CHAPTER 3 EVALUATION OF CURRENT WATER SUPPLIES IN THE REGION

A key task in the preparation of the 2026~~1~~ Region D Water Plan is the determination of the amount of water that is currently available to the ~~r~~Region. In Chapter 4, this information will be compared to the water demand projections presented in Chapter 2 to identify water user groups and water providers with projected needs beyond their available supply.

As part of the evaluation of current water supplies in the Region, the North East Texas Regional Water Planning Group (NETRWPG) was charged with updating the water supply availability numbers from the 2021~~16~~ Plan. Water supply estimates were updated using a variety of methods:

- Groundwater availability was based on the Modeled Available Groundwater (MAG) volumes that may be produced on an average annual basis to achieve a Desired Future Condition (DFC) as adopted by Groundwater Management Areas (GMAs) (per Texas Water Code 36.001). Groundwater availability is not limited by permits currently issued. MAG volumes for each aquifer were provided by TWDB through the DB27~~2~~ ~~interface, and~~interface and split into discrete geographic-aquifer units by: Region/Aquifer/County/Basin. In certain instances, groundwater availabilities above the identified MAG volumes were developed based on a local geologic ~~assessment, and~~assessment and were reviewed and approved by TWDB and the NETRWPG for inclusion in the 2026~~1~~ Region D Plan.
- ~~In the Red River Basin, Lamar County reservoir yields were updated based upon a modification of the WAM for the Red River Basin, as developed for the City of Paris by HDR Engineers and approved by the Texas Water Development Board (TWDB).~~
- A detailed analysis of the source availability and supply available from Lake Wright Patman was performed at the request of the Riverbend Water Resources District, whereby ~~new~~ information related to the present storage capacity of the reservoir and sedimentation effects was ~~incorporated~~ brought forward from the 2021 Region D Plan to render a more accurate depiction of supply for the purposes of the ~~2021 Region D Plan~~2026 Region D Plan.
- A survey form was distributed to all municipal Water User Groups (WUGs) to identify any changes in sources or supply amounts since the 2021~~16~~ plan – for example, new wells, purchase contract renewals, new contracts, mergers, or new reuse supplies. Surveyed contacts within Region D are presented in Appendix C3-1.
- In all river basins, the firm yields of various water supplies have been updated using Texas Commission on Environment Quality (TCEQ) supplied WAM model results, the implementation of which is detailed in the ~~April 4, 2018~~October 27, 2023 Water Supplies Assumption memorandum submitted to the TWDB by the NETRWPG, as approved at the ~~April~~ October 4, ~~2018~~ 2023 NETRWPG meeting.

The analysis of currently available water supply is presented in three parts, per TWDB guidance:

- Estimates of available water by source (surface and groundwater);
- Estimates of the supplies currently available to each water user group; and
- Estimates of the supplies currently available to each designated major water provider.

The following sections of this chapter present the calculated source availabilities and supply amounts accordingly.

Table 3.1 Overall Water Availability by Source

Water Availability (ac-ft/yr)	2030	2040	2050	2060	2070	2080
SURFACE WATER IN REGION D	1,253,289	1,234,623	1,215,977	1,197,466	1,178,841	1,160,256
GROUNDWATER IN REGION D	191,021	191,020	191,042	191,397	191,876	192,580
DIRECT REUSE	72,993	67,677	68,933	77,807	71,581	71,581
TOTAL	**1,517,303**	**1,493,320**	**1,475,952**	**1,466,670**	**1,442,298**	**1,424,417**

3.1 Surface Water Sources

The North East Texas Regional Water Planning Area (RWPA) includes all or a portion of 19 counties that encompass major portions of four river basins: the Cypress Creek Basin, the Red River Basin, the Sulphur River Basin, and the Sabine River Basin. Relatively small portions of the Neches River Basin and the Trinity River Basin also extend into the RWPA. Surface water sources within the region include rivers, streams, lakes, ponds, and tanks.

Surface water in Texas is owned by the State, and its use is regulated under the legal doctrine of prior appropriation. This means that water rights that are issued by the ~~s~~State for the diversion and use of surface water have priority according to the date that the right was issued. The oldest issued water right has priority over all subsequently issued water rights, regardless of the type of use. Water rights issued by the S~~s~~tate generally are one of two types, run-of-the-river rights and stored water rights.

Run-of-the-river water rights permits allow diversions of water directly from a river or stream provided there is water in the stream and that the water is not needed to meet senior downstream water rights. Run-of-the-river rights are greatly impacted by drought conditions, particularly in the upper portions of a river basin.

Stored water rights allow the impoundment of water by a permittee in a reservoir. Water can be held for storage as long as the inflow is not needed to meet a senior downstream water right or other condition, such as release requirements for maintenance of instream flows. Water stored in the reservoir can be withdrawn by the permittee at a later date to meet water demands. Stored water rights are generally based on a reservoir's firm yield and are therefore less sensitive to drought conditions.

In addition to water rights issued by the state, individual ~~land owners~~landowners are allowed to use certain surface waters without a permit. Specifically, ~~land owners~~landowners are allowed to construct impoundments with up to 200 acre-feet of storage or use water directly from a stream for domestic and livestock purposes. These types of water supplies are referred to as "local supply sources." Where permits have been identified for irrigation and/or livestock uses, water availability for local supply sources was determined utilizing the applicable official WAM. Supplies not requiring a permit for domestic irrigation and/or livestock uses, such as private supplies from individual water wells on private property, have been based on a comparative analysis of USDA reported 2022~~17~~ county census amounts of livestock along with estimated median water use coefficients developed and reported by the USGS (Lovelace, 2009) for various livestock categories. These estimates were then compared to reported historical agricultural water use estimates from the TWDB along with the supplies reported and adopted for previous Region D Water

Plans to ensure estimated firm water supplies for the non-permitted domestic irrigation and/or livestock uses are conservative and consistent with reported county amounts.

A summary of the available surface water sources in each of the river basins within the ~~r~~Region is presented below. In accordance with TWDB guidelines, the estimates of source water availability and water supply are based on the following key assumptions:

- Source water availability is evaluated as the amount of water that a user can depend on obtaining during drought of record conditions. For reservoirs, this corresponds to the firm yield. For run-of-the-river sources, this corresponds to the amount of water available for diversion during the driest period of record. Detailed reporting on source water availabilities are presented in Appendix C3-2.
- Water availability is to ~~be based on the assumption~~assume that all senior downstream water rights are being fully utilized.
- RWPGs evaluate existing supplies that are legally and physically available to WUGs and wholesale water suppliers. For example, water would not be considered available from a reservoir if a user needs to construct the water intake and pipeline required for diverting and conveying water from the reservoir to the area of need. In this case, the strategies considered could include construction of the necessary pipeline, intake, or other infrastructure necessary to fully access the source.
- A properly issued water right is no guarantee of access to water. It is possible that a water right can be held in which there is no water during some time of the year. For example, a holder of a water right that is run-of-the-river may have no access to water when there is no flow in the river. A holder of a water right that is a right to store and divert at a later date may have only limited access to water during a drought. It should be acknowledged that water rights have been issued in circumstances where the water is estimated to be available under a water right in a water supply contract. It is essential that buyers understand the limitations and qualifications of the water right that supports the water supply contract. It is not uncommon for Wholesale Water Providers (WWPs) to have water rights for a volume greater than what can be delivered during the worst drought of record. It is not uncommon for water rights to be issued in an amount greater than the dependable yield of a reservoir.

3.1.1 Water Availability Models

As required by Texas Administrative Code (TAC) §357.32, for the 2026~~1~~ Regional Water Plan the most current TCEQ Water Availability Models (WAM) for reservoirs and river systems were utilized, except for Pat Mayse and Lake Crook Reservoirs in the Red River Basin (whereby an alternate study ~~more recent study~~ was approved for utilization by the NETRWPG and TWDB~~), and for the Sulphur River Basin~~). ~~A new Sulphur River Basin WAM was adopted by the TCEQ in late-2019, at a point too late to incorporate this new WAM for the purposes of the 2021 Region D Plan. With updated hydrology indicating a potential new drought of record, it is anticipated that this new official WAM for the Sulphur River Basin will be included in subsequent regional water plans.~~ For the 2026 cycle, the updated WAM for the Sulphur River Basin has been adopted. The TCEQ introduced a new WAM in late 2019, which was too late for the 2021 Region D Plan. The 2026 plans will now integrate the most recent WAM, released in 2023.

The WAM was developed to account for water availability during drought of record conditions and considers factors such as reservoir firm yield, run-of-river diversions, and assumed full exercise of senior water rights within a system. The adopted definition for firm yield as defined in TAC §357.10(14) is the maximum water volume a reservoir can provide each year under a repeat of the drought of record using anticipated sedimentation rates and assuming that all senior water rights will be totally utilizedutilized, andutilized, and all applicable permit conditions met. It also accounts for a minimum pool level for each reservoir in the system and, if applicable, maximum reservoir level at the top of the water supply storage (i.e., conservation pool) volume. Table 3.2 below presents a list of the water rights that are the basis for the surface water availability in the plan.

Table 3.2 List of Water Rights Utilized in Development of Surface Water Availability

County/Reservoir	Basin	WUG	WR Number	Water Right Owner
BIG CREEK LAKE	Sulphur	Cooper	03-4060 (App 03-4395)	City Of Cooper
BIG SANDY CREEK LAKE	Sabine	Longview	05-4759	City Of Longview
BOB SANDLIN LAKE	Cypress	Titus County FWD 1	04-4564	Titus County FWSD 1
BOWIE	Red	Irrigation	02-3976	Ethel E Musselman Et Al
BOWIE	Red	Irrigation	02-4058	J C Dodson; BJ Shipping Company, Inc.; Theodorus J and Wanda Deboer
BOWIE	Red	Irrigation	02-4952	Carol A and Eldon K Lenth; Chris and Jason Sylte
BOWIE	Red	Irrigation	02-4953	Anne R. Farris; Coleman and Melissa Ann Young
BOWIE	Red	Irrigation	02-4954	Three Sides Land Co., LTD; John Wayne Ward et al
BOWIE	Red	Irrigation	02-4955	ASCKCC, LLP
BOWIE	Red	Irrigation	02-4956	Cranfill Dairy Farms, Inc.
BOWIE	Red	Irrigation	02-4957	Joe Conner Hart
BOWIE	Red	Manufacturing	02-4958	Cranfill Dairy Farms, Inc.
BOWIE	Red	Irrigation	02-4959	Texarkana Riverbend Plantation, Inc.
BOWIE	Red	Irrigation	02-4960	W H Wommack Jr
BOWIE	Red	Irrigation	02-4961	City Of Texarkana
BOWIE	Red	Irrigation	02-4962	Steve Ledwell
BOWIE	Red	Irrigation	02-5632	B & W Land Company, LLC
BOWIE	Sulphur	Irrigation	03-4829	Estate of A D Simms; Loyd Wilson Independent Executor and Trustee et al
BOWIE	Sulphur	Irrigation	03-4830	Estate of A D Simms; Loyd Wilson Independent Executor and Trustee et al
BOWIE	Sulphur	New Boston	03-4831	City Of New Boston
BOWIE	Sulphur	New Boston	03-4832	City Of New Boston
BOWIE	Sulphur	Manufacturing	03-4833	H C Prange Jr

County/Reservoir	Basin	WUG	WR Number	Water Right Owner
BOWIE	Sulphur	Irrigation	03-4834	Estate of A D Simms; Loyd Wilson Independent Executor and Trustee et al
BOWIE	Sulphur	Irrigation	03-4837	Leon S Kennedy Jr; Henry and Predetta Maddox Jr
BRANDY BRANCH LAKE	Sabine	Steam Electric	05-4647	Southwestern Electric Power Company
CAMP	Cypress	Livestock	04-4561	Loyd and Sunny Daily
CAMP	Cypress	Livestock	04-4574	Princedale Country Club, Inc.
CAMP	Cypress	Livestock	04-5251	Ruth Ann and Steven A. Roberts
CAMP	Cypress	Mining	04-5813	Luminant Mining Company LLC
CASS	Cypress	Livestock	04-4587	Eagle Landing Homeowners Association, Inc.
CASS	Cypress	Manufacturing	04-4598	Jimmy H Wakefield
CASS	Cypress	Livestock	04-4599	Delwin Young
CASS	Sulphur	Livestock	03-5449	Texas Parks and Wildlife Department
CHAPMAN LAKE NON SYSTEMNON-SYSTEM PORTION	Sulphur	Sulphur River MWD	03-4797	City of Commerce; Sulphur River MWD
CHAPMAN LAKE NON SYSTEMNON-SYSTEM PORTION	Sulphur	North Texas MWD	03-4798	North Texas MWD
CHAPMAN LAKE NON SYSTEMNON-SYSTEM PORTION	Sulphur	Irving	03-4799	City Of Irving
CHEROKEE LAKE	Sabine	Cherokee Water Company	05-4642	Cherokee Water Company
CROOK LAKE	Red	Paris	02-4943	City Of Paris
CYPRESS SPRINGS LAKE	Cypress	Mount Pleasant	04-4560	Franklin County Water District; City Of Mount Pleasant
DELTA	Sulphur	Irrigation	03-3845 (APP 03-4148)	Five Counties Ranch, LLC
DELTA	Sulphur	Cooper	03-4800	City Of Cooper
DELTA	Sulphur	Irrigation	03-4801	Delta Country Club
EDGEWOOD CITY LAKE	Sabine	Edgewood	05-4678	City Of Edgewood
ELLISON LAKE	Cypress	Northeast Texas MWD	04-4582	U.S. Steel Tubular Products, Llc
FORK LAKE	Sabine	Sabine River Authority	05-4669	Sabine River Authority of Texas
FRANKLIN	Sulphur	Irrigation	03-4803	Christa and Helmut Hermann; Jimmie Kate Terry Brown

County/Reservoir	Basin	WUG	WR Number	Water Right Owner
FRANKLIN	Sulphur	Mount Vernon	03-4816	City Of Mount Vernon
FRANKLIN	Sulphur	Irrigation	03-4817	Hans and Waltraud Weiss
FRANKLIN	Sulphur	Irrigation	03-4818	Dewitta and Robert W Campbell
FRANKLIN; TITUS	Cypress	Livestock	04-5814	T5 Holdings, L.P.; Luminant Mining Company LLC
GILMER LAKE	Cypress	Gilmer	04-5272	Gilmer Economic Development Corporation
GLADEWATER LAKE	Sabine	Gladewater	05-4762	City Of Gladewater
GREENVILLE CITY LAKE	Sabine	Greenville	05-4665	City Of Greenville
GREGG	Cypress	Irrigation	04-4608	George D Grogan
GREGG	Cypress	Irrigation	04-5608	Hunters Creek H.A., Inc.
GREGG	Sabine	Mining	05-4623	James Madison Enterprises, Inc.
GREGG	Sabine	Longview	05-4624	City Of Longview
GREGG	Sabine	Irrigation	05-4626	M F Glover et al
GREGG	Sabine	Irrigation	05-4628	Gino Venitucci
GREGG	Sabine	Irrigation	05-4629	Carlos B Griffin Jr
GREGG	Sabine	Irrigation	05-4630	George D Grogan
GREGG	Sabine	Irrigation	05-4732	Edwin and Jimmie Lou Baggett
GREGG	Sabine	Longview	05-5090	City Of Longview
HARRISON	Cypress	Manufacturing	04-4005 (APP 04-4349)	Longhorn Army Ammunition Plant; U.S. Department of the Interior Fish and Wildlife Service
HARRISON	Cypress	Manufacturing	04-4254 (APP 04-4573)	Snider Industries, Inc.
HARRISON	Cypress	Manufacturing	04-4609	T S Murrell
HARRISON	Cypress	Irrigation	04-4610	Westover Land and Livestock Company
HARRISON	Cypress	Manufacturing	04-4611	T & P Lake, Inc. et al
HARRISON	Cypress	Mining	04-4613	Fair Oil, LC
HARRISON	Cypress	Marshall	04-4614	City Of Marshall
HARRISON	Cypress	Irrigation	04-4615	Marshall Lakeside Country Club
HARRISON	Sabine	Mining	05-12049	The Sabine Mining Company
HARRISON	Sabine	Manufacturing	05-4631	Eastman Chemical Company
HARRISON	Sabine	Irrigation	05-4632	Peppy Jean Family Limited Partnership; Pinecrest County Club
HARRISON	Sabine	Manufacturing	05-4633	Carrie S and Clarence W Young
HARRISON	Sabine	Irrigation	05-4634	E C Johnston Jr
HARRISON	Sabine	Irrigation	05-4635	Living Trust of Phyllis Cary; Anda Flowers and R Byron Roach

