REGION C WATER PLANNING GROUP

TO: REGION C WATER PLANNING GROUP

FROM: J. KEVIN WARD, CHAIR

SUBJECT: JANUARY 6, 2025 PUBLIC MEETING

DATE: DECEMBER 30, 2024

This memorandum will serve as a notice that the Region C Water Planning Group (RCWPG) is holding a public meeting at **1:00 P.M. on Monday January 6, 2025,** at the **North Central Texas Council of Governments, 616 Six Flags Drive, Centerpoint Two Building, First Floor Transportation Council Room, Arlington, Texas, 76011**. An agenda (including information on how to participate in the public meeting) has been prepared for the meeting and is attached to this memorandum. The following is a brief overview of the agenda items to be discussed with relevant materials and handouts. Meeting materials, including draft chapters of the Initially Prepared Plan, are available on the Region C website at https:\RegionCwater.org.

OPEN MEETING

I. ROLL CALL

II. APPROVAL OF MINUTES – September 30, 2024

Agenda Item II: RCWPG Minutes from September 30, 2024

III. PUBLIC COMMENTS (Limited to 2 minutes per speaker)

IV. PRIMARY ACTION ITEMS FOR CONSIDERATION

A. Amend the *Region C Bylaws Article IV.1* (Officers) to remove the requirement that two voting members representing the same interest group cannot serve as officers at the same time. *Amended the Region C Bylaws Article VII.2* (Voting Membership) allows a person retired from a represented interest to serve as a voting member for said interest.

The RCWPG will consider approval of revised Region C Bylaws. Region C Bylaws Article IV.1: Remove the sentence "No two voting members representing the same interest group shall serve as officers at the same time." Region C Bylaws Article VII.2: Update to "A person retired from a represented interest can serve as a voting member for said interest." The

RCWPG will take additional action as necessary contingent upon the approval of the revised Bylaws.

Agenda Item IV.A: Amended RCWPG Bylaws Sections

B. Announcement of Region C RWPG voting member vacancies: Kevin Ward representing River Authorities; Call for nominations to fill vacancy and vote to fill vacancy.

This action item will consider recommendations for replacement of RCWPG members who have resigned. Kevin Ward resigned from the RCWPG effective January 7, 2025. Kevin nominated Glenn Clingenpeel to fill the River Authorities interest vacancy.

Agenda Item IV.B: Recommendation for Glenn Clingenpeel as the replacement for Kevin Ward

C. Announcement of Region C RWPG Chair vacancy; Call for nominations for a nominating committee to fill vacancy and vote to appoint a nominating committee.

This action item will consider nominations for a nominating committee to make recommendations for the Region C RWPG Chair replacement at the next schedule RCWPG meeting. The current chair, Kevin Ward, resigned from the RCWPG effective January 7, 2025.

V. OTHER ITEMS (MAY RESULT IN ACTIONS)

A. Draft Chapter 4 Overview (Identification of Water Needed).

Agenda Item V.A: Draft IPP Chapter 4

B. Draft Chapter 5A Overview (Methodology for Evaluation and Selection of WMS).

Agenda Item V.B: Draft IPP Chapter 5A

C. Update on Recommended WMS for Major Water Providers.

D. Update on Conservation.

E. Draft Chapter 7 Overview (Drought Response).

Agenda Item V.E: Draft IPP Chapter 7

F. Draft Chapter 8 Overview (Unique Stream Segments, Unique Reservoir Sites, and Legislative Recommendations).

Agenda Item V.F: Draft IPP Chapter 8

G. Schedule Overview.

VI. OTHER DISCUSSION

A. Updates from the Chair.
B. Report from Regional Liaisons.
C. Report from the Interregional Planning Council.
D. Report from Texas Water Development Board.
E. Report from Texas Department of Agriculture.
F. Report from Texas Parks and Wildlife Department.
G. Report from Texas State Soil & Water Conservation Board.
H. Other Reports.

VII. ADJOURNMENT

The following items are enclosed with this memorandum:

I. RCWPG Agenda – January 6, 2025
II. Meeting Handouts
   A. Agenda Item II – RCWPG Minutes from September 30, 2024
   B. Agenda Item IV.A – Amended RCWPG Bylaws Sections
   C. Agenda Item IV.B – Recommendation for Glenn Clingenpeel as the replacement for Kevin Ward
   D. Agenda Item V.A – Draft IPP Chapter 4 (available online only)
   E. Agenda Item V.B – Draft IPP Chapter 5A (available online only)
   F. Agenda Item V.E – Draft IPP Chapter 7 (available online only)
   G. Agenda Item V.F – Draft IPP Chapter 8 (available online only)

Agenda Item II – Attachment

RCWPG Minutes from September 30, 2024

REGION C WATER PLANNING GROUP

MINUTES OF AN OPEN PUBLIC MEETING

September 30, 2024

The Region C Water Planning Group (RCWPG) met in an open public meeting on Monday, September 30, 2024, at 2:00 P.M. The meeting was held at the North Central Texas Council of Governments located at 616 Six Flags Drive, Centerpoint Two Building, First Floor Transportation Council Room, Arlington, Texas. Notice of the meeting was legally posted.

Chairman Kevin Ward called the Region C Regional Water Planning Group meeting to order at approximately 2:05 P.M. and welcomed guests.

I. ROLL CALL

Chairman Ward conducted a roll call. The following members were in attendance:

David Bailey	John Lingenfelder
Jay Barksdale	Steve Mundt
Chris Boyd	Denis Qualls
Dan Buhman	Haley Salazar (Alt. for Stephen Gay)
Jenna Covington	Rick Shaffer
Grace Darling	Doug Shaw
Christopher Harder	Paul Sigle
Harold Latham	Connie Standridge
Russell Laughlin	Kevin Ward

Kevin Smith, TWDB, Kathy Jones, Region G, and Adam Whisenant, TPW, were present. The registration lists signed by guests in attendance are attached.

II. APPROVAL OF MINUTES – April 29, 2024

The minutes of the April 29, 2024, RCWPG meeting were approved by unanimous consensus by the RCWPG.

III. PUBLIC COMMENTS (Limited to 2 minutes per speaker)

Three speakers made public comments.

IV. PRIMARY ACTION ITEMS FOR CONSIDERATION

A. Announcement of Region C RWPG voting member vacancies: G. K. Maenius representing Counties; Call for nominations to fill vacancy and vote to fill vacancy.

Chairman Ward presented this item to consider recommendations for replacement of RCWPG members who have resigned. G. K. Maenius resigned from the Region C Water Planning Group effective August 13, 2024. Steve Starnes expressed interest to fill this Counties vacancy. Chairman Ward asked if there were any other nominations from the floor for this vacancy. Hearing none, Chairman Ward asked for a vote on the nomination.

There were no public comments on this action item.

Upon a motion by Chairman Ward, and a second by Dan Buhman, the Region C WPG voted unanimously to appoint Steve Starnes to fill the Counties interest vacancy left by the resignation of G. K. Maenius.

V. OTHER ITEMS (MAY RESULT IN ACTIONS)

A. Draft Chapter 1 Overview (Description of Region C)

Simone Kiel, FNI, gave this presentation on Chapter 1 which gives an overall summary of the economic drivers, water users, water resources, and threats to these resources in Region C. Ms. Kiel highlighted the following contents:

- Regional water planning area overview
  - Population
  - Economics
- Sources of Water
- Current water uses and demand centers
- Major/regional water providers
- Pre-existing plans for water supply development
- Drought and water loss/water audit
- Other water-related programs
- Agricultural and natural resources
- Threats and constraints to water supply
- Water-related threats to agricultural and natural resources

Planning Area Overview

16 Counties
2021 Population: 7.2 Million
26% of State's Population
30% of State's Economy
10% of State's Water Use
57 Cities over 20,000 population
89% of Demand Met by Surface Water

Major and Minor Aquifers

The most heavily used aquifer in Region C is the Trinity aquifer, which supplies most of the groundwater used in the region. The Carrizo-Wilcox aquifer also outcrops in Region C in Navarro, Freestone, and Henderson Counties. Minor aquifers in Region C include the Woodbine aquifer, the Nacatoch aquifer, the Cross Timbers aquifer, and a small part of the Queen City aquifer.

Surface Water

5 River Basins (mainly Trinity)
>20 Major Reservoirs

2021 Region C Water Use

Total use of 1.39 million AF/Y
Municipal use of 1.23 million AF/Y
All other use of <0.12 million AF/Y

Major Water Providers

- City of Fort Worth
- Dallas Water Utilities
- North Texas Municipal Water District
- Tarrant Regional Water District
- Trinity River Authority
- Upper Trinity Regional Water District

Regional Water Providers

- City of Corsicana
- Greater Texoma Utility Authority

B. Draft Chapter 2 Overview (Population and Water Demand Projections)

Simone Kiel, FNI, gave this presentation on Chapter Two which summarizes the population and water demand projections for Region C as approved by the Texas Water Development Board (TWDB). This chapter also includes a discussion on historical growth trends in Region C and the basis of projections.

Population Projections

Region C is the most populous of the sixteen regional planning areas, making up approximately a quarter of the State's population. The sixteen counties that comprise Region C have been among the fastest growing areas in Texas and the nation since the 1950s. The population of the region more than tripled from 1960 to 2020. The region's highest population density is centered in and around Dallas and Tarrant Counties.

Population and water demand projections have been developed for all water user groups (WUGs). For this update of the Region C Plan, ten new water user groups (WUGs) have been added, and one WUG was combined with another WUG. Four WUGs were also renamed. Ms. Kiel added that the population projections presented in this section are based on draft population projections provided by the TWDB on January 23, 2023. Revisions to the projections were made based on input from water user groups and wholesale water providers in Region C.

Each municipal WUG in Region C was emailed a survey regarding their population projections. In the survey, each WUG was provided TWDB's draft population projection for the 2026 Region C Water Plan along with any revisions the consultants were suggesting based on gathered data. If the WUG was not in agreement with the projections, they were asked to provide alternative projections. Twenty-nine WUGs responded with suggestions for revisions to the population projections, and those revisions were incorporated if feasible.

As required by TWDB regulations, these projections were posted for public review on the Region C website in advance of the Region C WPG meeting where they were considered for approval. The population projections were approved by the Planning Group at the November 6, 2023, Public Meeting and were subsequently adopted by the TWDB. No public comments were received on these population revisions.

Water Demand Projections

Water demand projections are divided into two main water use categories: municipal and non-municipal. Non-municipal water use is further divided into five water use categories: irrigation, livestock, manufacturing, mining, and steam electric power for the purposes of regional planning. Additionally, non-municipal demands are sometimes referred to as agricultural (irrigation and livestock) and industrial (manufacturing, mining, and steam electric).

Region C was given the opportunity to request adjustments to the water demand projections if needed. Region C requested several revisions, and those revisions are detailed in separate memoranda for each use category. As required by TWDB, these projections were posted for public review on the Region C website in advance of the Region C WPG meeting at which they were considered for approval. The demand projections were approved at the November 6, 2023, Public Meeting and subsequently adopted by TWDB. No public comments were received on these projection revisions. Ms. Kiel added that Fort Worth and North Texas Municipal Water District saw the highest increase in water demands since the 2021 Water Plan.

C. Draft Chapter 3 Overview (Analysis of Water Supply)

Christina Gildea, FNI, made this presentation on Chapter 3 which gives an overall summary of the water supplies available to Region C. Ms. Gildea outlined the following highlights of Chapter 3:

- Overall water supply availability
  - Surface Water
  - Groundwater
- Currently available water supplies
- Water availability by Major Water Providers

Overall Water Supply Availability

The supplies available by source are based on the supply available during drought of record conditions. For surface water reservoirs, available supply is generally the equivalent of firm yield supply or permitted amount (whichever is lower). However, several providers in Region C have chosen to use alternative yields such as safe yields and yields that consider droughts worse than the drought of record as the available supply.

Available groundwater supplies are defined by county and aquifer. Generally, groundwater supply is the supply available with acceptable long-term impacts as defined by the Desired Future Conditions adopted by the Groundwater Management Areas (GMAs).

Currently available water supplies are those water supplies that have been permitted or contracted and that have infrastructure in place to transport and treat the water. This is the supply that is distributed to water users and used to assess water needs.

Ms. Gildea stated that the majority of Region C water availability comes from reservoirs. The 2030 total overall supply availability is 2.42 million AF/Y and the breakdown is as follows:

- Reservoirs: 58%
- Reuse: 18%
- Imports: 16%
- Groundwater: 7%
- ROR/Local supplies: <1%

Region C water suppliers are currently using approximately 72 percent of the reliable supply available from existing sources. The projected overall water supplies available to Region C in 2080 from current sources is over 2.39 million AF/Y (not considering supply limitations due to the capacities of current raw water transmission facilities and wells).

D. Update on Major Water Provider Strategies/WUGs Strategy Survey

Christina Gildea, FNI, gave this update on Major Water Providers (MWP) and Water User Groups (WUG) Strategy survey. This strategy survey was sent out in June to municipal WUGs (except county-others). The survey included the following:

- Existing supplies
- Water management strategies
- Request for input on existing contracts, infrastructure capacity, and emergency interconnections
- Feedback received from 48 of 256 (19% response rate)
- Consultants followed up via emails and phone calls

WUGs Strategy Survey – Wholesale Water Providers (WWP)

- Consultants emailed larger WWPs a specific summary workbook and offered to set up a teleconference to discuss
- Summary workbook included –
    - Population and water demands
    - Existing supplies
    - Needs before strategies
    - 2021 plan strategies

    - Request for input on existing contracts, infrastructure capacity, and emergency interconnections
- Received feedback from 5 and met with 2 WWPs
- Consultants continuing to coordinate with all WUGs

Major Water Providers

- Consultants meet with all the MWP/RWP
- Reviewed and received input on –
    - Population and water demands
    - Existing supplies
    - Needs before strategies
    - 2021 plan strategies
    - New strategies
    - Customers, etc.
- Held joint strategies meeting

Marvin Nichols Reservoir

- Recommended strategy for TRWD, NTMWD and UTRWD
- TWDB Feasibility Study published September 16, 2024 with comments due by October 25, 2024
- Does Region C WPG want to submit comments?
- Types of comments
    - Acknowledge TWDBs assessment the project is feasible
    - Clarify statements regarding the economic impacts (Note from FNI: Region C not required to do Socioeconomic Impact Study on all feasible projects)

Simone Kiel, FNI, led this discussion on the proposed Marvin Nichols Reservoir. Ms. Kiel asked the Planning Group if Region C wants to submit comments to the TWDB on Marvin Nichols. Chairman Ward suggested that the Planning Group submit a response. Gracie Darling asked if other options have been considered. Chairman Ward replied that they had, but they are not cost-effective. Dan Buhman added that new projects require permits, and there are other factors. Mr. Buhman added further that the balance between the environmental impact and cost is being considered, and other strategies are being explored.

Upon a motion by Steve Mundt, and a second by Denis Qualls, the Region C WPG voted unanimously to submit comments on the proposed Marvin Nichols Reservoir to the TWDB.

E. Update on Conservation Strategies

Qiwen Zhang and Ellen McDonald, Plummer, gave this update on the Scope of Work for Task 5C. The Conservation Recommendations are as follows:

- Evaluate WUGs' water conservation plans (WCPs) and Model WCPs to inform Water Management Strategies (WMSs)

- New plans for this cycle: 57 out of 142 required received, 13 non-required received
- Set drought-based GPCD goals for each municipal WUG
- Explain non-recommendation of conservation WMSs, if applicable

Drought-Based GPCD Goal Approach

- Review municipal WUGs' demand patterns and define GPCD threshold
- Identify WUGs for whom conservation WMSs will be recommended
- Develop conservation packages
- Quantify conservation savings and set GPCD goals

1. **GPCD Threshold for Conservation Recommendation**
   - Previous threshold from the 2021 Plan: 140 GPCD (20 yrs Old)
   - Baseline GPCD by Population Group
2. **Relative Distribution of the Baseline GPCDs**
   - Conservation recommendation threshold – 25th percentile of the baseline demand of all WUGs = 108 GPCD
3. **Municipal Conservation Packages for 2026 RWP**
   1) Plumbing Code Related Strategies for all WUGs
      - Low flow plumbing fixture rules
      - Efficient new residential clothes washer standards
      - Efficient new residential dishwasher standards
   2) Best Management Practices for all WUGs
      - Enhanced public and school education
      - Price elasticity/rate structure impacts
      - Enhanced water loss control program
   3) Conservation Package for a Subset of WUGs
      - Water conservation coordinator
      - Time-of-day irrigation restriction
      - Twice weekly irrigation restriction

      Conservation Package 3 Recommendation for Municipal WUGs that meet the following criteria:
      - Per Capita demand surpasses threshold (108 GPCD)
      - Measure is not already implemented
      - Measure is applicable to the WUG
      - A sponsor is available for implementation
      - Package 3 is accessible to all WUGs, with flexibility to select appropriate strategies

   4) Drought-based GPCD Goal Estimate
      - Region C Water Conservation Planning Tool (Quantifies GPCD goals of WUG)
        - Evaluated water savings/costs for the past four plans
        - Provides easy data updates for regional planning
        - Incorporates prior recommendations

- When reasonable, utilizes water savings and cost assumptions from:
  - TWDB Municipal Water Conservation Planning Tool
  - Alliance for Water Efficiency Tool

There were several questions and comments regarding this water conservation item. Dan Buhman commented that quantification needs to be included in the Water Plan. Gracie Darling asked what the recommendations are to enforce WMS conservation strategies. Simone Kiel responded that it is up to the WUG to implement water conservation strategies. Ms. Kiel added that Region C is well known for water conservation and is making progress. Jenna Covington added that the NTMWD has seen significant progress in Region C recommendations. Ms. Covington added that every WUG is required to submit a conservation plan every 5 years in order to keep receiving TWDB funding. Russell Laughlin commented that education is key but not much has changed since the 2021 water plan. Mr. Laughlin asked if Region C will ever get below 10% water loss. Jenna Covington replied that is why it is important to invest in pipelines.

Rick Shaffer asked why 108 is the 25th percentile. Simone Kiel asked if another number is preferred. Ms. Kiel commented that 140 was the previous percentile but is no longer relevant. Ms. Kiel added that 108 is not a threshold, it is a trigger. Jenna Covington recommended Region C use TWDB criteria. Steve Mundt asked if Region C knows how much water is lost with old infrastructure. Ms. Kiel replied that cities are required to submit an annual water loss audit to TWDB.

Upon a motion by Denis Qualls, and a second by Chris Harder, the Region C Water Planning Group voted unanimously to form a Water Conservation Subcommittee to consider revisions to the Water Conservation Strategy best management practices for inclusion in the 2026 Water Plan. Region C board members appointed to this Subcommittee are: Dan Buhman, Grace Darling, Chris Harder, John Lingenfelder, Denis Qualls, and Rick Shaffer.

There were no public comments on this item.

F. Update on Drought Management (Chapter 7)

Qiwen Zhang and Ellen McDonald, Plummer, gave this presentation on Chapter 7 Drought Management. The following items were discussed:

- Drought(s) of Record
- Uncertainty and Drought(s) Worse than Drought of Record [NEW]
- Current Drought Preparations and Response

Drought(s) of Record

- Previous Cycle:
  - 1950s Drought: Recognized as the Drought of Record (DOR) for the State
  - Region C Evaluation included:

- Reservoir storage (TCEQ Water Availability Model)
- Palmer Hydrological Severity Index (PHSI)

- Evaluation suggested that the 1950s drought is also the DOR for most Region C area.

- Approach for this cycle:
  - Follow similar evaluation as the previous cycle

Uncertainty and Drought(s) Worse than Drought of Record

- Newly required section in this cycle
- Section should address the following components:
  - Planning for Uncertainty
    - Water availabilities and management strategies are based on sustainable supplies as defined through the Joint Planning and Regional Water Planning Processes
  - Existing Measures for Preparation of the DWDOR
    - 3 MWPs conducted safe yield analyses or climate modeling
    - Drought management measures outlined in Drought Contingency Plans (DCPs)
    - Management supply factor >1.1
  - Potential Additional Measures for DWDOR Resilience
    - Multiple water sources for redundancy
    - Emergency interconnects and/or interim emergency purchases
    - Drought Planning Survey Results

Response to the 2010s Drought for Region C WUGs

- Achieved an 18% reduction from 2011 to 2013 on average
- Stabilizing GPCD trend indicates the challenge of achieving a similar magnitude of reduction
- Baseline demand reflective of dry-year demand provides a buffer for supply planning

G. Update on Legislative Recommendations (Chapter 8)

Qiwen Zhang and Ellen McDonald, Plummer, gave this update on Legislative recommendations.

- Survey sent 9/3/24 to gather input from RWPG
- 2 Responses received so far:
  - North Texas Municipal Water District
  - Tarrant Regional Water District
  - Proposals for the 2026 Water Plan – To be determined

H. Schedule Overview

Christina Gildea, FNI, gave a working timeline of the 2026 RWP Cycle as follows:

- **January 6, 2025** - RCWPG Meeting
- **January 27, 2025** - Draft IPP posted to Region C Website
- **February 10, 2025** - RCWPG Meeting

- **March 3, 2025** - Initially Prepared Plan Due
- **October 20, 2025** - Final Water Plan Due

Next Steps

- Water Management Strategies
- Evaluate Strategies
- Finalize MWP/RWP plans and strategies by December 2024

VI. OTHER DISCUSSION

A. Updates from the Chair – None
B. Report from Regional Liaisons
   - Region B – None
   - Region G – None
   - Region H – None
   - Region I – None
C. Interregional Planning Council – None
D. Reports from Texas Water Development Board included:

   - Scott Galaway, TWDB, gave a presentation on the Financial Assistance Programs available

   - Temple McKinnon, TWDB, gave a presentation on the Marvin Nichols Feasibility Review. Ms. McKinnon advised that pursuant to HB1, 88th Regular Session, the TWDB has conducted a project feasibility review of the proposed Marvin Nichols Reservoir project to be located on the Sulphur River and upstream of the confluence of the White Oak Creek in Franklin, Titus, and Red River Counties. A report regarding the findings of this review shall be prepared and submitted by TWDB to the Legislative Budget Board and Governor no later than January 5, 2025. A draft report is now available for a 40-day public review and comment period.

   - Kevin Smith, TWDB, discussed the following topics:
     - 2026 Regional Water Plan Water Supply Needs/Surplus Map
     - Flood Mitigation Projects with Water Supply Benefit List
     - Texas Water Fund Implementation Plan

E. Report from Texas Department of Agriculture – None
F. Report from Texas Parks and Wildlife Department - None
G. Other Reports – None
H. Confirm Date and Location of Next Meeting – January 6, 2025; NCTCOG, 616 Six Flags Drive, Centerpoint Two Building, First Floor Transportation Council Room, Arlington, Texas 76011
I. Public Comments – None

VII. ADJOURNMENT

There being no further business, the meeting of the Region C WPG adjourned at approximately 4:00 PM.

