

## Application Checklist

### I. GENERAL INFORMATION

- 1. Legal name of applicant(s).
- 2. Regional Water Planning Group:
- 3. Authority of law under which the applicant was created.
- 4. Applicant's official representative, Name, Title, Mailing address, Phone number, Fax number, if available, E-mail Address, and Vendor ID Number.
- 5. Is this application in response to a Request for Proposals published in the Texas Register?  
Yes            No
- 6. If yes to No. 6 above, list document number and date of publication of the Texas Register.
- 7. Type of proposed planning (Check all that apply)
  - Initial scope of work
  - Development of a regional water plan
  - Revision of a regional water plan
  - Special studies approved by TWDB
- 8. Total proposed planning cost
- 9. Cash Contribution to the study.
- 10. List source of cash contribution, explanation of source of local cash contribution.
- 11. Total grant funds requested from the Texas Water Development Board.
- 12. Detailed statement of the purpose for which the money will be used. . (Not to exceed 1 page.)
- 13. Detailed description of why state funding assistance is needed. (Not to exceed 1 page.)
- 14. Identify potential sources and amounts of funding available for implementation of viable solutions resulting from proposed planning.

### II. PLANNING INFORMATION

- 15. A detailed scope of work for proposed planning. (Not to exceed 6 pages.)
- 16. Prioritization of scope of work tasks by the regional planning group.
- 17. A task budget for detailed scope of work by task. *Example is attached.*
- 18. An expense budget for detailed scope of work by expense category. *Example is attached.*
- 19. A time schedule for completing detailed Scope of Work by task.
- 20. Specific deliverables for each task in Scope of Work.
- 21. Method of monitoring study progress.
- 22. Qualifications and direct experience of proposed project staff.

### **III. WRITTEN ASSURANCES**

Written assurance of the following items:

- Proposed planning does not duplicate existing projects;
- Implementation of viable solutions identified through the proposed planning will be diligently pursued and identification of potential sources of funding for implementation of viable solutions;
- If a grant is awarded, written evidence that local matching funds are available for the proposed planning must be provided when the contract is executed.

### **IV. PROOF OF NOTIFICATION**

- Proof of notification

Develop or revise regional water plans. Eligible applicants requesting funds to develop or revise regional water plans must, not less than 30 days before board consideration of the application, provide notice that an application for planning assistance is being filed with the executive administrator by:

- (1) publishing notice once in a newspaper of general circulation in each county located in whole or in part in the regional water planning area; and
- (2) mailing notice to each mayor of a municipality with a population of 1,000 or more or which is a county seat and that is located in whole or in part in the regional water planning area, to each county judge of a county located in whole or in part in the regional water planning area, to all districts and authorities created under Texas Constitution, Article III, §52, or Article XVI, §59, located in whole or in part in the regional water planning area based upon lists of such water districts and river authorities obtained from Texas Commission on Environmental Quality, and all regional water planning groups in the state.

The notice must include the following:

- Name and address of applicant and applicant's official representative;
- Brief description of proposed planning area;
- Purpose of the proposed planning;
- Texas Water Development Board Executive Administrator's name and address; and
- Statement that any comments on the proposed planning must be filed with the applicant and the Texas Water Development Board Executive Administrator within 30 days of the date on which the notice was mailed.

**APPLICATION FOR  
REGIONAL WATER PLANNING GRANT**

**FOR THE REVISION OF THE  
COASTAL BEND REGIONAL WATER PLAN**

Submitted to:

**The Texas Water Development Board**

Submitted by:

**The Nueces River Authority**

On behalf of:

**Coastal Bend Regional Water Planning Group  
Region "N"**

**September 11, 2006**

**Application for a Regional Water Planning Grant for the Revision  
Of the Coastal Bend Regional Water Plan**

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**I. General Information**

**(1) Legal name of applicant(s):**

Nueces River Authority on behalf of the Coastal Bend Regional Water Planning Group  
(Coastal Bend RWPG)

**(2) Regional Water Planning Group:**

Region N- Coastal Bend Region

**(3) Authority of law under which the applicant was created:**

The Nueces River Authority, created in 1935 by special act of the 44<sup>th</sup> Texas Legislature codified as Article 8280-115 (Texas Water Code Auxiliary Laws, as amended), was designated by the Coastal Bend RWPG at their regular meeting on April 9, 1998 as the political subdivision to represent the Coastal Bend RWPG (See **Attachment A-1**).

On August 16, 2006 the Coastal Bend RWPG directed the Nueces River Authority to submit an application for the first biennium funding cycle (third round) for planning activities related to revising and updating the 2006 Coastal Bend Regional Water Plan (See affidavit by CBRWPG authorizing submittal of application in **Attachment A-2**).

**(4) Applicant's official representative:**

The official representative for the Nueces River Authority and the Coastal Bend RWPG for the purpose of this application is:

Mr. Con Mims, Executive Director  
Nueces River Authority  
P.O. Box 349  
Uvalde, Texas 78802-0349  
Phone: 830-278-6810; Fax: 830-278-2025  
Email: [cmims@nueces-ra.org](mailto:cmims@nueces-ra.org)  
Tax ID: 74-1666349

**(5) Application in response to a Request for Proposals published in the Texas Register:**

Yes

**(6) Document Number and Date of Publication of the Texas Register:**

TRD-200603279, RWP RFP, 31 TexReg 5210 June 23, 2006

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- (7) **Type of Proposed Planning (Check all that apply):**  
 Initial scope of work    √  
 Development of a regional water plan    √  
 Revision of a regional water plan    √  
 Special studies approved by TWDB    √
- (8) **Total Proposed Planning Cost**   \$493,900
- (9) **Cash Contribution to the Study**   \$120,000
- (10) **List source of cash contribution, explanation of source of local cash contribution.**  
 Cash contributions are solicited yearly from participating political subdivisions based  
 on population, using a \$0.1109 per capita rate.
- (11) **Total TWDB Grant Funds Requested:**   **\$373,900**

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**(12) Detailed statement of the purpose for which the money will be used**

The regional water planning grant funds hereby requested will be used for reimbursement of expenses associated with five work items recommended and prioritized at the August 16, 2006 Region N meeting for the revision of the Coastal Bend (Region N) Regional Water Plan. These expenses include contractual services of the Primary Subconsultant (selected at the August 16, 2006 meeting of the Coastal Bend RWPG) and expenses related to the development of two newsletters for public outreach.

Region N's Priority No. 1 is a detailed study of Goliad Sands Gulf Coast Aquifer Supplies, surface water supplies from the Garwood (Colorado River) project, and potential additional supplies from Lake Texana to be delivered to the City of Corpus Christi and their customers via the Mary Rhodes Pipeline. The study will include addressing blending issues, additional treatment requirements, and evaluating various operating and delivery scenarios to help support more effective and efficient management of regional and interregional water supplies.

Region N's Priority No. 2 is a site-specific study to determine optimal off-channel reservoir capacity and pump station capabilities, preferred location and site conditions, and evaluation of alternative reservoir operating parameters to facilitate implementation of this water management strategy to best manage water supplies.

Region N's Priority No. 3 is a more rigorous study of optimal pipeline routing and capacity to deliver water supplies from Choke Canyon Reservoir through a pipeline to Lake Corpus Christi. The requested funding includes a channel loss analysis between the Three Rivers gage and Lake Corpus Christi.

Region N's Priority No. 4 requested funding would be used to update the Corpus Christi Water Supply Model to include water quality calculations of total dissolved solids and chloride concentrations for existing water supplies (Lake Texana, Lake Corpus Christi, and at the Calallen pool) for various operating conditions.

Region N's Priority No. 5 is the development of a list of most important water conservation best management practices (BMPs) for the Coastal Bend Region based on feedback from water user groups, successful programs in the region, and potential savings associated with various BMPs.

Cash contributions by participating political subdivisions will be used to fund direct expenses incurred by the Nueces River Authority in administering the regional planning revision program on behalf of the Coastal Bend RWPG. The direct expenses of the Nueces River Authority include: salaries, benefits, travel, and other expenses (printing costs, publication of notices, postage for mailing of notices and other materials, phone and long distance charges, office supplies, rental of facilities for public meetings, etc).

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### **(13) Detailed description of why state funding assistance is needed**

Pursuant to Senate Bill 1 (1997) Texas was divided into 16 water planning regions by the TWDB, with each region required to develop and adopt a regional water plan in 2001, and every 5 years thereafter. In response to Senate Bill 1, as amended, the Coastal Bend Region (Region N) has developed regional water plans for 2001, and 2006, and is beginning the process to develop a plan for 2011.

Regional water planning is outside the financial ability and obligation of any one entity within the region. The requested regional water planning grant funds are needed so that all water users groups and water suppliers in the planning area are equally evaluated, ensuring that reasonable water management strategies are considered and recommended for each water user group and/or entity.

### **(14) Identify potential sources and amounts of funding available for implementation of viable solutions resulting from proposed planning.**

When it is economically feasible, local water user groups who would benefit from implemented water projects are expected to contribute to financing those facilities needed from their own resources. State loans and state or federal participation assistance can also be available, as needed. A primary source of funding for implementation of viable solutions as a result of the proposed planning is through the Texas Water Development Board's Financial Assistance Program. Other funding sources include the US Army Corps of Engineers (on projects that are also identified in the Nueces Basin Feasibility Study) and the Texas State Soil and Water Conservation Board.

## **II. Planning Information**

### **(15) A detailed scope of work for proposed planning.**

**Scope of Work:** In response to Texas Water Development Board (TWDB) Request for Proposal (RFP) RWP RFP, 31 TexReg 5210 June 23, 2006 Texas Register, the Coastal Bend Regional Water Planning Group (CBRWPG) presents the following planning topics listed in the CBRWPG's order of priority for consideration by the TWDB:

1. Detailed Study of Gulf Coast Groundwater and Garwood Supplies;
2. Optimization and Implementation Studies for Off-Channel Reservoir;
3. Optimization and Implementation Studies for Pipeline from Choke Canyon Reservoir to Lake Corpus Christi, including channel loss study;
4. Water Quality Modeling of Regional Water Supply System to Enhance Water Quality and Improve Industrial Water Conservation; and
5. Development of list of Region-Specific Water Conservation Best Management Practices (BMPs).

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The proposed scope of work and budgets are presented below.

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**Administration:** Administration, including scope of work development, meetings related to scope of work, public participation, and expenses related to the development of two newsletters for public outreach.

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### Work Item 1: Gulf Coast Groundwater and Garwood Supplies

**Conduct a detailed study of additional water supplies to be delivered via Mary Rhodes Pipeline. This study will include potential groundwater supplies from the Goliad Sands Gulf Coast Aquifer, potential additional supplies from Lake Texana, and surface water supplies from the Garwood Project (Colorado River).**

TWDB Funding Eligibility: Yes.

Qualifying Topic(s): Studies that will further implementation of recommended water management strategies *and* Refinement of water supply information or water management strategies

#### *Background*

The City of Corpus Christi (City) and San Patricio Municipal Water District (District) distribute water to numerous entities and provide a combined 85 percent of the municipal and industrial water demand in the region. The City and District are evaluating groundwater supplies from the Gulf Coast Aquifer, as well as surface water supplies from the Colorado River (Garwood Project) to meet their customers projected water needs. These water supplies are considered for delivery via the Mary Rhodes Pipeline.

In 1998, the Mary Rhodes Memorial Pipeline was completed and began to deliver 41,840 acft/yr from Lake Texana in the Lavaca-Navidad River Basin to the City of Corpus Christi in the Nueces Basin. Currently, the City has contracts for up to 53,840 acft/yr from Lake Texana (41,840 acft/yr on a firm basis and 12,000 acft/yr on an interruptible basis). As part of a plan for future supplies, the pipeline was upsized and is capable of delivering up to 112,000 acft/yr. Potential water supplies that could be transported via this pipeline include groundwater supplies from the Gulf Coast Aquifer, Garwood water from the Colorado River, as well as additional Lake Texana water developed by additional storage, or alternative reservoir operating procedures.

The District has a contract with Goliad Sands, LLC to evaluate groundwater supplies in Bee County, is considering a contract for groundwater supplies in San Patricio County, and is currently conducting a groundwater study and negotiating an agreement with the City of Corpus Christi (City) to develop the groundwater project. The well field study area has been identified and plans include drilling three study wells and evaluating water quality for full spectrum of water quality constituents. The District is targeting groundwater supplies with total dissolved solids at or below 600 mg/L. Based on water quality results, the District will develop up to 11,000 acft/yr of groundwater supplies. The City is considering up to 7,000 acft/yr of additional groundwater supply and up to 35,000 acft/yr from the Colorado River as part of the Garwood Project.

The City has entered into an agreement for the purchase of 35,000 acft/yr from the Garwood Irrigation Company, who holds the most significant senior water right in the Lower Colorado River Basin with a priority date of November 1, 1900. On October 7, 1998, TCEQ approved the City's



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purchase and authorized the City to divert 35,000 acft/yr from the Colorado River for irrigation, municipal and industrial purpose.<sup>1</sup>

In the 2006 Plan, both the Gulf Coast Aquifer Supply Project and Garwood Project are recommended water management strategies. The 2006 Coastal Bend Regional Water Plan included an analysis of the Gulf Coast Aquifer Supply Project in Bee and San Patricio County using the TWDB's Central Gulf Coast Groundwater Availability Model. According to the model simulation, pumping an additional 18,000 acft/yr of groundwater supplies could result in an estimated 50 foot drawdown, which does not exceed drawdown criteria adopted by the planning group. The 2006 Plan recommended Gulf Coast aquifer groundwater supplies for the District beginning in Year 2010 and an additional 7,000 acft by Year 2060 to meet City of Corpus Christi needs. Furthermore, the Garwood Project was recommended in the 2006 Plan to provide additional water supplies for the City of Corpus Christi and their customers by Year 2030. Based on planning-level cost analysis, the Gulf Coast Aquifer Groundwater Supply Project and Garwood water supplies delivered through the Mary Rhodes pipeline are considered to be cost effective future projects, with unit costs of less than \$600 per acft including treatment.<sup>2</sup> While the 2006 Plan included a discussion of projects and costs for both Gulf Coast Aquifer Supplies and Garwood Project, it did not include an analysis of integrating the supplies in the LCC/CCR/Lake Texana reservoir system.