County/Reservoir	Basin	WUG	WR Number	Water Right Owner
HARRISON	Sabine	Irrigation	05-4645	James Elvyn Utz
HARRISON	Sabine	Irrigation	05-4646	Carolyn Holloway Bicknell
HARRISON	Sabine	Mining	05-5082	The Sabine Mining Company
HARRISON	Sabine	Mining	05-5124	Sabine Mining Company
HARRISON	Sabine	Manufacturing	05-5158	Norit Americas, Inc.
HARRISON	Sabine	Mining	05-5177	The Sabine Mining Company
HARRISON	Sabine	Mining	05-5246	The Sabine Mining Company
HARRISON	Sabine	Mining	05-5382	Sabine Mining Company
HARRISON	Sabine	Mining	05-5439	The Sabine Mining Company
HARRISON	Sabine	Mining	05-5454	The Sabine Mining Company
HARRISON	Sabine	Manufacturing	05-5468	Norit Americas, Inc.
HARRISON	Sabine	Mining	05-5607	Sabine Mining Company
HARRISON	Sabine	Mining	05-5662	The Sabine Mining Company
HARRISON	Sabine	Irrigation	05-5918	Charlotte and Larry Slone
HOPKINS	Sabine	Irrigation	05-4699	Truman L Renshaw; Gary Blake and Lindsey Huffman Johnson
HOPKINS	Sabine	Irrigation	05-4702	Dahalia V and Dewey Dickens
HOPKINS	Sabine	Irrigation	05-4703	The Estate of Richard and Anita L Tynes
HOPKINS	Sabine	County-Other	05-5217	Coy and Patsy Johnson; Claire C and Harold D Knight
HOPKINS	Sulphur	Irrigation	03-12145	Los Senderos Cattle And Ranch Company
HOPKINS	Sulphur	Sulphur Springs	03-4812	City Of Sulphur Springs
HOPKINS	Sulphur	Irrigation	03-4813	Sulphur Springs Country Club
HOPKINS	Sulphur	Irrigation	03-4814	Jill A. Jordan
HOPKINS	Sulphur	Livestock	03-5150	Larry Miles
HOPKINS	Sulphur	Livestock	03-5906	City of Sulphur Springs
HUNT	Sabine	Irrigation	05-4666	Edgar Hutchins
HUNT	Sabine	Irrigation	05-4667	E F Buehring; Dr Van G Kaden; Carol and Lowell Lawson; R R Sutherland
HUNT	Sulphur	Irrigation	03-4796	Webb Hill Country Club, Inc.
JOHNSON CREEK LAKE	Cypress	Steam Electric	04-4588	Southwestern Electric Power Company
LAKE O' THE PINES	Cypress	Northeast Texas MWD	04-4590	Northeast Texas MWD
LAMAR	Red	Irrigation	02-12132	Richard J. Perry
LAMAR	Red	Irrigation	02-3888	Duckhole Partners LLC

County/Reservoir	Basin	WUG	WR Number	Water Right Owner
LAMAR	Red	Irrigation	02-3924	Crawford Family Farm, LP; John Thomas and Linda Crawford Graves
LAMAR	Red	Irrigation	02-4930	Joey Cale Sanders
LAMAR	Red	Irrigation	02-4934	A G Robinson
LAMAR	Red	Irrigation	02-4935	Jennifer and Kevin Clark Foster
LAMAR	Red	Irrigation	02-4938	2017 PG Investments, LLC
LAMAR	Red	Irrigation	02-4939	Laura and Q B Stephens
LAMAR	Red	Irrigation	02-4941	Dorothy E and Nolan Butts; Charles C and Cynthia Taylor
LAMAR	Red	Irrigation	02-4945	James C and Terri Darnell
LAMAR	Red	Irrigation	02-5119	City Of Paris
LAMAR	Red	Irrigation	02-5233	Leroy H. and Viola E. Kautz; Vulgamore Family Farms, LLC et al
LAMAR	Red	Irrigation	02-5276	Vulgamore Family Farms, LLC
LAMAR	Red	Irrigation	02-5558	Paris Golf and Country Club, Inc.
LAMAR	Red	Irrigation	02-5617	Vulgamore Family Farms, LLC
LAMAR	Sulphur	Manufacturing	03-12810	Daisy Farms, LLC
LANGFORD LAKE	Sulphur	Clarksville	03-4809	Red River County WCID 1 Langford Creek
LOMA LAKE	Sabine	County-Other	05-4758	Institute In Basic Life Principles, Inc.
MARION	Cypress	Irrigation	04-4198 (APP 04-4525)	Jimmy D. Moore and Patricia W. Moore
MARION	Cypress	Irrigation	04-4591	Linda L Carpenter
MARION	Cypress	Irrigation	04-4592	David R and E M Key
MARION	Cypress	Irrigation	04-4593	George D Grogan
MARION	Cypress	Irrigation	04-4594	Snider Industries, L.L.P.; Kimmie and Robert Sanders; Caddo Lake Institute, Inc.; The Nature Conservancy
MARION	Cypress	Jefferson	04-4595	Jefferson Water and Sewer District
MARION	Cypress	Irrigation	04-4596	Estate of David R Key
MARION	Cypress	Irrigation	04-4600	Jarvis L Smoak
MARION	Cypress	Irrigation	04-4612	David R Key
MARION	Cypress	Irrigation	04-4618	James H. Morris
MILL CREEK LAKE	Sabine	Canton	05-4675	City Of Canton
MONTICELLO LAKE	Cypress	Steam Electric	04-4563	Luminant Generation Company LLC
MORRIS	Cypress	Irrigation	04-4577	Adron Justiss

County/Reservoir	Basin	WUG	WR Number	Water Right Owner
MORRIS	Cypress	Irrigation	04-4578	Adron Justiss
MORRIS	Cypress	Irrigation	04-4579	Adron Justiss
MORRIS	Cypress	Irrigation	04-4580	Johnthan Eugene Dale
MORRIS	Cypress	Irrigation	04-4597	Lloyd Justiss Farms, Inc.
PAT MAYSE LAKE	Red	Paris	02-4940	City Of Paris
RAINS	Sabine	Irrigation	05-4681	SEBW LLC
RAINS	Sabine	Irrigation	05-4700	AM Development Company
RAINS	Sabine	Irrigation	05-4701	Larry and Paula Knecht
RED RIVER	Red	Irrigation	02-4946	Atlee M Kohl Trustee; Dianne M Siebens Trustee
RED RIVER	Red	Irrigation	02-4947	James E Waggoner
RED RIVER	Red	Irrigation	02-4948	James E Waggoner
RED RIVER	Red	Irrigation	02-4949	Glen E and Sue Nichols
RED RIVER	Red	Irrigation	02-4950	James E Waggoner
RED RIVER	Red	Irrigation	02-4951	Clarksville Country Club
RED RIVER	Sulphur	Irrigation	03-4802	Alexander Frick ET AL
RED RIVER	Sulphur	Steam Electric	03-4804	Luminant Generation Company LLC
RED RIVER	Sulphur	Irrigation	03-4806	Laura Elizabeth Vaughan McCoin; Mary Lynn Vaughan Palmer; William Jeffery Vaughan
RED RIVER	Sulphur	Irrigation	03-4807	Mary Margaret Vaughan
RED RIVER	Sulphur	Irrigation	03-4810	Donelson Family, LTD.
RHINES LAKE	Neches	Mining	06-3222	Rhines Lake Association, Inc.
SMITH	Neches	County-Other	06-4724	Hide-A-Way Lake Club, Inc.
SMITH	Neches	Irrigation	06-4850	Archie E Reynolds
SMITH	Sabine	Irrigation	05-4248 (APP 05-4575)	Robert Thomas and Julia Lucile Wood Perry; Joe and Susan Nelson II
SMITH	Sabine	County-Other	05-4625	City Of Overton
SMITH	Sabine	County-Other	05-4693	ETX Paragon, LTD
SMITH	Sabine	Irrigation	05-4698	Oakhurst Farms, L.P.; Glenn Dean and Janice G Childres
SMITH	Sabine	Irrigation	05-4724	Hide-A-Way Lake Club, Inc.
SMITH	Sabine	Irrigation	05-4727	Oakhurst Farms, L.P.
SMITH	Sabine	Irrigation	05-4728	James R. Arthur et al
SMITH	Sabine	Irrigation	05-4739	Faye B and Robert E Smith
SMITH	Sabine	Irrigation	05-4740	Lonie Branch and William L Brady
SMITH	Sabine	Irrigation	05-4742	Kambala Land, LLC

County/Reservoir	Basin	WUG	WR Number	Water Right Owner
SMITH	Sabine	Irrigation	05-4743	Jean Branch and William L Brady
SMITH	Sabine	Irrigation	05-4745	Edwin B and Laura Kidd Ashby
SMITH	Sabine	Irrigation	05-4746	Lonie Branch and William L Brady
SMITH	Sabine	Irrigation	05-4747	Lonie Branch and William L Brady
SMITH	Sabine	Irrigation	05-4748	Pinehurst Partners I, LLC
SMITH	Sabine	Manufacturing	05-4761	Donald Therneau
SMITH	Sabine	Irrigation	05-5229	Charles Breedlove
SULPHUR SPRINGS LAKE	Sulphur	Sulphur Springs	03-4811	City Of Sulphur Springs
TANKERSLEY LAKE	Cypress	Mount Pleasant	04-4565	City Of Mount Pleasant
TAWAKONI LAKE	Sabine	Sabine River Authority	05-4670	Sabine River Authority of Texas
TITUS	Cypress	Irrigation	04-4562	G M Scott
TITUS	Cypress	Irrigation	04-4566	William Dean Priefert
TITUS	Cypress	Irrigation	04-4567	William Dean Priefert
TITUS	Cypress	Irrigation	04-4568	The Etoil Jackson Family Partnership, L.P.
TITUS	Cypress	Mount Pleasant	04-4569	City Of Mount Pleasant
TITUS	Cypress	Mount Pleasant	04-4570	City Of Mount Pleasant
TITUS	Cypress	Irrigation	04-4571	R. J. Porter Estate
TITUS	Cypress	Irrigation	04-4572	KRB Investments, LLC
TITUS	Cypress	Irrigation	04-4573	Edith A Sanders and Almie E Smith Sr.
TITUS	Cypress	Mining	04-5167	Luminant Mining Company LLC
TITUS	Cypress	Mining	04-5850	Luminant Mining Company LLC
TITUS	Cypress	Livestock	04-5914	Luminant Mining Company LLC
TITUS	Sulphur	Mining	03-12099	Luminant Mining Company LLC
TITUS	Sulphur	Irrigation	03-4805	E. P. Land and Cattle Company
TITUS	Sulphur	Irrigation	03-4820	Joe R. Menefee
TITUS	Sulphur	Manufacturing	03-4821	Anna Pearl Lewis
TITUS	Sulphur	Irrigation	03-4822	Bernice Ann Baldwin
TITUS	Sulphur	Irrigation	03-4823	Luminant Mining Company LLC
TITUS	Sulphur	Irrigation	03-4824	Walter W Lee
TITUS	Sulphur	Irrigation	03-4825	Luminant Mining Company LLC
TITUS	Sulphur	Mining	03-5562	Luminant Mining Company LLC

County/Reservoir	Basin	WUG	WR Number	Water Right Owner
TURKEY CREEK LAKE	Sulphur	Wolfe City	03-4795	City Of Wolfe City
UPSHUR	Cypress	Irrigation	04-4583	JFS Timber Partners, LTD.
UPSHUR	Cypress	Irrigation	04-4584	Estate of Edwin Lacy et al
UPSHUR	Cypress	Irrigation	04-4585	Gaston W Deberry
UPSHUR	Cypress	Irrigation	04-4586	Douglas Newsom
UPSHUR	Cypress	Irrigation	04-4604	Jan Lee Jackson and Sharon Jackson
UPSHUR	Sabine	Irrigation	05-3899 (APP 05-4220)	Ralph Trimble
UPSHUR	Sabine	Mining	05-3969 (APP 05-4307)	Tyler Sand Company
UPSHUR	Sabine	Irrigation	05-4763	Investorade SFR Holdings, LLC
VAN ZANDT	Neches	Irrigation	06-3221	A C and Louise R Love
VAN ZANDT	Neches	Irrigation	06-3223	Nipp Investments, LTD.; Baker Lucas
VAN ZANDT	Neches	Irrigation	06-3244	Charles R and Margaret Easley
VAN ZANDT	Neches	Irrigation	06-3245	Amelia Roberts Knox and Charles Stewart Roberts
VAN ZANDT	Neches	Irrigation	06-3251	W L Duncan
VAN ZANDT	Neches	Irrigation	06-3252	Ann H and Dwayne Collins
VAN ZANDT	Neches	Irrigation	06-3253	Ted L Hand
VAN ZANDT	Neches	Manufacturing	06-5232	Debbie and Robert R. Waldrop
VAN ZANDT	Neches	Livestock	06-5415	James G Wise
VAN ZANDT	Neches	Livestock	06-5613	Benton Rutledge; William W Willingham III
VAN ZANDT	Neches	Irrigation	06-5746	Andre, Bridget, Gideon C, and Lorraine Dekkers
VAN ZANDT	Neches	Livestock	06-5757	The Florida Company
VAN ZANDT	Sabine	Livestock	05-12098	Sabine River Bottom Partners LP
VAN ZANDT	Sabine	Wills Point	05-4671	City Of Wills Point
VAN ZANDT	Sabine	County-Other	05-4673	Willow Lake Estates Association
VAN ZANDT	Sabine	Canton	05-4675	City Of Canton
VAN ZANDT	Sabine	Canton	05-4676	City Of Canton
VAN ZANDT	Sabine	Grand Saline	05-4679	M4 Investment Group LLC
VAN ZANDT	Sabine	Irrigation	05-4682	Gail Hill
VAN ZANDT	Sabine	Irrigation	05-4684	Jack C Kellam
VAN ZANDT	Sabine	Irrigation	05-4688	Kay and Robert Dozier; Cindy M and J Glen Turner Jr; George A Shafer
VAN ZANDT	Sabine	Mining	05-4689	Morton Salt, Inc.
WELSH LAKE	Cypress	Steam Electric	04-4576	Southwestern Electric Power Company

County/Reservoir	Basin	WUG	WR Number	Water Right Owner
WOOD	Sabine	Irrigation	05-3942 (APP 05-4267)	Peach Springs Nursery, LLC
WOOD	Sabine	Irrigation	05-4202 (APP 05-4513)	Kay H. Walker
WOOD	Sabine	Irrigation	05-4704	A C and Nell Mcafee
WOOD	Sabine	Irrigation	05-4710	Bradley D Lengel and Brian W Lengel
WOOD	Sabine	Irrigation	05-4712	Lake Lydia Incorporated
WOOD	Sabine	Irrigation	05-4714	Allen A Cooper Jr; Tom E Glover; Bill Ward
WOOD	Sabine	Irrigation	05-4716	Bank of America, National Association
WOOD	Sabine	Irrigation	05-4718	H. L. Hobbs
WOOD	Sabine	Irrigation	05-4722	Barney and Marie Holmes Jr
WOOD	Sabine	Irrigation	05-4737	Joe E Holmes
WOOD	Sabine	Irrigation	05-4738	Barney and Marie Holmes Jr
WOOD	Sabine	County-Other	05-4749	Wood County
WOOD	Sabine	Irrigation	05-4750	Dena and Virgil Woodard
WOOD	Sabine	Irrigation	05-4752	Charlene and Comy E Bradshaw
WOOD	Sabine	Irrigation	05-4754	Mill Creek Company
WOOD	Sabine	Irrigation	05-4755	Real Estate Holdings, Inc.
WOOD	Sabine	Irrigation	05-4769	Jennifer Roseborough; BBVA USA
WOOD	Sabine	Irrigation	05-4771	Little Sandy Hunting & Fishing Club
WRIGHT PATMAN LAKE	Sulphur	Texarkana	03-4836	City Of Texarkana

Table 3.3 summarizes information ~~regardin~~regarding the WAM version, simulation date, and WRAP version used for simulations employed for the purposes of the Final ~~2021 Region D Plan~~2026 Region D Plan.

Table 3.3 Summary of Characteristics of Water Availability Models Employed for the Final ~~2021 Region D Plan~~2026 Region D Plan

Basin	WAM Version	WRAP Version	Simulation Date
Cypress Creek River Basin	1-Oct-2023	Jul-2022	17-Nov-2023
Red River Basin	1-Oct-2023	Jul-2022	20-Nov-2023
Neches River Basin	1-Oct-2023	Jul-2022	17-Nov-2023
Sabine River Basin	1-Oct-2023	Jul-2022	19-Jan-2023
Sulphur River Basin	1-Oct-2023	Jul-2022	19-Nov-2023

3.1.1.1 Sedimentation

Reservoir sedimentation reduces the storage capacity of a reservoir, potentially impacting the beneficial uses of reservoirs such as water supply, flood control, hydropower, navigation, and recreation. Surveys of volumetric storage in a reservoir allow for the derivation of rates and loadings of sediment to the reservoir. The annual loading can then be distributed to determine a revised elevation-area-capacity curve which models the distribution of the total volume of sediment accumulated at the end of an analysis period. The resultant area-capacity relationship is then incorporated into the applicable WAM for the given reservoir in order to calculate a modeled firm yield.

