



Nueces River Authority

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November 16, 2015

Environmental Flows Advisory Group
The Honorable Troy Fraser, Co-Presiding Officer
The Honorable Jim Keffer, Co-Presiding Officer

Texas Commission on Environmental Quality
Mr. Richard Hyde, Executive Director

Re: Request for Amendment of the Nueces River and Corpus Christi and Baffin Bays Basin and Bay Area Stakeholder Committee's (Nueces BBASC) Work Plan for Adaptive Management dated November 2012

Dear Senator Fraser, Representative Ritter, and Mr. Hyde:

On November 30, 2012, the Nueces BBASC submitted to the Environmental Flows Advisory Group (EFAG) and the Texas Commission on Environmental Quality (TCEQ) its Work Plan for Adaptive Management (Work Plan). The Work Plan set forth strategies to meet the Nueces BBASC's environmental flows recommendations and specific studies and efforts deemed necessary to address known data gaps. Since that time, the Nueces Estuary Advisory Council (NEAC) has assumed responsibility for developing scopes of work and budgets to support Texas Water Development Board (TWDB) funding of studies and efforts identified in the Work Plan.

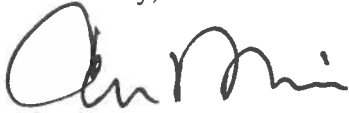
With recent completion of the first round of Work Plan studies, and after further research and discussion within NEAC, it has been determined that there are data gaps with regard to water circulation in Nueces Bay. This issue was not included in the 2012 Work Plan. The NEAC believes that this is important information to develop to better understand where fresh water is moving within Nueces Bay and how it influences the ecology in different areas of the ecosystem. The data, also, can provide information at the bay-marsh interface. This information, in turn, can be used to help design shoreline protection strategies.

Attached is a document titled "Nueces BBASC Priority Projects for 2015". The circulation study, explained above, is shown as Project 3 - Nueces Bay Circulation Assessment Project, and is more fully described within the document. This is intended to be a Tier 2b study.

The NEAC recommends revising the Nueces BBASC 2012 Work Plan to include this document as an addendum to that Work Plan. On behalf of the Nueces BBASC and NEAC, I am making that request.

Please let me know if you need other information.

Sincerely,

A handwritten signature in black ink, appearing to read 'Con Mims', written in a cursive style.

Con Mims, Chair
Nueces BBASC

Cc:

Honorable Bob Huston, Chair, SAC
Leslie Patterson, TCEQ
Lori Hamilton, TCEQ
Kelly Mills, TCEQ

Nueces BBASC Priority Projects for 2015

This document serves as a list of priority projects proposed by the Nueces BBASC to the Texas Water Development Board (TWDB) for funding in 2015. This document also serves as an addendum to supplement the Nueces BBASC Tier 2b Bays Work Plan Recommendations. Through further research and discussion with the Nueces Estuary Advisory Council (NEAC), it has been determined that there are data gaps with regard to circulation data in Nueces Bay. The NEAC recommends revising the work plan to include a circulation study (project 3 below) in the Bay, the mouth of the River and Rincon Bayou, and the Bay-marsh interface. This study will help understand where freshwater is moving in the Bay and how it influences the ecology in different areas of the ecosystem. This data will also provide information on erosion at the Bay-marsh interface and could be used to help design shoreline protection strategies.

	Project title/description	Work Plan Priority	Cost
1	Feasibility Assessment for Landform Modifications in the Nueces Delta	Tier 1, <i>Explore Landform Modifications to Nueces Bay and Nueces Delta</i>	\$60K
2	Identify vegetation/marsh changes occurring in the Nueces Delta over time	Tier 2b Bays Work Plan, <i>Identify vegetation/marsh changes occurring in the Rincon Bayou Delta and relationship of those changes to freshwater inflow</i>	\$40K
3	Nueces Bay Circulation Assessment Project	Need to submit addendum for work plan	\$60K
4	Re-examination of the 2001 Agreed Order monthly targets: Phase II	Tier 1, <i>Re-examination of the 2001 Agreed Order monthly targets</i>	\$20K
5	Nutrient Budget for Nueces Bay	Tier 2b Bays Work Plan, <i>Nueces Watershed pre- and post-development nutrient budgets</i>	\$80K
6	Explore and evaluate alternative methods to increase freshwater to Delta	Tier 1, Evaluate potential for Allison wastewater effluent with its nutrients and other return flows to improve environmental health of the Rincon Bayou Delta	\$50K
7	Assessment of sediment transport and loadings into the Nueces Delta and estuary	Tier 2b Bays Work Plan, <i>Assessment of sediment transport and loadings into the Nueces Delta and estuary</i>	\$50K
8	Examine and define ecological effects of zero flow event duration, intervals between periods of zero flow, and long-term frequency of zero flow events	Tier 2b Bays Work Plan, <i>Define ecological effects of zero flow event duration, intervals between periods of zero flow, and long-term frequency of zero flow events</i>	\$40K

All projects will be completed by August 31, 2017.