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KEVIN WARD, Chairman

REGION C WATER PLANNING GROUP

OPEN MEETING
September 30, 2024

ATTENDANCE REGISTRATION SHEET

NAME	REPRESENTING	E-MAIL ADDRESS
Howdy Lizenbee	Region D Water Planning Grap	howdy.lizenbee@commercetx.org
Jay Barksdale	Region C Public	jbarksdale@sunwestpr.com
Nicole Rutigliano	TRWD	nicole.rutigliano@trwd.com
Eddie Belcher	Land Owner Red River Co.	ewbenthand@yahoo.com
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Qiwen Zhang	Plummer	Qiwenzhang@Plummer.com
Jon Albrights	FNI	jsa@freese.com
COURTNEY CORSO	FNI	COURTNEY.CORSO@freese.com
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[illegible]	Region D	
Amy Stelter	TRA	Stelter@trinitytra.org

REGION C WATER PLANNING GROUP

OPEN MEETING
September 30, 2024

ATTENDANCE REGISTRATION SHEET

NAME	REPRESENTING	E-MAIL ADDRESS
FRED E. MILTON	Region D Board	fmilton@gmail.com
Kyle Dooley	Riverbend Water Resources	kyledooley@rwrd.org
Eli Hunt	Riverbend Water Resources District	elihunt@rwrd.org
Stanley Jessee	Rivercrest ISD - Landowner	stanjessee@gmail.com
John Jessee	Landowner	River.81.crest@outlook.com
Jim Thompson	Region D	jimthompson@wagetimber.com
Nathan Toon	Landowner	n.toon@txstate.edu
TRAVIS RANSOM	CASS County Judge	TRANSOM@CASSCOUNTYTX.org
Kevin Smith	TWDB	Kevin.Smith@twdb.texas.gov
SCOTT RUTHERFORD	LAND OWNER	SCOTTGRUTHERFORD@GMAIL.COM
Connie K Brooks	Land Owner	cKBrooks48@yahoo.com
John A. Mayes	Land Owner	amayes7360@yahoo.com

REGION C WATER PLANNING GROUP

OPEN MEETING
September 30, 2024

ATTENDANCE REGISTRATION SHEET

NAME	REPRESENTING	E-MAIL ADDRESS
Kathy Turner Jones	Prairielandsgcd	KJones@prairielandsgcd.org
Molly Rooke	landowner citizen (myself)	mollyrooke@me.com
Rick Shaffer	RCWPG	
Pamela Fenner	East Tx Timber	ginger9636@AOL.com

REGION C WATER PLANNING GROUP

OPEN MEETING
September 30, 2024

ATTENDANCE REGISTRATION SHEET

NAME	REPRESENTING	E-MAIL ADDRESS
Colin Henry	DMC Henry LLC	txrp155230@yahoo.com
Lon Burnam	~~Lobbyist~~ & Self	lonburnam@gmail.com
Marc Gustafson	Fox 4 News	kdfwd@fox.com
Scott Hudson	citizen	jrshudson@sbcglobal.net
SATISH MANTHA	GEI	SMANTHA@GEICONSULTANTS.COM

REGION C WATER PLANNING GROUP
PRESENTATION ON MARVIN NICHOLS RESERVOIR PROJECT

OPEN MEETING
September 30, 2024

ATTENDANCE REGISTRATION SHEET

NAME	REPRESENTING	E-MAIL ADDRESS
Stanley Jessee	Rivercrest ISD / Landowner	Stanjessee@gmail.com
FRED E. MILTON	Region D Board	fmilog@gmail.com
KYLE DOOLEY	RIVERBEND WATER RESOURCES	kyledooley@rwrd.org
Eli Hunt	Riverbend Water Resources District	elihunt@rwrd.org
Kirby Hollingsworth	SRBA	kirbyh@peoplescom.net
David Weidman	SRBA	dsrba@srbatx.org
Christi McIntosh	SRBA	srba@srbatx.org
JANICE BEZANSON	Tx Conservation Alliance	janice@tcatexas.org
TRAVIS RANSOM	CASS COUNTY (Judge)	TRANSOM@CASSCOUNTYTX.GOV
Nathan Toon	Landowner	n.toon@txstate.edu
Jim Mangum	Region D	jimmangum@wardtimber.com
JOHN STEVENSON	REGION C	JSTEVENSON@THEPROJECTSGROUP.COM

REGION C WATER PLANNING GROUP
PRESENTATION ON MARVIN NICHOLS RESERVOIR PROJECT

OPEN MEETING
September 30, 2024

ATTENDANCE REGISTRATION SHEET

NAME	REPRESENTING	E-MAIL ADDRESS
Mason Corley	TPWD	mason.corley@tpwd.texas.gov
Robert Edwards	Red River County Resident	[illegible]
Scott Rutherford	Land Owner	SCOTTGRUTHERFORD@GMAIL.COM
Bobby Favors	Land Owner	amigodpd@verizon.net
Jennifer	Prosper Northeast Texas	
Andrew Figueroa	City of Celina	afigueroa@celina-tx.gov
Rachel Ickert	TPWD	
Chris Harder	City of Fort Worth	christopher.harder@fortworthtexas.gov
~~Rocky Fitzcoat~~	Land Owner	
Corey Jones	NTGCD	CoreyJones@ntgcd.com
Jason Stovall	SRA	jstovall@srataf.org
Kristal Williams	FNI	kristal-williams@freese.com

REGION C WATER PLANNING GROUP
PRESENTATION ON MARVIN NICHOLS RESERVOIR PROJECT

OPEN MEETING
September 30, 2024

ATTENDANCE REGISTRATION SHEET

NAME	REPRESENTING	E-MAIL ADDRESS
Janet McCoy	Region D Board	mamc50@aol.com
Temple McKinnon	TWDB	temple.mckinnon@twdb.texas.gov
RJ Muraski	NTMWD	rmuraski@NTMWD.com
Denise Allison	C21 - Harvey Properties	denise.allison@c21harvey.com
Ronna Hartt	VTRWD	rhartt@vtrwd.com
Dewayne Martin	Cuthand	DMartin@ymail.com
Randy Mayes	Cuthand	Randy.Mayes@LehighDefense.com
Evan Parras	Cuthand - Woodland HS	evanp4570@gmail.com
Howdy Lisenbee	Region D Water Planning Group	howdy.lisenbee@commercetx.org
Robert Holt	Cuthand Maple Community	
Nina Holt	Cuthand-Maple Community	
Howard Crenshaw	howard.crenshaw@tpwd.texas.gov	TPWD

REGION C WATER PLANNING GROUP
PRESENTATION ON MARVIN NICHOLS RESERVOIR PROJECT

OPEN MEETING
September 30, 2024

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NAME	REPRESENTING	E-MAIL ADDRESS
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Thomas Stidham	THR	thomasstidham@texashealth.org
Shela Chowdhury	City of Fort Worth	shela.chowdhury@fortworthtexas.org
Travis Reynolds	Dallas Regional Chamber	treynolds@dallaschamber.org
Nick Koonce	Hellwood Properties	Nicholas.Koonce@Hellwood.com
Matthew Besedin	TSSWCB	mbesedin@tsswcb.texas.gov
Monica Malone	GEI	mmalone@geiconsultants.com

REGION C WATER PLANNING GROUP
PRESENTATION ON MARVIN NICHOLS RESERVOIR PROJECT

OPEN MEETING
September 30, 2024

ATTENDANCE REGISTRATION SHEET

NAME	REPRESENTING	E-MAIL ADDRESS
ANNE TINDELL	SELF	AETINDELL@yahoo.com
COURTNEY CORSO	FREESE + NICHOLS	COURTNEY.CORSO@FREESE.COM
Philip Tawa	FNI	philip.tawa@fnisc.com
TROY D HENRY		THENRY@SRATX.ORG
SUSAN ALVAREZ	NCTCOG	—
Haley Salazar	City of Denton	haley.salazar@cityofdenton.com
Todd Reck	City of Irving	treck@cityofirving.org

Agenda Item IV.A - Attachment

Amended RCWPG Bylaws Sections

ARTICLE IV. OFFICERS

Section 1. Composition

The RCWPG shall elect from its voting membership a Chair, Vice Chair and Secretary for five-year terms with no limit on the terms a member may serve in any position, except as their membership shall otherwise be limited herein. Elections shall take place during the first meeting of each five-year planning cycle, and officers serving at the time of the adoption of this requirement shall continue in office until the beginning of the next regional planning cycle. ~~No two voting members representing the same interest group shall serve as officers at the same time.~~ The officers shall be elected by two-thirds majority vote of the members present at a properly posted meeting. Upon the resignation or removal of an officer, the Nominating Committee shall make recommendations to the RCWPG at its next scheduled meeting for the officer's replacement.

ARTICLE VII. VOTING MEMBERSHIP

Section 2. Conditions of Membership

To be eligible for voting membership on the RCWPG, a person must represent the interest for which a member is sought, be willing to participate in the regional water planning process and abide by these Bylaws. A person retired from a represented interest ~~cannot continue to~~ can serve as a voting member for said interest.

Agenda Item IV.A – Attachment

Recommendation for Glenn Clingenpeel as the replacement for Kevin Ward

Trinity River Authority of Texas

General Office

December 19, 2024

Region C Water Planning Group Members,

It has been a great honor to serve on the Board of the Region C Water Planning Group for 12 years and as the Chairman for the last 5. I believe that all of you are dedicated public servants that take the charge of preparing and adopting a plan for this region of the state very seriously, and the consistent result has been success for the State of Texas. Looking forward into the next few years, I have determined that I will not be able to commit the time to Region C that will be required of the Chairman.

This letter is intended to serve as my official notice of resignation from the position of Chairman of Region C effective January 7, 2025. Commensurate with my resignation as Chairman, I request that you approve Glenn Clingenpeel to replace me as the primary representative for river authorities for Region C, and for me to serve as his alternate. As Glenn will only serve as a member of the Region C Planning Group, you will need to nominate and elect a new Chairman at the next Region C meeting. I thank everyone for the opportunity to have served in this role and look forward to being involved with Region C in a new capacity.

TRA, as in the past when Jody Puckett served as Chairman, is still willing to serve as the designated political subdivision and provide administrative support for Region C.

Sincerely,

J. Kevin Ward
General Manager
Trinity River Authority of Texas

JKW/cac

P.O. Box 60
Arlington, Texas 76004
817-467-4343

Glenn Christopher Clingenpeel

3005 Sunray Valley Ct.
Arlington, TX 76012

(214) 686-5016
clingenpeelg@trinityra.org

EDUCATION

1990-1991 La Sorbonne, The University of Paris IV Paris, France
Studies in French language and culture

1993-1995 The University of Texas Austin, Texas
Studies in biology with an emphasis on molecular biology and natural systems

- Bachelor of Arts in Biology
- Bachelor of Science in Evolution, Ecology and Conservation Biology

1996 The University of Arizona Tucson, Arizona
Pursued graduate studies in aquatic natural systems

1997-1998 The University of North Texas Denton, Texas
Completed graduate work specializing on the application of constructed wetlands in water reclamation

- Master of Science in Environmental Sciences

2004-2006 The University of Texas at Arlington Arlington, Texas

- Master of Business Administration
- MBA All-Star, Dallas Business Journal, March 2007

PROFESSIONAL EXPERIENCEE

Trinity River Authority of Texas

2013-Present Executive Manager, Planning and Environmental Services

- Member of the executive team responsible for implementing Board policies
- Oversee team of scientists and engineers with multi-million-dollar budget
- Manage Authority's water supply portfolio and assisting in water sales negotiations
- Anticipate and evaluate future regulatory challenges; design and conduct scientific studies to collect data to inform regulatory processes with sound science
- Oversee GIS group and support Authority operations through serving of geospatial databases and applications
- Collaborate with regulatory agencies, special interest groups and industry experts to influence application of regulations towards effective environmental stewardship
- Oversee multiple grant contracts for environmental studies
- Administer the Upper Trinity Water Quality Compact; a consortium of water utilities in the Dallas-Fort-Worth area, including the cities of Dallas and Fort Worth.

20011-2013 Senior Manager, Planning and Environmental Management Division

- Oversee Clean Rivers Program
- Coordinate with multiple municipalities to maintain a comprehensive water quality monitoring network
- Conceive, design and implement environmental studies
- Developed first stand-alone support-service budget for new department (Planning and Environmental Services)

2005-20011 Executive Assistant to the General Manager

- Provide assistance to the General Manager in all areas of development and management of the Authority
- Provide assistance in matters related to preparation and administration of budgets, administration and finance, project development and management, public information, regional water planning, environmental management, and legislative communications
- Perform special projects assigned by the General Manager

2000-2005 Manager of Special Studies and Assessments

- Directed all aspects of the Clean Rivers Program including technical, financial and administrative components
- Drafted, reviewed and approved contracts for water quality and quantity investigations
- Served as Project Manager during execution of contracts for water quality investigations
- Oversaw Authority's basin-wide water quality sampling efforts
- Negotiated with Trinity Basin water agencies to build a voluntary, basin-wise monitoring network

1998-2000 Clean Rivers Program Coordinator

- Managed the day-to-day activities of the Clean Rivers Program under the direction of the Manager of Planning and Environmental Management Division
- Reviewed, quality assured and interpreted data
- Conceived, developed and managed water quality database
- Produced technical reports addressing water quality issues in the Trinity Basin

COMMUNITY ACTIVITIES

Present
Allied Federal Credit Union (formerly Arlington FCU), Chairman, Board of Directors
Habitat for Humanity volunteer

PROFESSIONAL MEMBERSHIPS

Associations
Chair, Region 3 Regional Flood Planning Group
Chair, TWA Endangered Species Committee
Texas Water Association
Member and Former Chair, North-Central Texas Council of Governments Water Resources Council
Member and Former Chair, Galveston Bay Council
Water Environment Federation of Texas

ACHIEVEMENTS, RECOGNITIONS AND PUBLICATIONS

MBA All-Star, Dallas Business Journal, March 2007
Tri Beta, Biology Honor Society, UT Austin Chapter, Member
Golden Key National Honor Society, UT Austin Chapter, Member
Beta Gamma Sigma Business Honor Society, UT Arlington Chapter, Member

Clingenpeel, G.C. (2005) "Status and trends of North-central Texas water resources: the integrity of the Trinity." In *Water for Texas*, ed. Norwine, et al, 122-134. Texas A&M Press, College Station.

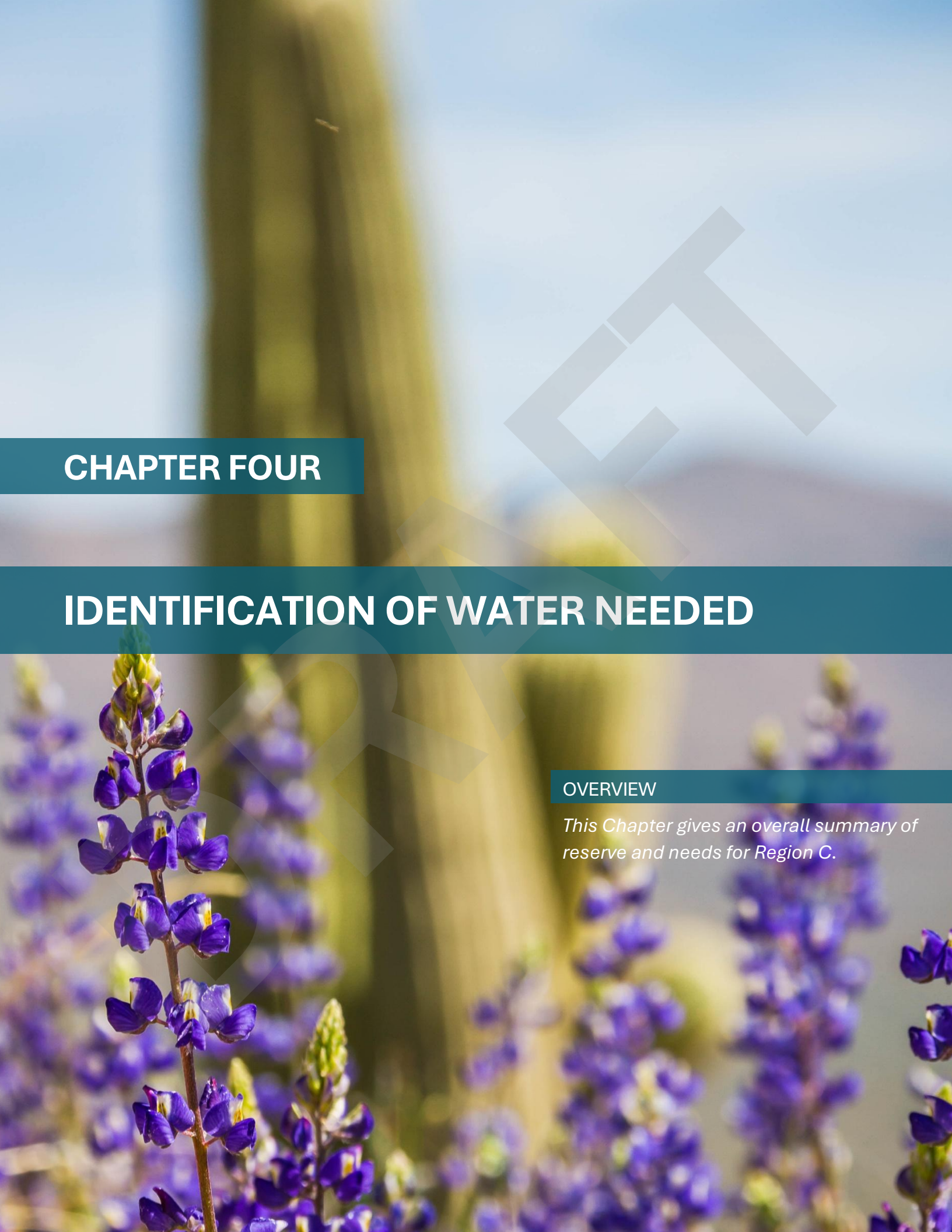
Jensen, P.A, Lee, K.L., Labay, A., Clingenpeel, G.C., Kilpatrick, A.K., Portugal, J., and Rhodes, T. (2005) "Backwater Blues – Jacksboro and Johnson Lake." Texas WET. Vol. 23 Issue 5.

Agenda Item V.A – Attachment

Draft IPP Chapter 4

CHAPTER FOUR

IDENTIFICATION OF WATER NEEDED



OVERVIEW

This Chapter gives an overall summary of reserve and needs for Region C.

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4 IDENTIFICATION OF WATER NEEDED

CHAPTER OUTLINE	
Section 4.1	Regional Comparison of Supply and Demand
Section 4.2	Comparison of Connected Supply and Projected Demand by Major Water Provider
Section 4.3	Comparison of Connected Supply and Projected Demand by Other Water Providers
Section 4.4	Summary of Projected Water Shortages
Section 4.5	Second-Tier Needs Analysis
RELATED APPENDICES	
Appendix D	DB22 Reports

TWDB guidelines require that reserves and needs for additional water supply be determined for each water user group in the region based on the comparison of current water supply and projected demand. The specific reserves and needs shown should be treated with caution because their development is based on certain assumptions:

- TWDB guidelines require that the comparison between supply and demand be based on currently connected supplies, without considering the future connection of already developed supplies [(1)].
- The division of existing supplies among users can be made in many ways. For example, the amount of groundwater available in a county on a sustainable basis was divided among users based on historical use and on well capacities. The actual future groundwater use may differ from these assumptions.

The resulting comparison shows the reserves and needs that will exist in Region C if no steps are taken to connect existing water supplies or develop additional water supplies. This comparison is specifically required by TWDB planning guidelines [(1)]. Also included is a summary of these needs by major water provider and other water providers. The second-tier needs analysis determines water needs that would remain if recommended conservation and direct reuse strategies were fully implemented.

Development of infrastructure to make existing supplies available to users and development of new supplies are treated as water management strategies, and they will be discussed in **Chapter 5**.

4.1 Regional Comparison of Supply and Demand

Regional water plans must compare projected water demands with existing water supplies to determine whether entities will experience water surpluses or water needs (shortages). **Table 4.1** and **Figure 4.1** provide a comparison of total currently connected water supply and total projected water demand in Region C, considering all water user groups.

TABLE 4.1 COMPARISON OF CONNECTED SUPPLY WITH PROJECTED DEMAND BY DECADE

	2030	2040	2050	2060	2070	2080
Connected Supply	1,761,111	1,754,383	1,744,458	1,735,535	1,724,146	1,715,323
Projected Demand	1,948,387	2,214,056	2,449,165	2,663,622	2,860,536	3,028,785
Total Regional Need (with Surpluses)	***187,276***	***459,673***	***704,707***	***928,087***	***1,136,390***	***1,313,462***
Surpluses	*28,818*	*17,882*	*15,713*	*13,888*	*13,043*	*12,593*
Total Regional Need (without Surpluses)	***216,094***	***477,555***	***720,420***	***941,975***	***1,149,433***	***1,326,055***
Counties with Needs	15	16	16	16	16	16
WUGs with Needs	224	251	257	260	268	271

FIGURE 4.1 COMPARISON OF CONNECTED SUPPLY WITH PROJECTED DEMAND BY DECADE

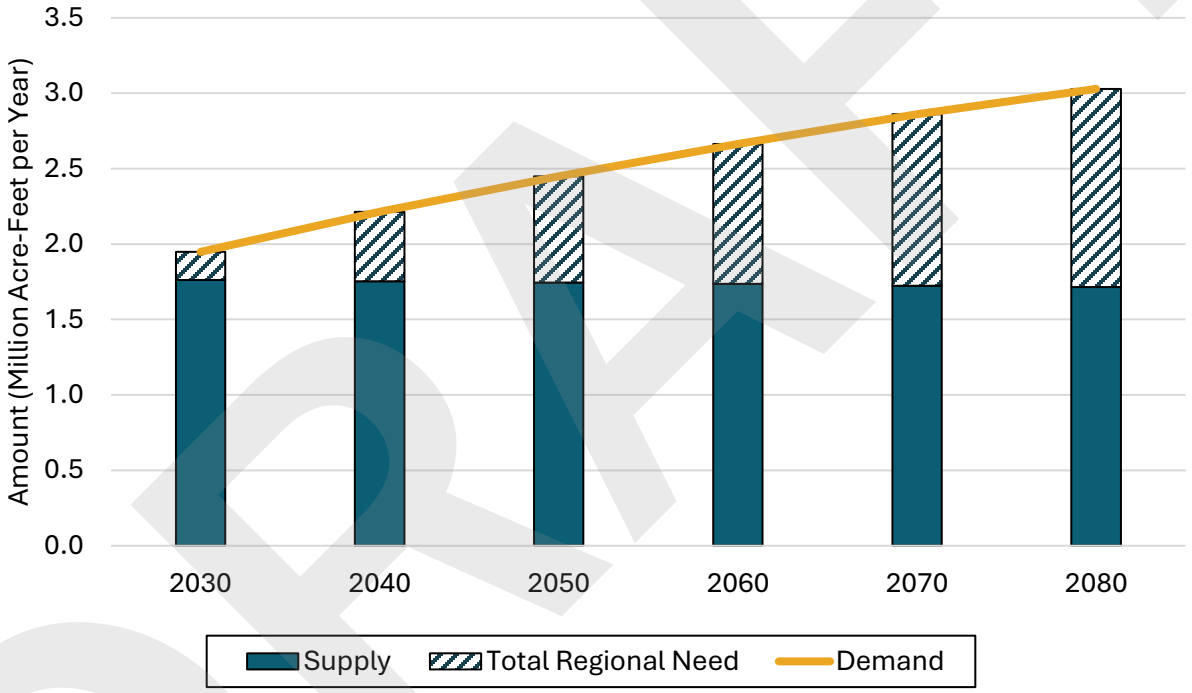


Table 4.2 shows the projected distribution of shortages by water use type. Most of the projected shortage is for municipal users. Many of the shortages shown for 2030 are fully or partially met with expected conservation savings which is treated as a water management strategy rather than a currently available supply. This is discussed in more detail in **Section 4.5** regarding the second tier needs analysis.

