Coastal Bend Regional Water Planning Area (Region N)
Second Biennium Funding Cycle for Development of the 2011 Regional Water Plan

The third cycle of regional water planning (2011 Plan) is currently in progress. In May 2006, the TWDB approved the first phase (Phase I) of 2011 Plan activities for Region N ($364,000), to include technical evaluation of five (5) region-specific studies and administrative and public participation activities.

On January 22, 2008, the Texas Water Development Board issued a request to publish announcement of the second phase (Phase II) of the third cycle of regional water planning (2011 Plan) and identified Base Funding Allocations for Region N of $151,310 (or 3.5% of total base funding allocation of $4.2 million for all 16 regions in Texas). Base funding was allocated amongst all regions in Texas based on a estimation by the TWDB of the level of effort necessary to incorporate results from Phase I region-specific studies and update regional water plans in accordance with 31 TAC 357 based on foreseeable changed conditions since the 2006 Plan. **An additional $4.8 million state-wide is estimated to be available for additional work beyond base activities in response to changed conditions and will be evaluated on a competitive basis.**

Table 1 presents a summary of draft base funding and additional funding requests for consideration by the CBRWPG during the April 10th meeting. A range of costs is presented for the additional funding request and will be refined after receiving feedback from the CBRWPG regarding interest and task activities. Without considering costs of seawater desalination project tasks, the 2011 Plan development is estimated to cost between $431,310 and $491,310 with additional funding projects.

Prior to submitting the final scope in June 2008, the funding requests will need to be prioritized.

Total Base Funding Request: $151,310
Range of Additional Funding Request: $265,000 to $394,000
Total Funding Request: $416,310 to $545,310

Table 1
***Draft* Task Budget**

Task	Funds for Tasks
0. Scope of Work (Includes Scope Development)	$ 10,000
1. Planning Area Description	$ 10,000
2. Population and Water Demand Projections	$ 6,400
3. Evaluation of Existing Water Supply	$ 5,100
4. Identification of Water Needs and Selection of WMS	$ 7,800
5. Impacts of WMS on Water Quality	$3,410
6. Water Conservation and Drought Management Recommendations	$ 10,000
7. Long-term Protection of State's Water,Agricultural and Natural Resources	$ 10,000
8. Legislative Policy Recommendations, Unique Stream Segments and/or Reservoir Sites	$ 15,000
9. Infrastructure Funding Recommendations	$ 1,800
10. Plan Adoption (with scope of work costs removed, and included as Task 0)	$ 71,800
Base Funding Sub-Total (Formula Funding)	**$151,310**
Additional Task 3 Funding Requested	$20,000
Additional Task 4 Funding Requested	$230,000 to $290,000**
Additional Task 10 Funding Requested	$30,000
Grand Total	$ 431,310 to $491,310

** Note: Does not include seawater desalination projects.

Task 0: Scope of Work Development

TWDB Base Funding Allocated (from Task 10): $10,000

Task 1: Planning Area Description [31 TAC §357.7(a)(1)]

- Update agriculture and economic data summaries to reflect most current information readily available;
- Update water quality concerns based on Nueces River Authority's Basin Highlights Report
- Summarize 2006 Plan activities;
- Update status of water resources planning, including GMA activities in Region N
- Add water conservation targets for entities that submitted Water Conservation and Drought Contingency Plans;
- Add information compiled by TWDB from water loss audits performed by retail public utilities pursuant to [31 TAC §358.6].

TWDB Base Funding Allocated: $10,000

Task 2: Population and Water Demand Projections [31 TAC §357.7(a)(2)]

There are minimal updates anticipated for this section since the next census is not scheduled until 2010. Population and water demands will generally be the same as those shown in the 2006 Plan.

- Review and integration of new water demand projections for steam-electric power water users, which are estimated to be provided by the TWDB in August 2008.
- Update water demand projections and TWDB database.