1. Feasibility Assessment for Landform Modifications in the Nueces Delta

BBASC Work Plan Priority: Tier 1 “*Explore Landform Modifications to Nueces Bay and Nueces Delta*”

What: The purpose of this project is to complete an environmental assessment for the Landform Modification Project # 4, Middle Rincon Bayou Diversion to South Lake Area and # 5, North Lake Diversion to South Lake System.

Why: The Nueces BBASC identified that one of the strategy options for achieving the environmental flow standards within the Nueces Estuary is to “*Explore Landform Modifications to Nueces Bay and Nueces Delta*”, and was completed in the 2015 project. When researchers modeled pumping with the addition of the diversions presented in project 4 & 5, there was more acreage inundated to South Lake, an area of concern that previously received little freshwater from pumping events. The landform modifications should be further investigated in order to maximize the current usage of pumping freshwater to the Rincon Bayou.

How: Perform an environmental assessment of the landform modifications. This project includes field visits to the Nueces Delta to examine the area of the diversions, acreage and type of resources impacted from proposed design and other environmental characterizations. This project could include preliminary or conceptual engineering (30% conceptual design) to include describing the area to be dredged for the diversion, describing logistics and feasibility of landform modifications, cost estimation/refinement, and identification of types of permits required. Project should also include a plan or design for excavated/dredge material, i.e. create platforms, wetlands, placement areas, etc.

Where: In the Nueces Delta, off of the Rincon Bayou to South Lake.

When: 1 year

Who: Qualified contractor and civil engineer

Cost: \$60,000

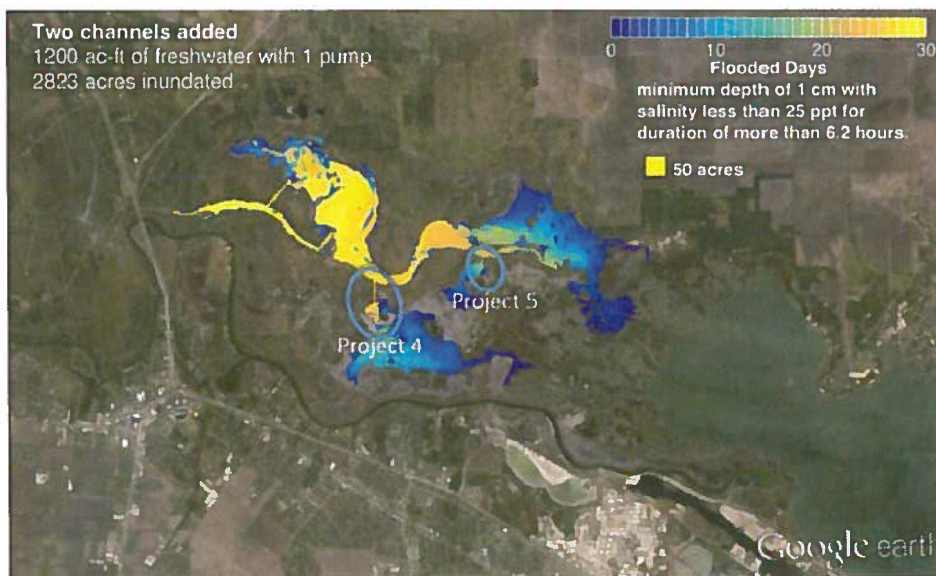


Figure to the left is from the 2015 Landform Modification project. Image shows the locations of project 4 & 5 and hydrodynamic model results after adding the diversions.

2. Identify vegetation/marsh changes occurring in the Rincon Bayou Delta and relationship of those changes to freshwater inflow

BBASC Work Plan Priority: Tier 2b Bays Work Plan, *Identify vegetation/marsh changes occurring in the Rincon Bayou Delta and relationship of those changes to freshwater inflow*

What: The purpose of this project is to identify changes in the areal extent of the Nueces Delta marsh as they relate to changes in sediment loading, freshwater inflows, subsidence, sea level rise and other factors.

