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# Appendix A - Hydrologic Variance Request & TWDB Approval Letter

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## Shaw, Kristi

**From:** Shaw, Kristi
**Sent:** Tuesday, December 5, 2023 3:58 PM
**To:** Michele Foss
**Cc:** tpruski@nueces-ra.org; Scott Bledsoe (wsb3@aol.com)
**Subject:** Region N SW Hydrologic Variance Request
**Attachments:** 2026RWP_SurfaceWater_HydrologicVariance_Checklist_RegionN_TWDB.docx; Background_Variance_Request_RegionN_2026Plan.pdf

Hi Michele,

Attached is TWDB checklist submittal for Region N's surface water hydrologic variance request approved by the RWPG on May 18th. The second attachment presents supplemental background and supporting information for the request to use the Corpus Christi Water Supply Model & safe yield for determining water availability from the Corpus Christi Regional Supply system for the 2026 Region N Plan.

Please let me know if you have any questions.

Thanks,

**Kristi Shaw,** P.E.
*Senior Professional Associate*

**HDR**
4401 West Gate Blvd Suite 400
Austin, TX 78745
**D** 512.912.5118 **M** 512.576.7429
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# Surface Water Hydrologic Variance Request Checklist

Texas Water Development Board (TWDB) rules[1] require that regional water planning groups (RWPG) use the most current Water Availability Models (WAM) from the Texas Commission on Environmental Quality (TCEQ) and assume full utilization of existing water rights and no return flows for surface water supply analysis. Additionally, evaluation of existing stored surface water available during Drought of Record conditions must be based on Firm Yield using anticipated sedimentation rates. However, the TWDB rules also allow, and **we encourage**, RWPGs to use more representative, water availability modeling assumptions; better site-specific information; or justified operational procedures other than Firm Yield with written approval (via a Hydrologic Variance) from the Executive Administrator in order to better represent and therefore prepare for expected drought conditions.

RWPGs must use this checklist, which is intended to save time and reduce effort, to request a Hydrologic Variance for estimating the availability of surface water sources. For Questions 4 – 10, please indicate whether the requested variance is for determining Existing Supply, Strategy Supply, or both. Please complete a separate checklist for each river basin in which variances are being requested.

**Water Planning Region:** N

1. Which major river basin does the request apply to? Please specify if the request only applies part of the basin or only to certain reservoirs.

   Nueces Basin. Specifically, the water supply available to the City of Corpus Christi from the Choke Canyon Reservoir and Lake Corpus Christi.

2. Please give a brief, bulleted, description of the requested hydrologic variances including how the alternative availability assumptions vary from rule requirements, how the modifications will affect the associated annual availability volume(s) in the regional water plan, and why the variance is necessary or provides a better basis for planning. You must provide more-detailed descriptions in the subsequent checklist questions. Attach any available documentation supporting the request.

   The Coastal Bend Regional Water Planning Group is requesting two variances:

   - Use of the Corpus Christi Water Supply Model to evaluate water availability for the Corpus Christi Regional Supply System. All other run-of-river rights will be evaluated using the Nueces WAM Run #3 to estimate availability.
   - Use of Safe Yield with 75,000 ac-ft reserve and City's reservoir operations policy to evaluate surface water supplies for the Corpus Christi Regional Supply System. All other rights will be evaluated using firm yield.

   Background and supporting information related to this request is provided in Attachment 1 supplement.

[1] 31 Texas Administrative Code (TAC) §§ 357.10(14) and 357.32(c)

3. Was this request submitted in a previous planning cycle? If yes, please indicate which cycle and note how it is different, if at all, from the previous request?

   Yes

   The previous Region N Plans (2006, 2011, 2016, and 2021 Plans) have received hydrologic variances to use the Corpus Christi Water Supply Model (formerly NUBAY model) and use of safe yield to evaluate water availability for the Corpus Christi Regional Supply System.

4. Are you requesting to extend the period of record beyond the current applicable WAM hydrologic period? If yes, please describe the proposed methodology. Indicate whether you believe there is a new drought of record in the basin.

   Yes

   Existing Supply

   A new drought of record for the Corpus Christi Regional Water Supply System from 2007 to 2013 was identified in the 2021 Plan. The single lowest inflow year to the Lake Corpus Christi/ Choke Canyon Reservoir system occurred in 2011. The minimum 2 year (twenty-four month) inflow to the LCC/CCR system during this most recent decade occurred from October 2010 to September 2012 at an inflow of 124,000 acft, which is 32% less than the minimum 2 year inflow to the Lake Corpus Christi/ Choke Canyon system in the Nueces Basin in the 1990's of 183,000 acft that occurred from August 1994 to July 1996 and was the driver of the previous drought of record.

   The hydrology update used the same methodology that was used to develop the Nueces WAM hydrology.

5. Are you requesting to use a reservoir safe yield? If yes, please describe in detail how the safe yield would be calculated and defined, which reservoir(s) it would apply to, and why the modification is needed or preferrable for drought planning purposes.

   Yes

   Existing Supply

   Similar to the 2021 Plan cycle, the annual safe yield assumes 75,000 ac-ft remains in CCR/LCC system storage during the critical month of the drought of record. The Coastal Bend Regional Water Planning Group requests use of safe yield for supply planning, instead of the firm yield with zero remaining storage during historical drought of record conditions, due to historical trends showing increasing severity with each successive drought as described in Chapter 1.10. Background and supporting information related to this request is provided in Attachment 1 supplement.

6. Are you requesting to use a reservoir yield other than firm yield or safe yield? If yes, please describe, in a bulleted list, each modification requested including how the alternative yield was calculated, which reservoir(s) it applies to, and why the modification is needed or preferrable for drought planning purposes. Examples of alternative reservoir yield analyses may include using an alternative reservoir level, conditional reliability, or other special reservoir operations.

   No

   Choose an item.

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7. Are you requesting to use a different model (such as a RiverWare or Excel-based models) than RUN 3 of the applicable TCEQ WAM? If yes, please describe the model being considered including how it incorporates water rights and prior appropriation and how it is more conservative than RUN 3 of the applicable TCEQ WAM.

   Yes

   Existing Supply

   The Corpus Christi Water Supply Model (CCWSM) focuses on the operations of the CCR/LCC/Lake Texana/MRP Phase II System and is capable of simulating this system subject to the City of Corpus Christi's Phased Operations Plan and the 2001 Agreed Order governing freshwater inflow passage to the Nueces Estuary. It includes water rights and simulates availability through prior appropriation subject to hydrologic availability.

8. Are you requesting to use a modified TCEQ WAM? If yes, please describe in a bulleted list all modifications in detail including all specific changes to the WAM and whether the modified WAM is more conservative than the TCEQ WAM RUN 3. Examples of WAM modifications may include adding subordination agreements, contracts, updated water rights, modified spring flows, updated lake evaporation, updated sedimentation[2], system or reservoir operations, or special operational procedures into the WAM.

   No

   Choose an item.

   Click or tap here to enter text.

[2] Updating anticipated sedimentation rates does not require a hydrologic variance under 31 TAC § 357.10(14). The Technical Memorandum will require providing details regarding the sedimentation methodology utilized. Please consider providing that information with this request.

9. Are you requesting to include return flows in the modeling? If yes, are you doing so to model an indirect reuse water management strategy (WMS)? Please provide complete details regarding the proposed methodology for determining reuse WMS availability.

   No

   Existing Supply

10. Are any of the requested Hydrologic Variances also planned to be used by another region for the same basin? If yes, please indicate the other Region. Please indicate if unknown.

    No

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11. Please describe any other variance requests not captured on this checklist or add any other information regarding the variance requests on this checklist.

    Click or tap here to enter text.

## Attachment 1-

**Hydrologic variance request to use the Corpus Christi Regional Water Supply Model for regional water supply availability instead of TCEQ Water Availability Model (WAM) Run # 3**

At the Coastal Bend Meeting on May 18, 2023, the Coastal Bend (Region N) Regional Water Planning Group approved the submittal of a hydrologic variance request to the TWDB Executive Administrator to (1) use the Corpus Christi Water Supply Model to evaluate water availability for the Corpus Christi Regional Water Supply System and (2) use of safe yield with 75,000 acft reserve and the City's reservoir operating policies to calculate water availability from the Corpus Christi Regional Water Supply System for the 2026 Region N Water Plan.

**Request for hydrologic variance for use of the Corpus Christi Water Supply Model to Evaluate Water Availability for the Corpus Christi Regional Water Supply System-**

**Background:** The TWDB guidelines[1] state that planning groups must use the unmodified TCEQ Water Availability Model (WAM) Run # 3 for determining current and future water supplies *unless a hydrologic variance approval is granted by the TWDB Executive Administrator for variations in modeling requirements*. TCEQ's WAM Run # 3, includes all water rights at full authorizations and no return flows.

The TCEQ Nueces Basin WAM Run # 3 does not accurately simulate the City's system operation policy within permit allowances nor does it reflect all aspects of the TCEQ 2001 Agreed Order. Furthermore, the hydrology ends in 1996 and doesn't cover the recent drought of record. WAM Run #3 is not reasonable for drought planning purposes or to reflect conditions expected in near term, actual drought conditions.

The previous Region N Plans (2006, 2011, 2016, and 2021 Plans) have received hydrologic variances to use the Corpus Christi Water Supply Model (formerly NUBAY model) to evaluate water availability for the Corpus Christi Regional Supply System. Since the original model developed in 1990, the Texas Water Development Board, U.S. Army Corp of Engineers, and City of Corpus Christi have made significant investments in the Corpus Christi Water Supply Model to simulate water availability for the regional water supply system, which spans multiple river basins.

All other run-of-river rights will be evaluated using the Nueces WAM Run #3 to estimate yields.

**Supporting Information for Use of the Corpus Christi Water Supply Model to Evaluate Water Availability for the Corpus Christi Regional Water Supply System:**

All previous Region N Plans have used the Corpus Christi Water Supply Model (formerly NUBAY model) to determine water availability for the City's Regional Water Supply System.

The Corpus Christi Regional Water Supply Model includes:

- Hydrology through 2015 for total model period of 82 years (1934 to 2015), to include the most recent drought of record
- New TWDB volumetric survey data for Lake Corpus Christi and Choke Canyon Reservoir with updated sedimentation rates

[1] First Amended General Guidelines for Development of the 2026 Regional Water Plans, October 2022.

- Integrated recent hydrology for Lake Texana and Colorado River (for Mary Rhodes Phase II supplies)
- Includes all provisions of the TCEQ 2001 Agreed Order
- Simulates current contracted supplies from Lake Texana, which includes the LNRA exercised call-back for local water users in Jackson County pursuant to City of Corpus Christi contract terms
- Operational flexibility to exercise water supply calls on the Garwood water right on the Colorado River at a variable rate according to diversion rate and priority date of the rights and based on MRP Phase II system capacities.
- Other updates

**Request for hydrologic variance for use of Safe Yield of 75,000 acft reserve and City's Reservoir Operations Policy to Evaluate Surface Water Supplies for the Corpus Christi Regional Supply System-**

**Background:** The TWDB guidelines[2] state that planning groups must use firm yield *unless a hydrologic variance approval is granted by the TWDB Executive Administrator for variations in modeling requirements*.

Firm yield is defined as the maximum water volume a reservoir can provide each year under a repeat of a drought of record, using anticipated sedimentation rates and assuming all senior rights are utilized and no return flows are included such that the reservoir storage draws down to zero or some other defined dead pool storage with no shortages.

Safe yield is a provision for climate and growth uncertainty and has been used in previous Region N plans and City of Corpus Christi water planning. Safe yield is defined as the maximum amount of supply that can be diverted from a reservoir system such that a *specified reserve amount remains* in storage during the modeled critical drought. A description of the City's existing reservoir operating policy and safe yield assumptions from the 2021 Region N Plan is included in Section 3.1: https://www.twdb.texas.gov/waterplanning/rwp/plans/2021/N/RegionN_2021RWP.pdf?d=3050.7000000029802

The previous Region N Plans (2006, 2011, and 2016) have received hydrologic variances to use safe yield and the City's reservoir system operations policy for water supply planning for the Corpus Christi Regional Water Supply System.

**Supporting Information for Use of Safe Yield and City's Reservoir Operations Policy:** The City's regional water supply system includes water supplies from the Nueces, Lavaca/Navidad, and Colorado basins. The City operates the reservoirs as a system and receives roughly half of its water supplies to meet current water demands from the Choke Canyon Reservoir/Lake Corpus Christi system and the other half from the east (i.e. Mary Rhodes Pipeline supplies originating from Lake Texana and Colorado River). The City operates their reservoirs and run-of-the-river rights on the Colorado River within the four corners of their permits and in conjunction with their contract with Lavaca Navidad River Authority (LNRA) for Lake Texana supplies, with the aggregated system yield being greater than individual reservoir yields when supplies are considered separately.

[2] First Amended General Guidelines for Fifth Cycle of Regional Water Plan Development, April 2017.

A significant amount of water supplied to the region is provided by Lake Texana in Region P and the Colorado River (Mary Rhodes Phase II) in Region K which helps mitigate drought impacts in the Nueces Basin. For example, on September 27, 2013, while the combined storage in Choke Canyon Reservoir and Lake Corpus Christi was at 33% of capacity, storage in Lake Texana was at 81.9% of capacity. Often, drought occurs at different times and at different levels of severity in the Nueces, Lavaca-Navidad, and Colorado River basins. This frequent situation gives the City flexibility in operating the CCR/LCC/Texana/MRP Phase II system to optimize water supplies[3]. The DOR for the Lavaca-Navidad and Colorado River basins are December 1952 to April 1957 and October 2007 to April 2015, respectively.[4]

The City's regional water supply system is prone to severe drought. Average annual inflows to Lake Corpus Christi and Choke Canyon System is lower with each successive drought. With the Corpus Christi Water Supply Model update in the 2021 Region N Plan cycle to include recent hydrology through 2015, a new drought of record was confirmed. In terms of severity and duration, the drought from 2007-2013 is considered to be a new DOR for the Region N planning area. Although the LCC/CCR system has not yet returned to full capacity, rainfall events in October 2013 and June 2015 ameliorated the severity of drought during this time and replenished stored water levels. The combined CCR/LCC system has not been full since September 2007 and system storage as of February 2020 is approximately 52%, hence, it is important to understand that estimates of firm or safe yield reported herein represent maximums.

The 2021 Region N Plan indicated that the critical drawdown was 73 months from October 2007 to October 2013 during which time the reservoirs went from full to a minimum storage of 32.6% before inflows restored lake storage. From 2010-2012, inflows into LCC and CCR were 32% less (or 59,000 ac-ft less) than the inflows from 1994-1996 into LCC and CCR. For additional comparison, the 2010-2012 inflows were almost 50% less (or 98,200 ac-ft less) than the inflow into LCC and CCR from 1954-1956. Annual inflow to the CCR/LCC System for the model period from 1934 to 2015 is shown in Figure 1. The 3-year moving average shows the severity and duration of the recent drought relative to other droughts since the 1930s, and includes the recovery in 2013 and 2015.

In the previous 2021 Region N Plan, the Corpus Christi Water Supply Model was used to estimate firm yield of the system for 2020 and 2070 sediment conditions, which is the maximum amount of water volume that can be provided under a repeat of drought of record (DOR) conditions assuming that all senior water rights will be totally utilized and all permit conditions met. In this case, this is the yield that would be available such that reservoir active storage would be equal to zero during the worst month of the drought of record. Figure 2 shows a storage trace for the LCC/CCR system under a hypothetical 2020 firm yield demand of 194,000 ac-ft/yr. The critical month of the DOR is September 2013.

Figure 3 shows the CCR/LCC system trace based safe yield to maintain a reserve in storage during the worst, historical drought of record that occurred from 2007 to (at least) 2013. The storage trace for the LCC/CCR system is similar to Figure 2 except that a 75,000 ac-ft reserve is maintained during the critical month of the DOR (September 2013) resulting in a 2020 safe yield of 178,000 ac-ft/yr. The safe yield maintains the 75,000 ac-ft reserve through the planning period (2020-2070) and declines to 167,000 ac-ft/yr by 2070 due to sedimentation.

[3] Subject to permitted or contracted supply amounts.

[4] https://www.lcra.org/download/2020-water-management-plan/?wpdmdl=11923 p. 3-2

Safe yield supply from the City's Regional Water Supply System is requested to serve as the basis of the needs analysis for entities relying on surface water supplies from the City and the City's wholesale customers (San Patricio Municipal Water District and South Texas Water Authority).

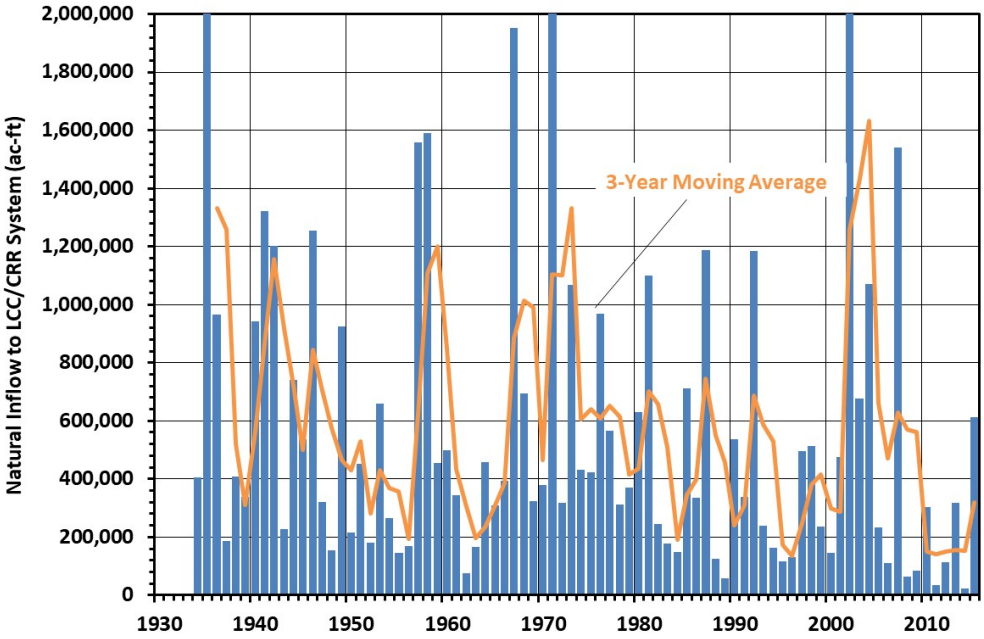



***Figure 1***
***Annual Natural Inflow to the CCR/LCC System***

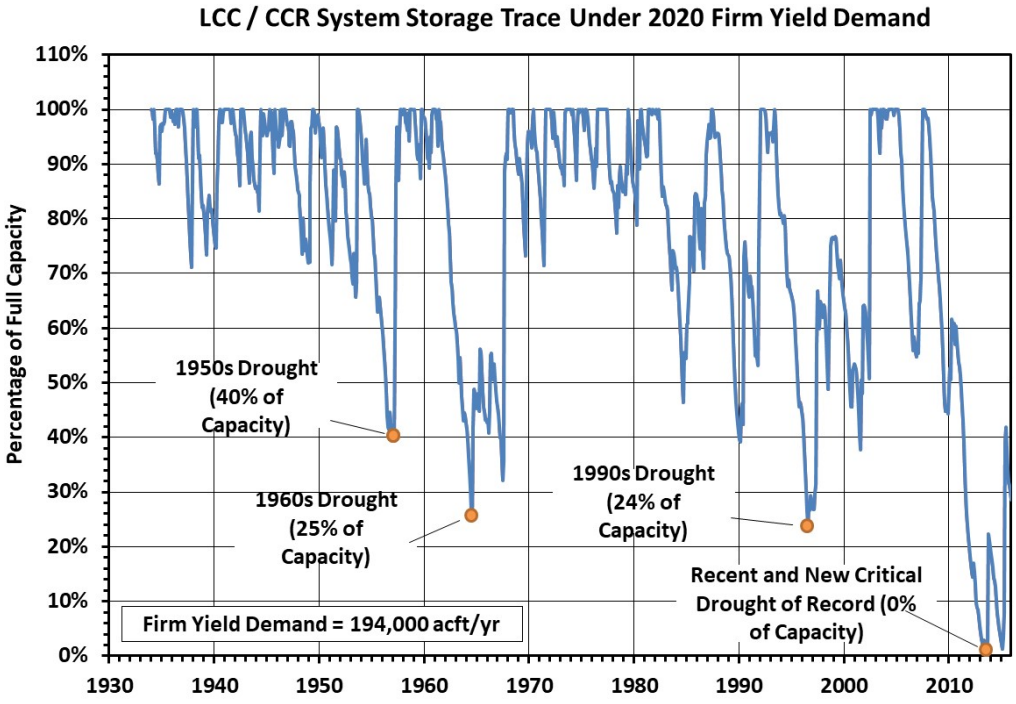
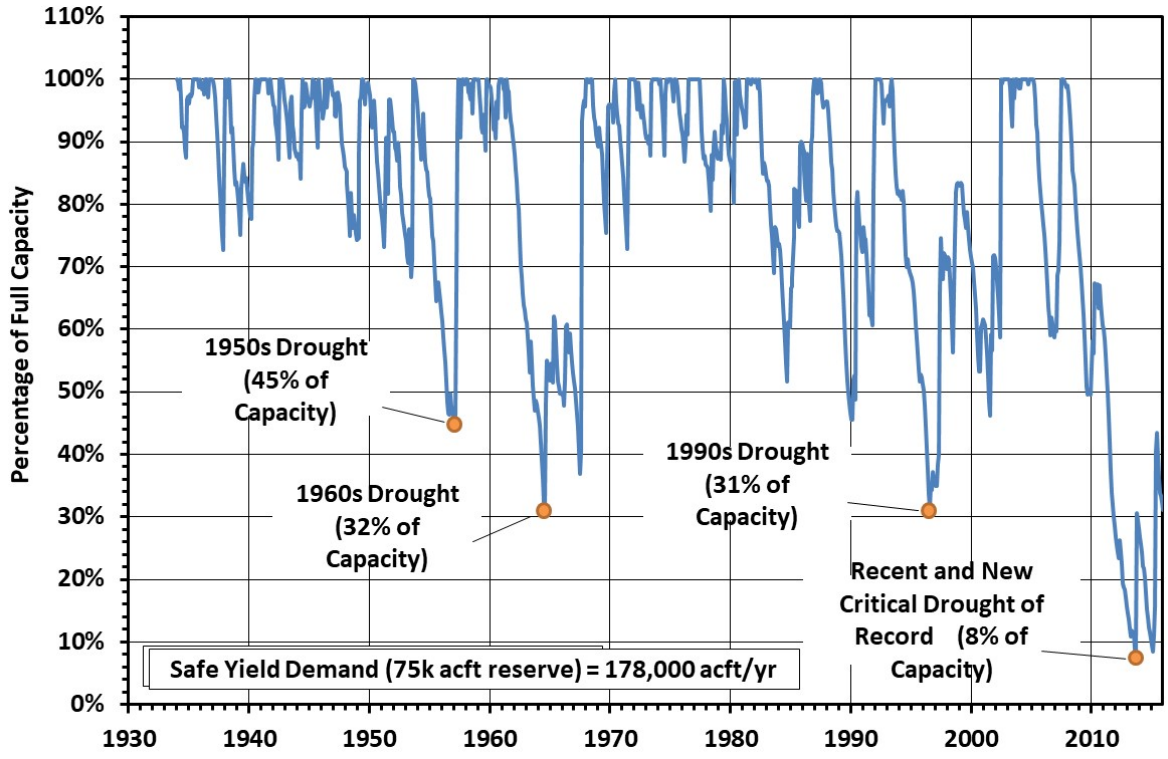



***Figure 2***
***CCR/LCC System Storage Trace- 2020 Firm Yield of 194,000 ac-ft/yr***

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***CCR/LCC System Storage Trace- 2020 Safe Yield of 178,000 ac-ft/yr***

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**TO:** Michele Foss, Regional Water Planner, Regional Water Planning

**FROM:** Nelun Fernando, Ph.D., Manager, Water Availability

**DATE**: January 3, 2024

**SUBJECT**: Recommendations on Region N's hydrologic variance request for the 2026 Regional Water Plan

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This memorandum summarizes my review recommendations on the hydrologic variance request submitted for assessing current surface water availability in Region N's 2026 regional water plan.

1. Use the Corpus Christi Water Supply Model to evaluate existing supplies from Lake Corpus Christi and Choke Canyon Reservoir for the Corpus Christi Regional Water Supply System.

   ***Recommendation:*** Approve request.

   ***Justification:*** The Corpus Christi Water Supply Model includes the operations of Choke Canyon Reservoir, Lake Corpus Christi, accounts for contracted supplies from Lake Texana, and the Mary Rose Pipeline Phase II System, and is capable of simulating the system's performance subject to the City of Corpus Christi's Phased Operations Plan and the 2001 Agreed Order governing freshwater inflow passage to the Nueces Estuary. Furthermore, the variance request was implemented in the 2006, 2011, 2016, and 2021 regional water plans.

2. Use of Safe Yield with 75,000 ac-ft reserve to evaluate existing surface water supplies for the Corpus Christi Regional Supply System.

   ***Recommendation:*** Approve request.

   ***Justification:*** The use of safe yield allows reservoir operators to maintain a supply in reserve and is a means of extending supply in the event of a drought worse than the drought of record. Furthermore, the same variance request was implemented in the 2021 regional water plan.

3. Use of hydrology updated through 2015, which includes the new drought of record from 2007 through 2013, to evaluate existing supply.

   ***Recommendation:*** Approve request.

   ***Justification:*** The 2021 Region N water plan identified 2007 through 2013 as a new drought of record within the Nueces River Basin. The extended hydrology covers the new drought of record.

   ***Additional resources for consideration:***
   The TWDB has developed auxiliary extended naturalized flows and reservoir evaporation through December 2021 for the Nueces Water Availability Model (WAM). Extended naturalized flow data are available at https://www.twdb.texas.gov/surfacewater/data/ExtendedNatFlow/Data/CRUN3_extended.txt and net reservoir evaporation data are available at https://www.twdb.texas.gov/surfacewater/data/ExtendedNatFlow/Data/CRUN3_eva.txt.

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Texas Water Development Board

P.O. Box 13231, 1700 N. Congress Ave.
Austin, TX 78711-3231, www.twdb.texas.gov
Phone (512) 463-7847, Fax (512) 475-2053

January 8, 2024

Messrs. Scotty Bledsoe and Pancho Hubert
Co-Chairs
Coastal Bend (Region N) Regional Water Planning Group
c/o Nueces River Authority
500 IH69, Suite 805
Robstown, TX 78380

Dear Messrs. Bledsoe and Hubert:

I have reviewed your request dated December 5, 2023, for approval of alternative water supply assumptions to be used in determining existing surface water availability. This letter confirms that the TWDB approves the following assumptions:

1. Use of the Corpus Christi Water Supply Model, including extending the hydrology through 2015, to evaluate existing supplies from Lake Corpus Christi and Choke Canyon Reservoir for the Corpus Christi Regional Water Supply System.
2. Use of Safe Yield with 75,000 ac-ft reserve to evaluate existing surface water supplies for the Corpus Christi Regional Supply System.

Although the TWDB approves the use of a safe yield with 75,000 ac-ft reserve for developing estimates of current water supplies, firm yield for each reservoir must still be reported to TWDB in the online planning database and plan documents.

For the purpose of evaluating potentially feasible water management strategies, the TCEQ WAM Run 3 is to be used, unless a separate hydrologic variance for water management strategy availability is submitted and approved by the TWDB.

While the TWDB authorizes these modification to evaluate existing water supplies for development of the 2026 Region N Coastal Bend RWP, it is the responsibility of the RWPG to ensure that the resulting estimates of water availability are reasonable for drought planning purposes and will reflect conditions expected in the event of actual drought conditions; and in all other regards will be evaluated in accordance with the most recent version of regional water planning contract Exhibit C, *General Guidelines for Development of the 2026 Regional Water Plans.*

Please do not hesitate to contact Michele Foss of our Regional Water Planning staff at 512-463-9225 or mfoss@twdb.texas.gov if you have any questions.

Sincerely,

Temple McKinnon

Digitally signed by Temple McKinnon
Date: 2024.01.08 15:19:01 -06'00'

Matt Nelson
Deputy Executive Administrator

c: Travis Pruski, Nueces River Authority
Kristi Shaw, HDR
Michele Foss, Water Supply Planning
Sarah Lee, Water Supply Planning
Nelun Fernando, Ph.D., Surface Water

# Appendix B - TWDB Socioeconomic Report

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# Socioeconomic Impacts of Projected Water Shortages for the Coastal Bend (Region N) Regional Water Planning Area

**Prepared in Support of the 2026 Region N Regional Water Plan**

Dr. John R. Ellis

Projections & Socioeconomic Analysis,
Water Supply Planning
Texas Water Development Board

June 2025

# Table of Contents

# Executive Summary

Evaluating the social and economic impacts of not meeting identified water needs is a required analysis in the regional water planning process. The Texas Water Development Board (TWDB) estimates these impacts for regional water planning groups (RWPGs) and summarizes the impacts in the state water plan. The analysis presented is for the Coastal Bend Regional Water Planning Group (Region N).

Based on projected water demands and existing water supplies, Region N identified water needs (potential shortages) that could occur within its region under a repeat of the drought of record for six water use categories (irrigation, livestock, manufacturing, mining, municipal and steam-electric power). The TWDB then estimated the annual socioeconomic impacts of those needs—if they are not met—for each water use category and as an aggregate for the region.

This analysis was performed using an economic impact modeling software package, IMPLAN (Impact for Planning Analysis), as well as other economic analysis techniques, and represents a snapshot of socioeconomic impacts that may occur during a single year repeat of the drought of record with the further caveat that no mitigation strategies are implemented. Decade-specific impact estimates assume that growth occurs, and future shocks are imposed on an economy at 10-year intervals. The estimates presented are not cumulative (i.e., summing up expected impacts from today up to the decade noted), but are simply snapshots of the estimated annual socioeconomic impacts should a drought of record occur in each particular decade based on anticipated water supplies and demands for that same decade.

For regional economic impacts, income losses and jobs potentially at risk are estimated within each planning decade (2030 through 2080). The income losses represent an approximation of gross domestic product (GDP) that would be foregone if water needs are not met.

The analysis also provides estimates of financial transfer impacts, which include tax losses (state, local, and utility tax collections); water trucking costs; and utility revenue losses. In addition, social impacts are estimated, encompassing lost consumer surplus (a welfare economics measure of consumer wellbeing); as well as population and school enrollment losses.

IMPLAN data reported that Region N generated more than $28 billion in gross domestic product (GDP) (2023 dollars) and supported more than 261,000 jobs in 2021. The Region N estimated total population was approximately 577,000 in 2021.

It is estimated that not meeting the identified water needs in Region N would result in an annually combined lost income impact of approximately $11.6 billion in 2030, increasing to $15.76 billion in 2080 (Table ES-1). In 2030, the region could lose approximately 49,000 jobs, and by 2080 at risk job losses would increase to approximately 66,600 if anticipated needs are not mitigated.

All impact estimates are in year 2023 dollars and were calculated using a variety of data sources and tools including the use of a region-specific IMPLAN model, data from TWDB annual water use

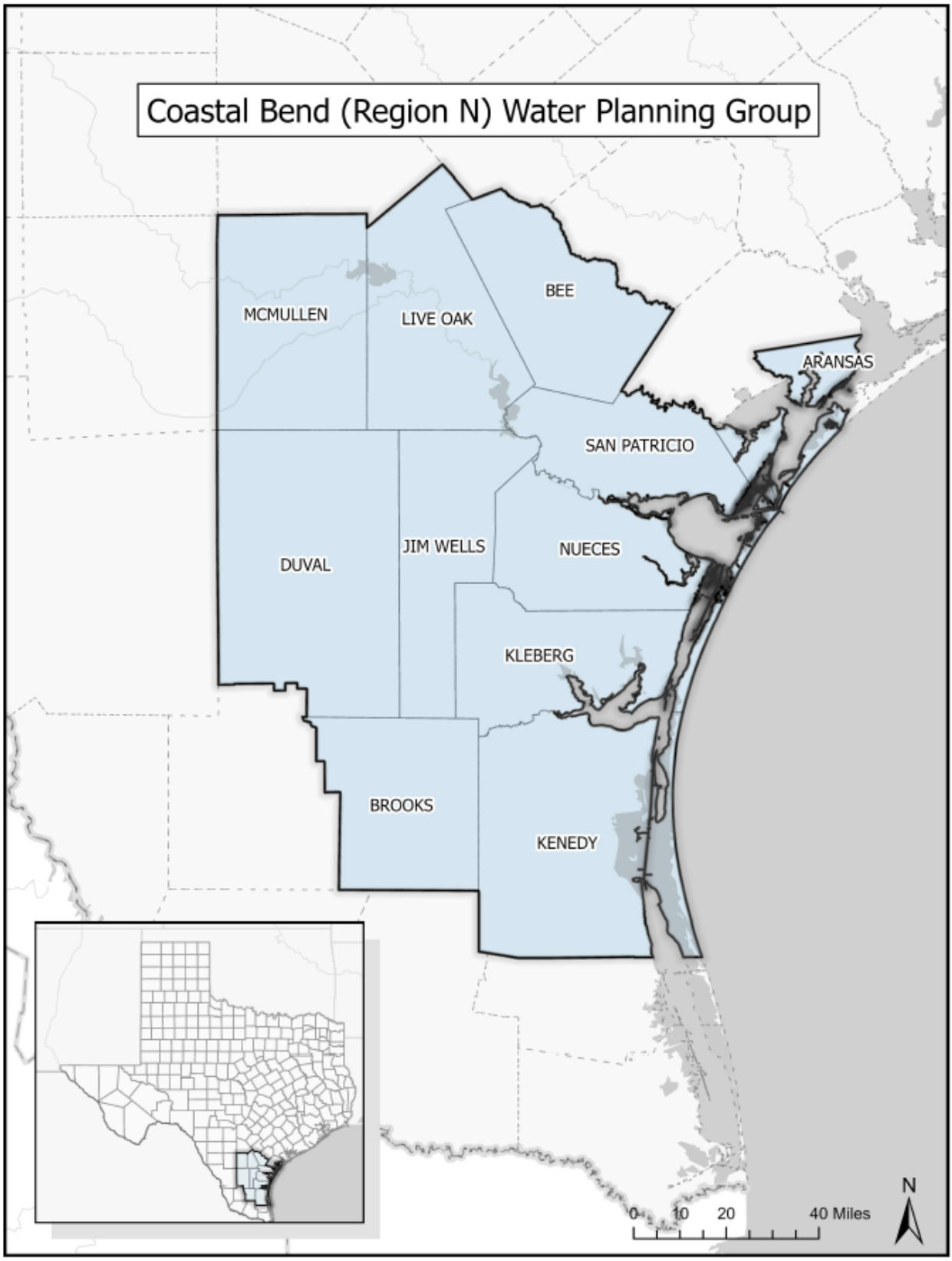
estimates, the U.S. Census Bureau, Texas Agricultural Statistics Service, and the Texas Municipal League.

**Table ES-1 Region N socioeconomic impact summary**

| Regional Economic Impacts | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| **Income losses ($ millions)*** | $11,606 | $12,709 | $13,540 | $14,248 | $15,033 | $15,761 |
| **At risk job losses** | 49,181 | 53,813 | 57,287 | 60,241 | 63,515 | 66,605 |
| **Financial Transfer Impacts** | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** |
| **Tax losses on production and imports ($ millions)*** | $612 | $671 | $715 | $752 | $794 | $833 |
| **Water trucking costs ($ millions)*** | $50 | $48 | $44 | $38 | $33 | $29 |
| **Utility revenue losses ($ millions)*** | $32 | $30 | $28 | $25 | $22 | $47 |
| **Utility tax revenue losses ($ millions)*** | $1 | $1 | $1 | $0 | $0 | $1 |
| **Social Impacts** | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** |
| **Consumer surplus losses ($ millions)*** | $80 | $75 | $67 | $58 | $44 | $27 |
| **At risk population out-migration** | 7,043 | 7,706 | 8,204 | 8,626 | 9,095 | 9,538 |
| **At risk school enrollment losses** | 1,285 | 1,406 | 1,497 | 1,574 | 1,660 | 1,741 |

* Year 2023 dollars, rounded**.** Entries denoted by a dash (-) indicate no estimated economic impact. Entries denoted by a zero ($0) indicate estimated income losses less than $500,000.

**Figure ES-1 Region N Planning Area Map**



# 1 Introduction

Water shortages during a repeat of the drought of record would likely curtail or eliminate certain economic activity in businesses and industries that rely heavily on water. Insufficient water supplies could not only have an immediate and real impact on the regional economy in the short term, but they could also adversely and chronically affect economic development in Texas. From a social perspective, water supply reliability is critical as well. Shortages could disrupt activity in homes, schools and government, and could adversely affect public health and safety. For these reasons, it is important to evaluate and understand how water supply shortages during drought could impact communities throughout the state.

As part of the regional water planning process, RWPGs must evaluate the social and economic impacts of not meeting water needs (31 Texas Administrative Code §357.33 (c)). Due to the complexity of the analysis and limited resources of the planning groups, the TWDB has historically performed this analysis for the RWPGs upon their request. Staff of the TWDB's Projections & Socioeconomic Analysis department designed and conducted this analysis in support of Region N, and those efforts for this Region as well as the other 15 regions allow consistency and a degree of comparability in the approach.

This document summarizes the results of the analysis and discusses the methodology used to generate the results. Section 1 provides a snapshot of the region's economy and summarizes the identified water needs in each water use category, which were calculated based on the RWPG's water supply and demand established during the regional water planning process. Section 2 defines each of ten impact assessment measures used in this analysis. Section 3 describes the methodology for the impact assessment and the approaches and assumptions specific to each water use category (i.e., irrigation, livestock, manufacturing, mining, municipal, and steam-electric power). Section 4 presents the impact estimates for each water use category with results summarized for the Region as a whole. Appendix A presents a further breakdown of the socioeconomic impacts by county.

## 1.1 Regional Economic Summary

The Region N Regional Water Planning Area generated more than $28 billion in gross domestic product (2023 dollars) and supported more than 261,000 jobs in the year 2021, according to the IMPLAN dataset utilized in this socioeconomic analysis. This activity accounted for approximately 1.5 percent of the state's total gross domestic product of 1.9 trillion dollars for the year 2021 based on IMPLAN. Table 1-1 lists all economic sectors ranked by the total value-added to the economy in Region N. The manufacturing and mining, quarrying, and oil and gas extraction sectors generated 33 percent of the region's total value-added and were also significant sources of tax revenue. The top employers in the region were in the health care and social assistance, accommodation and food services, and retail trade, sectors. Region N's estimated total population was roughly 577,000, which comprises approximately two percent of the state's total population in 2021.

To gain deeper insights into Region N's economy, it is helpful to examine Region N's industry types. Region N consists of 204 4-digit NAICS (North American Industry Classification System) industries in the year 2021 with an employment share of 1.7 percent total jobs in Texas and 2 percent of the

state's total tax revenue. Trade played a pivotal role in the Region's economy, indicating connections with external markets. Major export commodities included refined petroleum products, petrochemicals, and support activities for oil & gas operations. Major import commodities included natural gas & crude petroleum, insurance, and real estate services.

This represents a snapshot of the regional economy as a whole, and it is important to note that not all economic sectors were included in the TWDB socioeconomic impact analysis. Data considerations prompted use of only the more water-intensive sectors within the economy because damage estimates could only be calculated for those economic sectors which had both reliable income and water use estimates.