TABLE 4.2 PROJECTED SHORTAGE BY USE TYPE FOR REGION C

CATEGORY	2030	2040	2050	2060	2070	2080
Municipal	205,900	452,416	689,442	904,011	1,104,659	1,274,249
Irrigation	4,877	4,870	4,855	4,864	4,907	4,966
Livestock	68	68	68	68	68	68
Manufacturing	9,140	19,945	24,070	27,767	31,018	33,740
Mining	122	211	890	2,779	5,345	8,673
Steam Electric Power	1,022	5,590	6,843	8,163	9,196	10,034
TOTAL	***221,129***	***483,100***	***726,168***	***947,652***	***1,155,193***	***1,331,730***

Table 4.3 shows the comparison of supply and demands by county. In 2030, 15 counties show a net need for more water. On a regional basis, over 270 water users in Region C are predicted to have a need for additional water by 2080. In general, the largest water needs are in Collin, Dallas, Denton and Tarrant Counties.

TABLE 4.3 NEED BY COUNTY FOR REGION C (ACRE-FEET PER YEAR)

COUNTY	2030	2040	2050	2060	2070	2080
Collin	29,733	91,106	161,863	211,643	247,748	274,472
Cooke	64	128	171	198	229	333
Dallas	59,175	100,000	138,158	168,841	196,654	219,359
Denton	22,576	68,875	119,537	154,875	193,246	226,886
Ellis	8,650	15,006	21,945	29,216	38,098	47,668
Fannin	4,814	5,093	5,537	7,636	10,482	13,087
Freestone	0	2,981	3,574	4,196	4,715	5,162
Grayson	11,257	24,696	30,360	35,392	41,942	46,252
Henderson	3,701	4,151	4,737	5,750	7,088	8,025
Jack	517	906	1,110	1,345	1,524	1,662
Kaufman	3,271	8,729	16,852	26,611	37,083	45,663
Navarro	67	326	1,044	1,739	2,704	4,088
Parker	3,730	10,063	19,090	30,995	46,981	61,175
Rockwall	2,445	8,357	16,518	24,506	30,163	34,070
Tarrant	66,109	132,883	169,294	220,462	262,051	301,039
Wise	5,020	9,800	16,378	24,247	34,485	42,789
TOTAL	***221,129***	***483,100***	***726,168***	***947,652***	***1,155,193***	***1,331,730***

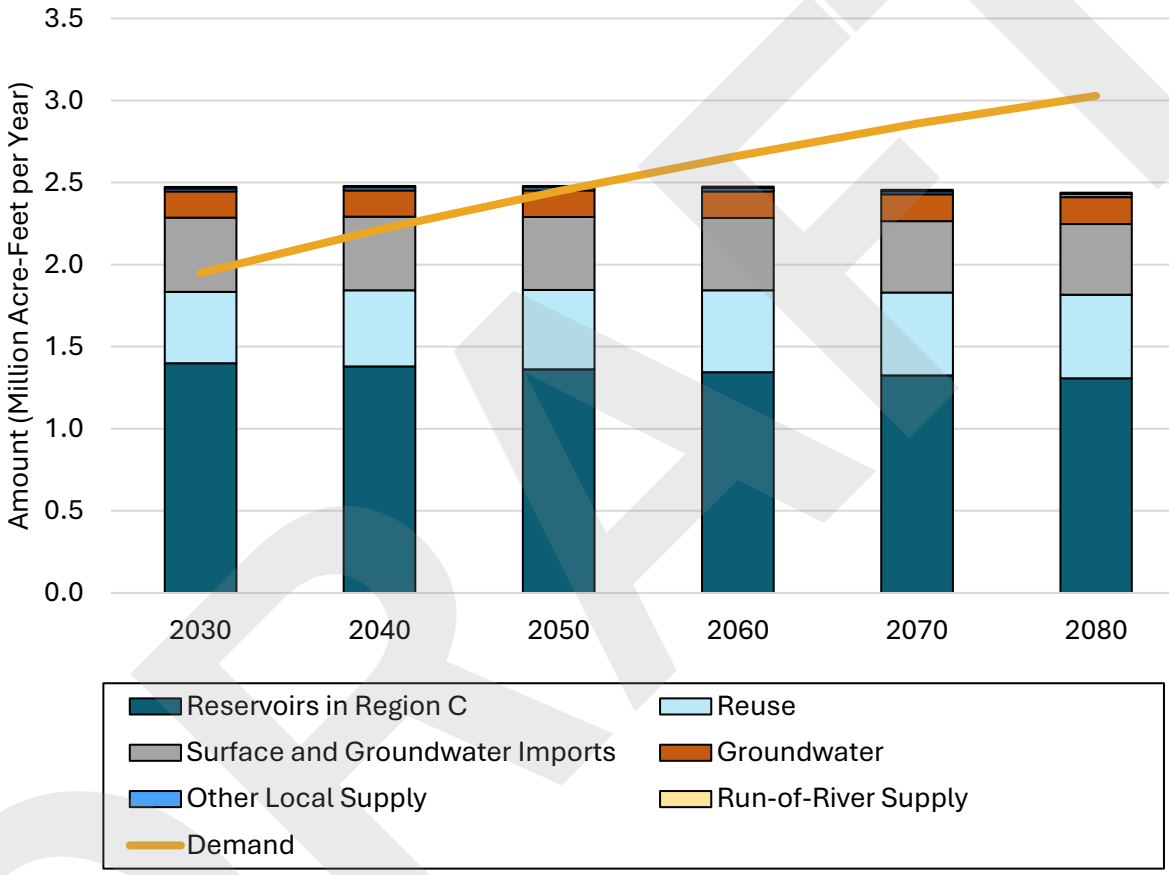
The comparison of supply and demand in **Table 4.2** and **Table 4.3** focuses on currently connected supplies. Existing supplies that are not connected could be made available to the region to meet some of these needs. An unconnected water supply is an existing and permitted supply that is not currently available due to infrastructure limitations, such as treatment or transmission capacity.

Table 4.4 and **Figure 4.2** show the comparison of total supply with demand for Region C, including connected and unconnected supply and surface water imports from other regions. By 2060, the projected demand for Region C exceeds total connected and unconnected supply. However, the needs for some individual water user groups occur sooner.

TABLE 4.4 COMPARISON OF TOTAL EXISTING SUPPLIES WITH DEMAND (ACRE-FEET PER YEAR)

	2030	2040	2050	2060	2070	2080
Total Connected and Unconnected Supply	2,473,013	2,479,977	2,480,356	2,474,705	2,456,388	2,438,954
Demand	1,948,387	2,214,056	2,449,165	2,663,622	2,860,536	3,028,785
Reserve (Need)	524,626	265,921	31,191	(188,917)	(404,148)	(589,831)

FIGURE 4.2 COMPARISON OF TOTAL EXISTING SUPPLIES WITH DEMAND



4.2 Comparison of Connected Supply and Projected Demand by Major Water Provider

Under the planning rules, a major water provider (MWP) is defined as "a water user group or a wholesale water provider of particular significance to the region's water supply as determined by the regional water planning group." [1]. The Region C Water Planning Group has designated six major water providers for Region C. In addition, two other wholesale water providers are considered "regional" water providers. **Table 4.5** shows the projected reserves or needs for additional supply for each major and regional water provider. Steps to meet these projected needs are discussed in **Chapter 5D**.

TABLE 4.5 RESERVE OR (NEED) BY MAJOR WATER PROVIDER USING ONLY CONNECTED SUPPLIES (ACRE-FEET PER YEAR)

WATER PROVIDER	PROJECTED RESERVE OR (NEED) FOR CURRENT AND FUTURE CUSTOMERS					
	2030	2040	2050	2060	2070	2080
Major Water Providers						
Tarrant Regional Water District	**(90,731)**	**(181,434)**	**(249,356)**	**(333,752)**	**(410,797)**	**(484,651)**
Municipal	*(87,107)*	*(173,702)*	*(239,488)*	*(321,321)*	*(396,055)*	*(467,586)*
Irrigation	*(192)*	*(335)*	*(411)*	*(498)*	*(564)*	*(614)*
Livestock	*0*	*0*	*0*	*0*	*0*	*0*
Manufacturing	*(1,686)*	*(3,155)*	*(4,089)*	*(5,212)*	*(6,184)*	*(7,088)*
Mining	*(137)*	*(236)*	*(459)*	*(770)*	*(1,254)*	*(2,015)*
Steam Electric Power	*(1,609)*	*(4,006)*	*(4,909)*	*(5,951)*	*(6,740)*	*(7,348)*
North Texas Municipal Water District	**(45,106)**	**(136,657)**	**(236,821)**	**(321,464)**	**(378,785)**	**(417,311)**
Municipal	*(41,647)*	*(126,987)*	*(220,677)*	*(300,058)*	*(353,821)*	*(389,831)*
Irrigation	*0*	*0*	*0*	*0*	*0*	*0*
Livestock	*0*	*0*	*0*	*0*	*0*	*0*
Manufacturing	*(1,053)*	*(2,738)*	*(4,282)*	*(5,432)*	*(6,240)*	*(6,917)*
Mining	*0*	*0*	*0*	*0*	*0*	*0*
Steam Electric Power	*(98)*	*(247)*	*(374)*	*(458)*	*(506)*	*(539)*
Fort Worth	**(47,553)**	**(94,093)**	**(120,396)**	**(156,508)**	**(190,825)**	**(222,308)**
Municipal	*(46,206)*	*(91,642)*	*(117,279)*	*(152,585)*	*(186,214)*	*(217,092)*
Irrigation	*0*	*0*	*0*	*0*	*0*	*0*
Livestock	*0*	*0*	*0*	*0*	*0*	*0*
Manufacturing	*(1,347)*	*(2,450)*	*(3,116)*	*(3,922)*	*(4,610)*	*(5,215)*
Mining	*0*	*0*	*0*	*0*	*0*	*0*
Steam Electric Power	*0*	*0*	*0*	*0*	*0*	*0*
Dallas Water Utilities	**(51,048)**	**(90,027)**	**(127,013)**	**(157,652)**	**(190,975)**	**(220,303)**
Municipal	*(49,661)*	*(87,801)*	*(123,859)*	*(153,736)*	*(186,278)*	*(214,919)*
Irrigation	*(110)*	*(170)*	*(234)*	*(283)*	*(328)*	*(365)*
Livestock	*0*	*0*	*0*	*0*	*0*	*0*
Manufacturing	*(1,200)*	*(1,936)*	*(2,756)*	*(3,435)*	*(4,139)*	*(4,763)*
Mining	*0*	*0*	*0*	*0*	*0*	*0*
Steam Electric Power	*(77)*	*(120)*	*(164)*	*(198)*	*(230)*	*(256)*
Trinity River Authority	**(9,089)**	**(18,430)**	**(20,869)**	**(23,826)**	**(25,945)**	**(27,581)**
Municipal	*(9,089)*	*(18,430)*	*(20,869)*	*(23,826)*	*(25,945)*	*(27,581)*
Irrigation	*0*	*0*	*0*	*0*	*0*	*0*
Livestock	*0*	*0*	*0*	*0*	*0*	*0*
Manufacturing	*0*	*0*	*0*	*0*	*0*	*0*
Mining	*0*	*0*	*0*	*0*	*0*	*0*
Steam Electric Power	*0*	*0*	*0*	*0*	*0*	*0*

WATER PROVIDER	PROJECTED RESERVE OR (NEED) FOR CURRENT AND FUTURE CUSTOMERS					
	2030	2040	2050	2060	2070	2080
Upper Trinity Regional Water District	**(4,325)**	**(35,522)**	**(71,105)**	**(87,855)**	**(108,338)**	**(126,181)**
Municipal	*(3,588)*	*(32,773)*	*(65,618)*	*(81,578)*	*(101,081)*	*(118,067)*
Irrigation	*(560)*	*(1,121)*	*(2,240)*	*(2,240)*	*(2,240)*	*(2,240)*
Livestock	*0*	*0*	*0*	*0*	*0*	*0*
Manufacturing	*0*	*(9)*	*(15)*	*(17)*	*(20)*	*(21)*
Mining	*0*	*0*	*0*	*0*	*0*	*0*
Steam Electric Power	*0*	*0*	*0*	*0*	*0*	*0*
Regional Water Providers						
Greater Texoma Utility Authority	**(23,440)**	**(38,358)**	**(44,473)**	**(49,743)**	**(55,084)**	**(58,361)**
Municipal	*(5,692)*	*(13,787)*	*(19,544)*	*(24,499)*	*(29,495)*	*(32,574)*
Irrigation	*0*	*0*	*0*	*0*	*0*	*0*
Livestock	*0*	*0*	*0*	*0*	*0*	*0*
Manufacturing	*(3,167)*	*(9,990)*	*(10,348)*	*(10,664)*	*(11,009)*	*(11,206)*
Mining	*0*	*0*	*0*	*0*	*0*	*0*
Steam Electric Power	*0*	*0*	*0*	*0*	*0*	*0*
Corsicana	**0**	**(327)**	**(1,214)**	**(2,070)**	**(3,046)**	**(4,074)**
Municipal	*0*	*(287)*	*(1,069)*	*(1,828)*	*(2,699)*	*(3,621)*
Irrigation	*0*	*0*	*0*	*0*	*0*	*0*
Livestock	*0*	*0*	*0*	*0*	*0*	*0*
Manufacturing	*0*	*(40)*	*(145)*	*(242)*	*(347)*	*(453)*
Mining	*0*	*0*	*0*	*0*	*0*	*0*
Steam Electric Power	*0*	*0*	*0*	*0*	*0*	*0*

4.3 Comparison of Connected Supply and Projected Demand by Other Water Providers

Projected supplies, demands, reserves, and shortages are summarized for each wholesale water provider and water user group in **Chapters 5D** and **5E**. As shown on **Table 4.1** there are over 270 water user groups with projected water shortages by 2080.

Chapter 5E of this plan discusses the selection of water management strategies to address the requirements for additional supply. Many water user groups in Region C are served by wholesale water providers, and the needs of these water user groups will be addressed by obtaining additional supplies from the wholesale water providers. Other water user groups will require the development of individual water management strategies to address their needs.

4.4 Summary of Projected Water Shortages

All of the Region C counties, except for Freestone County, have net needs beginning in 2030 and all Region C Counties have net needs by 2040. There are over 220 water user groups that are projected to need more supply in 2030, growing to over 270 water user groups by 2080.

If no new supplies are developed, the total projected overall shortage in Region C is approximately 217,000 acre-feet per year by 2030, growing to over 1.33 million acre-feet per year by 2080. Some of the shortages in 2030 are fully addressed by water conservation measures (including reuse).

Additionally, there are substantial unconnected supplies in Region C that could be made available by completing water transmission facilities. However, many Region C water suppliers depend on the region's major and regional water providers for all or part of their supplies. Most of the major and regional water providers will need to connect or develop additional supplies by 2030, and all will need additional supplies by 2040.

4.5 Second-Tier Needs Analysis

Regional planning rules require a second-tier needs analysis for all WUGs and MWPs for which conservation and direct reuse are recommended WMSs. The second-tier needs analysis determines water needs that would remain if recommended conservation and direct reuse strategies were fully implemented.

TWDB has provided a second-tier water needs analysis report from DB27. This report is included in **Appendix D** and includes the second-tier water needs analysis by individual WUG.

In addition to the information provided in the DB27 report, **Table 4.6** summarizes the second-tier needs by WUG category and **Table 4.7** summarizes second-tier needs by major water provider.

TABLE 4.6 SECOND-TIER WATER NEEDS BY WUG CATEGORY

	VALUES IN ACRE-FEET PER YEAR					
WUG CATEGORY	**2030**	**2040**	**2050**	**2060**	**2070**	**2080**
Municipal	121,326	293,550	478,840	665,976	841,028	987,208
Irrigation	0	0	0	0	0	0
Livestock	68	68	68	68	68	68
Manufacturing	9,140	16,806	17,792	21,489	24,740	27,462
Mining	0	0	0	0	0	0
Steam Electric Power	0	3,230	4,483	5,803	6,836	7,674
TOTAL	***130,534***	***313,654***	***501,183***	***693,336***	***872,672***	***1,022,412***

TABLE 4.7 SECOND-TIER WATER NEEDS BY MAJOR WATER PROVIDER

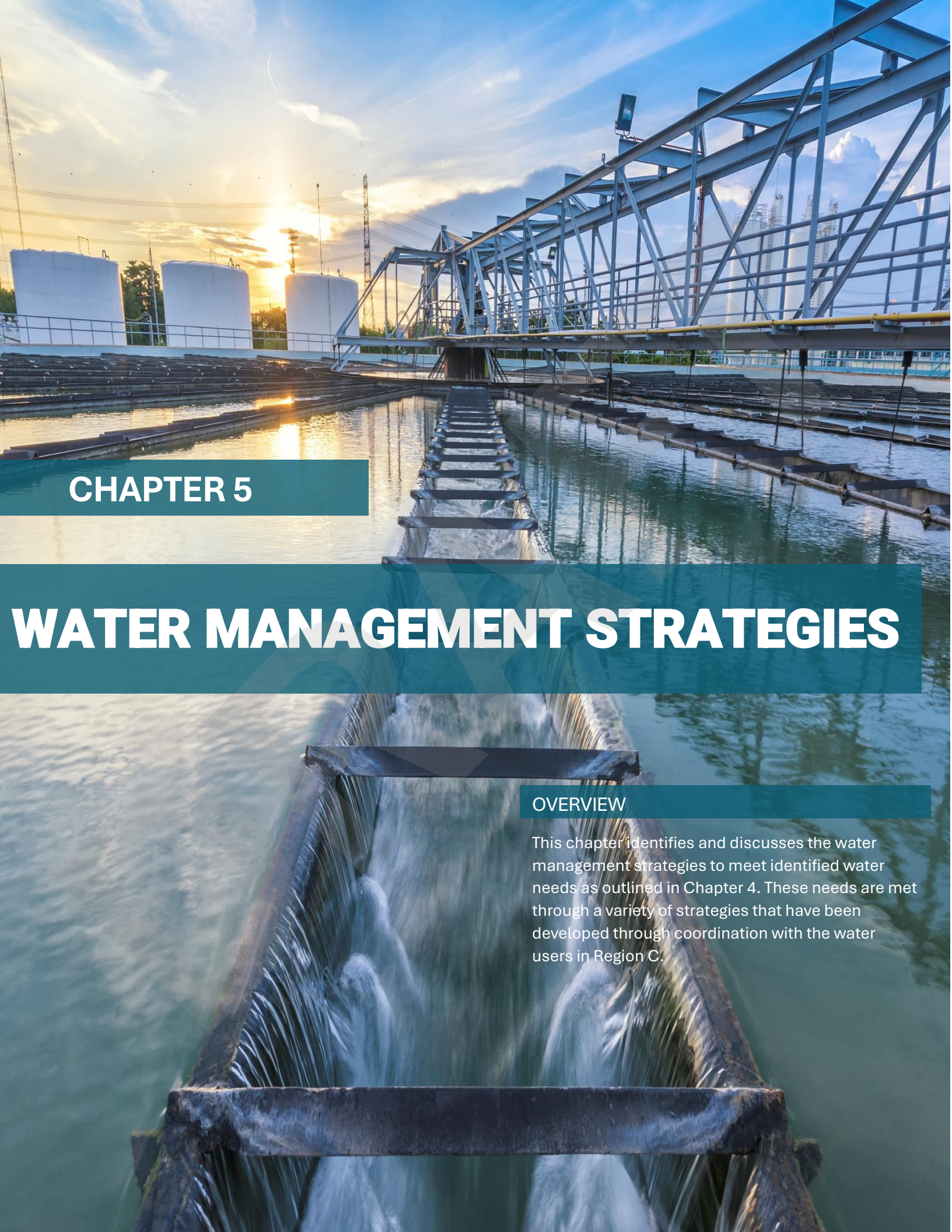
	VALUES IN ACRE-FEET PER YEAR					
WUG CATEGORY	**2030**	**2040**	**2050**	**2060**	**2070**	**2080**
Tarrant Regional Water District	66,918	138,007	195,063	269,397	337,963	402,984
North Texas Municipal Water District	22,211	92,322	175,856	251,005	303,438	338,690
Fort Worth	27,796	54,365	73,189	105,333	135,369	162,496
Dallas Water Utilities	27,577	48,227	73,244	99,213	127,872	152,787
Trinity River Authority	3,973	8,061	10,283	13,046	15,044	16,551
Upper Trinity Regional Water District	3,553	25,090	53,761	69,431	87,045	102,237
TOTAL	***152,028***	***366,072***	***581,396***	***807,425***	***1,006,731***	***1,175,745***

4.6 Chapter 4 List of References

(1) Texas Water Development Board, *Exhibit C Second Amended General Guidelines for Fifth Cycle Regional Water Plan Development* (April 2018), Austin, [Online] URL: http://www.twdb.texas.gov/waterplanning/rwp/planningdocu/2021/doc/current_docs/contract_docs/2ndAmendedExhibitC.pdf?d=1570051503683, April, 2018.

Agenda Item V.B – Attachment

Draft IPP Chapter 5A



CHAPTER 5

WATER MANAGEMENT STRATEGIES

OVERVIEW

This chapter identifies and discusses the water management strategies to meet identified water needs as outlined in Chapter 4. These needs are met through a variety of strategies that have been developed through coordination with the water users in Region C.

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Chapter 5 Water Management Strategies

CHAPTER OUTLINE

Chapter 5 identifies and discusses the water management strategies to meet identified water needs as outlined in **Chapter 4**. These needs are met through a variety of strategies that have been developed through coordination with the water users in Region C.

Over the planning period, water users may need to upgrade or modify their water supply systems or develop new supplies in ways that are not specifically identified in this plan. For aggregated water users, such as county other, the identification of needs and projects can be challenging due to the county-wide nature of the planning effort. It is the intent of this plan to include all water systems that demonstrate a need for water supply. This includes established water providers and new water suppliers that may be formed in the future to provide a reliable water supply.

The Region C Regional Water Plan outlines a potential approach that water suppliers can take to meet their projected water needs. Implementation of the water management strategies discussed within this plan is the responsibility of the water suppliers. The details of strategies will evolve as they are implemented. Sales of water to other users will be agreed upon between the seller and buyer. The identification of such strategies in this plan does not guarantee agreements can be reached nor does it obligate the water provider to provide the water. Costs for water purchases are generic placeholders and do not represent actual negotiated costs between a buyer and seller. The Region C Regional Water Planning Group will not be implementing water management strategies and does not want this plan to be an obstacle in the development of needed water supplies.

5A METHODOLOGY FOR EVALUATION AND SELECTION OF WATER MANAGEMENT STRATEGIES

CHAPTER OUTLINE	
Section 5A.1	Types of Water Management Strategies
Section 5A.2	Methodology for Evaluating Water Management Strategies
RELATED APPENDICES	
Appendix F	Potentially Feasible Water Management Strategies
Appendix G	Water Management Strategy Evaluations

This section describes the process to determine potentially feasible strategies for Region C as well as the methods used to evaluate potentially feasible strategies and select recommended or alternative strategies.