Generally, for the purposes of the ~~2021 Region D Plan~~2026 Region D Plan if a reservoir is calculated to have no firm yield, that result is assumed for all decades in the 203~~2~~0-208~~7~~0 planning horizon. For those reservoirs lacking volumetric surveys, original area-capacity relations employed within WAM Run 3 are assumed constant. If original elevation-area-capacity relations were not available, the most recent elevation-area-capacity- relation for a reservoir will be used as a baseline for future projections. For reservoirs with available volumetric survey information, an annual sediment rate was calculated or cited from available information, and loadings calculated for year 203~~2~~0 through year 208~~7~~0. Sediment distribution within the reservoir was calculated using the Empirical Area Reduction Method, and resultant 203~~2~~0 and 208~~7~~0 area-capacity curves were developed and employed within the applicable WAM to calculate 203~~2~~0 through 208~~7~~0 firm yields.

Table 3.4 Summary of Sedimentation Rates, Sources, and Rating Curves Employed for Region D Reservoirs

Basin	Reservoir	Average Annual Sedimentation Rate at Conservation Pool (ac-ft/yr)	Sedimentation Data Source	Year for Rating Curve
CYPRESS	Bob Sandlin	249	TWDB	2018
CYPRESS	Caddo	N/A	No volumetric /sedimentation survey	1971
CYPRESS	Cypress Springs	168	TWDB	2007
CYPRESS	Ellison Creek	N/A	No volumetric /sedimentation survey	1943
CYPRESS	Johnson Creek	N/A	No volumetric /sedimentation survey	1961
CYPRESS	Lake Gilmer	N/A	No volumetric /sedimentation survey	1998
CYPRESS	Lake O' The Pines	260	TWDB	2009
CYPRESS	Monticello	214	TWDB	1998
CYPRESS	Peacock Site 1A Tailings Lakes	N/A	No volumetric /sedimentation survey	1983
CYPRESS	Tankersley	N/A	No volumetric /sedimentation survey	1955
CYPRESS	Welsh	129	TWDB	2001
NECHES	Rhines	N/A	No volumetric /sedimentation survey	1948
RED	Crook	28	Lake Pat Mayse Water Availability Study, HDR	2003
RED	Pat Mayse	162	Lake Pat Mayse Water Availability Study, HDR	2008
SABINE	Big Sandy Creek	N/A	No volumetric /sedimentation survey	1935
SABINE	Brandy Branch	N/A	No volumetric /sedimentation survey	1983
SABINE	Cherokee	33	TWDB	2015
SABINE	Edgewood City Lake	N/A	No volumetric /sedimentation survey	1951
SABINE	Fork	1327	Survey by TWDB, calculations by Freese and Nichols	2009
SABINE	Gladewater	46	TWDB	2000
SABINE	Greenville Lakes	N/A	No volumetric /sedimentation survey	1925

Basin	Reservoir	Average Annual Sedimentation Rate at Conservation Pool (ac-ft/yr)	Sedimentation Data Source	Year for Rating Curve
SABINE	Hawkins	N/A	No volumetric /sedimentation survey	1962
SABINE	Holbrook	N/A	No volumetric /sedimentation survey	1962
SABINE	Lake Quitman	N/A	No volumetric /sedimentation survey	1962
SABINE	Lake Winnsboro	N/A	No volumetric /sedimentation survey	1962
SABINE	Loma	N/A	No volumetric /sedimentation survey	1965
SABINE	Mill Creek	N/A	No volumetric /sedimentation survey	1970
SABINE	Tawakoni	1322	Survey by TWDB, calculations by Freese and Nichols	2009
SULPHUR	Big Creek	56	TWDB	2022
SULPHUR	Caney Creek	N/A	No volumetric /sedimentation survey	2005
SULPHUR	Elliot Creek	N/A	No volumetric /sedimentation survey	2005
SULPHUR	Jim Chapman/Cooper	830	TWDB	2022
SULPHUR	Langford	38	Material submitted by City of Clarksville produced by MTG Engineers	2008
SULPHUR	Rivercrest	N/A	No volumetric /sedimentation survey	1953
SULPHUR	Sulphur Springs	N/A	No volumetric /sedimentation survey	1974
SULPHUR	Turkey Creek	N/A	No volumetric /sedimentation survey	1957
SULPHUR	Wright Patman	824*	Material submitted by Riverbend Water Resources District, produced by Arroyo Environmental Inc., LJA Engineering, and HDR Engineering	2018

* Annual sedimentation accumulation below elevation 224.9' msl. Annual sedimentation accumulation below elevation 220.6' msl is 714 ac-ft/yr.

3.1.2 Modeled Source Water Availabilities

3.1.2.1 Sabine River Basin

The Sabine River originates in Collin County, just west of the North East Texas Region, and extends to Sabine Lake in the far southeastern portion of Texas. The total drainage area of the basin is nearly 9,800 square miles. Of this area, approximately 7,5400 square miles are in Texas while the remaining 2,3400 square miles of drainage are in Louisiana. Within the North East Texas Region, all or portions of Hunt, Hopkins, Franklin, Rains, Wood, Upshur, Gregg, Harrison, Smith and Van Zandt counties are in the Sabine Basin. The existing surface water sources modeled in the Sabine Basin included nine13 reservoirs, and combined run-of-the-river supplies from the Sabine River. Table 3.5 presents the modeled source water availability for these sources during drought of record conditions by decade.

Table 3.5 Sabine Basin Surface Water Firm Yield (ac-ft/yr)

Source Name	2030	2040	2050	2060	2070	2080
BIG SANDY CREEK LAKE / RESERVOIR	2,680	2,680	2,680	2,680	2,680	2,680
BRANDY BRANCH LAKE / RESERVOIR	19,889	19,889	19,889	19,889	19,889	19,889
EDGEWOOD CITY LAKE / RESERVOIR	160	160	160	160	160	160

Source Name	2030	2040	2050	2060	2070	2080
LAKE FORK / RESERVOIR	168,966	167,119	165,272	163,424	161,577	159,730
GLADEWATER LAKE / RESERVOIR	4,540	3,944	3,348	2,752	2,156	1,560
GREENVILLE CITY LAKE / RESERVOIR	3,420	3,420	3,420	3,420	3,420	3,420
LOMA LAKE / RESERVOIR	880	880	880	880	880	880
MILL CREEK LAKE / RESERVOIR	1190	1190	1190	1190	1190	1190
TAWAKONI LAKE / RESERVOIR	226,239	224,543	222,847	221,152	219,456	217,760
SABINE LIVESTOCK LOCAL SUPPLY	5,980	5,980	5,980	5,980	5,980	5,980
SABINE OTHER LOCAL SUPPLY	3347	3507	3670	3837	3998	4161
SABINE RIVER COMBINED RUN OF RIVER	111,202	111,202	111,202	111,202	111,202	111,202
DIRECT REUSE	6161	6161	6161	6161	6161	6161
TOTAL	554,654	550,675	546,699	542,727	538,749	534,773

3.1.2.2 Red River Basin

The Red River Basin originates in eastern New Mexico and extends eastward across north Texas and southern Oklahoma and into Louisiana. Approximately 24,297460 square miles of the 9348,40350 square miles drainage area of the basin areis within Texas. Within the North East Texas RWPA, all or part of Bowie, Red River, and Lamar Counties are in the Red River Basin.

The existing surface water sources in the Red River Basin include Lake Texoma, Pat Mayse Lake and Lake Crook. Table 3.6 presents the modeled source water availability under drought of record conditions within Region D. None of the water in Lake Texoma is considered available to the North East Texas Region due to lack of infrastructure and water rights; thusthus, it is not listed as a supply for Region D.

Pat Mayse Reservoir and Lake Crook supplies are shown in Table 3.6. HDR Engineering, at the request of the City of Paris, completed a study in which the water availability for the two lakes was analyzed. HDR developed a drainage area specific water availability model for these two reservoirs, which they based upon information from the Corps of Engineers and stream flow data from the Sulphur River gauge at Highway 24. The NETRWPG in their April 4th, 2018 meeting approved the utilization of the results from the HDR water availability model. Consideration of the minimum annual diversion for run-of-river non-municipal rights in Region D for this basin provides lessmore water than shown in the 202116 Plan.

Table 3.6 Red River Basin Surface Firm Yield (ac-ft/yr)

Source Name	20320	20430	20540	20650	20760	20870
CROOK LAKE / RESERVOIR	5,000	4,800	4,600	4,400	4,200	4,000
PAT MAYSE LAKE / RESERVOIR	50,490	50,252	50,014	49,776	49,538	49,300
RED RIVER COMBINED RUN OF RIVER	8,690	8,690	8,690	8,690	8,690	8,690
SABINE LIVESTOCK LOCAL SUPPLY	491	488	497	510	517	517
DIRECT REUSE	12	12	12	12	12	12
TOTAL	**64,683**	**64,242**	**63,813**	**63,388**	**62,957**	**62,519**

3.1.2.3 Sulphur River Basin

The Sulphur River Basin begins in Fannin and Hunt counties and extends eastward to southwest Arkansas where it joins the Red River. Within the North East Texas Region, all or part of Hunt, Delta, Lamar, Hopkins, Franklin, Titus, Red River, Morris, Bowie, and Cass counties are within the Sulphur Basin. The Texas portion of the Sulphur Basin covers ~~approx.~~ 3,~~558~~ 580 square miles.

Due to high average rainfall and runoff, the Sulphur Basin has an abundant supply of surface water. There are 29 impoundments in the Sulphur Basin with a normal storage capacity greater than 200 acre-feet. However, five reservoirs account for the majority of current supply in the basin. Table 3.7 presents the source water availability in the Sulphur River Basin.

Table 3.7 Sulphur River Basin Surface Firm Yield (ac-ft/yr)

Source Name	2030	2040	2050	2060	2070	2080
BIG CREEK LAKE / RESERVOIR	940	752	564	376	188	0
TURKEY CREEK LAKE	190	190	190	190	190	190
CHAPMAN/COOPER LAKE/RESERVOIR (NON-SYSTEM)	63,901	62,381	60,861	59,341	57,821	56,301
CANEY CREEK LAKE	792	792	792	792	792	792
LANGFORD LAKE / RESERVOIR	130	0	0	0	0	0
RIVER CREST LAKE / SULPHUR RUN OF THE RIVER*	5300	5300	5300	5300	5300	5300
SULPHUR SPRINGS LAKE	7,730	7,730	7,730	7,730	7,730	7,730
ELLIOT CREEK LAKE	1,318	1,318	1,318	1,318	1,318	1,318
WRIGHT PATMAN LAKE / RESERVOIR**	264,230	255,166	246,102	237,038	227,974	218,910
SULPHUR RIVER COMBINED RUN OF RIVER	13,126	13,126	13,126	13,126	13,126	13,126
SULPHUR LIVESTOCK LOCAL SUPPLY	6,130	6,053	5,819	5,715	5,456	5,343
SULPHUR OTHER LOCAL SUPPLY	25	26	26	26	26	26
TOTAL	**363,812**	**352,834**	**341,828**	**330,952**	**319,921**	**309,036**

* River Crest watershed is negligible. This yield is based on a permit for transfer of up to 10,000 ac-ft/yr from the Sulphur River.
** Firm yield of Wright Patman estimated at ultimate curve reservoir operations with sedimentation. However, only 180,000 ac-ft/yr is permitted.

3.1.2.4 Cypress Creek Basin

The Cypress Creek Basin originates in Hopkins County and extends eastward into northwest Louisiana, where it flows into the Red River. The Texas portion of the Cypress Basin covers ~~approximately 2,800~~2,929 square miles and includes all or portions of Hopkins, Gregg, Franklin, Wood, Titus, Camp, Upshur, Cass, Marion, Morris and Harrison counties in the North East Texas Region. Table 3.8 presents source water availabilities for the Cypress Creek Basin.

Table 3.8 Cypress Creek Basin Surface Firm Yield (ac-ft/yr)

Source Name	2030	2040	2050	2060	2070	2080
BOB SANDLIN LAKE/RESERVOIR	26,200	25,660	25,120	24,580	24,040	23,500

Source Name	2030	2040	2050	2060	2070	2080
CADDO LAKE / RESERVOIR	10,000	10,000	10,000	10,000	10,000	10,000
CYPRESS SPRINGS LAKE / RESERVOIR	10,500	10,040	9,580	9,120	8,660	8,200
ELLISON CREEK LAKE / RESERVOIR	33,640	33,640	33,640	33,640	33,640	33,640
GILMER LAKE / RESERVOIR	6,300	6,300	6,300	6,300	6,300	6,300
JOHNSON CREEK LAKE / RESERVOIR	2,280	2,280	2,280	2,280	2,280	2,280
MONTICELLO LAKE/RESERVOIR	5,000	4,560	4,120	3,680	3,240	2,800
LAKE O' THE PINES / RESERVOIR	159,000	157,500	156,000	154,500	153,000	151,500
TANKERSLEY LAKE / RESERVOIR	1,500	1,500	1,500	1,500	1,500	1,500
WELSH LAKE / RESERVOIR	2,900	2,620	2,340	2,060	1,780	1,500
DIRECT REUSE	66,820	61,504	62,760	71,634	65,408	65,408
CYPRESS RIVER COMBINED RUN-OF-RIVER	11,754	11,754	11,754	11,754	11,754	11,754
CYPRESS LIVESTOCK LOCAL SUPPLY	3,261	3,288	3,354	3,448	3,544	3,570
GRAYS CREEK RUN-OF-RIVER	12	12	12	12	12	12
PEACOCK SITE 1A TAILINGS LAKE/RESERVOIR	877	874	871	867	864	861
TOTAL	**340,044**	**331,532**	**329,631**	**335,375**	**326,022**	**322,825**

* Firm yields of reservoirs presented herein do not reflect contractual agreements between entities, unless such agreements are incorporated into the TCEQ official WAM for the basin. If not within the official WAM, such agreements are reflected in the individual supplies for each WUG/WWP/MWP.

3.1.2.5 Neches River Basin

The Neches River Basin originates in Van Zandt County and extends southeast to the Gulf of Mexico, with total~~a~~ drainage area of ~~approximately~~ 9,937~~10,000~~ square miles. The portion within the North East Texas Region is very small, with only small parts of Van Zandt and Smith Counties in the basin. Source water availabilities for Region D sources in the Neches River Basin are presented in Table 3.9.

Table 3.9 Neches Basin Surface Firm Yield (ac-ft/yr)

Source Name	2030	2040	2050	2060	2070	2080
RHINES LAKE / RESERVOIR	1,170	1,170	1,170	1,170	1,170	1,170
NECHES COMBINED RUN OF RIVER	150	150	150	150	150	150
NECHES LIVESTOCK LOCAL SUPPLY	1,136	1,136	1,136	1,136	1,136	1,136
TOTAL	**2,456**	**2,456**	**2,456**	**2,456**	**2,456**	**2,456**

3.1.2.6 Trinity River Basin

The Trinity River Basin originates in Archer County and extends southeast to the Gulf of Mexico. The total drainage area of the basin is ~~nearly 18,000~~17,913 square miles and contains the largest population of any basin in the state. However, within the North East Texas Region only small parts of Hunt and Van Zandt counties are located within the Trinity River Basin.

There are no major surface water supplies within the portion of the Trinity Basin in the North East Texas Region. However, some supply from Lake Lavon is available for use in the region. Source water availabilities for Region D sources in the Trinity River Basin are presented in Table 3.10.

Table 3.10 Trinity Basin Surface Firm Yield (ac-ft/yr)

Source Name	2030	2040	2050	2060	2070	2080
TRINITY OTHER LOCAL SUPPLY	633	561	483	375	317	228
TOTAL	**633**	**561**	**483**	**375**	**317**	**228**

3.2 Groundwater Availability

Commented [CB1]: Section to be updated when local hydrogeologic assessment is complete.

Groundwater availability estimates for the North East Texas Region are presented in the sections that follow. This includes a brief discussion of the methods that were used to estimate groundwater availability, including the methodology used to develop estimates for each aquifer represented in this regional water plan.

3.2.1 Background

In June 1997, the 75th Texas Legislature enacted Senate Bill 1 (SB 1) to establish a comprehensive statewide water planning process to help ensure that the water needs of all Texans are met. SB 1 mandated that representatives serve as members of RWPGs to prepare regional water plans for their respective areas. These plans map out how to conserve water supplies, meet future water supply needs and respond to future droughts in the planning areas. Additionally, SB 1 established that groundwater conservation districts (GCDs) were the preferred entities for groundwater management and contained provisions that required the GCDs to prepare management plans.