**Table 1-1 Region N regional economy by economic sector***

| Economic sector | Value-added ($ millions) | Tax ($ millions) | Jobs |
|---|---|---|---|
| Manufacturing | $6,413.68 | $206.82 | 10,930 |
| Mining, Quarrying, and Oil and Gas Extraction | $3,193.31 | $653.94 | 9,253 |
| Health Care and Social Assistance | $2,856.54 | ($92.10) | 42,643 |
| Construction | $1,904.30 | ($54.89) | 21,748 |
| Retail Trade | $1,792.28 | $439.09 | 27,939 |
| Wholesale Trade | $1,779.49 | $498.89 | 7,373 |
| Real Estate and Rental and Leasing | $1,779.31 | $253.89 | 11,739 |
| Professional, Scientific, and Technical Services | $1,777.17 | $0.35 | 16,783 |
| Accommodation and Food Services | $1,402.03 | $7.53 | 33,675 |
| Finance and Insurance | $1,025.12 | $49.46 | 12,614 |
| Other Services (except Public Administration) | $978.78 | $89.69 | 16,476 |
| Administrative and Support and Waste Management and Remediation Services | $936.55 | $34.34 | 16,633 |
| Utilities | $856.02 | $196.11 | 1,221 |
| Transportation and Warehousing | $692.70 | $55.45 | 10,901 |
| Information | $536.59 | $173.30 | 2,144 |
| Agriculture, Forestry, Fishing and Hunting | $377.77 | ($58.53) | 10,916 |
| Management of Companies and Enterprises | $238.94 | $7.10 | 2,250 |
| Arts, Entertainment, and Recreation | $201.91 | $13.03 | 3,823 |
| Educational Services | $65.83 | $1.15 | 1,960 |
| **Grand Total** | **$28,808.34** | **$2,474.62** | **261,020** |

*Source: 2021 IMPLAN for 546 sectors aggregated by 2-digit NAICS

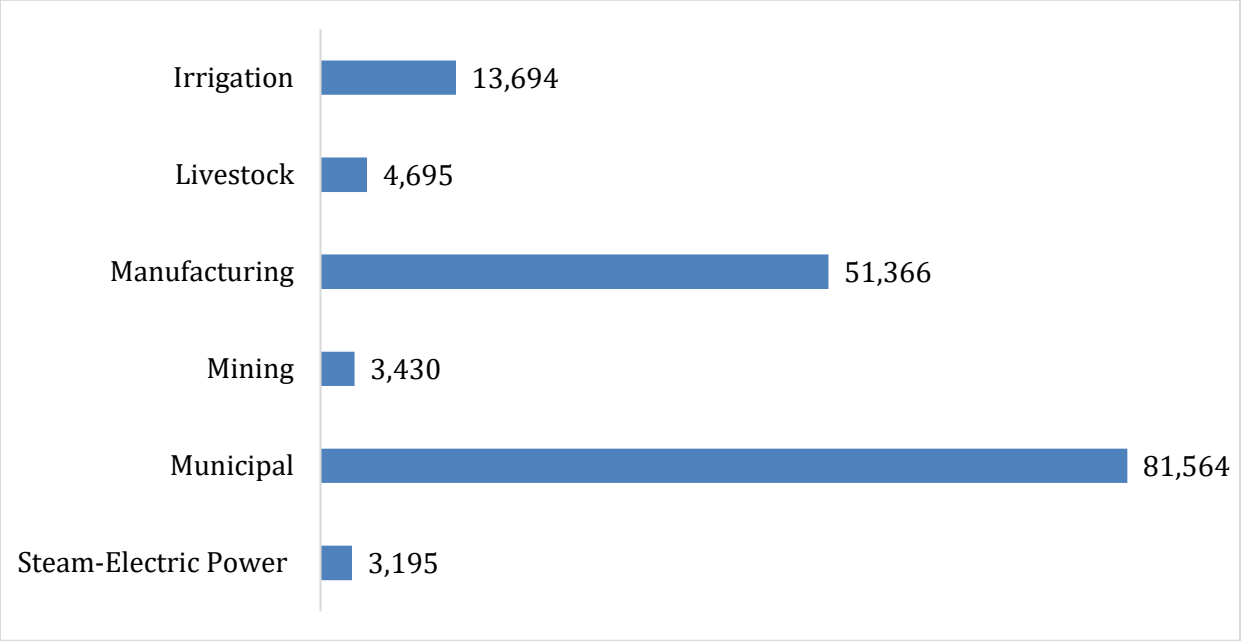
Note that for some sectors, taxes may be negative. This is due to federal subsidies in the sector and the subsequent net value in taxes collected and subsidies paid results in a negative tax payment (i.e., the subsidies paid were larger than the taxes collected for the year). Due to the Covid-19

pandemic, many sectors received more subsidies in the year 2021 than previous years, and the resulting net value for taxes is negative.

## 1.2 Regional Water Use Summary

While the manufacturing and mining sectors led the region in economic output, the majority (52 percent) of water use occurred in the municipal water use category in 2021. The manufacturing sector accounted for approximately 33 percent of Region N's water use in 2021. Figure 1-1 illustrates Region N's breakdown of the 2021 water use estimates by TWDB water use category.

**Figure 1-1 Region N 2021 water use estimates by water use category (in acre-feet)**




Source: TWDB Annual Water Use Estimates (all values in acre-feet)

## 1.3 Identified Regional Water Needs (Potential Shortages)

As part of the regional water planning process, the TWDB adopted water demand projections for water user groups (WUG) in Region N with input from the planning group. WUG-level demand projections were established for utilities that provide more than 100 acre-feet of annual water supply, combined rural areas (designated as county-other), and county-wide water demand projections for five non-municipal categories (irrigation, livestock, manufacturing, mining and steam-electric power) per (31 TAC § 357.10(43)). The RWPG then compared demands to the existing water supplies of each WUG to determine potential shortages, or needs, by decade.

Table 1-2 summarizes the region's identified water needs in the event of a repeat of the drought of record (needs identified in the Initially Prepared Plans). Demand management, such as conservation, or the development of new infrastructure to increase supplies, are water management strategies that may be recommended by the planning group to address those needs. This analysis assumes that no strategies are implemented, and that the identified needs correspond

to future water shortages. Note that projected water needs generally increase over time, primarily due to anticipated population growth, economic growth, or declining supplies. To provide a general sense of proportion, total projected needs as an overall percentage of total demand by water use category are also presented in aggregate in Table 1-2. Projected needs for individual water user groups within the aggregate can vary greatly and may reach 100% for a given WUG and water use category. A detailed summary of water needs appears in Chapter 4 of the 2026 Region N Regional Water Plan.

**Table 1-2 Regional water needs summary by water use category***

| Water Use Category | | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|
| **Irrigation** | water needs (acre-feet per year) | - | - | - | - | - | - |
| | % of the category's total water demand | 0% | 0% | 0% | 0% | 0% | 0% |
| **Livestock** | water needs (acre-feet per year) | - | - | - | - | - | - |
| | % of the category's total water demand | 0% | 0% | 0% | 0% | 0% | 0% |
| **Manufacturing** | water needs (acre-feet per year) | 33,680 | 36,890 | 39,309 | 41,373 | 43,656 | 45,756 |
| | % of the category's total water demand | 29% | 32% | 34% | 36% | 38% | 39% |
| **Mining** | water needs (acre-feet per year) | 113 | 123 | 118 | 109 | 120 | 101 |
| | % of the category's total water demand | 2% | 2% | 2% | 2% | 2% | 10% |
| **Municipal**** | water needs (acre-feet per year) | 7,291 | 6,975 | 6,520 | 5,952 | 5,348 | 9,809 |
| | % of the category's total water demand | 7% | 6% | 6% | 5% | 5% | 9% |
| **Steam-Electric Power** | water needs (acre-feet per year) | - | - | - | - | - | - |
| | % of the category's total water demand | 0% | 0% | 0% | 0% | 0% | 0% |
| **Total water needs (acre-feet per year)** | | **41,084** | **43,988** | **45,947** | **47,434** | **49,124** | **55,666** |

*Entries denoted by a dash (-) indicate no identified water need for a given water use category.

**** Municipal category consists of residential and non-residential (commercial and institutional) subcategories.

# 2 Impact Assessment Measures

A required component of the regional and state water plans is to estimate the potential economic and social impacts of potential water shortages during a repeat of the drought of record. Consistent with previous water plans, ten impact measures were estimated and are described in Table 2-1.

**Table 2-1 Socioeconomic impact analysis measures**

| **Regional economic impacts** | **Description** |
|---|---|
| **Income losses - value-added** | The value of output less the value of intermediate consumption; it is a measure of the contribution to gross domestic product (GDP) made by an individual producer, industry, sector, or group of sectors within a year. Value-added measures used in this report have been adjusted to include the direct, indirect, and induced monetary impacts on the region. |
| **Income losses - electrical power purchase costs** | Proxy for income loss in the form of additional costs of power as a result of impacts of water shortages. |
| **At risk job losses** | Number of part-time and full-time jobs at risk of being lost due to the shortage. These values have been adjusted to include the direct, indirect, and induced employment impacts on the region. |
| **Financial transfer impacts** | **Description** |
| **Tax losses on production and imports** | Sales and excise taxes not collected due to the shortage, in addition to customs duties, property taxes, motor vehicle licenses, severance taxes, other taxes, and special assessments less subsidies. These values have been adjusted to include the direct, indirect and induced tax impacts on the region. |
| **Water trucking costs** | Estimated cost of shipping potable water. |
| **Utility revenue losses** | Foregone utility income due to not selling as much water. |
| **Utility tax revenue losses** | Foregone miscellaneous gross receipts tax collections. |
| **Social impacts** | **Description** |
| **Consumer surplus losses** | A welfare measure of the lost value to consumers accompanying restricted water use. |

| | |
|---|---|
| **At risk population out-migration** | Potential population losses accompanying potential job losses. |
| **At risk school enrollment losses** | Potential school enrollment losses (K-12) accompanying potential job losses. |

## 2.1 Regional Economic Impacts

The two key measures used to assess regional economic impacts are income losses and at risk job losses. The income losses presented consist of the sum of value-added losses and the additional purchase costs of electrical power.

### *Income Losses - Value-added Losses*

Value-added is the value of total output less the value of the intermediate inputs also used in the production of the final product. Value-added is similar to GDP, a familiar measure of the productivity of an economy. The loss of value-added due to water shortages is estimated by input-output analysis using the IMPLAN software package, and includes the direct, indirect, and induced monetary impacts on the region. The indirect and induced effects are measures of reduced income as well as reduced employee spending for those input sectors which provide resources to the water shortage impacted production sectors.

### *Income Losses - Electric Power Purchase Costs*

The electrical power grid and market within the state is a complex interconnected system. The industry response to water shortages, and the resulting impact on the region, are not easily modeled using traditional input/output impact analysis and the IMPLAN model. Adverse impacts on the region will occur and are represented in this analysis by estimated additional costs associated with power purchases from other generating plants within the region or state. Consequently, the analysis employs additional power purchase costs as a proxy for the value-added impacts for the steam-electric power water use category, and these are included as a portion of the overall income impact for completeness.

For the purpose of this analysis, it is assumed that power companies with insufficient water will be forced to purchase power on the electrical market at a projected higher rate of 5.60 cents per kilowatt hour. This rate is based upon the average day-ahead market purchase price of electricity in Texas that occurred during the recent drought period in 2011. This price is assumed to be comparable to those prices which would prevail in the event of another drought of record.

### *At Risk Job Losses*

The number of jobs at risk of being lost due to the economic impact is estimated using IMPLAN output associated with each TWDB water use category. Because of the difficulty in predicting outcomes and a lack of relevant data, at risk job loss estimates are not calculated for the steam-electric power category. Furthermore, the estimates of such job losses for the remaining water use

sectors do not consider conversion to hybrid or remote employment, as IMPLAN employment estimates are based on the establishment locations.

## 2.2 Financial Transfer Impacts

Several impact measures evaluated in this analysis are presented to provide additional detail concerning potential impacts on a portion of the economy or government. These financial transfer impact measures include lost tax collections (on production and imports), trucking costs for imported water, declines in utility revenues, and declines in utility tax revenue collected by the state. These measures are not solely adverse, with some having both positive and negative impacts. For example, cities and residents would suffer if forced to pay large costs for trucking in potable water. Trucking firms, conversely, would benefit from the transaction. Additional detail for each of these measures follows.

### *Tax Losses on Production and Imports*

Reduced production of goods and services accompanying water shortages adversely impacts the collection of taxes by state and local government. The regional IMPLAN model is used to estimate reduced tax collections associated with the reduced output in the economy. Impact estimates for this measure include the direct, indirect, and induced impacts for the affected sectors.

### *Water Trucking Costs*

In instances where water shortages for a municipal water user group are estimated by RWPGs to exceed 80 percent of water demands, it is assumed that water would need to be trucked in to support basic consumption and sanitation needs. For water shortages of 80 percent or greater, a fixed, maximum of $45,500[1] per acre-foot of water applied as an economic cost. This water trucking cost was utilized for both the residential and non-residential portions of municipal water needs.

### *Utility Revenue Losses*

Lost utility income is calculated as the price of water service multiplied by the quantity of water not sold during a drought shortage. Such estimates are obtained from utility-specific pricing data provided by the Texas Municipal League, where available, for both water and wastewater. These water rates are applied to the potential water shortage to estimate forgone utility revenue as water providers sold less water during the drought due to restricted supplies.

[1] Based on a TWDB staff survey of year 2023 water trucking costs in the state. There are many factors and variables that would determine actual water trucking costs including distance, cost of water, and length of drought.

### *Utility Tax Losses*

Foregone utility tax losses include estimates of forgone miscellaneous gross receipts taxes[2]. Reduced water sales reduce the amount of utility tax that would be collected by the State of Texas for water and wastewater service sales.

## 2.3 Social Impacts

### *Consumer Surplus Losses for Municipal Water Users*

Consumer surplus loss is a measure of impact to the wellbeing of municipal water users when their water use is restricted. Consumer surplus is the difference between how much a consumer is willing and able to pay for a commodity (i.e., water) and how much they actually have to pay. The difference is a benefit to the consumer's wellbeing since they do not have to pay as much for the commodity as they would be willing to pay. Consumer surplus may also be viewed as an estimate of how much consumers would be willing to pay to keep the original quantity of water which they used prior to the drought. Lost consumer surplus estimates within this analysis only apply to the residential portion of municipal demand, with estimates being made for reduced outdoor and indoor residential use. Lost consumer surplus estimates varied widely by location and degree of water shortage.

### *At Risk Population and School Enrollment Losses*

Population at risk of out-migration due to water shortages, as well as the associated decline in school enrollment, are based upon the at risk job loss estimates discussed in Section 2.1. A simplified ratio of at risk jobs and population out-migration are calculated for the state as a whole based on a recent study of how job layoffs impact the labor market population.[3] For every 100 jobs lost, 14 people were assumed to move out of the area. This ratio does not consider conversion to hybrid or remote employment and subsequent impacts to the labor market population. School enrollment losses are estimated as a proportion of the population at risk of out-migration based upon public school enrollment data from the Texas Education Agency concerning the age K-12 population within the state (approximately 18%).

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[2] https://comptroller.texas.gov/taxes/misc-gross-receipts/

[3] Foote, Andrew, Grosz, Michel, Stevens, Ann. "Locate Your Nearest Exit: Mass Layoffs and Local Labor Market Response." University of California, Davis. April 2015, http://paa2015.princeton.edu/papers/150194. The study utilized Bureau of Labor Statistics data regarding layoffs between 1996 and 2013, as well as Internal Revenue Service data regarding migration, to model the change in the population as the result of a job layoff event. The study found that layoffs impact both out-migration and in-migration into a region, and that a majority of those who did move following a layoff moved to another labor market rather than an adjacent county.

# 3 Socioeconomic Impact Assessment Methodology

This portion of the report provides a summary of the methodology used to estimate the potential economic impacts of future water shortages. The general approach employed in the analysis was to obtain estimates for at risk income and job losses on the smallest geographic level that the available data would support, tie those values to their accompanying historic water use estimate, and thereby determine a maximum impact per acre-foot of water shortage for each of the socioeconomic measures. The calculations of economic impacts are based on the overall composition of the economy divided into many underlying economic sectors. Sectors in this analysis refer to one or more of the 546 specific production sectors of the economy designated within IMPLAN, the economic impact modeling software used for this assessment. Economic impacts within this report are estimated for approximately 330 of these economic sectors, with the focus on the more water-intensive production sectors. The economic impacts for a single water use category consist of an aggregation of impacts to multiple, related IMPLAN economic sectors.

## 3.1 Analysis Context

The context of this socioeconomic impact analysis involves situations where there are physical shortages of groundwater or surface water due to a recurrence of drought of record conditions. Anticipated shortages for specific water users may be nonexistent in earlier decades of the planning horizon, yet population growth or greater industrial, agricultural or other sector demands in later decades may result in greater overall demand, exceeding the existing supplies. Estimated socioeconomic impacts measure what would happen if water user groups experience water shortages for a period of one year. Actual socioeconomic impacts would likely become larger as drought of record conditions persist for periods greater than a single year.

## 3.2 IMPLAN Model and Data

The Input-Output (I-O) model provides a framework to analyze an event like a water shortage during a one-year repeat of the drought of record that impacts interdependent economic sectors. IMPLAN cloud is used as the primary software for estimating the value-added, jobs, and tax related impact measures. IMPLAN is a widely-accepted software model that combines data and analytics to empower a greater understanding of different economic impacts utilizing the foundations of I-O modeling techniques. This analysis employed regional level models, developed utilizing Regional Water Planning Area counties, to determine key economic impacts. IMPLAN was originally developed by the U.S. Forestry Service in the 1970's to model economic activity at varying geographic levels. The model is currently maintained by the IMPLAN Group LLC (implan.com) which collects and sells county and state specific data and software.

IMPLAN currently combines information for 546 IMPLAN industry sectors. For the purpose of this socioeconomic impact analysis, all water-intensive industries are consolidated into six water user categories (irrigation, livestock, manufacturing, mining, municipal, and steam-electric power). Estimates of value-added for a water use category is obtained by summing value-added estimates across the relevant IMPLAN sectors associated with that water use category, for which there is

estimated water use in Texas. A similar approach was followed to estimate the number of at risk jobs as well as tax losses on production and imports.

IMPLAN categorizes the impact of water shortage events on value-added, jobs, and tax estimates into three components:

- ***Direct effects*** representing the initial change in the industry analyzed;
- ***Indirect effects*** that are changes in inter-industry transactions as supplying industries respond to reduced demands from the directly affected industries; and,
- ***Induced effects*** that reflect changes in local spending that result from reduced household income among employees in the directly and indirectly affected industry sectors.

## 3.3 Elasticity of Economic Impacts

The economic impact of a water need is based on the size of the water need relative to the total water demand for each water user group. Smaller water shortages, for example, less than 5 percent, are generally anticipated to result in no initial negative economic impact because water users are assumed to have a certain amount of flexibility in dealing with small shortages. As a water shortage intensifies, however, such flexibility lessens and results in actual and increasing economic losses, eventually reaching a representative maximum impact estimate per unit volume of water. To account for these characteristics, an elasticity adjustment function is used to estimate impacts for the income, tax and job loss measures. Figure 3-1 illustrates this general relationship for the adjustment functions. Negative impacts are assumed to begin accruing when the shortage reaches the lower bound 'b1' (5 percent in Figure 3-1), with impacts then increasing linearly up to the 100 percent impact level (per unit volume) once the upper bound reaches the 'b2' level shortage (40 percent in Figure 3-1).

To illustrate this, if the total annual value-added for manufacturing in the region was $2 million and the reported annual volume of water used in that industry is 10,000 acre-feet, the estimated economic measure of the water shortage would be $200 per acre-foot. The economic impact of the shortage would then be estimated using this value-added amount as the maximum impact estimate ($200 per acre-foot) applied to the anticipated shortage volume and then adjusted by the elasticity function. Using the sample elasticity function shown in Figure 3-1, an approximately 22 percent shortage in the manufacturing category would indicate an economic impact estimate of 50% of the original $200 per acre-foot impact value (i.e., $100 per acre-foot).

Such adjustments are not required in estimating lost consumer surplus, utility revenue losses, or utility tax losses. Estimates of lost consumer surplus rely on utility-specific demand curves with the lost consumer surplus estimate calculated based on the relative percentage of the utility's water shortage. Estimated changes in population and school enrollment are indirectly related to the elasticity of job losses.

Assumed values for the lower and upper bounds 'b1' and 'b2' vary by water use category and are presented in Table 3-1.

**Figure 3-1 Example economic impact elasticity function (as applied to a single water user's shortage)**

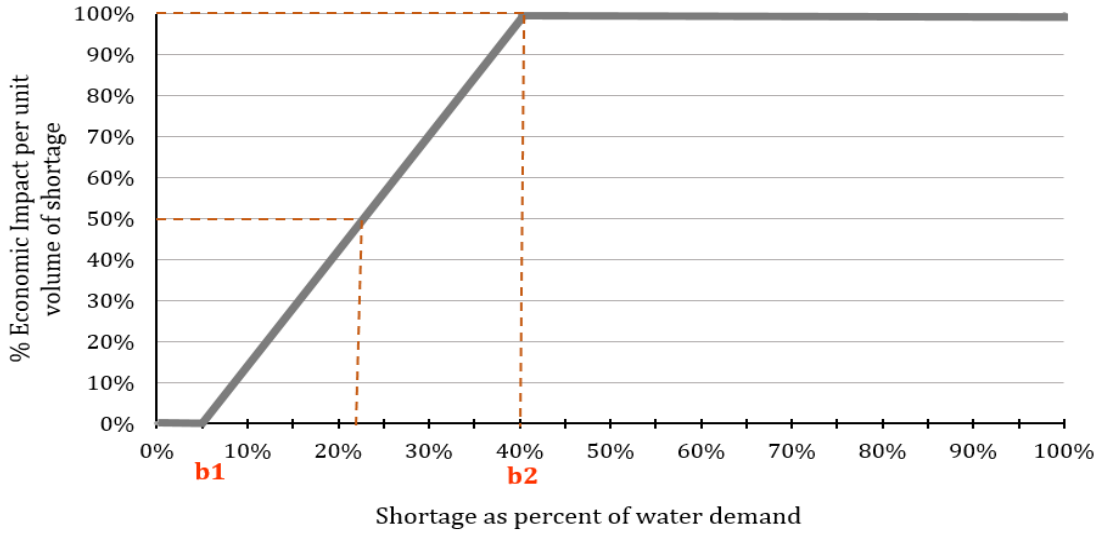


**Table 3-1 Economic impact elasticity function lower and upper bounds**

| Water use category | Lower bound (b1) | Upper bound (b2) |
|---|---|---|
| **Irrigation** | **5%** | **40%** |
| **Livestock** | **5%** | **10%** |
| **Manufacturing** | **5%** | **40%** |
| **Mining** | **5%** | **40%** |
| **Municipal (non-residential water intensive subcategory)** | **5%** | **40%** |
| **Steam-electric power** | **N/A** | **N/A** |

## 3.4 Analysis Assumptions and Limitations

The modeling of complex systems requires making many assumptions and acknowledging the model's uncertainty and limitations. This is particularly true when attempting to estimate a wide range of socioeconomic impacts over a large geographic area and into future decades. Some of the key assumptions and limitations of this methodology include:

1. The foundation for estimating the socioeconomic impacts of water shortages resulting from a drought are the water needs (potential shortages) that were identified by RWPGs as part of the

regional water planning process. These needs have some uncertainty associated with them but serve as a reasonable basis for evaluating the potential impacts of a drought of record event.

2. All estimated socioeconomic impacts are snapshots for years in which water needs were identified (i.e., 2030, 2040, 2050, 2060, 2070, and 2080). The estimates are independent and distinct "what if" scenarios for each particular year, and water shortages are assumed to be temporary events resulting from a single year recurrence of drought of record conditions. The evaluation assumed that no recommended water management strategies are implemented. Note that the estimates presented are not cumulative (i.e., summing up expected impacts from today up to the decade noted), but are simply snapshots of the estimated annual socioeconomic impacts should a drought of record occur in each particular decade based on anticipated water supplies and demands for that same decade.

3. Because the overarching context of this analysis is a one-year repeat drought of record, it is assumed that water-related utilities and companies would not implement mitigation measures or shock absorbers within such a short timeframe. Therefore, estimated impacts to the economy in this report may appear higher than if mitigation strategies were implemented in the short-term. If faced with drought over a longer timeframe, individual utilities and companies might alter their behavior to induce more efficient use of the limited water supplies available to them.

4. Input-output models such as IMPLAN rely on a static profile of the structure of the economy as it appears today. IMPLAN Input-output analysis is a backward-looking model, as it only reflects effects of input industries. This presumes that the relative contributions of all sectors of the economy would remain the same, regardless of changes in technology, availability of limited resources, and other structural changes to the economy that may occur in the future. Changes in water use efficiency will undoubtedly take place in the future as supplies become more stressed. Use of the static IMPLAN structure was a significant assumption and simplification considering the 50-year time period examined in this analysis. To presume an alternative future economic makeup, however, would entail positing many other major assumptions that would very likely generate as much or more error.

5. This is not a form of cost-benefit analysis. That approach to evaluating the economic feasibility of a specific policy or project employs discounting future benefits and costs to their present value dollars using some assumed discount rate. The methodology employed in this effort to estimate the economic impacts of future water shortages did not use any discounting methods to weigh future costs differently through time.

6. All monetary values originally based upon year 2021 IMPLAN and other sources are reported in constant year 2023 dollars to be consistent with the water management strategy requirements in the State Water Plan.

7. IMPLAN based loss estimates (income-value-added, jobs, and taxes on production and imports) are calculated only for those IMPLAN sectors for which the TWDB's Water Use Survey (WUS) data was available and deemed reliable. Every effort is made in the annual WUS effort to capture all relevant firms who are significant water users. Lack of response to the WUS, or omission of relevant firms, impacts the loss estimates.

8. Impacts are annual estimates. The socioeconomic analysis does not reflect the full extent of impacts that might occur as a result of persistent water shortages occurring over an extended duration. The drought of record in most regions of Texas lasted several years.

9. Loss in value-added estimates are the primary estimate of the economic impacts within this report. One may be tempted to add consumer surplus impacts to obtain an estimate of total adverse economic impacts to the region, but the consumer surplus measure represents the change to the wellbeing of households (and other water users), not an actual change in the flow of dollars through the economy. The two measures (value-added and consumer surplus) are both valid impacts but ideally should not be summed.

10. The value-added, jobs, and taxes on production and import impacts include the direct, indirect and induced effects to capture backward linkages in the economy described in Section 2.1. Population and school enrollment at risk of out-migration also indirectly include such effects as they are based on the associated losses in employment. The remaining measures (consumer surplus, utility revenue, utility taxes, additional electrical power purchase costs, and potable water trucking costs), however, do not include any induced or indirect effects.

11. The majority of impacts estimated in this analysis may be more conservative (i.e., smaller) than those that might actually occur under drought of record conditions due to not including impacts in the forward linkages in the economy. Input-output models such as IMPLAN only capture backward linkages on suppliers (including households that supply labor to directly affected industries). While this is a common limitation in this type of economic modeling effort, it is important to note that forward linkages on the industries that use the outputs of the directly affected industries can also be very important. A good example is impacts on livestock operators. Livestock producers tend to suffer substantially during droughts, not because there is not enough water for their stock, but because reductions in available pasture and higher prices for purchased hay have significant economic effects on their operations. Food processors could be in a similar situation if they cannot get the grains or other inputs that they need. These effects are not captured in IMPLAN, resulting in conservative impact estimates.

12. The model does not reflect dynamic economic responses to water shortages as they might occur, nor does the model reflect economic impacts associated with a recovery from a drought of record including:
    a. The likely significant economic rebound to some industries immediately following a drought, such as landscaping;

b. The cost and time to rebuild liquidated livestock herds (a major capital investment in that industry);
c. Direct impacts on recreational sectors (i.e., stranded docks and reduced tourism); or,
d. Impacts of negative publicity on Texas' ability to attract population and business in the event that it was not able to provide adequate water supplies for the existing economy.

13. Estimates for at risk job losses and the associated population and school enrollment changes may exceed what would actually occur. In practice, firms may be hesitant to lay off employees, even in difficult economic times. Estimates of potential population and school enrollment changes are based on regional evaluations and therefore do not necessarily reflect what might occur on a statewide basis.

14. **The results must be interpreted carefully. It is the general and relative magnitudes of impacts as well as the changes of these impacts over time that should be the focus rather than the absolute numbers.** Analyses of this type are much better at predicting relative percent differences brought about by a shock to a complex system (i.e., a water shortage) than the precise size of an impact. To illustrate, assuming that the estimated economic impacts of a drought of record on the manufacturing and mining water user categories are $2 and $1 million, respectively, one should be more confident that the economic impacts on manufacturing are twice as large as those on mining and that these impacts will likely be in the millions of dollars. But one should have less confidence that the actual total economic impact experienced would be $3 million.

15. The methodology does not capture "spillover" effects between regions – or the secondary impacts that occur outside of the region where the water shortage is projected to occur.

16. The methodology that the TWDB has developed for estimating the economic impacts of unmet water needs, and the assumptions and models used in the analysis, are specifically designed to estimate potential economic effects at the regional and county levels. Although it may be tempting to add the regional impacts together in an effort to produce a statewide result, the TWDB cautions against that approach for a number of reasons. The IMPLAN modeling (and corresponding economic multipliers) are all derived from regional models – a statewide model of Texas would produce somewhat different multipliers. As noted in point 14 within this section, the regional modeling used by TWDB does not capture spillover losses that could result in other regions from unmet needs in the Region analyzed, or potential spillover gains if decreased production in one Region leads to increases in production elsewhere. The assumed drought of record may also not occur in every region of Texas at the same time, or to the same degree.

# 4 Analysis Results

This section presents estimates of potential economic impacts that could reasonably be expected in the event of water shortages associated with a drought of record and if no recommended water management strategies were implemented. Projected economic impacts for the six water use categories (irrigation, livestock, manufacturing, mining, municipal, and steam-electric power) are reported by decade.

## 4.1 Impacts for Irrigation Water Shortages

None of the 11 counties in the Region are projected to experience water shortages in the irrigated agriculture water use category for one or more decades within the planning horizon. Estimated impacts to this water use category appear in Table 4-1. Note that tax collection impacts were not estimated for this water use category. IMPLAN data indicates a negative tax impact (i.e., increased tax collections) for the associated production sectors, primarily due to past subsidies from the federal government. However, it was not considered realistic to report increasing tax revenues during a drought of record.

**Table 4-1 Impacts of water shortages on irrigation**

| Impact measure | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| **Income losses ($ millions)*** | $- | $- | $- | $- | $- | $- |
| **At risk job losses** | - | - | - | - | - | - |

* Year 2023 dollars, rounded. Entries denoted by a dash (-) indicate no estimated economic impact. Entries denoted by a zero ($0) indicate estimated income losses less than $500,000.

## 4.2 Impacts for Livestock Water Shortages

None of the 11 counties in the Region are projected to experience water shortages in the livestock water use category. Estimated impacts to this water use category appear in Table 4-2.

**Table 4-2 Impacts of water shortages on livestock**

| Impact measure | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| **Income losses ($ millions)*** | $- | $- | $- | $- | $- | $- |
| **At risk job losses** | - | - | - | - | - | - |
| **Tax losses on production and imports ($ millions)*** | $- | $- | $- | $- | $- | $- |

* Year 2023 dollars, rounded. Entries denoted by a dash (-) indicate no estimated economic impact. Entries denoted by a zero ($0) indicate estimated income losses less than $500,000.

## 4.3 Impacts of Manufacturing Water Shortages

Manufacturing water shortages in the Region are projected to occur in two of the 11 counties for at least one decade of the planning horizon. Estimated impacts to this water use category appear in Table 4-3.

**Table 4-3 Impacts of water shortages on manufacturing**

| Impacts measure | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| **Income losses ($ millions)*** | $11,577 | $12,681 | $13,514 | $14,225 | $15,013 | $15,739 |
| **At risk job losses** | 48,780 | 53,432 | 56,941 | 59,937 | 63,255 | 66,311 |
| **Tax losses on production and Imports ($ millions)*** | $611 | $670 | $714 | $751 | $793 | $832 |

* Year 2023 dollars, rounded. Entries denoted by a dash (-) indicate no estimated economic impact. Entries denoted by a zero ($0) indicate estimated income losses less than $500,000.

## 4.4 Impacts of Mining Water Shortages

Two of the 11 counties in the Region are projected to experience water shortages in the mining water use category. Estimated impacts to this water use type appear in Table 4-4.

**Table 4-4 Impacts of water shortages on mining**

| Impacts measure | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| **Income losses ($ millions)*** | $2 | $2 | $2 | $1 | $2 | $2 |
| **At risk job losses** | 8 | 10 | 8 | 6 | 8 | 8 |
| **Tax losses on production and Imports ($ millions)*** | $0 | $0 | $0 | $0 | $0 | $0 |

* Year 2023 dollars, rounded. Entries denoted by a dash (-) indicate no estimated economic impact. Entries denoted by a zero ($0) indicate estimated income losses less than $500,000.

## 4.5 Impacts for Municipal Water Shortages

Six of the 11 counties in the Region are projected to experience water shortages in the municipal water use category for one or more decades within the planning horizon.

Impact estimates were made for two sub-categories within municipal water use: residential and non-residential. Non-residential municipal water use includes commercial and institutional users, which are further divided into non-water-intensive and water-intensive subsectors including car wash, laundry, hospitality, health care, recreation, and education. Lost consumer surplus estimates were made only for needs in the residential portion of municipal water use. Available IMPLAN and TWDB Water Use Survey data for the non-residential, water-intensive portion of municipal demand allowed these sectors to be included in income, jobs, and tax loss impact estimate.

Trucking cost estimates, calculated for shortages exceeding 80 percent, assumed a fixed, maximum cost of $45,500 per acre-foot to transport water for municipal use. The estimated impacts to this water use category appear in Table 4-5.

**Table 4-5 Impacts of water shortages on municipal water users**

| Impacts measure | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| **Income losses[1] ($ millions)*** | $28 | $26 | $24 | $21 | $18 | $20 |
| **At risk job losses [1]** | 393 | 371 | 339 | 298 | 252 | 286 |
| **Tax losses on production and imports[1] ($ millions)*** | $1 | $1 | $1 | $1 | $1 | $1 |
| **Trucking costs ($ millions)*** | $50 | $48 | $44 | $38 | $33 | $29 |
| **Utility revenue losses ($ millions)*** | $32 | $30 | $28 | $25 | $22 | $47 |
| **Utility tax revenue losses ($ millions)*** | $1 | $1 | $1 | $0 | $0 | $1 |

[1] Estimates apply to the water-intensive portion of non-residential municipal water use.
* Year 2023 dollars, rounded. Entries denoted by a dash (-) indicate no estimated economic impact. Entries denoted by a zero ($0) indicate estimated income losses less than $500,000.

## 4.6 Impacts of Steam-Electric Power Water Shortages

None of the 11 counties in the Region are projected to experience water shortages in the steam-electric water category. Estimated impacts to this water use category appear in Table 4-6.

Note that estimated economic impacts to steam-electric power water users:

- Are reflected as an income loss proxy in the form of estimated additional purchasing costs for power from the electrical grid to replace power that could not be generated due to a shortage;
- Do not include estimates of impacts on jobs. Because of the unique conditions of power generators during drought conditions and lack of relevant data, it was assumed that the

industry would retain, perhaps relocating or repurposing, their existing staff in order to manage their ongoing operations through a severe drought.

- Do not presume a decline in tax collections. Associated tax collections, in fact, would likely increase under drought conditions since, historically, the demand for electricity increases during times of drought, thereby increasing taxes collected on the additional sales of power.

**Table 4-6 Impacts of water shortages on steam-electric power**

| Impacts measure | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| **Income Losses ($ millions)*** | $- | $- | $- | $- | $- | $- |

* Year 2023 dollars, rounded. Entries denoted by a dash (-) indicate no estimated economic impact. Entries denoted by a zero ($0) indicate estimated income losses less than $500,000.

## 4.7 Regional Social Impacts

Projected changes in population, based upon several factors (household size, population, and job loss estimates), as well as the accompanying change in school enrollment, were also estimated and are summarized in Table 4-7.

**Table 4-7 Region-wide social impacts of water shortages**

| Impacts measure | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| **Consumer surplus losses ($ millions)*** | $80 | $75 | $67 | $58 | $44 | $27 |
| **At risk population out-migration** | 7,043 | 7,706 | 8,204 | 8,626 | 9,095 | 9,538 |
| **At risk school enrollment losses** | 1,285 | 1,406 | 1,497 | 1,574 | 1,660 | 1,741 |

* Year 2023 dollars, rounded. Entries denoted by a dash (-) indicate no estimated economic impact. Entries denoted by a zero ($0) indicate estimated income losses less than $500,000.

# Appendix A - County Level Summary of Estimated Economic Impacts

County level summary of estimated regional economic impacts of not meeting identified water needs by water use category and decade (in 2023 dollars, rounded). Values are presented only for counties with projected economic impacts for at least one decade.

**(* Entries denoted by a dash (-) indicate no estimated economic impact)**

| | | Income losses ($ millions) | | | | | | At risk job losses | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **County** | **Water Use Category** | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** |
| Bee | Mining | $ 0.35 | $ 0.35 | $ 0.35 | $ 0.35 | $ 0.35 | $ - | 2 | 2 | 2 | 2 | 2 | - |
| Bee | Municipal | $ 8.02 | $ 7.53 | $ 6.66 | $ 5.57 | $ 4.37 | $ 3.01 | 113 | 106 | 94 | 79 | 62 | 42 |
| **Bee Total** | | $ 8.37 | $ 7.88 | $ 7.01 | $ 5.92 | $ 4.72 | $ 3.01 | 115 | 108 | 96 | 80 | 63 | 42 |
| Brooks | Municipal | $ 1.32 | $ 1.23 | $ 1.10 | $ 0.93 | $ 0.73 | $ 0.47 | 19 | 17 | 15 | 13 | 10 | 7 |
| **Brooks Total** | | $ 1.32 | $ 1.23 | $ 1.10 | $ 0.93 | $ 0.73 | $ 0.47 | 19 | 17 | 15 | 13 | 10 | 7 |
| Duval | Municipal | $ 1.19 | $ 1.05 | $ 0.93 | $ 0.84 | $ 0.71 | $ 0.53 | 17 | 15 | 13 | 12 | 10 | 7 |
| **Duval Total** | | $ 1.19 | $ 1.05 | $ 0.93 | $ 0.84 | $ 0.71 | $ 0.53 | 17 | 15 | 13 | 12 | 10 | 7 |
| Jim Wells | Manufacturing | $ 1.30 | $ 3.08 | $ 5.47 | $ 8.39 | $ 13.05 | $ 18.48 | 5 | 11 | 20 | 31 | 48 | 68 |
| Jim Wells | Municipal | $ 7.63 | $ 6.63 | $ 5.46 | $ 3.97 | $ 2.30 | $ 0.42 | 108 | 94 | 77 | 56 | 32 | 6 |
| **Jim Wells Total** | | $ 8.93 | $ 9.72 | $ 10.93 | $ 12.36 | $ 15.35 | $ 18.90 | 112 | 105 | 97 | 87 | 80 | 74 |
| Live Oak | Municipal | $ 0.14 | $ 0.11 | $ 0.10 | $ 0.11 | $ 0.13 | $ 0.14 | 2 | 2 | 1 | 2 | 2 | 2 |
| **Live Oak Total** | | $ 0.14 | $ 0.11 | $ 0.10 | $ 0.11 | $ 0.13 | $ 0.14 | 2 | 2 | 1 | 2 | 2 | 2 |
| Nueces | Manufacturing | $ 11,575.40 | $ 12,677.87 | $ 13,508.42 | $ 14,216.93 | $ 15,000.38 | $ 15,720.92 | 48,775 | 53,421 | 56,921 | 59,906 | 63,207 | 66,243 |
| Nueces | Mining | $ 1.37 | $ 1.69 | $ 1.39 | $ 0.99 | $ 1.39 | $ 1.63 | 6 | 8 | 7 | 5 | 7 | 8 |
| Nueces | Municipal | $ 9.60 | $ 9.75 | $ 9.77 | $ 9.70 | $ 9.63 | $ 15.71 | 135 | 137 | 138 | 137 | 136 | 221 |
| **Nueces Total** | | $ 11,586.36 | $ 12,689.32 | $ 13,519.58 | $ 14,227.61 | $ 15,011.40 | $ 15,738.26 | 48,917 | 53,566 | 57,065 | 60,047 | 63,350 | 66,472 |
| **Region N Total** | | **$ 11,606.31** | **$ 12,709.30** | **$ 13,539.65** | **$ 14,247.78** | **$ 15,033.03** | **$ 15,761.32** | **49,181** | **53,813** | **57,287** | **60,241** | **63,515** | **66,605** |

# Addendum to Socioeconomic Impact Analysis for the 2026 Regional Water Plans

After the release of the socioeconomic impact analysis regional reports, the TWDB determined that a portion of the multi-faceted socio-economic impact estimates likely include upwardly biased impact results. It appears that the baseline value-added per acre-foot, used to determine the final drought degree adjusted impact estimates, may be inflated for the manufacturing water use sector. A similar conclusion applies for the estimates for jobs at risk and tax collections within that sector since all three measures rely upon a similar calculation procedure and required datasets.