The steps in the identification of water management strategies for Region C include:

- Review previous plans for water supply in Region C, including locally developed plans and the 2022 State Water Plan [1].
- Consider the types of water management strategies required by Senate Bill One regional planning guidelines [2].
- Consider feasibility screening criteria for management strategies (the strategy must have an identifiable sponsor, must be technically feasible, and must meet existing regulations);
- Seek input from water providers and RCWPG members on potential strategies;
- Evaluate strategies based on the criteria set forth by the TWDB;
- Present the data to the potential sponsors and seek concurrence with recommendations;
- Select recommended strategies for Region C for approval by the RCWPG.

The process to identify potentially feasible water management strategies was presented at a public meeting and approved by the RCWPG on November 6, 2023. A list of the identified potentially feasible water management strategies is included in **Appendix F**.

FIGURE 5A.1 PROCESS TO IDENTIFY AND EVALUATE WATER MANAGEMENT STRATEGIES

5A.1 Types of Water Management Strategies

Regional Planning guidelines require that certain types of water management strategies be considered for developing additional water supplies [2].

The Region C Water Planning Group reviewed each of these types of water management strategies and determined whether there were potentially feasible strategies to develop water supply in Region C within each type. Water conservation strategies are discussed in **Chapter 5B**. Drought response planning is discussed in **Chapter 7**.

Other types of management strategies are discussed below, and a detailed listing of potentially feasible water management strategies for Region C is included in **Appendix F**. The evaluations of the potential water management strategies are discussed in **Appendix G**.

Water Management Strategies

The RWPGs shall consider, but not be limited to considering, the following types of WMSs for all identified water needs:

- Water Conservation
- Drought Management Measures
- Water Reuse
- Management and/or Expanded Use of Existing Supplies
  - System Optimization
  - Connection of Existing Supplies
  - Conjunctive Use
  - Reallocation of Reservoir Storage
  - Voluntary Redistribution of Water Resources
  - Voluntary Subordination of Water Rights
  - Yield Enhancement
  - Water Quality Improvements
- New Supply Development
  - Surface Water Resources
  - Groundwater Resources
  - Desalination
  - Water Right Cancellation
  - Brush Control
  - Rainwater Harvesting
  - Precipitation Enhancement
- Aquifer Storage and Recovery (ASR)
- Interbasin Transfers
- Emergency Transfers of Water

5A.1.1 Water Conservation

Water conservation is defined as "those practices, techniques, and technologies that will 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 water supply is made available for future or alternative uses."[3] Water conservation measures typically result in long-term, on-going changes in water use.

Water conservation is a valued water management strategy in Region C because it helps reduce the growing demands of the region. It is recommended for all individual municipal water users, whether the user has a defined shortage or not. Conservation is also recommended for all non-municipal users that are shown to have a shortage, as appropriate.

Summary of Decision: Consider conservation for all individual municipal water users and non-municipal water users with a need, as appropriate.

5A.1.2 Drought Management Measures

Drought management measures are actions taken by a water provider during drought to reduce demands. Region C did not consider drought management as a feasible strategy to meet long-term growth in demands or currently identified needs. Drought management measures are temporary actions to conserve available water supplies during times of drought or emergencies. These measures minimize the adverse impacts of water supply shortages during drought. Drought management will be employed in the region through the implementation of local drought contingency plans. Region C is supportive of the development and use of these plans during periods of drought or emergency water needs.

Summary of Decision: Do not consider Drought Management Measures to meet long-term water needs.

5A.1.3 Water Reuse

Water reuse utilizes treated wastewater effluent either by direct diversion from a wastewater plant to a use (direct reuse) or by delivery of water through streams or lakes for use (indirect reuse). Water reuse is a major source of water for Region C water providers. As demands increase, the available wastewater effluent also increases. Some providers have projects in place today to utilize the increased effluent. Others are planning to construct new projects to treat and transport the reuse water to the end user. Several major water providers are working together to maximize the available reuse to the region.

Summary of Decision: Include water reuse as part of the water management strategies considered in the Region C plan.

5A.1.4 Management and/or Expanded Use of Existing Supplies

Expanded use of existing supplies includes eight subcategories ranging from selling developed water that is not currently used to enhancing existing supplies through operations, storage, treatment or other means. Each of these subcategories was considered during the identification of potentially feasible strategies, and the applicability to Region C is discussed below.

System Optimization. System optimization is the coordinated use of multiple sources of supply, usually surface water reservoirs. This can also include development of regional water supply facilities or providing regional management of existing water supply facilities. System optimization is widely used throughout Region C, and can be implemented for many purposes, including gaining yield, reducing pumping costs, or maintaining acceptable water quality. Most of the systems in Region C are operated primarily to reduce pumping costs. For the purpose of the Region C planning process, only system operation that results in increased yield will be considered as potentially feasible water management strategies. Generally, only system operation with new water supplies is considered for evaluation as a water management strategy for the Region C Water Plan. Any increase in supplies due to system optimization is included as part of the respective strategy. No strategies were identified for existing reservoir system operations that increase yield above the current supply amounts.

Summary of Decision: System optimization is widely used in Region C, primarily to reduce pumping costs. Potentially feasible system operation strategies to provide additional yield should be investigated as part of other new strategies.

Connection of Existing Supplies. The connection of existing supplies that are not yet being fully utilized is a major element of the *Region C Water Plan*. There are several sources of water supply that have long been committed for use in Region C and could be connected to provide additional water supply. Region C water suppliers could potentially connect to currently uncommitted supplies in other regions through new, renewed or increased contracts or agreements with the seller of the water. This category also includes improvements to infrastructure to utilize the water, such as new or renovated transmission systems and water treatment plants.

Major sources of existing water considered for new connections to Region C water users include: Lake Palestine, Lake Texoma, Toledo Bend Reservoir, Lake O' the Pines, and water from Oklahoma. Other existing sources are considered for expanded use and voluntary sales to others.

Summary of Decision: Include connection of existing supplies as a major component of the Region C plan. Evaluate specific potentially feasible strategies for connection of existing supplies.

Conjunctive Use of Groundwater and Surface Water. In Region C, only about 6 percent of the water used currently comes from groundwater. However, as water providers expand their portfolios of water sources, groundwater and conjunctive use will become more important in developing resilient supplies. When used conjunctively, groundwater can help meet higher dry year demands in systems that have both groundwater and surface water supplies, while more surface water is used during normal to wet years.

Summary of Decision: Consider conjunctive use for Region C providers that have both groundwater and surface water sources. Generally, this will be considered as part of new groundwater strategies.

Reallocation of Reservoir Storage. Reallocation of water storage from a non-water supply use (such as hydropower generation or flood control) is the development of new water supply. Evaluation of reallocation of reservoir storage must consider available unappropriated water and seek appropriate authorizations. This strategy type can only apply to those reservoirs that dedicate storage for a non-water supply use. For Region C, that includes mainly reservoirs operated by the USACE.

Summary of Decision: Evaluate storage reallocation to water supply for Lake Texoma, Wright Patman Lake, and Bardwell Lake.

Voluntary Redistribution of Water Resources. In many cases, the connection of existing sources and the development of new sources require the voluntary redistribution of water resources by sale from the owner of the supply to the proposed user. (This would be true unless the proposed user is also the owner of the supply.) The water management strategies involving the voluntary redistribution of water resources are often discussed under other categories.

Summary of Decision: Evaluate potentially feasible strategies involving the voluntary redistribution of water resources as a unique strategy or as part of other strategies.

Voluntary Subordination of Water Rights

Voluntary subordination of water rights is useful where senior water rights limit reservoir yields under the prior appropriations doctrine.

Very little additional yield is available for existing reservoirs in Region C by voluntary subordination. This strategy is appropriate for new water supply sources that would have junior water rights.

In Region C, subordination of water rights is necessary to obtain the permitted amount for Muenster Lake in Cooke County.

Summary of Decision: Include voluntary subordination of water rights as a source of water supply for Muenster Lake and others as appropriate.

Yield Enhancement

Enhancement of surface water yields would generally include system optimization and conjunctive use, which are listed separately.

Enhancement of groundwater yields would include artificial recharge, which could include several methods. Artificial recharge of aquifers has not been implemented or studied in depth in Region C. If artificial recharge were to be implemented, it would likely be as part of an aquifer storage and recovery (ASR) program, which is discussed separately.

Summary of Decision: Do not include enhancement of yields of existing sources as a source of water supply for Region C water users except as discussed under other categories.

Water Quality Improvements

Water quality improvements allow for the use of impaired water for municipal or other uses. Generally, this strategy is considered for users with existing water supplies but impaired water quality. In Region C, there are some users of brackish surface water and groundwater. Water quality improvement for these sources are typically accomplished through desalination or blending. This is discussed under the strategy type "Desalination". Other types of water quality improvements can be applied at a watershed level, such as the Red River Chloride Control Project. The Chloride Control Project is only partially implemented. Should this project move forward, some benefits may be realized in Lake Texoma. While chloride control is a concern for some users in Region C, this strategy type also would apply to treatment of other water quality parameters.

Summary of Decision: Consider water treatment improvements for users of supplies with impaired water quality.

5A.1.5 New Supply Development

New supply development is a critical component of the *Region C Water Plan*. With a regional projected water need of 1.3 million acre-feet per year by 2070, these shortages cannot be met through conservation and existing supplies alone. Most of the new supply development will be new surface water, but other strategy subtypes were also considered.

Surface Water Resources

New surface water includes a variety of strategies, but all include new appropriations of state water. New reservoirs represent a large source of potential supply for Region C. To develop a new reservoir, both a state water right permit and a federal Section 404 permit are required. The permitting process alone can take multiple decades, depending upon the project. Design, construction and filling of the reservoir can add another 10 to 15 years. Because of the large amount of time needed to implement new reservoir strategies, long-term planning for these types of strategies is essential for implementation by the time the supply is needed. As a result, many of these potential reservoirs have been previously studied. Five potential new reservoirs are being considered for the *2026 Region C Water Plan*.

Potential New Reservoirs

- Lake Tehuacana
- Lake Columbia
- Marvin Nichols Reservoir
- George Parkhouse Lake (North)
- George Parkhouse Lake (South)

Other new surface sources include two proposed river diversions with off-channel storage, Neches Run-of-River, Sabine River Off-Channel Reservoir, and Red River Off-Channel Reservoir.

In addition, DWU is proposing to construct an off-channel reservoir in Ellis County for impounding wastewater return flows and potentially new appropriations. This strategy is considered under water reuse.

Summary of Decision: Evaluate new reservoirs and river diversions as potentially feasible strategies.

Groundwater Resources

New groundwater supplies within Region C are limited since most of the available groundwater supplies are already developed. However, there may be opportunities to expand current use in specific areas. In this round of planning, there are no recommended water management strategies utilizing brackish groundwater desalination because municipal needs are able to be met through other strategies. However, brackish groundwater desalination was considered and is included as an alternative water management strategy for MEN WSC. Also, several water providers are considering importing groundwater from outside the region.

Summary of Decision: Evaluate the importation of groundwater as considered by potential sponsors. Evaluate specific potentially feasible groundwater supplies within Region C.

Desalination

The salinity of water in Lake Texoma and the Red River is too high for municipal use. The water must be desalinated or blended with higher-quality water to meet drinking water standards. For strategies that propose new development of water from these sources, desalination would be needed. The cost of desalination has decreased in recent years, and the process is being used more frequently.

Desalination is a potentially feasible strategy to use supplies from the following sources:

- Lake Texoma and the Red River
- Brackish groundwater
- Water from the Brazos River
- Water from the Gulf of Mexico
- Local projects from other sources, if pursued by water suppliers.

Summary of Decision: Include desalination as a potentially feasible water management strategy to utilize supplies that require desalination for the planned use.

Water Right Cancellation

The Texas Commission on Environmental Quality has the power to cancel water rights after ten years of non-use, but this involuntary cancellation authority has seldom been used. The Water Availability Models showed that very little additional supply would be gained from water right cancellation in Region C [4]. Therefore, water rights cancellation is not recommended as a potentially feasible water management strategy for Region C.

Summary of Decision: Do not consider water rights cancellation as a potentially feasible strategy for the development of additional water supplies.

Brush Control

Brush control is the process of removing non-native brush from the banks along rivers and streams and upland areas to reduce water consumption by vegetation and increase stream flows and groundwater availability. Studies and pilot projects of brush control in West Texas show promising

results. Two reservoirs in Region C, Lake Jacksboro and Lake Weatherford, were listed in the State Brush Control Plan as potential watersheds where brush control could enhance supplies. No formal studies have been conducted for either watershed. Given that there is no quantifiable evidence that brush control would increase water supply in either reservoir, brush control is not recommended as a potentially feasible water management strategy for any specific water user group (WUG) in Region C. However, brush control may be a management strategy for localized areas within the region, especially as a means to help meet localized livestock water supply needs.

Summary of Decision: Allow for studies and localized pilot projects to further investigate brush control. Do not consider brush control as a potentially feasible strategy for the development of additional water supplies.

Rainwater Harvesting

Rainwater harvesting is an ancient practice involving the capture, diversion, and storage of rainwater for landscape irrigation, drinking and domestic use, aquifer recharge, and, in modern times, stormwater abatement. Due to a lack of detailed data on the quantity of supplies that would be made available through rainwater harvesting, this strategy is not recommended as a potentially feasible water management strategy for any specific water user in Region C. However, there may be localized areas in Region C that might benefit from such a management strategy.

Summary of Decision: Allow for studies and localized pilot projects to further investigate rainwater harvesting. Do not consider rainwater harvesting as a potentially feasible strategy for the development of additional water supplies.

Precipitation Enhancement

Precipitation enhancement involves seeding clouds with silver iodide to promote rainfall. Such programs are generally located within areas where the rainfall is lower than in Region C. Given that Region C has adequate rainfall and that there are no studies showing what impact precipitation enhancement would have on streamflow and reservoirs in Region C, precipitation enhancement is not recommended as a potentially feasible water management strategy for Region C. However, there may be localized areas in Region C that might benefit from such a management strategy.

Summary of Decision: Do not include precipitation enhancement as a potentially feasible strategy for the development of additional water supplies. Allow for studies and localized pilot projects to further investigate precipitation enhancement.

5A.1.6 Aquifer Storage and Recovery

Aquifer storage and recovery (ASR) involves storing water in aquifers and retrieving this water when needed. The water to be stored can be introduced through enhanced recharge or more commonly, injected through a well into the aquifer. If an injection well is used, Texas law requires that the water not degrade the quality of the receiving aquifer. Source water for ASR can include excess surface water, treated wastewater, or groundwater from another aquifer.

Recent legislation passed by the 86th Texas Legislature and signed by the Governor on June 10, 2019 requires the regional water plans to consider ASR and provide a specific assessment of this

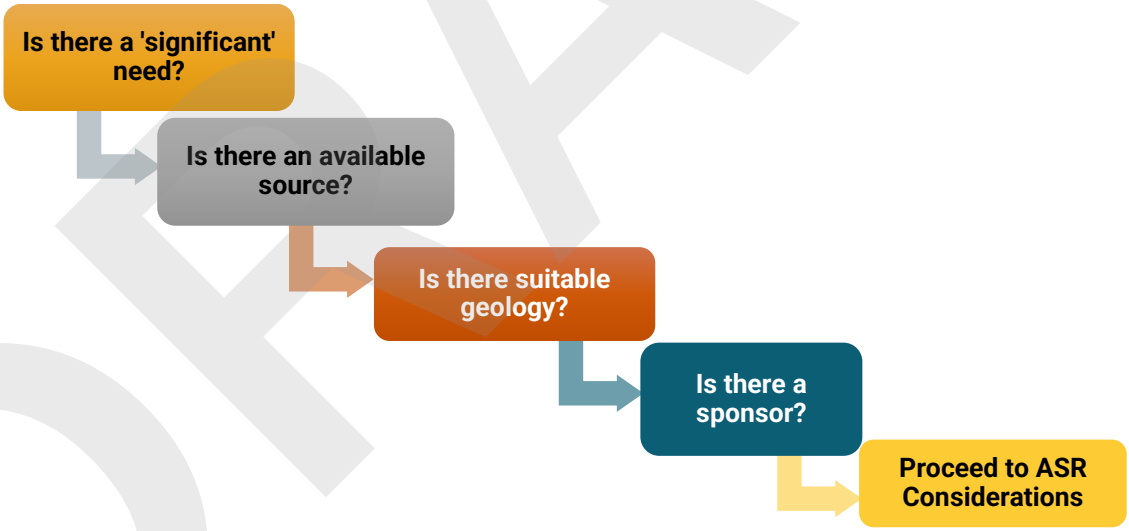
strategy if the region has significant needs. The definition of significant need is deferred to each region. For purposes of this assessment, the Region C major water providers are shown to have significant needs.

To determine the feasibility and applicability of ASR, there are several technical considerations. Specifically,

- ASR requires suitable geological conditions for implementation. Since geologic conditions vary by location, studies must be performed to determine what specific locations would be suitable for ASR. There is little data available on the suitability of ASR in Region C.
- Raw surface water and water reuse most likely will require pretreatment prior to injection and treatment to drinking water standards after retrieval.
- Operation of an ASR system could significantly impact the amount of water that is retrievable.

Summary of Decision: Develop a large-scale generic strategy for ASR that could be implemented by one or more of the Region C major water providers. Consider small-scale projects that are more likely to be implemented. Support continuing studies of ASR and implementation of pilot projects.

FIGURE 5A.2 ASR DECISION PROCESS



5A.1.7 Interbasin Transfers

Interbasin transfers are a legal requirement associated with moving surface water from one basin to another. This legal requirement potentially will be in effect for new surface water supplies developed in one river basin and used in a different river basin. Additional detailed studies for the receiving and the source basins will be required as part of the permitting process for new interbasin transfers. This strategy category may be a component of several other strategy types, including new surface water development, connecting to existing supplies, and voluntary transfer of water.

Development of adequate supplies for Region C and the other growing areas of Texas will require interbasin transfers.

Summary of Decision: Include interbasin transfers as part of the management strategies considered in the Region C plan.

5A.1.8 Emergency Transfers of Water

Emergency transfers of water could include interim water sales during drought or emergency conditions, transfers of water from one use type to another use type, emergency interconnections, and other similar types of projects. Like drought management, such transfers are considered temporary and not appropriate to meet long-term growth water demands. This type of strategy is reserved for emergency use only.

Summary of Decision: Emergency transfers of water are reserved for emergency use only.

5A.1.9 Summary of Potentially Feasible Strategies

Appendix F includes a listing of potentially feasible water management strategies for Region C for major and regional water providers, wholesale water providers, and for all water user groups by county.

A list of the major strategies, defined as providing more than 30,000 acre-feet per year, is presented in **TABLE 5A.1**. The results of the evaluation and the recommended strategies for Region C are discussed in the subsequent sections of **Chapter 5** and detailed in **Appendix G**.

TABLE 5A.1 LIST OF MAJOR POTENTIALLY FEASIBLE WATER MANAGEMENT STRATEGIES

POTENTIALLY FEASIBLE WATER MANAGEMENT STRATEGY	POTENTIAL SPONSOR
Reuse Strategies	
Cedar Creek Wetland Reuse	TRWD
Reuse from TRA Central WWTP	TRWD
Reuse from Mary's Creek WRF	TRWD, Fort Worth
Ralph Hall Indirect Reuse	UTRWD
Additional Indirect Reuse Implementation	DWU
Main Stem Balancing Reservoir	DWU
Additional Lavon Watershed Reuse	NTMWD
Expanded Wetland Reuse	NTMWD
Connection of Existing Supplies	
Integrated Pipeline	TRWD, DWU
Connect to Lake Palestine (IPL Delivery Point to DWU WTP)	DWU
Lake Texoma (Blending)	NTMWD, UTRWD
GTUA Regional System	GTUA
Sabine Conjunctive System Operations	DWU
Toledo Bend Reservoir (Phase 1)	NTMWD, TRWD, UTRWD, DWU
Lake O' the Pines	NTMWD
Water from out-of-state (Oklahoma)	NTMWD, UTRWD, Irving

POTENTIALLY FEASIBLE WATER MANAGEMENT STRATEGY	POTENTIAL SPONSOR
New Surface Water	
Marvin Nichols Reservoir	NTMWD, UTRWD, TRWD, DWU and/or Irving
George Parkhouse Reservoir (North)	NTMWD and/or UTRWD
George Parkhouse Reservoir (South)	NTMWD and/or UTRWD
Wright Patman Reallocation	NTMWD, UTRWD, TRWD, DWU and/or Irving
Lake Texoma Reallocation	GTUA
Tehuacana Reservoir	TRWD
Lake Columbia	DWU
Red River Off Channel Reservoir	DWU, UTRWD
Neches Basin Supplies	DWU
New Groundwater	
Carrizo-Wilcox Groundwater	NTMWD, TRWD, DWU, UTRWD
Desalination	
Gulf of Mexico with Desalination	Multiple
Lake Texoma with Desalination	NTMWD, GTUA, DWU, Denison
Aquifer Storage and Recovery (ASR)	
Aquifer Storage and Recovery	Multiple

5A.1.10 Potentially Feasible Strategies with Flood Mitigation Benefits

Exhibit C, Section 2.5.1:

Identify those potentially feasible WMSs, if any, that, in addition to providing water supply, could potentially provide non-trivial flood mitigation benefits or that might be the best potential candidates for exploring ways that they might be combined with flood mitigation features to leverage planning efforts to achieve potential cost savings or other combined water supply and flood mitigation benefits. The work required to identify these WMSs will be based entirely on a high-level, qualitative assessment and should not require modeling or other additional technical analyses.

Generally, strategies that provide flood benefits are those that provide storage or detention of flood waters. Strategy types that are considered under this requirement include new reservoirs, conjunctive use and ASR strategies that utilize excess surface water. This assessment is discussed in Section 5F for the recommended WMSs.

5A.2 Methodology for Evaluating Water Management Strategies

The TWDB guidelines set forth certain factors that are to be considered by the regional water planning groups in the evaluation of water management strategies [(2)]. This subsection discusses the specific evaluation factors selected by the Region C Water Planning Group for the potentially feasible water management strategies, including the environmental evaluation of alternatives and the development of costs. Additional details on the evaluation of strategies are included in various appendices.

5A.2.1 Factors Considered in Evaluation

The factors specifically considered by the Region C Water Planning Group in the evaluation of potential water management strategies are summarized in the blue box at the right. As required, the evaluation of water management strategies includes the quantitative reporting of quantity, reliability, costs and environmental factors. While the quantitative reporting of water made available and the unit cost of delivered and treated water can readily be developed, data for the quantitative reporting of environmental factors are limited. The detailed quantitative assessment of environmental factors requires data from site-specific studies, which are often not conducted at the planning level. Available data for environmental factors are used in the evaluation.

Water Management Strategy Evaluation Factors

- Quantity of water made available
- Reliability of supply
- Unit cost of delivered and treated water
- Environmental factors
- Impacts on agricultural and rural areas
- Impacts on natural resources
- Impacts on other water management strategies and possible third-party impacts
- Impacts to key water quality parameters
- Consistency with plans of Region C water suppliers
- Consistency with other regions

Consistency with plans of Region C water suppliers is an important factor in the evaluation of strategies. It is the intent of the Region C Water Planning Group to consider the existing plans of the water suppliers in the region, especially the major and regional wholesale water providers, in the development of the *2026 Region C Water Plan*.

Equitable comparison of all feasible strategies is not included as an explicit evaluation factor because it describes the way the entire evaluation is conducted. This factor was considered in the development of the methodology for evaluations. Interbasin transfer requirements in the Texas Water Code were considered in the development of strategies.