In 2001, the Texas Legislature enacted Senate Bill 2 (SB 2) to build on the planning requirements of SB 1 and to further clarify the actions necessary for GCDs to manage and conserve groundwater resources. As part of SB 2, the Legislature called for the creation of GMAs which were based largely on hydrogeologic and aquifer boundaries instead of political boundaries. The TWDB divided Texas into 16 GMAs, and most contain multiple GCDs. One of the purposes for GMAs was to manage groundwater resources on a more aquifer-wide basis. Figure 3.1 shows the regulatory boundaries of the GMAs within Region D. The North East Texas Region does not contain any GCDs.

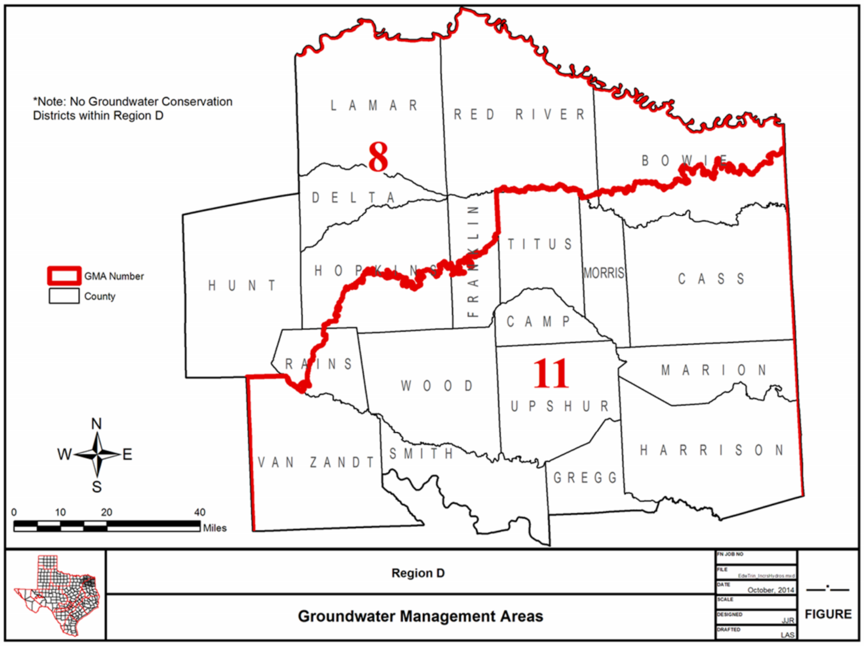

Figure 3.1 Groundwater Management Areas within Region D

The Texas Legislature enacted significant changes to the management of groundwater resources in Texas with the passage of House Bill 1763 (HB 1763) in 2005. ~~A main~~The main goal of HB 1763 was intended to clarify the authority and conflicts between GCDs and RWPGs. The new law clarified that GCDs would be responsible for aquifer planning and developing the amount of groundwater available for use and/or development by the RWPGs. To accomplish this, the law directed that all GCDs within each GMA to meet and participate in joint groundwater planning efforts. The focus of joint groundwater planning was to determine the DFCs for the groundwater resources within the GMA boundaries (before September 1, 2010, and at least once every 5 years after that).

DFCs were defined by statute to be "the desired, quantified condition of groundwater resources (such as water levels, spring flows, or volumes) within a management area at one or more specified future times as defined by participating groundwater conservation districts within a groundwater management area as part of the joint groundwater planning process." DFCs are quantifiable management goals that reflect how GCDs want to manage groundwater in their particular area and in areas that do not contain GCDs. The most common DFCs are based on the volume of groundwater in storage over time, water levels (limiting decline within the aquifer), water quality (limiting deterioration of quality), or spring flow (defining a minimum flow to sustain).

After the DFCs are determined by the GMAs, the TWDB performs quantitative analyses to determine the amount of groundwater available for production to meet the DFC. For aquifers where a Groundwater Availability Model (GAM) exists, the GAM is used to develop the MAG. For aquifers without a GAM, another quantitative approach is used to estimate the MAG.

In 2011, Senate Bill 660 required that GMA representatives must participate within each applicable RWPG. It also required the Regional Water Plans be consistent with the DFCs in place when the regional plans are initially developed. TWDB technical guidelines for the current round of planning generally establish that the MAG (within each county and basin) is the maximum amount of groundwater that can be used for existing uses and new strategies in Regional Water Plans. However, with the passage of Senate Bill 1101 by the 84th Texas Legislature in 2015, a RWPG is allowed to define all groundwater availability as long as there are no GCDs within the RWPA. In the State of Texas, this applies only to the Region D RWPA.

Because there are no GCDs within Region D, the NETRWPG exercised the right to refine the groundwater availability estimates to determine if the MAG volumes estimated by the TWDB were appropriate for the purposes of the ~~2021 Region D Plan~~2026 Region D Plan. The NETRWPG believes that local entities that operate wells and wellfields in the region have insight and information that may be helpful in refining the groundwater availability estimates. The refined evaluation was deemed necessary to ensure that historical use and local aquifer characteristics and conditions are properly considered when estimating local groundwater availability.

Without local GCD representation and data, it is difficult for GMA 11 and GMA 8 to assess groundwater availability at the level that may be required for local groundwater sources. Refinement of the groundwater availability estimates entailed comparing the MAGs for each county-aquifer-basin and calculated municipal pumpage. The term "relevant" as applied to groundwater aquifers, determines whether they are considered critical to joint groundwater planning, and is a designation that can change from one planning cycle to the next.

Generally, the MAG amounts were used for the purposes of the ~~2021 Region D Plan~~2026 Region D Plan, except in instances where it was determined that existing supplies (or possible Water Management Strategies) would exceed the MAG amount for a given county-aquifer-basin. In these instances, the following data were first reviewed:

- Public water supply well locations, well depths, well tested capacities, and public water supply system average daily consumption volumes available via the TCEQ Texas Drinking Water Watch.
- Groundwater well locations, depths and well yields available via TCEQ water well databases.
- Groundwater well locations, depths and well yields available via the TWDB.
- TWDB GAM run reports requested by GMA-8 for both the 2021~~16~~ and 2026~~1~~ planning cycles.
- Structure surfaces derived for either the Northern Trinity Woodbine GAM (Kelley and others, 2013) or the Nacatoch Brackish Availability Study (Laughlin and others, 2017).
- TWDB historical groundwater pumping from reported water use estimates and survey information.
- Supplemental modeling performed by TWDB identifying total groundwater availabilities that are physically compatible with desired future conditions for aquifers in GCDs not located in Region D in co-located groundwater management areas.

For municipal pumping, public water supply (PWS) locations were verified to be active and to have the correct aquifer designation based on geologic structure. River basin splits, where applicable, were noted for each public system so that pumping could be properly allocated to compare to MAG volumes split out by basin. Total test well capacities were summed for PWS wells by county-aquifer-basin, then divided by four to derive the expected average annual pumping for the system. The average daily consumption of the system, if reported, was also converted to an annual volume to represent the average annual PWS system pumping. Estimates of average annual pumping volume were then compared to the MAG volume.

For non-municipal pumping, the only non-municipal estimates that are based on annual surveys are pumping estimates reported by industrial users, which accounted for approximately four percent of Region D pumping in 2016. To verify non-municipal historical pumping estimates, existing non-municipal well locations were verified (when possible) to be active and aquifer designations were either determined (from state well reports) or verified (for TWDB historical wells) using the geologic structure sources mentioned previously. Non-surveyed estimates were then evaluated to determine if they could be substantiated by existing active wells found within the county-aquifer-basin. Since the non-surveyed volumes are county-wide estimates and are not location-specific, in some areas they can erroneously assign pumping to water users that cannot be substantiated using the ~~publicly-available~~publicly available state well databases and other resources. Region D considered the non-surveyed historical pumping estimates to be questionable when there were no well data to support the assumption that the demands are supplied by wells in that specific county-aquifer-basin. TWDB's non-surveyed historical estimates may not have any direct relationship to MAG volumes or regional supply estimates, but they can provide insight for water resource planning.

Noting the lack of GCDs in Region D, the region wanted to exercise the right to refine the groundwater availability estimates to determine if the MAG volumes estimated by the TWDB were appropriate for the region. Region D believes that local entities that operate wells and wellfields in the region have insight and information that may be helpful in refining the groundwater availability estimates. The refined evaluation was deemed necessary to ensure that historical use and local aquifer characteristics and conditions were properly considered when estimating local groundwater availability. Without local GCD representation and data, it is difficult for Groundwater Management Area (GMA) 11 and GMA 8 to assess groundwater availability at the level that may be required for local groundwater sources. Refinement of the groundwater availability estimates entailed comparing the MAGs for each county-aquifer-basin and calculated municipal pumpage in nine county-aquifer-basins. The term "relevant" as applied to groundwater aquifers, determines whether they are considered critical to joint groundwater planning. The 'relevant' designation can change from one planning cycle to the next.

Through the course of the development of the ~~2021~~ 2026 Region D Water Plan, the NETRWPG submitted a proposed methodology for determining groundwater availability in the region. TWDB staff reviewed the proposed methodology and identified modeled estimates of compatible groundwater availability for desired future conditions for relevant aquifers (i.e., Trinity, Woodbine, Carrizo-Wilcox, and Queen City aquifers) in either Groundwater Management Area 8 or 11. The Blossom and Nacatoch aquifers were declared nonrelevant in Groundwater Management Area 8 and they do not have desired future conditions, so their compatibility did not need to be reviewed and the amounts identified by Region D for these aquifers have been utilized herein. Subsequent to the TWDB staff's review, the NETRWPG identified availabilities for final TWDB review and approval. In its' ~~January 16, 2020~~March 1, 2024, meeting, the TWDB Board approved amounts for relevant aquifers that did not exceed the TWDB's modeled availabilities and were physically compatible with desired future conditions for aquifers in co-located GMAs 11 and 8, namely:

- Carrizo-Wilcox Aquifer – Titus County – Cypress Creek Basin.
- Carrizo-Wilcox Aquifer – Van Zandt County – Sabine River Basin.
- Woodbine Aquifer – Lamar County – Red River Basin.
- Trinity Aquifer - Red River County – Sulphur River Basin.
- Carrizo-Wilcox Aquifer – Hopkins County – Sulphur River Basin.
- Trinity Aquifer – Hunt County – Sabine River Basin.

Appendix C3-3 presents the various formal communications between the NETRWPG and TWDB through this process, including the minutes of the January 16, 2020, meeting of the TWDB Board, wherein Item 5 reflects the approval of the groundwater availabilities utilized for the purposes of the ~~2021~~ 2026 Region D Water Plan. Volume adjustments for non-relevant aquifers (i.e., Nacatoch Aquifer) did not require TWDB approval and were based on the local hydrogeologic assessment. The volume adjustments to groundwater availability identified for the purposes of the ~~2021 Region D Plan~~2026 Region D Plan are presented along with the original MAG amounts in Table 3.11.

3.2.2 Characterization of Aquifers in Region D

The following discussion describes the two major aquifers (Carrizo-Wilcox and Trinity) along with the four minor aquifers (Nacatoch, Blossom, Queen City and Woodbine) found in the North East Texas Region.

Groundwater availability estimates have been extracted from GAM runs to determine the MAG for each aquifer. Table 3.12 details updated availability (MAG) numbers for 2021. The source(s) of data for each aquifer as well as a brief discussion of each aquifer are summarized below.

3.2.2.1 Blossom Aquifer

The Blossom Aquifer (see Figure 3.2) occupies a narrow east-west band in parts of Bowie, Red River, and Lamar counties in the northeast corner of the North East Texas Region. The TWDB has historically assumed that the annual availability for the Blossom Aquifer is equal to the effective recharge that occurs primarily through infiltration of rainfall over the outcrop. The Blossom formation consists of alternating sequences of sand and clay. In places it attains a thickness of 400 feet, although no more than 29 percent of this thickness consists of water-bearing sand. Most of the water in storage is under water-table conditions.

The Blossom Aquifer yields water in small to moderate amounts over a limited area on and south of the outcrop, with the largest well yields occurring in Red River County. The average well yields 75 gal/min in Red River County. Production decreases in the western half of the aquifer where yields less than 50 gal/min are more typical. Wells producing fresh to slightly saline water are located on the formation outcrop in northwestern Bowie and eastern Red River counties and in the City of Clarksville. The groundwater is generally soft, slightly alkaline and, in some areas, high in sodium bicarbonate, iron, and fluoride.

Table 3.11 Region D Groundwater Source Availability Volume Adjustments (ac-ft/yr)

Source			Original Modeled Available Groundwater (MAG)						Revised Groundwater Availability for 2021 Region D Plan2026 Region D Plan						Note
Aquifer	County	Basin	2020	2030	2040	2050	2060	2070	2020	2030	2040	2050	2060	2070	
WOODBINE	Lamar	Red	0	0	0	0	0	0	22	22	22	22	22	22	Local Hydrogeological Assessment approved by TWDB
CARRIZO-WILCOX	Hopkins	Sulphur	3,237	3,237	3,237	3,237	3,237	3,237	7,119	7,205	7,228	7,045	7,010	6,795	Local Hydrogeological Assessment approved by TWDB
NACATOCH	Hunt	Sulphur	491	491	491	491	491	491	491	491	513	868	1,347	2,052	Local Hydrogeological Assessment of Non-Relevant Aquifer
TRINITY	Hunt	Sabine	0	0	0	0	0	0	213	213	213	213	213	213	Local Hydrogeological Assessment approved by TWDB
NACATOCH	Red River	Sulphur	1,047	1,047	1,047	1,047	1,047	1,047	2,925	2,924	2,923	2,923	2,923	2,923	Local Hydrogeological Assessment of Non-Relevant Aquifer
TRINITY	Red River	Sulphur	125	125	125	125	125	125	234	233	234	233	234	233	Local Hydrogeological Assessment approved by TWDB
CARRIZO-WILCOX	Titus	Cypress	7,215	7,064	6,834	6,786	6,735	6,634	7,215	7,064	6,974	7,211	7,252	7,194	Local Hydrogeological Assessment approved by TWDB
CARRIZO-WILCOX	Van Zandt	Sabine	4,629	4,629	4,456	4,397	4,397	4,270	4,767	4,729	4,556	4,497	4,497	4,370	Local Hydrogeological Assessment approved by TWDB

Commented [RJ2]: Table to be updated when local hydrogeologic assessment is complete.

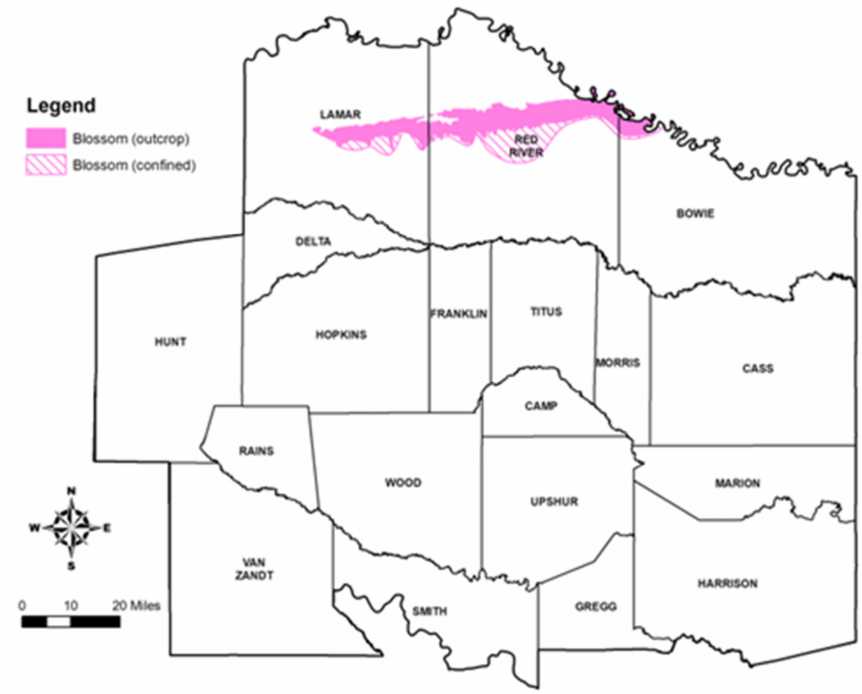

Figure 3.2 Blossom Aquifer within Region D

In 2021~~16~~, the total pumpage in the Region was ~~6,763~~9,003 ac-ft from the Blossom Aquifer. GMA 8 determined the Blossom aquifer to be non-relevant for joint planning purposes in 2017 and therefore, DFCs and MAGs were not developed for the Blossom aquifer. Previous MAG estimates (GTA Aquifer Assessment, 10-19 MAG Groundwater Management Area 8, Blossom Aquifer Modeled Available Groundwater estimates, December 9, 2011), historical use, and other local hydrogeologic information were used to help evaluate available supply from this aquifer.