Since the 2006 Plan, the District and City have conducted additional studies of the Gulf Coast Aquifer Supply Project and Garwood Project. The District has defined more specifically the possible wellfield location for Gulf Coast supplies and continues to consider groundwater supplies in San Patricio and/or Bee County. The City of Corpus Christi has completed a Phase 1 Garwood Project study<sup>3</sup>, which recommended three delivery options for a Phase 2 detailed study: Combined Facilities with LCRA/SAWS (Option 1), Garwood Town Canal to West Mustang Creek (Option 5); and Gulf Coast Furber Canal to Mary Rhodes Pipeline. The City is currently considering permitting and environmental issues associated with these options. Furthermore, the City of Corpus Christi Water Supply Model has been updated to include operating the Mary Rhodes Pipeline with groundwater and Garwood supplies.

### *Work Plan*

The District and the City of Corpus Christi plan to send untreated groundwater supplies and surface water supplies from Colorado Basin (Garwood) through the Mary Rhodes Pipeline. The Mary Rhodes Pipeline currently delivers raw surface water supplies from Lake Texana and is an attractive delivery option due to its proximity to projects and excess pipeline capacity. Prior to delivering groundwater supplies and surface water supplies from the Colorado River through the Mary Rhodes Pipeline, groundwater and surface water quality constituents need to be evaluated to address potential blending issues or additional treatment requirements. Evaluating various operating and delivery scenarios for the Gulf Coast groundwater supplies, Garwood supplies, and additional Lake Texana supplies will help support more effective and efficient management of regional and interregional water supplies. This work item does not duplicate previous or ongoing planning activities.

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1 The certificate also subordinates the 35,000 acft/yr to the remaining portion of the original Garwood Irrigation water right by giving it a priority of November 2, 1900.

2 Provided groundwater supplies are of suitable water quality and do not require advanced treatment (i.e. desalination).

3 Freese and Nichols, Garwood Water Project -- Phase 1 Report: Pipeline Route Screening Report, November 2004.

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Task A. Evaluate potential issues associated with blending raw groundwater and surface water supplies

- Water quality data will be compiled for groundwater in Bee and San Patricio Counties near the identified wellfield areas, the Colorado River near Garwood, and Lake Texana near the dam. Water quality constituents of interest include turbidity, temperature, alkalinity, hardness, pH, total organic carbon, ultraviolet absorbance, total dissolved solids, chloride, bromide, iron, radium-226, radium-228, gross alpha, radon, uranium, arsenic, and manganese and will be used as available.
- Based on the range of water quality values from collected data, a resulting blended water quality will be calculated for up to four combinations for the two new water sources. A model previously developed for the City of Corpus Christi will be used to determine chemical doses necessary for water treatment and compare to treatment processes currently utilized at the O.N. Stevens Water Treatment plant. Parameters which may exceed drinking water standards will be identified.
- Water treatment costs will be calculated for each blending option based on chemical dosage requirements. Also, the water quality model will be utilized to assess anticipated treated water quality for the blended waters and the potential for additional treatment to meet regulatory requirements.

Task B. Evaluate various Gulf Coast groundwater supply operating scenarios.

- A series of up to three scenarios will be considered for operating groundwater supplies based on water quality analysis (Task A) and pumping costs.
- A series of graphs will be provided comparing water quality, supply, and costs for each operating scenario. An additional graph will be included to show average available capacity in the Mary Rhodes Pipeline with delivery of Gulf Coast Aquifer Supplies.
- A series of figures will be prepared to show additional water supplies and changes to Nueces Bay and Estuary freshwater inflows with the groundwater project.

Task C. Evaluate reservoir system operations with Garwood Project

- A model run will be performed to include the Garwood Project in the City's reservoir system. A series of figures will be prepared to show additional water supplies and changes to Nueces Bay and Estuary freshwater inflows with the Garwood Project.

Task D. Evaluate reservoir system operations with additional Lake Texana supplies

- A model run will be performed to include additional Lake Texana supplies in the City's water supply system based on additional water supply opportunities under consideration by the Lavaca Navidad River Authority (LNRA). A series of figures will be prepared to show additional water supplies and changes to Nueces Bay and Estuary freshwater inflows with the Lake Texana supply.

Task E. RWPG meeting(s) and preparation of technical memorandum

- Two meetings to present study results to CBRWPG and receive feedback.

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- A technical report will be prepared to include description of model simulations, project implementation considerations (i.e. permitting, environmental impacts, etc), methodology and approach for evaluating water quality, calculations for determining blended water quality and treatment required, and model results of various operating scenarios.
- The report will be submitted per TWDB requirements and results from this study will be included in the 2011 Coastal Bend Water Plan.

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### Work Item 2: Optimization and Implementation Studies for Off-Channel Reservoir

**Conduct a site-specific study to determine optimal off-channel storage and pump station capacity, preferred location and site conditions, and evaluation of alternative reservoir operating parameters.**

TWDB Funding Eligibility: Yes.

Qualifying Topic(s): Studies that will further implementation of recommended water management strategies *and* Refinement of water supply information or water management strategies

#### *Background*

Choke Canyon Reservoir (CCR) has a storage capacity of approximately 695,000 acft and a contributing drainage of approximately 5,500 square miles. Lake Corpus Christi (LCC) has a storage capacity of approximately 257,000 acft and a contributing drainage of approximately 16,500 square miles. This configuration creates a situation where the smallest reservoir has the largest potential for capturing storm events because of the larger contributing drainage area.

The yield of the system is affected by the limited storage capacity of LCC and its limited ability to capture a significant portion of large storm events that travel down the Nueces River. Since LCC has the smaller capacity, many times it fills and spills during times when the bay has adequate freshwater inflow. However, if water could be pumped into an off-channel reservoir (OCR), it would result in more water in storage and enhance the system yield. For the 2006 Plan, preliminary reservoir capacities and pipeline delivery rates were evaluated for an OCR near LCC. The most favorable options included an OCR with a capacity between 200,000 and 300,000 acft and a pump station with a capacity of between 750 and 1,500 cfs.

The OCR is a recommended water management strategy in the 2006 Plan to provide additional water supplies for the City of Corpus Christi and their customers by Year 2040. Since the 2006 Plan, the City of Corpus Christi Model has been updated to include an off-channel reservoir option.

#### *Work Plan*

In order to facilitate implementation of this water management strategy, a more detailed study of the off-channel reservoir is necessary. The off-channel reservoir study performed for the 2006 Plan will be used as a baseline for further analysis. This work item will include site-specific studies to determine optimal off-channel storage and pump station capacity, preferred location and site conditions, and evaluation of alternative reservoir operating parameters to best manage water supply, water quality, and ecosystem restoration benefits. These work items do not duplicate previous or ongoing planning activities.

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### Task A. Optimize off-channel capacity and pipeline delivery rate

- A series model runs will be performed to evaluate a range of off-channel storage capacities (between 200,000 acft and 300,000 acft) and pipeline delivery rates (between 750 and 1,500 cfs).
- Planning level cost estimates will be developed for the range of reservoir sizes and transfer facilities so that approximate unit costs can be estimated for the purpose of selecting an optimum size.
- A series of figures will be prepared to compare volume of water pumped to/from OCR, change in streamflow downstream of LCC, increase in water supply, and changes in freshwater inflows to the Nueces Bay and Estuary.

### Task B. Identify preferred location for off-channel reservoir and environmental impacts

- Topographic maps, reported local groundwater level measurements, and TWDB Volumetric Survey of LCC will be used to identify a suitable location for the intake and pump station to deliver water to the OCR.
- Site reconnaissance will be performed to identify site-specific environmental considerations.

### Task C. Evaluate alternative reservoir operating parameters

- A series of model runs will be performed to evaluate the impact of modifying CCR/LCC system operating parameters, such as changing triggers for CCR releases, and trigger levels to pump to/from OCR. The goal of this work task is to provide information to assist with effective management of system storage, minimize evaporative losses, optimize additional water supply yields, and minimize impact to the environment by maintaining and possibly enhancing flows to the Nueces Estuary under critical conditions and evaluating the potential to stabilize LCC reservoir levels.
- A series of graphs will be prepared to show the relationship of alternative reservoir operating parameters, additional water supplies, changes to Nueces Estuary inflows, and changes in LCC reservoir levels.

### Task D. RWPG meeting(s) and preparation of technical memorandum

- Two meetings to present study results to CBRWPG and receive feedback.
- A technical report will be prepared to include the approach used to optimize OCR, discussion of site selection and local considerations, and results showing the impacts of alternative reservoir operating parameters.
- The report will be submitted per TWDB requirements and results from this study will be included in the 2011 Coastal Bend Water Plan.

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### Work Item 3: Implementation Analyses for Pipeline from CCR to LCC, including Measurement of Channel Losses

TWDB Funding Eligibility: Yes.

Qualifying Topic(s): Studies that will further implementation of recommended water management strategies *and* Refinement of water supply information or water management strategies

#### *Background*

Channel losses in streams that deliver water from Choke Canyon Reservoir (CCR) to Lake Corpus Christi (LCC) are often large, due in part to these streams being located within the outcrop of the Gulf Coast Aquifer, and have been estimated to range from 37.8 to 42 percent in the 63.3- mile reach of the Frio and Nueces Rivers downstream of CCR to LCC. The river channel segments that affect the ability of the lower Nueces River system to deliver water from Choke Canyon Reservoir and Lake Corpus Christi to the Calallen diversion reservoir, are as follows:

- Frio River from Choke Canyon Reservoir to Three Rivers (10 miles)
- Nueces River from Three Rivers to Lake Corpus Christi (53 miles), and
- Nueces River from Lake Corpus Christi to Calallen (39 miles)

Of these three segments, two reaches have been extensively studied by the City of Corpus Christi and the United States Geological Survey (USGS): Frio River from Choke Canyon Reservoir to Three Rivers and Nueces River from Lake Corpus Christi to Calallen. **However, the 53 mile river reach from Three Rivers to Lake Corpus Christi is poorly understood due to limited streamflow data and close hydraulic connection with the Goliad Sands of the Gulf Coast Aquifer.** The USGS installed a gage on the Nueces River at George West (#08210100) in December 2000, which can be used to provide more accurate estimates of channel losses from Three Rivers to LCC. Since the majority of the surface water supply from the CCR/LCC System for the City of Corpus Christi and its customers is stored in CCR and delivered to LCC using the natural stream channel, the yield of the system is affected by these losses. If water could be delivered by a pipeline that bypasses the stream channels, it would not be subjected to these losses and would result in more water in storage and enhance the system yield.

The CCR/LCC pipeline has been studied in the 2001 and 2006 Plan, however detailed analyses of channel losses have not been conducted for the reach between Three Rivers and Lake Corpus Christi to quantify reduced streamflow in the Nueces River when delivering water supplies to Lake Corpus Christi through the pipeline rather than river channel. Furthermore, analysis of associated environmental issues, and optimization of pipeline design will move the project towards implementation.

The CCR/LCC pipeline is a recommended water management strategy in the 2006 Plan to provide additional water supplies for the City of Corpus Christi and their customers by Year 2020. Since the 2006 Plan, the City of Corpus Christi Water Supply Model has been updated to include a CCR/LCC pipeline water delivery option.

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### *Work Plan*

In order to facilitate implementation of this water management strategy, a more detailed analysis of the CCR/LCC pipeline and river channel between CCR and LCC is necessary. This work item will include a more rigorous analysis of channel losses, optimal pipeline routing, capacity, and evaluate impacts of reduced streamflow between CCR and LCC. A more detailed analysis will be conducted for conjunctive operation of the OCR and CCR/LCC pipeline to include prioritization of projects and establishing timeline for implementation. This work item does not duplicate previous or ongoing planning activities.

#### Task A. Evaluate impacts associated with reduced streamflow between CCR and LCC

- USGS gaging station data for Nueces River at George West will be compiled from December 2000 to present.
- A channel loss analysis will be performed on the reach downstream of the Three Rivers gage by making a 2 to 3 week high flow rate release from Choke Canyon Reservoir when flows on the Nueces and Atascosa Rivers are minimal. Groundwater migration to channel during low flow will be considered, including potential water quality issues. Technical services and field measurements will be coordinated with the City of Corpus Christi.
- A delivery factor will be calculated based on volume of water received at Three Rivers and inflow to Lake Corpus Christi.
- Based on delivery factor, the resulting channel losses will be analyzed and used to estimate the portion of losses contributing to recharge to the Gulf Coast Aquifer.
- The City of Corpus Christi Water Supply Model will be updated with new channel loss data.
- The CCR/LCC pipeline will be simulated using the updated City of Corpus Christi Water Supply Model and calculated streamflow will be used to determine volume of water received at Three Rivers with CCR/LCC pipeline operation. After considering delivery factor from Three Rivers to LCC, the reduced channel losses will be used to calculate changes in recharge to the Gulf Coast Aquifer with operation of CCR/LCC pipeline.
- A series of graphs and tables will be prepared to compare streamflow and Gulf Coast aquifer recharge between CCR and LCC with and without the CCR/LCC pipeline for the 1934 to 2003 period.

#### Task B. Optimize pipeline capacity and location towards project implementation

- A series of model runs will be performed for up to three pumping rates to evaluate a more detailed range for pump station and pipeline sizing.
- Preliminary cost estimates will be developed for the range of pipeline sizes and transfer facilities so that approximate unit costs can be estimated for the purpose of selecting an optimum size.
- A series of figures will be prepared to compare the volume of water sent through CCR/LCC pipeline, change in streamflow downstream of CCR, increase in water supply, and impacts to the Nueces Bay and Estuary.
- Topographic maps and recent digital elevation model (DEM) will be used to identify a suitable location for CCR/LCC pipeline.

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- A model run will be performed operating the CCR/LCC pipeline conjunctively with the off-channel reservoir.

### **Task C. RWPG meeting(s) and preparation of technical memorandum**

- Two meetings to present results to CBRWPG and receive feedback.
- A technical report will be prepared to include the methodology used to optimize pipeline, approach for calculating delivery factors and channel losses for Nueces River reach between Three Rivers and LCC, and discuss possible impacts associated with operating the CCR/LCC pipeline (such as reduced aquifer recharge).
- The report will be submitted per TWDB requirements and results will be included in the 2011 Coastal Bend Water Plan.

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### **Work Item 4: Water Quality Modeling of Regional Water Supply System to Enhance Water Quality and Improve Industrial Water Conservation**

**Update Corpus Christi Water Supply Model (for monthly simulation from 1934 to 2003) to include calculation of total dissolved solids and chloride concentrations for Lake Texana, Lake Corpus Christi, and at the Calallen Pool for various operating conditions.**

TWDB Funding Eligibility: Yes.