TWDB Base Funding Allocated: $6,400

Task 3: Evaluation of Existing Water Supply [31 TAC §357.7(a)(3)]

- Provide technical support to the CBRWPG including discussion of available surface water models for the area (TCEQ Water Availability Model for the Nueces Basin and City of Corpus Christi Water Supply Model) including hydrologic assumptions, reservoir system operation considerations, and Agreed Order requirements for pass-thrus to the Nueces Bay and Estuary. Assist the CBRWPG in obtaining Executive Administrator approval to use alternative approach to TCEQ WAM Run 3 (no return flows) to estimate yields of surface water supplies.
- Provide technical support to the CBRWPG in response to TWDB guidance to base existing surface water supplies on firm yield. Based on previous studies of inflow reductions to the Choke Canyon Reservoir/ Lake Corpus Christi (CCR/LCC) System, the CBRWPG selected a safe yield analysis for the 2006 Plan to determine available surface water supplies. This provision of considering safe yield rather than firm yield supplies, allowed a designated amount of water to remain in storage in the event that a future drought event is worse than the drought of record. Assist the CBRWPG in obtaining Executive Administrator approval to use safe yield analysis.
- Update TWDB database for surface water and groundwater supplies.

NOTE: See "Additional Funding Activities" for proposed projects exceeding base funding request.

TWDB Base Funding Allocated: $5,100*

***** Base funding request is estimated to be sufficient with use of the City of Corpus Christi Water Supply Model for evaluating surface water availability. If the TWDB does not approve the request and mandates use of the TCEQ WAM Run 3 then additional funding will need to be requested.

Task 4: Identification of Water Needs and Selection of Water Management Strategies

- Update capital cost estimates to second quarter 2007 Engineering News Record (ENR) Construction Cost Index (CCI) for all water management strategies.
- Update annual costs to reflect updated power and capital/debt service costs per TWDB guidelines (i.e. 0.09 $/kWh).
- Update yields of water management strategies based on results of Phase I region-specific studies.
- Revise water management strategy yields for the off-channel reservoir, CCR/LCC pipeline, groundwater supplies in Bee County, and others due to changes in routing, capacity, or system operations based on priority topic studies developed in Phase I of 2011 planning cycle.

NOTE: See "Additional Funding Activities" for proposed projects exceeding base funding request.

TWDB Base Funding Allocated: $7,800

Task 5: Impacts of Water Management Strategies on Water Quality

- Incorporate and address water quality results from the Gulf Coast groundwater study for transmission through the Mary Rhodes Pipeline (Study No. 1) and Water Quality Modeling of the Regional Water Supply System (Study No. 4) developed in Phase I of 2011 Plan funding cycle. Address additional water quality issues associated with water management strategies developed in the second biennium funding cycle (such as Calallen Pool).

TWDB Base Funding Allocated: $3,410

Task 6: Conservation and Drought Management

- Update the summary of water conservation and drought management recommendations from 2006 Plan, include adding information for current water conservation practices in the region collected from water conservation BMP surveys (21 respondents) from Phase I studies.
- Update list of entities that have submitted drought management plans, since development of the 2006 Plan.
- Include existing Model Water Conservation and Drought Contingency Plans as appendices in 2011 Plan.

TWDB Base Funding Allocated: $10,000

Task 7: Description of How the Regional Water Plan is Consistent with Long-term Protection of State's Water, Agricultural, and Natural Resources

- Update documentation of the consistency of the 2011 Plan with goals of long-term protection of water, agricultural, and natural resources with results from the five Phase I region-specific projects, including project specific updates of environmental impacts.
- Assist CBRWPG in identifying specific resources important to planning areas and describe how these resources are protected through the regional water planning process.
- Update regional initiatives to respond to drought conditions, including revisions to safe yield analysis to account for impacts of climate and watershed changes (contingent on available funding to study "Study 9- Impacts of Climate and Watershed Studies" as described with Additional Funding Activities).

