Bill 3 process contains an adaptive management component which calls for continued studies to validate and refine the environmental flow analyses, recommendations, and standards, and to identify strategies to achieve those standards. The Nueces Basin and Bay Area Stakeholder Committee submitted its work plan for adaptive management to the Environmental Flows Advisory Group in November 2012. This work plan contains recommended studies and activities that, if implemented, will provide additional information for future rulemaking by the TCEQ.

In 2013, the 83rd Texas Legislature appropriated funds to the Texas Water Development Board (TWDB) for the continued study of environmental flows. In 2014, the Board approved the use of this funding to implement 15 priority work plan studies in five basin and bay areas, including four studies conducted in the Nueces basin that were completed this year (Attachment A). These

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studies provided the stakeholder committees with information to better define flow-ecology relationships and to identify and evaluate strategies to help meet environmental flow standards.

KEY ISSUES

The 84th Texas Legislature appropriated funds to the TWDB in its baseline budget for the Fiscal Year 2016-2017 biennium in support of Strategy A.1.1 Environmental Information for the purpose of the collection and analysis of environmental flow information to support a sound ecological environment in the state's streams, rivers, bays and estuaries. To support this strategy, TWDB staff sought input from Senate Bill 3 stakeholder committees by requesting that they submit for consideration a prioritized list of studies from work plans developed for their basins. These studies support Strategy A.1.1 by providing both monitoring and analyses of environmental flows information to address priority questions identified in their basins. The Nueces Basin and Bay Area Stakeholder Committee created a subcommittee to identify specific projects from their work plan to be recommended for funding. The full stakeholder committee approved the subcommittee's recommendations on November 3, 2015, and requested that the TWDB fund these projects. Staff is prepared to provide technical support and to administer the contracting of these funds for the priority projects identified by the Nueces Basin and Bay Area Stakeholder Committee.

In summary, the Nueces Basin and Bay Area Stakeholder Committee requests that six projects covering a range of topics are funded for a total amount not to exceed \$300,000. The stakeholder committee requests the following studies:

- (a) Verification and feasibility assessment for landform modifications in the Nueces Delta (\$60,000);
- (b) Identify vegetation/marsh changes occurring in the Rincon Bayou Delta and the relationship of those changes to freshwater inflow (\$40,000);
- (c) Nueces Bay circulation assessment project (\$55,000);
- (d) Re-examination of the 2001 Agreed Order monthly targets: Phase 2 (\$20,000);
- (e) Nutrient budget for Nueces Bay (\$75,000); and
- (f) Explore and evaluate alternative methods to increase freshwater to the Nueces Delta (\$50,000).

For more detailed descriptions of all requested studies, please see *Attachment B: Project Descriptions for Proposed Fiscal Year 2016-2017 Studies for the Nueces Bays Basin and Bay Area Stakeholder Committee*.

Contracting

The Executive Administrator requests authorization to negotiate and execute contracts with government agencies and universities with whom TWDB has the authority to directly contract through interagency contract, which have subject matter expertise, and in which contracts can be negotiated to represent a cost-savings to the State by eliminating reimbursement for overhead costs. This includes studies (b) and (c) with The University of Texas Marine Science Institute. Upon receiving authorization, the Executive Administrator will initiate the vendor selection process by publishing the RFQ for the remaining studies, (a), (d), (e) and (f) for up to \$205,000.

Review and final selection of a qualified firm will be presented for Board consideration at a future Board meeting. Following negotiations, if the contracted amount for any individual study is less than the amount indicated above, the Executive Administrator requests authorization to amend the remaining contract amounts such that the total of all contracts does not exceed \$300,000.

RECOMMENDATION

The Executive Administrator recommends approval of this item.

This recommendation has been reviewed by legal counsel and is in compliance with applicable statutes and Board rules.

Attachment A: Fiscal Year 2014-2015 Work Plan Studies

Attachment B: Project Descriptions for Proposed Fiscal Year 2016-2017 Studies for the Nueces Bays Basin and Bay Area Stakeholder Committee