Initial estimates for the value-added per acre-foot of water use are obtained using IMPLAN data coupled with TWDB Water Use Survey data. These calculations are limited to production subsectors (4-digit NAICS codes) for which TWDB Water Use Survey data was available and deemed reliable. These value-added estimates are adjusted downward, if necessary, to better correspond to the footprint of the data collected in the Water Use Survey. This is done to better match the productivity estimate from IMPLAN with the quantitative estimate of the water used to produce that output. The adjustment process involves using the proportion of the number of firms surveyed in the Water Use Survey versus the number of firms in the U.S. Census County Business Pattern data, limited to those firms with more than 50 employees. This approach assumes that the Water Use Survey captures water use from the larger water users in the state for the manufacturing sector.

Historically, this methodology has served the socio-economic impact estimation effort well, yet several factors have combined to result in likely upwardly biased estimates during this cycle that include:

- Adherence to the usual 5-year increment to access baseline IMPLAN value-added estimates prompted use of year 2021 data, a year with significant economic impacts as well as data collection issues prompted by the COVID pandemic, and
- Increased data suppression (reduced geographic data coverage) within the U.S. Census County Business Pattern Employment Data

This addendum is to make consumers of this analysis aware of the potentially skewed results for the manufacturing sector. Factors that are at play in this likely overestimated impact include: abnormal data collection results accompanying the COVID pandemic resulting in much higher than normal impact estimates for this water use sector, and reality-check values for the value-added per acre-foot of water that are almost non-existent within the research literature. The few research-based values that do exist, however, apply for periods ten or more years ago and/or foreign countries. Neither of these sources are deemed as being reliable for determining a reasonable upper bound or reliable estimate for this unique impact measure. The net effect is believed to overstate large projected income losses, jobs at risk, and tax collections within the manufacturing sector. This likely impacts a number of the sixteen planning regions but cannot be conclusively determined prior to planning groups needing to adopt their final regional water plans.

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# Appendix C - Region-Specific Model Water Conservation Plans

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# Model Water Conservation Plans

For municipal water users, the CBRWPG compiled a summary of frequent best management practices and water conservation goals (5 year and 10 year) from existing water conservation plans submitted to the TCEQ for water user groups in the Coastal Bend Region. The CBRWPG recommends appending these region-specific tables, beginning on the next page, with the TCEQ model municipal water use by public water supplier water conservation form (also attached). The TCEQ form, along with additional forms described below, can also be accessed electronically on the TCEQ website at:
https://www.tceq.texas.gov/permitting/water_rights/wr_technical-resources/conserve.html

Municipal water user groups in the area seeking to develop a water conservation plan are encouraged to consider the attached information from the CBRWPG as a guide. However, a one-size-fits-all approach is often impractical for all municipal water utilities and accordingly, it is to the discretion of the utility to develop a water conservation approach and target goals that serves its utility the best.

Municipal water entities that hold water rights of 1,000 acre-feet or more for municipal, industrial, and other non-irrigation uses; or water right holders of 10,000 acre-feet or more for irrigation uses are required to submit updates to their water conservation plan(s) and water conservation implementation report(s) every five years beginning May 1, 2009.[1]

Municipal Water Use by Public Water Supplier (see attached Retail Public Water Supplier form)
https://www.tceq.texas.gov/downloads/permitting/water-rights/water-conservation/10218.docx

Wholesale Public Water Supplier (see link for Investor-Owned Utilities form)
https://www.tceq.texas.gov/downloads/permitting/water-rights/water-conservation/20162.docx

Industrial Use
https://www.tceq.texas.gov/downloads/permitting/water-rights/water-conservation/20839.docx

Mining Use
https://www.tceq.texas.gov/downloads/permitting/water-rights/water-conservation/20840.docx

Agricultural Use
https://www.tceq.texas.gov/downloads/permitting/water-rights/water-conservation/10541.docx

[1] 30 Texas Administrative Code 288.30(1) to (4).

## *Summary of Water Conservation BMPs in the Coastal Bend Region*

| Wholesale Water Provider | WCP Available | Date | Best Management Practices | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Reduce Water Losses/Unaccounted for Water/Leak Detection | Water Conservation Pricing/Seasonal or Inverted Block Rates | Reuse | Improve Meter Accuracy | Toilet Replacement/ Retrofit Programs | Public/School Education | Landscape Conservation/Xeriscape | Others |
| City of Corpus Christi[1] | Y | 2020 | √ | √ | √ | √ | | √ | √ | √ |
| San Patricio Municipal Water District[1] | Y | 2019 | √ | √ | √ | √ | | √ | √ | √ |
| South Texas Water Authority[1] | Y | 2018 | √ | √ | | √ | | √ | | |
| Nueces County WCID 3[1,2] | Y | 2019 | √ | √ | √ | √ | √ | √ | | |
| Port of Corpus Christi Authority | Y | 2025 | √ | | | √ | | | | √ |
| **Water User Group** | | | | | | | | | | |
| Alice[1] | Y | 2024 | √ | √ | √ | √ | | √ | √ | |
| Aransas Pass | Y | 2019 | √ | √ | | √ | √ | √ | √ | |
| Beeville[1] | Y | 2024 | √ | √ | √ | √ | | √ | | |
| El Oso WSC | Y | 2008 | √ | √ | | √ | | √ | | √ |
| Falfurrias[1] | Y | 1999 | √ | √ | | √ | | √ | √ | |
| Holiday Beach WSC[1] | Y | 2018 | √ | √ | √ | √ | √ | | √ | |
| Ingleside[1] | Y | 2018 | √ | √ | √ | √ | | √ | √ | √ |
| Kingsville[1] | Y | 2018 | √ | √ | √ | √ | | √ | √ | |
| Lamar Improvement District[1] | Y | 2024 | √ | √ | | √ | | √ | | |
| McCoy WSC[1,2] | Y | 2014 | √ | √ | | √ | | √ | | |
| Nueces County WCID 4[1] | Y | 2019 | √ | √ | √ | √ | | √ | √ | |
| Nueces WSC[1] | Y | 2018 | √ | √ | | √ | | √ | | |
| Odem[1] | Y | 2013 | √ | √ | | √ | | √ | √ | √ |
| Portland[1] | Y | 2022 | √ | √ | √ | √ | √ | √ | √ | |
| Ricardo WSC[1] | Y | 2018 | √ | √ | | √ | | √ | | |
| River Acres WSC[1,2] | Y | 2021 | √ | √ | | √ | | √ | | |
| Robstown[2] | Y | 2011 | | | | | | √ | | |
| Rockport[2] | Y | 2015 | √ | √ | √ | √ | | | | |
| Taft[1] | Y | 2013 | √ | √ | √ | √ | √ | √ | √ | |
| Three Rivers[2] | Y | 2019 | √ | √ | √ | √ | | √ | √ | √ |

[1] Water Conservation Plan on-file with the Nueces River Authority.
[2] Water Conservation Plan provided by the TWDB.

## *Summary of 5- and 10-Year Water Conservation Goals in the Coastal Bend Region*

| Wholesale Water Provider | 5-Year Goal | | 10-Year Goal | |
|---|---|---|---|---|
| | GPCD Target | General | GPCD Target | General |
| City of Corpus Christi[1,2,3] | 195[2] | 1% annual reduction over next decade & reduce summertime peak demand | 184[2] | 1% annual reduction over next decade & reduce summertime peak demand |
| San Patricio Municipal Water District[1] | 141 | 1% annual reduction over next decade | 134 | 1% annual reduction over next decade |
| South Texas Water Authority[1] | 140-145 | Not Available | 140-145 | Not Available |
| Nueces County WCID 3[1,2] | 103 | Not Available | 108 | Not Available |
| Port of Corpus Christi Authority | N/A | Each customer to attain 90% of its five-year target(s) and/or goal(s) | N/A | Each customer to attain 95% of its ten-year target(s) and/or goal(s) |
| **Water User Group** | | | | |
| Alice[1] | 145 | Reduce per capita use by 3% | 141 | Reduce per capita use by 3% |
| Aransas Pass[2] | 225 | 2.5% per capita | 260 | 5% per capita |
| Beeville[1] | 161 | 1% annual reduction over next decade | 160 | 1% annual reduction over next decade |
| Corpus Christi[1,2,3] | 195 | 1% annual reduction over next decade | 184 | 1% annual reduction over next decade |
| El Oso WSC | N/A | Reduce water loss | N/A | Reduce water loss |
| Falfurrias[1] | N/A | Not Available | N/A | Not Available |
| Holiday Beach WSC[1] | 58 | Reduce water loss | 56 | Reduce water loss |
| Ingleside[1] | 106 | 1% reduction in water loss and usage within the next 5 years | 105 | 2% within the next 10 years |
| Kingsville[1,2] | 130 | 1% annual reduction | 125 | 1% annual reduction |
| Lamar Improvement District[1] | 150 | Reduce water loss | 145 | Reduce water loss |
| McCoy WSC[1] | 115 | Maintain current per capita usage; Reduce water loss to 4% of water pumped, line flushing/fire fighting | 110 | Reduce usage by 4.5%; Reduce water loss to 2% of water pumped, not including line flushing/fire fighting |
| Nueces County WCID 4[1,2] | 396 | 1% annual reduction over next decade | 376 | 1% annual reduction over next decade |
| Nueces WSC[1] | 118 | Maintain current per capita usage | 118 | Maintain current per capita usage |
| Odem[1] | 149 | 5% over the next 10 years | 146 | 7% reduction in unaccounted-for water over the next 10 years |
| Portland[1] | 88 | 5% reduction | 84 | 10% reduction |
| Ricardo WSC[1] | 95 | Maintain current per capita usage | 95 | Maintain current per capita usage |
| River Acres WSC[1] | 100 | 1% annual reduction | 99 | 1% annual reduction |
| Robstown[2] | N/A | Not Available | N/A | Not Available |
| Rockport | 107 | Maintain unaccounted water in the system below 12% annually in 2016 and subsequent years and reduce other water demands | 107 | Maintain unaccounted water in the system below 12% annually in 2016 and subsequent years and reduce other water demands |
| Taft[1] | 147 | Reduce per capita use by 3% | 140 | Reduce per capita use by 3% |
| Three Rivers[3] | 386 | 0.5% annual reduction | 377 | 0.5% annual reduction |

[1] Water Conservation Plan on-file with the Nueces River Authority.
[2] Information is from the 2019/2020 Water Conservation Plans, Target and Goal Table, provided by the TWDB.

[3] Calculated by taking volume of treated water, excluding water sold to wholesale customers, and dividing by permanent population, divided by 365. Because industrial use is close to 40% of treated water, the per capita rate is higher.

N/A = Not Available

# Texas Commission on Environmental Quality

**Water Availability Division**
**MC-160, P.O. Box 13087 Austin, Texas 78711-3087**
**Telephone (512) 239-4600, FAX (512) 239-2214**


## Utility Profile and Water Conservation Plan Requirements for Municipal Water Use by Retail Public Water Suppliers

This form is provided to assist retail public water suppliers in water conservation plan assistance in completing this form or in developing your plan, please contact the Conservation staff of the Resource Protection Team in the Water Availability Division at (512) 239-4600.

*Water users can find best management practices (BMPs) at the Texas Water Development Board's website http://www.twdb.texas.gov/conservation/BMPs/index.asp. The practices are broken out into sectors such as Agriculture, Commercial and Institutional, Industrial, Municipal and Wholesale. BMPs are voluntary measures that water users use to develop the required components of Title 30, Texas Administrative Code, Chapter 288. BMPs can also be implemented in addition to the rule requirements to achieve water conservation goals.*

**Contact Information**

Name of Water Supplier: _____

Address: _____

Telephone Number: _____ Fax: _____

Water Right No.(s): _____

Regional Water Planning Group: _____

Water Conservation Coordinator (or person responsible for implementing conservation program): _____ Phone: _____

Form Completed by: _____

Title: _____

Signature: _____ Date: _____

**A water conservation plan for municipal use by retail public water suppliers must include the following requirements (as detailed in 30 TAC Section 288.2). If the plan does not provide information for each requirement, you must include in the plan an explanation of why the requirement is not applicable.**

# Utility Profile

## I. POPULATION AND CUSTOMER DATA

### *A. Population and Service Area Data*

1. Attach a copy of your service-area map and, if applicable, a copy of your Certificate of Convenience and Necessity (CCN).

2. Service area size (in square miles):

   (Please attach a copy of service-area map)

3. Current population of service area:

4. Current population served for:

   a. Water

   b. Wastewater

5. Population served for previous five years:

| *Year* | *Population* |
|---|---|
| | |
| | |
| | |
| | |
| | |

6. Projected population for service area in the following decades:

| *Year* | *Population* |
|---|---|
| 2030 | |
| 2040 | |
| 2050 | |
| 2060 | |
| 2070 | |

7. List source or method for the calculation of current and projected population size.

*B. Customer Data*

Senate Bill 181 requires that uniform consistent methodologies for calculating water use and conservation be developed and available to retail water providers and certain other water use sectors as a guide for preparation of water use reports, water conservation plans, and reports on water conservation efforts. A water system must provide the most detailed level of customer and water use data available to it, however, any new billing system purchased must be capable of reporting data for each of the sectors listed below. More guidance can be found at: http://www.twdb.texas.gov/conservation/doc/SB181Guidance.pdf

1. Quantified 5-year and 10-year goals for water savings:

| | *Historic 5-year Average* | *Baseline* | *5-year goal for year* | *10-year goal for year* |
|---|---|---|---|---|
| Total GPCD | | | | |
| Residential GPCD | | | | |
| Water Loss GPCD | | | | |
| Water Loss Percentage | | | | |

**Notes:**
Total GPCD = (Total Gallons in System ÷ Permanent Population) ÷ 365
Residential GPCD = (Gallons Used for Residential Use ÷ Residential Population) ÷ 365
Water Loss GPCD = (Total Water Loss ÷ Permanent Population) ÷ 365
Water Loss Percentage = (Total Water Loss ÷ Total Gallons in System) x 100; or (Water Loss GPCD ÷ Total GPCD) x 100

2. Current number of active connections. Check whether multi-family service is counted as ☐ Residential or ☐ Commercial?

| *Treated Water Users* | *Metered* | *Non-Metered* | *Totals* |
|---|---|---|---|
| Residential | | | |
| Single-Family | | | |
| Multi-Family | | | |
| Commercial | | | |
| Industrial/Mining | | | |
| Institutional | | | |
| Agriculture | | | |
| Other/Wholesale | | | |

3. List the number of new connections per year for most recent three years.

| Year | | | |
|---|---|---|---|
| *Treated Water Users* | | | |
| Residential | | | |
| Single-Family | | | |
| Multi-Family | | | |
| Commercial | | | |
| Industrial/Mining | | | |
| Institutional | | | |
| Agriculture | | | |
| Other/Wholesale | | | |

4. List of annual water use for the five highest volume customers.

| *Customer* | *Use (1,000 gal/year)* | *Treated or Raw Water* |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |

## II. WATER USE DATA FOR SERVICE AREA

*A. Water Accounting Data*

1. List the amount of water use for the previous five years (in 1,000 gallons).

   Indicate whether this is ☐ diverted or ☐ treated water.

| *Year* | | | | | |
|---|---|---|---|---|---|
| *Month* | | | | | |
| January | | | | | |
| February | | | | | |
| March | | | | | |
| April | | | | | |
| May | | | | | |
| June | | | | | |
| July | | | | | |
| August | | | | | |
| September | | | | | |
| October | | | | | |
| November | | | | | |
| December | | | | | |
| **Totals** | | | | | |

2. Describe how the above figures were determined (e.g, from a master meter located at the point of a diversion from the source or located at a point where raw water enters the treatment plant, or from water sales).

3. Amount of water (in 1,000 gallons) delivered/sold as recorded by the following account types for the past five years.

| *Year* | | | | | |
|---|---|---|---|---|---|
| *Account Types* | | | | | |
| Residential | | | | | |
| Single-Family | | | | | |
| Multi-Family | | | | | |
| Commercial | | | | | |
| Industrial/Mining | | | | | |
| Institutional | | | | | |
| Agriculture | | | | | |
| Other/Wholesale | | | | | |

4. List the previous records for water loss for the past five years (the difference between water diverted or treated and water delivered or sold).

| *Year* | *Amount (gallons)* | *Percent %* |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |

*B. Projected Water Demands*

1. If applicable, attach or cite projected water supply demands from the applicable Regional Water Planning Group for the next ten years using information such as population trends, historical water use, and economic growth in the service area over the next ten years and any additional water supply requirements from such growth.

## III. WATER SUPPLY SYSTEM DATA

*A. Water Supply Sources*

1. List all current water supply sources and the amounts authorized (in acre feet) with each.

| *Water Type* | *Source* | *Amount Authorized* |
|---|---|---|
| Surface Water | | |

Groundwater _____ _____

Other _____ _____

*B. Treatment and Distribution System (if providing treated water)*

1. Design daily capacity of system (MGD):

2. Storage capacity (MGD):

   a. Elevated

   b. Ground

3. If surface water, do you recycle filter backwash to the head of the plant?

   ☐ Yes ☐ No If yes, approximate amount (MGD):

**IV. WASTEWATER SYSTEM DATA**

*A. Wastewater System Data (if applicable)*

1. Design capacity of wastewater treatment plant(s) (MGD):

2. Treated effluent is used for ☐ on-site irrigation, ☐ off-site irrigation, for ☐ plant wash-down, and/or for ☐ chlorination/dechlorination.

   If yes, approximate amount (in gallons per month):

3. Briefly describe the wastewater system(s) of the area serviced by the water utility. Describe how treated wastewater is disposed. Where applicable, identify treatment plant(s) with the TCEQ name and number, the operator, owner, and the receiving stream if wastewater is discharged.

*B. Wastewater Data for Service Area (if applicable)*

1. Percent of water service area served by wastewater system: %

2. Monthly volume treated for previous five years (in 1,000 gallons):

| *Year* | | | | | |
|---|---|---|---|---|---|
| *Month* | | | | | |
| January | | | | | |
| February | | | | | |
| March | | | | | |
| April | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| May | | | | | |
| June | | | | | |
| July | | | | | |
| August | | | | | |
| September | | | | | |
| October | | | | | |
| November | | | | | |
| December | | | | | |
| **Totals** | | | | | |

# Water Conservation Plan

In addition to the utility profile, please attach the following as required by Title 30, Texas Administrative Code, §288.2. Note: If the water conservation plan does not provide information for each requirement, an explanation must be included as to why the requirement is not applicable.

*A. Record Management System*

The water conservation plan must include a record management system which allows for the classification of water sales and uses in to the most detailed level of water use data currently available to it, including if possible, the following sectors: residential (single and multi-family), commercial.

*B. Specific, Quantified 5 & 10-Year Targets*

The water conservation plan must include specific, quantified five-year and ten-year targets for water savings to include goals for water loss programs and goals for municipal use in gallons per capita per day. Note that the goals established by a public water supplier under this subparagraph are not enforceable. These goals must be updated during the five-year review and submittal.

*C. Measuring and Accounting for Diversions*

The water conservation plan must include a statement about the water suppliers metering device(s), within an accuracy of plus or minus 5.0% in order to measure and account for the amount of water diverted from the source of supply.

*D. Universal Metering*

The water conservation plan must include and a program for universal metering of both customer and public uses of water, for meter testing and repair, and for periodic meter replacement.

*E. Measures to Determine and Control Water Loss*

The water conservation plan must include measures to determine and control water loss (for example, periodic visual inspections along distribution lines; annual or monthly audit of the water system to determine illegal connections; abandoned services; etc.).

*F. Continuing Public Education & Information*

The water conservation plan must include a description of the program of continuing public education and information regarding water conservation by the water supplier.

*G. Non-Promotional Water Rate Structure*

The water supplier must have a water rate structure which is not "promotional," i.e., a rate structure which is cost-based and which does not encourage the excessive use of water. This rate structure must be listed in the water conservation plan.

*H. Reservoir Systems Operations Plan*

The water conservation plan must include a reservoir systems operations plan, if applicable, providing for the coordinated operation of reservoirs owned by the applicant within a common watershed or river basin in order to optimize available water supplies.

*I. Enforcement Procedure and Plan Adoption*

The water conservation plan must include a means for implementation and enforcement, which shall be evidenced by a copy of the ordinance, rule, resolution, or tariff, indicating official adoption of the water conservation plan by the water supplier; and a description of the authority by which the water supplier will implement and enforce the conservation plan.

*J. Coordination with the Regional Water Planning Group(s)*

The water conservation plan must include documentation of coordination with the regional water planning groups for the service area of the public water supplier in order to ensure consistency with the appropriate approved regional water plans.

*K. Plan Review and Update*

A public water supplier for municipal use shall review and update its water conservation plan, as appropriate, based on an assessment of previous five-year and ten-year targets and any other new or updated information. The public water supplier for municipal use shall review and update the next revision of its water conservation plan not later than May 1, 2009, and every five years after that date to coincide with the regional water planning group. The revised plan must also include an implementation report.

## VI. ADDITIONAL REQUIREMENTS FOR LARGE SUPPLIERS

Required of suppliers serving population of 5,000 or more or a projected population of 5,000 or more within the next ten years:

*A. Leak Detection and Repair*

The plan must include a description of the program of leak detection, repair, and water loss accounting for the water transmission, delivery, and distribution system in order to control unaccounted for uses of water.

*B. Contract Requirements*

A requirement in every wholesale water supply contract entered into or renewed after official adoption of the plan (by either ordinance, resolution, or tariff), and including any contract extension, that each successive wholesale customer develop and implement a water conservation plan or water conservation measures using the applicable elements in this chapter. If the customer intends to resell the water, the contract between the initial supplier and customer must provide that the contract for the resale of the water must have water conservation requirements so that each successive customer in the resale of the water will be required to implement water conservation measures in accordance with the provisions of this chapter.

## VII. ADDITIONAL CONSERVATION STRATEGIES

Any combination of the following strategies shall be selected by the water supplier, in addition to the minimum requirements of 30 TAC §288.2(1), if they are necessary in order to achieve the stated water conservation goals of the plan. The commission may require by commission order that any of the following strategies be implemented by the water supplier if the commission determines that the strategies are necessary in order for the conservation plan to be achieved:

1. Conservation-oriented water rates and water rate structures such as uniform or increasing block rate schedules, and/or seasonal rates, but not flat rate or decreasing block rates;

2. Adoption of ordinances, plumbing codes, and/or rules requiring water conserving plumbing fixtures to be installed in new structures and existing structures undergoing substantial modification or addition;

3. A program for the replacement or retrofit of water-conserving plumbing fixtures in existing structures;

4. A program for reuse and/or recycling of wastewater and/or graywater;

5. A program for pressure control and/or reduction in the distribution system and/or for customer connections;

6. A program and/or ordinance(s) for landscape water management;

7. A method for monitoring the effectiveness and efficiency of the water conservation plan; and

8. Any other water conservation practice, method, or technique which the water supplier shows to be appropriate for achieving the stated goal or goals of the water conservation plan.

## VIII. WATER CONSERVATION PLANS SUBMITTED WITH A WATER RIGHT APPLICATION FOR NEW OR ADDITIONAL STATE WATER

Water Conservation Plans submitted with a water right application for New or Additional State Water must include data and information which:

1. support the applicant's proposed use of water with consideration of the water conservation goals of the water conservation plan;

2. evaluates conservation as an alternative to the proposed appropriation; and

3. evaluates any other feasible alternative to new water development including, but not limited to, waste prevention, recycling and reuse, water transfer and marketing, regionalization, and optimum water management practices and procedures.

Additionally, it shall be the burden of proof of the applicant to demonstrate that no feasible alternative to the proposed appropriation exists and that the requested amount of appropriation is necessary and reasonable for the proposed use.

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# Appendix D - Region-Specific Model Drought Contingency Plans

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# Model Drought Contingency Plans

For municipal water users, wholesale public water suppliers, and irrigation districts the CBRWPG compiled a summary of common drought contingency measures identified in existing drought contingency plans for water user groups in the Coastal Bend Region. The CBRWPG recommends appending this region-specific table, beginning on the next page, with the TCEQ model drought contingency plan for retail public water suppliers (also attached). The TCEQ form can be accessed electronically on the TCEQ website, along with a handbook for drought contingency planning or a customized drought contingency plan form for water supply corporations, at: https://www.tceq.texas.gov/permitting/water_rights/wr_technical-resources/contingency.html

Municipal water users, wholesale water providers, and irrigation districts in the area seeking to develop a drought contingency plan are encouraged to consider the attached information from the CPRWPG as a guide for utilities comparable in size and with similar water source (included in summary table). However, a one-size-fits-all approach is often impractical for all municipal water utilities and accordingly. It is to the discretion of the utility to develop a drought contingency plan that serves its utility best. Current links to TCEQ model drought contingency forms based on entity type are listed below.

Municipal Water Users (see attached Retail Public Water Supplier form)

https://www.tceq.texas.gov/downloads/permitting/water-rights/drought/20191.docx

Investor-Owned Utilities (see attached Investor-Owned Utilities form)

https://www.tceq.texas.gov/downloads/permitting/water-rights/drought/20189.docx

Wholesale Public Water Providers (see attached Wholesale Public Water Supplier form)

https://www.tceq.texas.gov/downloads/permitting/water-rights/drought/20193.docx

Irrigation Districts (see attached Irrigation District Supplier form)

https://www.tceq.texas.gov/downloads/permitting/water-rights/drought/20192.docx

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# *Common Drought Response Measures in the Coastal Bend Region*

| Wholesale Water Provider/Water User Group | Census 2020 (For Water User Groups Only) | DCP Available | Date | Drought Contingency Measures | | | | | | | | | | | | Water Supplies | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Watering schedules/ Landscape irrigation restrictions | Water demand reduction targets | Potable water use restrictions | Vehicle washing restrictions | Restrictions on wash down of hard-surfaces, buildings, and/or structures | Restrictions on new service connections, pipeline extensions, etc. | Restrictions on serving water to patrons at restaurants | Restrictions on flushing gutters, controllable leaks, and/or permitting water to run or accumulate | Restrictions on the use of water for pools, ponds, or fountains | Restrictions on use of water for dust control | Others | SW | GW |
| **Wholesale Water Providers** | | | | | | | | | | | | | | | | | |
| City of Corpus Christi | | Y | 2018 | √ | √ | √ | √ | √ | √ | | | √ | | √ | √ | |
| SPMWD | | Y | 2019 | √ | √ | √ | √ | √ | | | | √ | √ | √ | √ | |
| South Texas Water Authority | | Y | 2024 | √ | √ | | | | | | | | | √ | √ | |
| Nueces County WCID #3 | | Y | 2019 | √ | √ | √ | √ | √ | | | | √ | | | √ | |
| LNRA | | Y | 2024 | | √ | | | | | | | | | √ | √ | |
| **Water User Groups** | | | | | | | | | | | | | | | | | |
| Aransas Pass | 9,416 | Y | 2008 | √ | √ | | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| Rockport | 18,088 | Y | 2013 | √ | √ | | √ | √ | | | √ | √ | √ | √ | √ | |
| Beeville | 13,086 | Y | 2024 | √ | √ | √ | √ | √ | √ | | | √ | √ | √ | √ | |
| City of Three Rivers | 2,761 | Y | 2014 | √ | √ | | √ | √ | | | √ | √ | √ | | √ | √ |
| Freer WCID | 2,417 | Y | 2000 | √ | √ | | √ | √ | √ | √ | √ | √ | √ | √ | | √ |
| San Diego MUD #1 | 4,669 | Y | 2000 | √ | √ | | √ | √ | | | √ | √ | √ | √ | | |
| Alice | 20,651 | Y | 2019 | √ | √ | | √ | √ | √ | √ | √ | √ | √ | √ | √ | |
| Orange Grove | 1,443 | Y | 2000 | √ | √ | | √ | √ | √ | √ | √ | √ | √ | √ | | √ |
| Kingsville | 25,307 | Y | 2002 | √ | √ | | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| Ricardo WSC | 3,030 | Y | 2018 | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | |
| El Oso WSC | 1,290 | Y | 2009 | √ | √ | | √ | √ | √ | √ | √ | √ | √ | √ | | √ |
| McCoy WSC | 170 | Y | 2000 | √ | √ | | √ | √ | √ | √ | √ | √ | √ | √ | | √ |
| Old Marbach School WSC | 607 | Y | 2006 | √ | √ | | √ | √ | | | √ | √ | √ | | | √ |
| Nueces WSC | 5,805 | Y | 2019 | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | |
| River Acres WSC | 1,952 | Y | 2021 | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | |
| Odem | 3,055 | Y | 2013 | √ | √ | √ | √ | √ | √ | √ | √ | √ | | √ | √ | |
| Ingleside | 9,402 | Y | 2018 | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| Taft | 2,549 | Y | 2013 | √ | √ | | √ | √ | √ | √ | √ | √ | √ | √ | √ | |
| Portland | 17,910 | Y | 2024 | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | |
| Rincon WSC | 3,698 | Y | 2009 | √ | √ | | √ | | | | √ | √ | | √ | √ | |
| **County-Other Entities** | | | | | | | | | | | | | | | | | |
| Aransas County MUD #1 | | Y | 2009 | √ | | | | | | | √ | | | √ | | √ |
| Blueberry Hills | | Y | 2005 | √ | √ | | √ | √ | | | √ | √ | √ | √ | | √ |
| Copano Heights WC | | Y | 2018 | √ | √ | | √ | √ | | | √ | √ | √ | | √ | |
| Escondido Creek Estates | | Y | 2000 | √ | | | √ | | | √ | √ | √ | √ | √ | | √ |
| Riviera | | Y | 2000 | √ | | | √ | √ | | | √ | √ | √ | √ | | √ |
| Baffin Bay WSC | | Y | 2015 | √ | √ | | √ | √ | | | √ | √ | | | | |
| Pettus MUD | | Y | 2024 | √ | | | √ | √ | | | √ | √ | | √ | | √ |

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## *Coastal Bend (Region N) Drought Contingency Summary*

| Common Drought Contingency Measure | Number of Region N DCPs Recommending |
|---|---|
| Watering schedules/ Landscape irrigation restrictions | 31 |
| Water demand reduction targets | 28 |
| Potable water use restrictions | 10 |
| Vehicle washing restrictions | 29 |
| Restrictions on wash down of hard-surfaces, buildings, and/or structures | 27 |
| Restrictions on new service connections, pipeline extensions, etc. | 16 |
| Restrictions on serving water to patrons at restaurants | 15 |
| Restrictions on flushing gutters, controllable leaks, and/or permitting water to run or accumulate | 26 |
| Restrictions on the use of water for pools, ponds, or fountains | 29 |
| Restrictions on use of water for dust control | 23 |
| Others | 27 |

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**Texas Commission on Environmental Quality**
Water Availability Division
MC-160, P.O. Box 13087 Austin, Texas 78711-3087
Telephone (512) 239-4600, FAX (512) 239-2214

# Drought Contingency Plan for a Retail Public Water Supplier

This form is provided as a model of a drought contingency plan for a retail public water supplier. If you need assistance in completing this form or in developing your plan, please contact the Conservation Staff of the Resource Protection Team in the Water Availability Division at (512) 239-4600.

**Drought Contingency Plans must be formally adopted by the governing body of the water provider and documentation of adoption must be submitted with the plan.** For municipal water systems, adoption would be by the city council as an ordinance. For other types of publicly-owned water systems (example: utility districts), plan adoption would be by resolution of the entity's board of directors adopting the plan as administrative rules. For private investor-owned utilities, the drought contingency plan is to be incorporated into the utility's rate tariff. Each water supplier shall provide documentation of the formal adoption of their drought contingency plan.

Name: Click to add text

Address: _____

Telephone Number: (  ) _____ Fax: (  ) _____

Water Right No.(s): _____

Regional Water Planning Group: _____

Form Completed by: _____

Title: _____

Person responsible for implementation: _____ Phone: (  ) _____

Signature: _____ Date: /  / _____

## Section I: Declaration of Policy, Purpose, and Intent

In order to conserve the available water supply and protect the integrity of water supply facilities, with particular regard for domestic water use, sanitation, and fire protection, and to protect and preserve public health, welfare, and safety and minimize the adverse impacts of water supply shortage or other water supply emergency conditions, the _____ (*name of your water supplier*) hereby adopts the following regulations and restrictions on the delivery and consumption of water.

Water uses regulated or prohibited under this Drought Contingency Plan (the Plan) are considered to be non-essential and continuation of such uses during times of water shortage or other emergency water supply condition are deemed to constitute a waste of water which subjects the offender(s) to penalties as defined in Section X of this Plan.

**Section II: Public Involvement**
Opportunity for the public to provide input into the preparation of the Plan was provided by the _____ (*name of your water supplier*) by means of _____ (*describe methods used to inform the public about the preparation of the plan and provide opportunities for input; for example, scheduling and providing public notice of a public meeting to accept input on the Plan*).

**Section III: Public Education**
The _____ (*name of your water supplier*) will periodically provide the public with information about the Plan, including information about the conditions under which each stage of the Plan is to be initiated or terminated and the drought response measures to be implemented in each stage. This information will be provided by means of _____ (*describe methods to be used to provide information to the public about the Plan; for example, public events, press releases or utility bill inserts*).

**Section IV: Coordination with Regional Water Planning Groups**
The service area of the _____ (*name of your water supplier*) is located within the _____ (*name of regional water planning area or areas*) and _____ (*name of your water supplier*) has provided a copy of this Plan to the _____ (*name of your regional water planning group or groups*).

**Section V: Authorization**
The _____ (*designated official; for example, the mayor, city manager, utility director, general manager, etc.*), or his/her designee is hereby authorized and directed to implement the applicable provisions of this Plan upon determination that such implementation is necessary to protect public health, safety, and welfare. The _____ (*designated official*) or his/her designee shall have the authority to initiate or terminate drought or other water supply emergency response measures as described in this Plan.

**Section VI: Application**
The provisions of this Plan shall apply to all persons, customers, and property utilizing water provided by the _____ (*name of your water supplier*). The terms "person" and "customer" as used in the Plan include individuals, corporations, partnerships, associations, and all other legal entities.

**Section VII: Definitions**
For the purposes of this Plan**,** the following definitions shall apply:

Aesthetic water use: water use for ornamental or decorative purposes such as fountains, reflecting pools, and water gardens.

Commercial and institutional water use: water use which is integral to the operations of commercial and non-profit establishments and governmental entities such as retail establishments, hotels and motels, restaurants, and office buildings.

Conservation: those practices, techniques, and technologies that reduce the consumption of water, reduce the loss or waste of water, improve the efficiency in the use of water or increase the recycling and reuse of water so that a supply is conserved and made available for future or alternative uses.

Customer: any person, company, or organization using water supplied by _____ (*name of your water supplier*).

Domestic water use: water use for personal needs or for household or sanitary purposes such as drinking, bathing, heating, cooking, sanitation, or for cleaning a residence, business, industry, or institution.

Even number address: street addresses, box numbers, or rural postal route numbers ending in 0, 2, 4, 6, or 8 and locations without addresses.

Foundation watering: an application of water to the soils directly abutting (within 2 feet) the foundation of a building, structure.

Industrial water use: the use of water in processes designed to convert materials of lower value into forms having greater usability and value.

Landscape irrigation use: water used for the irrigation and maintenance of landscaped areas, whether publicly or privately owned, including residential and commercial lawns, gardens, golf courses, parks, and rights-of-way and medians.

Non-essential water use: water uses that are not essential nor required for the protection of public, health, safety, and welfare, including:

(a) irrigation of landscape areas, including parks, athletic fields, and golf courses, except otherwise provided under this Plan;
(b) use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle;
(c) use of water to wash down any sidewalks, walkways, driveways, parking lots, tennis courts, or other hard-surfaced areas;
(d) use of water to wash down buildings or structures for purposes other than immediate fire protection;
(e) flushing gutters or permitting water to run or accumulate in any gutter or street;
(f) use of water to fill, refill, or add to any indoor or outdoor swimming pools or Jacuzzi-type pools;
(g) use of water in a fountain or pond for aesthetic or scenic purposes except where necessary to support aquatic life;
(h) failure to repair a controllable leak(s) within a reasonable period after having been given notice directing the repair of such leak(s); and
(i) use of water from hydrants for construction purposes or any other purposes other than fire fighting.

Odd numbered address: street addresses, box numbers, or rural postal route numbers ending in 1, 3, 5, 7, or 9.

**Section VIII: Criteria for Initiation and Termination of Drought Response Stages**

The _____ (*designated official*) or his/her designee shall monitor water supply and/or demand conditions on a _____ (*example: daily, weekly, monthly*) basis and shall determine when conditions warrant initiation or termination of each stage of the Plan, that is, when the specified "triggers" are reached.

The triggering criteria described below are based on:

_____.
(*Provide a brief description of the rationale for the triggering criteria; for example, triggering criteria / trigger levels based on a statistical analysis of the vulnerability of the water source under drought of record conditions, or based on known system capacity limits*).

**Utilization of alternative water sources and/or alternative delivery mechanisms:**

Alternative water source(s) for _____ (*name of utility*) is/are: _____.
*(Examples: Other well(s), Inter-connection with other system, Temporary use of a non-municipal water supply, Purchased water, Use of reclaimed water for non-potable purposes, etc.).*

**Stage 1 Triggers -- MILD Water Shortage Conditions**

Requirements for initiation
Customers shall be requested to voluntarily conserve water and adhere to the prescribed restrictions on certain water uses, defined in Section VII Definitions, when _____.
(*Describe triggering criteria / trigger levels; see examples below*).

*Following are examples of the types of triggering criteria that might be used in one or more successive stages of a drought contingency plan. The public water supplier may devise other triggering criteria and an appropriate number of stages tailored to its system. One or a combination of the criteria selected by the public water supplier must be defined for each drought response stage, but usually not all will apply.*

*Example 1:* *Annually, beginning on May 1 through September 30.*

*Example 2:* *When the water supply available to the _____ (name of your water supplier) is equal to or less than _____ (acre-feet, percentage of storage, etc.).*

*Example 3:* *When, pursuant to requirements specified in the _____ (name of **your** water supplier) wholesale water purchase contract with _____ (name of your wholesale water supplier), notification is received requesting initiation of Stage 1 of the Drought Contingency Plan.*

*Example 4:* *When flows in the _____ (name of stream or river) are equal to or less than _____ cubic feet per second.*

*Example 5:* *When the static water level in the _____ (name of your water supplier) well(s) is equal to or less than _____ feet above/below mean sea level.*

*Example 6:* *When the specific capacity of the _____ (name of your water supplier) well(s) is equal to or less than _____ percent of the well's original specific capacity.*

*Example 7:* *When total daily water demand equals or exceeds _____ million gallons for _____ consecutive days of _____ million gallons on a single day (example: based on the safe operating capacity of water supply facilities).*

*Example 8:* *Continually falling treated water reservoir levels which do not refill above _____ percent overnight (example: based on an evaluation of minimum treated water storage required to avoid system outage).*

Requirements for termination
Stage 1 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of _____ (*example: 3*) consecutive days.

**Stage 2 Triggers – MODERATE Water Shortage Conditions**

Requirements for initiation
Customers shall be required to comply with the requirements and restrictions on certain non-essential water uses provided in Section IX of this Plan when _____ (*describe triggering criteria; see examples in Stage 1*).

Requirements for termination
Stage 2 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of _____ (*example: 3*) consecutive days. Upon termination of Stage 2, Stage 1, or the applicable drought response stage based on the triggering criteria, becomes operative.

**Stage 3 Triggers – SEVERE Water Shortage Conditions**

Requirements for initiation
Customers shall be required to comply with the requirements and restrictions on certain non-essential water uses for Stage 3 of this Plan when _____ (*describe triggering criteria; see examples in Stage 1*).

Requirements for termination
Stage 3 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of _____ (*example: 3*) consecutive days. Upon termination of Stage 3, Stage 2, or the applicable drought response stage based on the triggering criteria, becomes operative.