TWDB Base Funding Allocated: $10,000

Task 8: Unique Reservoir/ Stream Segments and Other Legislative Recommendations

- Assist the CBRWPG with consideration of regional policy issues and development of regulatory, administrative, or legislative recommendations to facilitate the evaluation, management, and conservation of water resources in Texas.
- Assist the CBRWPG with documentation of any unique stream segments or unique reservoir sites for inclusion in the 2011 Plan, including consideration of Palmetto Bend – Stage II and Nueces Off-Channel Reservoir per 2007 State Water Plan.

TWDB Base Funding Allocated: $15,000

Task 9: Water Infrastructure Funding

- Assist CBRWPG with infrastructure funding survey and compilation of responses.

TWDB Base Funding Allocated: $1,800

Task 10: Adoption of Plan

- Scope of Work Development (Base Funding Request: $10,000)
- Development of one newsletter for public information;
- Assemble Initially Prepared 2011 Plan for public review and comment per TWDB rules and guidance;
- Assist RWPG with responses to comments and revisions to Initially Prepared Plan;
- Assemble 2011 Plan for RWPG adoption and TWDB approval;
- Assist the CBRWPG in verification of integration of the 2011 Plan into the 2012 State Water Plan.
- Project Administration activities, coordination, and public participation meetings.

NOTE: See "Additional Funding Activities" for proposed projects exceeding base funding request.

TWDB Base Funding Allocated: $71,800
(With Scope of Work funding removed, as included in Task 0)

Total Base Funding Allocated To Region N: $151,310

Due to limited base-funding allocations, several region-specific projects are proposed for the CBRWPG to consider for submittal to the TWDB for additional work to be evaluated on a competitive basis amongst all regions for TWDB funding. The most significant effort for additional work items is anticipated to be associated with Tasks 3, 4, and Task 10.

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Task 3: Water supply analysis

GMA 16 is in the process of providing desired future conditions for groundwater development and anticipates submittal to the TWDB by June 1, 2008. Provided that Region N receives managed available groundwater information from the TWDB by the end of November 2008, revised groundwater supplies will need to be considered for the 2011 Plan.

Incorporating Managed Available Groundwater Supplies in the 2011 Plan

Estimated Cost: $20,000

- Coordination with Groundwater Management Areas to ensure that new Managed Available Groundwater volumes reflect their desired future conditions and intentions for inclusion in the 2011 Plan.
- Coordination with the TWDB to address local historical groundwater issues and formatting compatibility with incorporating Managed Available Groundwater in the 2011 Water Plan.
- Update groundwater supplies, and recalculate projected water surplus/needs for groundwater water user groups

Task 4: Identification, evaluation and selection of water management strategies

Currently, five (5) studies are being conducted as part of Phase I (Studies 1 through 5) with funds provided by TWDB for Task 4 activities. The Phase II request continues with sequential numbering of proposed Task 4 projects, beginning with Study 6 as shown below.

Lower Nueces River Water Quality (Studies 6 & 7)

Background: Previous studies have indicated a significant increase in the concentration of dissolved minerals in the Lower Nueces River over about a 35 river mile stretch, between Mathis and the Calallen Saltwater Barrier Dam. Chloride concentrations in the Lower Nueces River at Calallen Pool, just upstream of the Calallen Saltwater Barrier, are on the average 2.5 times the level of chlorides in water released from Lake Corpus Christi. These dissolved mineral increases can be attributed to natural seepage of groundwater from the Gulf Coast Aquifer, enhanced mineralization of LCC water when stored over large period of time, and man-made periodic discharges of salty water likely from sand and gravel operations.

Based on recent preliminary results of a current Region N study, raw water from Lake Texana and the Colorado River near Bay City contain average chloride levels of 16 mg/L and 61 mg/L respectively, *which is about 60 to 90% less than the average chloride levels in Lower Nueces River raw water* of 163 mg/L. The City of Corpus Christi, SPMWD, STWA, and their customers receive contracted supplies via the Mary Rhodes Pipeline from Lake Texana which improves water quality when blended with Nueces River supplies and are considering additional projects in the Lavaca-Navidad and Colorado Basins to increase supply and maintain or improve water quality (Garwood, Groundwater, Stage II Lake Texana).