Qualifying Topic(s): Activities that will help overcome problems identified from last round of planning

#### *Background*

The City of Corpus Christi and their customers rely on surface water supplies from Choke Canyon Reservoir, Lake Corpus Christi, the Calallen Pool, and Lake Texana to meet regional water needs. The City of Corpus Christi provides water supplies, either directly or indirectly through other wholesale water providers, to meet over 85 percent of the municipal and industrial water demand in the region. Water releases from Choke Canyon Reservoir and streamflow from the Nueces River provide inflows to Lake Corpus Christi, which are subsequently delivered via the Nueces River at the Calallen Pool. Water supplies from Lake Texana are brought in near Calallen and blended with Nueces River supplies prior to being delivered to the City of Corpus Christi and their customers.

The 2001 and 2006 Coastal Bend Regional Water Plans include significant descriptions of Nueces River water quality concerns and more specifically, impacts on water consumption especially for manufacturing users. Good water quality supports conservation and more efficient use of water supplies especially in industrial cooling water towers which recycle water until dissolved solids limits are reached. Higher concentrations of total dissolved solids and chlorides occur in Choke Canyon Reservoir and near water supply intakes located downstream of Lake Corpus Christi in the Lower Nueces River near Calallen during drought conditions and low streamflow events.

The Corpus Christi Water Supply Model (also referred to as the Lower Nueces River Basin Bay and Estuary Model) is a multi-basin water supply model that includes operations of Choke Canyon Reservoir, Lake Corpus Christi (including reservoir pass-through for the Nueces Estuary), Lake Texana, and the Lower Colorado River (for future water supplies from Garwood Project). For the 2006 Coastal Bend Regional Water Plan, the model was updated to include hydrologic conditions during the drought of the 1990's (1993-2001) and can now provide monthly simulations from 1934

## **Application for a Regional Water Planning Grant for the Revision Of the Coastal Bend Regional Water Plan**

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to 2003. While the model is the best tool for managing water supplies from the CCR/LCC/Lake Texana/ Lower Colorado River and required releases to maintain the health of the Nueces Bay and Estuary, the Corpus Christi Water Supply Model does not currently provide information related to water quality. Factors that contribute to poor water quality during droughts include: longer retention time of water in storage and mineralization as a result of evaporation, reduced inflows to reservoirs, high evaporative losses, and low streamflow in the lower Nueces River related to reduced rainfall and reduced pass-thrus and releases from the Choke Canyon Reservoir/ Lake Corpus Christi (CCR/LCC) system. By incorporating a water quality component in the City of Corpus Christi Water Supply Model, the CCR/LCC/Lake Texana/Lower Colorado River system can be simulated to help manage water quality, and thereby support selection of water management strategies that will reduce water quality impacts to regional water supplies.

### *Work Plan*

In order to accomplish the above evaluation, the City of Corpus Christi Water Supply Model will be updated using historic, hydrologic conditions from 1934 to 2003 and improved to include calculation of total dissolved solids and chloride concentrations for Lake Texana, Lake Corpus Christi, and at the Calallen Pool. Under this enhancement the model would have the ability to calculate total dissolved solids and chloride concentrations for the 1934 to 2003 simulation period for any operation plan. As part of the USCOE Nueces Feasibility Study, the model will be updated to include similar water quality calculations for Choke Canyon Reservoir. This work item does not duplicate previous or ongoing planning activities.

#### Task A. Prepare a water quality database for the City of Corpus Christi Water Supply Model

- A monthly water quality database will be developed for inflows to Lake Corpus Christi, Calallen Pool, and Lake Texana for the 1934 to 2003 period based on regression equations for Nueces and Navidad River flows. Water quality data and streamflow measurements included in the 2001 and 2006 Plan will be used together with USGS and other data for the Lower Nueces River (downstream of Lake Corpus Christi to Calallen).
- New model code will be developed to integrate the water quality database into the City of Corpus Christi Water Supply Model.

#### Task B. Evaluate reservoir operating scenarios and impact on total dissolved solids and chloride concentrations using the City of Corpus Christi Water Supply Model with long term (monthly) simulation from 1934 to 2003

- A series of model runs will be performed for up to four system operating scenarios to evaluate the impacts of changing the trigger level for water delivery from Choke Canyon Reservoir to Lake Corpus Christi, safe versus firm yield, constant versus seasonal monthly delivery pattern from Lake Texana supplies while maintaining pass-thru targets to the Nueces Bay and Estuary per 2001 Agreed Order. At least one run will consider monthly variable Lake Corpus Christi target levels.
- A series of figures will be prepared to show the relationship between storage levels in Lake Corpus Christi and total dissolved solids and chloride concentrations. Similar figures will be prepared to compare storage levels in Lake



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Texana and streamflow at Calallen Pool to total dissolved solids and chloride levels.

Task C. RWPG meeting(s) and preparation of technical memorandum

- Meeting to present study results to CBRWPG and receive feedback.
- A technical report will be prepared to include description of the model updates, methodology, and model operating scenario results with summary tables and graphs.
- The report will be submitted per TWDB requirements and results from this study will be included in the 2011 Coastal Bend Water Plan.

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### **Work Item 5: Region-Specific Water Conservation Best Management Practices (BMPs)**

**Develop a list of most important water conservation BMPs for the Coastal Bend Region, send to each water user group in the Coastal Bend Region, and solicit feedback regarding their water conservation programs.**

TWDB Funding Eligibility: Yes.

Qualifying Topic(s): Studies that will further implementation of recommended water management strategies *and* Refinement of water supply information or water management strategies

#### *Background*

Water conservation refers to those methods and practices that either reduce the demand for water supply or increase the efficiency of the supply or use facilities so that available supply is conserved and made available for future use. Water conservation is typically a low-capital intensive alternative that water supply entities can pursue.

In 2001, the Texas Legislature amended the Texas Water Code to require Regional Water Planning Groups to consider water conservation and drought management measures for each water user group with a need (projected water shortage). The Water Conservation Implementation Task Force was created by Senate Bill 1094 to identify and describe Water Conservation Best Management Practices (BMPs) and provide a BMP Guide for use by Regional Water Planning groups in the development of the 2006 Regional Water Plans. In November 2004, the Texas Water Development Board and Water Conservation Implementation Task Force issued a "Water Conservation Best Management Practices Guide" that was used by the Coastal Bend Region to evaluate water savings associated with various water conservation techniques. In the 2006 Plan, the Coastal Bend Regional Water Planning Group encourages all municipal entities in the Coastal Bend Region to conserve water, regardless of per capita consumption. However, the 2006 Plan specifically recommends a 15 percent reduction in per capita water use for those municipal entities with per capita use in 2060 greater than 165 gpcd.

The TCEQ provides guidance for Water Conservation and Drought Contingency Plans in 30 Texas Administrative Code Chapter 288, which requires entities applying for new water rights or an amendment to existing water right to prepare and implement a water conservation/drought contingency plan to be submitted with their application. Furthermore, 30 TAC Chapter 288, requires "specific, quantified five and ten year targets for water savings to be included in all water conservation plans to be submitted to the TCEQ no later than May 1, 2005."

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### *Work Plan*

To encourage more effective water conservation, this study will include developing a list of most important and effective water conservation best management practices for the Coastal Bend Region. This list will then be sent to each water user group in the Coastal Bend Region and each entity will be contacted to determine their interest in participation and/or types of water conservation programs that are currently being implemented. This work item does not duplicate previous or ongoing planning activities.

Task A. Develop a list of water conservation best management practices for the Coastal Bend Region and solicit feedback from water user groups

- Review water conservation techniques identified by the Water Conservation Task Force and water conservation plans submitted to TCEQ for water user groups in Coastal Bend Region.
- Based on provided information, approximately ten water conservation techniques will be selected by the Regional Water Planning Groups to promote conservation within the Coastal Bend Region.
- Send list of recommended water conservation practices to all water user groups in Coastal Bend Region with information about various BMPs and potential savings and receive feedback regarding their current water conservation programs and interest in participating in water conservation techniques identified by the Regional Water Planning Group.
- Compile results from surveys and evaluate water savings associated with recommended water conservation techniques.

Task B. RWPG meeting(s) and preparation of technical memorandum

- Two meetings to present results to CBRWPG and receive feedback.
- A technical report will be prepared to include the recommended list of water conservation best management practices for the Coastal Bend Region, results of water user group surveys, and calculated water savings associated with selected water conservation programs.
- The report will be submitted per TWDB requirements and results from this study will be included in the 2011 Coastal Bend Water Plan.

### **(16) Prioritization of scope of work tasks by the regional planning group**

**Priority Number 1:** Detailed Study of Gulf Coast Groundwater and Garwood Supplies;

**Priority Number 2:** Optimization and Implementation Studies for Off-Channel Reservoir;

**Priority Number 3:** Optimization and Implementation Studies for Pipeline from Choke Canyon Reservoir to Lake Corpus Christi, including channel loss study;

**Priority Number 4:** Water Quality Modeling of Regional Water Supply System to Enhance Water Quality and Improve Industrial Water Conservation; and

**Priority Number 5:** Development of list of Region-Specific Water Conservation Best Management Practices (BMPs).

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**(17) A task budget for detailed scope of work by task**

**TASK BUDGET BY PRIORITY TOPICS**

<b>TOPIC</b>	<b>DESCRIPTION</b>	<b>LOCAL FUNDS</b>	<b>TWDB FUNDS REQUESTED</b>
1	Detailed Study of Gulf Coast Groundwater and Garwood Supplies		<b>\$ 70,000</b>
1a	Evaluate potential issues associated with blending raw groundwater and surface water supplies		\$31,500
1b	Evaluate various Gulf Coast groundwater supply operating scenarios		\$7,000
1c	Evaluate reservoir system operations with Garwood Project		\$3,100
1d	Evaluate reservoir system operations with additional Lake Texana supplies		\$3,100
1e	Two RWPG meetings and preparation of technical memorandum		\$25,300
2	Optimization and Implementation Studies for Off-Channel Reservoir		<b>\$ 58,000</b>
2a	Optimize off-channel capacity and pipeline delivery rate		\$8,600
2b	Identify preferred location for off-channel reservoir and environmental impacts		\$19,100
2c	Evaluate alternative reservoir operating parameters		\$5,900
2d	Two RWPG meetings and preparation of technical memorandum		\$24,400
3	Implementation Analyses for Pipeline from CCR to LCC, including Measurement of Channel Losses		<b>\$ 85,000</b>
3a	Evaluate impacts associated with reduced streamflow between CCR/ LCC		\$51,000
3b	Optimize pipeline capacity and location, towards project implementation		\$8,800
3c	Two RWPG meetings and preparation of technical memorandum		\$25,200
4	Water Quality Modeling of Regional Water Supply System to Enhance Water Quality and Improve Industrial Water Conservation		<b>\$ 80,000</b>
4a	Prepare a water quality database for the City of Corpus Christi Water Supply Model		\$51,200
4b	Evaluate reservoir operating scenarios and impact on total dissolved solids and chloride concentrations using the City of Corpus Christi Water Supply Model with long term (monthly) simulation from 1934 to 2003		\$6,100
4c	One RWPG meeting and preparation of technical memorandum		\$22,700
5	Development of list of Region-Specific Water Conservation Best Management Practices (BMPs)		<b>\$ 40,000</b>
5a	Develop a list of water conservation BMPs for the Coastal Bend Region and solicit feedback from water user groups		\$21,700
5b	Two RWPG meetings and preparation of technical memorandum		\$18,300
8	Administration and public participation activities	<b>\$ 120,000</b>	<b>\$40,900</b>
8a	Administrative	\$120,000	
8b	Scope of Work		\$19,000
8c	Public Participation and Newsletters		\$21,900
Total		\$ 120,000	\$373,900

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**TASK BUDGET BY TWDB TASKS**

<b>TASK</b>	<b>DESCRIPTION</b>	<b>CBRWPG/ NRA</b>	<b>SUBCONTRACTOR</b>	<b>TOTAL</b>
0	Scope of Work <sup>1</sup>	0	\$ 19,000	\$19,000
1	Planning area description	0	0	0
2	Review and revision of population and water demand projections	0	0	0
3	Water supply analysis	0	0	0
4	Identification, evaluation, and selection of water management strategies based on needs	0	\$ 333,000	\$333,000
5	Impacts of Selected Water Management Strategies on Key Parameters of Water Quality and Impacts of Moving Water from Rural and Agricultural Areas	0	0	0
6	Water Conservation and Drought Management Recommendations	0	0	0
7	Description of How the Regional Water Plan is Consistent with Long-term Protection of the State's Water Resources, Agricultural Resources, and Natural Resources	0	0	0
8	Unique stream segments/reservoir sites /legislative recommendations	0	0	0
9	Report to Legislature on Water Infrastructure Funding Recommendation	0	0	0
10	Adoption of Plan <sup>2</sup>	\$ 9,900	\$12,000	\$ 21,900
	<b>Total</b>	<b>\$ 9,900</b>	<b>\$ 364,000</b>	<b>\$ 373,900</b>

<sup>1</sup> Includes regional planning group and public meetings associated with scope of work development.

<sup>2</sup> Includes administration, project management, and development of two newsletters.

**(18) An expense budget for detailed scope of work by expense category**

<b>CATEGORY</b>	<b>TOTAL AMOUNT</b>	<b>SUB- CONTRACTOR</b>	<b>Priority Task 1</b>	<b>Priority Task 2</b>	<b>Priority Task 3</b>	<b>Priority Task 4</b>	<b>Priority Task 5</b>
Salaries and Wages		\$ 109,862	\$23,083	\$19,135	\$28,273	\$26,393	\$12,978
Fringe		\$ 51,536	\$10,828	\$8,976	\$13,263	\$12,382	\$6,087
Travel		\$ 8,630	\$1,813	\$1,503	\$2,222	\$2,073	\$1,019
Other Expenses		\$ 16,850	\$3,540	\$2,935	\$4,336	\$4,049	\$1,990
Overhead		\$ 140,722	\$29,567	\$24,510	\$36,216	\$33,807	\$16,622
Profit		\$ 36,400	\$7,648	\$6,340	\$9,368	\$8,744	\$4,300
Subcontract Services	\$ 364,000		\$76,479	\$63,399	\$93,678	\$87,448	\$42,996
Administration	\$ 9,900						
<b>TOTAL</b>	<b>\$ 373,900</b>	<b>\$ 364,000</b>					

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**(19) A time schedule for completing detailed Scope of Work by task**

Tasks	Months 1 -- 6	Months 7 -- 12	Months 13 -- 18	Months 19 -- 24
Task 1.A				
Task 1.B				
Task 1.C				
Task 1.D				
Task 1.E				
Task 2.A				
Task 2.B				
Task 2.C				
Task 2.D				
Task 3.A				
Task 3.B				
Task 3.C				
Task 4.A				
Task 4.B				
Task 4.C				
Task 5.A				
Task 5.B				
Completion				

**(20) Specific deliverables for each task in Scope of Work**

The results of work of each task will be presented in draft report form (Technical Report in accordance with TWDB planning report guidelines) to the Regional Water Planning Group at regularly scheduled planning group meetings for review. Upon response to the review, appropriate changes and/or corrections will be made, and final report(s) will be submitted to the planning group and the TWDB.