Why: Recommended by the BBASC in the Nueces BBASC Tier 2b Bays Work Plan, *Identify vegetation/marsh changes occurring in the Rincon Bayou Delta and relationship of those changes to freshwater inflow (and other impacts): Health of the marsh plant community in the Rincon Bayou delta has been used to demonstrate effects of changes in freshwater inflow. Continue field studies in the Rincon Bayou delta to track changes in vegetation and marsh condition and relate those changes to freshwater inflow patterns.*

This project would quantify the loss of internal deltaic marsh over time. It has been well documented that the outer marsh edges of the Nueces Delta are eroding rapidly, however there has been no research to quantify the changes in the internal marsh complexes. This is important because it appears that the open water areas of the Nueces Delta are expanding. This could be due to decreased freshwater inflows, sediment loading or other factors such as subsidence, sea level rise, and erosion.

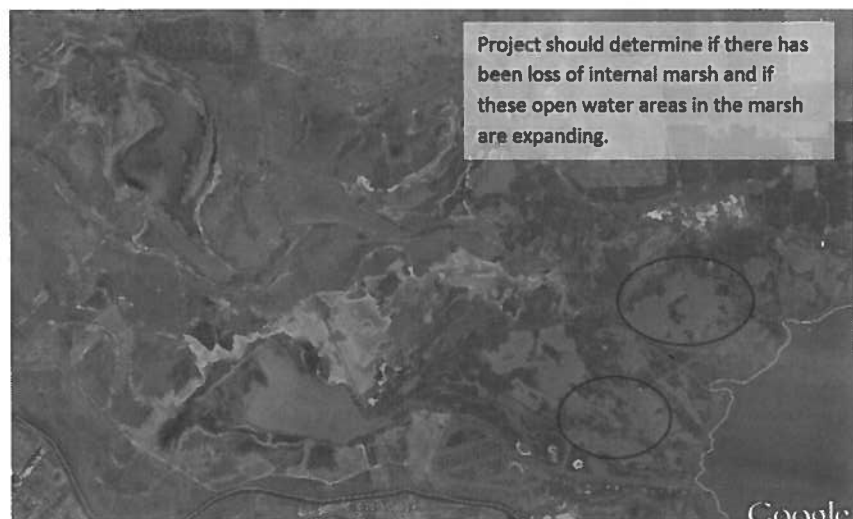
How: Couple mapping, analysis of historical aerial imagery, elevation data, and field surveys, if needed, to map and compare wetland changes.

Where: In the Nueces Delta

When: 1 year

Who: Qualified contractor

Cost: \$40,000



3. Nueces Bay Circulation Assessment Project

BBASC Work Plan Priority: Need to submit an addendum to work plan.

What: The purpose of this project is to collect water circulation data in Nueces Bay in order to assess circulation patterns in the area and provide the baseline data needed to determine how freshwater inflows are moving within the bay.

Why: There is great interest in how freshwater input patterns affect the Nueces Estuary. When combined with water quality and biological monitoring data, circulation data may provide important additional insights into how freshwater inflows influence the ecology in different areas of the system. The current data gathered in Nueces Bay will also be valuable for the future development and validation of a circulation model for the bay.

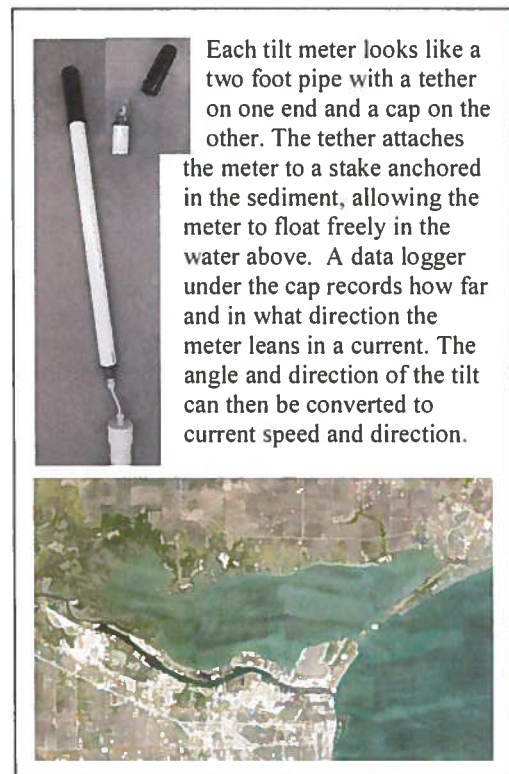
How: An array of tilt meters deployed over the back end of Nueces Bay (from Salt01 west to the Nueces Delta) would collect approximately 1 year of continuous circulation monitoring data that would improve our understanding of the movement of freshwater inputs within the system. Tilt meters could also be placed at the Nueces River mouth and the entrance to Rincon Bayou from Nueces Bay to assess water exchange between the main inflow connections and the bay. Tilt meters require maintenance every two weeks to remove fouling and offload data. Raw data from the meters can be manually processed and subjected to quality control procedures. The final outcome would be baseline data of water circulation patterns from Salt01 west to the Nueces Delta and a visual representation of current movements in Nueces Bay under various conditions (wind, tide, freshwater inflow events) seen during the project period.