5A.2.2 Environmental Evaluation

The environmental evaluation of potentially feasible management strategies is summarized in **Appendix G**. Factors reported quantitatively include the total acres impacted by the strategy and the number of threatened and endangered species listed in the counties of the proposed water source. For existing water sources, only the species that are water-dependent are included in the

count of threatened and endangered species. Other factors were assigned a high, moderate, or low rating based on existing data and the potential to avoid or mitigate each of the environmental factors. These evaluations were summarized in an overall environmental evaluation for the strategy. Certain management strategies were evaluated as a category rather than individually because their environmental effects do not vary greatly. Examples of evaluation by category include purchasing water from another provider and the development of new wells in aquifers with additional water available.

5A.2.3 Agricultural Resources and Other Natural Resources

The evaluation of impacts on agricultural resources and rural areas assesses the ability to continue current agricultural and livestock activities. Strategies that move considerable amounts of water from rural to urban areas were also considered under this category. The impacts of recommended strategies on these factors are discussed in more detail in **Chapter 6**.

Impacts to other natural resources include potential impacts to water resources that are not the direct source for the strategy and impacts to mineral resources, oil and gas, timber resources, and parks and public lands. (Impacts to the water resources that are the source for the strategy are included under environmental factors.) The consideration of the impacts to agricultural and natural resources are used to assess how the regional water plan is consistent with the protection of the state's resources. This discussion is also summarized in **Chapter 6** of the plan.

5A.2.4 Recommended Water Management Strategies

Water management strategies are recommended based on the overall factors set forth in the strategy evaluations. As discussed above, consistency with the on-going water development plans of regional water providers is an important factor in the strategy selection. All factors are considered in the selection process. The recommended strategies are based on the ability to supply the quantity of water needed at a reasonable cost while providing long-term protection of the state's resources.

5A.3 Chapter 5A List of References

(1) Texas Water Development Board: *2022 State Water Plan for Texas, Austin* [Online] Available URL: https://www.twdb.texas.gov/waterplanning/swp/2022/, July 2022

(2) Texas Water Development Board: Chapter 357, *Regional Water Planning Guidelines*, Austin, November 2019.

(3) Texas Water Code, Title 2, Subtitle B, Chapter 11, Subchapter A. Section 11.002(8)(B). Online: https://statutes.capitol.texas.gov/Docs/WA/htm/WA.11.htm

(4) Freese and Nichols, Inc., Alan Plummer Associates, Inc., CP&Y, Inc., and Cooksey Communications, Inc.: *2011 Region C Water Plan*, prepared for the Region C Water Planning Group, Fort Worth, October 2010.

Agenda Item V.E – Attachment

Draft IPP Chapter 7

CHAPTER 7

DROUGHT RESPONSE

OVERVIEW

This chapter presents information concerning historical droughts in the Region, drought uncertainties, current drought preparation and responses, recommendations for region-specific drought responses, and region-specific model drought contingency plans.

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7 DROUGHT RESPONSE

CHAPTER OUTLINE

RELATED APPENDICES

Appendix M	Summary of Existing Drought Plans and Potential Emergency Connections

Drought is a natural and recurring meteorological phenomenon that occurs when precipitation is significantly below "normal" for a period of time. Relatively mild, short-duration droughts are common throughout Texas and typically result in relatively mild impacts. However, extended and severe drought conditions can have serious impacts on water supplies, water suppliers, and water users including:

- Reduction in available water supply leading to shortage conditions;
- Increases in water demand, particularly for seasonal demands such as landscape irrigation;
- Stress on water utility infrastructure due to elevated seasonal peak water demands;
- Deterioration of source water quality;
- Lifestyle and financial impacts to water users associated with restrictions on non-essential water uses (e.g., loss of landscaping); and
- Financial impacts on water suppliers due to reduced revenues from water sales during periods of water demand curtailment.

Due to the potentially devastating effects of drought on communities and the State's economy, it is important that water suppliers and users consider the potential impacts of drought and develop robust plans to address supply or demand management under drought conditions. This chapter presents information concerning historical droughts in the Region, drought uncertainties, current drought preparation and responses, recommendations for region-specific drought responses, and region-specific model drought contingency plans.

7.1 Drought of Record in the Regional Water Planning Area

Section 7.1 describes the drought of record in Region C, two measures that indicate drought severity, and other significant droughts in the region.

7.1.1 Regional Drought of Record

The Drought of Record (DOR) is typically defined as the worst drought to occur for a particular area during the available period of hydrologic record. Due to the variety of ways in which drought may be characterized (deviation from normal precipitation, temperature, agricultural impacts, economic losses, duration, impacts to reservoirs, etc.), defining which drought is the DOR for an area can be a complex issue. For much of the State, the DOR is generally considered to have occurred from 1950 through 1957. This drought combined severe reductions in rainfall with a multi-year duration, resulting in reduction or cessation of flows for many springs and streams, losses to livestock production and irrigated agriculture, and widespread impacts to vegetation. By the end of the drought in late 1956 or early 1957, nearly all the counties in the State had been declared disaster areas.

The drought of record for most water supplies used in Region C occurred from 1950 through 1957. The two drought periods recently experienced in Region C (2003 through 2006 and 2011 through 2015) caused low inflows and low water levels for many Region C lakes. In Region C, several existing water supply sources in the Red River Basin recorded new droughts of record that resulted in substantial reductions in firm yields for some sources **(Table 7-1**). Other sources in the Sulphur River Basin (Region D) that are used in Region C also experienced new drought of records. A complete list of the drought of records for surface water reservoirs in Region C is included in **Appendix E**.

TABLE 7-1 RESERVOIRS WITH NEW DROUGHT OF RECORD

RESERVOIR	DOR (YEARS)	FIRM YIELD PRIOR TO DOR (ACRE-FEET)	FIRM YIELD AFTER DOR (ACRE-FEET)	YIELD REDUCTION (%)
Bois d'Arc Lake	4/2010 to 12/2015	120,200	90,600	25%
Bonham	4/2012 to 5/2015	5,340	3,800	29%
Moss	4/2010 to 5/2015	7,410	4,900	34%

Note: Lake Texoma also recorded a new drought of record, but the reservoir yield was unaffected.

7.1.2 Surface Water Drought Indication

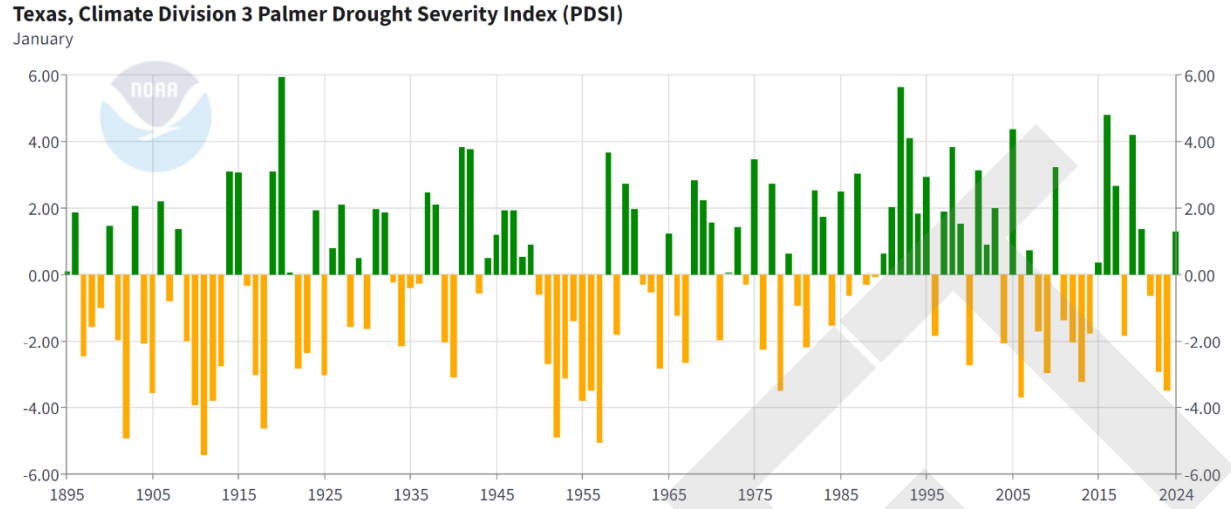
The significance of drought for the Region can be illustrated in several ways. For reservoir supplies, which make up a large portion of the water supply for Region C, the DOR corresponds to the period

that reaches the minimum storage in the reservoir under an assumed demand. While many of the major water supply reservoirs serving Region C were not yet constructed during the DOR, their performance under a repeat of historical hydrology including the DOR can be assessed using the Texas Commission on Environmental Quality (TCEQ) Water Availability Model (WAM); this assessment is directly associated with the use of the WAM model to determine firm availability of surface water.

7.1.3 Palmer Drought Severity Index

Another indicator commonly used by federal and state agencies to characterize drought severity is the Palmer Drought Severity Index (PDSI). The PDSI is an estimate of soil moisture conditions calculated based on precipitation and temperature. The PDSI classifies soil moisture on a scale ranging from approximately -6.0 to 6.0, with values of approximately -0.49 to +0.49 reflecting normal conditions, and -4.0 or lower representing extreme drought. The annual PDSI for the North Central Texas area, which includes the majority of the population in Region C, is shown in **Figure 7.1**. As illustrated in the figure, the 1950s drought is among the most severe in terms of PDSI and is also prolonged.

FIGURE 7.1 PALMER DROUGHT SEVERITY INDEX FOR NORTH CENTRAL TEXAS



Source: NOAA, National Centers for Environmental Information, accessed in August 2024.
https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/divisional/time-series/4103/pdsi/1/1/1895-2024

7.1.4 Other Regional Droughts

The Region C area, like much of Texas, has experienced a number of droughts in addition to the DOR, including several more recent dry periods. The drought period that began in approximately year 2010-2011 resulted in extremely low rainfall and soil moisture and high temperatures and created a new drought of record in some locations in the state. More recently, years 2022 and 2023 also were very dry years. In Region C, these dry periods, while intense, were not as long as the 1950s drought. Consequently, most water supplies, besides those mentioned in **Section 7.1.1**, were not impacted to the extent that would occur in a repeat of the DOR.

7.2 Uncertainty and Drought(s) Worse Than the Drought of Record

Section 7.2 highlights Region C's approach to addressing uncertainty by preparing for extreme drought conditions and summarizes the measures to enhance resilience against drought(s) worse than the drought of record (DWDOR).

7.2.1 Planning for Uncertainty

Across the state, new records are being consistently set: population growth, rising temperatures, unprecedented rainfall events, and new droughts of record. Each of these factors contributes to uncertainty in water planning.

In this plan, baseline water demands and available water supply volumes are estimated for DOR conditions. However, as evidenced by the recent DORs described in Section 7.1, Region C water supplies or supplies associated with Region C recommended water management strategies could experience a DWDOR. In addition, there are uncertainties in projected water demands and available water supply volumes. Either of these could potentially cause actual water demands greater than the baseline demands and/or reduced actual available supply volumes.

Aspects of the Region C Water Plan that will help mitigate the potential impacts of new droughts of record and uncertainties in planning variables include total supplies that are greater than the water demands, drought and emergency management measures, baseline water demands that have become more conservative, and conservative estimates of available water supply volumes.

7.2.2 Existing Measures for Preparation of the DWDOR

This section outlines four existing measures, discussed in more detail below, that Region C has implemented to prepare the DWDOR: Total Supply Greater Than Water Demand, Drought and Emergency Management Measures, Conservative Estimates of Available Water Supply Volumes, and Baseline Water Demands Becoming More Conservative.

Total Supply Greater Than Water Demand

One method to mitigate planning uncertainties and DWDORs is to plan for a total supply that is greater than the water demand, as represented by a management supply factor greater than one. If all of the recommended strategies in the Region C Water Plan are implemented, Region C would have an overall supply management factor of [to be added in later after all WMSs are developed].

Drought and Emergency Management Measures

The region purposefully does not recommend drought management strategies to meet projected water needs, reserving them for water providers to address DWDORs or other emergency water supply needs. Existing and potential drought and emergency management measures that would likely be available to Region C WUGs in the event of a DWDOR are discussed in the remainder of this chapter, beginning in Section 7.3.

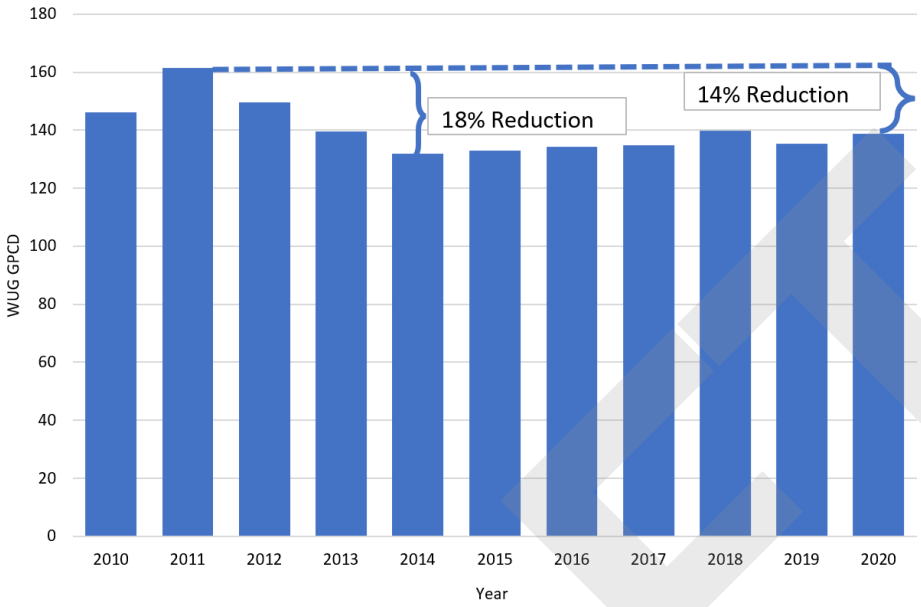
Conservative Estimates of Available Water Supply Volumes

Nearly 90 percent of the municipal water supply in Region C is provided by the MWPs. These providers recognize the intrinsic uncertainty in water planning and are actively planning for DWDORs. Three of the region's Major Water Providers (TRWD, DWU, and NTMWD) use conservative methods to estimate the supplies available from their surface water sources, resulting in supply estimates that are less than the firm yield. TRWD and DWU use a safe yield analysis, while NTMWD uses estimates based on climate modeling to assess resilience of its water sources under future conditions.

Baseline Water Demands Becoming More Conservative

Projected water demands for most WUGs in Region C are based on the per capita water demands experienced in 2011, a very dry year, minus the projected savings from passive water conservation measures. During the 2010s drought (**Figure 7.2**), WUGs in Region C achieved an average 18% reduction in per capita water use from 2011 to 2014, some of which could be attributed to permanent water conservation efforts and the natural replacement of inefficient fixtures. In more recent dry years, such as 2020, the average per capita water demand has been approximately 14 percent less than the 2011 per capita water demand. This suggests that permanent demand reductions may have taken place since 2011, leaving a buffer against increased water demands during a DWDOR or uncertainties in planning variables.

FIGURE 7.2. AVERAGE GPCDS OF REGION C WUGS



Sources: TWDB provided spreadsheet dated March 2022 (CORRECTED - WUG_HistoricalData_2026RWPs.xlsx)

7.2.3 Potential Additional Measures for DWDOR Resilience

Water providers in Region C may have other tools to address DWDORs that are not specifically addressed in this plan. For example, water providers with multiple sources may have the potential to gain extra yield from system operations of their supplies. Emergency interconnects and/or interim emergency purchases with other providers provide another potential option for water during a DWDOR.

7.3 Current Preparations for Drought in Region C

Section 7.3 outlines current drought preparation activities, including an overview of drought contingency plans (DCPs) for Region C WUGs, on-going drought-related preparations and coordination efforts, and a summary of counterproductive drought initiatives in the Region C area.

7.3.1 Drought Contingency Planning Overview

The TCEQ, in accordance with the Texas Administrative Code (TAC), requires all wholesale public water suppliers, retail public water suppliers, irrigation districts, and applicants for new or amended water rights to prepare and submit to the TCEQ DCPs meeting the requirements of 30 TAC §288(b) and to update these plans at least every five years. TCEQ administrative rules define a drought contingency plan as "a strategy or combination of strategies for temporary supply management and demand management responses to temporary and potentially recurring water supply shortages and other water supply emergencies". TCEQ rules and associated guidance for documents for drought contingency planning embody several key principles including:

- Drought and its potential impacts on both water supply and demand, as well as water supply infrastructure, can be expected to occur;

- Drought response measures and implementation procedures can be defined in advance of drought;
- Through timely implementation of drought response measures, it is possible to avoid, minimize, or mitigate the risks and impacts of water shortages and other drought-related water supply emergencies;
- Some water demands are considered essential to public health and safety or to the economy while others can be considered non-essential or discretionary; and
- Drought contingency plans should be tailored to the unique circumstances of each water supplier (e.g., vulnerability of water supply and/or infrastructure to drought, end-users and demand characteristics, objectives, etc.).

Although each water supplier faces unique circumstances, a few elements are found in most drought contingency plans and are consistent with the requirements for municipal DCPs in 30 TAC §288.20. These include:

- Criteria and procedures for determining when to initiate and when to terminate drought response measures. These are typically referred to as drought triggers. Common examples of drought triggers include indicators of supply availability (e.g., quantity of water supply remaining in a source) and demand indicators (e.g., daily demand relative to infrastructure capacity).
- Successive stages of drought response that require the implementation of increasingly stringent measures in response to increasingly severe drought conditions. A typical drought contingency plan will have an initial stage of voluntary measures followed by two or three successive stages of increasing stringent mandatory measures.
- Demand reduction goals or targets for each stage.
- Predetermined drought response measures for each stage that may include supply management, such as the temporary use of an alternative water source, and/or demand management, such as restrictions on non-essential water uses.
- Procedures for plan implementation and enforcement.
- Public information (e.g., notification) and education.

Most drought contingency plans place a heavy emphasis on demand management measures that are designed to reduce water demands by means of curtailment of certain uses. It is important to note that demand management in this context is distinctly different from water conservation, although the terms are often used interchangeably. The objective of water conservation is to achieve lasting, long-term reductions in water use through improved water use efficiency, reduced waste, and through reuse and recycling. By contrast, demand curtailment is focused on temporary reductions in water use in response to temporary and potentially recurring water supply shortages or other water supply emergencies (e.g., equipment failures caused by excessively high peak water demands). Common approaches to water demand curtailment, applied individually or in combination, include:

- Prescriptive restrictions or bans on non-essential water uses and waste. In a municipal setting, such restrictions commonly target landscape irrigation, car washing, ornamental fountains, etc.
- Use of water pricing strategies, such as excess use surcharges, to encourage compliance with water use restrictions or to penalize excessive water use.
- Water rationing, where water is allocated to users on some proportionate or pro rata basis.

7.3.2 Current Drought Preparation

All wholesale public water providers and most municipalities in Region C have made preparation for responding to drought conditions, including the development of individual drought contingency plans to be implemented when necessary.

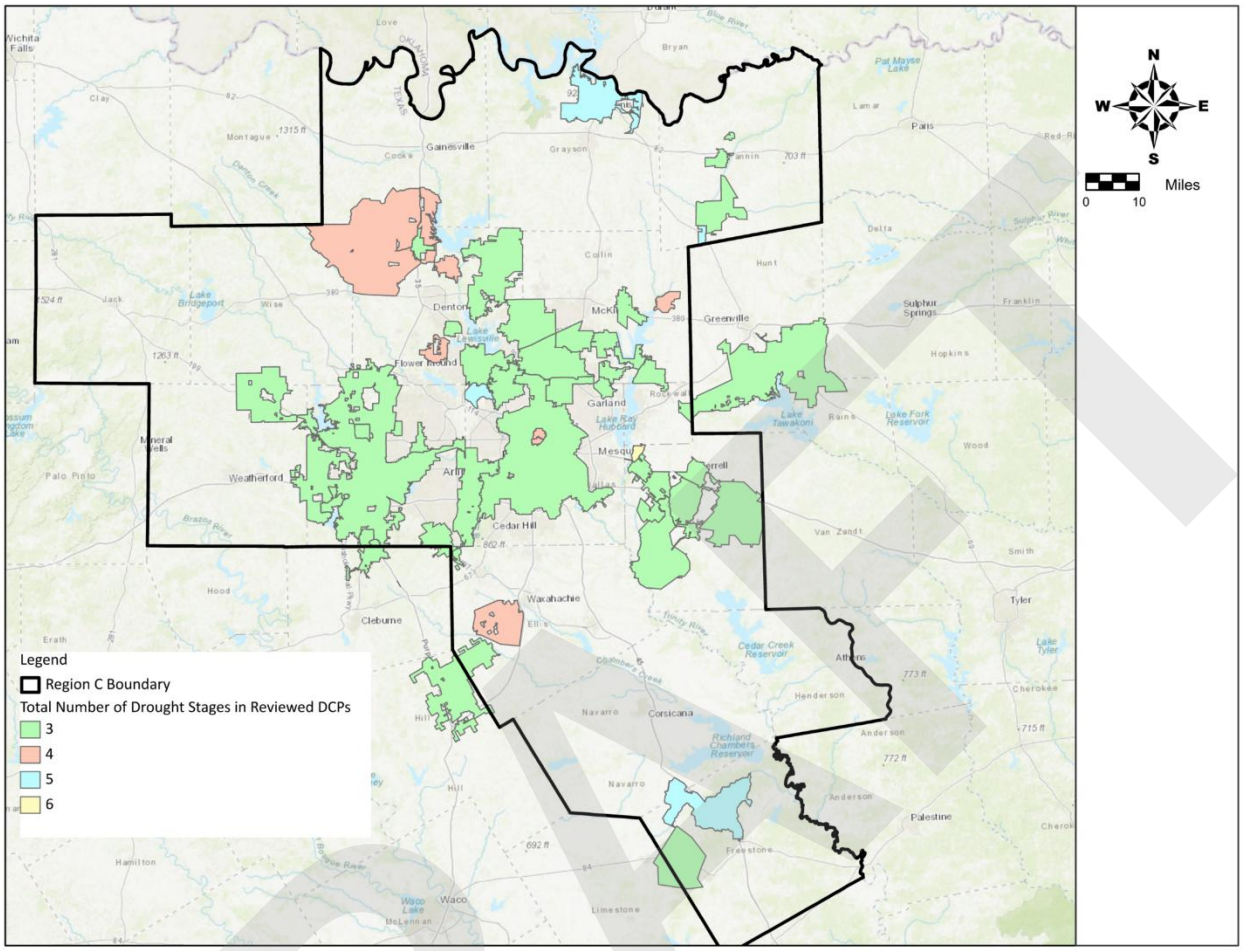
7.3.3 Regional Coordination

Being in the same media market, most of the MWPs (DWU, Fort Worth, NTMWD, TRWD and UTRWD) have coordinated their DCPs to have three stages which include the following irrigation restrictions for the following stages.

- **Stage 1** - Mandatory no more than twice per week watering [1](except for hand watering, drip irrigation and soaker hoses).
- **Stage 2** - Mandatory no more than once per week watering (except for hand watering, drip irrigation and soaker hoses).
- **Stage 3** - No outdoor irrigation (some exceptions for hand watering, drip irrigation and soaker hoses for trees and foundations).