**(21) Method of Monitoring Progress**

The Nueces River Authority will provide administrative functions in support of all activities, including contract administration, subconsultant contract management and oversight, meeting preparation and management, posting of meeting notices, meeting attendance, and public participation activities.

The Primary Subconsultant will provide updates at the RWPG meetings of the work being performed to revise the regional water plan, and will be a part of the monthly requests for reimbursement from TWDB. Draft and final reports will be required of the Primary Subconsultant, and transmitted to TWDB, in accordance with planning contract procedures and requirements.

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**(22) Qualifications and direct experience of proposed staff**

Proposed Project Staff: CBRWPG Members.

Mr. Con Mims, Executive Director, Nueces River Authority

Ms. Rocky Freund, Deputy Executive Director, Nueces River Authority

Primary Subconsultant Project Staff:

Ken Choffel, P.E.,

Kristine Shaw, P.E.,

Larry Land, P.E.,

Mark Graves, P.E., and

Cory Shockley, P.E.

See **Attachment B** for Nueces River Authority staff and Primary Subconsultant qualifications and experience directing and/or conducting in similar planning projects.

**III. Written Assurances**

The proposed planning activities by the Nueces River Authority, on behalf of the Coastal Bend RWPG, do not duplicate existing projects. The Nueces River Authority and Coastal Bend RWPG will diligently pursue any implementation of viable solutions identified through the proposed planning and identify potential sources of funding for the implementation of viable solutions.

**IV. Proof of Notification**

**Published Notice:** Notice that the Nueces River Authority, on behalf of the Coastal Bend RWPG, will file an application with the Texas Water Development Board (TWDB) for funding assistance to revise the Coastal Bend Regional Water Plan has been published in the *Corpus Christi Caller-Times*, a newspaper of general circulation in each of the eleven counties in the Coastal Bend Region. A copy of the notice, showing publication date (August 27, 2006) is included as **Attachment C-1**.

**Mailed Notices:** Notice that the Nueces River Authority, on behalf of the Coastal Bend RWPG, will file an application with the TWDB for funding assistance to revise the Coastal Bend Regional Water Management Plan has been mailed to the mayor of each municipality with a population of over 1,000 or more that are located in whole or in part of the Coastal Bend Region, to the county judge in each of the eleven counties in the Coastal Bend Region, to all districts and authorities created under the Texas Constitution, Article III, 52, or Article XVI, 59 that are located in whole or in part in the Coastal Bend Region, and all other SB-1 regional water planning groups in the state. A copy of the notice and a list of those to whom and when the notice was sent are included as **Attachment C-2**.

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**Attachment A-1:**

**Verifications: Designation of the Nueces River Authority as the Political Subdivision  
Representing the Coastal Bend Regional Water Planning Group**

Minutes of the April 9, 1998 Meeting of the  
Regional Water Planning Group for the  
Senate Bill I Regional Water Planning Program for Region "N"

The first meeting of the Regional Water Planning Group (RWPG) was held in the "TTVN" Classroom at the TAMU Research and Extension Center, 10345 Agnes Street, Corpus Christi, Texas 78406. The meeting was called to order by Dr. David McNichols at 1:37 p.m. Ariel Garcia, the interim Chairman, was not present. Dr. McNichols was asked to take over as interim Chair for this meeting.

Members of the RWPG in attendance were: Dr. McNichols, Mr. Kane, Mr. Bledsoe, Mr. Figueroa, Mr. Kunkel, Mr. Nedbalek, Mr. Yturria, Dr. Hubert, Mr. DeLaune, Ms. Serrato, Mr. Sandoval, Mr. Paulson, Dr. Prouty, Mr. Flores, and Mr. Tolan. Members absent included: Judge Miller, Mayor Cantu and Mr. Garcia.

Others attending the meeting included: Mr. Randy Fugate, Texas Parks and Wildlife Department (TPWD), Mr. Eduardo Garana (City of Corpus Christi), Mr. Hubert Hall (City of Corpus Christi), Mr. Con Mims (Nueces River Authority), Mr. Larry Land (HDR Engineering), Dr. Ron Waters (Freese & Nichols Engineering), Mr. Kyle Spiller (TPWD), Mr. James Dodson (Nueces River Authority), Mr. Smiley Nava (TPWD), Ms. Paulette Shaw (San Patricio County Economic Development Corporation) and Mr. Jim Naismith (San Patricio Municipal Water District).

Minutes from the March 27, 1998 meeting of the Initial Coordinating Body for Region "N" were reviewed. Mr. Yturria moved that the minutes be approved as written and Mr. Kunkel seconded; there was a unanimous voice vote approving the motion.

Dr. McNichols asked each person to introduce himself or herself and all present did so.

Mr. Kane addressed discussion of the bylaws. He moved to adopt the "model" bylaws provided by the Texas Water Development Board (TWDB) as interim bylaws, to be modified at a later time, and to amend the word "model" with a name applying to Region "N", it was seconded; there was a unanimous voice vote approving the motion.

**Election of officers:**

There was a discussion regarding the election of Co-chairs and amending the bylaws to change the Chair and Vice Chair position to two Co-chairs. There was a motion by Mr. Yturria to make this amendment to the bylaws and it was seconded; there was a unanimous voice vote approving the motion. Mr. Paulson made a motion to elect Judge Josephine Miller and Mr. Jerry Kane as Co-chairs of the RWPG and it was seconded; there was a unanimous voice vote approving the motion. Mr. Paulson also made a motion to elect Dr. Patrick Hubert as the secretary for the RWPG and Ms. Serrato seconded it; the motion was passed by a unanimous voice vote. A motion was made and seconded to appoint Mr. Bernard Paulson and Mr. Scott Bledsoe, III as members of the executive committee. Both were voted in unanimously.



Mr. James Dodson discussed the bylaws and designating alternate representation whenever a member plans to be absent from a meeting. A written notice must be sent to the Co-chairs at least 48 hours prior to a meeting designating the alternate who will be attending the meeting. The alternates should represent the same interest group as that of the absent member, and cannot perform the duties of the officers. A member cannot designate more than two different alternates over the period of one year. The alternate has to come from outside of the RWPG — a simple written proxy is not allowed.

The Nueces River Authority (NRA) was recommended to be the designated political subdivision to represent the RWPG and apply for state financial assistance for scope of work and Regional Water Plan (RWP) development, hold contracts with other entities on behalf of the RWPG and perform the administrative functions of the group. A motion was made to that effect by Mr. Paulson and Ms. Serrato seconded it. There was no discussion. The motion was passed by a unanimous voice vote. Mr. Con Mims, the Executive Director of the NRA, thanked the RWPG for designating the NRA.

Mr. Dodson discussed how the RWPG might determine the methodology for preparing a scope of work and a Request for Qualifications (RFQ) for the selection of firms to provide professional services. He stressed the importance of the RWPG having a consensus on the methodologies that they would like to use to pursue the task of doing the planning work. He also pointed out that there is a defined process to select qualified consultants that will be providing professional services for the RWPG. Mr. Dodson requested that the RWPG give the NRA some general direction on how they would like to function and work, as far as how much involvement the RWPG wishes to have in the process and whether there will be subcommittees involved in the process. Dr. McNichols responded by suggesting that at the next meeting the RWPG could have a "visioning process", allowing everyone to discuss what their position and their thoughts are on what the RWPG should be aiming towards.

Mr. Paulson suggested that all members should have a copy of the Trans-Texas Water Program report for the South-Central Study area. Mr. Bledsoe agreed, but noted that the RWPG should go beyond that study because of other users now involved in the planning program. Dr. McNichols pointed out two reasons as to why the RWPG should go beyond the Trans-Texas Water Study: (1) many members of the community believe that the study should be more inclusive and should go broader, and (2) some regional water development activities have already gone beyond Trans-Texas Water Study as a working document, such as desalination and the Tampa Bay Project. Mr. Bledsoe also commented on desalination and how people are not up to date on this subject, so the Trans-Texas Water Plan is a good place to start. This plan is out of date but it does contain good information to get people up to speed.

Minutes of the Regional Water Planning Group meeting on April 9, 1998.

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Mr. Robert Flores provided copies of the most current state water plan, Water for Texas, to each member of the RWPG, referring to page 3-71 as a brief synopsis of the Coastal Bend Region. He emphasized that the scope of work is a foundation for the planning process because you need a detailed outline to get a good work product. Mr. Flores pointed out that the Texas Water Development Board (TWDB) will fund the initial scope of work up to \$20,000 and would like to avoid any duplication of effort.

Ms. Serrato suggested that a discussion take place on the current operating order for freshwater inflows to the Nueces Estuary and how it evolved, because there is a misconception of how it exactly works. Mr. Dodson offered to prepare a presentation on the freshwater inflow operating plan and other regional water planning studies and issues at the next meeting. Dr. Prouty also suggested that the gaps be addressed on all water issues. Dr. McNichols stressed the importance of explaining the reservoir-operating plan because there are still people out there working against the process. Mr. Kane also suggested that the group discuss conservation and new water resources. He requested that an additional presentation be given by Mr. Robert Flores from the TWDB perspective, such as political and physical realities, and how far we can go, addressing what the plan is for the year 2001 and even getting to the year 2050. Mr. Kane also gave his personal opinion on subcommittees and would prefer that the RWPG make decisions as a whole instead of in subcommittees.

Mr. Yturria commented on how he would like the presentation to first address where the committee is now and this will help to determine how to obtain the goals of the future. Mr. Dodson responded that he would address these issues, including where the previous planning committees left off and what has changed since those studies were concluded.

Dr. Hubert commented on his concerns regarding the economics of water supply for ranchers and small businesses in rural areas. Mr. Dodson stated that NRA and TWDB had co-sponsored a study on water supply for Duval County and that he can present that information. Mr. Yturria asked if the report, Water for Texas, covered a lot of the issues that the RWPG must address? Mr. Dodson said that the report covers the issues but not thoroughly for this new planning area.

Mr. Flores brought up the question as to TNRCC representation on the RWPG and if anyone is working closely with someone from TNRCC. Mr. Kane remarked that a TNRCC representative should be present every step of the way. Dr. McNichols felt that the TNRCC should probably send a local representative, someone like Mr. Buddy Stanley, Manager for Region 14.

Minutes of the Regional Water Planning Group meeting on April 9, 1998.

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Dr. McNichols asked Mr. Dodson if there is anymore consideration for authorization of preparation and dissemination of a RFQ of consultants. Mr. Dodson responded that if the RWPG would direct the NRA to do so, he would prepare a draft RFQ for consideration at the next meeting. Dr. McNichols moved that the NRA staff prepare a draft RFQ for the next meeting and Dr. Prouty seconded it. There was a unanimous voice vote passing the motion.

Mr. Robert Flores of the TWDB passed out a four-page information piece titled *Notice and Meeting Requirements* to all members of the RWPG. He emphasized that notices have to be sent to all RWPG and subgroups by 72 hours plus the various areas it must be sent to for posting. He noted that a proposal has been made to amend the TWDB rules so as to avoid having to publish the meeting notices in the *Texas Register*. Another key change is to send notice to all other RWPGs when applying for state assistance for 75% funding of regional water plan development costs.

Mr. Flores indicated that TWDB is planning to sponsor a statewide meeting on the SB 1 Regional Water Planning Program in the either 2<sup>nd</sup> or 3<sup>rd</sup> week of May in Austin. Mr. Flores also noted that TWDB was looking at the liability issues associated with membership on the RWPG and would have more information on that subject for the members at a later date.

Dr. McNichols initiated discussion on the local cost sharing of the 25% of the overall cost of the Regional Water Planning Program. Mr. Dodson laid out several concepts that the RWPG might consider in terms of methods of allocating the local cost share, including having the City of Corpus Christi fund most of the cash portion of the 25% local match requirement, then "pass-through" those costs to other regional entities who are part of the Choke Canyon/Lake Corpus Christi water supply system in the raw water rates that are charged by the City of Corpus Christi to all water users. Another approach would be to simply allocate the local cost share on a per capita basis by counties.

Mr. Dodson noted that TWDB rules would prohibit the use of state funding to pay administrative costs associated with the regional water planning program, and that NRA's administrative expenses would likely have to come from the local cost share.

Mr. Kane asked for a "ballpark" figure on how much the planning program would cost. Mr. Dodson responded that he thought TWDB has been appropriated enough monies to provide about \$450,000 per region, and that the 25% local share might then be another \$150,000.

Minutes of the Regional Water Planning Group meeting on April 9, 1998.

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Discussion ensued regarding the need to come up with a local cost share allocation method and the need to visit with county judges as soon as some dollar figures might be available. Ms. Serrato asked whether the RWPG should make a decision at that meeting. Mr. Bledsoe indicated he felt that some direction should be provided. It was moved by Mr. Kane and seconded by Ms. Serrato to direct the NRA staff to draft and submit an application to TWDB on behalf of the RWPG for state financial assistance for the scope of work development. The motion was approved by a unanimous voice vote.

There was then discussion regarding items for the agenda for the next RWPG meeting. It was decided that the next meeting would be a Public Meeting for the purposes of gathering input on issues and items that should be included in the regional water planning program. At that meeting, agenda items are to include: (1) Presentation on Water Supply Planning in Region, (2) Discussion on goals and objectives for the regional water plan/process, (3) Approve RFQ dissemination, and (4) accept public comment on scope of work and regional water planning program.