Where: In Nueces Bay from Salt01 west to the Nueces Delta and including the lower portion of the Nueces River and the mouth of Rincon Bayou.

When: A year's worth of monitoring would allow for data to be collected during all seasons of the year. Another 3 months' time would be needed to write up a final report and develop the visualization tools of currents in Nueces Bay.

Who: Contractor familiar with utilizing tilt meters and analyzing circulation data.

Cost: \$60,000 to deploy tilt meters for a year, with data retrieval every other week, data analysis, final report writing, and visualization tools.



4. Re-examination of the 2001 Agreed Order monthly targets: Phase II

BBASC Work Plan Priority: Tier 1, *Re-examination of the 2001 Agreed Order monthly targets*

What: The purpose of this project is to follow up on the 2015 project, “Re-examination of the 2001 Agreed Order monthly targets”, and examine impacts of adjusting monthly target pass through requirements.

Why: As described in Section 4.1 of the Nueces BBEST Environmental Flows Recommendations Report, there has been a shift in monthly freshwater inflow patterns to the Nueces Bay, and based on this analysis there is a similar pattern of inflow into the reservoirs. Section 2.3 of the Nueces BBASC Environmental Flows Recommendations Report describes reservoir operations and the Agreed Order, pointing out that there might be an opportunity to better manage the limited freshwater resource by reviewing new data that was not available during the creation of the 1995 Agreed Order, which is the basis for the current pass through operation of the reservoir system.

During low pass-through months, such as January and February (2500 acre feet) and March and April (3500 acre feet), after calculating the pass through requirements they are often very small. These amounts are so small that the committee feels it is not an efficient use of the pumped freshwater. Therefore, a re-examination of the specific monthly targets should be performed.

How: A small project should re-evaluate the monthly targets by moving some water from the highest acre-feet months (i.e. May, June, September) to the ones with lower acre-feet (i.e. January, February) and then evaluating safe yield. The annual target amount will not change. End product would be recommendation for 10 year pilot project with new monthly inflow targets.

Table shows the current monthly pass through targets when the reservoir system is greater than or equal to 70% of storage capacity, as written in the 2001 Agreed Order. Total annual target amount is 138,000 acre-feet.

January	2,500	July	6,500
February	2,500	August	6,500
March	3,500	September	28,500
April	3,500	October	20,000
May	25,500	November	9,000
June	25,500	December	4,500

Where: Nueces River Basin.

When: 1 year

Who: Qualified contractor

Cost: \$20,000

5. Nutrient budget for Nueces Bay

BBASC Work Plan Priority: Tier 2b Bays Work Plan, *Nueces Watershed pre- and post-development nutrient budgets*

What: The purpose of this project is to identify all nutrient sources and sinks to the tidal segment of the Nueces River and Nueces Bay, develop a nutrient budget, and quantify loading to the tidal segment of the river and the bay.

Why: Nutrient inputs to coastal waters are an important element in the ecology and health of estuarine ecosystems. The Environmental Protection Agency has been encouraging states to address nutrients in a quantitative manner and particularly favors establishment of numerical criteria for nutrients. The Nueces River and Corpus Christi and Baffin Bays Basin and Bay Area Stakeholder Committee agrees that there is a potential for nutrient levels to affect aquatic plants and other biological resources and believes there is a need for a watershed approach to allow for effective management the estuary. A fundamental aspect of this approach is recognition that nutrient loading can be too high, thus degrading water quality, or too low (artificially reduced) therefore adversely affecting ecological productivity. Proper management first requires identifying whether nutrient loading is too high or too low. This project is following up on the “Nueces watershed pre- and post- development nutrient budgets”.