The MWPs also encouraged their customers to adopt similar DCPs. Consultants to the RWPG reviewed 52 DCPs from Region C WUGs and water providers; of these, 41, or 79%, have Stage 3 as the terminal stage (**Figure 7.3**Error! Reference source not found.), and the total number of stages in many plans has been reduced to coordinate with other DCPs in the region.

FIGURE 7.3 TOTAL NUMBER OF DROUGHT STAGES IN THE REVIEWED DCPS



[1] In their 2024 DCP, the North Texas Municipal Water District has lifted the twice per week watering restriction in Stage 1. Instead, the plan now includes "increase enforcement of landscape watering restrictions from the water conservation plan" in Stage 1. The 2024 WCP limits spray irrigation to two days per week in summer and one day per week in winter, with education on the necessity of less frequent watering.

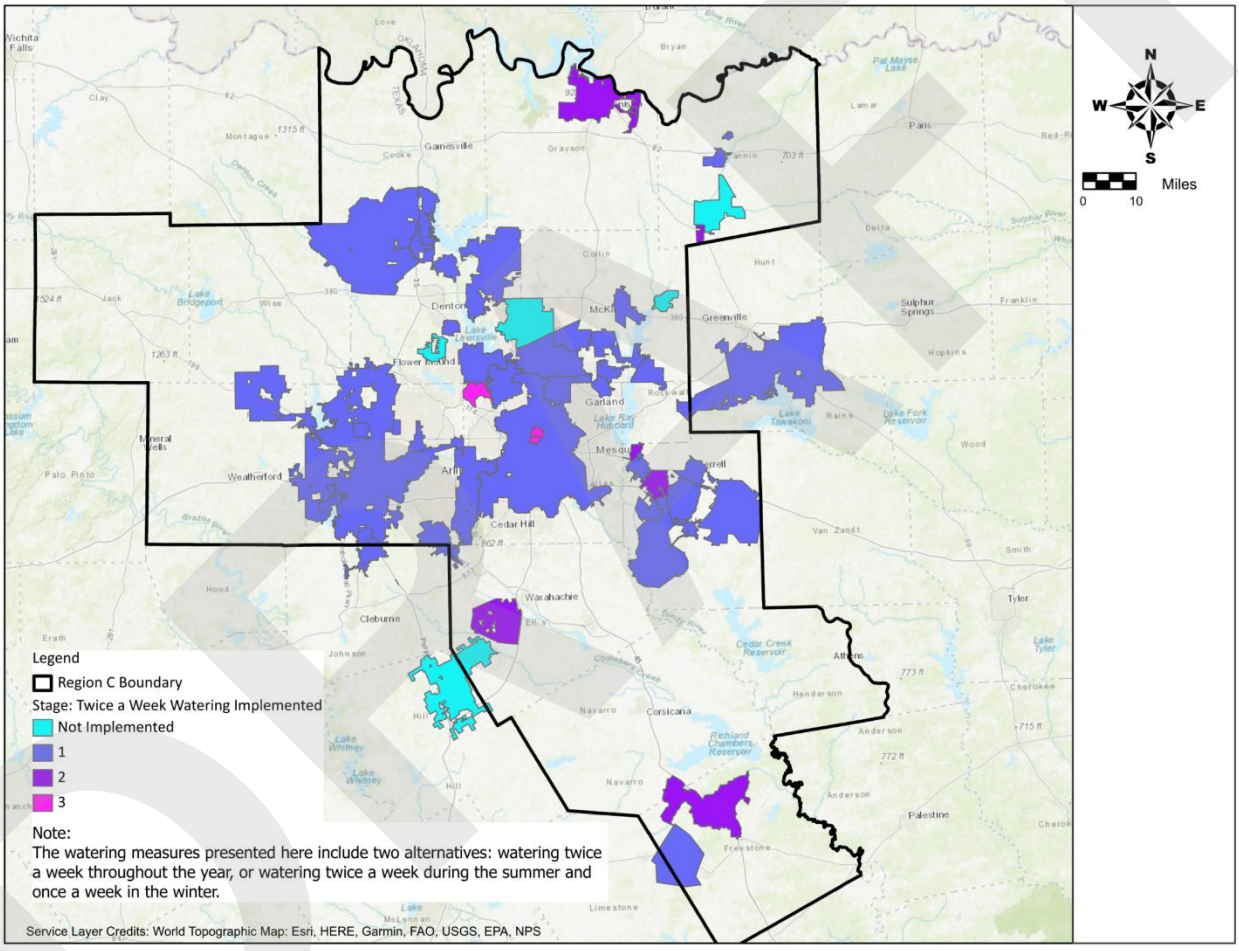
7.3.4 Summary of Existing Triggers and Responses

As part of the effort associated with Task 7 of the RWP, the RCWPG performed an assessment of existing drought triggers and planned responses in the region based on available DCPs. TCEQ rules and 30 TAC §288(b) require that DCPs include documentation of coordination with the RWPGs to ensure consistency with the regional plans. The RCWPG was able to obtain DCPs for 52 entities in the Region, including named water user groups (WUGs), and retail suppliers within the County Other WUGs.

A Region C drought contingency plan database was developed to store information on the available DCPs, including sponsor information, number of stages, and the trigger and response types associated with each stage. Each drought stage was also characterized by the reduction type (percent demand, unit reduction, etc.), and associated reduction quantity value (percentage, MGD, or other). The results of this analysis are summarized in **Appendix M**. The Drought Response summary table in **Appendix M** is organized by WWP since many of the customers' triggers are dependent on the WWP triggers.

The drought management strategies for most suppliers include limitation on outdoor irrigation and other non-irrigation measures such as imposing restrictions that prohibit certain water uses. Many of the entities included measures for twice per week, once per week and no outdoor irrigation for the first three stages as limiting outdoor irrigation tends to reach a larger customer group with higher potential water savings. This resulted from a regional consistency initiative sponsored by the major suppliers**. Figure 7.4** shows the stages when the twice a week watering restriction was initiated in the respective DCPs by the Region C WUGs. While some WUGs implement irrigation restrictions at different stages for various local reasons deemed appropriate by individual Region C WUGs, the majority have adopted the twice-a-week watering restriction starting at Stage 1.

FIGURE 7.4 INITIAL STAGE OF IMPLEMENTING TWICE-A-WEEK WATERING SCHEDULE IN REVIEWED DCPS



Note: Many Region C entities include year-round twice-a-week watering restrictions in their water conservation plans or on their websites. However, this information was not summarized in their DCPs and, therefore, was not included in the figure.

7.3.5 Effectiveness of Drought Response Measures and Challenges in Quantification

The information available to the RWPG through submitted DCP documents does not quantify the historical or potential reductions in water use associated with implementation of the DCPs.

7.3.6 Recent Implementation of Drought Contingency Measures in Region C

TCEQ collects data on Texas public water systems (PWSs) that reported water use restrictions and priority levels due to drought or emergency conditions. The most recent list of Texas PWSs limiting water use is found here: https://www.tceq.texas.gov/drinkingwater/trot/droughtw.html.

Region C RWPG analyzed records available from the TCEQ website to determine which Region C PWSs implemented water restrictions and to what extent the restrictions were implemented **(Table 7-2**). As of November 2024, only five PWSs currently have implemented various stages of the water restriction since January 2024. This number is significantly smaller than the total of 146 PWSs that implemented water restrictions during the 2011 through 2015 drought period, as reported in the 2021 RWP.

TABLE 7-2 REGION C PUBLIC WATER SYSTEMS RESTRICTING OUTDOOR WATER USE DUE TO DROUGHT

PWS ID	PWS NAME	COUNTY	DATE NOTIFIED	TCEQ STAGE
TX2200002	City of Azle	Tarrant	1/23/2024	V
TX2490007	City of Rhome	Wise	7/4/2024	M2
TX1990014	City of Heath	Rockwall	8/5/2024	M1
TX0610002	City of Denton	Denton	8/20/2024	M1
TX1840008	Walnut Creek SUD	Parker	10/22/2024	V

Notes:

Information above are obtained from the TCEQ website: https://www.tceq.texas.gov/drinkingwater/trot/droughtw.html

- V - Voluntary Watering Schedule
  - Voluntary restrictions. Customers requested to voluntarily limit water use.
- M1 - Mandatory, Limited Watering Schedule
  - Mild restrictions. Use of water for non-essential uses is restricted (i.e. outdoor watering limited to no more than twice or once a week)
- M2 - Mandatory, Limited to Hand-Held Hose Only

    - Moderate restrictions. All outdoor water usage is prohibited except by hand-held hoses with manual on/off nozzles. Water usage for livestock is exempt from this restriction.
- M3 - Mandatory, No Outside Watering:
    - Severe restrictions. All outdoor water usage is prohibited; livestock watering may be exempted by the utility. All consumption may also be limited to each customer in specific ways.

7.3.7 Summary of Unnecessary or Counterproductive Drought Response Efforts

House Bill 807, passed by the 86th Texas Legislature in 2019, amended Section 16.053 of the Texas Water Code to include the requirement that RWPGs "identify unnecessary or counterproductive variations in specific drought response strategies, including outdoor watering restrictions, among user groups in the regional water planning area that may confuse the public or otherwise impede drought response efforts" (TWC §16.053(e)(3)(E)).

The TWDB provided the following guidance to meet this requirement: "consider drought contingency plans from each WUG, as necessary, to inform WMS evaluations and recommendations and to determine which drought response efforts are unnecessary or counterproductive."

In response, the RWPG reviewed the DCPs of Region C customers and presented their findings in two spatial maps (**Figure 7.3 and Figure 7.4**), which illustrate variations in the number of drought stages and outdoor irrigation restrictions. While the RWPG acknowledged the discrepancies in these plans and encouraged Region C entities to review the maps and address inconsistencies, it also recognized that each entity has unique circumstances that influence their chosen stages and water use restrictions in drought measures.

7.4 RWPA Drought Response Triggers & Actions

Region C recommends drought responses for surface water and groundwater sources, as detailed in **Section 7.4.1** and **7.4.2**.

7.4.1 Drought Response Recommendation for Surface Water

The RCWPG acknowledges that the DCPs for surface water suppliers provide the best drought management tools for surface supplies and recommends that the DCPs developed by the operators of these supplies serve as the RCWPG triggers for surface water. The RCWPG also recognizes that these triggers are subject to change as providers periodically reassess their needs and encourages both wholesale providers and other entities using surface water to examine their DCPs regularly.

In particular, reservoirs are a major source of surface water in Region C, and drought triggers for direct providers and direct users of surface water in Region C are typically tied to reservoir levels or storage volume.

7.4.2 Drought Response Recommendation for Groundwater and Other Sources

Region C has historically relied primarily on surface water sources for most of its supply. Only a small percentage of the overall supply in the region comes from groundwater sources. Groundwater production is generally local to points of use, and aquifer properties vary spatially. Likewise, the characteristics of other sources such as reuse are specific to the associated supplier. As such, many providers using these sources have developed their DCPs in the context of their individual supply portfolios. The RCWPG acknowledges that the DCPs for groundwater suppliers are the best drought management tools for groundwater supplies and recommends that the DCPs developed by the operators of these supplies serve as the RCWPG triggers for groundwater. The RCWPG also recognizes that these triggers are subject to change as providers periodically reassess their needs and encourage both wholesale providers and other entities to examine their DCPs regularly.

The RCWPG recommends that water providers regularly review the U.S. Drought Monitor as a tool for tracking drought conditions and in drought planning efforts leading up to drought measure implementation. (https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?TX)

The drought monitor is easily accessible, regularly updated, and does not require entities to directly monitor specific sources to benefit from its information. Its simplicity also facilitates its use in communicating drought conditions to customers and other water users. **Figure 7.4** shows the categories of the U.S. Drought Monitor with corresponding Palmer Drought Severity Index values.

TABLE 7-3 U.S. DROUGHT MONITOR CATEGORIES

CATEGORY	DESCRIPTION	POSSIBLE IMPACTS	PALMER DROUGHT INDEX
D0	Abnormally Dry	Going into drought: short-term dryness slowing planting, growth of crops or pastures. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered	-1.0 to -1.9
D1	Moderate Drought	Some damage to crops, pastures; streams, reservoirs, or wells low, some water shortages developing or imminent; voluntary water-use restrictions requested	-2.0 to -2.9
D2	Severe Drought	Crop or pasture losses likely; water shortages common; water restrictions imposed	-3.0 to -3.9
D3	Extreme Drought	Major crop/pasture losses; widespread water shortages or restrictions	-4.0 to -4.9
D4	Exceptional Drought	Exceptional and widespread crop/pasture losses; shortages of water in reservoirs, streams, and wells creating water emergencies	-5.0 or less

The RCWPG recommends the following actions based on each of the drought classifications listed:

- **Abnormally Dry.** Entities should begin to review their DCP, status of current supplies and current demands to determine if implementation of a DCP stage is necessary.
- **Moderate Drought.** Entities should review their DCP, status of current supplies and current demands to determine if implementation of a DCP stage is necessary.
- **Severe Drought.** Entities should review their DCP, status of current supplies and current demands to determine if implementation of a DCP stage or changing to a more stringent stage is necessary. At this point if the review indicates current supplies may not be sufficient to meet reduced demands the entity should begin considering alternative supplies.
- **Extreme Drought.** Entities should review their DCP, status of current supplies and current demands to determine if implementation of a DCP stage or changing to a more stringent stage is necessary. At this point if the review indicates current supplies may not be sufficient to meet reduced demands the entity should consider alternative supplies.
- **Exceptional Drought.** Entities should review their DCP, status of current supplies and current demands to determine if implementation of a DCP stage or changing to a more stringent stage is necessary. At this point if the review indicates current supplies are not sufficient to meet reduced demands the entity should implement alternative supplies.

7.5 Existing and Potential Emergency Interconnects

In accordance with the requirements of the Texas Water Development Board (TWDB) and the Texas Administrative Code, the RCWPG was required to collect information on existing water infrastructure that may be used for emergency interconnects. Existing emergency interconnect information was obtained from the Texas Commission on Environmental Quality, Texas Drinking Water Watch available at https://dww2.tceq.texas.gov/DWW/ and by soliciting such information

from Region C MWPs and WUGs through a number of surveys and outreach conducted in 2023 and 2024 by the Region C consultant team. **Table 7-4** includes a summary list of entities and their respective emergency interconnect providers.

TABLE 7-4 SUMMARY OF EMERGENCY INTERCONNECTS

ENTITY NAME	EMERGENCY INTERCONNECT PROVIDER
Anna	Altoga WSC
Argyle WSC	City of Denton; Cross Timbers WSC
Arledge Ridge WSC	City of Leon
Aubrey	Upper Trinity Regional Water District; Mustang SUD
Balch Springs	City of Dallas
Becker Jiba WSC	City of Kemp
Bedford	City of Colleyville; City of Hurst
Bells	SW Fannin County SUD
Benbrook Water Authority	City of Fort Worth
Blackland WSC	Cash SUD
Bois D Arc MUD	City of Windom
Boyd	Walnut Creek SUD
Buena Vista-Bethel SUD	City of Waxahachie; Emerald Forest
Callisburg WSC	Callisburg ISD
Chatfield WSC	City of Kerens
Colleyville	City of Grapevine; City of North Richland Hills; City of Bedford
Crandall	City of Forney; Gastonia-Scurry SUD; City of Mesquite
Cross Timbers WSC	Argyle WSC; Denton County FWSD 7
Culleoka WSC	City of Princeton
Dallas County Park Cities MUD	City of Dallas
Desoto	City of Dallas
East Cedar Creek FWSD	Payne Springs WSC
Edgecliff	City of Fort Worth
Euless	City of Grapevine
Everman	City of Fort Worth

ENTITY NAME	EMERGENCY INTERCONNECT PROVIDER
Fairfield	Westwood Utility Co
Farmersville	Caddo Basin SUD
Forest Hill	Harris County MUD
Frognot WSC	North Farmersville WSC
Gainesville	Woodbine WSC
Grand Prairie	City of Arlington
Grapevine	City of Colleyville; City of Southlake; DFW Airport; City of Grapevine
Gunter	Marilee SUD
Haltom City	City of North Richland Hills
Highland Park	City of Dallas
Honey Grove	Bois d'Arc MUD
Howe	City of Sherman; North Texas Municipal Water District
Hudson Oaks	City of Weatherford
Hurst	Trinity River Authority; City of Colleyville
Josephine	Nevada SUD
Kemp	City of Mabank
Lake Cities Municipal Utility Authority	Harbor Grove WSC
Leonard	Arledge Ridge WSC
Mesquite	City of Dallas
Mount Zion WSC	City of Rockwall
Mountain Springs WSC	Pioneer Valley Water Company
North Kaufman WSC	City of Kaufman
Northlake	Argyle WSC
Pantego	City of Arlington
Pelican Bay	City of Azle
Pink Hill WSC	City of Sherman
Providence Village WCID	Upper Trinity Regional Water District
R C H WSC	Blackland WSC
Red Oak	City of Glenn Heights; Rockett SUD
Reno (Parker)	City of Azle
Richardson	City of Dallas
Saginaw	City of Fort Worth

ENTITY NAME	EMERGENCY INTERCONNECT PROVIDER
Sansom Park	City of Fort Worth
Savoy	Southwest Fannin County SUD
Seagoville	City of Dallas
South Ellis County WSC	City of Italy
Southlake	City of Grapevine
Springtown	Walnut Creek SUD
Starr WSC	City of Sherman
Walnut Creek SUD	City of Springtown
Watauga	City of North Richland Hills
Waxahachie	Bardwell Lake
West Wise SUD	Walnut Creek SUD; City of Chico
Westminster SUD	Collin County Adventure Camp
White Shed WSC	Ravenna Nunnelee WSC
Willow Park	City of Weatherford
Wilmer	City of Hutchins; Pinto Water Station
Woodbine WSC	City of Callisburg; City of Gainesville; City of Oak Ridge

7.6 Drought Management Water Management Strategies

The RCWPG does not support drought management measures as a WMS in the Region C RWP. Such measures are not designed to address long-term growth in demand but, rather, are inherently temporary strategies intended to conserve water supplies or reduce adverse impacts during times of drought or emergency and are not active under more hydrologically favorable conditions. Drought management measures would not be implemented until well into a drought of record and would be lifted shortly after the drought has subsided. Because drought management is only active and beneficial under certain periods of time, its reliable yield is essentially zero when considered in an analogous manner to surface water, groundwater, reuse, or conservation. Also, as discussed previously, the efficacy of individual drought response measures is difficult to quantify and can vary considerably from one entity to another and one drought to another due to hydrologic and human factors. This creates additional uncertainty in the use of drought response as a reliable measure for addressing water needs. While drought management measures are not included as WMS in the Region C RWP, drought management is an important component of water supply management. The RCWPG supports implementation of DCPs under appropriate conditions by water providers to prolong supply availability and reduce impacts to water users and local economies.

In addition, as part of drought preparedness efforts, the Texas Section of the American Water Works Association (TAWWA) compiled the TAWWA Drought Planning Survey Results[2]. This report outlines key findings regarding drought planning for Texas public water utilities. It highlights effective measures for demand management during droughts, such as monetary consequences like fines and fees, which are seen as effective but diminishing in impact over time. Additionally, designated watering schedules are considered the next most effective water-saving measure. These drought measures have proven to be effective measures in reducing demand during droughts. Therefore, the Region C RWPG recommends that the WUGs within Region C area consider implementing these measures as part of their drought contingency planning if they are not already utilized.

7.7 Emergency Responses to Local Drought Conditions or Loss of Municipal Supply

In addition to regional or statewide droughts, entities may be subject to localized drought conditions or loss of existing water supplies due to infrastructure failure, temporary water quality impairment, or other unforeseen conditions. Loss of existing supplies, while relatively uncommon, is particularly challenging to address as the causes are often difficult to anticipate. Numerous entities within Region C have DCPs which include an emergency response stage and corresponding measures for droughts exceeding the DOR or for other emergency water supply conditions. Some entities, including a number of WWPs, also have emergency action plans which establish procedures for responding rapidly and effectively to emergency conditions.

Because it is not possible for water providers to predict all emergency conditions and because responses or repairs may require an extended period of time, it is important to consider the range of options for emergency water supply sources available under emergency conditions. A high-level analysis of options was performed to assess potential emergency water supply options for WUGs in Region C with an estimated Year 2020 population of 7,500 or less that rely on a sole source for existing supply, as well as for all County Other WUGs (these parameters were set forth in the scope of work for regional planning). Consideration of emergency supply options for these entities is particularly important as many smaller WUGs may not have existing access to backup supplies through interconnect facilities with adjacent systems. It was assumed that the entities evaluated for emergency responses to local drought conditions or loss of municipal supply have 180 days or less of remaining supply. Applicable WUGs, including 16 County-Other WUGs and 68 additional municipal WUGs that rely on one water source and have an estimated 2020 population less than 7,500, were characterized by projected Year 2030 population, Year 2030 demand, existing supply source type (surface water, groundwater, or blend), and other WUG-specific information. These characteristics were then used to identify potentially feasible emergency supply options and associated infrastructure requirements. The results of this analysis are presented in **Appendix M.**

[2] https://savetexaswater.org/resources/doc/TAWWA-Drought-Survey-Summary-of-Findings_DRAFT1.pdf

7.8 Other Recommendations

Section 7.8 presents additional recommendations from the RCRWPG for entities in the Region C area, including those from the Texas Drought Preparedness Council (DPC), considerations related to the DCPs, and recommendations for entities not required to submit a DCP.

7.8.1 Texas Drought Preparedness Council

The DPC is composed of representatives from multiple State agencies and plays an important role in monitoring drought conditions, advising the governor and other groups on significant drought conditions, and facilitating coordination among local, State, and federal agencies in drought-response planning. The Council meets regularly to discuss drought indicators and conditions across the state and releases Situation Reports summarizing its findings.

Additionally, the Council has developed the State Drought Preparedness Plan, which sets forth a framework for approaching drought in an integrated manner to minimize impacts to people and resources. The RCWPG supports the ongoing efforts of the Texas Drought Preparedness Council and recommends that water providers and other interested parties regularly review the Situation Reports as part of their drought monitoring procedures. In a letter dated February 8, 2024, the Council provided three recommendations to the Region C RWPGs which are addressed in this chapter.

- "The regional water plans and state water plan shall serve as water supply plans under drought of record conditions. The DPC encourages regional water planning groups to consider planning for drought conditions worse than the drought of record, including scenarios that reflect greater rainfall deficits and/or higher surface temperatures."
    - Region C Response: Region C has utilized the Chapter 7 template provided by TWDB staff and has addressed the requirements related to a DWDOR, as shown in **Section 7.2.**
- "The Drought Preparedness Council encourages regional water planning groups to incorporate projected future reservoir evaporation rates in their assessments of future surface water availability."
    - Region C Response: DWU does consider alternative evaporation rates in developing its safe yields. However, the incorporation of future evaporation rates in the assessments of future surface water availability for Region C reservoirs would need to be developed by the TCEQ as part of the WAM updates. Regional water planning rules require the TCEQ-approved WAMs be used for surface water supplies.
- "The Drought Preparedness Council encourages regional water planning groups to identify in their plans utilities within their boundaries that reported having less than 180 days of available water supply to the Texas Commission on Environmental Quality during the current or preceding planning cycle. For systems that appeared on the 180-day list, RWPGs should perform the evaluation required by Texas Administrative Code Section 357.42(g), if it has not already been completed for that system."
    - Region C Response: Region C has addressed this requirement in **Section 7.7**and Appendix M.