There are industries and a public water provider with intakes located in the Calallen Pool that do not currently have access to water supplies from the Mary Rhodes Pipeline. By evaluating options to (1) provide supplies from Mary Rhodes Pipeline to users with intakes in Calallen Pool and/or (2) evaluate system operations of LCC based on water quality, overall regional water supplies become more reliable with a reduction in water consumption and treatment costs.

Study 6: **Evaluation of Pipeline Inter-connects to Provide Access to Water from the Mary Rhodes Pipeline to Water Providers near Calallen (Municipal and Industrial)- Figure 1**

Estimated Cost: $70,000 - $100,000

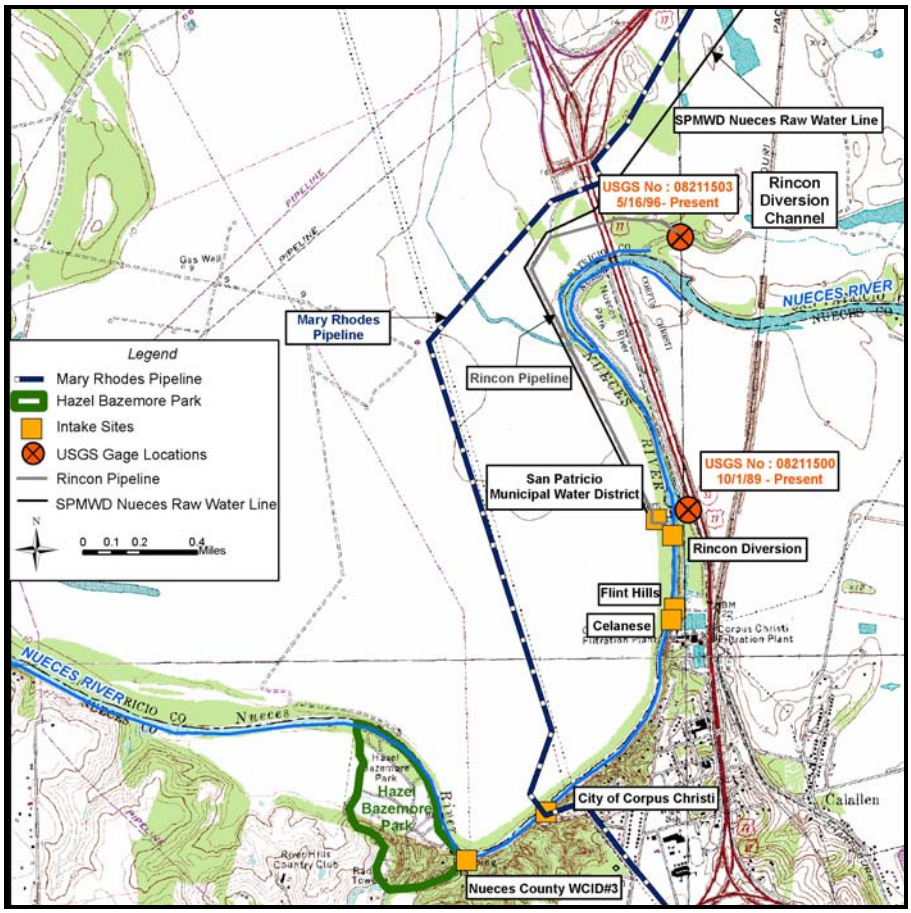

Figure 1- Nueces River at Calallen Pool and Associated Water Supply Features

- Conduct meetings with Flint Hills, Celanese, and others with intakes in Calallen Pool area that do not currently have access to Mary Rhodes Pipeline supplies to identify specific water quality concerns, obtain records of their water quality data (as available), and collect other pertinent data.
- Identify water quality constituents of interest for evaluation.
- Perform analysis of available water quality and corresponding streamflow data to determine seasonal or other patterns in water quality.
- Evaluate up to five scenarios considering existing supplies from Lake Texana, with and without three future water management strategies for delivery by the Mary Rhodes Pipeline (Garwood, Stage II of Lake Texana, and/or Gulf Coast Aquifer). One strategy will consider all four possible sources, up to pipeline capacity.