The RWPG then considered the date of the next meeting and decided to set a regular meeting date. It was moved and seconded that the RWPG would meet regularly at 1:30 p.m. on the 2<sup>nd</sup> Thursday of the month at the Texas A&M University Research and Extension Center (10345 Agnes Street, Corpus Christi, Texas 78406). The motion was approved by a unanimous voice vote.

It was moved and seconded that the area now designated by TWDB as "Region "N"" be renamed to be designated the "Coastal Bend" area. Thus the official name of the RWPG would be the "Coastal Bend Regional Water Planning Group." The motion carried by a unanimous voice vote.

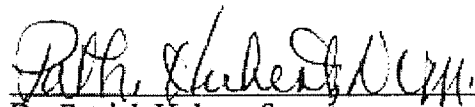
Dr. McNichols called for any public comment. There was none.


The meeting adjourned at 3:05 p.m.

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Minutes prepared by Ms. Melida (Meli) Sugarek and Mr. James Dodson.

Minutes submitted by:

  
Dr. Patrick Hubert, Secretary  
Coastal Bend RWPG

  
Date

## AGREEMENT

This agreement is entered into by and between Coastal Bend Regional Water Planning Group (Coastal Bend RWPG) and Nueces River Authority (NRA) effective as of the 9th day of April, 1998:

WHEREAS, Coastal Bend RWPG is the regional water planning group established for Region N, State of Texas by the Texas Water Development Board (TWDB) pursuant to Senate Bill No. 1, 75th Legislature-Regular Session; and

WHEREAS, NRA is a conservation and reclamation district and political subdivision of the State of Texas created and existing under the laws of the State, including particularly Article XVI, Section 59 of the State Constitution and TEX. WATER CODE AUX. LAWS art. 8280-115 (Act of November 1, 1935, 44th Leg., 1st C.S., ch. 427, 1935 Gen. Laws 1660) as amended; and

WHEREAS, at a regular meeting of Coastal Bend RWPG on April 9, 1998, NRA was selected as the designated political subdivision to represent Coastal Bend RWPG and apply for state financial assistance for regional water planning, hold contracts with other entities on behalf of Coastal Bend RWPG and perform the administrative functions of the Coastal Bend RWPG; and

WHEREAS, Coastal Bend RWPG and NRA desire to agree upon the duties and responsibilities of the parties in carrying out water planning for Region N pursuant to the said Senate Bill No. 1;

NOW, THEREFORE, Coastal Bend RWPG and NRA agree as follows:

- 1. Regional Water Planning.** Coastal Bend RWPG is the group established pursuant to Senate Bill No. 1 to submit a regional water plan for Region N, State of Texas, to TWDB.
- 2. Representative; Effective Date.** NRA is the political subdivision of the State of Texas designated by Coastal Bend RWPG to represent Coastal Bend RWPG to apply to, and contract with, the TWDB for funds for regional water planning pursuant to Senate Bill No. 1. This Agreement is effective as of April 9, 1998, the date Coastal Bend RWPG designated NRA as its representative. All actions taken by the parties hereto in furtherance of the regional water planning program for the Coastal Bend Region from and after April 9, 1998, are hereby ratified and approved. This Agreement will continue in effect until and unless terminated by either party upon 90 days written notice to the other party. If this agreement is terminated by either party, NRA will transfer all funds and records maintained on behalf of the Coastal Bend RWPG to another political subdivision designated by the Coastal Bend RWPG.
- 3. Contracts and Administration.** NRA will negotiate and enter into contracts with other entities on behalf of Coastal Bend RWPG, and perform the administrative functions of the Coastal Bend RWPG, including, but not limited to, entering into and administering the performance of the contract between TWDB and NRA for regional water supply planning for the Coastal Bend Region

(Contract), a copy of which is attached hereto. In administering the performance of the Contract, NRA will enter into those agreements or contracts necessary to perform the Contract, subject to any guidelines established by Coastal Bend RWPG or TWDB.

**4. Administration.** In connection with its representation of Coastal Bend RWPG and its administration of the Contract, NRA will provide the following services:

A. Maintain an office in Corpus Christi, Texas;

B. Provide employees of NRA to staff the office of NRA in Corpus Christi, Texas;

C. Maintain in the Corpus Christi office all of the records of Coastal Bend RWPG; and provide support for meetings of Coastal Bend RWPG including issuing notices of same in compliance with the Texas Open Meetings Act and any applicable rules of the TWDB;

D. Receive and pay out, and maintain records with respect to, all funds received or paid, and all in-kind contributions, in connection with regional water planning pursuant to Senate Bill No. 1 consistent with generally accepted accounting principles; and maintain all of said records for a minimum of seven (7) years;

E. Act as the administrative representative for Coastal Bend RWPG, and in that capacity NRA, through its Executive Director, is authorized to take all necessary actions to carry out the day to day activities of Coastal Bend RWPG, subject to any guidelines established by Coastal Bend RWPG or TWDB, including negotiation and execution of contracts and other official documents on behalf of Coastal Bend RWPG..

**5. Compensation.** It is anticipated that an application filed by NRA with TWDB will result in execution of the Contract, and that following execution of the Contract NRA will receive funds from TWDB for regional water planning for Region N on behalf of Coastal Bend RWPG. Prior to receipt of such funds, however, NRA has expended and will continue to expend funds for rent, salaries and other expenses to establish its Coastal Bend Division in Corpus Christi, Texas. Prior to the CONTRACT INITIATION DATE as defined and set forth in the Contract as May 21, 1998, funds expended by NRA for initiation of the regional water planning process pursuant to Senate Bill No. 1 will be recorded as in-kind services provided by NRA in accordance with Senate Bill No. 1 or the Contract, and documentation of same will be provided to TWDB in accordance with the Contract. Beginning on the CONTRACT INITIATION DATE, NRA will be compensated for its services pursuant to this agreement as set forth in the Contract and any amendments to it or any subsequent contracts between NRA and TWDB or between NRA and other parties in furtherance of the Contract and this agreement. Should it be necessary for NRA to provide funds on an interim basis after the CONTRACT INITIATION DATE because of the timing of payments by TWDB to NRA pursuant to the Contract, NRA will be reimbursed for such funds out of payments by TWDB to NRA when such payments are received by NRA, or any other funds paid as local share contributions or from other funds paid to Coastal Bend RWPG or NRA for regional water planning for the Coastal Bend RWPG.

6. **Additional Services.** Coastal Bend RWPG and NRA by action of their respective governing bodies may agree upon the performance of additional services by NRA for Coastal Bend RWPG with respect to regional water planning without the necessity of amendment of this agreement.

7. **Arbitration.** Any dispute arising under this agreement will be decided by binding arbitration by the American Arbitration Association pursuant to the commercial arbitration rules of the American Arbitration Association. Before any arbitration can be commenced, however, the parties will use the mediation or other alternate dispute resolution procedure to attempt to resolve any dispute.

8. **Texas Law to Apply.** This agreement shall be construed under and in accordance with the laws of the State of Texas.

9. **Parties Bound.** This agreement shall be binding on and inure to the benefit of the parties to it and their respective successors, and assigns.

10. **Legal Construction.** In the event any one or more of the provisions contained in this agreement shall for any reason be held to be invalid, illegal, or unenforceable in any respect, such invalidity, illegality, or unenforceability shall not affect any other provisions, and this agreement shall be construed as if such invalid, illegal, or unenforceable provision had never been contained in it.

11. **Time of Essence.** Time is of the essence with respect to each date or time specified in this agreement by which an event is to occur.

12. **Rights and Remedies Cumulative.** The rights and remedies provided by this agreement are cumulative, and the use of any one right or remedy by either party shall not preclude or waive its right to use any or all other remedies. Said rights and remedies are given in addition to any other rights the parties may have by law, statute, ordinance or otherwise.


13. **Captions.** All captions in this agreement are for reference and convenience only and shall not modify or affect the provisions of this agreement in any manner.

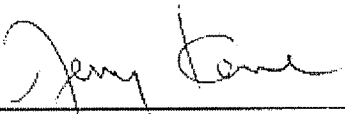
14 **Successors.** This agreement is binding on the successors or assigns of the parties hereto.

15. **Entire Agreement.** This agreement, including any exhibits, constitutes the parties' final and mutual agreement. There are no written or oral representations or understandings that are not fully expressed in this agreement. No change, waiver or discharge is valid unless in writing that is signed by the party against whom it is sought to be enforced.


IN TESTIMONY WHEREOF, this agreement is executed in duplicate originals, either of which shall be deemed to be an original, at Corpus Christi, Texas, this 30th day of July, 1998, effective as of April 9, 1998.

COASTAL BEND REGIONAL WATER PLANNING GROUP

By:   
Judge Josephine Miller, Co-Chair

By:   
Mr. Jerry Kane, Co-Chair

NUECES RIVER AUTHORITY

By:   
Mr. Ariel Garcia, President



**Application for a Regional Water Planning Grant for the Revision  
Of the Coastal Bend Regional Water Plan**

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**Attachment A-2:**

**Verifications: Authorization to Submit the Regional Water Planning Grant Application**

# Affidavit

## Verifying that the Coastal Bend Regional Water Planning Group, At a Meeting on August 16, 2006, Took Action to Approve and Authorize the Nueces River Authority To Submit to the Texas Water Development Board An Application for a Regional Water Planning Grant To Revise the Adopted Coastal Bend Regional Water Plan

I do hereby verify that on August 16, 2006, the Coastal Bend Regional Water Planning Group held a duly posted public and regional water planning group meeting, attended by a quorum of the voting members, and took action to approve and authorize the Nueces River Authority to submit to the Texas Water Development Board an application for state funding for planning activities to revise the Adopted Regional Water Plan for the Coastal Bend Regional Water Planning Area (Region "N").

By:

 Patrick Hubert, D.V.M. 8-30-06

Dr. Patrick Hubert

Date

Secretary

Coastal Bend RWPG

**Application for a Regional Water Planning Grant for the Revision  
Of the Coastal Bend Regional Water Plan**

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**Attachment B:**

**Experience in Directing Similar Projects and NRA and  
Primary Subconsultant Staff Qualifications**

**Application for a Regional Water Planning Grant for the Revision  
Of the Coastal Bend Regional Water Plan**

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**Regional Water Planning Programs Administered by the Nueces River Authority:**

- 2006 “Senate Bill 1 Regional Water Plan for the Coastal Bend Region (Region “N”).”  
(HDR, Engineering, Inc.)
- 2002 “Inter-Regional Coordination for the Development of Consensus on Water  
Management Strategies for South Texas.” (HDR Engineering, Inc.)
- 2001 “Senate Bill 1 Regional Water Plan for the Coastal Bend Region (Region “N”).”  
(HDR, Engineering, Inc.)
- 1996 “Regional Water Supply Planning Study - Duval and Jim Wells Counties, Texas.”  
(Naismith Engineering, Inc. with Coym & Rehmet Engineering Co., Inc.)
- 1993 “Nueces Basin Water Supply Study, Phase II, Conditional Probability Modeling.”  
(Michael Sullivan and Associates, Inc.)
- 1991 “Regional Water Supply Planning Study, Phase III, Recharge Enhancement,  
Nueces River Basin.” (HDR Engineering, Inc.)
- 1991 “Regional Water Supply Planning Study, Phase I, Nueces River Basin.” (HDR  
Engineering, Inc.)
- 1982 “Report on Availability of Additional Surface Water Supply from the Nueces  
River between Uvalde and Three Rivers.” (Freese and Nichols Engineering)

**Nueces River Authority**

Con Mims, Executive Director  
Rocky A. Freund, Deputy Executive Director

**Staff Qualifications:** (See following pages)

**Application for a Regional Water Planning Grant for the Revision  
Of the Coastal Bend Regional Water Plan**

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**CON MIMS**

**Current Position:**

Executive Director, Nueces River Authority  
March 1976 to present

**Former Member of:**

South Texas Watermaster Advisory Committee  
Corpus Christi Bay National Estuary Program  
Corpus Christi Mayor's Task Force on Water Issues  
San Antonio Joint Committee on Water Resources  
Policy Management Committee of the South Central Trans-Texas Water Program

**Current Member of:**

Nueces Estuary Advisory Council  
South Central Texas Regional Water Planning Group-Region L; Chair  
Region L Liaison to Plateau Regional Water Planning Group-Region J  
Region L Liaison to Coastal Bend Regional Water Planning Group-Region N

**Education:**

B.S. in Animal Science, Texas A&M University, 1966

**Current Address:**

Nueces River Authority  
200 East Nopal, Suite 206  
P. O. Box 349  
Uvalde, Texas 78802-0349

**Phone Numbers:**

Office: 830-278-6810  
Fax: 830-278-2025  
Home: 830-278-8183

**Email:**

[cmims@nueces-ra.org](mailto:cmims@nueces-ra.org)

**Application for a Regional Water Planning Grant for the Revision  
Of the Coastal Bend Regional Water Plan**

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**ROCKY A. FREUND**

**Current Position:**

Deputy Executive Director, Nueces River Authority,  
2005 to present

**Recent Professional Experience:**

Clean River Program Project Manager  
2003 to present

**Regional Water Planning Experience:**

Facilitator for the Coastal Bend Regional (Region N) Water Planning Group  
2002 to present

**Current Member of:**

Nueces Estuary Advisory Council  
Coastal Bend Bays and Estuaries Bays Council

**Education:**

B.S. Geology, University of Texas at Austin, 1981  
M.S. Computer Science, Corpus Christi State University, 1991

**Current Address:**

Nueces River Authority, Coastal Bend Division  
6300 Ocean Drive, Unit 5865  
Corpus Christi, Texas 78412-5865

**Phone Numbers:**

Office: 361-825-3193  
Fax: 361-825-3195  
Home: 361-937-0724  
Cell: 361-946-7827

**Email:**

[rfreund@nueces-ra.org](mailto:rfreund@nueces-ra.org)



## Kenneth L. Choffel

Project Principal

### Education

Bachelor of Science, Civil Engineering, University of Texas Austin, 1974

### Professional Registrations

Professional Engineer, Texas, No. 45686, 1979.