7.8.2 Development, Content, and Implementation of DCPs

The RCWPG recognizes that the DCPs developed by water providers in the Region are the best available tools for drought management, and recommends the following actions regarding development, content, and implementation of DCPs:

- In addition to any monitoring procedures included in the DCP, regular monitoring of resources and information from TCEQ, TWDB, the Texas Drought Preparedness Council, and the U.S. Drought Monitor.
- Coordination with wholesale providers regarding drought conditions and potential implementation of drought stages, particularly during times of limited precipitation.
- Review of the DCP by appropriate water provider representatives, particularly during times of limited precipitation.
- Regular consideration of updates to the DCP document to accommodate changes in supply sources, infrastructure, water demands, or service area.
- Communication with customers during times of decreased supply or precipitation to facilitate potential implementation of drought measures and reinforce the importance of compliance with any voluntary measures.

Designation of appropriate resources to allow for consistent application of enforcement procedures as established in the DCP.

7.8.3 Recommendations for Entities Not Required to Submit a DCP

While wholesale suppliers, retail public water suppliers, and irrigation districts are required to have a DCP, no DCP is required for a number of users such as industrial operations and individual irrigators. While some of these users receive water from providers with established drought management procedures, all water users are subject to the impacts of drought. For entities not required to have a DCP and not under the DCP of a supplier, the RCWPG recommends that they consider developing a DCP based on one of the model plans provided on the Region C website. A link are provided in **Section 7.9** of this document.

The RCWPG recommends that these entities regularly monitor drought conditions to facilitate decision-making processes. Several resources are available for monitoring drought. For users that receive water from an outside supplier, communication and notifications of anticipated or implemented drought stages are key resources.

The following references are also recommended for consideration:

- **Palmer Drought Severity Index:** https://www.drought.gov/drought/data-maps-tools/current-conditions
- **U.S. Drought Monitor (Texas detail):** https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?TX
- **TCEQ drought information:** https://www.tceq.texas.gov/response/drought
- **TWDB drought information:** https://www.waterdatafortexas.org/drought

7.9 Model Drought Contingency Plans

Model drought contingency plans addressing the requirements of 30 TAC §288(b) were developed for Region C and are available on the Region C website. Model plans were developed for municipal providers, irrigation users, manufacturing users, and steam electric water users. These model plans were largely based on templates provided by the TCEQ, with several modifications made to elaborate on notification procedures, provide consistency with region-wide efforts to have three standard stages, and incorporate other components.

These plans are available in the 2026 Regional Water Plan documents folder at regioncwater.org.

Agenda Item V.F – Attachment

Draft IPP Chapter 8

CHAPTER EIGHT

UNIQUE STREAM SEGMENTS, UNIQUE RESERVOIR SITES, AND LEGISLATIVE RECOMMENDATIONS

OVERVIEW

This chapter gives an overall summary of make recommendations regarding ecologically unique river and stream segments; unique sites for reservoir construction; and regulatory, administrative, or legislative actions.

Richland Chambers Reservoir

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8 UNIQUE STREAM SEGMENTS, UNIQUE RESERVOIR SITES, AND LEGISLATIVE RECOMMENDATIONS

CHAPTER OUTLINE

Regional Water Planning Guidelines, Title 31, Part 10, Chapter 357 of the Texas Administrative Code, call for regional water planning groups to make recommendations regarding ecologically unique river and stream segments; unique sites for reservoir construction; and regulatory, administrative, or legislative actions that will facilitate the orderly development, management, and conservation of water resources. At the February 24, 2025 Region C Water Planning Group (RCWPG) meeting, the group voted to approve the recommendations which are reflected in this chapter.

8.1 Summary of Recommendations

The recommendations for this chapter are divided into three main categories: Ecologically Unique River and Stream Segments; Unique Sites for Reservoir Construction; and Regulatory, Administrative, or Legislative Actions.

Recommendations for Ecologically Unique River and Stream Segments

The following are recommendations for ecologically unique river and stream segments:

- ~~Convene a working group comprised of representatives of TWDB, TPWD, TCEQ, and the sixteen regions to bring clarity, purpose, and direction to the legislative mandate to "identify river and stream segments of unique ecological value [1]."~~
- No recommendations to river or stream segments as ecologically unique

Recommendations for Unique Sites for Reservoir Construction

The following are recommendations for unique sites for reservoir construction:

- Recommend that the Texas Legislature continue to designate the following sites as unique sites for reservoir construction:
  - Ralph Hall [under construction]
  - Marvin Nichols
  - ~~Fastrill~~[1]
  - Tehuacana
  - Columbia
- Recommend that the Texas Legislature designate the following sites for reservoir construction:
  - George Parkhouse II (North)
  - George Parkhouse I (South)
- Encourage continued affirmative votes by sponsors of these proposed reservoirs to make expenditures necessary to construct or apply for required permits and avoid termination of unique reservoir site designations. **Section 8.3** describes actions that sponsors have taken to preserve the unique reservoir site designations for the designated reservoirs.

Policy and Legislative Recommendations

The following are recommendations for regulatory, administrative, or legislative action:

- Regional Water Planning Process
  - Encourage formation of a Working Group on Stream Segments of Unique Ecological Value.
  - Support legislative and state agency findings regarding water use evaluation.
  - Coordination between TWDB and TCEQ to determine the appropriate data and tools for use in regional water planning and in permitting.
- TCEQ Policy and Water Rights
  - Remove some of the unnecessary barriers to interbasin transfers.
  - Support recent changes to water code that exempt certain water right permits from cancellation for non-use.

[1] ~~The Region I RWPG is considering a vote during its January 2025 meeting to determine whether to remove Fastrill from the list of Unique Sites for Reservoir Construction.~~

  - Support reservoir construction.
- State Funding and Water Supply Programs
  - Continue and expand State funding for TWDB SWIFT, WIF, and other loans and programs.
  - More State funding for water conservation efforts.
  - Consider alternative financing arrangements for large projects.
  - Continue and expand funding of Groundwater Conservation Districts.
  - Funding for NRCS structures as a form of watershed protection.
- Water Reuse and Desalination
  - Support research to advance reuse and desalination.
  - Continue and expand funding assistance for desalination and water reuse projects.
- State and Federal Program – Water Supply Issues
  - Continued and increased State support for efforts to develop out-of-state water supplies.
  - ~~Oversight of Groundwater Conservation District rule making.~~
  - Revise Federal Section 316(b) regulations on power plant cooling water.
  - Reallocation of storage in and maintenance of Federal reservoirs.
  - Funding of long-range Federal water supply projects.
  - Provide education to State policy makers related to Aquifer Storage and Recovery.
  - Consideration of statewide restrictions on outdoor landscape watering.
  - Development of a program for managing abandoned or deteriorating water wells.

8.2 Recommendations for Ecologically Unique River and Stream Segments

TPWD recommendations for 10 ecologically unique river and stream segments in Region C were published in *Ecologically Significant River and Stream Segments of Region C, April 2002*. These 10 river and stream segments, along with the attributes that qualified them for unique status, are listed in **TABLE 8.1**. The segments are also depicted in red in **FIGURE 8.1**. No update to this list of streams has been developed by TPWD to date. In previous Region C Water Plans, and again in this *2026 Region C Water Plan*, the Region C Water Planning Group decided not to recommend any river or stream segments as ecologically unique because of continued unresolved concerns regarding the implications of such a designation by the Texas Legislature. According to Texas Water Code 16.051(f), "This designation solely means that a state agency or political subdivision of the state may not finance the actual construction of a reservoir in a specific river or stream segment designated by the legislature…". However, TWDB regulations governing regional water planning require analysis of the impacts of water management strategies on unique stream segments, which implies a level of protection beyond the mere prevention of reservoir development.

In preparing for the *2011 Region C Water Plan*, the RCWPG reviewed the 2006 recommendations of the other regional planning groups and directed its consultants to take several actions regarding ecologically unique river and stream segments. These actions included developing scenarios of concern, meeting with state agencies, reviewing previously identified segments, considering additional segments, presenting possible candidate segments to the RCWPG, receiving

comments, and recommending actions. The potential scenarios of concern involved features such as dams, pipeline crossings, water intakes, new water outfalls, treated effluent outfalls, constructed wetlands, and bed and banks transport of reservoir releases. The potential scenarios of concern were addressed in an August 2009 meeting with TWDB, TPWD, and TCEQ. During this meeting, they reviewed ecologically unique river and stream segment legislation and agency rules. The conclusions from that meeting were as follows:

- TPWD planned no updates to its Ecologically Significant River and Stream Segments of Region C, April 2002.
- TPWD and TWDB staff believed that ecologically unique river and stream segment legislation only impacts public financing of reservoirs.
- TCEQ staff's position is to use all available information to regulate attributes of river and stream segments without regard to ecologically unique designation.
- Ecologically unique river and stream segment designation may influence public opinion.
- Ecologically unique river and stream segment legislation has not been tested in the courts.
- A statewide working group involving TWDB, TPWD, TCEQ, and Regional Water Planning Groups (RWPG) could help address concerns.

The RCWPG continues to recommend the formation of a working group comprised of representatives of TWDB, TPWD, TCEQ, and the sixteen water planning regions to bring clarity, purpose, and direction to the legislative mandate to "identify river and stream segments of unique ecological value." It is expected that the group would:

- Research, verify, and publicize the intent of ecologically unique river and stream segment legislation.
- Research agency rules and recommend changes or clarifications where needed.
- Ensure common understanding of "reservoir" as used in ecologically unique river and stream segment legislation and agency rules.
- Identify the lateral extent of ecologically unique river and stream segment designation.
- Seek clarification of quantitative assessment of impacts on ecologically unique river and stream segments.
- Illustrate the value of ecologically unique river and stream segment designations.

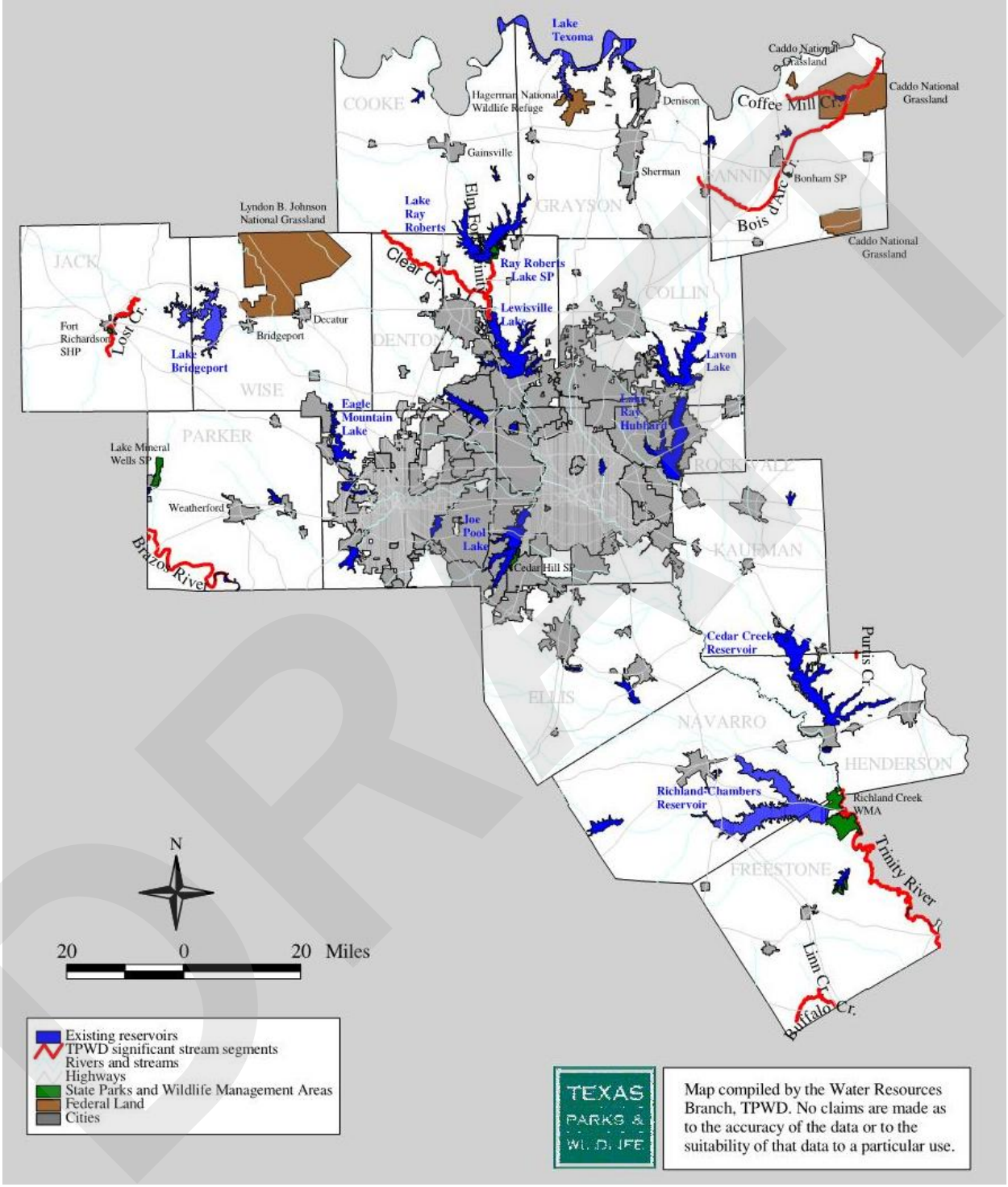
TABLE 8.1 TEXAS PARKS AND WILDLIFE DEPARTMENT RECOMMENDATIONS FOR DESIGNATION AS ECOLOGICALLY UNIQUE RIVER AND STREAM SEGMENTS

REGION C RIVER OR STREAM SEGMENT	DESCRIPTION	BASIN	COUNTY	TPWD REASONS FOR DESIGNATION [A]				
				BIOLOGICAL FUNCTION	HYDROLOGIC FUNCTION	RIPARIAN CONSERVATION AREA	HIGH WATER QUALITY/ EXCEPTIONAL AQUATIC LIFE/ AESTHETIC VALUE	ENDANGERED SPECIES/ UNIQUE COMMUNITIES
Bois d'Arc Creek	Entire length	Red	Fannin/ Grayson	X	X	X		
Brazos River	F.M. 2580 to Parker/Palo Pinto County line	Brazos	Parker	X			X	X
Buffalo Creek	Alligator Creek. to S.H. 164	Trinity	Freestone	X	X			
Clear Creek	Elm Fork Trinity River to Denton/Cooke County line	Trinity	Denton				X	
Coffee Mill Creek	Entire length	Red	Fannin			X		
Elm Fork of Trinity River	Lewisville Lake to Lake Ray Roberts Dam	Trinity	Denton			X		
Linn Creek	Buffalo Creek. to C.R. 691	Trinity	Freestone	X	X			
Lost Creek	Entire length	Trinity	Jack			X	X	
Purtis Creek	S. Twin Creek. to Henderson/Van Zandt County line	Trinity	Henderson			X		
Trinity River	Freestone/Anderson/Leon County line to Henderson/Anderson County line	Trinity	Freestone/ Anderson	X		X		X

[a] *Data are from source (2).*

[b] *The criteria listed are from Texas Administration Code, Title 31, Section 358.2. The Texas Parks and Wildlife Department feels that their recommended stream reaches meet those criteria marked with an X.*

FIGURE 8.1 TEXAS PARKS AND WILDLIFE DEPARTMENT RECOMMENDATIONS FOR DESIGNATION AS ECOLOGICALLY UNIQUE RIVER AND STREAM SEGMENTS



8.3 Recommendations for Unique Sites for Reservoir Construction

In 2007, the 80th Texas Legislature passed Senate Bill 3 (SB3), which designated unique sites for reservoir construction as recommended in the *2007 State Water Plan*, including the following sites previously recommended by the Region C Water Planning Group that are proposed to maintain designation:

- Ralph Hall site on the North Sulphur River in Fannin County [Under Construction]
- Marvin Nichols site on the Sulphur River in Red River, Titus, and Franklin counties
- ~~Fastrill site on the Neches River in Anderson and Cherokee counties~~
- Tehuacana site on Tehuacana Creek in Freestone County.

SB3 also designated the Columbia site on Mud Creek in Cherokee County as a unique site for reservoir construction. This site was previously recommended by the East Texas Regional Water Planning Group.

According to Section 16.051 of the Texas Water Code, these designations were to terminate on September 1, 2015, unless there was "an affirmative vote by a proposed project sponsor to make expenditures necessary in order to construct or file applications for permits required in connection with the construction of the reservoir under federal or state law". To date, none of the existing reservoir designations have been terminated.

Two new reservoirs located at the George Parkhouse II (North) site and George Parkhouse I (South) site are included as alternative water management strategies in the *2026 Region C Water Plan* for the Upper Trinity Regional Water District (UTRWD) and the North Texas Municipal Water District (NTWMD). It was recommended in the *2022 State Water Plan* that the Texas Legislature designate the George Parkhouse II (North) site as a unique site for reservoir construction, and it is recommended in this plan that the Texas Legislature also designate the George Parkhouse II (South) site as a unique site for reservoir construction. The Legislature has not yet approved these additional designations.

Lake Ralph Hall is located on the North Sulphur River in southeast Fannin County, north of Ladonia. The site is located in the Sulphur River Basin in Region C. The reservoir will yield approximately 40,000 acre-feet per year, store 180,000 acre-feet, and covers approximately 7,600 acres. Lake Ralph Hall, currently under construction, is a recommended water management strategy for the UTRWD. The lake will provide water to southeast Fannin County residents, as well as to customers of the UTRWD in the Denton County area.

To develop Lake Ralph Hall, UTRWD has completed the following:

- Secured a water right. Permit 5821, issued in December 2013, allows UTRWD to impound up to 180,000 acre-feet in Lake Ralph Hall and to divert up to 45,000 acre-feet per year for municipal, industrial, irrigation, and recreation purposes. As part of the water right permitting process, UTRWD completed special engineering and cultural resources studies, including:

  - Hydrologic and hydraulic studies,
  - Biological and in-stream flow assessment,
  - Geologic characteristics study,
  - Economic impact study, and
  - Water conservation implementation plan.
- Received a Clean Water Act Section 404 permit from the U.S. Army Corps of Engineers (USACE) in January 2020. As part of the 404 permitting process, UTRWD has:
  - Completed special engineering and cultural resources studies, including:
  - Hydrologic and hydraulic studies,
  - Preliminary jurisdictional determination of waters of the U.S.,
  - Preliminary habitat assessment,
  - Archaeology & quaternary geology,
  - Biological and in-stream flow assessment,
  - Geologic characteristics,
  - Economic impact study,
  - Geomorphic and sedimentation evaluation, and
  - Mitigation plan for impacts to aquatic resources and terrestrial habitats.
- Developed an Environmental Impact Statement (EIS) and submitted it to the USACE. Final approval of the EIS was issued in September 2019.
- Begun construction in 2021 with road and bridgework completion in late 2023. Project completion for water delivery is anticipated in 2026.

Marvin Nichols Reservoir would be located on the Sulphur River upstream from its confluence with White Oak Creek. The dam would be in Titus and Red River counties and would also impound water in Franklin County. The site is located in the Sulphur River Basin in Region D.

The Region C entities that are interested in development of Marvin Nichols Reservoir and other Sulphur Basin Supplies (NTMWD, TRWD, Dallas, UTRWD, and Irving) have formed a Joint Committee on Program Development (JCPD). Since 2001, the JCPD has provided more than $5 million to further investigate the development of Marvin Nichols Reservoir and other potential water supply sources in the Sulphur River Basin, with the most comprehensive study completed with the USACE in 2014. The JCPD has also sponsored independent studies on the economic impacts, updated hydraulic studies, dam design, and cost of the project. The most recent study was completed in 2024.

This *2026 Region C Water Plan* recommends a Marvin Nichols Reservoir as a recommended strategy for three providers: TRWD, NTMWD and UTRWD. It is an alternative strategy for DWU and Irving. The proposed Marvin Nichols strategy would provide 414,600 acre-feet per year. Approximately 80 percent of the water supplied from the Marvin Nichols Reservoir is expected to

serve customers of wholesale water providers in Region C and approximately 20 percent would serve water needs in Region D.

As mentioned above, since 2001, the JCPD has continued to investigate the development of Marvin Nichols Reservoir and other potential water supply sources in the Sulphur River Basin. These investigations have included:

- Land use/land cover classification
- Identification of reservoir sites and conservation pool elevations
- Reconnaissance geology review of potential dam sites
- Mapping
- A site selection study for Marvin Nichols Reservoir
- System operation assessment of Wright Patman Lake and Jim Chapman Lake
- Analysis of Sulphur River instream flows (hydrology, hydraulics, and fish habitat utilization)
- Aerial LIDAR survey
- Hydrologic and hydraulic modeling
- Modification of the TCEQ's Sulphur River Water Availability Model
- Development of a Sulphur River Basin Soil and Water Assessment Tool (SWAT) model
- Wright Patman Lake additional yield modeling
- Socioeconomic Assessment
- Comparative Environmental Assessment
- Studies of
    - Operation issues
    - Institutional issues
    - Water demand/availability

These studies are needed to develop applications for a state water permit and a Section 404 permit for the project. Some of the investigations listed above are part of the Sulphur River Basin Feasibility Study, conducted by the JCPD in partnership with USACE and the SRBA [4]. More recent studies looked at an updated Probable Maximum Flood (PMF) at the site and updated the dam design and costs of the project.

Per House Bill 1 of the 88th Regular Legislative Session, TWDB conducted a 2025 Feasibility Review of the proposed reservoir, including the implementation timeline, associated costs, land acquisition considerations, and the economic impact of the proposed project. The review found that the Dallas-Fort Worth area is in need of the reservoir based on the anticipated growth in population and water demand over the planning horizon. In addition, the project was determined to be considered feasible based on the studied components of the review.

Tehuacana Reservoir would be located on Tehuacana Creek in Freestone County, south of the Richland-Chambers Reservoir. The site is located in the Trinity River Basin in Region C and was originally conceived as an extension of Richland-Chambers Reservoir. The spillway at Richland-Chambers was sized to accommodate the spills from Tehuacana Reservoir. The proposed reservoir would have a safe yield of 22,330 acre-feet per year and would inundate approximately 15,000 acres. Tarrant Regional Water District would be the developer of Tehuacana Reservoir.

Tehuacana Reservoir is an recommended water management strategy in the *2026 Region C Water plan* to serve needs in Freestone County in addition to customers of TRWD. In addition, TRWD has completed an evaluation of four alternative dam locations and impact scenarios, reservoir site geology, natural resources, and land and mineral ownership [(6)].

Lake Columbia would be located on Mud Creek in Cherokee County, southeast of Jacksonville. The site is located in the Neches River Basin in Region I. The proposed reservoir is estimated to have a firm yield of 85,507 acre-feet per year. Approximately 75% of the firm supply (56,000 acre-feet per year) would be available to Dallas. Lake Columbia would cover 10,133 acres of land. The Angelina & Neches River Authority (ANRA) would be the developer of Lake Columbia. Purchasing water from Lake Columbia is a component of the recommended Neches Watershed water management strategy for Dallas. Implementation would likely occur after 2080 unless additional supplies are needed sooner. ANRA is currently under contract with 17 local participants who support the project. In addition, ANRA and the TWDB have an active master agreement in which the TWDB has a 37% interest in the project.