3.2.2.2 Carrizo-Wilcox Aquifer

The Carrizo-Wilcox group (see Figure 3.3) is the most extensive and productive aquifer in the North East Texas Region and is a designated major aquifer by the TWDB. This aquifer extends from the Rio Grande in south Texas northeast into Arkansas and Louisiana, providing water to 60 counties in Texas. In the outcrop, wells generally yield less than 100 gpm – downdip yields greater than 500 gpm are not uncommon. The production capacity of the Carrizo-Wilcox Aquifer is variable because of the heterogeneous nature of the sediments that comprise the aquifer. Nevertheless, in general, it is a very productive aquifer and is recharged from infiltration from precipitation. The majority of municipal wells in the North East Texas Region produce from the Carrizo-Wilcox Aquifer.

Regionally, water from the Carrizo-Wilcox Aquifer is fresh to slightly saline with quality problems in localized areas. Iron and manganese are sometimes higher than drinking water standards. In the outcrop, the water is hard, yet usually low in dissolved solids. Hydrogen sulfide and methane may occur locally. Excessively corrosive water can occur in some areas of the Region.

Total estimated groundwater availability (MAGs) for the Carrizo-Wilcox Aquifer in the North East Texas Region is 105,715~~36,548~~ ac-ft/yr for planning year 203~~2~~0. Total groundwater pumpage from the Carrizo-Wilcox Aquifer in the North East Texas Region was ~~50,602~~54,339 ac-ft during 2021~~16~~.

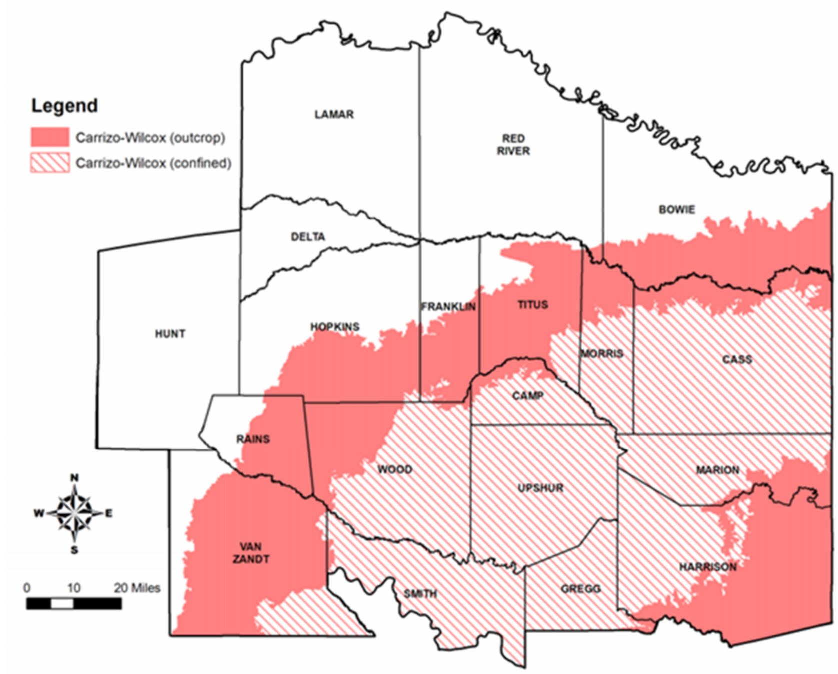

Figure 3.3 Carrizo-Wilcox Aquifer within Region D

Groundwater availability estimates for the Carrizo-Wilcox Aquifer were listed in ~~GAM Run 17-024 MAG~~GAM Run 21-016 MAG report, which applied to the Queen City/Sparta and Carrizo-Wilcox predictive model. The MAG within the groundwater conservation districts reflected the DFCs adopted by GMA 11. In a letter dated February 15, 2017, GMA 11 provided the TWDB with the DFC of the Carrizo-Wilcox, Queen City, and Sparta aquifers within Groundwater Management Area 11. The DFC for the aquifers are described in Attachment B of the Resolution and were adopted on January 11, 2017 by the groundwater conservation districts (GCDs) within Groundwater Management Area 11. The DFCs will allow an average drawdown of 56 feet in the Carrizo-Wilcox from the year 2000 to 2070. DFC drawdowns range from one foot in Rains County to 119 feet in Smith County.

3.2.2.3 Nacatoch Aquifer

The Nacatoch Aquifer (see Figure 3.4) is classified as a minor aquifer by the TWDB. This sandstone aquifer occurs along a narrow band in northeast and north-central Texas and extends into Arkansas and Louisiana. The Nacatoch formation is composed of one to three sequences of sands separated by impermeable layers of mudstone or clay. The aquifer also includes a hydrologically connected mantle of alluvium up to 80 feet thick where it covers the Nacatoch formation along major drainage way (such as the Red River). Groundwater in this aquifer is usually under artesian conditions except in shallow wells on the outcrop where water-table conditions exist. Well yields are generally low, less than 50 gal/min, and rarely exceed 500 gal/min. The quality of groundwater in the aquifer is generally alkaline, high in sodium bicarbonate, and soft. Dissolved-solids concentrations increase in the downdip portion of the aquifer and are significantly higher downdip of faults.

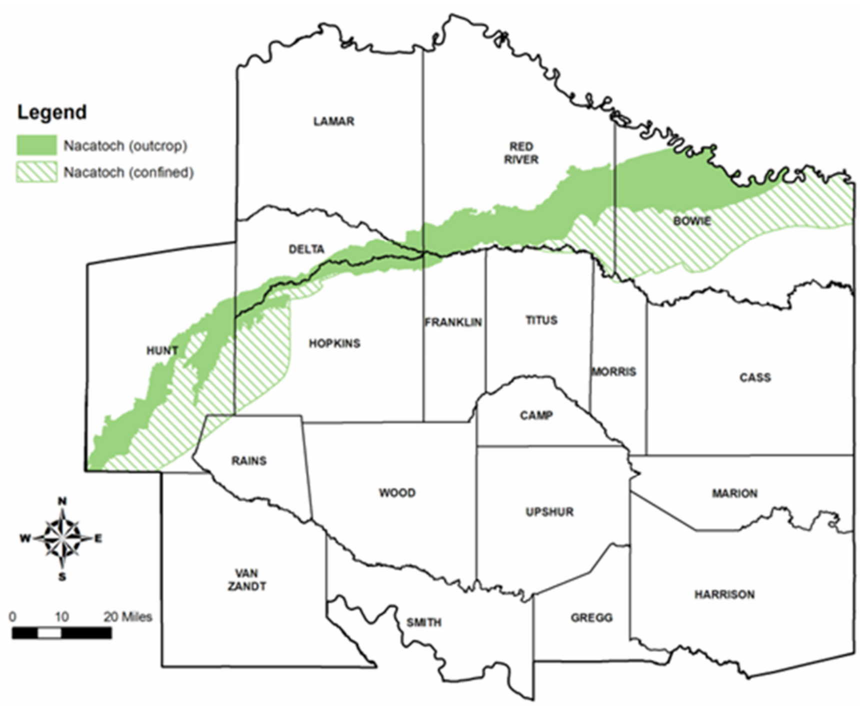

Figure 3.4 Nacatoch Aquifer within Region D

During 20162021, pumpage from the aquifer totaled 2,9684,136 ac-ft. GMA 8 determined the Nacatoch aquifer to be non-relevant for joint planning purposes in 2017 and therefore, DFCs and MAGs were not developed for this aquifer. Previous MAG estimates (GAM Run 10-006 by Mohammad Masud Hassan P.E., Texas Water Development Board, Groundwater Availability Modeling Section, July 30, 2012), historical use, and other local hydrogeologic information were used to help evaluate available supply in this aquifer.

3.2.2.4 Queen City Aquifer

The Queen City Aquifer (see Figure 3.5) is classified as a minor aquifer by the TWDB. The Queen City Aquifer extends in a band across most of Texas from the Frio River in south Texas northeast into Louisiana. The Queen City Aquifer overlies the Carrizo-Wilcox Aquifer and is shallower and more prone to potential impacts of drought and over-pumping as compared to the deeper Carrizo-Wilcox Aquifer. However, the Queen City Aquifer contains relatively large quantities of recoverable groundwater in the North East Texas Region. The Queen City formation is composed mainly of sand, loosely cemented sandstone, and interbedded clays. Although large amounts of usable quality groundwater are contained in the Queen City yields are typically low. Throughout most of its extent, the chemical quality of the Queen City Aquifer water is excellent; however, quality deteriorates with depth in the downdip direction.

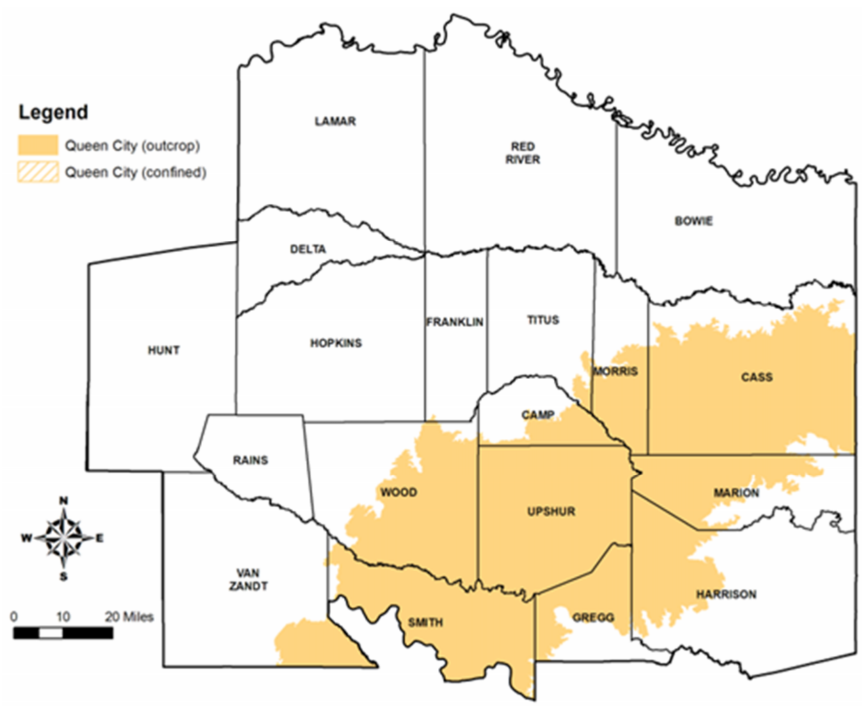

Figure 3.5 Queen City Aquifer within Region D

Groundwater availability estimates for the Queen City aquifer were listed in ~~GAM Run 17-024 MAG~~GAM Run 21-016 MAG report, which applied to the Queen City, Sparta, and Carrizo-Wilcox predictive model. The MAG within the groundwater conservation districts reflected the DFCs adopted by GMA 11. In a letter dated February 15, 2017, GMA 11 provided the TWDB with the DFC of the Carrizo-Wilcox, Queen City, and Sparta aquifers within GMA 11. The DFC for the aquifers are described in Attachment B of the Resolution and were adopted January 11, 2017 by the GCDs within GMA 11. The DFC allows ~~average~~an average drawdown of ten feet in the Queen City from the year 2000 to 2070. DFC drawdowns range from one foot in Harrison County to 24 feet in Marion County. In some counties, the Queen City was determined to be non-relevant where the combined outcrop and downdip area in the county is less than 200 square miles.

3.2.2.5 Trinity Aquifer

The Trinity Aquifer (see Figure 3.6) is composed of sand, clay, and limestone units which occur in a band from the Red River in north Texas, to the Hill Country of south-central Texas. The groundwater use from the Trinity Aquifer during ~~2016~~ 2021 in the Region was ~~1,342~~1,236 ac-ft. This value is relatively small because only a small northwestern portion of the Region overlies the downdip portion of the Trinity Aquifer, and the groundwater from the Trinity Aquifer in the Region generally exceeds the 1,000 milligrams per liter (mg/l) TDS limits established by TCEQ for municipal supply.

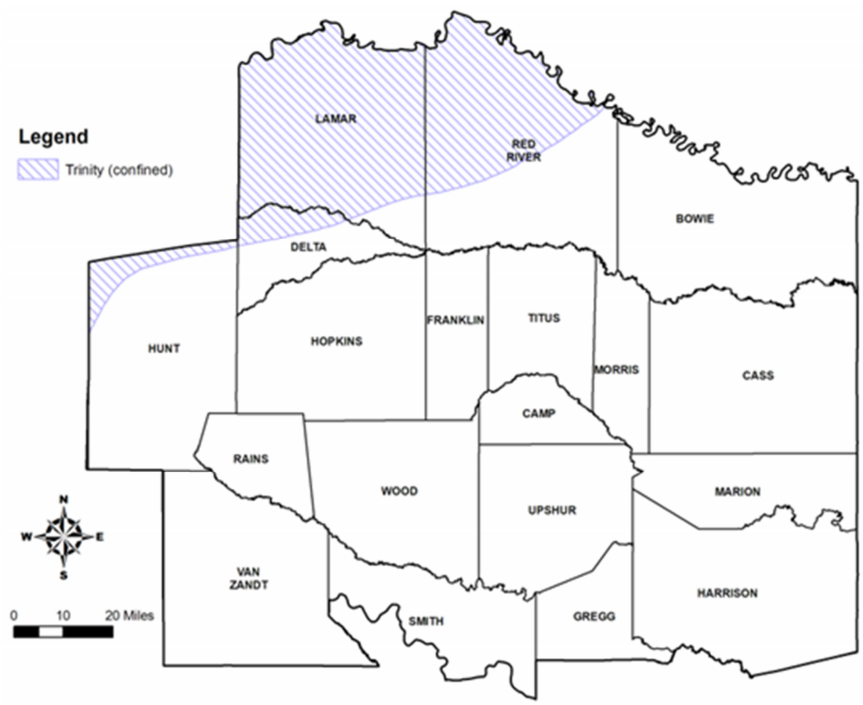

Figure 3.6 Trinity Aquifer within Region D

Groundwater availability estimates for the Trinity Aquifer were taken from GAM Run 17-029 MAG. GMA 8 provided the TWDB with the DFCs of the Trinity Aquifer adopted in a resolution dated January 31, 2017. The DFCs for the Trinity formations within Region D (hydrostratigraphic region 3 in the TWDB GAM report) average 144 feet of drawdown for the Paluxy, 116 feet for the Glen Rose, and 177 feet for the Travis Peak from 2010 to 2070.

GMA 11 determined the Trinity aquifer to be non-relevant for joint planning purposes in 2017 and therefore, DFCs and MAGs were not developed for this aquifer in GMA-11. Previous MAG estimates, historical use, and other local hydrogeologic information were used to help evaluate available supply in this aquifer.

3.2.2.6 Woodbine Aquifer

The Woodbine Aquifer (see Figure 3.7) is classified as a minor aquifer by the TWDB. The Woodbine Aquifer extends from McLennan County in north-central Texas northward to Cooke County and eastward to Red River County, paralleling the Red River. The Woodbine Aquifer is composed of water bearing sand and sandstone beds interbedded with shale and clay. The water in storage is under water-table conditions in the outcrop and under artesian conditions in the subsurface. Yields of wells in the Woodbine Aquifer in the Region are generally less than 100 gpm. Water quality in the Woodbine Aquifer in the North East Texas RWPA is typically not acceptable for public water supply because it does not meet current drinking water standards, but it may be used for domestic, irrigation, and livestock purposes.

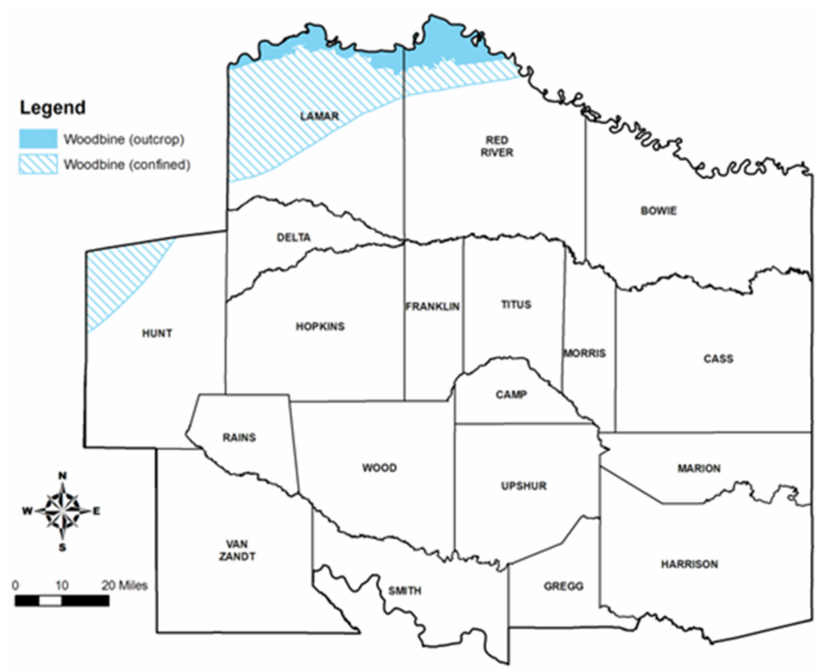

Figure 3.7 Woodbine Aquifer within Region D

Groundwater availability estimates for the Woodbine Aquifer were taken from GAM Run 17-029 MAG. GMA 8 provided the TWDB with the DFCs of the Woodbine Aquifer adopted in a resolution dated January 31, 2017. The DFC for the Woodbine aquifer allows an average drawdown of 146 feet from 2010 to 2070.