**Stage 4 Triggers – CRITICAL Water Shortage Conditions**

Requirements for initiation
Customers shall be required to comply with the requirements and restrictions on certain non-essential water uses for Stage 4 of this Plan when _____ (*describe triggering criteria; see examples in Stage 1*).

Requirements for termination
Stage 4 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of _____ (*example: 3*) consecutive days. Upon termination of Stage 4, Stage 3, or the applicable drought response stage based on the triggering criteria, becomes operative.

**Stage 5 Triggers – EMERGENCY Water Shortage Conditions**

Requirements for initiation
Customers shall be required to comply with the requirements and restrictions for Stage 5 of this Plan when _____ (*designated official*), or his/her designee, determines that a water supply emergency exists based on:

1. Major water line breaks, or pump or system failures occur, which cause unprecedented loss of capability to provide water service; **or**

2. Natural or man-made contamination of the water supply source(s).

Requirements for termination
Stage 5 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of _____ (*example: 3*) consecutive days.

**Stage 6 Triggers – WATER ALLOCATION**

Requirements for initiation
Customers shall be required to comply with the water allocation plan prescribed in Section IX of this Plan and comply with the requirements and restrictions for Stage 5 of this Plan when _____ (*describe triggering criteria, see examples in Stage 1*).

Requirements for termination - Water allocation may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of _____ (*example: 3*) consecutive days.

*Note: The inclusion of WATER ALLOCATION as part of a drought contingency plan may not be required in all cases. For example, for a given water supplier, an analysis of water supply availability under drought of record conditions may indicate that there is essentially no risk of water supply shortage. Hence, a drought contingency plan for such a water supplier might only address facility capacity limitations and emergency conditions (example: supply source contamination and system capacity limitations).*

**Section IX: Drought Response Stages**
The _____ (*designated official*), or his/her designee, shall monitor water supply and/or demand conditions on a daily basis and, in accordance with the triggering criteria set forth in Section VIII of this Plan, shall determine that a mild, moderate, severe, critical, emergency or water shortage condition exists and shall implement the following notification procedures:

**Notification**
Notification of the Public:
The _____ (*designated official*) or his/ her designee shall notify the public by means of:

*Examples:*
*publication in a newspaper of general circulation,*
*direct mail to each customer,*
*public service announcements,*
*signs posted in public places*
*take-home fliers at schools.*

Additional Notification:
The _____ (*designated official*) or his/ her designee shall notify directly, or cause to be notified directly, the following individuals and entities:

*Examples:*
*Mayor / Chairman and members of the City Council / Utility Board*
*Fire Chief(s)*
*City and/or County Emergency Management Coordinator(s)*
*County Judge & Commissioner(s)*
*State Disaster District / Department of Public Safety*
TCEQ *(required when* mandatory *restrictions are imposed)*

*Major water users*
*Critical water users, i.e. hospitals*
*Parks / street superintendents & public facilities managers*

*Note: The plan should specify direct notice only as appropriate to respective drought stages.*

**Stage 1 Response – MILD Water Shortage Conditions**

**Target: Achieve a voluntary _____ percent reduction in _____ (*example: total water use, daily water demand, etc.*).**

Best Management Practices for Supply Management:

D*escribe additional measures, if any, to be implemented directly by (name of your water supplier) to manage limited water supplies and/or reduce water demand. Examples include: system water loss control, activation and use of an alternative supply source(s); use of reclaimed water for non-potable purposes.*

Voluntary Water Use Restrictions for Reducing Demand:

(a) Water customers are requested to voluntarily limit the irrigation of landscaped areas to Sundays and Thursdays for customers with a street address ending in an even number (0, 2, 4, 6 or 8), and Saturdays and Wednesdays for water customers with a street address ending in an odd number (1, 3, 5, 7 or 9), and to irrigate landscapes only between the hours of midnight and 10:00 a.m. and 8:00 p.m. to midnight on designated watering days.

(b) All operations of the _____ (*name of your water supplier*) shall adhere to water use restrictions prescribed for Stage 1 of the Plan.

(c) Water customers are requested to practice water conservation and to minimize or discontinue water use for non-essential purposes.

**Stage 2 Response – MODERATE Water Shortage Conditions**

**Target: Achieve a _____ percent reduction in _____ (*example: total water use, daily water demand, etc.*).**

Best Management Practices for Supply Management:

*Describe additional measures, if any, to be implemented directly by _____ (name of your water supplier) to manage limited water supplies and/or reduce water demand. Examples include: system water loss control, reduced or discontinued irrigation of public landscaped areas; use of an alternative supply source(s); use of reclaimed water for non-potable purposes.*

Water Use Restrictions for Demand Reduction:
Under threat of penalty for violation, the following water use restrictions shall apply to all persons:

(a) Irrigation of landscaped areas with hose-end sprinklers or automatic irrigation systems shall be limited to Sundays and Thursdays for customers with a street

address ending in an even number (0, 2, 4, 6 or 8), and Saturdays and Wednesdays for water customers with a street address ending in an odd number (1, 3, 5, 7 or 9), and irrigation of landscaped areas is further limited to the hours of 12:00 midnight until 10:00 a.m. and between 8:00 p.m. and 12:00 midnight on designated watering days. However, irrigation of landscaped areas is permitted at anytime if it is by means of a hand-held hose, a faucet filled bucket or watering can of five (5) gallons or less, or drip irrigation system.

(b) Use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle is prohibited except on designated watering days between the hours of 12:00 midnight and 10:00 a.m. and between 8:00 p.m. and 12:00 midnight. Such washing, when allowed, shall be done with a hand-held bucket or a hand-held hose equipped with a positive shutoff nozzle for quick rises. Vehicle washing may be done at any time on the immediate premises of a commercial car wash or commercial service station. Further, such washing may be exempted from these regulations if the health, safety, and welfare of the public is contingent upon frequent vehicle cleansing, such as garbage trucks and vehicles used to transport food and perishables.

(c) Use of water to fill, refill, or add to any indoor or outdoor swimming pools, wading pools, or Jacuzzi-type pools is prohibited except on designated watering days between the hours of 12:00 midnight and 10:00 a.m. and between 8 p.m. and 12:00 midnight.

(d) Operation of any ornamental fountain or pond for aesthetic or scenic purposes is prohibited except where necessary to support aquatic life or where such fountains or ponds are equipped with a recirculation system.

(e) Use of water from hydrants shall be limited to fire fighting, related activities, or other activities necessary to maintain public health, safety, and welfare, except that use of water from designated fire hydrants for construction purposes may be allowed under special permit from the _____ (*name of your water supplier*).

(f) Use of water for the irrigation of golf course greens, tees, and fairways is prohibited except on designated watering days between the hours 12:00 midnight and 10:00 a.m. and between 8 p.m. and 12:00 midnight. However, if the golf course utilizes a water source other than that provided by the _____ (*name of your water supplier*), the facility shall not be subject to these regulations.

(g) All restaurants are prohibited from serving water to patrons except upon request of the patron.

(h) The following uses of water are defined as non-essential and are prohibited:
1. wash down of any sidewalks, walkways, driveways, parking lots, tennis courts, or other hard-surfaced areas;
2. use of water to wash down buildings or structures for purposes other than immediate fire protection;
3. use of water for dust control;
4. flushing gutters or permitting water to run or accumulate in any gutter or street; and
5. failure to repair a controllable leak(s) within a reasonable period after having been given notice directing the repair of such leak(s).

**Stage 3 Response – SEVERE Water Shortage Conditions**

**Target: Achieve a _____ percent reduction in _____ (*example: total water use, daily water demand, etc.*).**

Best Management Practices for Supply Management:

*Describe additional measures, if any, to be implemented directly by _____ (name of your water supplier) to manage limited water supplies and/or reduce water demand. Examples include: system water loss control, reduced or discontinued irrigation of public landscaped areas; use of an alternative supply source(s); use of reclaimed water for non-potable purposes.*

Water Use Restrictions for Demand Reduction:
All requirements of Stage 2 shall remain in effect during Stage 3 except:

(a) Irrigation of landscaped areas shall be limited to designated watering days between the hours of 12:00 midnight and 10:00 a.m. and between 8 p.m. and 12:00 midnight and shall be by means of hand-held hoses, hand-held buckets, drip irrigation, or permanently installed automatic sprinkler system only. The use of hose-end sprinklers is prohibited at all times.

(b) The watering of golf course tees is prohibited unless the golf course utilizes a water source other than that provided by the _____ (*name of your water supplier*).

(c) The use of water for construction purposes from designated fire hydrants under special permit is to be discontinued.

(d) Foundation Watering (within 2 feet) and watering of trees may occur for two hours one day per week with a hand-held hose or with a dedicated zone using a Drip Irrigation system and/or Soaker Hose, provided no runoff occurs.

**Stage 4 Response – CRITICAL Water Shortage Conditions**

**Target: Achieve a _____ percent reduction in _____ (*example: total water use, daily water demand, etc.*).**

Best Management Practices for Supply Management:

*Describe additional measures, if any, to be implemented directly by _____ (name of your water supplier) to manage limited water supplies and/or reduce water demand. Examples include: system water loss control, reduced or discontinued irrigation of public landscaped areas; use of an alternative supply source(s); use of reclaimed water for non-potable purposes.*

Water Use Restrictions for Reducing Demand:
All requirements of Stage 2 and 3 shall remain in effect during Stage 4 except:

(a) Irrigation of landscaped areas shall be limited to designated watering days between the hours of 6:00 a.m. and 10:00 a.m. and between 8:00 p.m. and 12:00

midnight and shall be by means of hand-held hoses, hand-held buckets, or drip irrigation only. The use of hose-end sprinklers or permanently installed automatic sprinkler systems are prohibited at all times.

(b) Use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle not occurring on the premises of a commercial car wash and commercial service stations and not in the immediate interest of public health, safety, and welfare is prohibited. Further, such vehicle washing at commercial car washes and commercial service stations shall occur only between the hours of 6:00 a.m. and 10:00 a.m. and between 6:00 p.m. and 10 p.m.

(c) The filling, refilling, or adding of water to swimming pools, wading pools, and Jacuzzi-type pools is prohibited.

(d) Operation of any ornamental fountain or pond for aesthetic or scenic purposes is prohibited except where necessary to support aquatic life or where such fountains or ponds are equipped with a recirculation system.

(e) No application for new, additional, expanded, or increased-in-size water service connections, meters, service lines, pipeline extensions, mains, or water service facilities of any kind shall be approved, and time limits for approval of such applications are hereby suspended for such time as this drought response stage or a higher-numbered stage shall be in effect.

**Stage 5 Response – EMERGENCY Water Shortage Conditions**

**Target: Achieve a _____ percent reduction in _____ (*example: total water use, daily water demand, etc.*).**

Best Management Practices for Supply Management:

*Describe additional measures, if any, to be implemented directly by _____ (name of your water supplier) to manage limited water supplies and/or reduce water demand. Examples include: system water loss control, reduced or discontinued irrigation of public landscaped areas; use of an alternative supply source(s); use of reclaimed water for non-potable purposes.*

Water Use Restrictions for Reducing Demand:
All requirements of Stage 2, 3, and 4 shall remain in effect during Stage 5 except:

(a) Irrigation of landscaped areas is absolutely prohibited, except soaker hoses, hand-held hoses or a dedicated zone using a drip irrigation system may be used to water trees up to two hours per week or foundations as necessary, provided no runoff occurs.
(b) Use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle is absolutely prohibited.

**Stage 6 Response – WATER ALLOCATION**

In the event that water shortage conditions threaten public health, safety, and welfare, the _____ (*designated official*) is hereby authorized to allocate water according to the following water allocation plan:

**Single-Family Residential Customers**

The allocation to residential water customers residing in a single-family dwelling shall be as follows:

| Persons per Household | Gallons per Month |
|---|---|
| 1 or 2 | 6,000 |
| 3 or 4 | 7,000 |
| 5 or 6 | 8,000 |
| 7 or 8 | 9,000 |
| 9 or 10 | 10,000 |
| 11 or more | 12,000 |

"Household" means the residential premises served by the customer's meter. "Persons per household" include only those persons currently physically residing at the premises and expected to reside there for the entire billing period. It shall be assumed that a particular customer's household is comprised of two (2) persons unless the customer notifies the _____ (*name of your water supplier*) of a greater number of persons per household on a form prescribed by the _____ (*designated official*). The _____ (*designated official*) shall give his/her best effort to see that such forms are mailed, otherwise provided, or made available to every residential customer. If, however, a customer does not receive such a form, it shall be the customer's responsibility to go to the _____ (*name of your water supplier*) offices to complete and sign the form claiming more than two (2) persons per household. New customers may claim more persons per household at the time of applying for water service on the form prescribed by the _____ (*designated official*). When the number of persons per household increases so as to place the customer in a different allocation category, the customer may notify the _____ (*name of water supplier*) on such form and the change will be implemented in the next practicable billing period. If the number of persons in a household is reduced, the customer shall notify the _____ (*name of your water supplier*) in writing within two (2) days. In prescribing the method for claiming more than two (2) persons per household, the _____ (*designated official*) shall adopt methods to insure the accuracy of the claim. Any person who knowingly, recklessly, or with criminal negligence falsely reports the number of persons in a household or fails to timely notify the _____ (*name of your water supplier*) of a reduction in the number of person in a household shall be fined not less than $_____.

Residential water customers shall pay the following surcharges:

$_____ for the first 1,000 gallons over allocation.
$_____ for the second 1,000 gallons over allocation.
$_____ for the third 1,000 gallons over allocation.
$_____ for each additional 1,000 gallons over allocation.

Surcharges shall be cumulative.

**Master-Metered Multi-Family Residential Customers**

The allocation to a customer billed from a master meter which jointly measures water to multiple permanent residential dwelling units (example: apartments, mobile homes) shall be allocated 6,000 gallons per month for each dwelling unit. It shall be assumed that such a customer's meter serves two dwelling units unless the customer notifies the _____ (*name of your water supplier*) of a greater number on a form prescribed by the _____ (*designated official*). The _____ (*designated official*) shall give his/her best effort to see that such forms are mailed, otherwise provided, or made available to every such customer. If, however, a customer does not receive such a form, it shall be the customer's responsibility to go to the _____ (*name of your water supplier*) offices to complete and sign the form claiming more than two (2) dwellings. A dwelling unit may be claimed under this provision whether it is occupied or not. New customers may claim more dwelling units at the time of applying for water service on the form prescribed by the _____ (*designated official*). If the number of dwelling units served by a master meter is reduced, the customer shall notify the _____ (*name of your water supplier*) in writing within two (2) days. In prescribing the method for claiming more than two (2) dwelling units, the _____ (*designated official*) shall adopt methods to insure the accuracy of the claim. Any person who knowingly, recklessly, or with criminal negligence falsely reports the number of dwelling units served by a master meter or fails to timely notify the _____ (*name of your water supplier*) of a reduction in the number of person in a household shall be fined not less than $_____. Customers billed from a master meter under this provision shall pay the following monthly surcharges:

$_____ for 1,000 gallons over allocation up through 1,000 gallons for each dwelling unit.
$_____, thereafter, for each additional 1,000 gallons over allocation up through a second 1,000 gallons for each dwelling unit.
$_____, thereafter, for each additional 1,000 gallons over allocation up through a third 1,000 gallons for each dwelling unit.
$_____, thereafter for each additional 1,000 gallons over allocation.

Surcharges shall be cumulative.

**Commercial Customers**

A monthly water allocation shall be established by the _____ (*designated official*), or his/her designee, for each nonresidential commercial customer other than an industrial customer who uses water for processing purposes. The non-residential customer's allocation shall be approximately _____ (*example: 75%*) percent of the customer's usage for corresponding month's billing period for the previous 12 months. If the customer's billing history is shorter than 12 months, the monthly average for the period for which there is a record shall be used for any monthly period for which no history exists. Provided, however, a customer, _____ percent of whose monthly usage is less than _____ gallons, shall be allocated _____ gallons. The _____ (*designated official*) shall give his/her best effort to see that notice of each non-residential customer's allocation is mailed to such customer. If, however, a customer does not receive such notice, it shall be the customer's responsibility to contact the _____ (*name of your water supplier*) to determine the allocation. Upon request of the customer or at the initiative of the _____ (*designated official*), the allocation may be reduced or increased if, (1) the designated period does not accurately reflect the customer's normal water usage, (2) one nonresidential customer agrees to transfer part of its allocation to another nonresidential customer, or (3) other objective evidence demonstrates that the designated allocation is inaccurate under

present conditions. A customer may appeal an allocation established hereunder to the _____ (*designated official or alternatively, a special water allocation review committee*). Nonresidential commercial customers shall pay the following surcharges:

Customers whose allocation is _____ gallons through _____ gallons per month:

$_____ per thousand gallons for the first 1,000 gallons over allocation.
$_____ per thousand gallons for the second 1,000 gallons over allocation.
$_____ per thousand gallons for the third 1,000 gallons over allocation.
$_____ per thousand gallons for each additional 1,000 gallons over allocation.

Customers whose allocation is _____ gallons per month or more:

_____ times the block rate for each 1,000 gallons in excess of the allocation up through 5 percent above allocation.
_____ times the block rate for each 1,000 gallons from 5 percent through 10 percent above allocation.
_____ times the block rate for each 1,000 gallons from 10 percent through 15 percent above allocation.
_____ times the block rate for each 1,000 gallons more than 15 percent above allocation.

The surcharges shall be cumulative. As used herein, "block rate" means the charge to the customer per 1,000 gallons at the regular water rate schedule at the level of the customer's allocation.

**Industrial Customers**

A monthly water allocation shall be established by the _____ (*designated official*), or his/her designee, for each industrial customer, which uses water for processing purposes. The industrial customer's allocation shall be approximately _____ (*example: 90%*) percent of the customer's water usage baseline. Ninety (90) days after the initial imposition of the allocation for industrial customers, the industrial customer's allocation shall be further reduced to _____ (*example: 85%*) percent of the customer's water usage baseline. The industrial customer's water use baseline will be computed on the average water use for the _____ month period ending prior to the date of implementation of Stage 2 of the Plan. If the industrial water customer's billing history is shorter than _____ months, the monthly average for the period for which there is a record shall be used for any monthly period for which no billing history exists. The _____ (*designated official*) shall give his/her best effort to see that notice of each industrial customer's allocation is mailed to such customer. If, however, a customer does not receive such notice, it shall be the customer's responsibility to contact the _____ (*name of your water supplier*) to determine the allocation, and the allocation shall be fully effective notwithstanding the lack of receipt of written notice. Upon request of the customer or at the initiative of the _____ (*designated official*), the allocation may be reduced or increased, (1) if the designated period does not accurately reflect the customer's normal water use because the customer had shutdown a major processing unit for repair or overhaul during the period, (2) the customer has added or is in the process of adding significant additional processing capacity, (3) the customer has shutdown or significantly reduced the production of a major processing unit, (4) the customer has previously implemented significant permanent water conservation measures such that the ability to further reduce water use is limited, (5) the customer agrees to transfer part of its allocation to another industrial customer, or (6) if

other objective evidence demonstrates that the designated allocation is inaccurate under present conditions. A customer may appeal an allocation established hereunder to the _____ (*designated official or alternatively, a special water allocation review committee*). Industrial customers shall pay the following surcharges:

Customers whose allocation is _____ gallons through _____ gallons per month:

$_____ per thousand gallons for the first 1,000 gallons over allocation.
$_____ per thousand gallons for the second 1,000 gallons over allocation.
$_____ per thousand gallons for the third 1,000 gallons over allocation.
$_____ per thousand gallons for each additional 1,000 gallons over allocation.

Customers whose allocation is _____ gallons per month or more:

_____ times the block rate for each 1,000 gallons in excess of the allocation up through 5 percent above allocation.
_____ times the block rate for each 1,000 gallons from 5 percent through 10 percent above allocation.
_____ times the block rate for each 1,000 gallons from 10 percent through 15 percent above allocation.
_____ times the block rate for each 1,000 gallons more than 15 percent above allocation.

The surcharges shall be cumulative. As used herein, "block rate" means the charge to the customer per 1,000 gallons at the regular water rate schedule at the level of the customer's allocation.

**Section X: Enforcement**

(a) No person shall knowingly or intentionally allow the use of water from the _____ (*name of your water supplier*) for residential, commercial, industrial, agricultural, governmental, or any other purpose in a manner contrary to any provision of this Plan, or in an amount in excess of that permitted by the drought response stage in effect at the time pursuant to action taken by _____ (*designated official*), or his/her designee, in accordance with provisions of this Plan.

(b) Any person who violates this Plan is guilty of a misdemeanor and, upon conviction shall be punished by a fine of not less than _____ dollars ($_____) and not more than _____ dollars ($_____). Each day that one or more of the provisions in this Plan is violated shall constitute a separate offense. If a person is convicted of three or more distinct violations of this Plan, the _____ (*designated official*) shall, upon due notice to the customer, be authorized to discontinue water service to the premises where such violations occur. Services discontinued under such circumstances shall be restored only upon payment of a re-connection charge, hereby established at $ _____, and any other costs incurred by the _____ (*name of your water supplier*) in discontinuing service. In addition, suitable assurance must be given to the _____ (*designated official*) that the same action shall not be repeated while the Plan is in effect. Compliance with this plan may also be sought through injunctive relief in the district court.

(c) Any person, including a person classified as a water customer of the _____ (*name of your water supplier*), in apparent control of the property where a violation occurs or originates

shall be presumed to be the violator, and proof that the violation occurred on the person's property shall constitute a rebuttable presumption that the person in apparent control of the property committed the violation, but any such person shall have the right to show that he/she did not commit the violation. Parents shall be presumed to be responsible for violations of their minor children and proof that a violation, committed by a child, occurred on property within the parents' control shall constitute a rebuttable presumption that the parent committed the violation, but any such parent may be excused if he/she proves that he/she had previously directed the child not to use the water as it was used in violation of this Plan and that the parent could not have reasonably known of the violation.

(d) Any employee of the _____ (*name of your water supplier*), police officer, or other _____ employee designated by the _____ (*designated official*), may issue a citation to a person he/she reasonably believes to be in violation of this Ordinance. The citation shall be prepared in duplicate and shall contain the name and address of the alleged violator, if known, the offense charged, and shall direct him/her to appear in the _____ (*example: municipal court*) on the date shown on the citation for which the date shall not be less than 3 days nor more than 5 days from the date the citation was issued. The alleged violator shall be served a copy of the citation. Service of the citation shall be complete upon delivery of the citation to the alleged violator, to an agent or employee of a violator, or to a person over 14 years of age who is a member of the violator's immediate family or is a resident of the violator's residence. The alleged violator shall appear in _____ (*example: municipal court*) to enter a plea of guilty or not guilty for the violation of this Plan. If the alleged violator fails to appear in _____ (*example: municipal court*), a warrant for his/her arrest may be issued. A summons to appear may be issued in lieu of an arrest warrant. These cases shall be expedited and given preferential setting in _____ (*example: municipal court*) before all other cases.

**Section XI: Variances**

The _____ (*designated official*), or his/her designee, may, in writing, grant temporary variance for existing water uses otherwise prohibited under this Plan if it is determined that failure to grant such variance would cause an emergency condition adversely affecting the health, sanitation, or fire protection for the public or the person requesting such variance and if one or more of the following conditions are met:

(a) Compliance with this Plan cannot be technically accomplished during the duration of the water supply shortage or other condition for which the Plan is in effect.
(b) Alternative methods can be implemented which will achieve the same level of reduction in water use.

Persons requesting an exemption from the provisions of this Ordinance shall file a petition for variance with the _____ (*name of your water supplier*) within 5 days after the Plan or a particular drought response stage has been invoked. All petitions for variances shall be reviewed by the _____ (*designated official*), or his/her designee, and shall include the following:

(a) Name and address of the petitioner(s).
(b) Purpose of water use.
(c) Specific provision(s) of the Plan from which the petitioner is requesting relief.
(d) Detailed statement as to how the specific provision of the Plan adversely affects the petitioner or what damage or harm will occur to the petitioner or others if petitioner complies with this Ordinance.
(e) Description of the relief requested.

(f) Period of time for which the variance is sought.
(g) Alternative water use restrictions or other measures the petitioner is taking or proposes to take to meet the intent of this Plan and the compliance date.
(h) Other pertinent information.

**Texas Commission on Environmental Quality**
Water Availability Division
MC-160, P.O. Box 13087 Austin, Texas 78711-3087
Telephone (512) 239-4600, FAX (512) 239-2214

# Drought Contingency Plan for a Retail Public Water Supplier

This form is provided as a model of a drought contingency plan for a retail public water supplier. If you need assistance in completing this form or in developing your plan, please contact the Conservation Staff of the Resource Protection Team in the Water Availability Division at (512) 239-4600.

**Drought Contingency Plans must be formally adopted by the governing body of the water provider and documentation of adoption must be submitted with the plan.** For municipal water systems, adoption would be by the city council as an ordinance. For other types of publicly-owned water systems (example: utility districts), plan adoption would be by resolution of the entity's board of directors adopting the plan as administrative rules. For private investor-owned utilities, the drought contingency plan is to be incorporated into the utility's rate tariff. Each water supplier shall provide documentation of the formal adoption of their drought contingency plan.

This form is provided as a model of a drought contingency plan for a retail public water supplier. If you need assistance in completing this form or in developing your plan, please contact the Conservation Staff of the Resource Protection Team in the Water Availability Division at (512) 239-4600.

**Drought Contingency Plans must be formally adopted by the governing body of the water provider and documentation of adoption must be submitted with the plan.** For municipal water systems, adoption would be by the city council as an ordinance. For other types of publicly-owned water systems (example: utility districts), plan adoption would be by resolution of the entity's board of directors adopting the plan as administrative rules. For private investor-owned utilities, the drought contingency plan is to be incorporated into the utility's rate tariff. Each water supplier shall provide documentation of the formal adoption of their drought contingency plan.

| | |
|---|---|
| Name: | Click to add text |
| Address: | |
| Telephone Number: | ( ) Fax: ( ) |
| Water Right No.(s): | |
| Regional Water Planning Group: | |
| Form Completed by: | |
| Title: | |
| Person responsible for implementation: | Phone: ( ) |
| Signature: | Date: / / |

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# Hydrologic Models Table

***Models for which Surface Water Availabilities were based for the 2026 Region N Regional Water Plan***

Nueces Basin Water Availability Model (TCEQ): For all surface water rights, other than Corpus Christi Regional Water System

Named/labeled Version Date of Model Used: TCEQ Run 3 WAM downloaded on 11/25/2024

Model Run performed by HDR Engineering, Inc.

Date of Model Run: 01/02/2025

Corpus Christi Water Supply Model (variance approved by TWDB for Corpus Christi Regional Water System)

Named/labeled Version Date of Model Used: NUBAY13.exe 7/31/2017

Summary of modifications to model and the date these modifications were approved by the EA: MRP Phase II operations, LNRA call-back 10,400 ac-ft/yr, Lake Texana interruptible supplies per contract, CCR/LCC system with 2001 TCEQ Agreed Order. Approved by EA to use safe yield of 75,000 acft and Corpus Christi Water Supply Model (for regional supply system) on January 5, 2018.

Model Run performed by HDR Engineering, Inc.

Date of Model Run: 2/9/2024

***Models for which Groundwater Water Availabilities were based for the 2026 Region N Regional Water Plan***

The 2026 Coastal Bend RWPG used MAGs in development of the 2026 Region N IPP and therefore GAM model files are not available/applicable.

A table providing the details of hydrologic models used, including the model name, version date, model input/output files used, date model used, and other information is included on the following page.

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# Appendix E – 2001 Agreed Order Presentation City of Corpus Christi City Council August 30, 2016

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# Water Supply

## Discussion - Demands
## Inflows/Pass-Thru Requirements
## of Agreed Order

Council Presentation
August 30, 2016

# Today's Presentation

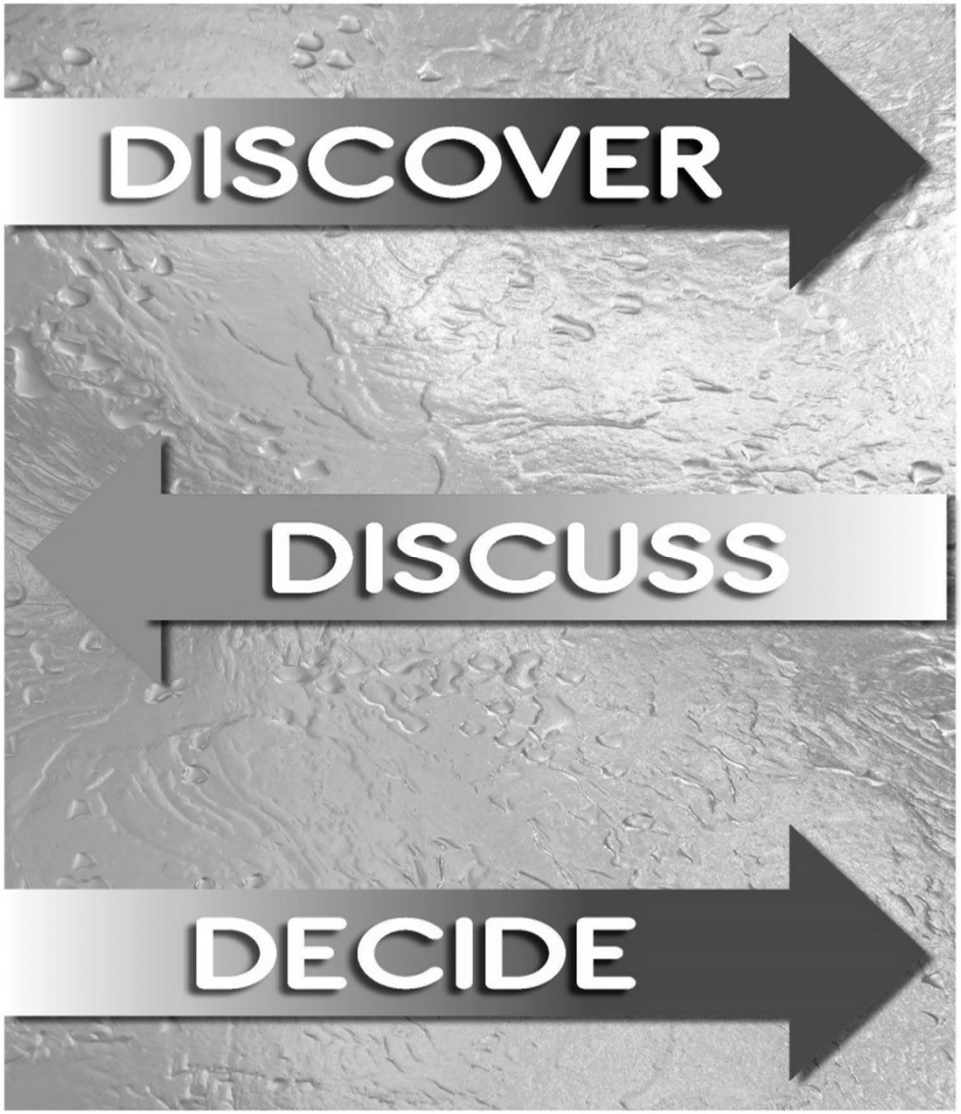
- **Alternative Demand Projection**
  - Kristi Shaw (HDR)

Slides Removed to Reduce File Size- Irrelevant to Agreed Order Discussion

- **Fresh Water Inflows**
  - Ray Allen (Coastal Bend Bays and Estuaries Program - CBBEP)

- **Agreed Order Pass-Thru Requirements**
  - Rocky Freund (Nueces River Authority - NRA)

# Discover, Discuss, Decide



# Presentation Schedule

| Date | Topic |
|---|---|
| May 10, 2016 | Discovery – Texas Water Planning |
| July 19, 2016 | Discovery – Demands |
| **August 30, 2016** | **Discussion – Demands**<br>**Discovery – Agreed Order** |
| September 27, 2016 | Discovery – Current Supplies (and Model Updates)<br>Discovery – Future Supplies*<br>Discovery and Discussion – RFI Approach |
| October/ November 2016 | Discovery - Future Supplies |
| Nov / Dec 2016 | Decide – Adopt Water Management Plan |

* **Studied by Region N**

# Key Entities

- **USBR** (US Bureau of Reclamation) – provided funding for and built Choke Canyon Reservoir (CCR)
- **TCEQ** (Texas Commission on Environmental Quality) – Party to permit and agreed order
- **City** (Corpus Christi) – Took operational responsibilities for CCR from USBR
- **NRA** (Nueces River Authority) – Third party, independent pass-thru compliance assistance
- **NEAC** (Nueces Estuary Advisory Council) – Monitor pass-thru implementation and make recommendations

# Who is NEAC?

- Established by 1992 Interim Agreed Order
- Continues through present
- Composed of State agency staff, Port of Corpus Christi, Non Governmental Organizations (NGOs), industry, private citizens, university staff, CBBEP, customers, NRA, and representatives of parties to agreed order, including the City
- Ray Allen, Rocky Freund and Bill Green are members

# Water Rights Permit - 1976

- Required for authorization of Choke Canyon Reservoir
- To appropriate waters of the state in the Nueces River Basin
- In order to protect the bays and estuaries, the State of Texas preserved inflows to the bay (151,000 AF– Special Condition 5b.)

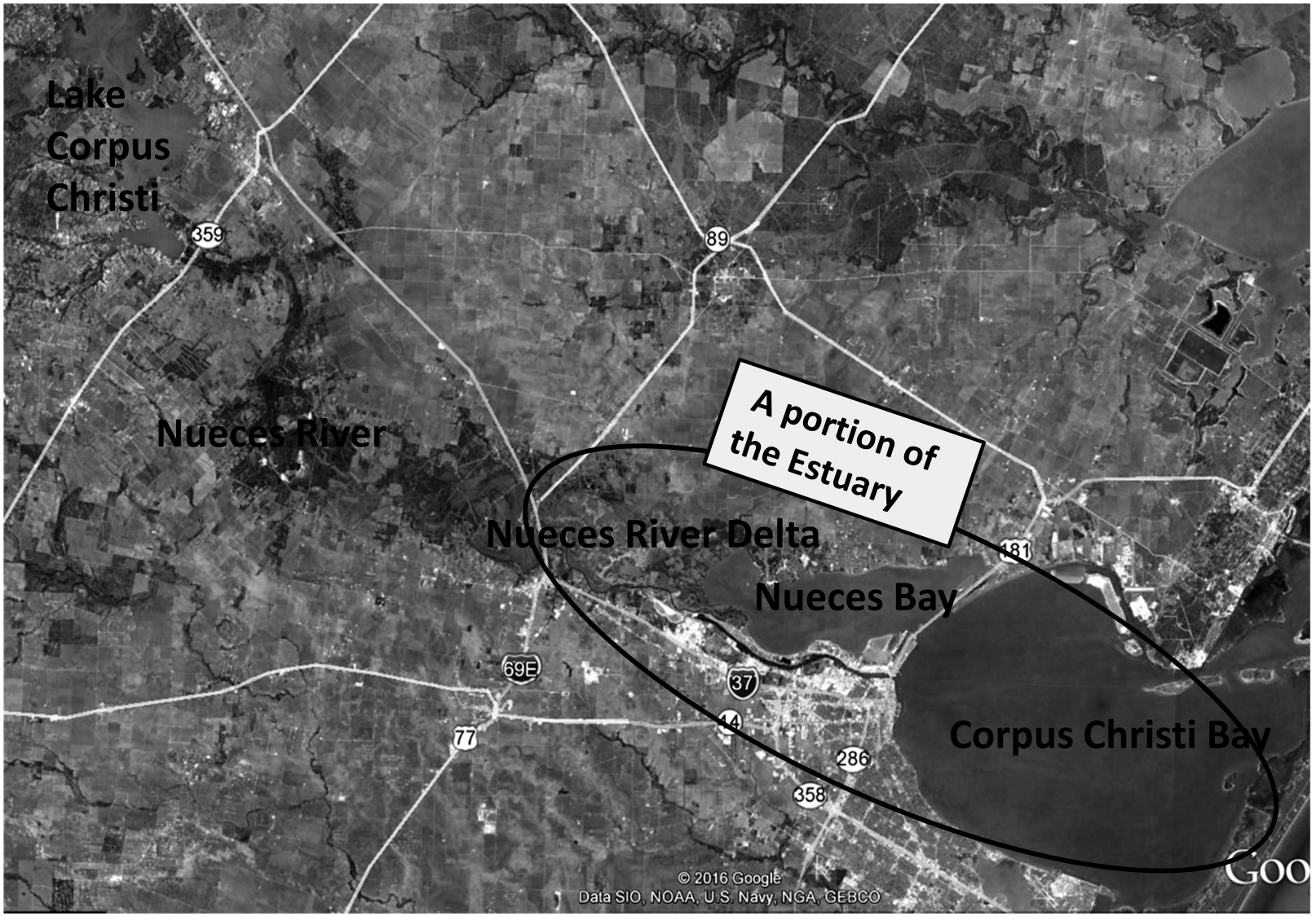
# Since the 1976 Water Rights Permit

| Year | Item | Significance |
|---|---|---|
| 1990 | First Order | Technical Advisory Committee |
| 1992 | Agreed Order | Nueces Estuary Advisory Council created, salinity credits |
| 1995 | Agreed Order | Changed from 'mandatory releases' to 'passage of inflows', Drought Contingency Plan |
| 2001 | Agreed Order | Opened overflow channel, Rincon Bayou pipeline, adaptive management |
| 2007 | Senate Bill 3 | Required state agencies to address environmental flows of streams and bays |

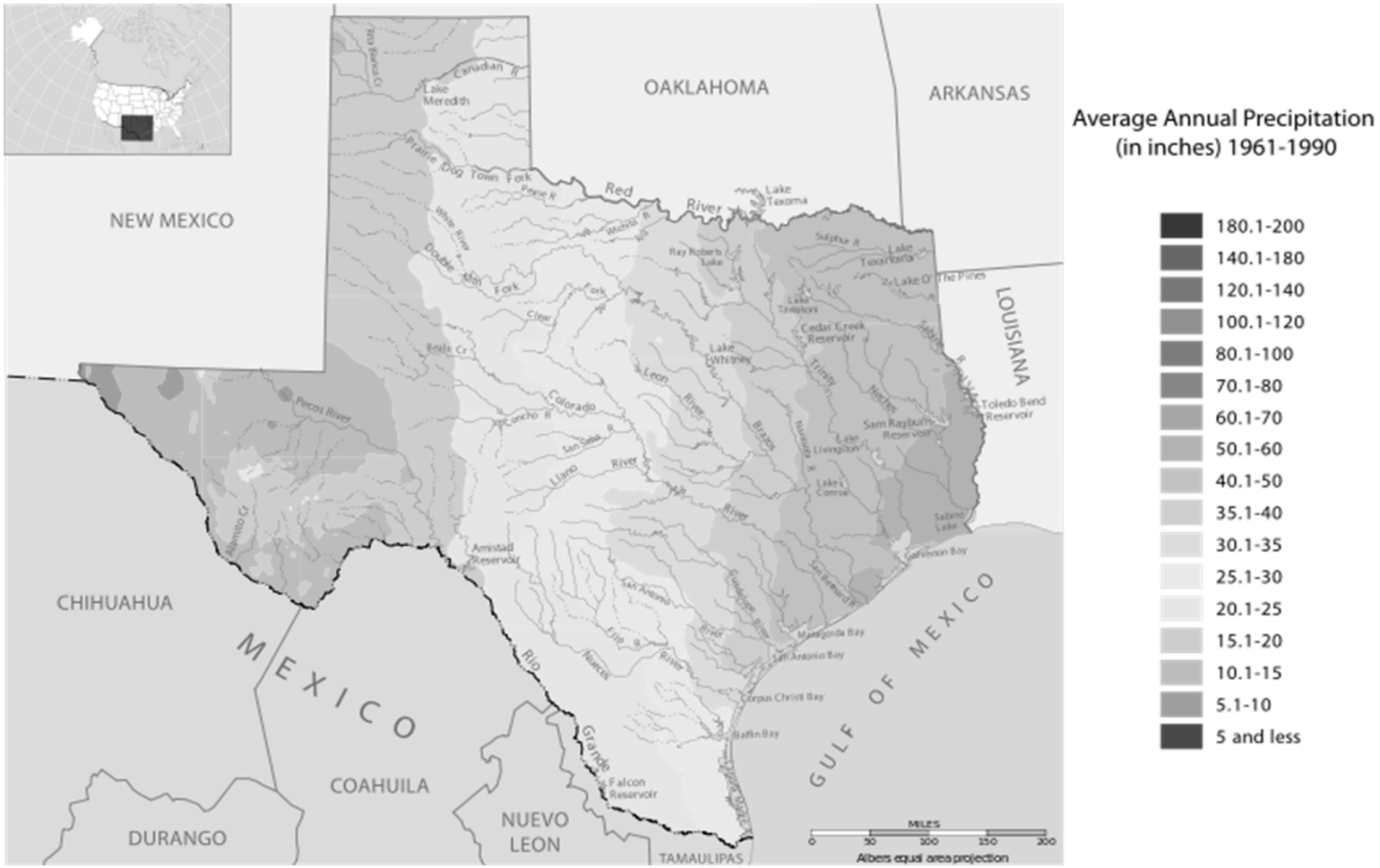
# Freshwater Inflows - History, Benefits, and Science