ATTACHMENT A

FISCAL YEAR 2014-2015 SENATE BILL 3 WORK PLAN STUDIES

Study Description	Contractor	Amount
Trinity, San Jacinto Basin and Bay Area		
Defining bioindicators for freshwater inflow needs studies	Texas A&M University at Galveston	\$105,500
Determination of freshwater inflow volume from the Trinity River into Trinity Bay	U.S. Geological Survey	\$95,000
Trinity River evaluation of adopted Senate Bill 3 environmental flow standards	Trinity River Authority	\$112,000
Brazos Basin and Bay Area		
Brazos basin environmental flow standard validation and integration of river flows and Brazos basin estuary response	BIO-WEST, Inc.	\$312,500
Colorado, Lavaca Basin and Bay Area		
Studies to evaluate achievement of freshwater inflow standards and ecological response	Anchor QEA	\$250,000
Evaluation of potential strategies to help provide needed instream flows or freshwater inflows to support an ecologically sound stream or estuary	Meadows Center for the Environment	\$62,500
Guadalupe, San Antonio Basin and Bay Area		
Texas instream flow program studies	San Antonio River Authority	\$200,000
Lower basin/estuarine inflow studies	University of Texas – Center for Research in Water Resources	\$200,000
<i>Rangia</i> clam investigations	San Antonio River Authority	\$150,000
Key estuarine faunal species studies	University of Texas Marine Science Institute	\$150,000
Strategy options for meeting attainment frequencies for the estuaries	San Antonio Bay Partnership	\$50,000
Nueces Basin and Bay Area		
Re-examination of the 2001 Agreed Order monthly targets and safe yield versus current demand evaluations	HDR, Inc.	\$45,000
Improve salinity modeling methods for determining environmental inflow regimes for Nueces Delta and Bay using a 3-D hydrodynamic model	University of Texas – Center for Research in Water Resources	\$80,000
Explore land modifications to Nueces Bay and Nueces Delta	Naismith Engineering	\$95,000
Nueces watershed pre- and post-reservoir nutrient budgets	HDR, Inc.	\$92,500

ATTACHMENT B

PROJECT DESCRIPTIONS FOR PROPOSED FISCAL YEAR 2016-2017 STUDIES FOR THE NUECES BASIN AND BAY AREA STAKEHOLDER COMMITTEE

Verification and Feasibility Assessment for Landform Modifications in the Nueces Delta – The Nueces Basin and Bay Area Stakeholder Committee requests a qualified contractor to complete Phase 2 of the Fiscal Year 2014-2015 Work Plan priority study to *Explore Landform Modifications to Nueces Bay and Nueces Delta*, a strategy option for achieving environmental flow standards. Funding for the project is anticipated to be \$60,000. Phase 2 includes model verification and an environmental assessment for the Middle Rincon Bayou Diversion to South Lake Area (Project #4) and the North Lake Diversion to South Lake System (Project # 5). Both of these diversion projects were identified during Phase 1 as modifications which would improve inflows to the South Lake area of the delta. Phase 2 will include site visits, surveys, and assessments to enable verification of the hydrological model and to assess potential site locations to ensure maximum usage of the freshwater pumped into Rincon Bayou along with minimum impact to hydrological flow and habitats. A recommendation to evaluate the proposed landform modifications is included in the Nueces basin and bay area work plan (Nueces BBASC 2012) as a Tier 1 priority study.

Identify Vegetation/Marsh Changes Occurring in the Rincon Bayou Delta and the Relationship of Those Changes to Freshwater Inflow – The Nueces Basin and Bay Area Stakeholder Committee requests The University of Texas Marine Science Institute or other qualified contractor to identify changes in the areal extent of the Nueces Delta marsh as it relates to changes in sediment loading, freshwater inflows, subsidence, sea level rise, and other factors. Funding for the project is anticipated to be \$40,000. The marsh plant community historically has been monitored to demonstrate the effects of changes in freshwater inflow patterns in the Nueces Delta. Past monitoring suggests that open water areas within the internal marsh are expanding; however, a targeted monitoring and assessment is required to quantify marsh vegetation condition and loss in the internal marsh complexes. The project will include mapping, analysis of historical aerial imagery, analysis of elevation data, and field surveys, if needed, to map and quantify marsh changes over time. A recommendation to determine marsh changes related to freshwater inflows is included in the Nueces basin and bay area work plan (Nueces BBASC 2012) as a Tier 2b priority study.

Nueces Bay Circulation Assessment Project – The Nueces Basin and Bay Area Stakeholder Committee requests The University of Texas Marine Science Institute or other qualified contractor to deploy and maintain an array of tilt-meters (instruments that measure water current speed and direction) to better understand circulation patterns throughout Nueces Bay. Funding for the project is anticipated to be \$55,000. With recent completion of the first round of work plan studies, and after further research and discussion within the Nueces Basin and Bay Area Stakeholder Committee, it was recently determined that there are data gaps with regard to water circulation in Nueces Bay. As this data gap was not addressed in the original work plan, an addendum to the plan was submitted on October 20, 2015, which prioritized the research need as a Tier 2b study. Tilt-meters will be placed throughout Nueces Bay but will be concentrated in the upper bay and at the mouth of the Nueces River and Rincon Bayou to assess water exchange between the main inflow connections and the bay for at least a one-year period. The result of this project will be a baseline dataset, data analysis, visualization tools, and a final report describing

water circulation patterns throughout Nueces Bay under various meteorological and hydrological conditions. When combined with water quality and biological monitoring data, circulation data may provide important additional insights into how freshwater inflows influence the estuarine system. The circulation data also will be valuable to TWDB staff and others who seek to validate hydrodynamic circulation models of the bay.