### Professional Affiliations

American Society of Civil Engineers (ASCE), Member

### HDR Tenure

28 Years

### Industry Tenure

32 Years

### Professional Experience

Ken Choffel, P.E. holds a Bachelors degree in Civil Engineering from the University of Texas. Twenty-eight of his 31 years of experience have been with HDR Engineering, working with Texas entities with complex surface and groundwater systems. His major clients have included San Antonio Water Systems, Dallas Water Utilities, the City of Corpus Christi, the Edwards Aquifer Authority, the Brazos River Authority, and the City of Abilene. He has served as Project Manager on more than 75 water resources projects throughout Texas, including the design of the first municipal, inland reverse osmosis water treatment plant in the State. He has successfully directed more than 25 water rights permit applications, many of which have included interbasin-transfer and systems operations issues. Mr. Choffel has extensive experience in presenting complicated water resource issues in public forums, and has co-authored and presented numerous technical papers throughout his career. He has testified before Federal and State legislative committees regarding water resources and water rights issues.

### HDR Project Experience

**Coastal Bend Regional Water Planning Group and Nueces River Authority, Texas.** Project Principal. Assisted in development of 2001 and 2006 Coastal Bend Regional Water Plans.

**City of Corpus Christi, Texas.** Project manager. Developed an interactive computer model of the Lower Nueces River Basin and Estuary (NUBEST), including the Choke Canyon Reservoir/Lake Corpus Christi System. Based on user-specified drought management trigger storages, target reservoir level, required monthly estuarine inflows, and return flows, the model calculates system firm yield, long-term system storage frequency, and monthly estuarine inflow statistics.

**City of Corpus Christi, Mary Rhodes (Lake Texana to Corpus Christi) Pipeline, Port of Corpus Christi Authority, Lake Texana To Corpus Line, Corpus Christi, TX.** Civil Engineer, Project Manager, Quality Reviewer.

**South Texas Water Authority.** Project manager. Modified the Lower Nueces River Basin and Estuary computer model previously developed for the City of Corpus Christi to incorporate operating rules and Nueces Bay inflow requirements proposed by the Texas Water Commission. Applied modified computer model (NUBAY) to evaluate the potential effects of municipal and industrial effluent and/or river diversion into the Nueces Delta area on the firm yield of the Choke Canyon Reservoir/Lake Corpus Christi System.

**Additional Reservoir Yield Studies.** Performed yield studies of the following existing or proposed reservoirs: Choke Canyon Reservoir, Lake Corpus Christi, Lake Bivins, Lake Bridgeport, Lake Weatherford, Lake Georgetown, Lake Granger, Lake Stillhouse Hollow, Bullinger Creek Reservoir, Lake Belton, Kickapoo Reservoir, Lake Granbury, Lake Mineral Wells, Santo Reservoir, Brenham Reservoir, Mill Creek Reservoir, South Fork Reservoir, Lake Proctor, Lake Palo Pinto, Leon River Reservoir, Dimple Reservoir, Meridian Reservoir, Turkey Peak Reservoir, Gatesville Reservoir, Cowhouse Creek Reservoir, Onion Creek Reservoir, Keechi Reservoir, Ioni Reservoir, Lakes Graham-Eddleman, and Sanchez Reservoir. Over 80 SCS Reservoirs and Numerous Off-Channel Reservoirs

**Bowie Water Supply District, Bowie, Texas.** Project manager. Prepared alternatives study, permit applications, design drawings, and environmental assessment for a 13,000 acre-foot reservoir project. Performed the hydrologic and hydraulic analysis for the 85-foot high embankment, spillways, and highway relocation.

**Brazos River Authority, Texas.** Project engineer. Performed system reservoir operation studies of Lakes Georgetown, Stillhouse Hollow, and Granger to determine the most economical pumping scheme from one reservoir to another. Results of studies showed how temporary over-drafting of reservoir nearest the water plant could significantly reduce both pipeline size and annual pumping costs.

**Cities of Clifton and Meridian, Texas.** Project manager. Prepared engineering report which determined the most economical type intake structure to be constructed in Lake Bosque.

**City of Commerce, Texas.** Project manager. Prepared long-range projections of future water requirements and determined that the City had water in excess of its needs. Assisted the City in negotiations for the temporary sale of their excess water.

**City of Marlin, Texas.** Project manager and hydrologist. Prepared yield and water quality studies of water supply alternatives which included two existing and two proposed reservoirs. Prepared preliminary plans and permit application for selected project which involved increasing the conservation storage in New Marlin City Lake and operating the old upstream reservoir as a sedimentation reservoir. Provided expert testimony before the Texas Water Commission.

**City of San Marcos, Texas.** Project manager. Prepared report to evaluate various water supply alternatives available to meet the future water needs of a rapidly growing city presently relying on one ground water supply source.

**Edwards Underground Water District, San Antonio, Texas.** Project manager.. Developed a customized computer model of the Nueces River Basin capable of accurately reproducing streamflows at 25 streamgage locations as well as historic recharge to the Edwards Aquifer, the sole source of drinking water for the City of San Antonio. The model will be used to predict the additional recharge potential of up to 19 recharge dams. The effects of this additional recharge on the yield of a downstream reservoir system which supplies water to the Corpus Christi area was also determined with the model. As a result of the success of the Nueces River Basin modeling work, new models of the San Antonio and Guadalupe River Basins are being developed.

**LaSalle County, Texas.** Project manager and hydrologist. Performed yield and water availability analysis for several proposed irrigation water supply reservoirs including the transfer of diversion rights from an existing reservoir. Evaluated the impact of conjunctive use of surface water and groundwater on yield and water quality. Numerous alternatives were identified and presented in a feasibility report.

**Shell Mining Venture.** Project engineer. Comprehensive hydrology studies near Rockdale, Texas. Established a network of stream gages, water quality sampling sites and rain gages to provide baseline hydrologic data for a proposed lignite mine. Work consisted of a site selection, equipment design and installation, water quality sampling, and stream flow measurements.

**Various Cities and River Authorities.** Program manager. Prepared water supply alternative studies under the Trans-Texas water program for two large areas within the state. The south-central study area included the analysis of 16 alternatives for a 12-county area near Corpus Christi, Texas. The west-central study area included the analysis of 37 alternatives for a 33-county area near San Antonio, Texas.



## Kristine S. Shaw

Project Manager

### Education

Master of Science, Civil Engineering, University of Texas Austin, 2001

Bachelor of Science, Bioenvironmental Science, Texas A & M University System, 1996

### Professional Registrations

Professional Engineer, Texas, No. 93962, 2004

### Professional Affiliations

National Ground Water Association, Member

Water Environment Federation, Member

### HDR Tenure

4 Years

### Industry Tenure

10 Years

### Professional Experience

Ms. Shaw's background is in water resources management with technical expertise in regional water planning, ground water protection and modeling, water supply evaluations with multiple water sources, and ground water and surface water interaction.

### *HDR Project Experience*

#### **Coastal Bend Regional Water Planning (Region N)- 2006 Regional Water Plan.**

Project Manager. Evaluated Texas Water Development Board (TWDB) water demand and supply projections for the Coastal Bend Region for the 2000-2060 planning cycle, developed water management strategies to meet projected regional water shortages, managed project budgets and deliverables, presented interim results on bi-monthly basis to diverse interests represented in the Regional Water Planning Group, coordinated and provided technical support to resource agencies, and prepared and submitted the 2006 Regional Water Plan for inclusion in the 2007 State Water Plan.

#### **South Central Texas Regional Water Planning (Region L)- Brush Management and Weather Modification Strategies for Water Supply.**

Project Engineer. Applied pilot recharge models of the Nueces and Blanco Recharge Basins using Hydrologic Simulation Program- Fortran (HSPF) to quantify Edwards Aquifer recharge enhancement associated with brush management and weather modification. Updated model to extend model simulation period (1934-1998) to include the historical drought of record and incorporate upstream watershed areas in the Blanco and Nueces Basins. Calibrated model and adjusted model parameters, such as interception, lower evapotranspiration, and precipitation to simulate brush management and weather modification. Model results were then used to quantify increases in streamflow and recharge to the Edwards Aquifer that could be achieved by implementing brush management and weather modification projects in the study area.

**Brazos River Authority, Brazos G 2006 Water Plan.** Project Engineer. Water Conservation as Water Management Strategy for 2006 Regional Water Plan. For the 2006 Plans, the Texas Water Development Board required each region to consider water conservation programs to reduce future water demand and meet needs. Ms. Shaw evaluated regional/local water usage and identified municipal and irrigation water conservation techniques that would be considered most effective in the area, quantified expected savings, and recommended focused and measurable water conservation targets for municipal and irrigation entities.

#### **Texas Water Development Board- North Trinity Groundwater Availability Model.**

Task Manager. Conducted surface water and groundwater interaction studies to develop MODFLOW reservoir and stream packages. Project responsibilities included compiling storage data of reservoirs and calculating the corresponding water level elevation based on elevation-area-capacity curves, compiling gain and loss studies, and performing base flow analyses.

**Johnson County Special Utility District Water Supply Study.** Project Manager. HDR was contracted by JCSUD to evaluate potential water supplies in the Trinity River Basin to

meet increasing demands and need for suitable water quality. The study includes evaluating up to five treated and raw water supplies in the Trinity Basin and considers costs associated with purchasing water, water treatment (if needed), and transmission facility costs to connect to JCSUD's existing system.

**Bureau of Reclamation, Assessment of Western Navajo and Hopi Tribes Water Supply Needs Distribution Analysis Alternatives and Impacts, AZ, NV.** Project Engineer. Conducted groundwater model analyses as part of a comprehensive water development study to establish the most cost-effective set of projects to supply high quality municipal and irrigation water to the major Navajo and Hopi Indian Reservations, while minimizing negative impacts. Developed MODFLOW simulations for multiple pumping and water demand patterns based on population trends for transient- 100 year simulation and evaluated impacts of pumping scenarios on groundwater level drawdown and spring flow in the reservation area. Recommended optimal pumping scenario for springflow sustainability and water supply.

**Idaho Surface Water Coalition Hydrological Evaluation.** Project Engineer. HDR was contracted by the A&B Irrigation District to provide a hydrological evaluation of the Eastern Snake River Plain Aquifer. Ms. Shaw conducted a thorough review of a complex, recharge calculation tool and Eastern Snake Plain Aquifer Groundwater Model developed on behalf of Idaho resource agencies; developed long-term simulations to estimate impacts of continuing current water use and supply practices on Snake River reaches and groundwater levels; and prepared attorney-work-product.

**NJ Morris County Groundwater Model.** Task Manager. Developed multi-layered, steady state groundwater model of complex, aquifer system in Morris County based on rigorous review of existing models and hydrologic conditions.

**San Antonio Water System- Potential Use of Quarries for Supplemental Recharge to Edwards.** Task Manager. Evaluated use of quarry for additional water supply and ecosystem benefits, developed strategy for anticipating droughts and simulating quarry in Edwards Aquifer groundwater model, recommended project improvements that resulted in more effective strategy for protecting springflow while providing maximum water supply benefit, and performed multiple model runs to optimize quarry location, size and pumping pattern. Managed project tasks and budgets and scheduling, presented interim progress reports to client, and prepared technical report.

**San Antonio Water System- Critical Period Management Evaluation.** Project Engineer. Employed GWSIM4 Edwards Aquifer Model to run simulations with new pumping caps, CPM trigger levels, and use of Aquifer Storage Recharge (ASR) to provide a technical assessment of benefits and impacts to index well levels and springflow. Also, developed input files for the model, executed multiple simulations, responded to client requests for additional model simulations, and prepared and presented results of the assessment(s).

**San Antonio Water System- Water Supply Management Model.** Project Engineer. Revised initial water levels of each grid cell in the GWSIM4 Edwards Aquifer Model based on a relationship to index wells and designated springs using regression equations, developed municipal pumpage cutbacks according to usage patterns and precipitation trends, and performed quality control of multi-sourced, user friendly model to ensure accuracy of model output.



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#### Education

Master of Science, Agricultural Engineering, Colorado State University, 1967

Bachelor of Science, Agricultural Engineering, Texas Tech University, 1965

#### Professional Registrations

Professional Engineer, Texas, No. 31380, 1971

#### Professional Affiliations

American Water Resources Association, Member

American Water Works Association, Member

National Ground Water Association, Member

National Society of Professional Engineers (NSPE), Texas (NSPE), Member

#### HDR Tenure

8 Years

#### Industry Tenure

39 Years

## Larry F. Land

Senior Project Manager

### Professional Experience

Mr. Land has over 37 years experience as a water resources engineer. His career includes over 30 years of experience with the U.S. Geological Survey-Water Resource Division. He has worked in the fields of ground water, surface water, and water quality. Mr. Land's greatest interests are solving water supply problems and issues and bringing all the disciplines of hydrology together for a comprehensive, technical assessment. His activities with HDR have been in water-resource planning, development, monitoring, well design, well field evaluation, and conjunctive use of surface water and ground water.

### HDR Project Experience

**Determination of Brackish Groundwater Supplies in the vicinity of Corpus Christi.** Project Manager. One of the alternative water supplies for the City of Corpus Christi is desalination of local surface water (Gulf of Mexico) and groundwater (Gulf Coast Aquifer). To assess the feasibility of developing brackish groundwater, Mr. Land developed a groundwater model of the major water bearing zone of the Gulf Coast Aquifer in Nueces County. He tested three potential well field locations and several different well spacing by calculating drawdowns. He also prepared salinity maps of groundwater in the Goliad Sand to aid in the design of the desalinization facility.

**Determination of Groundwater Availability in the Coastal Bend Water Planning Region.** Project Manager. Groundwater availability is one of the critical issues in the development of a water plan for the Coast Bend Region in South Texas. HDR, teamed with scientists at the Texas A&M University Corpus Christi, developed a regional groundwater model for the Coastal Bend Water Planning Region. Mr. Land was a technical advisor in the development of the USGS MODFLOW model and lead with the Regional Planning Group in the determination of groundwater availability that is consistent with their willingness to accept a given level of aquifer changes. The model is nearly 200 miles long and 100 miles wide and includes 5 layers. Data from a Geographical Information System is an important component in the development and testing of the model. A calibrated model has been tested for a range of water development and management criteria and has been used to estimate the sustained yield of the aquifer system.

**Determination of Groundwater Availability in the Regional Planning Areas.** Project Engineer. Groundwater availability is one of the critical building blocks in the development of water resources and regional water management plans for the SB-1 process. For the Brazos G, South Central Texas, Coastal Bend, and the Llano Estacado water planning regions, Mr. Land has taken the lead in reviewing previous estimates of fresh and saline groundwater availability, revising estimates with better methods, and calculating the groundwater availability for many options that were considered. Many of the options were evaluated with a groundwater modeling analysis.