**Ray Allen**
**Executive Director**
**Coastal Bend Bays & Estuaries Program**

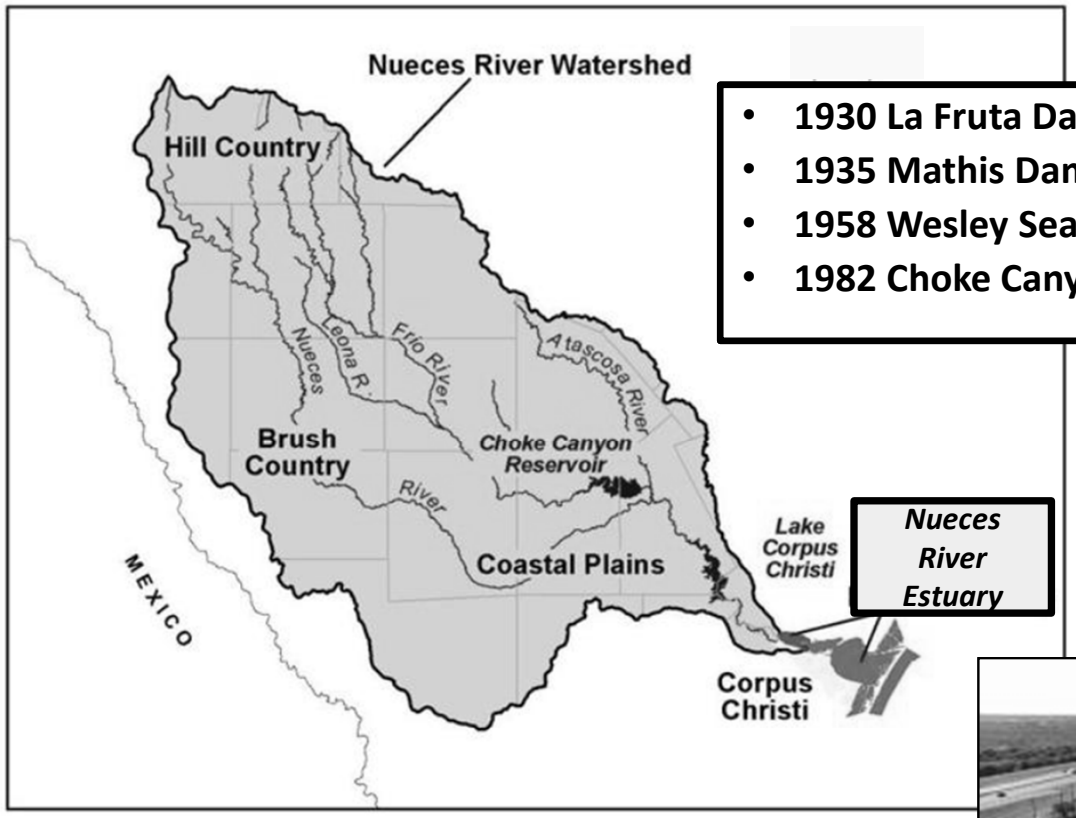
# Nueces River & Estuary



# We Live in a Semi-Arid Area



# History of the Reservoirs

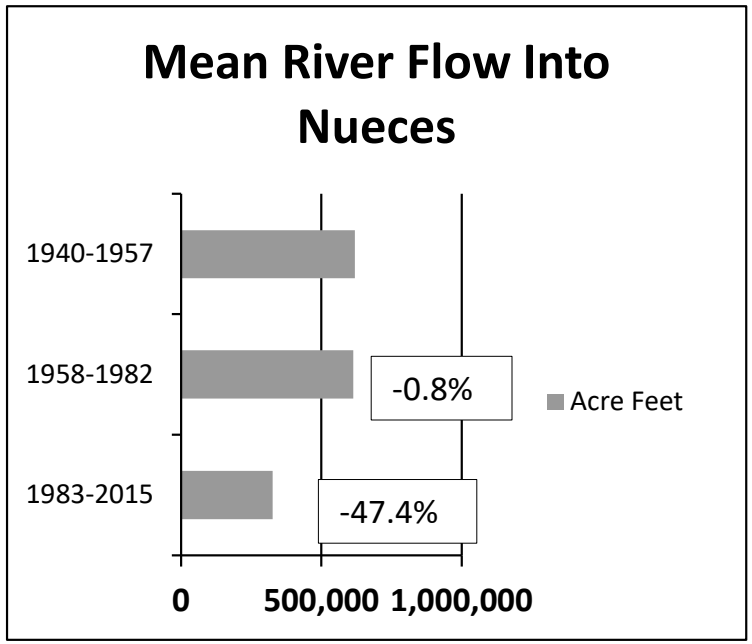



- 1930 La Fruta Dam – Lake Lovenskiold
- 1935 Mathis Dam – Lake Corpus Christi
- 1958 Wesley Seale Dam – Lake CC
- 1982 Choke Canyon Reservoir

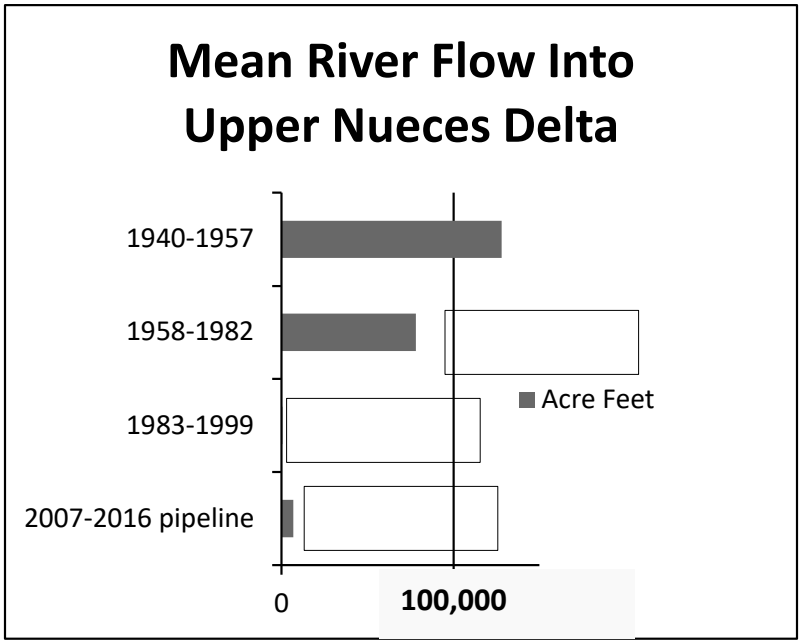
**Figure 2.1.1.** Location of the Nueces River Basin.

# Changes in Freshwater Inflows

- **Freshwater inflows have been reduced by *47%* into Nueces Estuary, and by *94%* in the Upper Nueces Delta**



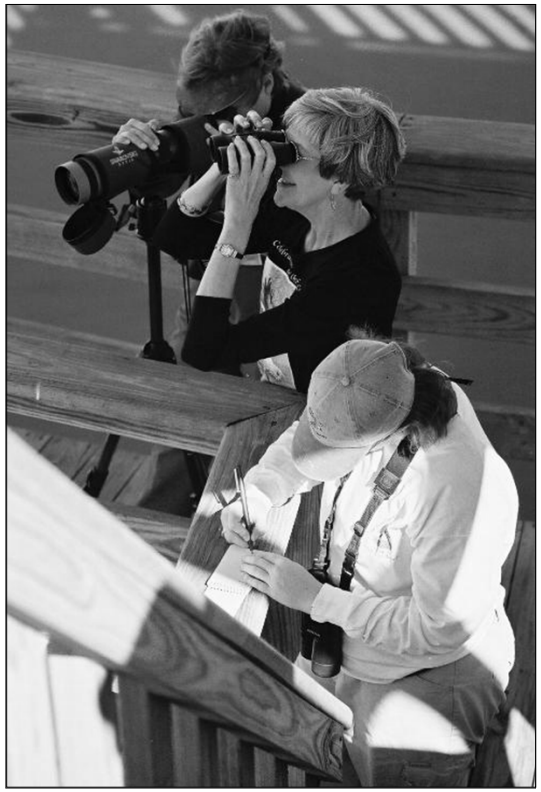

*Data not available for 1997 - 2000




*2007-2016 Rincon pipeline flows only, does not include natural overbanking from floods.

# Benefits of Freshwater Inflows

## Healthy Bays - Healthy Economy - Quality of Life



- Nature Tourism*
  - 47% of visitors are nature based
  - $674 million in visitor destination spending
  - $987 million total economic impact
- Commercial and Recreational Fisheries
- Quality of Life for people who live and play here

*The Economic Significance of Tourism and Nature Tourism in Corpus Christi, Dr. Jim Lee, TAMUCC, 2014.

# Science: Environmental Flows

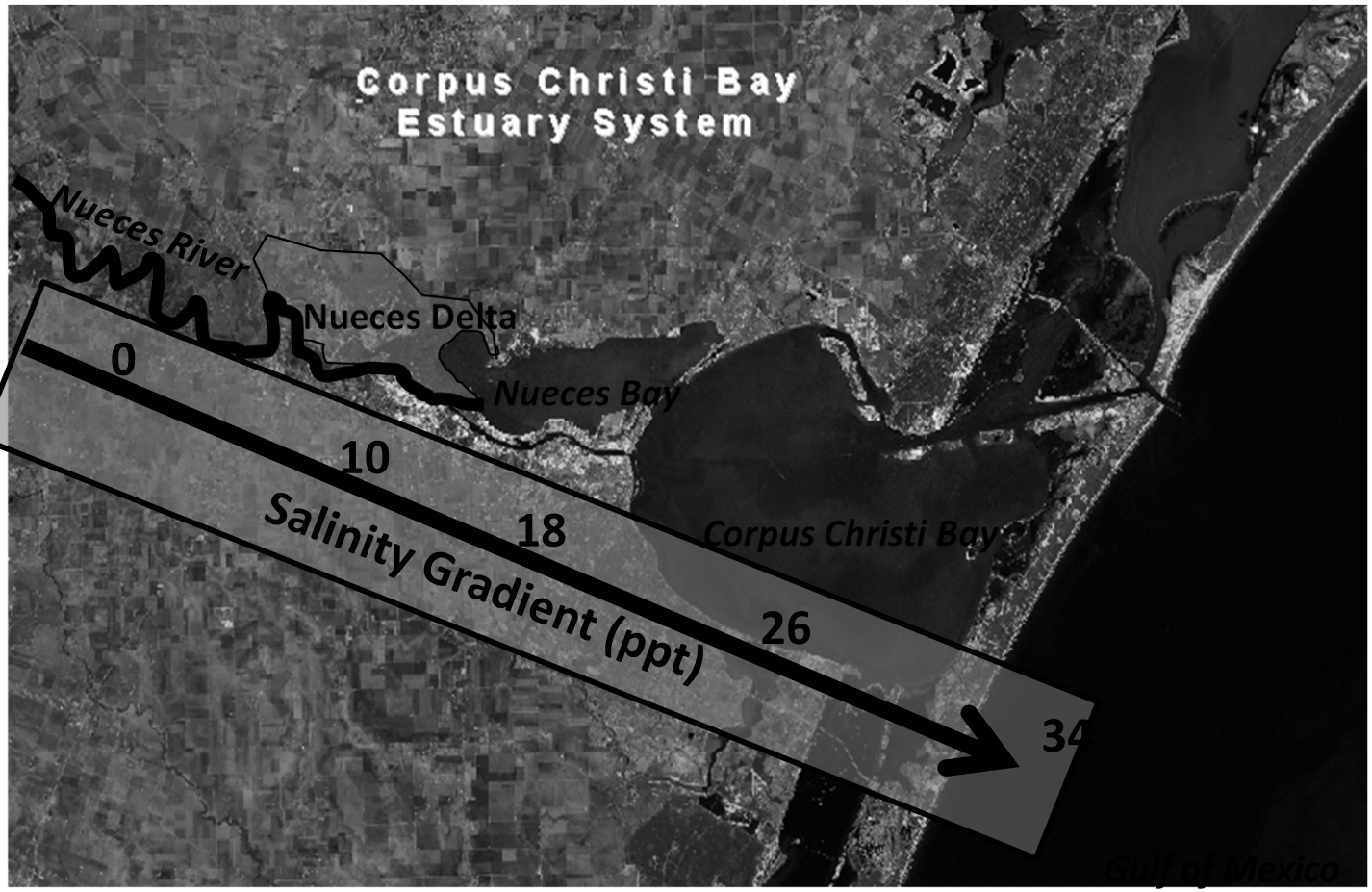
**"A schedule of flow quantities that reflects seasonal and yearly fluctuations that typically would vary geographically, by specific location in a watershed, and that are shown to be adequate to support a sound ecological environment and to maintain the productivity, extent, and persistence of key aquatic habitats in and along the affected water bodies."**

# Science: Sound Ecological Environment

- **Sustains the full complement of native species in perpetuity;**
- **Sustains key habitat features required by these species;**
- **Retains key features of the natural flow regime required by these species to complete their life cycles; and**
- **Sustains key ecosystem processes and services, such as elemental cycling and the productivity of important plant and animal populations.**

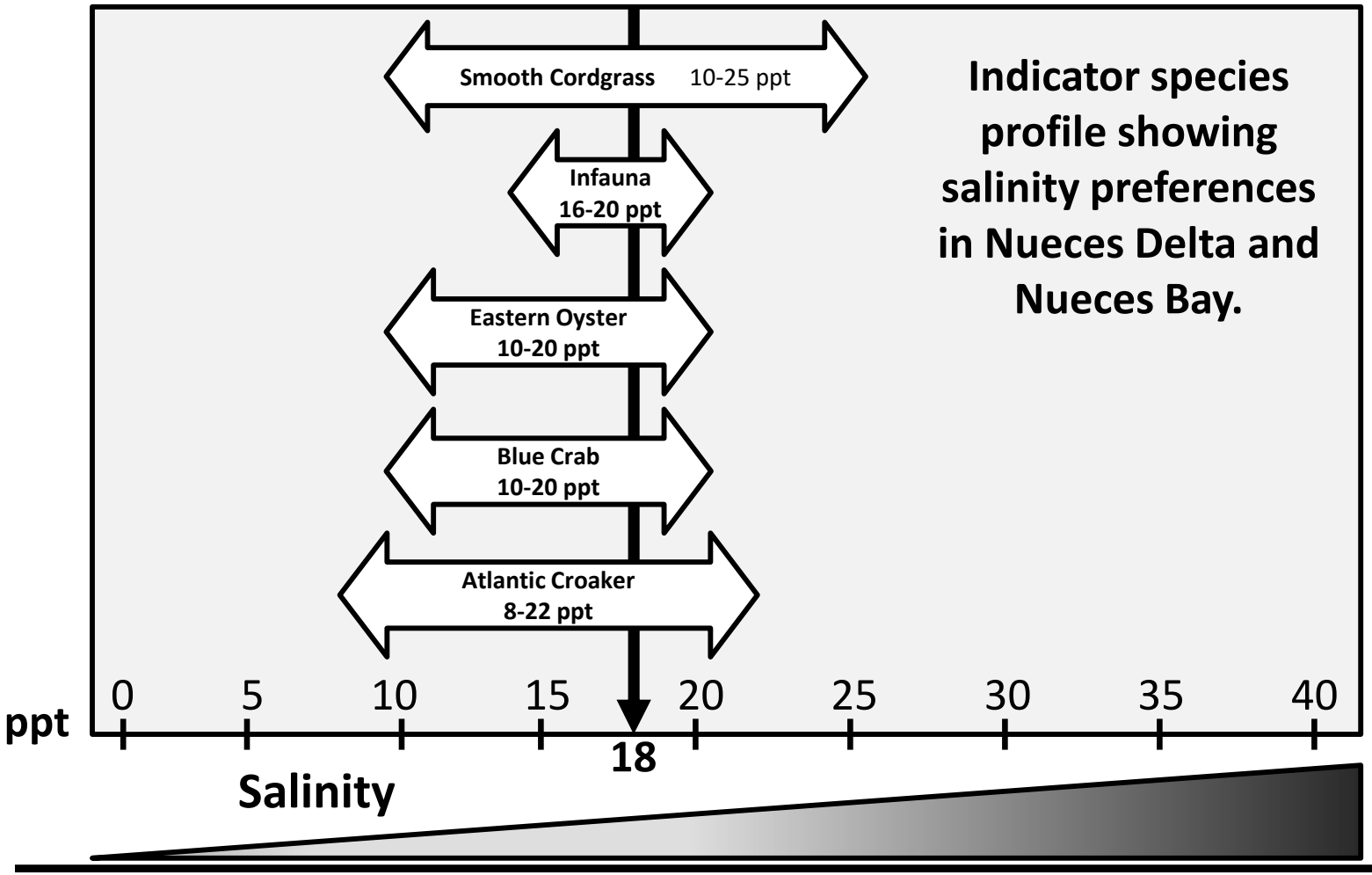
# What Exactly do Freshwater Inflows do in the Nueces Estuary?

**Create environmental conditions that sustain biological productivity.**



# Why is Salinity Important?

- Species prefer different salinities
- Benefits are seen throughout the food chain



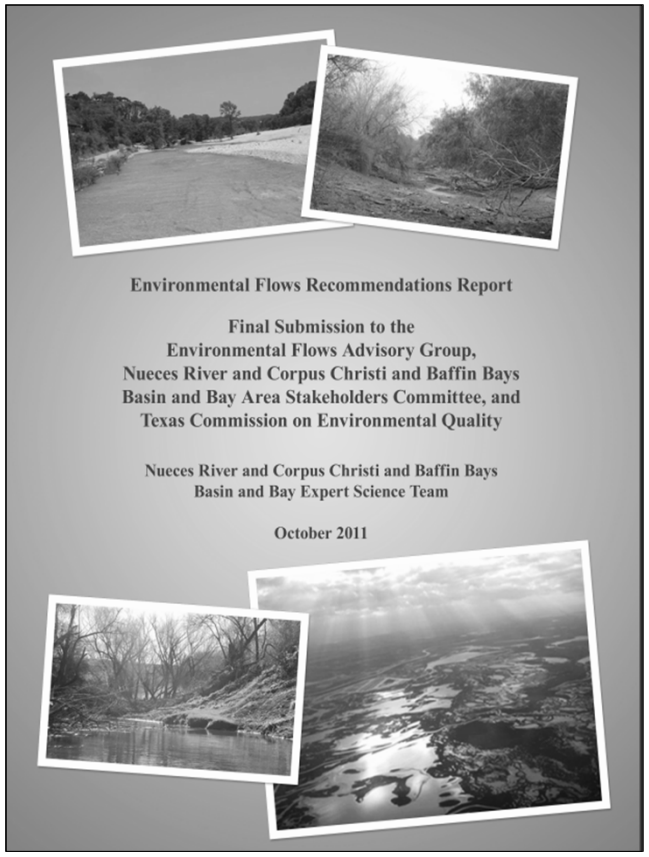
# Science: Senate Bill 3 Process

- **Nueces Basin & Bay Expert Science Team (BBEST)**

  **Historical and scientific review of estuary. Only estuary along Texas coast to not meet the definition of a Sound Ecological Environment.**

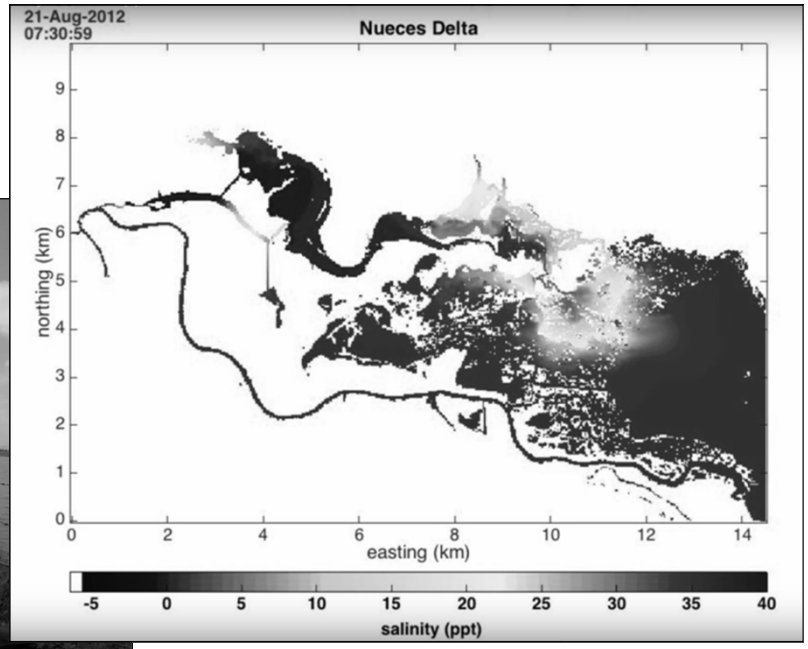
- **Nueces Basin & Bay Area Stakeholder Committee (BBASC)**

  **Representing agriculture, recreation, municipalities, industrial water users, commercial fishing, public interests, regional water planning, etc.**



# Studies and Research Since Choke

- **Salinity, tide, meteorological data collection**
- **Studies to evaluate the monthly targets**
- **Studies on the effectiveness of Rincon Bayou pipeline**
  - ***Hydrodynamic modeling***
  - ***Biological response***



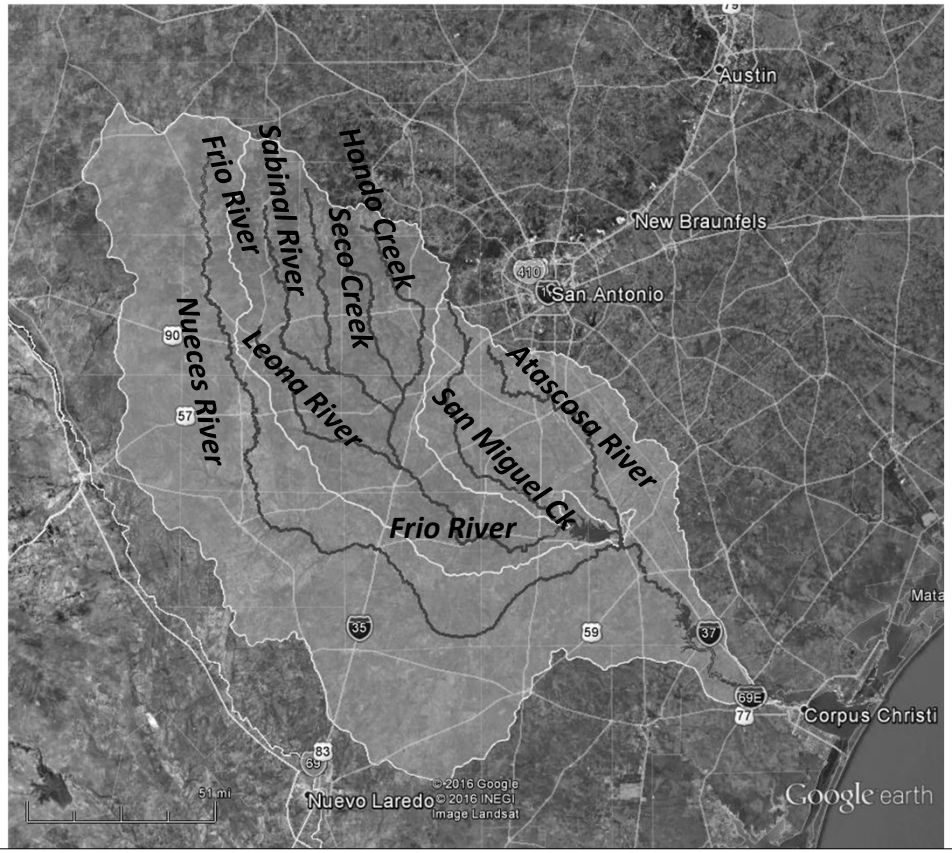
# Key Points

- **A healthy Nueces Estuary requires freshwater inflows.**
- **In Texas, other reservoir systems have pass-thru or release requirements (e.g. Lake Texana).**
- **Nueces BBEST Finding: Nueces Bay was not a sound ecological environment.**
- **Required inflow studies have been completed and are ongoing.**

# Pass-Thru Requirements of the Agreed Order

**Rocky Freund**
**Deputy Executive Director**
**Nueces River Authority**

# Watersheds




- Reservoirs operated as a system to maximize water supply
- Lake Corpus Christi – larger watershed, more likely to fill
- Choke Canyon Reservoir - cooler, deeper reservoir – better storage
- Pass-thru requirements released from Lake Corpus Christi

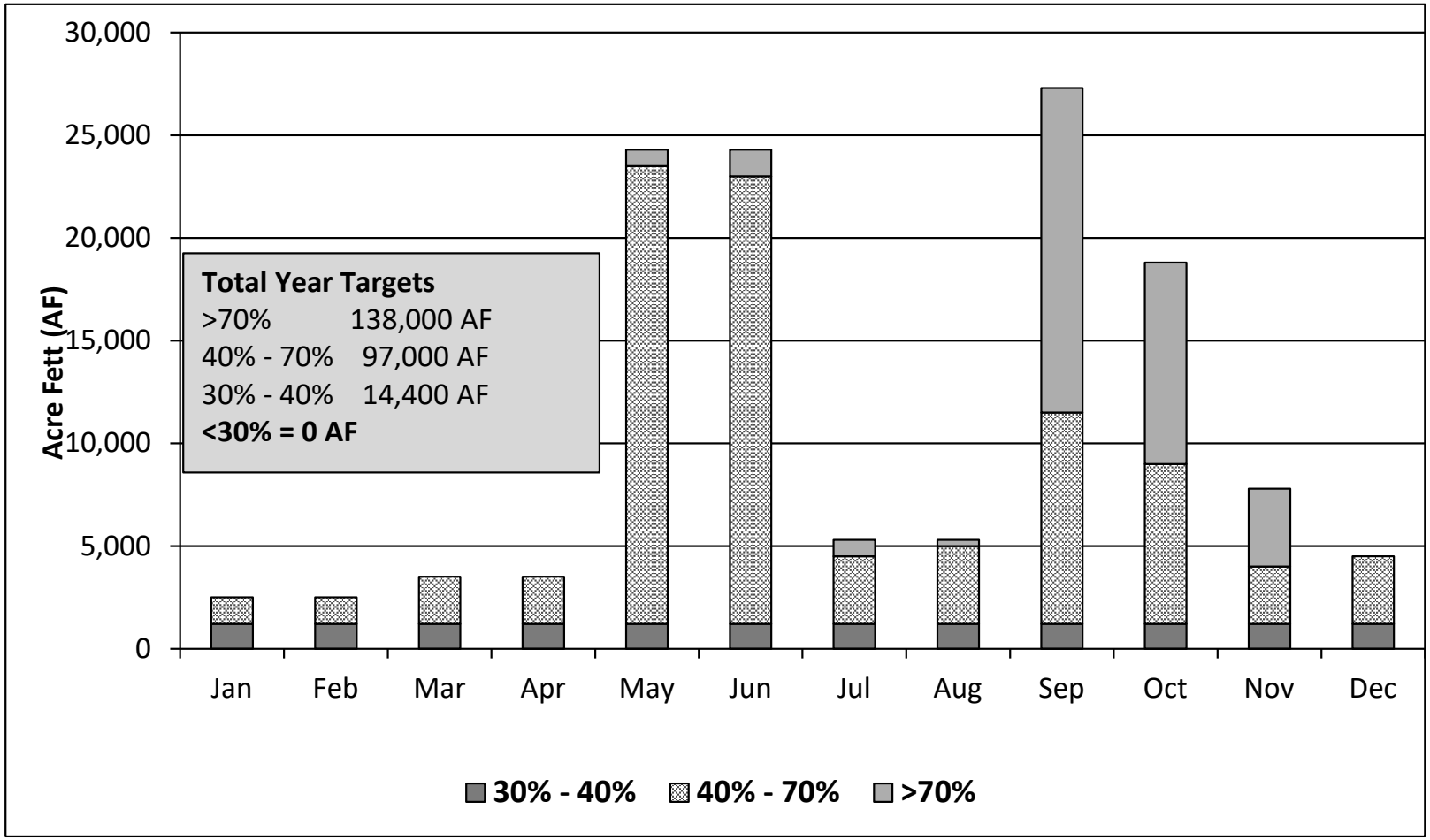
# What is Pass-Thru Requirement?

- **Measured inflow into the Choke Canyon / Lake Corpus Christi Reservoir System, UP to a *target* amount, is required to be passed through to the bays and estuaries.**
- ***Target,* in the sense, is the maximum requirement under the agreed order.**
- **Thus, no release from storage is ever required to meet the *target*.**

# What Determines Target Amount?

- **Varies by current reservoir system storage (% of total capacity)**
- **Varies by month (based on historic flow patterns)**
- **Salinity relief credit reduces target amount**

# Annual Total Targets



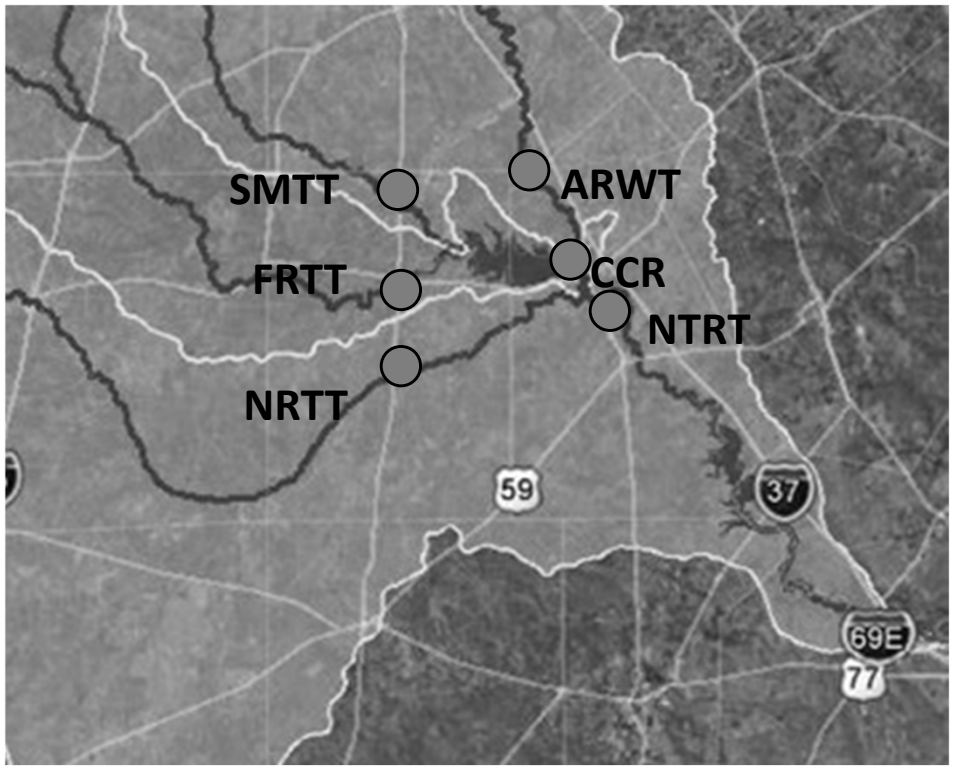
# How is the inflow into Reservoir System Measured?

**Two computations:**

**(1) Inflow = (NTRT*+FRTT+SMTT) – CCR**

**But if sum <0, then alternate calculation**

**(2) Inflow = NRTT+FRTT +SMTT+ARWT**




***(NTRT includes flows from NRTT, ARWT and CCR)**

# Frequently Asked Questions

## How does local rainfall affect pass-thru?

- Any measured inflow into Nueces Bay, whether over the salt water dam at Labonte Park or through Rincon pipeline, counts toward pass-thru.

## Does city get credit for surplus inflows?

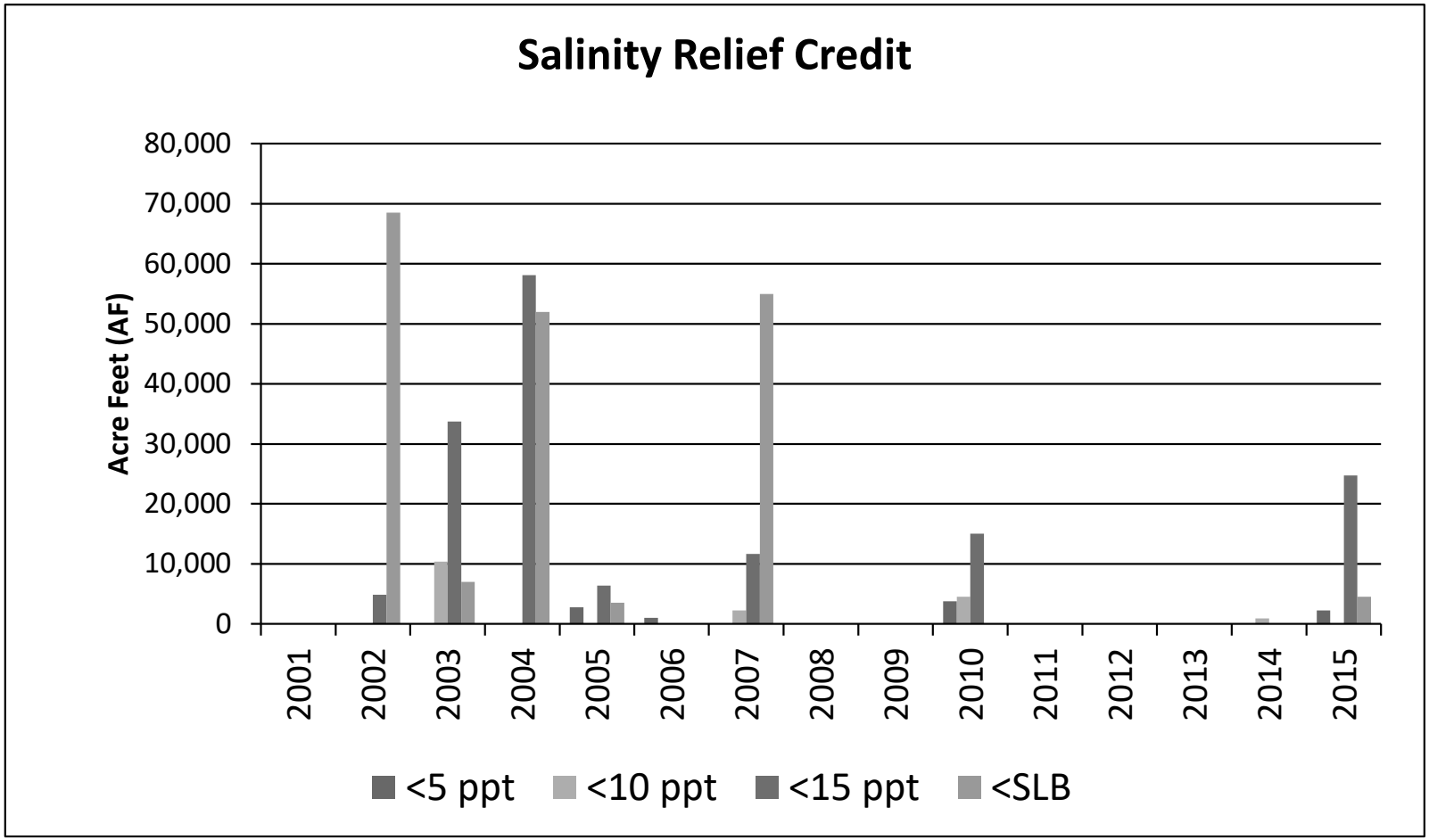
- Yes, surplus inflow, into Nueces Bay & Delta, over required pass-thru can be carried forward to next month but only up to one-half of monthly target.
- City also receives a 500 AF return flow credit every month that counts toward the pass-thru.

# How do salinity levels in Nueces Bay affect the Target Amount?

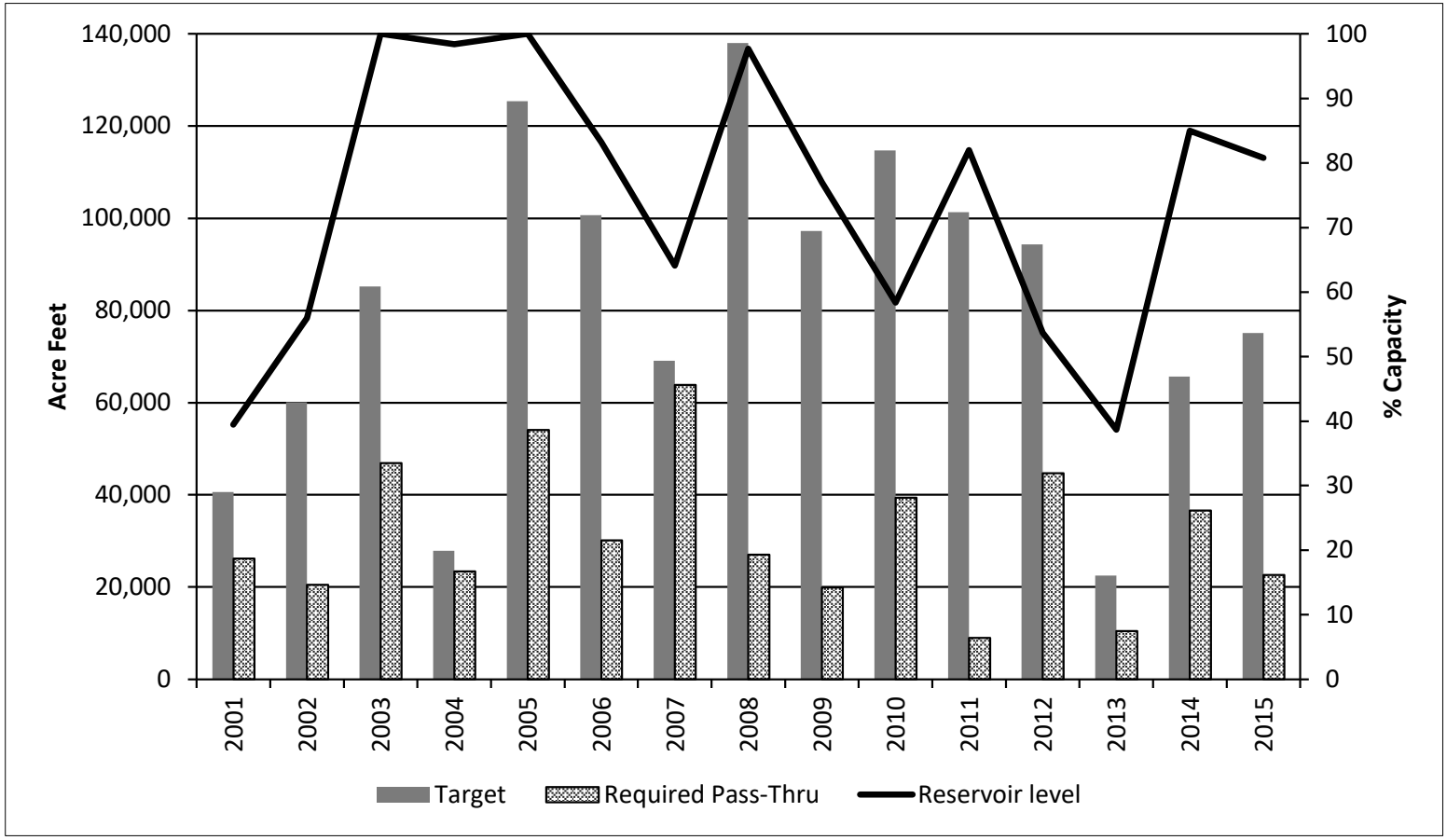
- If the salinity levels at the official monitoring site meets specific criteria, which varies by month, then a salinity relief credit can reduce the target amount.
- Examples:
  - In July 2016, the average salinity for 10 consecutive days was below 15 ppt, so the target was reduced by 50%.
  - In March 2016, the average salinity for 10 consecutive days was below 25 ppt, so the target was reduced by 25%.