Determine for each scenario:

- Estimated water quality improvement
- Additional water supply and/or improvement to the efficiency of treatment (treated water: raw water ratio)
- Project costs, including pipeline to connect Mary Rhodes pipeline to approximate site of intake locations.

- Conduct follow-up meetings with wholesale water providers and industries to present results and gather feedback and determine interest and project participation. Conduct two meetings with CBRWPG to present results and receive feedback.
- Prepare a draft report for the Initially Prepared Plan and final report for the 2011 Plan to be submitted per TWDB requirements.

Study 7: **Evaluation of Strategies for Management of Water Supply and Operation of Lake Corpus Christi to Improve Water Quality**

Estimated Cost: $90,000- $120,000

- Compile available water quality data for the Lower Nueces River near intakes and compare to inflows to Lake Corpus Christi (LCC), reservoir levels, and LCC operations.
- Meet with the City of Corpus Christi and other interests and select up to three target levels for tds/chlorides at Lower Nueces River at Calallen Pool
- Conduct model runs with the Corpus Christi Water Supply Model to determine necessary LCC releases to meet target levels and resulting impacts to storage capacity (based on tds/chloride loading relationships identified in on-going Region N Study 4).
- Update model code in the Corpus Christi Water Supply Model so that LCC releases increase when water quality in the Calallen Pool is worse than selected targets.
- Evaluate potential changes to the current operation of Choke Canyon Reservoir/ Lake Corpus Christi System (CCR/LCC), and with potential future water management strategies in the Nueces River Basin (Off-Channel Reservoir) to improve water quality and increase water supply. Identify additional operational considerations such as evaporation, additional groundwater seepage, and others.
- Evaluate changes in operations of Mary Rhodes Pipeline
- Meet with stakeholders (City of Corpus Christi, Nueces County WCID#3 (Robstown), SPMWD, STWA) to discuss the results of the study, and benefits and potential impacts with changes to their system operations.
- Compare results of Study 6 and Study 7 with respect to:
  - Estimated water quality improvement
  - Additional system yield and/or improvement to the efficiency of treatment (treated water: raw water ratio)
  - Project costs, including pipeline to connect Mary Rhodes pipeline to approximate site of intake locations.
- Conduct two meetings with CBRWPG to present results and provide feedback.
- Prepare a draft report for the Initially Prepared Plan and final report for the 2011 Plan to be submitted per TWDB requirements.

Impacts of Climate and Watershed Changes

Background: The Nueces Basin has received progressively less inflow each decade than previous time periods. This reduces reservoir system yield, and due to uncertainty of the severity of future droughts the 2006 Plan included provisions for safe yield supplies, which retains a certain amount in reservoir storage during the critical month of the drought of record. The safe yield analyses in the 2006 Plan assume a reserve of 75,000 acft (i.e. 7% LCC/CCR System storage) for future drought conditions which is generally equivalent to about 6 months of supply.