**Review of Groundwater Model for Platte West Well Field (2004-current).** Senior Engineer. The Metropolitan Utilities District (MUD) is in the process of expanding the



water supplies for Greater Omaha, Nebraska by installing a well field in the Platte River Valley west of Omaha. To plan and permit the water supply facility with 42 wells producing 90 million gallons per day, a groundwater model (MODFLOW) has been designed and developed by Chatman and Associates, Inc who are under contract with HDR. The model area covers about 650 square miles and has cell dimensions of 100 ft in the vicinity of Platte West Well Field. The model represents, major streams, well pumpage, evapotranspiration, recharge from precipitation and irrigation return flows, and areas outside the model boundary. Mr. Land provided an extensive technical review the models design, calibration, and applications for the district. His comments lead to refining the estimates of recharge and pumpage by irrigation wells, improving the calibration by considering base flow in streams, and clarifying the presentation of effects of Platte West pumping on the surrounding area.

**Assessment and Management of Water Supplies in the Republican River Basin.** Project Engineer. The Republican River starts in Colorado, flows into Kansas, then Nebraska, and finally back into Kansas. To allocate the surface water supplies in the late 1930s and early 1940s, the three state formed the Republican River Compact. Since, several reservoirs were constructed to develop the surface water supplies for irrigation and flood control, and wells have been constructed, mostly for irrigation, in all three states. Over the years, the streamflow has been declining; and, Kansas has blamed the upstream states wells as the cause. Mr. Land has assisted Nebraska and its defense team in determining the amount of streamflow declines and the causes. He is very much involved in the development of groundwater flow and stream-reservoir models for legal defense purposes as well as management tools.

**Assessment of Aquifer Storage and Recovery in the Brazos River Alluvium.** Project Manager. One alternative in expanding the water supplies in the Brazos River basin is to store excess surface water and recover the water during periods of shortage. Mr. Land proposed a concept to divert water from the Brazos River during seasons of high flow and to recharge the nearby Brazos River Alluvium and to recover the water with wells during the season of high summer demands or drought. Mr. Land is testing this concept by the development and application of a MODFLOW groundwater model of the study area.

**Calculating Volume of Groundwater in Storage.** Project Engineer. The Llano Estacado Regional Water Planning Group is developing long range water plans for the central part of the High Plains Aquifer. In support of the planning, the groundwater in storage was calculated for several counties using aquifer data from wells in several databases, reports, and Geographic Information System software. In addition, the water table was mapped in 1995 and 1995 were prepared and water level changes were calculated.

**Determination of Groundwater Assessment and Availability.** Project Manager. The San Antonio Water System (SAWS) is in the process of evaluating several Edwards and non-Edwards Aquifer water supply alternatives for future demands. Mr. Land provides leadership and technical support in the evaluation of availability and sustainability of the water supplies from each of these potential projects. The Edwards Aquifer alternatives included groundwater supplies in Kinney and Val Verde Counties. The non-Edwards alternatives have included several locations in the Carrizo-Wilcox, Gulf Coast, and Trinity Aquifers.



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## Mark C. Graves

Water Distribution and Treatment Engineer

### Education

Master of Science, Civil Engineering, University of Texas System, 1998

Bachelor of Science, Civil Engineering, Auburn University, 1995

### Professional Registrations

Professional Engineer - Civil, Texas, No. 90151, 2002

### Professional Affiliations

American Water Works Association, Member

International Desalination Association, Member

Water Environment Federation, Texas Chapter (WEAT), Member

### HDR Tenure

7 Years

### Industry Tenure

11 Years

### Professional Experience

Mr. Mark Graves is a process engineer with eight years of experience. His experience includes water distribution and treatment design and costing including membrane treatment, desalination, ozone, biological filters, and disinfection. Mr. Graves also has experience in construction cost estimating and Program Management.

### *HDR Project Experience*

**Water Quality and Treatment Model, City of Corpus Christi, Texas.** Project Engineer. This model was part of a project to comprehensively assess alternative supply system operation scenarios for the City of Corpus Christi. The City is supplied by two sources of water with different chemical qualities. Additional water sources are being evaluated that also differ from the current supply. A water quality and treatment model was developed to assess the impact on plant operations, costs and finished water quality from different blends of these water sources. A database of source water quality information was compiled for a multi year period and used as input to the model so that seasonal treatment requirements can be assessed. Model output for a range of water blends included the blended water quality including disinfection by-product (DBP) formation potential, total organic carbon, turbidity, and pH. The model then calculates approximate treatment costs and potential treatment problems. Costs are calculated based on coagulant dose required to meet turbidity and DBP requirements, required pH adjustment, chlorine dose to meet residual requirements, and quantity of solids produced. Alerts were triggered for blends of water that cannot be adequately treated with the current treatment process at the O.N. Stevens water plant.

**Desalination Facilities Evaluation, City of Corpus Christi, Texas.** Project Engineer. Assisted in a feasibility analysis to provide additional water to the Mustang Island-Port Aransas area located on the barrier island offshore of the City of Corpus Christi. The island is currently supplied with water through a water supply pipeline from the mainland. Options to supplement or replace the current water supply with desalinated water from the Gulf of Mexico or brackish water below the island were evaluated. Available desalination options including reverse osmosis and distillation (both for primary desalination and zero discharge co-use with RO) were evaluated and ranked based on cost estimates, siting constraints, regulatory requirements, and local issues.

**Water Treatment Plant Improvements, City of Alice, Texas.** Project Engineer. Evaluated existing disinfection scheme and recommended improvements. Developed disinfection benchmarking data and analyzed system for current and future SDWA compliance.

**Coastal Bend Regional Water Planning Group and Nueces River Authority.** Project Engineer. Developed information regarding water treatment options and the costs of water treatment associated with supply options for Senate Bill 1 Regional Water Plan.



**Lavaca-Navidad River Authority.** Project Engineer. Assisted in the development of a desalination water supply option for the Lavaca Regional Water Planning Group (Region P). The plan included evaluation of a seawater desalination plant on the Texas coast and pipelines for transmission to major demand centers near San Antonio, TX.

**Water Treatment Plant Expansion 2004, City of Kerrville, Texas.** Project Manager. Project consists of procurement, design, and bidding for a 1.6 MGD low-pressure membrane water treatment plant to expand the water treatment capacity at an existing conventional water treatment plant site. Initial phase of project included procurement of membrane system through a performance based bidding process based on membrane pilot study results. Current design phase consists of a new building with membrane system, electrical and I&C facilities, chemical feed, and modifications/expansion of existing water plant piping and pumps for integration of new membrane water treatment plant.

**Membrane Pilot Study, City of Kerrville, Texas.** Project Manager. Conducted a four-month membrane pilot study to evaluate the performance of competing membrane systems in treating Guadalupe River water. Results used in selection of a membrane treatment system for a 1.6 MGD expansion of existing water treatment capacity.

**Water Supply Study, City of Kenedy, Texas.** Project Engineer. Primary author of water supply and treatment options report. Evaluated upgrades to existing reverse osmosis water desalination plant, alternative treatment options for arsenic and dissolved solids removal, well field expansion, and surface water treatment and delivery options.

**Texas Water Development Board.** Project Engineer. Primary author of several sections of report, "Desalination for Texas Water Supply" for the Nueces River Authority and Texas Water Development Board. This project includes a comprehensive assessment of membrane technologies and their potential application in the state. The project also includes siting assessments for a seawater desalination project on the Texas coast. Specific tasks include: review and summarize literature, review application and performance of technologies, develop process selection guidance and industry trends, evaluate concentrate disposal alternatives, produce cost curves and cost estimating methodology, and prepare technologies and costs manual.

**SAWS Conceptual Study of Gonzales County Carrizo Aquifer Program.** Project Engineer. Mr. Graves lead one of the teams in a conceptual study of the Gonzales County Carrizo Aquifer Program supply for SAWS. This project had three components, including water quality testing and pipe loop study for corrosion evaluation, treatment recommendations, and conceptual designs of facilities. The conceptual design of the facilities was prepared for the well field, well field collection, raw water pump stations, raw water transmission, treatment, storage, and integration water pump stations and pipelines.

**Multiple Source Water Integration Study, San Antonio Water System.** Project Engineer. The San Antonio Water System (SAWS) is in the process of developing new water sources to augment their existing ground water supply. These sources, which include both surface and ground water supplies, can have significantly different water chemistry from the Edward's Aquifer supply that SAWS now utilizes. The purpose of this study was to quantify the impact that these new source waters might have on the existing corrosion scales in the SAWS distribution system. The study utilized old, galvanized pipe samples excavated from the SAWS system. These samples were analyzed for scale content and character, and then used in extended pipe loop tests with three different source waters. The waters (and blends of waters) were circulated and stagnated in the loops while water quality changes were monitored. After the potential for iron and corrosion product release was examined, various water conditioning schemes were tested in the loops to determine the treatment requirements and target finished water quality goals for the new sources.



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## Adam (Cory) Shockley

Water Resources Engineer

### Education

Bachelor of Science,  
Environmental Engineering  
(Hydrology), Tarleton State  
University, 1999

### Professional Registrations

Professional Engineer, Texas,  
No. 94761, 2004

### Professional Affiliations

### HDR Tenure

7 Years

### Industry Tenure

7 Years

### Professional Experience

Mr. Shockley's experience in water resources engineering includes river basin modeling, water rights analysis, model programming in the FORTRAN language, hydrology and hydraulics, engineering cost analysis, pipelines, pump-stations, hydraulic control structures, environmental data summarization, and water supply planning.

### *HDR Project Experience*

**Coastal Bend Regional Water Planning Group and Nueces River Authority.** Project Engineer. Developed new FORTRAN code for Corpus Christi Water Supply Model to simulate potential future water supply projects, including: off-channel reservoir located near Lake Corpus Christi, pipeline to deliver water from Choke Canyon Reservoir to Lake Corpus Christi, and Aquifer Storage and Recovery for water supply. Evaluated cumulative effects of water management strategies on future water supplies and flows to Nueces Bay and Estuary.

**Lower Nueces River Basin Water Supply Model.** Performed FORTRAN code modifications to existing Lower Nueces River Basin Water Supply Model (NUBAY). Code modifications enabled the model to model out of basin source water, calculate transmission costs through a pipeline, calculate water treatment plant costs associated with blending different source waters, and accurately model the complex channel losses in the lower Nueces Basin.

**Nueces River Basin Reconnaissance Study.** Examined a myriad a possible water resources projects in the Nueces River Basin for a possible Federal interest in one or more of the following categories: ecosystem restoration, flood damage reduction, economic development, recreation, and water supply. Performed in depth research on previously studied water resource projects in the basin. Incorporated these results into a presentation and report for presentation to the client to facilitate their decision making process on pursuing one or more of the suggested opportunities.

**Nueces Water Availability Model.** Project Hydrologist. Performed many tasks related to developing input files for the model. Executed the Water Rights Availability Package Model for the different run assumptions. Summarized output data from the model runs to show relations in the different assumptions of each run.

**Brazos River Basin Water Availability Model.** Water Resources EIT. Developed a water rights database for over 1,600 water rights in the Brazos and San Jacinto-Brazos River Basin. Using GIS applications, developed flow network for over 3,000 control points to be included in the Water Availability Model (WAM). Developed the necessary input files from water right and control point information required by the Water Rights Analysis Package (WRAP) Model. Created the different combinations of input files needed for simulating varying basin scenarios. Analyzed model results and developed summary tables, graphs and charts for incorporation into report. Authored detailed sections of the report describing the modeling process and the interpretation of the results.



**Engineering Cost Analysis for Region L Water Supply Projects.** Water Resources EIT. Provided engineering cost analysis for several different water supply options. Tasks included updating previous cost estimates to current cost construction indices, mapping out pipeline routes, calculating all hydraulics associated with proposed pipeline route, determining the most cost effective option for different variables for the proposed project, and summarizing data into table form. Some options that were analyzed included reservoir and dam construction, water treatment plant construction, Pump/Booster station construction and intake costs, pipeline construction, and various other costs associated with this type of project.

**Guadalupe and San Antonio River Water Availability Model.** Project Hydrologist. Performed many tasks related to the development of input files for the model. Executed the Water Rights Availability Package Model for the different run assumptions. Summarized output data from the model runs to show relations in the different assumptions of each run. Worked in the areas of database management for different aspects of this project including the water rights database and water use records.

**Hartley County Groundwater Transmission Project.** Performed engineering analysis to determine the costs associated with developing a well field and transmission system to deliver groundwater throughout the Texas panhandle and parts of New Mexico. Developed the hydraulics necessary to size collection and transmission piping. Analyzed existing aquifer conditions to determine well size and spacing. Authored report outlining results complete with graphs and figures and in depth cost analysis.

**Lower Colorado River Authority Slope Area Computation for Millers Creek.** Water Resources EIT. Completed field survey of cross sections and high water marks from flood event. Used USGS SAC program and WS-Pro to calculate estimated discharge from slope-area computation. Results of survey and analysis were communicated via a technical report to client.

**Pflugerville Raw Water Storage Reservoir Spillway and Stilling Basin Design.** Water Resources EIT. Performed preliminary design analysis to produce drawings for a 200 ogee spillway, discharge apron, and stilling basin for the Pflugerville Raw Water Storage Reservoir. Using 100 year and PMF information for design flows, designed facilities to pass flood events downstream. Performed preliminary design analysis for erosion control structures (ACBs and Rip Rap) for channel and banks downstream of stilling basin.

**Rio Grande Basin Reconnaissance Study.** Examined a myriad a possible water resources projects in the Nueces River Basin for a possible Federal interest in one or more of the following categories: ecosystem restoration, flood damage reduction, economic development, recreation, and water supply. Performed in depth research on previously studied water resource projects in the basin. Incorporated these results into a presentation and report for presentation to the client to facilitate their decision making process on pursuing one or more of the suggested opportunities. Developed the report according to the Corps of Engineers Principles and Guidelines documents.

**South Central Texas Regional Water Plan Final Report.** Water Resources EIT. Performed functions related to water supply planning. Modified cost estimates for various water supply options. This included changes in hydraulics, facilities, and implementation times. Developed and utilized a cost matrix to distribute cost (debt service and operation/maintenance for water supply option and treatment and distribution) to several water user groups in 22 different counties in the south central Texas region. Created summarization graphics to show annual costs per decade as well as unit costs per decade in terms of how much supply is being utilized. Also developed naturalized daily flow from naturalized monthly flow using USGS daily flow data, and then developed environmental consensus criteria; such as median, 25th percentile and 7Q2, for the site.