**Note: City can use the salinity relief credit OR the surplus in any given month, not both.**

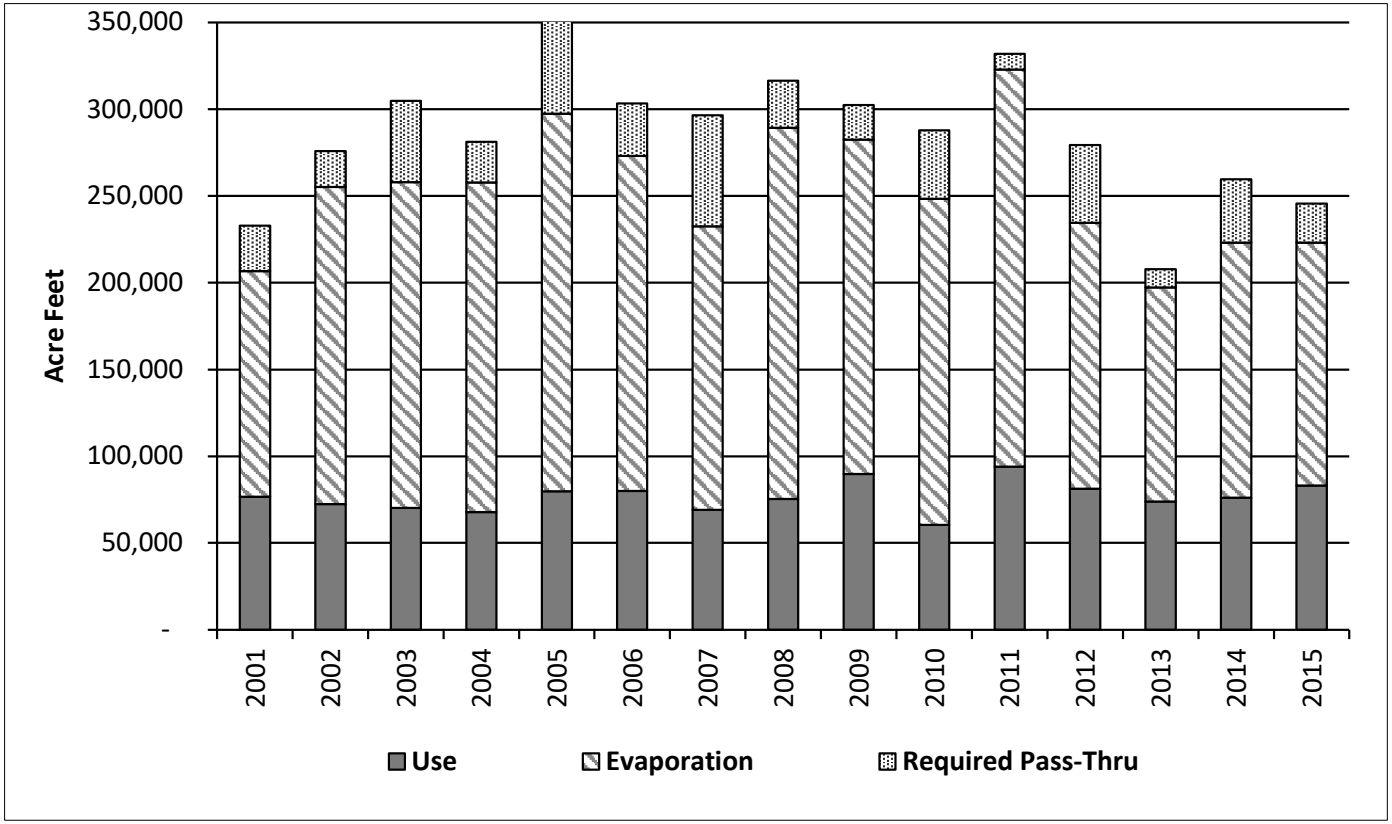
# Has the City Ever Received Salinity Relief Credits? *YES, 9 out of last 15 yrs.*



# Targets vs Actual Pass-thrus vs Reservoir Levels

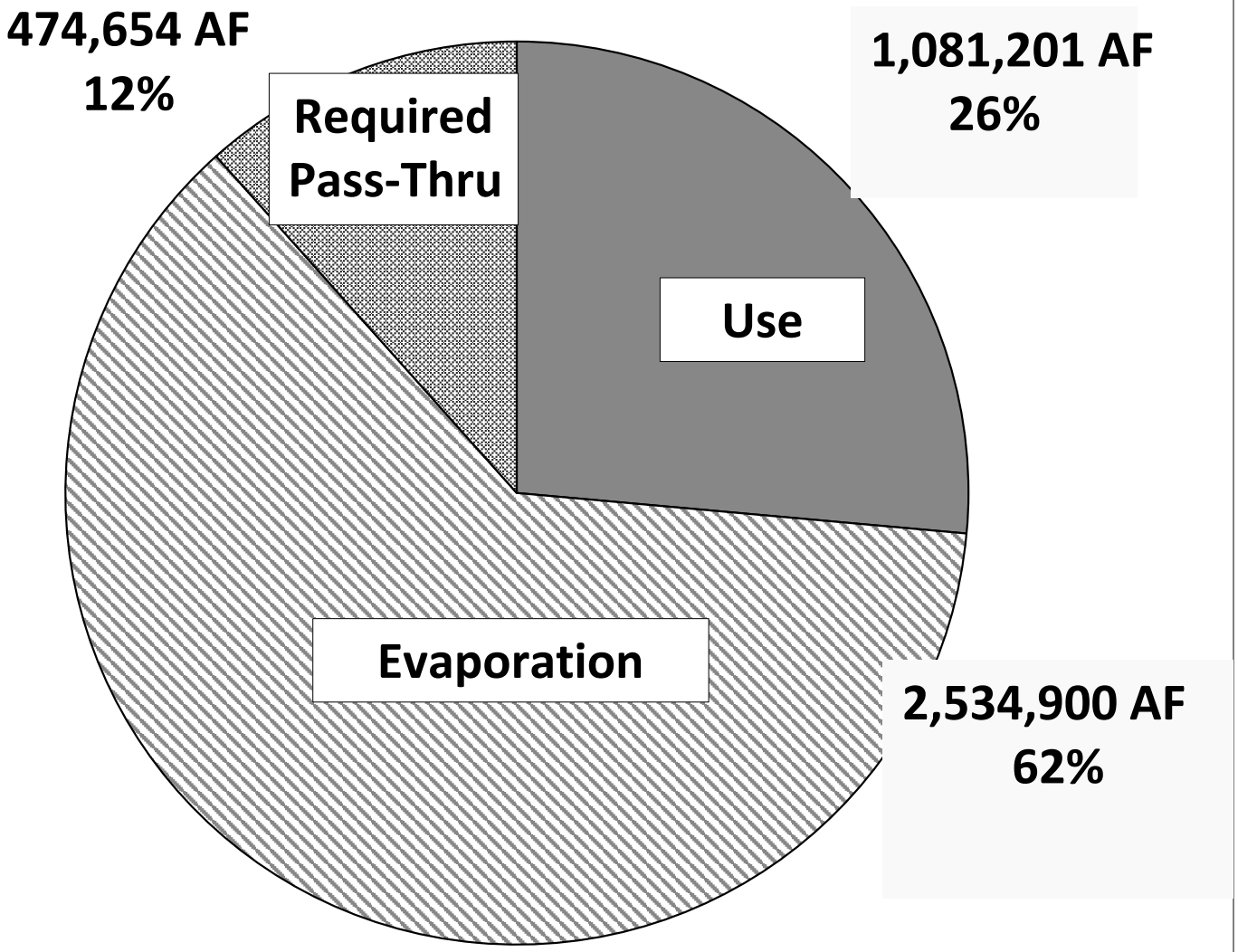


# Total Water Use*By Year
# Choke Canyon/Lake CC
# Reservoir Systems




***Does not include evaporation from rivers or channel loss between Choke Canyon Reservoir and Lake Corpus Christi.***

# Total Water Use*: 2001-2015




** Does not include evaporation from rivers or channel loss*

# Example Report

**Daily Reservoir System and Pass-Thru Status Report**
**August 22, 2016**

| Prosposed Water Supply Index | | |
|---|---|---|
| Value | Stage # | Stage Name |
| Under Review | | |

Reservoir Supply (AcFt); Stream Flow (AcFt); Evaporation (AcFt); Elevation (Ft); Rainfall (Inches); Temperature (°F)

| RESERVOIR STATISTICS | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Choke Canyon Reservoir | | | Lake Corpus Christi | | | CCR/LCC Combined | | Lake Texana | | |
| Date | Elevation | Volume | % Capacity | Elevation | Volume | % Capacity | Volume | % Capacity | Elevation | Volume | % Capacity |
| FULL | 220.5 | 695,271 | 100% | 94.0 | 257,260 | 100% | 952,531 | 100% | 44.0 | 161,085 | 100% |
| 08/22/2016 | 199.2 | 263,398 | 37.9% | 88.7 | 166,517 | 64.7% | 429,915 | 45.1% | 44.2 | 163,121 | 101.3% |
| 08/21/2016 | 198.4 | 252,149 | 36.3% | 88.6 | 164,283 | 63.9% | 416,432 | 43.7% | 44.2 | 163,121 | 101.3% |
| 07/22/2016 | 198.4 | 251,860 | 36.2% | 88.6 | 164,920 | 64.1% | 416,780 | 43.8% | 43.0 | 151,919 | 94.3% |
| 08/22/2015 | 199.0 | 261,031 | 37.5% | 92.8 | 236,337 | 91.9% | 497,368 | 52.2% | 42.6 | 148,332 | 92.1% |

| LAKE TEXANA WATER SUPPLY* | | | | | | | | | COLORADO WATER SUPPLY | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | Daily Intake | MTD | Non-Interruptible | | | Interruptible | | | Daily Intake | MTD | YTD |
| | | | July | YTD | Remaining | July | YTD | Remaining | | | |
| 08/21/2016 | 138 | 2,881 | 3,956 | 27,026 | 14,814 | 0 | 0 | 12,000 | 0 | 0 | 0 |

| WEATHER RELATED INFORMATION | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Choke Canyon Reservoir | | | Lake Corpus Christi | | | CCR/LCC Combined | |
| | 08/21/2016 | MTD | YTD | 08/21/2016 | MTD | YTD | MTD | YTD |
| Air Temp | 83 | | | 89 | | | | |
| Evaporation | 147 | 5,809 | 49,799 | 298 | 5,769 | 56,264 | 11,578 | 106,063 |
| Rainfall | 0.63 | 7.55 | 24.36 | 0.88 | 5.83 | 15.85 | | |

# Example: Stream Flows

| Stream Flows | | | |
|---|---|---|---|
| Gauging Station | | 08/21/2016 | MTD |
| NTRT | Nueces River at Three Rivers, Texas | 1,985 | 10,312 |
| NRTT | Nueces River at Tilden, Texas | 1,788 | 8,372 |
| FRTT | Frio River at Tilden, Texas | 1,792 | 2,109 |
| SMTT | San Miguel Creek at Tilden, Texas | 4,625 | 6,213 |
| ARWT | Atascosa River at Whitsett, Texas | 615 | 1,541 |
| CCR | Release from Choke Canyon Reservoir | 58 | 1,209 |
| NRMT | Nueces River at Mathis, Texas (La Fruta Bridge) | 359 | 5,653 |
| NCAT | Nueces River at Calallen, Texas | 0 | 35 |
| RBP | Rincon Bayou Pipeline | 195 | 1,791 |
| CRWT | Colorado River at Wharton, Texas | 13,319 | 75,797 |
| Reservoir InFlow | | | |
| Computed as: | (NTRT+FRTT+SMTT)-Release from Choke Canyon | 8,345 | 17,425 |

# Example:Inflows & Pass-Thru

| ESTUARY INFLOWS AND PASSTHRU REQUIREMENTS | | | | | |
|---|---|---|---|---|---|
| Target Passthru | Monthly Target | 5,000 | | | 5,000 |
| | Salinity Relief Credit | 0 | Effective | | |
| Credit / -Deficit From Previous Month | | | Date Deficit Satisfied | | 905 |
| Return Flow Credit | | | Effective | 08/01/2016 | 500 |
| Required Passthru | Monthly Target | 5,000 | 0 | | 5,000 |
| | Reservoir Inflow | 17,425 | | | |
| Estuary Inflows (NCAT + RBP) | | | | | 1,826 |
| Passthru Surplus / -Deficit | | | | | -1,769 |

**Pass-Thru Requirement equals the lesser of Reservoir Inflow or Monthly Target: 5,000 AF**

**5,000 – 905 (Surplus from July) = 4,095 AF**

**4,095 – 500 (Return Flow Credit*) = 3,595 AF**

**3,595 – 1,826 (Measured Estuary Inflow) = 1,769 AF remaining to be passed through**

*** Note: Deficits from previous months have to be made up before return flow credit can be applied**

# TAKEAWAYS

- **State of Texas had Water Rights to flow in Nueces River and retained that right with the construction of Choke Canyon.**
- **State asserted its Water Rights when agreeing to City's Water Rights for Choke Canyon. The State's water was/is, in essence, used for the pass-thru.**
- **Scientific basis for pass-thru and numerous studies**
- **Pass-thru requirement has been tweaked, to City's advantage, since original 1976.**
- **Robust monitoring system in place**
- **Go to https://www.nueces-ra.org/CP/CITY/passthru/index.php to see daily, monthly inflows and pass-thru reports.**
- **Reservoirs = *our cheapest source of water***
- **Critical in high demand periods when Mary Rhodes not sufficient to meet needs**
- **Operate reservoirs paid for by CC water customers to maximize yield for customers with eye to safety of property downstream**

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# Appendix F - *2021 Coastal Bend Regional Water Plan* – Implementation Plan Survey Results

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## *Table E.1.*
## *Recommended WMS Implementation Status*

| Planning Region | WMS or WMS Project Name | Database Online Decade | Related Sponsor Entity and/or Benefitting WUGs | Implementation Survey Record Type | Database ID | Has the sponsor taken affirmative vote or actions? (TWC 16.053(h)(10)) | What is the status of the WMS project or WMS recommended in the 2022 SWP? | If the project has not been started or no longer is being pursued, please explain why by adding information in this column. | Please select one or more project impediments. If an impediment is not listed, select "Other" and provide information in Column K. | If you selected "Other" in Column J, please provide information about project impediments not shown in the impediment list provided. | What funding type(s) are being used for the project? (Select all that apply) | Optional Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N | City of Alice - Brackish Groundwater Desalination | 2020 | Project Sponsor(s): Alice | Recommended WMS Project | 4249 | Yes | Project/WMS completed | | | | State | |
| N | City of Alice - Nonpotable Reuse | 2030 | Project Sponsor(s): Alice | Recommended WMS Project | 2092 | No | Project/WMS no longer being pursued | Not actively considered at this time. Brought on Alice Brackish Groundwater Desalination project | | | | |
| N | City of Corpus Christi ASR | 2030 | Project Sponsor(s): Corpus Christi | Recommended WMS Project | 4251 | Yes | Project/WMS started | | Shift in timeline | | State | |
| N | City of Corpus Christi Seawater Desalination (Inner Harbor) | 2030 | Project Sponsor(s): Corpus Christi | Recommended WMS Project | 4252 | Yes | Project/WMS started | | Contract/permit constraints | | State; Federal | |
| N | City of Corpus Christi Seawater Desalination (La Quinta) | 2030 | Project Sponsor(s): Corpus Christi | Recommended WMS Project | 4253 | Yes | Project/WMS started | | Contract/permit constraints | | Unknown | |
| N | Evangeline/Laguna Treated Groundwater Project | 2030 | Project Sponsor(s): San Patricio MWD; Corpus Christi | Recommended WMS Project | 4258 | Yes | Project/WMS started | | Other | Negotiations- Owner + Sponsor | Unknown | |
| N | Gulf Coast Aquifer Supplies - Region N El Oso WSC | 2020 | Project Sponsor(s): El Oso WSC | Recommended WMS Project | 4320 | Yes | Project/WMS started | | | | Unknown | |
| N | Gulf Coast Supplies - Bee County Other | 2020 | Project Sponsor(s): Municipal county-other (Bee) | Recommended WMS Project | 4218 | Yes | Project/WMS started | | | | Unknown | |
| N | Gulf Coast Supplies - Bee Irrigation | 2020 | Project Sponsor(s): Irrigation (Bee) | Recommended WMS Project | 4219 | Yes | Project/WMS started | | | | Unknown | |
| N | Gulf Coast Supplies - Bee Mining | 2020 | Project Sponsor(s): Mining (Bee) | Recommended WMS Project | 4220 | Yes | Project/WMS started | | | | Unknown | |
| N | Gulf Coast Supplies - Brooks County Other | 2020 | Project Sponsor(s): Municipal county-other (Brooks) | Recommended WMS Project | 4222 | Yes | Project/WMS started | | | | Unknown | |
| N | Gulf Coast Supplies - Brooks Mining | 2020 | Project Sponsor(s): Mining (Brooks) | Recommended WMS Project | 4223 | Yes | Project/WMS started | | | | Unknown | |
| N | Gulf Coast Supplies - Duval County Other | 2020 | Project Sponsor(s): Municipal county-other (Duval) | Recommended WMS Project | 4224 | Yes | Project/WMS started | | | | Unknown | |
| N | Gulf Coast Supplies - Duval Mining | 2020 | Project Sponsor(s): Mining (Duval) | Recommended WMS Project | 4225 | Yes | Project/WMS started | | | | Unknown | |
| N | Gulf Coast Supplies - Jim Wells County Other | 2020 | Project Sponsor(s): Municipal county-other (Jim Wells) | Recommended WMS Project | 4227 | Yes | Project/WMS started | | | | Unknown | |
| N | Gulf Coast Supplies - Jim Wells Irrigation | 2020 | Project Sponsor(s): Irrigation (Jim Wells) | Recommended WMS Project | 4228 | Yes | Project/WMS started | | | | Unknown | |
| N | Gulf Coast Supplies - Jim Wells Manufacturing | 2020 | Project Sponsor(s): Manufacturing (Jim Wells) | Recommended WMS Project | 4229 | Yes | Project/WMS started | | | | Unknown | |
| N | Gulf Coast Supplies - Jim Wells Mining | 2020 | Project Sponsor(s): Mining (Jim Wells) | Recommended WMS Project | 4230 | Yes | Project/WMS started | | | | Unknown | |
| N | Gulf Coast Supplies - Kenedy Mining | 2020 | Project Sponsor(s): Mining (Kenedy) | Recommended WMS Project | 4231 | Yes | Project/WMS started | | | | Unknown | |
| N | Gulf Coast Supplies - Kleberg Manufacturing | 2020 | Project Sponsor(s): Manufacturing (Kleberg) | Recommended WMS Project | 4232 | Yes | Project/WMS started | | | | Unknown | |
| N | Gulf Coast Supplies - Kleberg Mining | 2020 | Project Sponsor(s): Mining (Kleberg) | Recommended WMS Project | 4233 | Yes | Project/WMS started | | | | Unknown | |
| N | Gulf Coast Supplies - Live Oak Irrigation | 2020 | Project Sponsor(s): Irrigation (Live Oak) | Recommended WMS Project | 4234 | Yes | Project/WMS started | | | | Unknown | |
| N | Gulf Coast Supplies - Live Oak Manufacturing | 2020 | Project Sponsor(s): Manufacturing (Live Oak) | Recommended WMS Project | 4235 | Yes | Project/WMS started | | | | Unknown | |
| N | Gulf Coast Supplies - Nueces County Other | 2020 | Project Sponsor(s): Municipal county-other (Nueces) | Recommended WMS Project | 4236 | Yes | Project/WMS started | | | | Unknown | |
| N | Gulf Coast Supplies - Nueces Irrigation | 2020 | Project Sponsor(s): Irrigation (Nueces) | Recommended WMS Project | 4237 | Yes | Project/WMS started | | | | Unknown | |
| N | Gulf Coast Supplies - Nueces Mining | 2020 | Project Sponsor(s): Mining (Nueces) | Recommended WMS Project | 4238 | Yes | Project/WMS started | | | | Unknown | |
| N | Gulf Coast Supplies - San Diego MUD 1 | 2020 | Project Sponsor(s): San Diego MUD 1 | Recommended WMS Project | 4226 | Yes | Project/WMS started | | | | Unknown | |
| N | Gulf Coast Supplies - San Patricio Irrigation | 2020 | Project Sponsor(s): Irrigation (San Patricio) | Recommended WMS Project | 4239 | Yes | Project/WMS started | | | | Unknown | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N | Gulf Coast Supplies - San Patricio Mining | 2020 | Project Sponsor(s): Mining (San Patricio) | Recommended WMS Project | 4240 | Yes | Project/WMS started | | | | Unknown | |
| N | Gulf Coast Supplies - TDCJ Chase Field | 2020 | Project Sponsor(s): TDCJ Chase Field | Recommended WMS Project | 4221 | Yes | Project/WMS started | | | | Unknown | |
| N | Irrigation Conservation - Bee County | 2020 | Project Sponsor(s): Irrigation (Bee) | Recommended WMS Project | 4213 | Yes | Project/WMS started | | | | Unknown | |
| N | Irrigation Conservation - Jim Wells County | 2020 | Project Sponsor(s): Irrigation (Jim Wells) | Recommended WMS Project | 4214 | Yes | Project/WMS started | | | | Unknown | |
| N | Irrigation Conservation - Live Oak County | 2020 | Project Sponsor(s): Irrigation (Live Oak) | Recommended WMS Project | 4215 | Yes | Project/WMS started | | | | Unknown | |
| N | Irrigation Conservation - Nueces County | 2020 | Project Sponsor(s): Irrigation (Nueces) | Recommended WMS Project | 4216 | Yes | Project/WMS started | | | | Unknown | |
| N | Irrigation Conservation - San Patricio County | 2020 | Project Sponsor(s): Irrigation (San Patricio) | Recommended WMS Project | 4217 | Yes | Project/WMS started | | | | Unknown | |
| N | Local Balancing Storage Reservoir | 2020 | Project Sponsor(s): Nueces County WCID 3 | Recommended WMS Project | 2093 | Yes | Project/WMS started | | Economic feasibility/financing | | State | |
| N | Manufacturing Water Conservation | 2020 | WUG Reducing Demand: Manufacturing, Jim Wells | Recommended Demand Reduction Strategy Without WMS Project | 32904 | Yes | Project/WMS started | | | | Unknown | |
| N | Manufacturing Water Conservation | 2020 | WUG Reducing Demand: Manufacturing, Kleberg | Recommended Demand Reduction Strategy Without WMS Project | 32909 | Yes | Project/WMS started | | | | Unknown | |
| N | Manufacturing Water Conservation | 2020 | WUG Reducing Demand: Manufacturing, Live Oak | Recommended Demand Reduction Strategy Without WMS Project | 32914 | Yes | Project/WMS started | | | | Unknown | |
| N | Manufacturing Water Conservation | 2020 | WUG Reducing Demand: Manufacturing, Nueces | Recommended Demand Reduction Strategy Without WMS Project | 9198 | Yes | Project/WMS started | | | | Unknown | |
| N | Manufacturing Water Conservation | 2020 | WUG Reducing Demand: Manufacturing, San Patricio | Recommended Demand Reduction Strategy Without WMS Project | 9210 | Yes | Project/WMS started | | | | Unknown | |
| N | Mining Water Conservation | 2020 | WUG Reducing Demand: Mining, Bee | Recommended Demand Reduction Strategy Without WMS Project | 32919 | Yes | Project/WMS started | | | | Private | |
| N | Mining Water Conservation | 2020 | WUG Reducing Demand: Mining, Brooks | Recommended Demand Reduction Strategy Without WMS Project | 32921 | Yes | Project/WMS started | | | | Private | |
| N | Mining Water Conservation | 2020 | WUG Reducing Demand: Mining, Duval | Recommended Demand Reduction Strategy Without WMS Project | 32923 | Yes | Project/WMS started | | | | Private | |
| N | Mining Water Conservation | 2020 | WUG Reducing Demand: Mining, Jim Wells | Recommended Demand Reduction Strategy Without WMS Project | 32925 | Yes | Project/WMS started | | | | Private | |
| N | Mining Water Conservation | 2020 | WUG Reducing Demand: Mining, Kenedy | Recommended Demand Reduction Strategy Without WMS Project | 32927 | Yes | Project/WMS started | | | | Private | |
| N | Mining Water Conservation | 2020 | WUG Reducing Demand: Mining, Kleberg | Recommended Demand Reduction Strategy Without WMS Project | 32929 | Yes | Project/WMS started | | | | Private | |
| N | Mining Water Conservation | 2020 | WUG Reducing Demand: Mining, Nueces | Recommended Demand Reduction Strategy Without WMS Project | 32931 | Yes | Project/WMS started | | | | Private | |
| N | Mining Water Conservation | 2020 | WUG Reducing Demand: Mining, San Patricio | Recommended Demand Reduction Strategy Without WMS Project | 32933 | Yes | Project/WMS started | | | | Private | |
| N | Municipal Conservation - Alice | 2030 | Project Sponsor(s): Alice | Recommended WMS Project | 4171 | Yes | Project/WMS started | | | | Unknown | |
| N | Municipal Conservation - Beeville | 2030 | Project Sponsor(s): Beeville | Recommended WMS Project | 4165 | Yes | Project/WMS started | | | | Unknown | |
| N | Municipal Conservation - Bishop | 2030 | Project Sponsor(s): Bishop | Recommended WMS Project | 4180 | Yes | Project/WMS started | | | | Unknown | |
| N | Municipal Conservation - Corpus Christi | 2030 | Project Sponsor(s): Corpus Christi | Recommended WMS Project | 4181 | Yes | Project/WMS started | | | | Unknown | |
| N | Municipal Conservation - Corpus Christi Naval Air Station | 2030 | Project Sponsor(s): Corpus Christi Naval Air Station | Recommended WMS Project | 4182 | Yes | Project/WMS started | | | | Unknown | |
| N | Municipal Conservation - County Other (Kenedy) | 2030 | Project Sponsor(s): Municipal county-other (Kenedy) | Recommended WMS Project | 4175 | Yes | Project/WMS started | | | | Unknown | |
| N | Municipal Conservation - County Other (Kleberg) | 2030 | Project Sponsor(s): Municipal county-other (Kleberg) | Recommended WMS Project | 4176 | Yes | Project/WMS started | | | | Unknown | |
| N | Municipal Conservation - Falfurrias | 2030 | Project Sponsor(s): Falfurrias | Recommended WMS Project | 4168 | Yes | Project/WMS started | | | | Unknown | |
| N | Municipal Conservation - Freer WCID | 2030 | Project Sponsor(s): Freer WCID | Recommended WMS Project | 4169 | Yes | Project/WMS started | | | | Unknown | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N | Municipal Conservation - George West | 2030 | Project Sponsor(s): George West | Recommended WMS Project | 4178 | Yes | Project/WMS started | | | | Unknown | |
| N | Municipal Conservation - Gregory | 2030 | Project Sponsor(s): Gregory | Recommended WMS Project | 4187 | Yes | Project/WMS started | | | | Unknown | |
| N | Municipal Conservation - Naval Air Station Kingsville | 2030 | Project Sponsor(s): Naval Air Station Kingsville | Recommended WMS Project | 4177 | Yes | Project/WMS started | | | | Unknown | |
| N | Municipal Conservation - Nueces County WCID 3 | 2030 | Project Sponsor(s): Nueces County WCID 3 | Recommended WMS Project | 4183 | Yes | Project/WMS started | | | | Unknown | |
| N | Municipal Conservation - Nueces County WCID 4 | 2030 | Project Sponsor(s): Nueces County WCID 4 | Recommended WMS Project | 4185 | Yes | Project/WMS started | | | | Unknown | |
| N | Municipal Conservation - Nueces WSC | 2030 | Project Sponsor(s): Nueces WSC | Recommended WMS Project | 4186 | Yes | Project/WMS started | | | | Unknown | |
| N | Municipal Conservation - Orange Grove | 2030 | Project Sponsor(s): Orange Grove | Recommended WMS Project | 4172 | Yes | Project/WMS started | | | | Unknown | |
| N | Municipal Conservation - Premont | 2030 | Project Sponsor(s): Premont | Recommended WMS Project | 4173 | Yes | Project/WMS started | | | | Unknown | |
| N | Municipal Conservation - Region N El Oso WSC | 2030 | Project Sponsor(s): El Oso WSC | Recommended WMS Project | 4319 | Yes | Project/WMS started | | | | Unknown | |
| N | Municipal Conservation - Rockport | 2030 | Project Sponsor(s): Rockport | Recommended WMS Project | 4164 | Yes | Project/WMS started | | | | Unknown | |
| N | Municipal Conservation - San Diego MUD 1 | 2030 | Project Sponsor(s): San Diego MUD 1 | Recommended WMS Project | 4170 | Yes | Project/WMS started | | | | Unknown | |
| N | Municipal Conservation - Sinton | 2030 | Project Sponsor(s): Sinton | Recommended WMS Project | 4188 | Yes | Project/WMS started | | | | Unknown | |
| N | Municipal Conservation - TDCJ Chase Field | 2030 | Project Sponsor(s): TDCJ Chase Field | Recommended WMS Project | 4167 | Yes | Project/WMS started | | | | Unknown | |
| N | Municipal Conservation - Three Rivers | 2030 | Project Sponsor(s): Three Rivers | Recommended WMS Project | 4179 | Yes | Project/WMS started | | | | Unknown | |
| N | O.N. Stevens WTP Improvements | 2020 | Project Sponsor(s): Corpus Christi | Recommended WMS Project | 2415 | Yes | Project/WMS started | | Shift in timeline | | Unknown | |
| N | Port of Corpus Christi Authority Seawater Desalination - Harbor Island | 2030 | Project Sponsor(s): Port of Corpus Christi Authority | Recommended WMS Project | 4255 | Yes | Project/WMS started | | Contract/permit constraints | | State | |
| N | Port of Corpus Christi Authority Seawater Desalination - La Quinta Channel | 2030 | Project Sponsor(s): Port of Corpus Christi Authority | Recommended WMS Project | 4256 | Yes | Project/WMS started | | Contract/permit constraints | | Unknown | |
| N | Poseidon Regional Seawater Desalination Project at Ingleside | 2030 | Project Sponsor(s): Poseidon Water | Recommended WMS Project | 4254 | No | Project/WMS no longer being pursued | No longer active partnership between Poseidon & regional sponsors. | Project sponsor not identified | | | |
| N | Regional Industrial Wastewater Reuse Plan (SPMWD) | 2030 | Project Sponsor(s): San Patricio MWD | Recommended WMS Project | 4250 | Yes | Project/WMS started | | Shift in timeline | | Unknown | |

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# Appendix G – *Comments Received on the Initially Prepared Plan and Responses*

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The Region N Initially Prepared Plan was adopted by Region N on February 27, 2025 and submitted to the TWDB in March 2025, according to schedule.

The public hearing on the Initially Prepared Plan was held on May 15, 2025. Public comment period closed July 15, 2025 (60 days after hearing). The table below summarizes comments received from agencies, stakeholders, and the public. The Region N RWPG reviewed these comments and adopted the attached responses on September 11, 2025. The federal and state agency comments and responses are included first, with responses following agency comments. The chapters in the Final Plan were updated or revised accordingly to address comments, as indicated.

| **Federal and State Agency comments received on the Region N IPP** | | |
|---|---|---|
| *Respondent* | *Additional Information* | *Subject Matter* |
| TWDB comments | Email 6/23/2025 | Tier 1 & 2 comments |
| Texas Parks and Wildlife | Letter dated 7/15/2025 | Env impacts, general, etc. |
| **Public comments received on Region N IPP (comment period close: 7/15/2025)** | | |
| *Respondent* | *Additional Information* | *Subject Matter* |
| Jason Hale | Email to CBRWPG 7/15/2025 | Manufacturing water demand |

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**TWDB comments received on June 23, 2025**

***Note: Responses embedded in comment document (see italics)***

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# Texas Water Development Board (TWDB) comments on the Initially Prepared 2026 Coastal Bend (Region N) Regional Water Plan

**Level 1: Comments, questions, and data revisions that must be satisfactorily addressed to meet statutory, agency rule, and/or contract requirements.**

1. Section 1.4. In the first paragraph of Section 1.4, the City of Corpus Christi, San Patricio Municipal Water District, South Texas Water Authority, and Nueces County Water Control and Improvement District No. 3 are identified as wholesale water providers (WWPs) and major water providers (MWPs). Then in the second paragraph of Section 1.4, a different set of MWPs is identified as having been designated as MWPs by the planning group. Please review and reconcile the regions designated MWPs as appropriate in the final, adopted regional water plan. [31 Texas Administrative Code (TAC) § 357.30(4)]

   ***Proposed Response:*** *This comment has been accepted. The region's designated MWPs has been reconciled in Section 1.4. The following sentence has been removed from the first paragraph "These four entities are considered the major water providers of the region. The CBRWPG did not identify any additional entities as major water providers during development of this plan." The designated major water providers are City of Corpus Christi, SPMWD, STWA, and the City of Alice, as stated in the second paragraph of section 1.4.*

2. Section 2.2 and Table 2.1. The state-level population projections presented in Table 2.1 are incorrect for decades 2020 (historical) through 2070 (projected). The projected populations appear to be based on data for the 2021 regional water plans. For example, the 2023 statewide population projections associated with the 2021 Regional Water Plans is 33,913,233, whereas the 2030 statewide population projections associated with the 2026 regional water plans is 34,243,764. Please update the projected populations with data for the 2026 Regional Water Plans. [31 TAC § 357.31(a)]

   ***Proposed Response:*** *Comment accepted. The projected populations shown in Table 2.1 have been updated with the data for the 2026 regional water plans. The state level projections have been updated to the following values:*

   - *2020: 29,145,505*
   - *2030: 34,243,764*
   - *2040: 38,478,446*
   - *2050: 42,228,326*
   - *2060: 45,660,162*
   - *2070: 49,027,720*

3. Section 2.4. Table 2.11 does not include information for the City of Alice as a MWPs, as designated in Sections 1.4 and 3.1.8 of the plan. Please include water demands by category of use, for each MWP in the final, adopted regional water plan. [31 TAC § 357.31(b)]

***Proposed Response:*** *Comment accepted. Table 2.11 in Section 2.4 has been revised to include information for the City of Alice as a MWP. Water demands by category of use have been added for the City of Alice.*

4. Section 3.1.8 Page 3-13 refers to Table 4A.25 for the presentation of MWP supplies by category of use, however Table 4A.25 appears to present MWP demand by category of use, not supplies by category of use. Please ensure that existing supplies by category use, for each MWP, are clearly included in the final, adopted regional water plan. [31 TAC § 357.32(f)]

   ***Proposed Response:*** *Comment acknowledged. The following text has been added as footnote 13 to Table 4A.25 in Section 4A.4 as explanation: "Supplies are equal to projected demands for those systems that rely solely on water supplies from the regional CCR/LCC/Lake Texana/MRP system, in accordance with direct or indirect contracts with the City of Corpus Christi when maximum amounts are not specified. For entities that receive additional supplies from reuse or other strategies, those supplies are considered first with the remaining amount up to the demand assumed to be provided by safe yield supplies from the City's regional CCR/LCC/Lake Texana/MRP system."*

   ***Revised comment response:*** *Demands by category of use for each MWP have been added under the total water surplus/shortage lines for each MWP in Table 4A.25.*

5. Chapter 3. The plan does not appear to provide a methodology for estimating the amount of existing reuse water available, nor does the plan narrative indicate whether existing reuse supplies in the region are direct or indirect, however the supplies for the region in DB27 appear limited to direct reuse. Please clarify in the text of the final, adopted regional water plan 1) whether existing supplies in Region N are direct or indirect reuse and 2) the methodology(ies) used to determine the direct and/or indirect reuse supplies in the region—including how projected population and water demands were considered in the determination of volumes available for reuse supplies—in the final, adopted regional water plan. [Contract Exhibit C, Section 2.3.3; Contract Exhibit C, Section 2.3.6]

   ***Proposed Response:*** *Comment acknowledged. The following text has been added to the end of the first paragraph of Section 3.4 to address both parts of the comment: "The reuse supply was estimated from the maximum historical reuse during the 2018-2022 period based on data from the TWDB's Historical Water Use data dashboard. After these estimates, reuse supply projections were further revised based on the projected demand by county and type of use. Existing and projected reuse in the Coastal Bend Region is direct non-potable reuse.* ***Error! Reference source not found.*** *shows the existing reuse water projects in the Coastal Bend Region by county."*

6. Section 3.3 and the state water planning database (DB27). The livestock local supplies values presented in Table 3.4 are inconsistent with the value of 1,860 acre-feet per year stated in paragraph four of Page 3-17, as well as the livestock availability data entered into DB27 of 1,590 acre-feet per year. Please review this table and reconcile the data as necessary in the final, adopted regional water plan so

that livestock supplies are presented consistently between the plan and DB27. [Contract Exhibit C, Section 2.3.6]

***Proposed Response:*** *Comment acknowledged. The data in Table 3.4 and paragraph four of Page 3-17 have been reconciled. The total livestock local supplies value has been revised to 1,591 acre-feet per year in Section 3.3. Table 3.4 was revised to the table values below:*

| ***County*** | ***2030*** | ***2040*** | ***2050*** | ***2060*** | ***2070*** | ***2080*** |
|---|---|---|---|---|---|---|
| *Aransas* | *29* | *29* | *29* | *29* | *29* | *29* |
| *Bee* | *464* | *464* | *464* | *464* | *464* | *464* |
| *Brooks* | *135* | *135* | *135* | *135* | *135* | *135* |
| *Duval* | *30* | *30* | *30* | *30* | *30* | *30* |
| *Jim Wells* | *212* | *212* | *212* | *212* | *212* | *212* |
| *Kenedy* | *0* | *0* | *0* | *0* | *0* | *0* |
| *Kleberg* | *0* | *0* | *0* | *0* | *0* | *0* |
| *Live Oak* | *211* | *211* | *211* | *211* | *211* | *211* |
| *McMullen* | *295* | *295* | *295* | *295* | *295* | *295* |
| *Nueces* | *52* | *52* | *52* | *52* | *52* | *52* |
| *San Patricio* | *163* | *163* | *163* | *163* | *163* | *163* |
| ***Total*** | ***1,591*** | ***1,591*** | ***1,591*** | ***1,591*** | ***1,591*** | ***1,591*** |

7. Section 4A.4, Section 5D, and DB27. The needs for several water user groups (WUG) represented in the tables in Section 4A.4 (and Section 5D) appear to present information on projected water needs that is inconsistent with data reported in DB27. For example, El Oso WSC in Bee and Live Oak counties (Tables 4A.5 and 4A.18) shows zero needs for El Oso WSC in the plan, however DB27 reports a need for El Oso WSC in Bee and Live Oak counties within Region N in decades 2070 and 2080. Please review all data in the tables and related text and revise as necessary to present data consistent with DB27 in the final, adopted regional water plan. [31 TAC § 357.33(c)]

   ***Proposed Response:*** *Coordinated with Region L on updates to DB27 to show Carrizo Wilcox source supplies (Region L) being used to meet El Oso WSC- Bee and Live Oak County projected water demands and updated Section 5D tables for consistency. ~~plan~~*

8. Section 4A.4. The plan does not appear to present MWP needs by category of use. Table 4A.25 shows demands by category of use for each MWP, but only total needs. Please ensure that needs by category of use, for each MWP, are clearly included in the final, adopted regional water plan. [31 TAC § 357.33(c)]

   ***Proposed Response:*** *Comment acknowledged. The following text has been added as footnote 13 to Table 4A.25 in Section 4A.4 as explanation: "Supplies are equal to projected demands for those systems that rely solely on water supplies from the regional CCR/LCC/Lake Texana/MRP system, in accordance with direct or indirect*