3.2.3 Existing Groundwater Supplies

Based on historic groundwater estimates for years 2017~~12~~ through 2021~~16~~, regional groundwater sources supplied an average of 71,920~~69,283~~ acre feet of water annually. Groundwater provides ~~65~~ 67 percent of the municipal water used in the region, with approx. ~~19~~21 percent of groundwater used by irrigation. Groundwater is primarily found in two major and four minor aquifers in Region D, as shown in Figure 3.8. Wells in the aquifers vary in production capacity and groundwater quality.

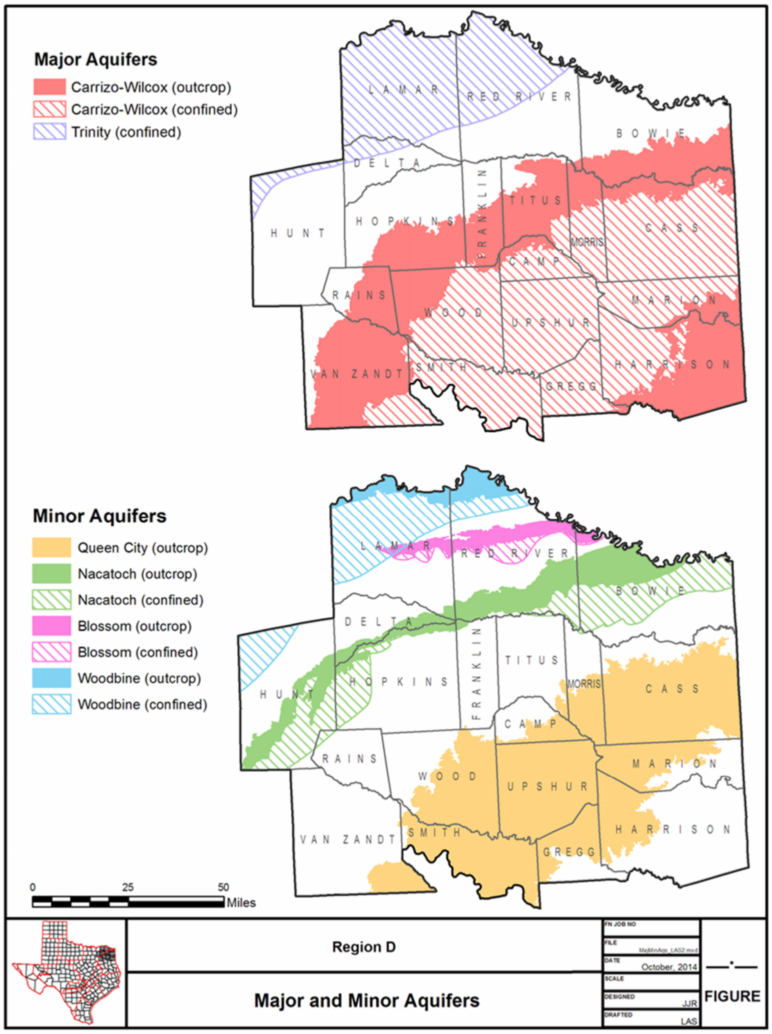

Figure 3.8 Major and Minor Aquifers in Region D

Region D historical groundwater pumping by aquifer for years ~~2012~~ 2017 through ~~2016~~ 2021 is shown in Figure 3.9. These data were calculated using the TWDB historical groundwater pumping estimates. The Carrizo-Wilcox supplied ~~77~~ 68 percent of the region's groundwater, and the Trinity supplied two percent. The minor aquifers provided the remaining ~~21~~ 30 percent.

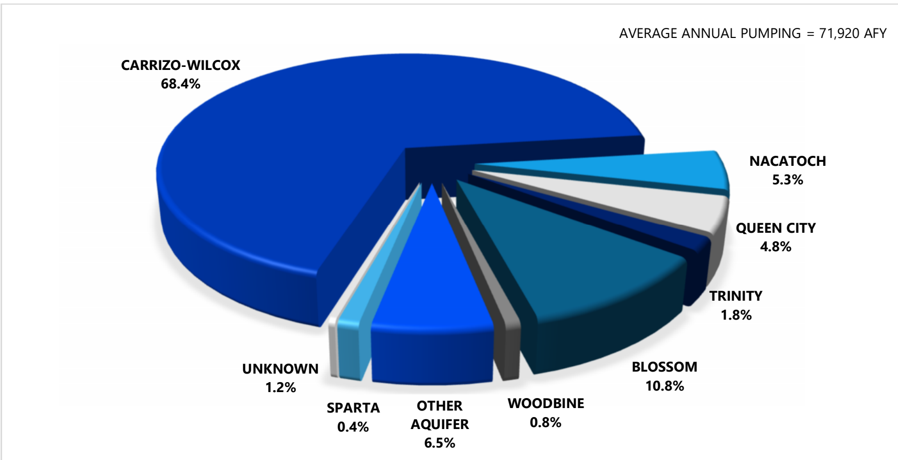

Figure 3.9 Historical Groundwater Pumping by Aquifer (20172-202146)

Commented [JJ3]: Figures to be updated when local hydrogeologic assessment is complete.

The same historical data set is presented in Figure 3.10 by use category. Municipal accounted for 65 67 percent of groundwater pumped in the region. Irrigation pumping consumed approx. 1921 percent of the groundwater and the remaining use categories collectively accounted for about 16 12 percent of total usage in the five-year period.

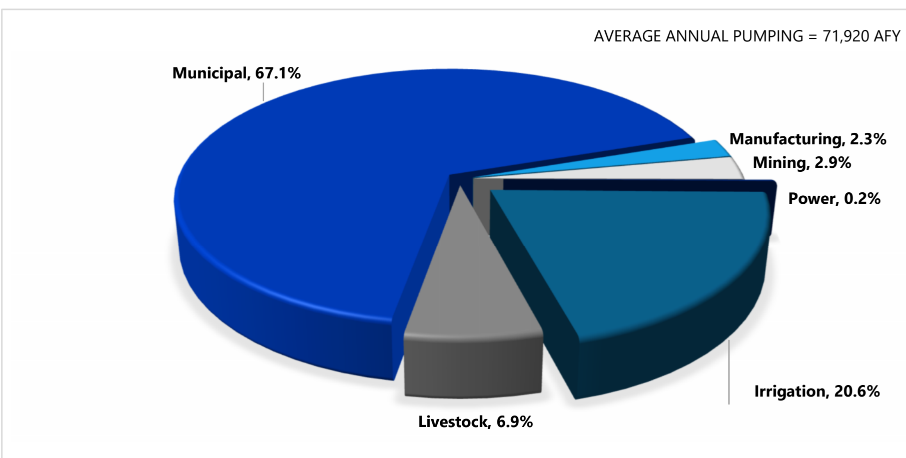

Figure 3.10 Historical Groundwater Pumping by Use (20172-20216)

Table 3.12 presents the MAG numbers by county, aquifer and river basin for planning years ~~2020~~ 2030 through ~~2070~~2080. MAG volumes are the largest amount of water that can be withdrawn from a given source without violating DFCs. Table 3.12 includes both non-relevant volumes, county aquifer combinations where a DFC has been defined by a GCD/GMA and the MAG subsequently has been determined by the TWDB using the GAM, and the aforementioned approved volume adjustments determined by Region D.

Table 3.12 Available Groundwater in Region D by County/Aquifer/Basin (ac-ft/yr)

Commented [JJ4]: Table to be updated when local hydrogeologic assessment is complete.

County	Aquifer	Basin	2030	2040	2050	2060	2070	2080
Bowie	Carrizo-Wilcox	Sulphur	9,645	9,645	9,645	9,645	9,645	9,645
	Blossom	Red	21	21	21	21	21	21
		Sulphur	180	180	180	180	180	180
	Nacatoch	Red	3,071	3,071	3,071	3,071	3,071	3,071
		Sulphur	1,942	1,942	1,942	1,942	1,942	1,942
Camp	Carrizo-Wilcox	Cypress	3,862	3,862	3,862	3,862	3,862	3,862
	Queen-City	Cypress	1,594	1,594	1,594	1,594	1,594	1,594
Cass	Carrizo-Wilcox	Cypress	12,865	12,865	12,865	12,865	12,865	12,865
		Sulphur	777	777	777	777	777	777
	Queen-City	Cypress	15,855	15,855	15,855	15,855	15,855	15,855
		Sulphur	624	624	624	624	624	624
	Sparta	Cypress	0	0	0	0	0	0
Delta	Trinity	Sulphur	56	56	56	56	56	56
	Nacatoch	Sulphur	575	575	575	575	575	575
Franklin	Carrizo-Wilcox	Cypress	5,334	5,334	5,334	5,334	5,334	5,334
		Sulphur	398	398	398	398	398	398
	Nacatoch	Sulphur	30	30	30	30	30	30
Gregg	Carrizo-Wilcox	Cypress	726	726	726	726	726	726
		Sabine	5,346	5,346	5,346	5,346	5,346	5,346
	Queen-City	Cypress	456	456	456	456	456	456
		Sabine	2,056	2,056	2,056	2,056	2,056	2,055
Harrison	Carrizo-Wilcox	Cypress	4,636	4,636	4,636	4,636	4,636	4,636
		Sabine	4,460	4,460	4,460	4,460	4,460	4,460
	Queen City	Cypress	2,976	2,976	2,976	2,976	2,976	2,976
		Sabine	561	561	561	561	561	561
Hopkins	Carrizo-Wilcox	Cypress	309	309	309	309	309	309
		Sabine	2,426	2,426	2,426	2,426	2,426	2,426
		Sulphur	2,017	2,017	2,017	2,017	2,017	2,017
	Nacatoch	Sabine	291	291	291	291	291	291
		Sulphur	916	916	916	916	916	916

County	Aquifer	Basin	2030	2040	2050	2060	2070	2080
Hunt	Trinity	Sabine	0	0	0	0	0	0
		Sulphur	3	3	3	3	3	3
		Trinity	0	0	0	0	0	0
	Nacatoch	Sabine	3,303	3,303	3,303	3,303	3,303	3,303
		Sulphur	491	491	513	868	1,347	2,052
	Woodbine	Sabine	268	268	268	268	268	268
		Sulphur	165	165	165	165	165	165
		Trinity	330	330	330	330	330	330
LAMAR	Trinity	Red	0	0	0	0	0	0
		Sulphur	8	8	8	8	8	8
	Blossom	Red	323	323	323	323	323	323
		Sulphur	71	71	71	71	71	71
	Nacatoch	Sulphur	110	110	110	110	110	110
	Woodbine	Red	0	0	0	0	0	0
		Sulphur	49	49	49	49	49	49
MARION	Carrizo-Wilcox	Cypress	1,966	1,966	1,966	1,966	1,966	1,966
	Queen City	Cypress	7,389	7,389	7,389	7,389	7,389	7,389
MORRIS	Carrizo-Wilcox	Cypress	2,156	2,156	2,156	2,156	2,156	2,156
		Sulphur	415	415	415	415	415	415
	Queen City	Cypress	3,278	3,278	3,278	3,278	3,278	3,278
RAINS	Carrizo-Wilcox	Sabine	1,411	1,411	1,411	1,411	1,411	1,411
	Nacatoch	Sabine	1	1	1	1	1	1
RED RIVER	Trinity	Red	52	52	52	52	52	52
		Sulphur	125	125	125	125	125	125
	Blossom	Red	665	665	665	665	665	665
		Sulphur	1,013	1,013	1,013	1,013	1,013	1,013
	Nacatoch	Red	58	58	58	58	58	58
		Sulphur	2,924	2,923	2,923	2,923	2,923	2,923
	Woodbine	Red	2	2	2	2	2	2
SMITH	Carrizo-Wilcox	Sabine	7,939	7,939	7,939	7,939	7,939	7,939
	Queen City	Sabine	12,457	12,457	12,457	12,457	12,457	12,457
TITUS	Carrizo-Wilcox	Cypress	5,594	5,594	5,594	5,594	5,594	5,594
		Sulphur	1,942	1,942	1,942	1,942	1,942	1,942
	Queen City	Cypress	0	0	0	0	0	0
UPSHUR	Carrizo-Wilcox	Cypress	5,107	5,107	5,107	5,107	5,107	5,107
		Sabine	1,550	1,550	1,550	1,550	1,550	1,550
	Queen City	Cypress	6,215	6,215	6,215	6,215	6,215	6,215

County	Aquifer	Basin	2030	2040	2050	2060	2070	2080
		Sabine	5,949	5,949	5,949	5,949	5,949	5,949
VAN ZANDT	Carrizo-Wilcox	Neches	2,616	2,616	2,616	2,616	2,616	2,616
		Sabine	3,286	3,286	3,286	3,286	3,286	3,286
		Trinity	1,030	1,030	1,030	1,030	1,030	1,030
	Queen City	Neches	2,343	2,343	2,343	2,343	2,343	2,343
WOOD	Carrizo-Wilcox	Cypress	925	925	925	925	925	925
		Sabine	16,977	16,977	16,977	16,977	16,977	16,977
	Queen City	Cypress	779	779	779	779	779	779
		Sabine	5,731	5,731	5,731	5,731	5,731	5,731
TOTAL			**191,021**	**191,020**	**191,042**	**191,397**	**191,876**	**192,580**

Groundwater availability volumes for non-relevant aquifers determined by the TWDB during MAG GAM Runs for relevant aquifers are called "DFC-compatible availability volumes." Non-relevant aquifers for the most recent planning cycle include the: Brazos River Alluvium, Blossom, Nacatoch, Yegua-Jackson, Gulf Coast and Trinity aquifers. There are also some counties in GMA 11 in which the Queen City is non-relevant where the outcrop and downdip area is less than 200 square miles. These areas have aquifer characteristics, groundwater demands, and current groundwater uses that do not warrant adoption of a DFC. It is anticipated that there will be no large-scale production from non-relevant aquifers. Additionally, it is assumed that what production does occur will not affect conditions in relevant portions of the aquifer(s).

Historical pumping estimates for years 20127 through 202116 were also utilized for comparison against the MAGs (Table 3.13). The county-aquifer-basin combinations that are highlighted in red exceed the year 20230 MAG. All pumping was summed by county, basin and aquifer and divided by five to determine average annual use. This was done to determine potential needs and conflicts based on where pumping has been occurring.

The pumping estimates are based on reported pumping (from TWDB surveys) as well as non-surveyed estimates. Non-surveyed estimates can comprise a rather significant portion of the historical estimates data. Irrigation estimates are based on USDA Farm Service Administration crop acreage data and irrigation depths are based on evapotranspiration. Livestock estimates are based upon Texas Agricultural Statistics Service livestock population statistics with use per animal derived from Texas Agricultural Experiment Station research. TWDB estimates water use for non-surveyed cities with a population greater than 500.

Most of the highlighted rows in Table 3.13 apply to non-relevant aquifers. The largest difference between a DFC-compatible availability volume and average historical pumping occurs in Lamar County - Blossom Aquifer - Red River Basin. The DFC-compatible volume is 323 acre-feet/year, and the average pumpage is 4,670374 acre-feet/year, which gives a difference of 4,367051 acre-feet. The largest discrepancy between a MAG and average pumping is in Hunt County.

The Hunt County - Woodbine Aquifer - Sulphur Basin MAG is 165 for year 20320, and the historical pumping indicates that the average pumpage for 201709 through 202116 is 502405 acre-feet. However, Hickory Creek SUD has four Woodbine wells. Two are in the Trinity Basin, one in the Sabine Basin, and two in the Sulphur Basin. All of their pumpage is reported in the Sulphur Basin. If the tested capacities of the four wells are weighted, the Sulphur Basin well only accounts for ~~22~~ 24 percent of the SUD's pumping, or ~~89~~173 acre-feet/year.

Table 3.13 Groundwater Supplies and Historical Pumping Estimates (2017~~2~~-2021~~16~~) (ac-ft/yr)

Commented [JJ5]: Table to be updated when local hydrogeologic assessment is complete.