Re-examination of the 2001 Agreed Order Monthly Targets: Phase 2 – The Nueces Basin and Bay Area Stakeholder Committee requests a qualified contractor to run additional model scenarios using the Corpus Christi Water Supply Model to re-examine the 2001 Agreed Order monthly target inflow volumes based on new data that was not available during the creation of the Agreed Order. Funding for the project is anticipated to be \$20,000. Results from the 2014-2015 Work Plan project, *Re-examination of the 2001 Agreed Order Monthly Targets and Safe Yield versus Current Demand Evaluations*, indicate that additional model scenarios are needed to inform the development of revised monthly inflow targets for the 2001 Agreed Order. Current pass-through requirements during low pass-through months, such as January and February (2,500 acre feet) and March and April (3,500 acre feet) are often so small that it is considered an inefficient use of the pumped freshwater. Therefore, this project should re-evaluate the monthly targets by moving some water from the months with higher flows (*i.e.*, May, June, September) to the months with lower flows (*i.e.*, January, February) and then evaluate the effects on safe yield. The annual target amount will not change. The outcome of this project will be a recommended ten-year pilot project with modified monthly inflow targets that will improve the management of freshwater resources for Nueces Bay and Delta. A recommendation to re-examine the monthly targets of the 2001 Agreed Order is included in the Nueces basin and bay area work plan (Nueces BBASC 2012) as a Tier 1 priority study.

Nutrient Budget for Nueces Bay – The Nueces Basin and Bay Area Stakeholder Committee requests a qualified contractor to continue the Fiscal Years 2014-2015 Work Plan project to *Develop Pre- and Post-Development Nutrient Budgets for Nueces Bay* by now focusing on evaluating nutrient inputs from the lower watershed. Whereas the previous study focused on the entire Nueces watershed, this project will evaluate nutrient inputs only from the lower watershed, including the tidal segment of the Nueces River, sub-watersheds surrounding Nueces Bay, and point sources such as treated wastewater effluents. Funding for the project is anticipated to be \$75,000. Nutrient budgets for both the pre-development and present condition (before and after Choke Canyon) will be developed using data from an extensive network of stream gages plus existing monitoring data contained within macro-detritus collected from the lower Nueces River, Nueces Bay and Delta. Determining annual loads for both the pre-development and present condition will provide a strong indication of trends and will facilitate building consensus on a desired future condition for estuarine productivity. The end result of this project will be the identification of all nutrient sources and sinks to the tidal segment of the Nueces River and Bay, development of a nutrient budget, and quantification of nutrient loading to the tidal segment of the Nueces River and Bay. A recommendation to quantify nutrient loading to Nueces Bay is included in the Nueces basin and bay area work plan (Nueces BBASC 2012) as a Tier 2b priority study.

Explore and Evaluate Alternative Methods to Increase Freshwater to the Nueces Delta –

The Nueces Basin and Bay Area Stakeholder Committee requests a qualified contractor to examine all aspects of evaluating alternative methods of increasing freshwater inflow to the Nueces Delta. Funding for the project is anticipated to be \$50,000. Improving and maintaining the health of the marsh ecosystem in the Nueces Delta will depend on alternative sources of freshwater delivery to the delta. This project will evaluate the feasibility of pumping water from the Nueces River into the South Lake area and will investigate issues associated with the physical and logistical aspects of the pumping, potential effects on the river, and permitting and regulatory requirements. A recommendation to evaluate potential methods to increase freshwater to the Delta to improve ecosystem health is included in the Nueces basin and bay area work plan (Nueces BBASC 2012) as a Tier 1 priority study.

References

Nueces BBASC. 2012. *Work Plan for Adaptive Management: Submission to the Environmental Flows Advisory Group and the Texas Commission on Environmental Quality*. Prepared by the Nueces River and Corpus Christi and Baffin Bays Basin and Bay Area Stakeholders Committee (BBASC) with Technical Support from Coastal Bend Bays and Estuaries Program, HDR Engineering, Inc., and the Nueces River and Corpus Christi and Baffin Bays Basin and Bay Expert Science Team, November 2012, 50 p.