*contracts with the City of Corpus Christi when maximum amounts are not specified. For entities that receive additional supplies from reuse or other strategies, those supplies are considered first with the remaining amount up to the demand assumed to be provided by safe yield supplies from the City's regional CCR/LCC/Lake Texana/MRP system."*

***Revised comment response:*** *Needs by category of use for each MWP have been added under the total water surplus/shortage lines for each MWP in Table 4A.25.*

9. Chapter 5 and DB27. The strategy evaluation for the Lower Balancing Reservoir Storage strategy appears to be the only water management strategy (WMS) evaluation that clarifies that the strategy yield was evaluated under drought of record conditions. Please confirm that water supply yields of all potentially feasible strategies were evaluated under drought of record conditions in the final, regional water plan. If any strategies were not evaluated to determine a firm yield under drought of record conditions, please re-evaluate if necessary and revise the yield in the plan and in DB27. [31 TAC § 357.34(b)]

   ***Proposed Response:*** *The water supply yields for all water management strategies were evaluated under drought of record conditions. Given the Local Balancing Storage Reservoir recommended water management strategy relies on surface water run-of-the-river sources and TWDB guidance has specific provisions for how to calculate yield, we felt the additional discussion on methodology was useful in the description of the strategy. Additional text was added to the statement included in the previously submitted IPP in Chapter 5A:* ***All potentially feasible water management strategy evaluations in the 2026 regional water plan included in Section 5B were evaluated under drought of record conditions and in accordance with 31 Texas Administrative Code (TAC) 357.34 requirements and the Texas Water Development Board (TWDB) guidelines.***

10. Section 5B.10.1 and DB27. The evaluation for the O.N. Stevens Water Treatment Plant (WTP) Improvements (WMSId 5311) strategy appears to document that the water treatment plant improvements will increase the firm supply for Corpus Christi by approximately 32,000 acre-feet per year, however this strategy has been entered as providing zero yield of firm supply in all decades in DB27. All recommended strategies and projects that are entered into DB27 must be designed to reduce the consumption of water, reduce the loss or waste of water, improve the efficiency in the use of water, or develop, deliver or treat additional water supply volumes to WUGs or WWPs in at least one planning decade such that additional water is available during drought of record conditions. Please confirm whether this strategy is increasing the volume of supply in the final, adopted regional water plan and update the firm yield in DB27, or remove this as a recommended strategy in the plan and in DB27. [31 TAC § 357.34(d); Contract Exhibit C, Section 2.5.2.15]

    ***Proposed Response:*** *The current O.N. Stevens WTP capacity is adequate for safe yield supplies. As discussed in the write-up, the O.N. Stevens WTP improvements strategy is to increase capacity for future raw water supplies. The yield of the strategy is equal to yield expected from the Evangeline Laguna Groundwater Project, or 25,637 ac-ft/yr. The Evangeline Laguna Groundwater supply is*

*anticipated to be delivered to O.N. Stevens WTP by way of the Mary Rhodes Pipeline Phase I Improvements to Increase Capacity and Reliability strategy.*

11. Section 5B.10.2 and DB27. The evaluation for the Mary Rhodes Rehabilitation (WMSId 6923) strategy appears to increase the pipeline capacity, however it appears that the strategy won't increase the volume of supply from the source. This strategy has been entered as providing zero yield of firm supply in all decades in DB27. All recommended strategies and projects that are entered into DB27 must be designed to reduce the consumption of water, reduce the loss or waste of water, improve the efficiency in the use of water, or develop, deliver or treat additional water supply volumes to WUGs or WWPs in at least one planning decade such that additional water is available during drought of record conditions. Please either provide additional clarification documenting whether and how this strategy is increasing the volume of supply in the final, adopted regional water plan and update the firm yield in DB27, or remove this as a recommended strategy in the plan and in DB27. [31 TAC § 357.34(d); Contract Exhibit C, Section 2.5.2.15]

    ***Proposed Response:*** *The strategy name and description in section 5B.10.2 and DB27 has been changed to "Mary Rhodes Pipeline Phase I Improvements to Increase Capacity and Reliability" to clarify the strategy will increase the overall MRP Ph I capacity by allowing new water sources to be tied into either the existing or proposed pipeline. Additional text explanations have been added throughout the writeup, including clarification of the yield (25,637 ac-ft/yr) coming from the Evangeline Laguna Groundwater Project.*

12. Section 5B.10.3 and DB27. The evaluation for the San Patricio Municipal Water District – Conveyance System Improvements and New Water Treatment Plant strategy appears to include three separate strategies that have been entered as providing zero yield of firm supply in all decades in DB27: SPMWD Project No. 1 - New WTP at Plant D (WMSId 7045); SPMWD Project No. 2 - New Intake PS and Raw Water Transmission (WMSId 7046); and SPMWD Project No. 3 - New Pump Station & Transmission Rehab (WMSId 7047). All recommended strategies and projects that are entered into DB27 must be designed to reduce the consumption of water, reduce the loss or waste of water, improve the efficiency in the use of water, or develop, deliver or treat additional water supply volumes to WUGs or WWPs in at least one planning decade such that additional water is available during drought of record conditions. Additionally, WMSIds 7046 and 7047 appear to include replacement of existing transmission lines. Please remove the transmission line replacement portions of these projects from the plan and provide additional clarification documenting specifically how the remaining portion of these strategies will increase the net volume of water supply in the final, adopted regional water plan and/or further modify or remove the strategy, as appropriate, to exclude replacement of existing infrastructure capacity. If these strategies remain as recommended, please update the firm yields in DB27 to reflect the non-zero firm yield. [31 TAC § 357.34(d); Contract Exhibit C, Section 2.5.2.15]

    ***Proposed Response:*** *Each of the three SPMWD WMSs include the replacement of existing transmission lines with either a larger pipe diameter (new pipeline) and/or with a more durable material (PVC to replace HDPE sections) to withstand the*

*additional pressures resulting from adding new supplies and new pump stations. A table will be included in Section 5B.10.3 that summarizes the additional capacities that each of the three SPMWD WMSs is anticipated to achieve.*

***Revised response:*** *The strategy name has been revised from "San Patricio Municipal Water District – Conveyance System Improvements and New Water Treatment Plant" to "SPMWD Increase Contracted Water Supply form the City of Corpus Christi" to better reflect the strategy. Table 5B.10.14 has also been revised to reflect the new pipeline.*

13. Section 5B.4.3. The plan contains a partial project evaluation for the Oso Regional WWTP Reuse strategy. Please ensure that the completed strategy evaluation is included in the final, adopted regional water plan and all relevant data has been entered into DB27. [31 TAC § 357.34(e)(2)]

    ***Proposed Response:*** *The Oso Regional WWTP Reuse Strategy has been updated to include relevant data needed for the strategy to be consistent with other recommended strategies in the plan based on TWDB guidance.*

14. Chapter 5. The plan does not appear to include quantified reporting on the reliability of strategy yields. Please include this information in the final, adopted regional water plan—ensuring that any recommended strategies provide a firm water supply throughout drought of record conditions. If this reporting is incorporated into an impact matrix, please ensure it is correlated to quantified values. [31 TAC § 357.34(e)(3)(A)]

    ***Proposed Response:*** *Section 5A has been updated to include the following sentence at the end of the last paragraph in the section: Reliability is required to be considered in the water management strategy evaluations. Quantifiably, the water volumes presented in this plan for recommended strategies are firm supplies that are 100 percent reliable during drought of record conditions per TWDB planning guidelines.*

15. Section 5B.11. It is unclear whether the Water Availability Analysis (WAM) analysis for the Nueces River Diversion to Choke Canyon Reservoir strategy considered the freshwater water inflow standards adopted for the Nueces Bay and Delta. Freshwater inflow standards are not hard-coded in the WAMs like instream flow standards; rather they are considered in post-modeling analysis to evaluate impairment on attainment frequencies of the standards. It is unclear if this post-modeling analysis was completed. Please confirm whether freshwater inflow standards for the region were considered and if post-modeling analysis was completed for the assessment of available supplies. If post-modeling analysis has not been completed, please update the yields as necessary in the final, adopted regional water plan and in DB27. [31 TAC § 357.34(e)(3)(B)]

    ***Proposed Response:*** *Section 5B.11.3 Environmental issues has been updated to include a discussion of the WAM evaluation of freshwater inflow standards including a table and graphs that show freshwater inflow frequency targets, goals and performance.*

16. Section 5B.8 and DB27. The Local Balancing Reservoir strategy is currently entered into DB27 as an "Other Surface Water" strategy type, however this strategy should be classified as a "New Reservoir" for water supply planning purposes. Please coordinate with TWDB's Water Supply and Strategy Analysis team to update the strategy type in DB27. [31 TAC § 357.50(g)(2)(B)]

    ***Proposed Response:*** *The HDR team coordinated with TWDB's Water Supply and Strategy Analysis team to update the strategy type in DB27 from "Other Surface Water" to "New Reservoir".*

17. Section 5.B and DB27. It is unclear from the evaluation and implementation status for the Local Balancing Reservoir strategy whether a Federal 404 permit will likely be needed for the project. Please clarify in the final, adopted regional water plan whether this permit will be needed, and if so, adjust the online decade to at least 2040 in the plan and DB27. [31 TAC § 357.34(g)(1)(A)]

    ***Proposed Response:*** *Section 5B.8.3 Environmental Issues has been updated to state "It is likely that waters of the U.S. could be avoided when siting this project, thereby avoiding the need for a Section 404 Permit". No adjustment to the online decade will be made.*

18. Section 5B.8. The evaluation for the Local Balancing Reservoir strategy does not appear to separately present the estimated mitigation land area and associated estimate of acquisition cost. Please provide an estimated separate acreage and cost related to land acquisition (or range) for both the reservoir footprint and mitigation within the appropriate section of the plan or costing sheet, in the final, adopted regional water plan. [Contract Exhibit C, Section 2.5.2.12]

    ***Proposed Response:*** *Table 5B.8.1 costs have been revised with a footnote added stating "Costs for this strategy only include facilities needed for the local balancing reservoir strategy, but does not included costs for the detention pond, as this is included in Nueces County Drainage District No. 2's project for flood control." Additionally, after discussing with our environmental team lead the first sentence in the Environmental Issues subsection has been revised: "Potential environmental issues associated with implementation of the local balancing storage reservoir includes consideration of impacts to affected aquatic and terrestrial habitats, cultural resources, and threatened and endangered species, in accordance with applicable state and federal requirements."*

19. Section 5B.5. The evaluation for the Corpus Christi Aquifer Storage and Recovery (ASR) with Indirect Potable Reuse (IPR) strategy (WMSId 6919) does not appear to include the injected volume, expected percent of recovery, and expected recovered volume from the aquifer. Please provide the injected volume, expected percent of recovery, and expected net recovered supply volume in the final, adopted regional water plan. If the strategy supply volumes do not reflect the lesser, expected percent of recovery, please modify the supply volumes as appropriate in the final, adopted regional water plan and in DB27. [Contract Exhibit C, Section 2.5.2.4]

    ***Proposed Response:*** *Additional information was added to the ASR strategy in Section 5B.5.2, as shown below.*

*"Phase I*

- *Recharge for 5 years and recovery for 2 years would be implemented for the ASR cycle. 5 MGD over 5 years is approximately 28,000 ac-ft recharged to the aquifer. 8 MGD over 2 years is approximately 18,000 ac-ft recovered. The percent recovery is 64%. This assumes a portion of water remains in storage to maintain the buffer zone from native groundwater.*

*Phase II*

- *Recharge for 5 years and recovery for 2 years would be implemented for the ASR cycle. 7.3 MGD over 5 years is approximately 41,000 ac-ft recharged to the aquifer. 10 MGD over 2 years is approximately 22,500 ac-ft recovered. The percent recovery is 55%. This assumes a portion of water remains in storage to maintain the buffer zone from native groundwater."*

20. Chapter 5BA and DB27. As shown in Table 4A.28 of the plan and in DB27, there are a number of WUGs which are projected to have municipal needs beginning in 2030. In Table 5D.113, municipal water conservation is not shown as a recommended water management strategy to address needs until 2040, and was not recommended at all to address municipal needs for County Other - Bee County, County Other - Brooks County, County Other - Duval County, County Other - Jim Wells County, and County Other - Live Oak County. Please document in the plan why conservation was not recommended to address these municipal needs. [31 TAC § 357.34(j)(2)(B)]

    ***Proposed Response**: Comment acknowledged. Table 5D.115 was updated to include municipal water conservation beginning in 2030 for those that qualify, i.e. above 140 gpcd target regardless of needs. Updated conservation tables were provided for DB27. Municipal water conservation was considered by the CBRWPG but not recommended to address municipal needs for 'County Other' in Bee, Brooks, Duval, Jim Wells, and Live Oak Counties since their 2020 (base year adopted by TWDB) gpcd values are already well below the 140 gpcd target for Region N.~~113~~.*

21. Section 5B.1.2.3. The plan includes cost and savings information for line replacement and advanced metering infrastructure (AMI), however only cost and savings for water use reduction conservation strategies have been entered into DB27. For regional water planning purposes, line replacement and AMI are to be included under water loss mitigation strategies and must be recommended and entered into DB27 separately from water loss reduction strategies. Please revise the municipal conservation description, yields, cost information, and reconcile updates in DB27 as appropriate to correctly group line replacement and AMI as water loss mitigation in the final, adopted regional water plan. Additionally, please provide a clear distinction in the plan between water loss mitigation and water use reduction conservation strategies. [Contract Scope of Work, Task 5C; Contract Exhibit C, Section 2.5.2.5; Contract Exhibit D, Appendix 17]

    ***Proposed Response:** The strategy write-up is being updated to include additional tables and descriptions that summarize water savings and costs associated with water loss mitigation programs- pipeline and meter replacement, for entities that*

*report high water loss. These programs are different and separate from the water use reduction conservation strategies shown in Tables 5B.1.11. Water loss mitigation is clearly identified and summarized in Tables 5B.1.9 and Tables 5B.1.10 The comment response has been revised to correctly state pipeline replacement and meter replacement are water loss mitigation.*

22. Chapter 5 and DB27. Unit costs have been entered into DB27 as $0 for the recommended conservation strategies for the mining and manufacturing WUGs. Please include non-zero unit costs for these strategies in DB27 and include assumptions used in the costing methodology utilized in the final, adopted regional water plan. [Contract Exhibit C, Section 2.5.2.12]

    ***Proposed Response:*** *Unit costs for mining and manufacturing conservation strategies have been provided in order to update DB27. The assumptions used for the costing methodology are based on the additional guidance provided by TWDB. Cost estimates assume that an average water demand of 1,000 acft/yr equates to a $10,000 water audit cost, with a minimum cost of $2,000. In addition, one audit will be conducted every five years, and implementation of these audits will occur by 2030.*

23. Chapter 5. The plan includes WTP expansion and other strategy types that include a WTP expansion as a stated project component. Any portion of strategies or costs that are associated with replacing portions of existing supply, including WTP capacity, are prohibited from being included in the regional water plans. The types of facilities and associated capital or other costs that may be included in a regional water plan must be directly associated with development of additional supplies from new water sources or additional supplies from more efficient use of existing supplies, or volumetric increases to existing water supplies. Please confirm that only the portion of WTP facilities (and costs) required to increase treated water supply volumes (not to replace lost capacity) are included in the final, adopted regional water plan. [Contract Exhibit C, Section 2.5.2.15]

    ***Proposed Response:*** *The SPMWD WMS (New 20 MGD WTP) is required to increase their capacity to serve future customers by increasing their treated water supply volume.*

    ***Response revised:*** *The strategy name has been revised from "San Patricio Municipal Water District – Conveyance System Improvements and New Water Treatment Plant" to "SPMWD Increase Contracted Water Supply form the City of Corpus Christi" to better reflect the strategy which includes three separate infrastructure projects needed by SPMWD for future, additional water supplies. Table 5B.10.14 has also been revised to reflect the new pipeline.*

24. Chapter 5, Table 5D.113, and DB27. The plan includes several strategies that are presented inconsistently as recommended strategies in Table 5D.113 and DB27. For example, Table 5D.113 does not include the City of Beeville Brackish Groundwater or the Driscoll Brackish Groundwater Treatment Project strategies as recommended strategies, however these are recommended strategies and projects in DB27. Table 5D.113 includes a recommended strategy and project for City of Alice- Brackish Groundwater Desalination, however this strategy is not included in DB27, nor does

the plan include an evaluation for this strategy. Additionally, the values for strategy supplies and costs for the Corpus Christi seawater desalination projects presented in the table do not match data reported in DB27. Please review the recommended strategy table in detail, and revise as necessary to ensure that all data in DB27 are consistent with those presented in the final, adopted regional water plan. [31 TAC § 357.35(g)(1)]

***Proposed Response:*** *DB27 updated as necessary. Table 5D.113 has been updated to remove the City of Alice Brackish Groundwater Desalination project as it has been constructed and added the brackish groundwater strategies for the City of Beeville and STWA (Driscoll) consistent with the water supply plan tables shown for Bee and Nueces County. Overall, Table 5D.113 has been checked and revised as necessary to be consistent with DB27 in the final plan.*

25. Executive Summary Table ES.10, Chapter 5 Tables 5D.113 and 5D.114, and DB27. The online decade for the Evangeline/Laguna Treated Groundwater strategy and associated project (WMSProjectId 4258) appear to be inconsistently reported between the plan and in DB27. For example, DB27 and Table 5D.114 show this strategy/project as providing supply in 2030 whereas Table ES.10 and Table 5D.113 show this strategy/project providing supply in 2040. Please confirm the anticipated online decade for this strategy and project and revise as necessary to ensure that all the strategy supply online decade(s) are reported consistently throughout the final, adopted regional water plan and DB27. [31 TAC § 357.35(g)(1)]

    ***Proposed Response:*** *Revisions have been made to Table 5D.113 and Table ES.10 to show online decade of 2030, consistent with DB27 and Table 5D.114.*

26. Chapter 5, Table 5D.113, and DB27. The project capital costs presented in the plan are inconsistent with capital costs in DB27 for the following projects: Municipal Conservation – Nueces WSC (WMSProjectId 4186), Municipal Conservation – Orange Grove (WMSProjectId 4172), and Municipal Conservation – El Oso WSC (WMSProjectId 4319). For example, the total project cost presented for Municipal Conservation – Nueces WSC in Table 5D.113 is $177,00 whereas in the capital cost is reported as $245,318 in DB27. Please review the costing information for all projects and revise as necessary to ensure that all project capital costs in DB27 are consistent with those in the final, adopted regional water plan. [31 TAC § 357.35(g)(1)]

    ***Proposed Response:*** *Updates have been made in DB27 and the final plan to show consistent capital costs for municipal conservation.*

27. Chapter 5, Table 5D.113, and DB27. Online decades for the following municipal conservation strategies and their associated projects appear to be inconsistently reported in the plan and DB27: Municipal Conservation – Orange Grove (WMSProjectId 4172) and Municipal Conservation – El Oso WSC (WMSProjectId 4319). The online decade for both of these projects is 2030 in DB27, whereas DB27 reports the related strategy volume as providing supply in 2040. Additionally, the plan presents these strategies as online in 2040 in Table 5D.113. Please review the online decades for all strategies and projects and revise as necessary to ensure that

all online decades and associated strategy supplies in DB27 are consistent with those presented in the final, adopted regional water plan. [31 TAC § 357.35(g)(1)]

***Proposed Response:*** *The municipal water conservation tables have been updated to show conservation water savings beginning in 2030. This information will be updated in DB27.*

28. Chapter 5, Table 5D.113, and DB27. Strategy supplies associated with the following municipal conservation strategies appear to be inconsistently reported between the plan and DB27: Municipal Conservation – Orange Grove (WMSProjectId 4172), Municipal Conservation – Portland (WMSProjectId 5436), Municipal Conservation – El Oso WSC (WMSProjectId 4319), and Municipal Conservation – San Diego MUD 1 (WMSProjectId 4170). For example, in DB27 the yield for Municipal Conservation – Orange Grove ranges from 33 acre-feet per year in 2040, to 93 acre-feet per year in 2080, whereas in Table 5D.113, supplies for this strategy range from 40 acre-feet per year in 2040 to 232 acre-feet per year in 2080. Please review the supply volumes for all strategies and revise as necessary to ensure that all strategy supplies in DB27 are consistent with those presented in the final, adopted regional water plan. [31 TAC § 357.35(g)(1)]

    ***Proposed Response:*** *The municipal water conservation tables have been updated to show conservation water savings beginning in 2030. These updates including those to water savings and costs will be reflected in the DB27 revision request.*

29. Executive Summary Table ES.10, Chapter 5, Table 5D.113, Section 5D.12.6, and DB27. The plan appears to present information for the Municipal Conservation – Portland (WMSId 6842) that is inconsistent between the plan and DB27. For example, DB27 and Table ES.10 report this strategy as recommended for Portland, however Section 5D.12.6 and Table 5D.113, does not include conservation as a recommended strategy for Portland. Please review the information presented for this strategy to ensure that all the strategy and project information is presented consistently between the plan and DB27. [31 TAC § 357.35(g)(1)]

    ***Proposed Response:*** *Comment accepted. Text has been updated accordingly in the referenced sections.*

30. Section 6.8 and DB27. The plan states that "there are no identified water needs that remain unmet for the 2026 regional water plan", however this is inconsistent with unmet needs data reported in DB27. For example, DB27 reports unmet needs for the following WUGs: County-Other, Bee County, San Diego MUD 1, and Manufacturing, Nueces County. Please revise the information presented in Section 6.8 so that it is reported consistently with DB27, in the final, adopted regional water plan. [31 TAC § 357.40(c)]

    ***Proposed Response:*** *There are no identified water needs that remain unmet in the 2026 Region N Plan. Confirmed with TWDB's Water Supply and Strategic Analysis team on 9/3/25 that DB27 shows this consistent with the final plan.*

31. Section 6.8 and DB27. The plan states that "there are no identified water needs that remain unmet for the 2026 regional water plan", however, the following municipal

WUGs shows unmet needs in DB27: County-Other, Bee County, and San Diego MUD 1. Please provide adequate justification for these unmet municipal need in the final, adopted regional water plan, including: 1) documentation that all potentially feasible WMS were considered to meet the need, including drought management WMS; 2) explanations as to why additional conservation and/or drought management WMS were not recommended to address the need; 3) descriptions of how, in the event of a repeat of the drought of record, the WUG associated with the unmet need shall ensure the public health, safety, and welfare in each planning decade with an unmet need; and, 4) explanation as to whether there may be occasion, prior to the development of the next Initially Prepared Plan, to amend the regional water plan to address all or a portion of the unmet municipal need. [31 TAC § 357.50(j)]

***Proposed Response:*** *There are no identified water needs that remain unmet in the 2026 Region N Plan. Confirmed with TWDB's Water Supply and Strategic Analysis team on 9/3/25 that DB27 shows this consistent with the final plan*

32. Section 7.5. Table 7.9 is missing emergency response information for several County-Other WUGs, including County-Other, Aransas; County-Other, Bee; County-Other, Jim Wells; County-Other, Nueces; and County-Other, San Patricio. Please update Table 7.9 to include the emergency response information for these County-Other WUGs in the region in the final, adopted regional water plan. [31 TAC § 357.42(g)]

    ***Proposed Response:*** *Table 7.9 was updated to include Aransas County-Other, Bee- County Other, Jim Wells- County Other, Nueces- County Other and San Patricio County-Other.* ~~*The remaining WUGs are not included in the table because they are not small WUGs (2020 population is over 10,000).*~~

    ***Comment response revised:*** *All county-other WUGS have been added to Table 7.9 even if the population is over 10,000.*

33. Section 9.1 and Appendix E. While the draft plan deliverable included an electronic version of the 2021 Regional Water Plan implementation survey, a copy of the table, as referenced on page 9-2 to be included in Appendix E, does not appear to have been included in the plan. Additionally, page 9-2 includes language that appears to be left over from the 2021 Regional Water Plan, as it indicates the survey was completed in February 2020. In the final, adopted regional water plan, please include a copy of the results of the 2021 regional water plan implementation survey, and ensure that appendices are referenced correctly. [31 TAC § 357.45(a)]

    ***Proposed Response:*** *The text in Section 9.1 has been updated to reflect the results of the 2021 regional water plan implementation survey and Appendix E has been updated to include the new survey.*

34. Section 9.2.4. The counts of water management strategies benefitting more than one WUG provided in Section 9.2.4 is inconsistent with strategies reported in DB22 and DB27 as benefitting more than one WUG. Please review the data reported in TWDB Secure Agency Reporting Application (SARA) Report ID 125 and either reconcile the

counts presented in Table 9-5 to align with the report or clarify the difference in counts reported in the final, adopted regional water plan. [31 TAC § 357.45(b)(1)]

***Proposed Response:*** *The counts presented in section 9.2.4 have been reconciled to match DB22 and DB27 in the final plan.*

35. Chapter 9. Please include the specific number of recommended water management strategies in the previous plan that serve multiple WUGs and have been implemented since that plan—or include a statement acknowledging if none have been implemented—in the final, adopted regional water plan. [31 TAC § 357.45(b)(2)]

    ***Proposed Response:*** *Comment acknowledged. An additional sub-section 9.2.5 is included that compares water management strategies from the 2021 Plan and 2026 Plan that serve multiple WUGs.*

36. Chapter 10. The plan does not appear to include a description of the rural outreach conducted by the planning group. Please include a summary of the region's rural outreach in the final, adopted regional water plan. [Contract Scope of Work, Task 10; Contract Exhibit C, Section 2.10]

    ***Proposed Response:*** *Comment acknowledged. The following response has been added to Section 10.3, Rural Outreach: "The CBRWPG held a rural community and water utility workshop on January 26, 2024. A Region N survey was sent to rural water user groups on November 19, 2024 to gather input on water supplies and contract relationships, water supply challenges, current water supply plans and future projects under consideration. The survey remained open until February 1, 2025. The following six (6) water utilities sent back survey responses: River Acres Water Supply Corporation, City of Mathis, City of Beeville, City of Portland, City of Orange Grove, and Nueces County WCID No. 3. The survey results are included in Table 10-1 and Table 10-2.*

37. Geographic Information System (GIS) files do not adhere to the contractually required naming convention. The file name shall include "WMSProject," Region letter, and geometry type with no spaces (EX: WMSProject_RegionN_Point). Please rename the GIS files following the naming convention outlined in Exhibit D, Section 2.5.2.1 in the final GIS files submitted [Contract Exhibit D, Section 2.5.2.1]

    ***Proposed Response****: The GIS files have been renamed following the naming convention outlined in Exhibit D, Section 2.5.2.1.*

**Level 2: Comments and suggestions for consideration that may improve the readability and overall understanding of the regional water plan.**

1. Section 1.11. On page 1-24, first paragraph, the plan is mis-identified as 2021 Coastal Bend Regional Water Plan. Please consider correcting to 2026 Coastal Bend Regional Water Plan

   ***Proposed Response:*** *Comment accepted. In the first paragraph of Section 1.11, the plan has been revised and correctly identified as the 2026 Coastal Bend Regional Water Plan.*

2. Section 2.4. The MWPs identified in Section 2.4 do not correlate with the MWPs designated by the planning group during their October 17, 2024 meeting. Please update and revise as appropriate in the final plan.

   ***Proposed Response:*** *Comment accepted. In the first paragraph of Section 2.4, the following sentence has been removed: "The CBRWPG designated these four WWPs as major water providers (MWPs) on November 9, 2017." The sentence was replaced with the following text that correlates with the MWPs designated by the planning group during their October 17, 2024 meeting: "On October 17, 2024, the CBRWPG designated four major water providers: City of Corpus Christi, SPMWD, STWA, and the City of Alice."*

3. Section 2.2. The calculated growth rate for the region in Table 2.1 does not appear to match the data values. Annual growth, calculated as ([last year/first year] to the power of [1/n]) minus one where n is count of years, is consistent with the growth rate for the state but not for the Region N and county growth rates. Additionally, many of the calculations described in the text in Section 2.2 are not consistent with the data values in the table, please review and consider revising as appropriate in the final plan.

   ***Proposed Response:*** *Comment accepted. The calculated growth rate for the region in Table 2.1 has been revised to match the data values. The calculations described in the text in Section 2.2 have been revised to be consistent with the data values in the table.*

4. Section 3.4. The plan does not contain a table showing the existing water reuse projects in the region. Please consider adding one to Section 3.4 (Reuse Availability). Additionally, Section 3.4 includes tables that show surface water availability. Please consider moving these to Section 3.3 in the final plan.

   ***Proposed Response:*** *Comment accepted. Table 3.5 has been added to section 3.4 to show the existing water reuse projects in the region based on TWDB-provided information. Surface water availability Tables 3.3 – 3.5 have been moved to Section 3.3.*

5. Section 4A.4. Please consider adding separate lists or tables identifying the region's WWPs and MWPs, respectively. For example, column headers in Tables 4A.25 and Table 4A.26 give the impression that Nueces County WCID 3 is designated as a MWP for this plan; however statements in the first paragraph of Section 4A.4 and in Section 3.1.8 on Page 3-13 indicate that the City of Alice, City of Corpus Christi, South Texas Water Authority, and San Patricio Municipal Water District are the only MWPs this planning cycle.

   ***Proposed Response:*** *Comment acknowledged. Table 4A.25 and Table 4A.26 column headers have been revised to identify both WWPs and MWPs. Rows*

*have been added to Table 4A.25 and Table 4A.26 to separate and identify WWPs from MWPs.*

6. Chapter 4. Throughout Section 4A of the plan, there are numerous references to obtaining reuse water supply data from "the TWDB data dashboard". Please clarify which data dashboard was used (e.g., Water Use Summary and Data Dashboard), as the TWDB has many data dashboards and it may not be clear to readers which one was consulted.

   ***Proposed Response:*** *Comment acknowledged. Text has been added to sections 4A.2.3 and various subsection in section 4A.3 to revise "TWDB's data dashboard" to "TWDB's Historical Water Use data dashboard"*

7. Section 4A.5. On page 4A-50 the plan refers to Appendix A for the second-tier needs for WUGs, however Appendix A does not appear to be included in the plan. Please update the reference to the pertinent section in the Executive Summary where readers may access the applicable DB27 report showing second-tier WUG needs.

   ***Proposed Response*****:** Appendix A showing second-tier needs to be included in the final plan.

8. Chapter 4B. The footnote at the bottom of Page 4B-2 does not reference the correct date that TWDB distributed information to the RWPGs regarding Project Feasibility analyses. Please consider revising this date to January 10, 2023.

   ***Proposed Response:*** *Comment acknowledged. The footnote at the bottom of Page 4B-2 has been revised to correctly reference the date of January 10, 2023 as the date that TWDB distributed information to the RWPGs regarding Project Feasibility analyses.*

9. Chapter 5. Please consider adding a separate section and/or a table in Chapter 5 that clearly identifies specific strategies that could potentially provide flood mitigation benefits.

   ***Proposed Response*****:** *Comment acknowledged. The following was added to Chapter 5B: Several water management strategies could potentially provide flood mitigation benefits, which include: 5B.8 Local Balancing Storage Reservoir project to firm up run-of-river supplies for possible co-location with Nueces County Drainage District No. 2 flood detention basins; 5B.11 Nueces River Diversion to Choke Canyon Reservoir, and 5B.12 Lake Corpus Christi Sediment Removal. The latter two projects were identified in the Nueces Basin (Region 13) Regional Flood Plan as flood mitigation strategies (FMSs).*

10. Section 5D.15. Information presented for the Corpus Christi Inner Harbor project in the implementation schedules figure for all projects (Figure 5D.2), does not match information presented in the implementation status table (Table 5D.114) or individual project schedule (Figure 5D.2) For example, Table 5D.114 and Figure 5D.2 shows the project online in 2030 in  but Figure 5D.8 shows it coming online anywhere

between 2030 and 2039 [making it 2040 for online decade]. Please consider correcting this discrepancy in the final plan.

***Proposed Response*****:** *Verifying that tables (and figures) consistently report implementation schedule of Year 2030. Figure 5D.8 (now Figure 5D.11) has been revised to show the Corpus Christi Inner Harbor project as online in 2030 to align with Figure 5D.2 and Table 5D.114.*

11. Section 5B. Please consider clarifying in the plan why municipal water conservation was not recommended to address municipal water needs for any WUG for the 2030 decade.

    **Proposed Response:** *Tables 5B.1.11, 5B.1.12 and 5B.1.13 have been revised accordingly to include municipal conservation for the 2030 decade for WUGs.*

12. Section 5B.4.1.1. Please consider explicitly stating that this recommended strategy involves indirect reuse.

    ***Proposed Response:*** *Comment acknowledged. No change made. The type of reuse water is described as non-potable, rather than as indirect potable reuse in the third paragraph, first sentence of Section 5B.4.1.1 .*

    ***"*****The Nueces River Authority is considering developing up to 1 mgd from Petronila Creek Regional WWTP as a non-potable Type 1 reuse supply to serve Nueces County industries."**

13. Section 5B. In the third paragraph of Page 5B-5, please consider correcting the reference to the planning period to the full planning horizon of 2030 through 2080. Also in that paragraph, please consider correcting the statement referring readers to Appendix A for calculated management supply factors for each decade by WUG.

    ***Proposed Response:*** *Comment acknowledged. The reference to the planning period has been revised to reference the full planning horizon of 2030 through 2080. The statement in that same paragraph referring readers to Appendix A for the calculated management supply factors has been revised to refer readers to Table 5B.6.*

14. Chapter 5, Page 5A-2. In the first paragraph on this page there is a reference to Chapter 11.3, which does not exist in the 2026 Coastal Bend Regional Water Plan. Please consider updating or removing this reference as needed.

    ***Proposed Response:*** *Comment acknowledged. The reference in the first paragraph of Chapter 5 on page 5A-2 has been revised from Chapter 11.3 to Chapter 9.3.*

15. Chapter 5, Page 5B-5. In the first paragraph on this page there is a statement indicating that "each strategy was evaluated with respect to 11 impact categories, as

required by TWDB rules." Further in the paragraph there is a statement referring to "the 10 impact categories". Please consider revising the second statement to properly reflect the 11 impact categories.

***Proposed Response:*** *Comment acknowledged. The statement in the first paragraph on page 5B-5 in Chapter 5 has been revied from "10" to "11" to properly reflect 11 impact categories.*

16. Chapter 5, Page 5B-5. In the third paragraph on this page, the planning period is incorrectly identified as 2040 through 2080. Please consider correcting this to reflect the current planning period of 2030 through 2080.

    ***Proposed Response:*** *Comment acknowledged. The reference to the planning period has been revised from 2040 to 2030 to reference the full planning horizon of 2030 through 2080.*

17. Chapter 5, Page 5B-9, Table 5B-6, and DB27. The MWPs indicated in Table 5B-6 do not reflect the MWPs reported in DB27. Please revise this table to ensure consistency between DB27 and the final plan.

    ***Proposed Response*****:** *In progress. Revisions will be made as needed to ensure consistency between DB27 and the final plan.*

18. Chapter 5, Page 5B-15, and Table 5B.1.1. In the last paragraph on Page 5B-15, there is a statement indicating that the City of Corpus Christi had reduced its municipal water use to 150 Gallons Per Capita Per Day (GPCD) by 2016. In Table 5B.1.1, the 2020 base year GPCD for Corpus Christi is reported as 173. Please consider providing additional clarification as to why the base year GPCD would be at least 15 percent higher than municipal water use values from 5 years prior.

    **Proposed *Response:*** *The last paragraph on Page 5B-15 has been revised to clarify the 2020 base year GPCD for Corpus Christi in comparison to municipal water use values from 5 years prior.*

19. Chapter 5, Page 5B-31. In the third paragraph on this page, there is a reference to the 2021 Coastal Bend Regional Water Plan while describing activities conducted for the current planning cycle. Please consider reviewing this reference and update to the 2026 Coastal Bend Regional Water Plan if appropriate.

    ***Proposed Response:*** *Comment acknowledged. The reference to the 2021 Coastal Bend Regional Water Plan has been revised to the 2026 Coastal Bend Regional Water Plan in the third paragraph of Chapter 5, section 5B.1.4.*

20. Chapter 5. There appears to be some duplication of page numbering within Chapter 5, beginning with 5B-25 (Chapter 5B.2, Manufacturing Water Conservation). Please review and consider correcting page numbering in the final, adopted regional water plan.

***Proposed Response*:** *In progress. Page numbering will be corrected as needed in the final plan.*

21. In Section 7.6 of the IPP, the last paragraph on Page 7-52 contains a statement indicating a “new” TWDB provision for including recently implemented drought condition responses. This statement is incorrect – this provision was a requirement for the 2021 Regional Water Plans but is not a requirement for the 2026 Regional Water Plans. Please consider updating or removing this statement in the final plan.

    ***Proposed Response:*** *The following revisions were made to Section 7.6 in the last paragraph on Page 7-52:*

    - **Recent implementation of measures to respond to drought conditions -** In response to the 2021~~a new~~ TWDB provision to include whether measures have been recently implemented in response to drought conditions, the CBRWPG recognizes that the City of Corpus Christi’s direct and indirect customers are required to adhere to the City of Corpus Christi DCP criteria and reductions. A Coastal Bend Region survey was prepared and sent to municipal water providers on November 19, 2024, with reminder sent on December 3, 2024. The results of the municipal survey are included in **Error! Reference source not found.**. ~~At this time, it is impractical to poll all 40+ municipal WUGs to inquire about the implementation status of DCP measures and TWDB funding has not been provided for this activity~~.

22. In Table 7.9 on Page 7-51, the Potential Entity Providing Supply listed for San Diego MUD 1 is "#NA". Please consider listing the correct supplier name or, if there is not one, follow the formatting convention of the remainder of the table.

    ***Proposed Response****: Removed #N/A and replaced with “-“ to remain consistent with the formatting convention for Table 7-9.*

23. Section 7.4. In the second paragraph on page 7-47, a reference is made to assessing and updating emergency interconnections identified in the 2016 Coastal Bend Regional Water Plan. Please consider updating this reference to the 2021 Coastal Bend Regional Water Plan.

    ***Proposed Response:*** *Comment accepted. The text on page 7-47 has been updated to reference the 2021 Coastal Bend regional water plan.*

24. Section 7.5. The emergency response analysis for the 2026 Regional Water Plans should have been based on projected 2030 populations to align with the planning horizon, please consider updating Section 7.5 to reflect the decade 2030 for the analysis for municipal WUG population, instead of 2020.

***Proposed Response:*** *Updated table. In 2020 the population of the Aransas Pass and Ingleside were under 10,000. They are still included even though the estimated 2030 population is over 10,000.*

25. Section 7.7. Page 7-55, footnote 13 at the bottom of the page contains a non-working web link to the Texas Commission on Environmental Quality's webpages containing information and example drought contingency plans for public water suppliers. Please consider updating this link in the final plan.

    ***Proposed Response:*** *Comment accepted. The text in footnote 13 has been updated with a working link.*

26. Chapter 9. Please consider adding a new subsection in final plan to present the regionalization assessment required by § 357.41(b), which is currently grouped under Section 9.2.4.

    ***Proposed Response:*** *Comment accepted. The following text has been updated accordingly and a new subsection 9.2.5 has been added.*

    "The 2026 regional water plan considers water management strategies that are intended to serve more than one WUG. Many of these strategies are sponsored by the major WWPs in the region. The strategies considered in the 2021 regional water plan were classified as conservation, reuse, aquifer storage and recovery (ASR), seawater desalination, brackish groundwater desalination, local balancing storage, groundwater supplies, or regional water supply management and treatment facilities. The 2026 regional water plan considered the same categories of strategies in addition to Nueces River Diversion to Choke Canyon Reservoir and Lake Corpus Christi Sediment Removal. The 2021 regional water plan considered 13 water management strategies that serve more than one WUG, not including municipal, irrigation, or manufacturing conservation. The 2026 regional water plan identifies 21 strategies, not including municipal or manufacturing conservation, that serve more than one WUG. Most notably – there are three new reuse strategies and four new regional water supply management and treatment facilities strategies for the 2026 regional water plan compared to the 2021 regional water plan."

27. Chapter 10. Please consider providing a list of rural entities that were not responsive to regional water planning group outreach efforts in the final plan.