County	Aquifer	Basin	MAG 2030	Non - Relevant groundwater supplies	Historical Pumping Average 2017-2021
BOWIE	Carrizo-Wilcox	Sulphur	9,645		1,178
	Blossom	Red		21	0
		Sulphur		180	0
	Nacatoch	Red		3,071	378
		Sulphur		1,942	308
CAMP	Carrizo-Wilcox	Cypress	3,862		1,579
	Queen-City	Cypress	1,594		2
CASS	Carrizo-Wilcox	Cypress	12,865		1,257
		Sulphur	777		293
	Queen-City	Cypress	15,855		2
		Sulphur	624		51
DELTA	Trinity	Sulphur	56		81
	Nacatoch	Sulphur		575	485
FRANKLIN	Carrizo-Wilcox	Cypress	5,334		304
		Sulphur	398		350
	Nacatoch	Sulphur		30	3
GREGG	Carrizo-Wilcox	Cypress	726		306
		Sabine	5,346		683
	Queen-City	Cypress	456		17
		Sabine	2,056		1
HARRISON	Carrizo-Wilcox	Cypress	4,636		3,321
		Sabine	4,460		1,312
	Queen City	Cypress	2,976		26
		Sabine	561		5
HOPKINS	Carrizo-Wilcox	Cypress	309		161
		Sabine	2,426		952
		Sulphur	2,017		2,014
	Nacatoch	Sabine		291	817
		Sulphur		916	110

County	Aquifer	Basin	MAG 2030	Non - Relevant groundwater supplies	Historical Pumping Average 2017-2021
HUNT	Trinity	Sabine	0		0
		Sulphur	3		91
		Trinity	0		0
	Nacatoch	Sabine		3,303	463
		Sulphur		491	448
	Woodbine	Sabine	268		62
		Sulphur	165		502
		Trinity	330		13
LAMAR	Trinity	Red	0		0
		Sulphur	8		61
	Blossom	Red		323	4,690
		Sulphur		71	1,966
	Nacatoch	Sulphur		110	2
	Woodbine	Red	0		16
		Sulphur	49		0
MARION	Carrizo-Wilcox	Cypress	1,966		488
	Queen City	Cypress	7,389		1
MORRIS	Carrizo-Wilcox	Cypress	2,156		226
		Sulphur	415		202
	Queen City	Cypress	3,278		9
RAINS	Carrizo-Wilcox	Sabine	1,411		390
	Nacatoch	Sabine		1	0
RED RIVER	Trinity	Red	52		670
		Sulphur	125		411
	Blossom	Red		665	0
		Sulphur		1,013	1,122
	Nacatoch	Red		58	0
		Sulphur		2,924	833
	Woodbine	Red	2		0
SMITH	Carrizo-Wilcox	Sabine	7,939		4,837
	Queen City	Sabine	12,457		286
TITUS	Carrizo-Wilcox	Cypress	5,594		310
		Sulphur	1,942		185

County	Aquifer	Basin	MAG 2030	Non - Relevant groundwater supplies	Historical Pumping Average 2017-2021
	Queen City	Cypress	0		0
UPSHUR	Carrizo-Wilcox	Cypress	5,107		3,252
		Sabine	1,550		629
	Queen City	Cypress	6,215		178
		Sabine	5,949		297
VAN ZANDT	Carrizo-Wilcox	Neches	2,616		1,231
		Sabine	3,286		1,911
		Trinity	1,030		666
	Queen City	Neches	2,343		153
WOOD	Carrizo-Wilcox	Cypress	925		335
		Sabine	16,977		5,525
	Queen City	Cypress	779		58
		Sabine	5,731		1,073

*Red highlighted text ~~represent~~represents non-relevant aquifers.

According to the Guidance Manual for Brackish Groundwater in Texas, prepared for the TWDB by NRS Consulting Engineers (2008), there exists 55.8 million acre-feet of brackish groundwater in storage beneath Region D. Brackish groundwater is groundwater with a total dissolved solids content of over 1,000 mg/l, and would require treatment to be acceptable for municipal supply. However, groundwater with TDS below 1,500 mg/l is sometimes acceptable for irrigation, and below 3,000 mg/l is acceptable for some livestock.

3.3 Reuse

As noted by the Texas Water Reuse Association, recycled water has increasingly become an effective alternative solution to a multitude of water management challenges in Texas. Water supply challenges in more arid regions have given rise to the need for drought-resilient, sustainable supplies such as recycled reuse water. However, growth is also noted to be occurring in more water-rich areas that are seeking water recycling solutions to manage stormwater and supply resiliency.

Given the availability and relative ease of accessing surface and groundwater sources in the NETRWPA, the existing extent of reuse as a supply alternative has historically been limited. However, there are existing reuse supplies that have been developed in several of the river basins in Region D, as presented in Table 3.14 below.

Table 3.14 North East Texas Reuse by River Basin (ac-ft/yr)

Source Name	2030	2040	2050	2060	2070	2080
CYPRESS CREEK BASIN DIRECT REUSE	66,820	61,504	62,760	71,634	65,408	65,408

Source Name	2030	2040	2050	2060	2070	2080
SABINE RIVER BASIN DIRECT REUSE	6,161	6,161	6,161	6,161	6,161	6,161
RED RIVER BASIN DIRECT REUSE	12	12	12	12	12	12
TOTAL	**72,993**	**67,677**	**68,933**	**77,807**	**71,581**	**71,581**

3.4 Supplies Currently Available to Each Water User Group

The water supplies available to the individual WUGs in the North East Texas Region are presented in the following sections. Also included is a description of the methods used to determine the supplies available to each water user group for the 2021 2026 Plan and the assumptions, if any, made in development of these data. Note that for the purposes of the 2021 2026 regional water planning process, the term 'supply' differs from the volume of available water from a given source, as the supply for a given entity may be limited by existing legal or infrastructure constraints. For example, a reservoir (source) with an identified firm yield may provide a lesser amount of 'supply' to an entity due to permit limitations, or due to an existing infrastructure limitation such as the pumping capacity of an intake.

The first series of data presents water supply by use category. A detailed breakdown of municipal WUG supply amounts in Region D is provided in Appendix C3-34, and all existing WUG water supply amounts are presented in Appendix C3-5.4.

3.4.1 Methodology to Determine Water User Supply

As noted in Chapter 2, each water user group was surveyed to determine not only population and population growth patterns but also water use and water supply. Each WUG was asked to identify their water supply source and supply volume.

The WUG was asked to provide the contract period if the water supply was provided by a contract with some other source. The water supply is assumed to end with the contract, although it is understood that contract renewal may likely continue the supply to meet future needs. In those instances where the water supply contract does not specify the contract expiration date, the contract is assumed to continue through at least year 20702080. If a maximum quantity is not specified in the contractcontract, then the supply was set equal to the demand for each year of the contract.

Water supply volumes herein also reflect known infrastructure limitations. Livestock and irrigation were assumed to be from private (local) supplies, except in instances where surface water permits, wells, or contracts were identified. These private supplies may be individual water wells on private property or local surface water supplies.

3.4.2 Regional Municipal Water Supply

Table 3.15 North East Texas Regional Municipal Water Supply by County (ac-ft/yr)

County	Basin	2030	2040	2050	2060	2070	2080
BOWIE	Red	1,128	1,149	1,130	1,119	1,119	1,119
	Sulphur	2,508	2,550	2,506	2,482	2,482	2,482

County	Basin	2030	2040	2050	2060	2070	2080
	Total	**3,636**	**3,699**	**3,636**	**3,601**	**3,601**	**3,601**
CAMP	Cypress	2,014	2,023	2,031	2,039	2,048	2,048
	Total	**2,014**	**2,023**	**2,031**	**2,039**	**2,048**	**2,048**
CASS	Cypress	4,492	4,552	4,625	4,622	4,622	4,621
	Sulphur	454	454	454	454	454	455
	Total	**4,946**	**5,006**	**5,079**	**5,076**	**5,076**	**5,076**
DELTA	Sulphur	1,811	1,603	1,394	1,184	979	782
	Total	**1,811**	**1,603**	**1,394**	**1,184**	**979**	**782**
FRANKLIN	Cypress	2,476	2,334	2,190	2,063	1,942	1,820
	Sulphur	3,700	3,537	3,365	3,201	3,036	2,874
	Total	**6,176**	**5,871**	**5,555**	**5,264**	**4,978**	**4,694**
GREGG	Cypress	1,396	1,412	1,433	1,450	1,457	1,457
	Sabine	64,398	64,336	64,289	64,260	64,603	64,562
	Total	**65,794**	**65,748**	**65,722**	**65,710**	**66,060**	**66,019**
HARRISON	Cypress	6,180	6,175	6,169	6,174	6,190	6,187
	Sabine	18,160	18,202	18,241	18,341	18,428	18,470
	Total	**24,340**	**24,377**	**24,410**	**24,515**	**24,618**	**24,657**
HOPKINS	Cypress	276	272	267	260	250	240
	Sabine	2,098	2,096	2,066	2,056	2,035	2,032
	Sulphur	5,995	6,058	6,129	6,177	6,238	6,279
	Total	**8,369**	**8,426**	**8,462**	**8,493**	**8,523**	**8,551**
HUNT	Sabine	14,223	14,604	15,288	16,520	17,922	18,014
	Sulphur	2,905	2,948	2,908	2,942	2,992	3,001
	Trinity	104	119	101	111	131	134
	Total	**17,232**	**17,671**	**18,297**	**19,573**	**21,045**	**21,149**
LAMAR	Red	7,021	6,888	6,790	6,760	6,713	6,706
	Sulphur	7,080	6,967	6,880	6,891	6,896	6,885
	Total	**14,101**	**13,855**	**13,670**	**13,651**	**13,609**	**13,591**
MARION	Cypress	4,230	4,230	4,230	4,230	4,230	4,230
	Total	**4,230**	**4,230**	**4,230**	**4,230**	**4,230**	**4,230**
MORRIS	Cypress	3,282	3,278	3,270	3,268	3,266	3,258
	Sulphur	421	421	421	421	421	421
	Total	**3,703**	**3,699**	**3,691**	**3,689**	**3,687**	**3,679**
RAINS	Sabine	3,548	3,549	3,562	3,600	3,528	3,535
	Total	**3,548**	**3,549**	**3,562**	**3,600**	**3,528**	**3,535**

County	Basin	2030	2040	2050	2060	2070	2080
RED RIVER	Red	336	335	336	334	332	332
	Sulphur	1,562	1,559	1,558	1,560	1,562	1,562
	Total	**1,898**	**1,894**	**1,894**	**1,894**	**1,894**	**1,894**
SMITH	Sabine	9,483	9,531	9,493	9,464	9,454	9,421
	Total	**9,483**	**9,531**	**9,493**	**9,464**	**9,454**	**9,421**
TITUS	Cypress	18,862	18,622	18,422	18,018	17,724	17,779
	Sulphur	1,625	1,705	1,798	1,897	1,983	2,076
	Total	**20,487**	**20,327**	**20,220**	**19,915**	**19,707**	**19,855**
UPSHUR	Cypress	6,976	7,060	7,060	7,080	7,102	7,102
	Sabine	2,576	2,585	2,573	2,564	2,550	2,406
	Total	**9,552**	**9,645**	**9,633**	**9,644**	**9,652**	**9,508**
VAN ZANDT	Neches	2,468	2,471	2,475	2,477	2,483	2,487
	Sabine	5,740	5,762	5,804	5,838	5,894	5,937
	Trinity	1,939	2,077	2,152	2,261	2,380	2,357
	Total	**10,147**	**10,310**	**10,431**	**10,576**	**10,757**	**10,781**
WOOD	Cypress	1,792	1,778	1,741	1,723	1,688	1,657
	Sabine	13,145	13,110	13,081	12,924	13,004	12,975
	Total	**14,937**	**14,888**	**14,822**	**14,647**	**14,692**	**14,632**
REGION TOTAL		**226,404**	**226,352**	**226,232**	**226,765**	**228,138**	**227,703**

Table 3.16 North East Texas Regional Municipal Water Supply by Basin (ac-ft/yr)

Basin	2030	2040	2050	2060	2070	2080
CYPRESS	51,976	51,736	51,438	50,927	50,519	50,399
NECHES	2,468	2,471	2,475	2,477	2,483	2,487
RED RIVER	8,485	8,372	8,256	8,213	8,164	8,157
SABINE	133,371	133,775	134,397	135,567	137,418	137,352
SULPHUR	28,061	27,802	27,413	27,209	27,043	26,817
TRINITY	2,043	2,196	2,253	2,372	2,511	2,491
TOTAL	**226,404**	**226,352**	**226,232**	**226,765**	**228,138**	**227,703**

3.4.3 Regional Manufacturing Supply

Table 3.17 North East Texas Regional Manufacturing Water Supply by County (ac-ft/yr)

County	Basin	2030	2040	2050	2060	2070	2080
BOWIE	Red	6	6	6	6	6	6
	Sulphur	28	28	28	28	28	28
	Total	**34**	**34**	**34**	**34**	**34**	**34**
CAMP	Cypress	2	2	2	2	2	2
	Total	**2**	**2**	**2**	**2**	**2**	**2**
CASS	Cypress	245	245	245	245	245	245
	Sulphur*	32,604	32,602	32,601	32,601	32,600	32,600
	Total	32,849	32,847	32,846	32,846	32,845	32,845
DELTA	Sulphur						
	Total						
FRANKLIN	Cypress						
	Sulphur						
	Total						
GREGG	Cypress						
	Sabine	1,572	1,572	1,572	1,572	1,572	1,572
	Total	**1,572**	**1,572**	**1,572**	**1,572**	**1,572**	**1,572**
HARRISON	Cypress	2,488	2,488	2,488	2,488	2,488	2,488
	Sabine	105,475	105,442	105,410	105,375	105,340	105,340
	Total	**107,963**	**107,930**	**107,898**	**107,863**	**107,828**	**107,828**
HOPKINS	Cypress						
	Sabine						
	Sulphur	1,830	1,915	1,987	2,126	2,275	2,275
	Total	**1,830**	**1,915**	**1,987**	**2,126**	**2,275**	**2,275**
HUNT	Sabine	1100	1,281	1,454	1,573	1,759	1,759
	Sulphur						
	Trinity						
	Total	**1,100**	**1,281**	**1,454**	**1,573**	**1,759**	**1,759**
LAMAR	Red	912	953	988	1054	1,089	1,089
	Sulphur	5,091	5,340	5,580	5,780	5,797	5,815
	Total	**6,003**	**6,293**	**6,568**	**6,834**	**6,886**	**6,904**
MORRIS	Cypress	115,260	109,944	111,200	120,074	113,848	113,848
	Sulphur						
	Total	**115,260**	**109,944**	**111,200**	**120,074**	**113,848**	**113,848**

County	Basin	2030	2040	2050	2060	2070	2080
RAINS	Sabine	12	12	12	12	12	12
	Total	**12**	**12**	**12**	**12**	**12**	**12**
RED RIVER	Red	5054	5047	5047	5047	5047	5047
	Sulphur						
	Total	**5,054**	**5,047**	**5,047**	**5,047**	**5,047**	**5,047**
SMITH	Sabine						
	Total						
TITUS	Cypress	2,737	2,860	2,850	2,591	2,461	2,461
	Sulphur						
	Total	**2,737**	**2,860**	**2,850**	**2,591**	**2,461**	**2,461**
UPSHUR	Cypress	6	6	6	6	6	6
	Sabine	0	0	0	0	0	0
	Total	**6**	**6**	**6**	**6**	**6**	**6**
VAN ZANDT	Neches						
	Sabine	208	208	215	217	207	211
	Trinity						
	Total	**208**	**208**	**215**	**217**	**207**	**211**
WOOD	Cypress						
	Sabine	1,502	1,502	1,502	1,502	1,502	1,502
	Total	**1,502**	**1,502**	**1,502**	**1,502**	**1,502**	**1,502**
REGION TOTAL		**276,132**	**271,453**	**273,193**	**282,299**	**276,284**	**276,306**

Note: Supply allocated for Cass County Manufacturing is 120,000 ac-ft/yr when reflecting capability for downstream releases from storage as part of Manufacturing WUG use. ~~Amounts~~The amounts shown herein reflect ~~supply~~the supply necessary to meet all projected primary diversion demand.