To develop Lake Columbia, ANRA has:

- Secured a water right. Permit 4228, issued in June 1985, allows ANRA to impound up to 195,500 acre-feet in Lake Columbia and to divert up to 85,507 acre-feet per year for municipal, industrial, and recreation purposes.
- Applied for a Clean Water Act Section 404 permit from the U.S. Army Corps of Engineers (USACE) in 2000 but was withdrawn in 2020 for insufficient purpose and need definition per USACE. ANRA continues to seek stakeholders who can satisfy the USACE purpose and need criteria requirements and the funding to complete the Section 404 permitting process. As part of the 404 permitting process, ANRA has:
    - Completed a downstream impact analysis.
    - Completed an archaeological field survey.
    - Completed a proposed mitigation plan.
    - Worked toward completion of a draft EIS.

There have been several bills passed into law that have further confirmed State support of Lake Columbia, including the following:

- SB 1600, 77th (R), 2001, Staples
    - State Water Right amendment extending the deadlines for construction of the reservoir.
- SB 1362, 78th (R), 2003, Staples
    - Renamed the project Lake Columbia, in honor of the space shuttle Columbia disaster;
    - Designated the site as a Unique Reservoir site;
    - Finding by the Legislature that the project was necessary to meet water supply requirements;

  - Legislative intent for the State Participation Program;
  - Rulemaking authority for water quality purposes.
- SB 1360, 81st (R), 2009, Nichols
  - Legislative findings declaring TWDB's interest in the project and the development of the project was in the public's interest;
  - State Water Right amendment removing construction deadlines.
- HB 3861, 81st (R), 2009, Hopson
  - Legislative findings that the project is in the public's interest, the TWDB has committed to acquire an interest in the project and made the determination that the state will recover its investment in the project;
  - Provided TWDB discretion in Making Findings:
    - In making any statutory finding under Section 16.135(1), Water Code, necessary to complete financing of the project, the Board may take into account any revenue reasonably expected to be received from:
      - a political subdivision not currently under contract with the authority to participate in paying the costs of the site acquisition stage of the project; or
      - a political subdivision not currently under contract to purchase a portion of the water to be supplied by the project.
    - The Board is not required to identify a political subdivision from which revenue is reasonably expected to be received as provided by Subsection (a) of this section at the time the Board makes a finding described by that subsection.

~~**Lake Fastrill** would be located on the Neches River in Anderson and Cherokee counties downstream of Lake Palestine and upstream of the Neches dam site. The site is located in the Neches River Basin in Region I. The proposed reservoir would yield 148,780 acre-feet per year and flood 24,950 acres. In 2006, the U.S. Fish and Wildlife Service established the Neches River Wildlife Refuge along the Upper Neches River near the same area as the proposed Lake Fastrill. Lake Fastrill was formerly a recommended water management strategy for Dallas. On February 22, 2010, the U.S. Supreme Court declined to hear an appeal of a decision by the 5th Circuit Court of Appeals that ruled against construction of Fastrill Lake and in favor of the wildlife refuge. Since that decision, Dallas has replaced Lake Fastrill with other projects in its long-range water supply planning. However, the Upper Neches River Municipal Water Authority (UNRMWA) has continued to pursue development of Lake Fastrill, and this reservoir could be a potentially feasible water management strategy for Dallas beyond the planning period.~~

George Parkhouse Reservoir II (North) would be located on the North Sulphur River in Lamar and Delta Counties, upstream of Marvin Nichols Reservoir and downstream of Lake Ralph Hall. The site is located in the Sulphur River Basin in Region D. With instream flow releases, the proposed reservoir would yield 94,460 acre-feet per year, but the yield would be reduced substantially by development of the Marvin Nichols Reservoir. The proposed reservoir would inundate

approximately 14,400 acres. George Parkhouse Reservoir (North) is an alternative water management strategy for UTRWD and NTWMD.

George Parkhouse Reservoir I (South) would be located on the South Sulphur River in Delta and Hopkins Counties, upstream of Marvin Nichols Reservoir and downstream of Jim Chapman Lake. The site is located in the Sulphur River Basin in Region D. With instream flow releases, the proposed reservoir would yield 114,960 acre-feet per year, but the yield would be reduced substantially by development of Marvin Nichols Reservoir. The proposed reservoir would inundate approximately 28,900 acres. George Parkhouse Reservoir I (South) is an alternative water management strategy for UTRWD and NTWMD.

In partnership with the USACE and the SRBA, the JCPD (including UTRWD and NTWMD) has studied the proposed George Parkhouse Reservoirs as part of the Sulphur River Basin Feasibility Study. The environmental impacts of the reservoir are documented in the Feasibility Study. The reservoir yield was updated using the Sulphur River Basin WAM.

Recommendations. The Region C Water Planning Group recommends the following:

- The Texas Legislature continue to designate the following sites as unique sites for reservoir construction: Ralph Hall, Marvin Nichols, Tehuacana, Columbia, ~~and~~ Fastrill~~~~.
- The Texas Legislature designate the George Parkhouse II (North) site and George Parkhouse I (South) site as unique sites for reservoir construction.
- Sponsors of these proposed reservoirs continue to affirmatively vote to make expenditures necessary to construct or apply for required permits for these reservoirs and avoid termination of unique reservoir site designation.

8.4 Policy and Legislative Recommendations

The Region C Water Planning Group discussed legislative and policy issues that impact the planning and development of water resources. The group offers the following policy and legislative recommendations, which are divided by topic.

8.4.1 Regional Water Planning Process

The RCWPG proposes the following recommendations for the regional water planning process.

Encourage Formation of a Working Group on Stream Segments of Unique Ecological Value. As in previous planning cycles, the Region C Water Planning Group continues to recommend the formation of a working group comprised of representatives of TWDB, TPWD, TCEQ, and the sixteen water planning regions to bring clarity, purpose, and direction to the legislative mandate to “identify river and stream segments of unique ecological value”. Specifically, it is expected that the working group would:

- Research, verify, and publicize the intent of ecologically unique river and stream segment legislation.
- Research agency rules and recommend changes or clarifications where needed.

- Ensure common understanding of "reservoir" as used in ecologically unique river and stream segment legislation and agency rules.
- Identify the lateral extent of ecologically unique river and stream segment designations.
- Seek clarification of quantitative assessment of impacts on ecologically unique river and stream segments.
- Illustrate the value of ecologically unique river and stream segment designations.

Support Legislative and State Agency Findings Regarding Water Use Evaluation. Per capita water use is unique to each water supplier and each region of the State. A statewide per capita water use value is not appropriate for the State, considering its wide variation in rainfall, economic development, and other factors.

The Texas Legislature has found that:

- "…using a single gallons per capita per day metric to compare the water use of municipalities and water utilities does not produce a reliable comparison because water use is dependent on several variables, including differences in the amount of water used for commercial and industrial sector activities, power production, permanent versus temporary service populations, and agricultural sector production…" and
- "a sector-based water use metric, adjusted for variables in water use by municipalities and water utilities, is necessary in order to provide an accurate comparison of water use and water conservation among municipalities and water utilities [7] [8]."

Similarly, in its *Guidance and Methodology for Reporting on Water Conservation and Water Use*, the TCEQ/TWDB/WCAC recognized that "a simple comparison of total gallons per capita per day among Texas municipal water providers may lead to inaccurate conclusions about comparative water use efficiencies among those municipal water providers. When examining the profiles of municipal water providers individually, significant differences may be found in climate, geography, source water characteristics, and service population profiles. As a metric, total gallons per capita per day has its limitations [8]." The Guidance further recommends use of sector-specific metrics in tracking and comparing water conservation and water.

The Region C Water Planning Group supports these findings and encourages continued development and refinement of sector-specific metrics for tracking water use.

Coordination between TWDB and TCEQ Regarding Use of the WAMs for Planning and Permitting. The TWDB requires that the Water Availability Models (WAMs) developed under the direction of TCEQ be used in determining available surface water supplies. The models were developed for the purpose of evaluating new water rights permit applications and are not appropriate for water supply planning. The assumptions built into the WAM (full use of all existing water rights, full operation of priority calls at all times, full permitted area and capacity, overlapping of environmental flow criteria developed during the Senate Bill 3 process and special conditions for instream flows developed using other statistical approaches) do not match the actual operations of supplies and could prohibit the issuance of water rights permits upon which implementation of the regional plans is dependent. Using these conservative assumptions could result in

unnecessary water supply projects to meet projected needs that might otherwise be satisfied through the flexible operation of existing supplies. The TWDB and TCEQ should coordinate their efforts to determine the appropriate data and tools available through the WAM program for use in water planning and permitting. The TWDB should allow the regional water planning groups flexibility in applying the models made available for planning purposes, and TCEQ should exercise flexibility in permitting to allow for optimization of existing or future water supplies.

8.4.2 Water Policy and Water Rights

The RCWPG proposes the following recommendations regarding water policy and water rights.

Requirements for Interbasin Transfers Introduced in Senate Bill One. In 1997, Senate Bill One introduced a number of new requirements for applications for water rights permits to allow interbasin transfers. The requirements are found in Section 11.085 of the Texas Water Code [(9)]. The code includes many provisions that are not required of any other water right, including:

- Public meetings in the basin of origin and the receiving basin.
- Simultaneous (and dual) notices of an interbasin transfer application in newspapers published in every county located either wholly or partially in both the basin of origin and the receiving basin, without regard to the distance or physical relationship between the proposed interbasin transfer and any such county's boundaries.
- Additional notice to county judges, mayors, and groundwater districts in the basin of origin.
- Additional notice to legislators in the basin of origin and the receiving basin.
- TCEQ request for comments from each county judge in the basin of origin.
- Proposed mitigation to the basin of origin.
- Demonstration that the applicant has prepared plans that will result in the "highest practicable water conservation and efficiency achievable..."

Exceptions to these extra requirements placed on interbasin transfers are made for emergency transfers, small transfers (less than 3,000 acre-feet under one water right), transfers to an adjoining coastal basin, transfers to a county partially within the basin of origin, transfers within a retail service area, and certain imports of water from outside the state.

The effect of these changes is to make obtaining a permit for interbasin transfer significantly more difficult than it was under prior law and thus to discourage the use of interbasin transfers for water supply. This is undesirable for several reasons:

- Interbasin transfers have been used extensively in Texas and are an important part of Region C's and the state's current water supply.
- Current supplies greatly exceed projected demands in some basins of origin, and the supplies already developed in those basins can only be beneficially used as a result of interbasin transfers.
- Senate Bill One water supply plans for major metropolitan areas in Texas (Dallas-Fort Worth, Houston, and San Antonio) rely on interbasin transfers as a key component of their plans.

- Texas water law regards surface water as "state water" belonging to the people of the state, to be used for the benefit of the state as a whole and not merely that area or region of the state where abundant surface water supplies may exist [10].
- The current requirements for permitting interbasin transfers provide unnecessary barriers to the development of the best, most economical, and most environmentally acceptable source of water supplies.

The legislature should revisit the current law on interbasin transfers and remove some of the unnecessary, unduly burdensome, and counterproductive barriers to such transfers that now exist.

Cancellation of Water Rights for Non-Use. Texas Water Code [11] allows the Texas Commission on Environmental Quality to cancel certain water rights, in whole or in part, for ten consecutive years of non-use. In 2013 the Texas Legislature provided the following additional exceptions to cancellation for non-use:

- If a significant portion of the water authorized has been used in accordance with a specific recommendation for meeting a water need included in an approved regional water plan;
- If the water right was obtained to meet demonstrated long-term public water supply or electric generation needs as evidenced by a water management plan developed by the holder and is consistent with projections of future water needs contained in the state water plan; or
- If the water right was obtained as the result of the construction of a reservoir funded, in whole or in part, by the holder of the water right as part of the holder's long-term water planning.

Support for Reservoir Construction. The RCWPG supports the development of reservoirs for water supply. Reservoirs are a critical component of the region's current and future water supplies, and the construction of reservoirs should not be restricted or prohibited.

These proposed changes to the interbasin transfer requirements, exceptions to cancellation of water rights, and the legislative support for reservoirs will assist with long-term water supply planning and allow water supply development to meet future needs, even if only part of the supply is used in the first ten years of the project's operation.

8.4.3 State Funding for Water Supply Programs

The RCWPG proposes the following recommendations to state funding for water supply programs.

Continued and Expanded State Funding for Texas Water Development Board Loans and the State Participation Program. The total capital cost of strategies recommended in the 2022 State Water Plan is $80 billion, including $29.9 billion for Region C recommended strategies. Municipal water providers anticipate needing $47 billion from state financial assistance programs [12]. The Texas Water Development Board's loan and State Participation Programs have been important tools in the development of existing supplies, but funding for many of these programs has been insufficient to serve all applicants. The SWIFT/SWIRFT funding program began in 2015 and has committed more than $11.5 billion towards water projects through Fiscal Year 2024. Twenty

percent of the SWIFT funding is reserved for water conservation and reuse projects. The SWIFT funding program is expected to finance $27 billion in state water plan projects over 50 years [13].

These programs should be continued and expanded with additional funding as needed to assist in the development of the water management strategies recommended in the regional water plans to meet the future water needs in Texas. Region C supports the continued expeditious implementation of the SWIFT/SWIRFT funding program and does not support diversion of existing funding for other purposes.

Expand Eligibility for SWIFT Funding to Include Consistency with Adopted Regional Water Plans. The current legislation specifies that a water supply project must be in the adopted State Water Plan to be eligible for SWIFT funding. To allow the TWDB sufficient time to develop the State Water Plan, there is a one-year period between when a regional water plan is adopted and when the TWDB approves the corresponding State Water Plan. During this one-year period, the State Water Plan is based on recommended projects in a superseded regional water plan. Region C recommends that the consistency requirement with the State Water Plan for eligibility for SWIFT funds be expanded to include the currently adopted regional water plans.

State Funding for Water Conservation Efforts. In 2007, the Texas Legislature formed the Water Conservation Advisory Council to serve as an expert resource to the state government and the public on water conservation in Texas. The Council publishes biennial reports to the Legislature on progress of water conservation in Texas. In its December 2024 report, the Council recommended that "the Texas Legislature replenish funding in the Agricultural Water Conservation Fund sufficient to support the TWDB's grant and loan program for a total of no less than $15,000,000 for the next 10 years[14]." Region C encourages adequate funding for the Water Conservation Advisory Council and for continued support of statewide water conservation efforts.

Consider Alternative Financing Arrangements for Large Projects. The Texas Water Development Board offers low-interest financing for development of projects from the State Water Plan through the Water Infrastructure Fund. TWDB also offers deferred financing with delayed requirements for repayment, but the terms for deferred financing are not as flexible as they could be.

To address this issue, the TWDB has created two flexible financing options in the SWIFT/SWIRFT funding program:

- Deferred loans have maturities of 20 to 30 years and may be used to fund developmental costs, such as planning and design. Principal and interest are deferred up to eight years or until end of construction, whichever is sooner.
- Board participation loans allow entities to reasonably finance the total debt for an optimally sized regional facility through temporary TWDB ownership interest in the facility. The local sponsor repurchases TWDB's interest on a repayment schedule that defers principal and interest. The typical maturity of a Board participation loan is 34 years.

Region C supports the flexible financing options offered under the SWIFT/SWIRFT funding program and encourages the Texas Water Development Board and the Legislature to continue to consider more flexible deferred financing.

Adequate Funding of Groundwater Conservation Districts. In recent years, the Texas Legislature has created a great number of new groundwater conservation districts across the state. Many of these districts continue to struggle to find adequate resources to develop and implement their rules. We recommend that the state fund a grant program to provide financial resources to support these districts.

Funding for NRCS Structures as a Form of Watershed Protection. One key element of water supply planning is the protection of the quality and usability of supplies already developed. Over the past 50 to 60 years, the U.S. Natural Resources Conservation Service (NRCS, formerly the Soil Conservation Service) has built numerous small dams for sediment control and flood control in Texas. The NRCS reservoirs improve water quality, prevent erosion in the watershed, provide water for livestock and provide increased streamflows during low flow periods.

The design life for the majority of the NRCS dams is 50 years. Most of the existing projects were built in the 1950s and 1960s and are nearing the end of their design life. Many NRCS structures are in need of maintenance or repair to extend their useful life. Under the PL-566[2] program, the NRCS provides technical assistance and funding for repair and rehabilitation of existing NRCS structures. The rehab program is a 65/35 split of federal funds to the sponsor's funds(15). In U.S. Congressional Districts located completely or partially within Region C, there are 1,180 existing NRCS dams, of which about 66 percent are located in Region C. In addition, the NRCS and local sponsors plan to construct new dams in Region C. Under the PL-566 program and the similar PL-534[3] program, the NRCS will provide 100 percent of the construction costs of new dams, and the sponsor provides the land acquisition costs.

The State should develop a program to provide funding for the development and rehabilitation of new and existing NRCS structures, as a form of watershed protection. Elements of such a program could include:

- State grants or matching funding for studies of NRCS structures
- Seminars on watershed protection.

The Region C Water Planning Group recommends that the State seek additional federal funding to improve and maintain NRCS structures. Region C also recommends that the State provide funding to local sponsors to aid them in paying for their required 35 percent of the cost for the dam rehabilitation projects.

[2] PL-566, the Watershed Protection and Flood Prevention Act of 1954, provides for cooperation between the Federal government and the States and their political subdivisions in a program to prevent erosion, floodwater, and sediment damage; to further the conservation, development, utilization, and disposal of water; and to further the conservation and proper utilization of land in authorized watersheds.

[3] PL-534, the Flood Control Act of 1944, authorizes the Secretary of Agriculture to install watershed improvement measures in 11 watersheds, also known as pilot watersheds, to reduce flood, sedimentation, and erosion damage; improve the conservation, development, utilization, and disposal of water; and advance the conservation and proper utilization of land.

8.4.4 Water Reuse and Desalination

The RCWPG proposes the following recommendations to water reuse and desalination.

Support for Research to Advance Reuse and Desalination. Water reuse and desalination are extremely important sources of water supply for Texas. However, these sources have unique challenges related to water quality and cost-effective implementation. Region C recommends that the Legislature and the TWDB continue to support research to advance these water supply strategies in the coming years.

Funding Assistance for Desalination Projects. The Red River and Lake Texoma in Region C have high concentrations of salts. The water from these sources must either be blended with a less saline supply or desalinated for direct use. The smaller communities neighboring these water supplies could potentially use this water with help in funding the necessary desalination process. These sources would be more economical for the smaller communities than building small pipelines of great lengths to purchase water from a larger supplier.

The new Texas Water Fund, has received $1 billion in funding. The TWDB has allocated at least $250 million from this fund for the following project types: marine and brackish water desalination, oil and gas produced water treatment projects, and aquifer storage and recovery projects. Region C recommends that the TWDB continue to provide funding assistance for desalination projects for smaller communities. Region C also recommends that federal funds be sought for desalination projects.

Funding Assistance for Water Reuse Projects. The Region C Water Plan includes reuse as a key water management strategy to meet the water needs of the Region between now and 2080. Water reuse projects are rapidly developing in Region C. In the *2021 Region C Water Plan*, the 2070 supply from existing reuse projects was almost 354,000 acre-feet per year [16]. In the current plan, newly developed projects have increased the supply available from existing reuse projects to more than 411,000 acre-feet per year by 2080. The current plan also calls for development of an additional 485,000 acre-feet per year in reuse projects by 2080. Statewide, all of the 16 regions included some type of reuse as a water management strategy by 2070 in their most recent water plans [16]. To achieve implementation of the significant quantities of reuse, there is a critical need to develop implementation approaches, funding support, and the technology and science associated with reuse. Region C recommends that the State Legislature work with water providers and associated professional organizations as well as provide funding support to pursue relevant reuse research.

8.4.5 State and Federal Programs – Water Supply Issues

The RCWPG proposes the following recommendations to the state and federal programs related to water supply issues.

Continued and Increased State Support of Efforts to Develop Out-of-State Water Supplies. In recent years, water suppliers in Region C have been seeking to develop unused water resources in neighboring states. We encourage the State of Texas to continue and increase its support of efforts to develop unused out-of-state water resources.

~~**Oversight of Groundwater Conservation District Rule Making.** The Legislature has established groundwater conservation districts across Texas, often without regard for aquifer boundaries. These groundwater conservation districts develop rules and regulations regarding groundwater pumping within their boundaries. Often, the rules that have been developed by these districts are inconsistent from one district to the next, resulting in inconsistent regulation of the same aquifer. Although one-size-fits all regulations are inappropriate, the groundwater conservation districts need state oversight, particularly with regard to their rule-making policies. Region C recommends that the TWDB or TCEQ provide oversight for the current and future groundwater conservation districts.~~

Revise Federal Section 316(b) Regulations on Power Plant Cooling Water. USEPA regulations adopted in 2017 implementing Section 316(b) of the Clean Water Act place requirements on cooling water intake structures that are intended to reduce fish/shellfish mortality due to impingement on screens/barriers or entrainment into flow entering an industrial facility. Although the regulations do not mandate cooling towers for new or existing power plants, they do generally require equivalent performance in terms of intake flowrates and velocities. Compared to once-through cooling (which was the usual approach in Texas prior to the new regulations), cooling towers reduce the amount of water diverted for a power plant but significantly increase the amount of water consumed. There is also a secondary impact; operation of cooling towers creates a high TDS (total dissolved solids) waste stream known as blowdown, that must be managed and/or treated, often resulting in additional increased water consumption. This higher water consumption is not good for Texas, where water supplies are scarce. We encourage TWDB and TCEQ to work with the Federal government on Section 316(b) regulations to allow the efficient use and conservation of water supplies for power plants and the state.

Support Ongoing Efforts of State Agencies to Develop Additional Data and Information Related to Evaluating the Feasibility of ASR Projects. House Bill 807 required regional water plans include a specific assessment of the feasibility of aquifer storage and recovery (ASR) projects for any regional water planning area with significant identified water needs. The Region C planning group acknowledges that ASR can be an effective water supply strategy under specific conditions. However, ASR is not a suitable or feasible strategy in all areas. Region C supports efforts to develop data and information regarding the site-specific applicability of ASR and the conditions under which ASR is or isn't a feasible WMS.

Consideration of Restrictions, Statewide, for Outdoor Landscape Watering. Consideration of restrictions, statewide, for outdoor landscape watering, via sprinkler or irrigation systems, to limit during daytime hours in summer months.

Program Related to Abandoned or Deteriorating Water Wells. Development of a program to manage the plugging of abandoned or deteriorating water wells, as these wells pose a direct threat to the long-term viability of the groundwater resources in many areas of the state. Abandoned wells can also release contaminants at the surface and affect water quality of the State's surface water sources.

8.5 Chapter 8 List of References

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(3) Texas Parks and Wildlife Department: *Ecologically Significant River and Stream Segments for Region C*, April 2002, Austin, [Online] Available URL: http://www.tpwd.texas.gov/landwater/water/conservation/water_resources/water_quantity/sigsegs/media/region_c_map.pdf, accessed December 2024.

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(10) Texas Water Code, Chapter 11 Water Rights, Subchapter B, Section 11.021 Amended by Acts 1977, 65th Leg., ch. 870, sec. 1, eff. Sept. 1, 1977, Austin, [Online], Available URL: http://www.statutes.legis.state.tx.us/Docs/WA/htm/WA.11.htm#11.021, accessed December 2024.

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(12) Texas Water Development Board: *2022 Water for Texas State Water Plan*, Austin, [Online], Available URL: https://www.twdb.texas.gov/waterplanning/swp/2022/index.asp, January 2022.

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