    ***Proposed Response:*** *Comment acknowledged. The text was updated to include a list of rural entities that responded to the CBRWPG survey in Section 10.3, Rural Outreach. Additionally,a list of rural entities that were not responsive were added. .*

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**TWDB comments received on:**

- **August 18, 2025 for the Three New Water Management Strategies since the Initially Prepared Plan Submittal**
- **August 22, 2025 for the Infrastructure Water Management Strategies**
- **August 27, 2025 for the Second Round Comments**

***Note: Responses embedded in comment document (see italics)***

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***Table G.1.***
***Additional TWDB Comments***

| Strategy | Comment | Section Page | Resolution | Proposed Response |
|---|---|---|---|---|
| EV Ranch | Overall, I am concerned with how this strategy is presented and how it will be perceived for funding purposes. Based on the write-up it is unclear which party/parties are responsible for construction, etc. and if the project can benefit multiple MWPs/WUGs. | *5D.1* | **Pending**: asked Kristi for input on 08/21/2025. Kristi to ask CoC how they wish to proceed. | |
| EV Ranch | If the proposed yield will trigger 357.34(g) for the project (brackish groundwater >10,000 AFY in any decade), please add this to the implementation of large projects section and complete that analysis for this project | *5D.2* | **Resolved:** Added to the implementation status table with input from Taylor Hecht (Garver). | This project has been added to the Implementation Status table. |
| EV Ranch | Maps and other info show this project going through Jim Hogg, Duval, Jim Wells, Kleberg, and Nueces counties. Check species and update text and Table 5B.7.13 as needed. | *5D.4* | **Resolved**: Changed the counties referenced in the text. | The text in the report has been changed to refelect the 5 counties that this analysis inlcudes. |
| EV Ranch | treatment facility? Missing word(s) here. | *5D.8* | **Resolved**: added the proposed text | The proposed language has been added to form a complete statement. |
| EV Ranch | I do not see this in the cost table. Was this included in the facilities costs, or somewhere else? Please explain or remove from this list. | *5D.9* | **Resolved**: The cost was included in land acquisition, but has been moved to its own line item. | The cost of the one-time due diligence fee was included in the land acquisiton costs in the UCM costing form. It has been broken out into its own line item for clarity. |
| EV Ranch | Table 5B.7.15? | *5D.11* | **Resolved**: no change required. This must have been an artifact from final formatting. It is not present in the current Word document. | This appears to have been an artifact from final formatting. We will do our best to ensure no such erros exist in future versions. |
| EV Ranch | Costs for brine injection wells, 18 mile pipeline, pumps, etc. are missing. Need to add. Where are your costs for long term lease - included in land acquisition?? | *5D.12* | **Resolved:** The piping and injection pumps were included in the "Well Field" line item of the costing summary, but have been moved to their own line item. | The cost of the brine injection wells, the wellfield piping, and the pumps were included in the "Well Fields" item of Table 5B.7.15. These items have been broken out into their own line items for clarity. |
| EV Ranch | This paragraph may need to be updated with information provided by TWDB Groundwater/BRACS staff. | *5B.7.5.2* | **Resolved**: Confirmed by the TWDB Groundwater and BRACS data science team. Added a footnote indicating confirmation. | TWDB Groundwater and BRACS data science team confirmed information presented in this paragraph. |
| EV Ranch | I see three separate numbers for this in the writeup - 70, 79 (Table 5B.7.14), and 89 (p. 5D.9). Which is the correct number? Revise for consistency and update/revise costs as needed for the correct number. | *5B.7.5.3* | **Resolved:** The transmission pipeline length was updated throughout the strategy as 79 miles. | The transmission pipeline length was updated to 79 miles throughout the strategy. |
| EV Ranch | Based on 79 miles from Hebbronville to ON Stevens. See earlier comment regarding pipeline length represented. | *5D.6.6* | **Resolved:** No change needed. 79 miles is the correct distance. | The value shown is correct. Transmission pipeline length of 79 miles updated throughout the strategy. |
| Oso Reuse | This proposed yield will trigger 357.34(g) for the project (DPR >5,000 AFY in any decade). Please add this to the implementation of large projects section and complete that analysis for this project | *5B-64* | **Resolved:** Added to the implementation status table with input from Taylor Hecht (Garver). | This project has been added to the Implementation Status table. |
| Petronila Regional WWTP Reuse | Changed for consistency with TCEQ nomenclature for reuse classification. | *5B.4.1.1* | **Resolved:** Updated numbering. | Nomenclature has been updated. |
| Petronila Regional WWTP Reuse | Not per 30 TAC 210.32(2). | *5B.4.1.2* | **Resolved:** Removed text. | Text inconsistent with 30 TAC 210.32(2) has been removed. |
| Petronila Regional WWTP Reuse | No septic, as per first paragraph of section? | *5B.4.1.4* | **Resolved:** No change needed. | The Regional WWTP will replace nearby failing septic systems, but the number of systems to be replaced is unknown at this time and therefore not mentioned. |
| Petronila Regional WWTP Reuse | I don't even see a preliminary assessment of species that may be potentially impacted. | *5B.4.1.4* | **Resolved:** Added species that may be potentially impacted. | A preliminary assessment of potentially impacted species has been added. |
| Petronila Regional WWTP Reuse | Not consistent with costs presented in Table 5B.4.2. | *5B.4.1.8* | **Resolved**: Updated costs. | Costs have been updated. |
| Greenwood WWTP Reuse | Environmental/natural resource evaluation is incomplete. Species impacts? Cultural? | *5B.4.2.3* | **Resolved:** Added environmental and cultural resource evaluation. | The environmental and cultural resource evaluation was added. |

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| Oso Reuse | This should be Table 5B.4.9. | *5B.4.3.7* | **Resolved**: Numbering is updated and consistent. | Numbering has been updated. |
| Oso Reuse | 11,209 ac-ft/yr per Table 5B.4.7. | *5B.4.3.7* | **Resolved:** Updated yield. | Yield has been updated. |
| Oso Reuse | Table 5B.5.6? Check table numbering and ensure consistency. | *5B-69* | **Resolved**: Numbering is updated and consistent. | Numbering has been updated. |
| Oso Reuse | Where are costs for pump station(s), chemical feed systems, storage tanks, brine disposal? | *5B-72* | **Resolved:** Added a footnote to indicate cost provided by Garver includes process building, storage/equalization, pump station, chemical feed and storage, land acquisition and improvements. Emailed Taylor Hecht 8/22/2025 for additional information on brine discharge strategy | A footnote has been added to clarify what is included in the DPR treatment cost estimate. The brine injection wells were broken into a separate line item for further clarification. |
| Oso Reuse | These seem low relative to described adjacent wetland areas and known cultural sites, as well as compared to other project writeups anticipating fewer potential impacts. Not required to change, but please check. | *5B-72* | **Resolved**: Updated cost to $500,000 | The environmental and archaeology cost estimate was increased to account for the adjacent cultural site and wildlife refuge. |
| Oso Reuse | Based in writeup, these need another look/additional consideration. | *5B-75* | **Resolved**: Updated comments. | Comments for insteam flows, bay and estuary inflows, and wetlands have been modified to "Moderate to high impact". Cultural resource comment now reads "Possible impact to Cayo del Oso cultural site" |
| Oso Reuse | Plan needs to state that these costs have also been indexed to Sept 2023 dollars, as required by Exh C. | *5B-70* | **Resolved:** No change required. The September 2023 cost basis is mentioned in the following sentence. | The September 2023 cost basis is mentioned in the following sentence. |
| Nueces BWROF | By the time the plan is adopted, all of these wells will have been constructed. I would remove this list and revise project description text. Your text below already alludes to this fact. | *5B.7.4.1* | **Resolved:** Updated the text | Removed list of wells and added text stating wells will already be constructed |
| Nueces BWROF | 5B.7.6?? | *5B.7.4.1* | **Resolved**: No change required. This must have been an artifact from final formatting. It is not present in the current Word document. | This appears to have been an artifact from final formatting. We will do our best to ensure no such erros exist in future versions. |
| Nueces BWROF | So what is the plan for this project in DB27? -Is there a recommended version of this WMS using the remaining source balance for GCA, Nueces-Rio Grande Basin? If so, the write up needs to clearly identify the MAG limited yield and the envisioned yield. -If this WMS is not included as a recommended WMS at all due to the MAG limitation, pls make sure that is clear from the write up | *5B.7.4.2* | **Resolved**: Included a table that compares MAG limited amount to project amount needed | |
| Nueces BWROF | I would remove this text | *5B.7.4.3* | **Resolved**: Removed text | |
| Nueces BWROF | I would remove this statement | *5B.7.4.4* | **Resolved**: Removed text | |
| Nueces BWROF | In third paragraph of first page you state cost of wells will not be included. Remove. | *5B.7.4.4* | **Resolved**: Wells are not included in costs. The "Well fields" item description in tables 5B.7.12.a and 5B.7.12.b were revised for clairity | Wellfield description for Option A was revised to say "Piping Only". Option B does include well costs for the injection wells, pumps, and piping. |
| Nueces BWROF | Thought this was going to be a new WTP located in/adjacent to Nueces River Park? | *5B.7.1* | **Resolved:** Updated the text. | Sentence updated: The produced water will be conveyed **through a 3.5 mile raw water pipeline to the new Nueces River Park treatment facility located downstream of the wellfield on the Nueces River at the location shown on Figure 5B.7.6**. |
| Nueces BWROF | Then where did the TDS value of 3,000 to 5,000 mg/L come from? | *5B.7.1* | **Resolved**: Added text to clarify. | Sentence updated: The Phase 1 raw water quality is non-potable with an estimated TDS of 3,000 to 5,000 mg/L, **based on typical water quality makeup of the lower Chicot and upper Evangeline members of the Gulf Coast Aquifer in this area.** |
| Nueces BWROF | Comparison Between Envisioned Project Yield and MAG Yield in Acre-Feet per Year | *5B.7.4.2* | **Resolved:** Updated the table caption. | |
| Nueces BWROF | August 22? | *5B.7.4.3* | **Resolved**: No change needed. | Information was provided by City of Corpus Christi on June 4. |

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| Nueces BWROF | Estimated 7 miles of pipelines, including brine concentrate transport to injection wells for Option B and 5 miles for Option A? | *5B.7.4.4* | **Resolved:** Updated the text to clarify pipeline lengths. | Sentence updated: Transmission costed according to 14,560 ac-ft/yr (13 mgd) for approximately 3.5 miles of pipeline to the treatment facility and an additional 1.5 miles of pipeline to the tie-in location at Sharpsburg and Up River Road. |
| Nueces BWROF | Envisioned yield amount? | *5B.7.4.4* | **Resolved:** Updated the text. | |
| Nueces BWROF | Envisioned yield amount? | *5B.7.4.4* | **Resolved:** Updated the text. | |
| Nueces BWROF | Specify the range for Options A and B? | *5B.7.4.6* | **Resolved:** Updated the text. | Text updated: $2,471 to $3,151 per ac-ft. |
| Diversion to Choke Canyon Reservoir | Evaluation of potential impacts to wetlands, species, and cultural? | *5B.11.3* | **Resolved:** Added environmental and cultural resource evaluation. | The environmental and cultural resource evaluation was added. |
| Diversion to Choke Canyon Reservoir | Need to revise based on cost adjustment for 4.8/5 miles of pipeline, not 4.5. | *5B.11.4* | **Resolved:** Updated the text. | |
| Diversion to Choke Canyon Reservoir | Does not match cost in Table 5B.11.2. | *5B.11.4* | **Resolved:** Updated the text. | |
| Diversion to Choke Canyon Reservoir | 4.8 miles. Round up to 5 if 4.8 is not possible. | *5B.11.4* | **Resolved:** Updated the text. | |
| Diversion to Choke Canyon Reservoir | Update per revisions noted above. | *5B.11.6* | **Resolved:** Updated the text. | |
| Diversion to Choke Canyon Reservoir | Evaluations for items 3 through 6 not completed. These are required. | *5B.11.6* | **Resolved:** Updated the text. | |
| Diversion to Choke Canyon Reservoir | Acreage incorrect? | *5B.11.6* | **Resolved:** Updated the text. | |
| Diversion to Choke Canyon Reservoir | Acreage incorrect? | *5B.11.6* | **Resolved:** Updated the text. | |
| San Pat MWD - Conveyance System Improvements and New WTP | IPP Comment: Section 5B.10.3 and DB27. The evaluation for the San Patricio Municipal Water District – Conveyance System Improvements and New Water Treatment Plant strategy appears to include three separate strategies that have been entered as providing zero yield of firm supply in all decades in DB27: SPMWD Project No. 1 - New WTP at Plant D (WMSId 7045); SPMWD Project No. 2 - New Intake PS and Raw Water Transmission (WMSId 7046); and SPMWD Project No. 3 - New Pump Station & Transmission Rehab (WMSId 7047). All recommended strategies and projects that are entered into DB27 must be designed to reduce the consumption of water, reduce the loss or waste of water, improve the efficiency in the use of water, or develop, deliver or treat additional water supply volumes to WUGs or WWPs in at least one planning decade such that additional water is available during drought of record conditions. Additionally, WMSIds 7046 and 7047 appear to include replacement of existing transmission lines. Please remove the transmission line replacement portions of these projects from the plan and provide additional clarification documenting specifically how the remaining portion of these strategies will increase the net volume of water supply in the final, adopted regional water plan and/or further modify or remove the strategy, as appropriate, to exclude replacement of existing infrastructure capacity. If these strategies remain as recommended, please update the firm yields in DB27 to reflect the non-zero firm yield. [31 TAC § 357.34(d); Contract Exhibit C, Section 2.5.2.15] | 5B.10.3 | **Resolved:** Updated strategies and removed replacement of existing transmission lines. | |
| San Pat MWD - Conveyance System Improvements and New WTP | Per IPP comment, recommended WMS may not include any portion of replacing existing capacity. Supply and cost needs to be for increased capacity only | *5B.10.3.7* | **Resolved:** Updated text to address the comment. | The cost estimate has been updated to include only the proposed new conveyance system improvements. |

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| San Pat MWD - Conveyance System Improvements and New WTP | Language that triggered comment above. Remove pipeline replacement or clarify as requested by comment | *5B.10.3.8* | **Resolved:** Updated text to address the comment. | Updated sentence: Proposed transmission pipeline improvements include constructing a new 36-inch PVC pipeline, especially under the roadway crossings, to allow for additional pressures from the new 25 MGD pump station |
| Mary Rhodes Pipeline Phase I Rehabilitation | So the "rehab" portion of this project would significantly reduce water loss, reduction of capacity, and possible loss of service? May want to emphasize these points a bit stronger. | *5B.10.2.1* | **Resolved:** Added text addressing the comment. | Added sentence: In addition to increasing the conveyance capacity, the MRP improvements described in this strategy would also reduce water loss and improve service reliability. |
| Mary Rhodes Pipeline Phase I Rehabilitation | If not relevant to project, not sure if this is worth stating in the plan. May be confusing to general readers. | *5B.10.2.1* | **Resolved:** No change made. | No change made. Paragraph provides relevant detail about ongoing improvements. |
| Mary Rhodes Pipeline Phase I Rehabilitation | Emphasize increased capacity from 79 mgd to 100 mgd? | *5B.10.2.1* | **Resolved:** Added text addressing the comment. | Updated sentence: Installing parallel pipe and adding a pump to each of 3 pump stations will allow the MRP Phase I to convey 100 MGD, **up from the current 79 MGD.** |
| Mary Rhodes Pipeline Phase I Rehabilitation | Based on this, I would not name/describe the project as "rehab" | *5B.10.2.2* | **Resolved:** Updated the text. | The WMS has been renamed to "May Rhodes Pipeline Phase I Improvements to Increase Capacity and Reliability" |
| Mary Rhodes Pipeline Phase I Rehabilitation | Project is designed for increased capacity and reliability. Would not use term "rehab/rehabilitation", as it is too limiting. | *5B.10.2* | **Resolved:** Updated the text. | The WMS has been renamed to "May Rhodes Pipeline Phase I Improvements to Increase Capacity and Reliability" |
| Mary Rhodes Pipeline Phase I Rehabilitation | Option 2 is problematic for inclusion in the RWP because full replacement would be replacing existing capacity. Supply and cost in the plan may only include the portion that increases the capacity/yield. Final plan needs to be clear that the recommended version of this WMS does not include any replacement of existing capacity - supply and cost is for new capacity/supply only | 5B.10.2.1 | **Resolved: Option 1 is recommended.** | |
| Mary Rhodes Pipeline Phase I Rehabilitation | Is this conveyance capacity large enough to handle additional project yield such as Evangeline Laguna GW project that would use MRP to transport water to ON Stevens? Would reconstruction of portions of MRP be needed to accommodate such projects? | *5B.10.2.1* | **Resolved:** Added text addressing the comment. | Updated paragraph: "The Mary Rhodes Pipeline Phase I improvements described in this strategy will increase conveyance capacity for additional source water supply projects, like the Evangeline Laguna Groundwater Project and others. The City of Corpus Christi is beginning a study to evaluate if reconstruction of portions of the MRP are needed to accommodate future water supplies and to what extent." |
| Section 2.2 and Table 2.1 | The value for 2030 is still incorrect. Please correct to 34,243,764 | *TWDB Comment 2* | **Resolved:** Updated the text. | |
| Section 3.1.8 Page 3-13 | The proposed footnote appears to explain allocation from City of Corpus Christi contracts; however, it does not seem to address the comment - especially for other MWPs. Impossible to tell if resolved without revised plan table/text. it needs to be explicitly clear what the supplies are for each MWP by category of use. This is a requirement by the rule referenced in comment. | *TWDB Comment 4* | **Resolved:** Updated the table to show category of use for projected shortages. | |
| Section 4A.4 | See comment response to TWDB Comment 4. It needs to be explicitly clear what the needs are for each MWP by category of use. This is a requirement by the rule referenced in comment. | *TWDB Comment 8* | **Resolved:** Updated the table to show category of use for projected shortages. | |
| Section 5B.10.1 | Same as TWDB Comment 7. HDR still determining supply available for this WMS. Per 8/27 call, coordinating with B&V | *TWDB Comment 10* | **Resolved:** Discussed supply availability needs for DB27. SPMWD projects are related to contractual increases with the City of Corpus Christi. The yield for MRP and O.N. Stevens WTP improvement projects are associated with source water supplies originating from Evangeline Laguna brackish groundwater strategy. | |
| Table 5D.113 | Consider adding footnote(s) to Table 5D.113 to explain. This needs to be added for 2030 to DB27 as well. Should be addressed by conservation update Grady is working on? | *TWDB Comment 20* | **Resolved:** Updated the text to include 2030 conservation savings. | |
| Section 5B.1.2.3 | Comment response needs correcting to state pipeline replacement and meter replacement are water loss mitigation. Plan can acknowledge that additional savings based on water use reduction were considered, but the plan should be clear that water loss mitigation WMS are what is recommended | *TWDB Comment 21* | **Resolved:** Updated 5D.1 write-up to separately include expected water savings and costs for pipeline replacement and meter replacement projects. | |

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| Chapter 5 | Response not adequate at this time. Response needs to document that new WTP does not include replacement of existing capacity. Same for any WTP expansions (e.g: O.N. Stevens WTP Improvements) | *TWDB Comment 23* | **Resolved:** Updated the text to clarify that the strategy is for new capacity. | |
| Section 7.5 Table 7.9 | Proposed response is not acceptable. Per 357.42(g)(3), ALL County-Other WUGs must be evaluated for potential emergency responses to drought or loss of existing supplies. Plan will not be approvable by TWDB unless all County-Other WUGs listed in the comment are included in the table:<br>County-Other, Bee<br>County-Other, Jim Wells<br>County-Other, Nueces<br>County-Other, San Patricio | *TWDB Comment 32* | **Resolved:** Table 7.9 was updated to include Aransas County-Other, Bee County Other, Jim Wells- County Other, Nueces County Other and San Patricio County Other according to TWDB guidance. | |
| Chapter 10 | Thank you for this response. However, the comment suggested indicating a list of entities that were NOT responsive to outreach efforts. | *TWDB Comment 27* | **Resolved:** A list of entities that did not provide responses was added. | |
| Chapter 10 | This sentence is very awkward. Perhaps just end after "...February 1, 2025."? | *TWDB Comment 36* | **Resolved:** Updated the text. | |

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**Texas Parks and Wildlife comments received via letter dated July 15, 2025**

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July 15, 2025

Mr. Scott Bledsoe and Dr. Pancho Hubert, Co-Chairs
Region N Water Planning Group
c/o Mr. Travis Pruski, Nueces River Authority
539 South Highway 83
Uvalde, Texas 78801

Re: 2026 Region N Initially Prepared Regional Water Plan

Dear Mr. Bledsoe and Dr. Hubert:

The Texas Parks and Wildlife Department (TPWD) has reviewed the 2026 Initially Prepared Regional Water Plan for Region N (IPP) and appreciated the opportunity to provide comments. Water impacts every aspect of TPWD's mission to manage and conserve the natural and cultural resources of Texas. TPWD is the agency with primary responsibility for protecting the state's fish and wildlife resources (Parks and Wildlife Code (PWC) Section (§) 12.0011) and serves as an ex officio member on each Regional Water Planning Group (Texas Water Code (TWC) §16.053(c)). The comments in this letter are a continued reflection of TPWDs participation as an ex-officio member. TPWD offers these comments intending to help conserve state fish and wildlife resources as mandated in TWC §16.053(a).

TPWD understands that regional water planning groups are guided by the rules in Title 31 TAC Chapter 357 when preparing regional water plans. These water planning rules spell out requirements related to natural resources and environmental protection. Accordingly, TPWD staff reviewed the IPP with a focus on the following questions:

- Does the IPP include a quantitative reporting of environmental factors including the effects on environmental water needs and habitat?
- Does the IPP include a description of natural resources and threats to natural resources due to water quantity or quality problems?
- Does the IPP discuss how these threats will be addressed?
- Does the IPP describe how it is consistent with long-term protection of natural resources?
- Does the IPP include water conservation as a water management strategy?
- Does the IPP include Drought Contingency Plans?

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- Does the IPP recommend any stream segments be nominated as ecologically unique?
- Does the IPP address concerns raised by TPWD in connection with the 2016 Water Plan?

The Texas Water Development Board (TWDB) divided the state into 16 planning regions and appointed members to the regional planning groups. The Coastal Bend Regional Water Planning Area (Region N) includes 11 counties. The Coastal Bend Regional Water Planning Group (CBRWPG) has a total of 20 voting members who are responsible for the development of the Coastal Bend Regional Water Plan. The CBRWPG adopted bylaws to govern its operations and, in accordance with its bylaws, selected the Nueces River Authority to serve as its administrative agency.

On May 18, 2023, the CBRWPG adopted the use of safe yield as the basis for determining availability for the Corpus Christi Regional Water Supply System. The TWDB approved the hydrologic variance request on January 8, 2024. Using the Safe Yield approach, surface water is projected to account for approximately 82% of 2080 municipal supplies, with groundwater accounting for 17% and reuse accounting for 1%. The IPP reports a projected population increase from 589,620 in 2020 to 592,173 by 2080, representing an annual growth rate of approximately 0.12% over the planning period. Total regional water demand is projected to increase from 163,074 acre-feet per year in 2020 to 250,809 acre-feet per year by 2080, with increased demand attributed to municipal and manufacturing sectors. Overall, the Coastal Bend Region is projected to experience a municipal water supply shortage throughout the 50-year planning cycle.

To address this shortage, the CBRWPG adopted a process for identifying and selecting potentially feasible water management strategies (WMS). Through this process, the following 12 WMS were selected and reported on:

- Municipal Water Conservation
- Manufacturing Water Conservation
- Mining Water Conservation
- Reuse
- Aquafer Storage and Recovery (ASR)
- Seawater Desalination
- Brackish Groundwater Desalination
- Local Balance Storage Reservoir
- Groundwater Supplies - Rural and Non-Municipal Water Systems
- Regional Water Supply Management and Treatment Facilities
- Nueces River Diversion to Choke Canyon Reservoir

- Lake Corpus Christi Sediment Removal

The 2026 IPP provides a broad overview of the region's natural resources in Chapter 1, particularly in Sections 1.5 and 1.7, including descriptions of estuarine systems, riparian and wetland habitats, coastal prairies, and native fish and wildlife communities. The IPP acknowledges the ecological and economic value of these systems.

The CBRWPG adopted environmental keys (or indicators) on January 30, 2025, for WMS evaluation. The methodology for quantifying environmental concerns is presented in Chapter 5. An evaluation summary is included at the end of each WMS description, which summarizes how each strategy relates to the 10 impact categories. Evaluation of impacts to fish and wildlife resources was initially limited to state and federally listed species and associated habitats. Environmental impacts were focused on individual project footprints to address regulatory permitting requirements. This section further details environmental concerns that may arise as the strategy matures. The scope of information presented in this section is dependent on the status of project development. Some strategies included an evaluation of species listed in the Texas Natural Diversity Database (TXNDD) or Species of Greatest Conservation Needs. Results were grouped into three categories and presented in a table for each WMS (Ex Table 5B.4).

While the IPP includes a quantitative reporting of environmental factors, the methodology for developing evaluation criteria was not adequately described.

> **Recommendation:** The IPP should include a detailed methodology for evaluation criteria development in Section 5B.

The environmental impact discussions in the IPP focus on each WMS individually and do not assess the cumulative effects of implementing multiple strategies concurrently or over time. As a result, the plan does not address landscape-level concerns such as habitat fragmentation, changes in salinity gradients, or shifts in ecosystem functions.

> **Recommendation:** The CBRWPG should incorporate procedures in future IPP's to address cumulative effects to the environment when evaluating an IPP with multiple WMS.

The IPP recognizes the importance of instream flows and freshwater inflows to maintain aquatic ecosystems, estuarine productivity, and

downstream habitat integrity. However, the plan provides limited quantitative analysis of how WMS implementation may affect flow regimes. Environmental flow standards adopted under the Senate Bill 3 (SB3) process are referenced, but the plan does not explicitly evaluate whether cumulative diversions, reuse, or other strategies would reduce streamflow below these benchmarks.

Several WMS (i.e., direct reuse, aquifer storage and recovery, new surface water diversions, and desalination) have the potential to alter flow volumes, timing, and variability, particularly during low-flow conditions. While Chapter 5 contains environmental issue summaries for individual strategies, these do not include flow modeling or instream flow compliance assessments. Consequently, the plan does not demonstrate whether the combined effect of WMS implementation would maintain, exceed, or fall short of established environmental flow standards in key river segments or estuary inflow points. In the absence of this analysis, it remains unclear whether full implementation of the WMS portfolio could contribute to ecologically significant reductions in instream or freshwater inflows.

> **Recommendation:** TPWD recommends that the CBRWPG coordinate with Texas Commission on Environmental Quality (TCEQ) and other appropriate agencies to reestablish the Nueces Estuary Advisory Council (NEAC). The NEAC previously served as a valuable forum for integrating science-based recommendations into freshwater inflow management for the Nueces Estuary.

The CBRWPG formed a subcommittee at an open meeting on October 17, 2024, to consider designation of ecologically unique stream segments for the Coastal Bend Region. The subcommittee met on November 14, 2024, to discuss and prepare recommendations for CBRWPG consideration. The subcommittee considered TPWD's 2002 recommendations for four stream segments in the Coastal Bend Region for designation of ecologically significant value:

- Aransas River Tidal (Segment 2003)
- Nueces River Tidal (Segment 2101)
- Nueces River (below Lake Corpus Christi) (Segment 2102)
- Nueces River (above Lake Corpus Christi) (Segment 2103)

It is unclear if the four proposed segments were adopted. In Section 8.2 of IPP, the report states "The subcommittee's recommendations were considered and adopted by the Coastal Bend Region on December 12, 2024." Subsequently, the IPP states "On December 12, 2024, the Coastal Bend Region considered and adopted the subcommittee's

recommendations that no river or stream segments within the Coastal Bend Region be identified at this time."

> **Recommendation:** TPWD requests the CBRWPG to clarify whether the proposed segments were adopted or if they were not adopted at this time.

TPWD has included in the 2024 Land and Water Resources Conservation and Recreation Plan a goal of updating the statewide assessment of ecologically significant stream segments by 2028. TPWD looks forward to assisting the CBRWPG should they decide to pursue the designation of ecologically unique stream segments and we are willing to assist with the preparation of a recommendation packet as identified in title 31, section 357.43 of the TAC.

The 2026 IPP references federally and state-listed species in the development of the WMS as well as Species of Greatest Conservation Need (SGCN), in multiple sections and recognizing further evaluation may be required.

> **Recommendation:** The TPWD Rare, Threatened, and Endangered Species of Texas (RTEST) database, which was most recently updated on January 15, 2025, should be used to ensure the accuracy and completeness of this list. The RTEST database is publicly available at: https://tpwd.texas.gov/gis/rtest/.

The IPP recognizes the value of fishing and hunting as a primary economic activity within the Coastal Bend Region but lacks any assessment on impacts to these species of concern when evaluating the WMS. These species rely on an adequate conveyance of freshwater inflows and estuarine habitat for healthy life cycle development, which in turn supports a robust regional economy. Potential impacts from the WMS to recreationally and commercially important species such as southern flounder, spotted seatrout, red and black drum, shrimp, oysters, bass, crappie, alligator gar, white tailed deer, dove, etc. at the local and regional level may result in resource management decisions and impacts to the regional economy in the recreation community and tourism.

> **Recommendation:** TPWD encourages the CBRWPG to consider expanding WMS evaluations of environmental impacts to include commercial and recreationally important species and habitats.

The IPP WMS lists five seawater desalination facilities and three brackish groundwater water desalination strategies further discussed in the environmental issues. In 2015, House Bill (HB) 2031 (84th Texas Legislature) directed TPWD and the Texas General Land Office (GLO) to identify zones in the Gulf appropriate for the diversion of marine seawater, and for the discharge of marine seawater desalination brine concentrate, while considering the need to protect marine organisms. The report informs an optional expedited permitting process under state law that would avoid diversions from, and discharges into, bays and estuaries.

> **Recommendation:** TPWD encourages the use of this report to help guide seawater desalination project development and planning within Region N. TPWD appreciates the incorporation of this report within the IPP.

With respect to brackish groundwater desalination, no such report identifies appropriate zones for discharge. The IPP recognizes salinity concentrations should be carefully monitored in the receiving waters and farther downstream to minimize impacts on aquatic species and their habitats.

> **Recommendation:** TPWD recommends an assessment of the receiving waters to identify appropriate zones for discharge and the environmental effect further downstream.

The effect of groundwater pumping on the baseflow in downstream reaches is identified in the IPP. Minor land surface subsidence could potentially occur as a result of lowering of groundwater levels. As a result, drainage patterns and other habitats might change to a small extent.

> **Recommendation:** TPWD recommends careful analysis of the potential for land subsidence and hydrologic alteration associated with groundwater withdrawals. Project sponsors should incorporate site-specific hydrogeologic studies and habitat mapping into planning processes.

While the current plan provides only a cursory level of detail regarding potential impacts to natural resources, TPWD looks forward to continued collaboration and the opportunity to provide additional information and recommendations to help minimize impacts as individual WMS projects are further developed and implemented.

**Recommendation:** TPWD recommends evaluating potential impacts of WMS implementation, particularly reuse, ASR, and desalination on fish and wildlife resources and their habitats.

TPWD is concerned with the transmission of invasive species such as zebra mussels and quagga mussels. As of March 2025, 34 lakes in Texas have been classified as fully infested with zebra mussels, meaning that reproducing populations exist in those waters. The potential transport of zebra mussels and other invasive species via pipelines falls under sections 66.007(n) and 66.0072(g) of PWC.

> **Recommendation:** To prevent the transmission of invasive species, TPWD recommends effective mitigative measures should be considered and implemented for preventing the transfer of zebra mussels.

In addition to aquatic fauna, *Arundo donax*, an invasive riparian plant, poses a growing threat to water supply reliability and ecosystem health in the Coastal Bend. This aggressive, fast-growing species displaces native vegetation, alters stream hydrology, and consumes large volumes of water, reducing availability for native species and human uses. It can also increase flood risk and wildfire susceptibility. *Arundo* infestations undermine conservation goals and habitat restoration efforts.

> **Recommendation:** TPWD encourages the CBRWPG to consider *Arundo* control and prevention in areas where water management strategies intersect with riparian corridors, and to coordinate with local invasive species partnerships and watershed groups where applicable.

The 2026 Region N IPP identifies water conservation as a key WMS and incorporates it into the recommended strategy portfolios for all municipal water user groups with projected shortages. Municipal conservation is discussed in Section 5B.1, which outlines specific practices such as leak detection and repair, fixture retrofits, landscape irrigation efficiency, and public education. In addition, industrial, mining, and agricultural conservation strategies are addressed in Sections 5B.2 and 5B.3, with an emphasis on water-use efficiency and process optimization. The plan promotes achieving the statewide conservation goal of 140 gallons per capita per day (gpcd) through phased reductions in per capita use for entities exceeding that threshold.

**Recommendation:** TPWD supports the continued emphasis on conservation, as it is the most cost-effective strategy for meeting long-term water needs with minimal ecological impact.

TPWD commends the CBRWPG with the considerable effort invested in the preparation and development of the 2026 IPP. TPWD recognizes the complexity of balancing growing water demands with long-term sustainability and appreciate the thoughtful integration of technical analyses, stakeholder engagement, and strategy evaluation throughout the document.

Thank you for your consideration of these comments. TPWD looks forward to continuing to work with the planning group to develop water supply strategies that not only meet the future water supply needs of the region but also preserve the ecological health of the region's aquatic resources. If you have any questions or comments, please contact me by email at Marty.Kelly@TPWD.Texas.gov or by phone at (512) 389-8214.

Sincerely,

Marty Kelly

Marty Kelly
Water Resources

CC: Alex Nunez, Coastal Fisheries Division

***Response – Texas Parks and Wildlife comments***

*TPWD Recommendation: The Initially Prepared Plan should include a detailed methodology for evaluation criteria development in Section 5B.*

*Response: The impacts to environmental factors key and agricultural resources key methodology was developed during the 2021 Plan cycle during regular public meetings. This criteria and method will be reviewed in future planning cycles.*

*TPWD Recommendation: The CBRWPG should incorporate procedures in future Initially Prepared Plans to address cumulative effects to the environment with multiple WMS.*

*Response: We hear your concern related to impacts that multiple WMS could cause if implemented concurrently or over time and potential habitat fragmentation, changes in salinity gradients or shifts in ecosystem function that could arise. The majority of recommended WMS in the Coastal Bend Region focus on desalination, groundwater, and infrastructure improvements. Currently, there are no publicly available models that include site and project specific details to evaluate the cumulative impacts for these projects. TCEQ and other regulatory agencies require modeling as part of desalination permit application process. Expanding these models to include other local or regional projects in the vicinity, could have value in evaluating cumulative impacts of multiple projects.*

*TPWD Recommendation: Consider adding how WMS implementation may affect flow regimes.*

*Response: All water management strategy evaluations include a discussion of instream flow impacts. For example, the Oso WWTP Reuse considers Agreed Order provisions, Local Balancing Reservoir considers instream flow impacts associated with Nueces River diversions, and Nueces River Diversion to Choke Canyon Reservoir includes a flow regime analysis based on estimated diversion rate and frequency of flow diversion.*

*Water management strategy sponsors are encouraged to conduct flow modeling and instream flow compliance assessments in future phases of project development.*

*TPWD Recommendation: TPWD recommends that the CBRWPG coordinate with TCEQ and other appropriate agencies to reestablish the Nueces Estuary Council (NEAC). The NEAC previously served as a valuable forum for integrating science-based recommendations into freshwater inflow management for the Nueces Estuary.*

*Response: There have been conversations during CBRWPG meetings this planning cycle that discussed reestablishing NEAC. There are multiple stakeholders that participated in the process, which would need to initiate the process.*

*TPWD Recommendation: TPWD requests the CBRWPG to clarify whether river or stream segments were adopted as having unique ecological significance.*

*Response: The CBRWPG did not designate any river or stream segments in the Coastal Bend Region as having ecologically significant value.*

*TPWD Recommendation: The TPWD Rare, Threatened, and Endangered Species of Texas (RTEST) database, which was most recently updated on January 15, 2025, should be used to ensure the accuracy and completeness of the list.*

*Response: HDR used the RTEST database when evaluating potential environmental issues associated with each water management strategy.*

*TPWD encourages the CBRWPG to consider expanding WMS evaluations of environmental impacts to include commercial and recreationally important species and habitats.*

*Response: The water management strategy evaluations are considered planning-level, however additional discussion is included in Environmental Issues that states the importance of additional studies on environmental impacts as the project progresses towards implementation which could include specific-studies on impacts to commercial and recreationally important species and habitat. TWDB guidance in future planning cycles would be helpful in standardizing an approach and identifying readily available resources.*

*TPWD encourages the use of the HB 2031 GLO report that identifies zones in the Gulf appropriate for the diversion of seawater and discharge of brine concentrate.*

*Response: This report was considered and included in the Seawater Desalination- Barney Davis water management strategy. For the other seawater desalination projects, the project sponsors provided site details.*

*TPWD recommends an assessment of the receiving waters to identify appropriate zones for discharge and the environmental effects further downstream.*

*Response: The implementation issues section states additional studies being needed to evaluate impacts of discharge which may be required during permitting.*

*TPWD recommends careful analysis of the potential for land subsidence and hydrologic alteration associated with groundwater withdrawals. Project sponsors should incorporate site-specific hydrogeologic studies and habitat mapping into planning processes.*

*Response: Subsidence is discussed in the Environmental and Implementation Issues sections related to groundwater strategies.*

*TPWD recommends evaluating potential impacts of WMS implementation, particularly reuse, ASR, and desalination on fish and wildlife resources and their habitats.*

*Response: Agreed. This information can be found in the Implementation Issues discussion for reuse, ASR and desalination strategies.*

*TPWD recommends effective mitigative measures should be considered and implemented to prevent the transfer of zebra mussels, an invasive species.*

*Response: Mitigation measures for preventing the spread of zebra mussels in pipelines is chemical treatment with oxidizing biocides (i.e. chlorination). As part of ongoing operations*

*of maintenance of constructed projects, many water utilities have programs to prevent the spread and proliferation of zebra mussels. The Coastal Bend Regional Water Plan is a planning-level document and it is assumed that sponsors will develop maintenance programs that best relate to their constructed projects.*

*TPWD encourages the CBRWPG to consider Arundo control and prevention in areas where water management strategies intersect with riparian corridors, and to coordinate with local invasive species partnerships and watershed groups where applicable.*

*Response: The CBRWPG invites TPWD to present at a future Region N meeting on the impacts of Arundo on water supply quality and quantity for consideration in the water management strategy evaluations in future planning cycles.*

*TPWD supports the continued emphasis on conversation, as it is the most cost-effective strategy for meeting long-term water needs with minimal ecological impact.*

*Response: Noted. Thank you.*

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*Public Comments Received on the Region N Initially Prepared Plan*

Jason Hale- email to CBRWPG related to manufacturing water demand, sent 7/15/25

Section 2.3.2- Manufacturing Water Demand: This section mentions how refineries use much less water than the national average. It references a study from 1990. My comment is that the study is over 30 years old and if the plan is going to assert that refineries are still using less water than the national average, it should be verified with a more up to date document, with recent data, that can be inspected by the public to verify those claims. Also if such a document exists, I am unaware of it and would appreciate it if someone emailed the document to me. If that information does not exist then I recommend the plan to be updated to reflect that these conservation measures happened in the past but are not reflective of current water efficiencies in refining.

**Proposed Response:** HDR reached out to TWDB to inquire about a more recent manufacturing water conservation report but none are available. The TWDB is discussing the development of a manufacturing water conservation toolkit for future planning cycles to more effectively communicate water savings practices. During 2026 Region N plan development, local industries participated in a workgroup call on September 18, 2024 and provided input on successful best management practices (BMPs) for industries that have reduced water use (Table 5B.2.3). Additionally, a survey was sent out in December 2024 to gather information on water use, voluntary BMPs, and challenges/impediments in implementing water conservation strategies. Responses were received for Construction, Chemical Manufacturing, Crude Terminal and Refining industries citing elimination of non-essential water use as the primary BMP implemented during drought which has resulted in approximately 10% water savings.

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