**Application for a Regional Water Planning Grant for the Revision  
Of the Coastal Bend Regional Water Plan**

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**Attachment C-1:**

**Public Notice Published in *Corpus Christi Caller-Times*, August 27, 2006**

PUBLISHER'S AFFIDAVIT

State of Texas }  
County of Nueces } ss: NUECES RIVER AUTHORITY  
Ad # 5557804  
PO #

Before me, the undersigned, a Notary Public, this day personally came Sandra Orum, who being first duly sworn, according to law, says that she is Legal Sales Representative of the *Corpus Christi Caller-Times*, a daily newspaper published at Corpus Christi in said City and State, generally circulated in Aransas, Bee, Brooks, Duval, Jim Hogg, Jim Wells, Karnes, Kenedy, Kleberg, Live Oak, Nueces, Refugio, San Patricio, Victoria and Webb Counties, and that the publication of, NOTICE OF APPLICATION FOR PLANNING which the annexed is a true copy, was inserted in the *Corpus Christi Caller-Times* and on the World Wide Web on the *Caller-Times Interactive* on the 27TH day(s) of AUGUST, 2006.

\$290.63

*Sandra Orum*

Legal Sales Representative  
TWO (2) Time(s)

Subscribed and sworn to me on the date of 8/28/06

*Michelle Cabrera*

Notary Public, Nueces County, Texas  
Michelle Cabrera  
Print or Type Name of Notary Public  
My commission expires on March 19, 2008.



\*\*\* Ad Receipt \*\*\*

Corpus Christi Caller-Times  
 820 Lower N. Broadway  
 Corpus Christi, TX 78401  
 (361)884-2011

Printed by: SandraO on Aug 23, 2006 at 2:25pm

Account Information	Ad Information
<b>Phone:</b> (361) 825-3193 <b>Name:</b> NUCLES RIVER AUTHORITY <b>Account #:</b> R43485 <b>Address:</b> 6300 OCEAN DR UNIT 5865 ATTN: ROCKY FREUND Corpus Christi, TX 78412-5865 <b>Client:</b> <b>Placed by:</b> Rocky Freund <b>Fax #:</b>	<b>Classification:</b> 1110-Legal Notices <b>Size:</b> 1 x 86.870 <b>Start date:</b> 08-27-06 <b>Billed size:</b> 87.00 7.5pt lines <b>Stop date:</b> 08-27-06 <b>Ad #:</b> 5557804 <b>Rate code:</b> Legal Line <b>Ad type:</b> Liner Ad <b>Insertions:</b> 2 <b>Taken by:</b> Sandra Orum <b>Publications:</b> Sunday Caller-Times CII

Payment Information																	
<table border="1"> <thead> <tr> <th>Date</th> <th>Payment #</th> <th>Type</th> <th>Number</th> <th>Card Name</th> <th>Expires</th> <th>Approval</th> <th>Amount</th> </tr> </thead> <tbody> <tr> <td colspan="7"></td> <td align="right"><b>Total payments:</b></td> <td align="right">\$ 0.00</td> </tr> </tbody> </table> <p><b>Note:</b>The above advertising may be subject to credit card approval</p>	Date	Payment #	Type	Number	Card Name	Expires	Approval	Amount								<b>Total payments:</b>	\$ 0.00
Date	Payment #	Type	Number	Card Name	Expires	Approval	Amount										
							<b>Total payments:</b>	\$ 0.00									

**Gross price:** \$ 290.63  
**Net price:** \$ 290.63  
**Total payments:** \$ 0.00

**Amount Due:** \$ 290.63

Ad Copy:

**NOTICE OF APPLICATION FOR PLANNING ASSISTANCE FOR THE COASTAL BEND REGIONAL WATER PLANNING GROUP**

The Coastal Bend Division of the Nueces River Authority (NRA), on behalf of the Coastal Bend Regional Water Planning Group (RWPG) for the Senate Bill 1 Regional Water Planning Program, is providing notice that NRA will submit a grant application for financial assistance to the Texas Water Development Board (TWDB) to carry out a Scope of Work for the 2006 -2011 planning period.

The Coastal Bend RWPG was established under provisions of Texas Senate Bill 1 (76th Texas Legislature) to develop a regional water plan for the Coastal Bend Regional Water Planning Area (TWDB Region "N"), which includes the following counties:

**\*\*\* Ad Receipt \*\*\***

**Corpus Christi Caller-Times  
820 Lower N. Broadway  
Corpus Christi, TX 78401  
(361)884-2011**

**Printed by: SandraO on Aug 23, 2006 at 2:25pm**

Aransas, Bee, Brooks, Duval, Jim Wells, Kenedy, Kleberg, Live Oak, McMullen, Nueces, and San Patricio. The 2006 Plan will be updated, with emphasis on moving forward with the next stages of implementation of key water management strategies.

Copies of the grant application may be obtained from NRA when it becomes available. Written comments on the grant application must be filed prior to November 14, 2006 with both NRA and TWDB as follows:

Ms. Rocky Freund  
Deputy Executive  
Director  
Nueces River Authority  
6300 Ocean Drive  
Unit 5865  
Corpus Christi, Texas  
78418-5865

Mr. J. Kevin Ward  
Executive Administrator  
Texas Water  
Development Board  
P.O. Box 13231  
Austin, Texas  
78711-3231

**For more information,  
contact:  
Nueces River Authority,  
Coastal Bend Division  
Phone: 361-825-3193;  
<http://www.nuecesra.org>**

**Application for a Regional Water Planning Grant for the Revision  
Of the Coastal Bend Regional Water Plan**

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**Attachment C-2:**

**Notice Mailed to Mayor, Judges, and Other Representatives in the Coastal Bend Region**

**NOTICE OF APPLICATION FOR PLANNING ASSISTANCE FOR THE COASTAL  
BEND REGIONAL WATER PLANNING GROUP**

The Coastal Bend Division of the Nueces River Authority (NRA), on behalf of the Coastal Bend Regional Water Planning Group (RWPG) for the Senate Bill 1 Regional Water Planning Program, is providing notice that NRA will submit a grant application for financial assistance to the Texas Water Development Board (TWDB) to carry out a Scope of Work for the 2006 -2011 planning period.

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Deputy Executive Director  
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6300 Ocean Drive Unit 5865  
Corpus Christi, Texas 78418-5865

Mr. J. Kevin Ward  
Executive Administrator  
Texas Water Development Board  
P.O. Box 13231  
Austin, Texas 78711-3231

**FOR MORE INFORMATION, CONTACT:**

Nueces River Authority, Coastal Bend Division,  
6300 Ocean Drive, Unit 5865, Corpus Christi, Texas 78412-5865  
361-825-3193 <http://www.nueces-ra.org>

The Honorable Henry Garrett  
Mayor, City of Corpus Christi  
P.O. Box 9277  
Corpus Christi, TX 78469

The Honorable Jessie Rodriguez, Sr.  
Mayor, City of Odem  
P.O. Box 754  
Odem, TX 78370

The Honorable Kenneth D. Chessire  
Mayor, City of Beeville  
400 N. Washington St.  
Beeville, TX 78102-3938

The Honorable Felipe Q. Martinez  
Mayor, City of Three Rivers  
P.O. Box 398  
Three Rivers, TX 78071

The Honorable Jesse Galvan  
Mayor, City of Aransas Pass  
P.O. Box 2000  
Aransas Pass, TX 78336

The Honorable David Krebs  
Mayor, City of Portland  
P.O. Drawer 1285  
Portland, TX 78374

The Honorable Elaine Kemp  
Mayor, City of Ingleside  
P.O. Box 400  
Ingleside, TX 78362

The Honorable Mario O. Rodriguez  
Mayor, City of Premont  
P.O. Drawer 340  
Premont, TX 78375

The Honorable Grace Saenz-Lopez  
Mayor, City of Alice  
P.O. Box 3229  
Alice, TX 78333

The Honorable Geraldine Ryppl  
Mayor, City of Bishop  
P.O. Box 356  
Bishop, TX 78343

The Honorable Seale Brand  
Mayor, City of Orange Grove  
P.O. Drawer 1350  
Orange Grove, TX 78372

The Honorable Ted Ozuna  
Mayor, City of Driscoll  
P.O. Box 178  
Driscoll, TX 78351

The Honorable Fernando Gomez  
Mayor, City of Gregory  
P.O. Box 297  
Gregory, TX 78359

The Honorable Cynthia Canales  
Mayor, City of Benavides  
P.O. Drawer R  
Benavides, TX 78341

The Honorable August Caron, Jr.  
Mayor, City of George West  
406 Nueces Street  
George West, TX 78022

The Honorable Arnaldo Cantu  
Mayor, City of Freer  
P.O. Drawer N  
Freer, TX 78357

The Honorable Carl Vajdos  
Mayor, City of Agua Dulce  
P.O. Box 297  
Agua Dulce, TX 78330

The Honorable Rodrigo Ramon, Jr.  
Mayor, City of Robstown  
P.O. Box 872  
Robstown, TX 78380

The Honorable Vincente H. Gonzalez  
Mayor, City of Mathis  
411 E. San Patricio  
Mathis, TX 78368

The Honorable Claude Brown  
Mayor, City of Port Aransas  
710 West Avenue A  
Port Aransas, TX 78373

The Honorable Alonzo Lopez  
Mayor, City of San Diego  
404 S. Mier  
San Diego, TX 78384

The Honorable Wesley Jacobs  
Mayor, City of Falfurrias  
P.O. Drawer E  
Falfurrias, TX 78355

The Honorable Pete Gonzales  
Mayor, City of Sinton  
P.O. Box 1395  
Sinton, TX 78387

The Honorable Cynthia Foster  
Mayor, City of Ingleside on the Bay  
P.O. Box 309  
Ingleside on the Bay, TX 78362

The Honorable Todd Pearson  
Mayor, City of Rockport  
622 E. Market Street  
Rockport, TX 78382

The Honorable Jerry L. King  
Mayor, City of Taft  
501 Green Ave.  
Taft, TX 78390

The Honorable Sam Fugate  
Mayor, City of Kingsville  
P.O. Box 1458  
Kingsville, TX 78364

The Honorable Gene Herod  
Mayor, City of Lake City  
P.O. Box 177  
Lake City, TX 78368

The Honorable Ed Gentry  
Mayor, City of Lakeside  
P.O. Box 787  
Lakeside, TX 78368

The Honorable William J. Ordner  
Mayor, City of Petronila  
2475 County Rd 69  
Robstown, TX 78380

The Honorable Lonnie Glasscock III  
Mayor, City of San Patricio  
20680 McMurray  
Mathis, TX 78368

The Honorable Russell Cole  
Mayor, Town of Fulton  
P.O. Box 1130  
Fulton, TX 78358

The Honorable Jerry W Hedrick  
Mayor, Village of Pernitus Point  
101 Bluff Circle  
Sandia, TX 78383



The Honorable Glenn Guillory  
Aransas County Courthouse  
301 N. Liveoak  
Rockport, TX 78382

The Honorable Terry Simpson  
San Patricio County Courthouse  
400 W. Sinton, Rm. 105  
Sinton, TX 78387

The Honorable Jimmy Martinez  
Bee County Courthouse  
105 W. Corpus Christi, Rm. 106  
Beeville, TX 78102

The Honorable Terry Shamsie  
Nueces County Courthouse  
901 Leopard St.  
Corpus Christi, TX 78401

The Honorable Arnaldo Saenz  
Jim Wells County Courthouse  
200 N. Almond  
Alice, TX 78332

The Honorable Joe B. Garcia  
Brooks County Courthouse  
Box 515  
Falfurrias, TX 78355

The Honorable J.A. Garcia, Jr.  
Kenedy County Courthouse  
P.O. Box 37  
Sarita, TX 78385

The Honorable Linda Lee Henry  
McMullen County Courthouse  
P.O. Box 237  
Tilden, TX 78072

The Honorable E. B. Garcia, Jr.  
Duval County Courthouse  
P.O. Box 189  
San Diego, TX 78384

The Honorable Jim Huff  
Live Oak County Courthouse  
P.O. Box 487  
George West, TX 78022

The Honorable Pete De La Garza  
Kleberg County Courthouse  
Kingsville, TX 78363

ARANSAS COUNTY MUD 1  
1100 LOUISIANA ST STE 400  
SMITH MURDAUGH LITTLE  
& BONHAM LLP  
HOUSTON, TEXAS 77002-5211

BEEVILLE WATER SUPPLY DISTRICT  
400 N WASHINGTON ST  
BEEVILLE, TEXAS 78102-3912

PETTUS MUD  
PO BOX 153  
PETTUS, TEXAS 78146-0153

DUVAL COUNTY CONSERVATION &  
RECLAMATION DISTRICT  
PO BOX 469  
BENAVIDES, TEXAS 78341

FREER WCID  
PO BOX 329  
FREER, TEXAS 78357-0329

SAN DIEGO MUD 1  
200 S DR E E DUNLAP HWY  
SAN DIEGO, TEXAS 78384-3204

ALICE WATER AUTHORITY  
PO BOX 3229  
ALICE, TEXAS 78333

JIM WELLS COUNTY FWSD 1  
PO BOX 428  
BEN BOLT, TEXAS 78342

RIVIERA WCID  
PO BOX 430  
RIVIERA, TEXAS 78379-0430

SOUTH TEXAS WATER AUTHORITY  
PO BOX 1701  
KINGSVILLE, TEXAS 78364-1701

LIVE OAK UWCD  
3460A HIGHWAY 281  
GEORGE WEST, TEXAS 78022

MCMULLEN COUNTY WCID 1  
PO BOX 232  
TILDEN, TEXAS 78072

MCMULLEN COUNTY WCID 2  
HC 71 BOX 199  
THREE RIVERS, TEXAS 78071-9401

NUECES COUNTY WCID 3  
PO BOX 1147  
ROBSTOWN, TEXAS 78380-1147

NUECES COUNTY WCID 4  
315 S 9TH ST  
PORT ARANSAS, TEXAS 78373-5207

NUECES COUNTY WCID 5  
PO BOX 157  
BANQUETE, TEXAS 78339-0157

SAN PATRICIO COUNTY MUD 1  
PO BOX 39  
EDROY, TEXAS 78352-0039

SAN PATRICIO MWD  
PO BOX 940  
INGLESIDE, TEXAS 78362-0940