How: The previous study focused on the entire Nueces Watershed and the changes before and after building Choke Canyon. This study will focus on nutrient inputs to the Lower Nueces Bay Watershed, including the tidal segment of the Nueces River, sub-watersheds surrounding Nueces Bay, and point sources such as treated wastewater effluents. This project will develop nutrient budgets based on a quantitative understanding of the natural supply of all nutrient forms and the anthropogenic changes in these supplies over time for the Lower Nueces Bay watershed. Nutrient budgets for both the present and pre-development condition (before and after Choke Canyon) will be developed using data from an extensive network of stream gauges plus existing monitoring data contained within macro-detritus collected from the lower Nueces River, Nueces Bay and delta. Ascertaining annual loads for both the pre-development and present condition will provide a strong indication of trends and potential problems and will facilitate building consensus on a desired future condition for estuarine productivity, where chlorophyll *a* and other measures are the basis for determining desired conditions. Methods could include an extensive literature search, analysis of TCEQ data, land use/land cover analysis, and changes in point sources.

Where: In the Nueces Bay and the surrounding watersheds.

When: 1 year

Who: Qualified contractor

Cost: \$80,000

6. Explore and evaluate alternative methods to increase freshwater to Delta

BBASC Work Plan Priority: Tier 1, *Evaluate potential for Allison wastewater effluent with its nutrients and other return flows to improve environmental health of the Rincon Bayou Delta*

What: Specifically, examine the feasibility of modifying the Rincon Bayou Pipeline permit to pump Nueces River water into the South Lake area of the Nueces Delta.

Why: Assessing alternative sources of water that is discharged into the Nueces Delta could be important in the future for the health of the marsh ecosystem.

How: This project would look at all aspects of evaluating alternative methods of increasing freshwater to the Delta, but specifically pumping river water into the South Lake area. The goal of this project is to identify issues associated with this idea, look at affects on the River, physical and logistical aspects of the pumping, and permitting and regulatory issues.

Where: In the Nueces River, Delta and the surrounding areas

When: 1 year

Who: Qualified contractor

Cost: \$50,000

7. Assessment of sediment transport and loadings into the Nueces Delta and estuary

BBASC Work Plan Priority: Tier 2b Bays Work Plan, *Assessment of sediment transport and loadings into the Nueces Delta and estuary*

What: This project should determine historical and present-day sediment transport and loadings into the Nueces Delta and estuary.

Why: It is well known that decreasing riverine sediment transport to estuaries negatively impacts river deltas and coastal marsh systems. With regards to sediment transport, TPWD drew attention to the Nueces BBEST's conclusion that seasonal pulses do not provide sufficient energy to move adequate amounts of sediment. TPWD encourages the Nueces BBEST to work with the Nueces BBASC in addressing this important issue and incorporating high flow pulses in the Nueces BBASC's work plan.

How: Dependant on data available, project will analyze past and present sediment transport into the Nueces Delta and Estuary.

Where: In the Nueces River, Delta and the surrounding areas

When: 1 year

Who: Qualified contractor

Cost: \$50,000

8. Examine and define ecological effects of zero flow event duration, intervals between periods of zero flow, and long-term frequency of zero flow events

BBASC Work Plan Priority: Tier 2b Bays Work Plan, *Define ecological effects of zero flow event duration, intervals between periods of zero flow, and long-term frequency of zero flow events*

What: From 1989 to October 2011, 18 percent of the days had no flow from the Nueces River into Nueces Bay. Only one of 23 years during this period has had flow every day. Some no flow periods have lasted for 2 consecutive months. Monitoring, research, and studies have been ongoing and planned in the Nueces Delta and Bay. Data from these studies and future studies can be used to evaluate how periods of no flow are affecting ecological health of the bay and delta.

Why: Recent research in the Nueces Delta has focused on the affects of the Rincon Bayou pumping. This study would take a different angle and compare the periods before the pumping when there were long periods of zero flow events.

How: Historical data on flora or fauna of the Nueces Delta, River and/or Bay will be analyzed with data on flow in the Nueces River, salinity, and other factors. New analyses should be compared with results from projects looking at impacts of the Rincon Bayou pipeline to assist in creating a pumping strategy that maximizes ecological benefit.

Where: In the Nueces River, Delta, and Bay.

When: 1 year

Who: Qualified contractor

Cost: \$40,000