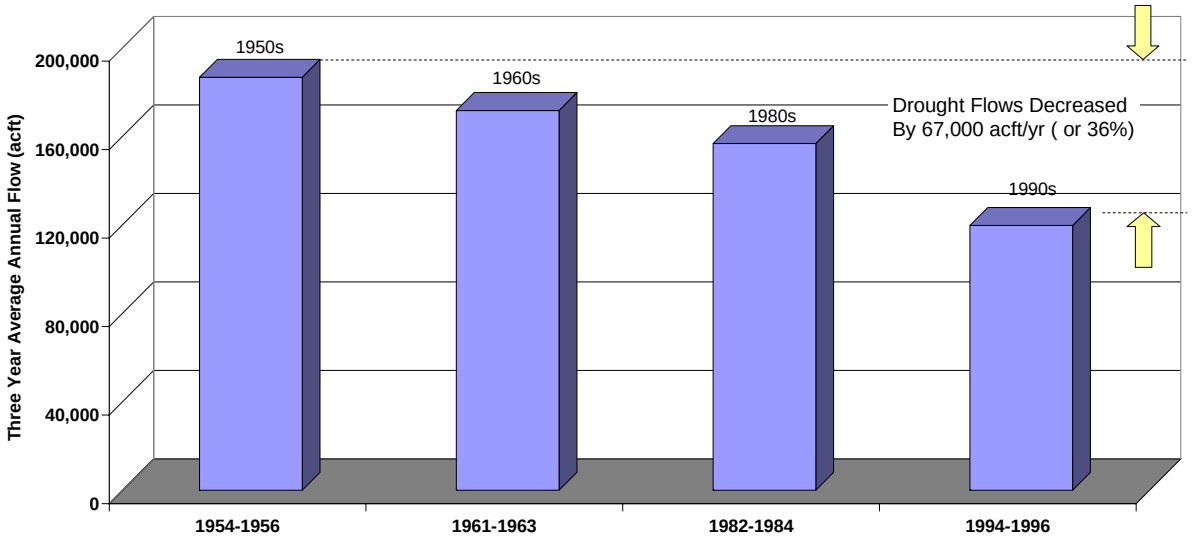

Figure 2- Historical Changes in Average Annual Reservoir System Inflows

Study 8: **Evaluation of CCR/LCC reservoir system yields to evaluate impacts of climate and watershed changes**

Estimated Cost: $25,000

- Calculate the change in firm and safe yields of the CCR/LCC reservoir system occurring between the 1950's and 1990's droughts to determine if the current volume of storage reserve in the system (about 6 months) is adequate to protect against a future drought which could be worse than previous droughts due to climate change or other changes in the Nueces River watershed.
- Summarize results of the study. Conduct one meeting with CBRWPG to present results and receive feedback.
- Prepare a draft report for the Initially Prepared Plan and final report for the 2011 Plan to be submitted per TWDB requirements.

Continue Evaluation of Off-Channel Reservoir

Background: The proposed off-channel reservoir near Lake Corpus Christi was recommended as a water management strategy in the 2006 Plan. Currently, the off-channel reservoir is being studied as part of Phase I region-specific studies (Study 2) to evaluate site conditions (size and location) and reservoir operations to optimize the project yield and minimize environmental impacts. As part of a full evaluation of the off-channel reservoir, the CBRWPG subcommittee recommended identifying the property owner(s) for proposed off-channel reservoir site.

***Study 9:* Evaluating Land Ownership within Proposed Off-Channel Reservoir Site**

Estimated Cost: $15,000

- Based on the off-channel reservoir site location identified by the on-going Phase I study, obtain most recently available property maps for consideration of size and number of properties within proposed off-channel area.
- Prepare letter to be addressed to property owners potentially impacted by the off-channel reservoir to include, identification of project, site specific advantages, and other issues. Present draft letter to CBRWPG for review and approval. Send letter to property owner(s) and receive feedback regarding project interest.
- Report results to CBRWPG, and include appropriate update in off-channel reservoir write-up for Initially Prepared Plan and 2011 Plan.

CCR/LCC System Yield Enhancement Due to Increases in Biological Productivity from Treated Wastewater Diversions

Background: The TCEQ 2001 Agreed Order includes provisions for operating the LCC/CCR system and requires monthly pass-thrus based on system inflows to provide fresh water to the Nueces Bay and Estuary for aquatic health. Per the Agreed Order, the City of Corpus Christi constructed the Rincon pipeline to provide freshwater directly to the Nueces Delta and are in the process of development of an operations plan. Currently, the TCEQ Agreed Order includes a credit of 500 acft per month for treated waste-water return flows from the Allison Water Treatment Plant to the Nueces Bay and Estuary but does not provide credit for measureable enhancements of biological productivity in the Nueces Bay and Estuary especially Nueces Delta Area.

***Study 10:* Updates to CCR/LCC System Yields Through Modification of TCEQ Agreed Order for Reservoir System Operations**

Estimated Cost: $30,000

- Evaluation of potential increases in yield of the CCR/LCC reservoir system if multipliers were allowed by NEAC and TCEQ (under Agreed Order) for increases in biological productivity associated with: a) the discharge of treated waste-water to the Nueces River Delta; or b) the discharge of water into the Delta through the City's new Rincon pump station and pipeline.

Seawater Desalination

Background: Seawater desalination was a recommended water management strategy in the 2006 Plan, as included in the USCOE Nueces Feasibility Projects. In the future, seawater desalination could be operated in conjunction with other regional water supplies to provide additional water supplies and ecosystem restoration benefits. In the 2006 Plan, with federal or state funding of 65% project costs and water supply calculated at 65% project potential, the unit cost of water for seawater desalination with other USCOE Feasibility Projects was $491 per acft for a supply of 62,205 acft/yr.

A meeting is scheduled with the TWDB in early April 2008 to discuss state-wide seawater desalination initiatives. The results of this meeting will be reported at the CBRWPG April 10th meeting. Based on state and federal participation levels, this option may continue to be attractive to the region.

Study 11: **Evaluation of Opportunities for Seawater Desalination**

Estimated Cost: To Be Determined (based on results from April TWDB meeting)

- Evaluation of State, Federal or other entity subsidy ($ per 1,000 gallons) necessary for Seawater Desalination to be a competitively priced strategy for the Region
- Conduct meetings with stakeholders, including potential state and federal participants.
- In co-operation with TWDB, develop a plan for the development of a Pilot Seawater Desalination Plant in the Coastal Bend Region.
- Two meetings to present results to CBRWPG and receive feedback.
- Prepare a draft report for the Initially Prepared Plan and final report for the 2011 Plan to be submitted per TWDB requirements.

Other issues as identified by the Coastal Bend Regional Water Planning Group

Task 10: Adoption of Plan and Public Participation

Interregional Coordination

Background: Nearby regional water planning areas (Region L and P) are developing water management strategies that may impact Region N water supplies. Although most of their projects are in the early stages of development, interregional coordination early in project development is essential to identify and resolve significant issues that may impact the success of projects. Surface water supply projects are being considered in the Upper Nueces Basin in Region L that may impact flows into the CCR/LCC System and hence impact Region N system yields.

Region P is considering Stage II of Lake Texana, which was identified as a unique reservoir site in the 2007 State Water Plan and priority site in TWDB Reservoir Site Protection Study. The Lavaca Navidad River Authority (LNRA) is looking for participants to develop Stage II of Lake Texana, which was recommended in the 2006 Region N Plan to provide future water supplies to the City of Corpus Christi and their customers.

Interregional Coordination with Region L and Additional Surface Water Availability Runs

Estimated Cost: $20,000

- Meeting(s) with Region L Executive Committee members to discuss opportunities for co-operation on seawater desalination and other Corps of Engineers projects including mitigation options for recharge projects.
- Review Region L water management strategy updates and results of changes to Nueces and Frio streamflow that may impact Region N, attributable to surface water supply development in the Upper Nueces Basin. Update associated flow files in the City of Corpus Christi Water Supply Model, as necessary.
- Provide information to CBRWPG regarding opportunities to jointly develop water supplies with Region L, and quantify changes in system yield and potential mitigation options associated with recharge projects.

Interregional Coordination with Region P

Estimated Cost: $10,000

- Meeting(s) with Region P Executive Committee members or LNRA management to discuss opportunities for co-operation concerning Stage II of Lake Texana
- Provide information to CBRWPG regarding opportunities to jointly develop water supplies with Region P. Conduct two meetings with CBRWPG and/or designated subcommittee.

Additional Funding Request (Region N): $280,000 to $340,000*

* Does not include seawater desalination projects.

COMMENTS
Comments will be accepted through **May 10, 2008**. Send to:

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

Comments may also be sent via email to: rfreund@nueces-ra.org