Table 3.18 North East Texas Regional Manufacturing Supply by Basin (ac-ft/yr)

Basin	2030	2040	2050	2060	2070	2080
CYPRESS	120,738	115,545	116,791	125,406	119,050	119,050
NECHES	0	0	0	0	0	0
RED RIVER	5972	6006	6041	6107	6,142	6,142
SABINE	109,869	110,017	110,165	110,251	110,392	110,396
SULPHUR	39,553	39,885	40,196	40,535	40,700	40,718
TRINITY	0	0	0	0	0	0
TOTAL	**276,132**	**271,453**	**273,193**	**282,299**	**276,284**	**276,306**

3.4.4 Regional Irrigation Supply

Table 3.19 North East Texas Regional Irrigation Water Supply by County (ac-ft/yr)

County	Basin	2030	2040	2050	2060	2070	2080
BOWIE	Red	4,684	4,684	4,684	4,684	4,684	4,684
	Sulphur	167	167	167	167	167	167
	Total	**4,851**	**4,851**	**4,851**	**4,851**	**4,851**	**4,851**
CAMP	Cypress	0	0	0	0	0	0
	Total	**0**	**0**	**0**	**0**	**0**	**0**
CASS	Cypress						
	Sulphur						
	Total						
DELTA	Sulphur	5,102	5,112	5,117	5,117	5,129	5,129
	Total	**5,102**	**5,112**	**5,117**	**5,117**	**5,129**	**5,129**
FRANKLIN	Cypress	102	102	102	102	102	102
	Sabine	102	102	102	102	102	102
	Sulphur	103	103	103	103	103	103
	Total	**307**	**307**	**307**	**307**	**307**	**307**
GREGG	Sabine	187	187	187	187	187	187
	Total	**187**	**187**	**187**	**187**	**187**	**187**
HARRISON	Cypress	53	53	53	53	53	53
	Sabine	33	33	33	33	33	33
	Total	**86**	**86**	**86**	**86**	**86**	**86**
HOPKINS	Cypress	1	1	1	1	1	1
	Sabine	18	18	18	18	18	18
	Sulphur	104	104	104	104	104	104
	Total	**123**	**123**	**123**	**123**	**123**	**123**
HUNT	Sabine	113	113	113	113	113	113
	Sulphur	0	0	0	0	0	0
	Trinity	12	12	12	12	12	12
	Total	**125**	**125**	**125**	**125**	**125**	**125**
LAMAR	Red	2,116	2,116	2,116	2,116	2,116	2,116
	Sulphur	1,288	1,288	1,288	1,288	1,288	1,288
	Total	**3,404**	**3,404**	**3,404**	**3,404**	**3,404**	**3,404**
MARION	Cypress	315	315	315	315	315	315
	Total	**315**	**315**	**315**	**315**	**315**	**315**
MORRIS	Cypress	61	61	61	61	61	61

County	Basin	2030	2040	2050	2060	2070	2080
	Sulphur	8	8	8	8	8	8
	Total	**69**	**69**	**69**	**69**	**69**	**69**
RAINS	Sabine	57	57	57	57	57	57
	Total	**57**	**57**	**57**	**57**	**57**	**57**
RED RIVER	Red	1,015	1,015	1,015	1,015	1,015	1,015
	Sulphur	87	87	87	87	87	87
	Total	**1,102**	**1,102**	**1,102**	**1,102**	**1,102**	**1,102**
SMITH	Sabine						
	Total						
TITUS	Cypress	121	121	121	121	121	121
	Sulphur	1,078	1,078	1,078	1,078	1,078	1,078
	Total	**1,199**	**1,199**	**1,199**	**1,199**	**1,199**	**1,199**
UPSHUR	Cypress	711	711	711	711	711	711
	Total	**711**	**711**	**711**	**711**	**711**	**711**
VAN ZANDT	Neches	423	421	420	418	413	413
	Total	**423**	**421**	**420**	**418**	**413**	**413**
WOOD	Cypress	125	125	125	125	125	125
	Sabine	1,235	1,235	1,235	1,235	1,235	1,235
	Total	**1,360**	**1,360**	**1,360**	**1,360**	**1,360**	**1,360**
REGION TOTAL		**19,421**	**19,429**	**19,433**	**19,431**	**19,438**	**19,438**

Table 3.20 North East Texas Regional Irrigation Water Supply by Basin (ac-ft/yr)

Basin	2030	2040	2050	2060	2070	2080
CYPRESS	1,489	1,489	1,489	1,489	1,489	1,489
NECHES	423	421	420	418	413	413
RED RIVER	7,815	7,815	7,815	7,815	7,815	7,815
SABINE	1,745	1,745	1,745	1,745	1,745	1,745
SULPHUR	7,937	7,947	7,952	7,952	7,964	7,964
TRINITY	12	12	12	12	12	12
TOTAL	**19,421**	**19,429**	**19,433**	**19,431**	**19,438**	**19,438**

3.4.5 Regional Steam Electric Supply

Table 3.21 North East Texas Regional Steam Electric Water Supply by County (ac-ft/yr)

County	Basin	2030	2040	2050	2060	2070	2080
BOWIE	Red						
	Sulphur						
	Total						
CAMP	Cypress						
	Total						
CASS	Cypress						
	Sulphur						
	Total						
DELTA	Sulphur						
	Total						
FRANKLIN	Cypress						
	Sulphur						
	Total						
GREGG	Cypress						
	Sabine	2,242	2,242	2,242	2,242	2,242	2,242
	Total	**2,242**	**2,242**	**2,242**	**2,242**	**2,242**	**2,242**
HARRISON	Cypress						
	Sabine	26,508	26,508	26,508	26,508	26,508	26,508
	Total	**26,508**	**26,508**	**26,508**	**26,508**	**26,508**	**26,508**
HOPKINS	Cypress						
	Sabine						
	Sulphur						
	Total						
HUNT	Sabine	373	373	373	373	373	373
	Sulphur						
	Trinity						
	Total	**373**	**373**	**373**	**373**	**373**	**373**
LAMAR	Red	683	683	683	683	683	683
	Sulphur	8,278	8,278	8,278	8,278	8,278	8,278
	Total	**8,961**	**8,961**	**8,961**	**8,961**	**8,961**	**8,961**
MARION	Cypress	4,445	4,827	5,292	5,860	6,247	6,247
	Total	**4,445**	**4,827**	**5,292**	**5,860**	**6,247**	**6,247**
MORRIS	Cypress	820	820	820	820	820	820

County	Basin	2030	2040	2050	2060	2070	2080
	Sulphur						
	Total	**820**	**820**	**820**	**820**	**820**	**820**
RAINS	Sabine						
	Total						
RED RIVER	Red						
	Sulphur						
	Total						
SMITH	Sabine						
	Total						
TITUS	Cypress	28,465	27,045	25,725	24,957	24,068	23,248
	Sulphur						
	Total	**28,465**	**27,045**	**25,725**	**24,957**	**24,068**	**23,248**
UPSHUR	Cypress						
	Sabine						
	Total						
VAN ZANDT	Neches						
	Sabine						
	Trinity						
	Total						
WOOD	Cypress						
	Sabine						
	Total						
REGION TOTAL		**71,814**	**70,776**	**69,921**	**69,721**	**69,219**	**68,399**

Table 3.22 North East Texas Regional Steam Electric Water Supply by Basin (ac-ft/yr)

Basin	2030	2040	2050	2060	2070	2080
CYPRESS	33,730	32,692	31,837	31,637	31,135	30,315
NECHES	0	0	0	0	0	0
RED RIVER	683	683	683	683	683	683
SABINE	29,123	29,123	29,123	29,123	29,123	29,123
SULPHUR	8,278	8,278	8,278	8,278	8,278	8,278
TRINITY	0	0	0	0	0	0
TOTAL	**71,814**	**70,776**	**69,921**	**69,721**	**69,219**	**68,399**

3.4.6 Regional Mining Supply

Table 3.23 North East Texas Regional Mining Water Supply by County (ac-ft/yr)

County	Basin	2030	2040	2050	2060	2070	2080
BOWIE	Red	0	0	0	0	0	0
	Sulphur	0	0	0	0	0	0
	Total	**0**	**0**	**0**	**0**	**0**	**0**
CAMP	Cypress						
	Total						
CASS	Cypress	839	862	871	904	926	952
	Sulphur						
	Total	**839**	**862**	**871**	**904**	**926**	**952**
DELTA	Sulphur						
	Total						
FRANKLIN	Cypress						
	Sulphur						
	Total						
GREGG	Cypress	22	22	17	13	9	9
	Sabine	392	388	306	223	165	165
	Total	**414**	**410**	**323**	**236**	**174**	**174**
HARRISON	Cypress	299	307	316	323	333	333
	Sabine	540	550	559	567	576	576
	Total	**839**	**857**	**875**	**890**	**909**	**909**
HOPKINS	Cypress						
	Sabine	260	267	274	283	291	291
	Sulphur						
	Total	**260**	**267**	**274**	**283**	**291**	**291**
HUNT	Sabine						
	Sulphur						
	Trinity						
	Total						
LAMAR	Red						
	Sulphur						
	Total						
MARION	Cypress	119	122	124	126	128	128
	Total	**119**	**122**	**124**	**126**	**128**	**128**
MORRIS	Cypress						

County	Basin	2030	2040	2050	2060	2070	2080
	Sulphur						
	Total						
RAINS	Sabine						
	Total						
RED RIVER	Red						
	Sulphur						
	Total						
SMITH	Sabine						
	Total						
TITUS	Cypress						
	Sulphur						
	Total						
UPSHUR	Cypress						
	Sabine	258	268	234	200	175	175
	Total	**258**	**268**	**234**	**200**	**175**	**175**
VAN ZANDT	Neches						
	Sabine	2,009	2,182	2,393	2,582	2,693	2,731
	Trinity						
	Total	**2,009**	**2,182**	**2,393**	**2,582**	**2,693**	**2,731**
WOOD	Cypress						
	Sabine	288	289	290	292	293	293
	Total	**288**	**289**	**290**	**292**	**293**	**293**
REGION TOTAL		**5,026**	**5,257**	**5,384**	**5,513**	**5,589**	**5,653**

Table 3.24 North East Texas Regional Mining Water Supply by Basin (ac-ft/yr)

Basin	2030	2040	2050	2060	2070	2080
CYPRESS	1,279	1,313	1,328	1,366	1,396	1,422
NECHES	0	0	0	0	0	0
RED RIVER	0	0	0	0	0	0
SABINE	3,747	3,944	4,056	4,147	4,193	4,231
SULPHUR	0	0	0	0	0	0
TRINITY	0	0	0	0	0	0
TOTAL	**5,026**	**5,257**	**5,384**	**5,513**	**5,589**	**5,653**

3.4.7 Regional Livestock Supply

Table 3.25 North East Texas Regional Livestock Water Supply by County (ac-ft/yr)

County	Basin	2030	2040	2050	2060	2070	2080
BOWIE	Red	435	395	339	290	271	271
	Sulphur	721	655	561	481	449	449
	Total	**1,156**	**1,050**	**900**	**771**	**720**	**720**
CAMP	Cypress	952	952	952	952	952	952
	Total	**952**	**952**	**952**	**952**	**952**	**952**
CASS	Cypress	484	484	484	484	484	484
	Sulphur	355	355	357	357	357	357
	Total	**839**	**839**	**841**	**841**	**841**	**841**
DELTA	Sulphur	291	291	291	291	291	291
	Total	**291**	**291**	**291**	**291**	**291**	**291**
FRANKLIN	Cypress	425	425	425	425	425	425
	Sulphur	621	621	621	621	621	621
	Total	**1,046**	**1,046**	**1,046**	**1,046**	**1,046**	**1,046**
GREGG	Cypress	11	11	11	11	11	11
	Sabine	204	204	204	204	204	204
	Total	**215**	**215**	**215**	**215**	**215**	**215**
HARRISON	Cypress	571	627	686	726	756	756
	Sabine	425	447	469	492	514	514
	Total	**996**	**1,074**	**1,155**	**1,218**	**1,270**	**1,270**
HOPKINS	Cypress	180	184	184	188	190	190
	Sabine	1,877	1,923	1,926	1,976	1,998	1,998
	Sulphur	2,797	2,747	2,744	2,691	2,668	2,668
	Total	**4,854**	**4,854**	**4,854**	**4,855**	**4,856**	**4,856**
HUNT	Sabine	812	812	812	812	812	812
	Sulphur	300	300	300	300	300	300
	Trinity	34	34	34	35	35	35
	Total	**1,146**	**1,146**	**1,146**	**1,147**	**1,147**	**1,147**
LAMAR	Red	497	497	497	497	497	497
	Sulphur	1,624	1,624	1,624	1,624	1,624	1,624
	Total	**2,121**	**2,121**	**2,121**	**2,121**	**2,121**	**2,121**
MARION	Cypress	411	411	411	411	411	411
	Total	**411**	**411**	**411**	**411**	**411**	**411**
MORRIS	Cypress	310	310	310	310	310	310

County	Basin	2030	2040	2050	2060	2070	2080
	Sulphur	285	285	285	285	285	285
	Total	**595**	**595**	**595**	**595**	**595**	**595**
RAINS	Sabine	506	506	506	506	506	506
	Total	**506**	**506**	**506**	**506**	**506**	**506**
RED RIVER	Red	578	578	578	578	578	578
	Sulphur	949	949	949	949	949	949
	Total	**1,527**	**1,527**	**1,527**	**1,527**	**1,527**	**1,527**
SMITH	Sabine						
	Total						
TITUS	Cypress	433	433	433	428	428	428
	Sulphur	575	575	575	535	514	514
	Total	**1,008**	**1,008**	**1,008**	**963**	**942**	**942**
UPSHUR	Cypress	1,158	1,158	1,158	1,158	1,158	1,158
	Sabine	353	353	353	353	353	353
	Total	**1,511**	**1,511**	**1,511**	**1,511**	**1,511**	**1,511**
VAN ZANDT	Neches	1,152	1,150	1,149	1,148	1,147	1,146
	Sabine	1,101	1,101	1,103	1,104	1,100	1,102
	Trinity	565	559	528	579	512	557
	Total	**2,818**	**2,810**	**2,780**	**2,831**	**2,759**	**2,805**
WOOD	Cypress	555	555	555	555	555	555
	Sabine	1,642	1,642	1,642	1,642	1,642	1,642
	Total	**2,197**	**2,197**	**2,197**	**2,197**	**2,197**	**2,197**
REGION TOTAL		**24,189**	**24,153**	**24,056**	**23,998**	**23,907**	**23,953**

Table 3.26 North East Texas Regional Livestock Water Supply by Basin (ac-ft/yr)

Basin	2030	2040	2050	2060	2070	2080
CYPRESS	5,490	5,550	5,609	5,648	5,680	5,680
NECHES	1,152	1,150	1,149	1,148	1,147	1,146
RED RIVER	1,510	1,470	1414	1365	1346	1346
SABINE	6,920	6,988	7,015	7,089	7,129	7,131
SULPHUR	8,518	8,402	8,307	8,134	8,058	8,058
TRINITY	599	593	562	614	547	592
TOTAL	**24,189**	**24,153**	**24,056**	**23,998**	**23,907**	**23,953**

3.4.8 Major Water Providers

MWPs are defined in TAC §357.10(19) 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. This may include public or private entities that provide water for any water use category.” Table 3.27 provides a listing of MWPs supplying water to entities in the North East Texas Regional Water Planning Area. Note that Cash SUD obtains some water from Lake Lavon in Region C, Cherokee Water Company imports water from Lake Cherokee in Region I, and the Sabine River Authority is included herein as that entity is a major water provider in the North East Texas Region. Note that these supplies are the entirety of volume physically and legally accessible to the MWP.

Table 3.27 Major Water Provider Water Supplies

Major Water Provider	Source Region	Source Basin	Supply Available ac-ft/yr					
			2030	2040	2050	2060	2070	2080
BI COUNTY WSC	D	Cypress	1,829	1,829	1,829	1,829	1,829	1,829
BRIGHT STAR SALEM SUD	D	Sabine	1,535	1,527	1,519	1,511	1,502	1,502
CASH SUD	C	Trinity	1,471	1,618	1,698	1,530	1,404	1,404
	D	Sabine	1,805	1,869	2,318	3,466	4,577	4,577
CHEROKEE WATER COMPANY	I	Sabine	18,000	18,000	18,000	18,000	18,000	18,094
CITY OF COMMERCE	D	Sabine	2,100	2,100	2,100	2,100	2,100	2,100
	D	Sulphur	322	322	322	322	322	322
CITY OF COOPER	D	Sulphur	1,707	1,501	1,295	1,088	882	676
CITY OF EMORY	D	Sabine	1,267	1,272	1,276	1,280	1,283	1,283
FRANKLIN COUNTY WD	D	Cypress	8,036	7,684	7,332	6,979	6,628	6,276
CITY OF GLADEWATER	D	Sabine	1,868	1,868	1,868	1,868	1,868	1,560
CITY OF GRAND SALINE	D	Sabine	360	360	374	379	376	388
CITY OF GREENVILLE	D	Sabine	8,256	8,299	8,358	8,430	8,527	8,580
CITY OF HUGHES SPRINGS	D	Cypress	654	654	654	654	654	654
CITY OF KILGORE	D	Sabine	7,558	7,493	7,432	7,414	7,906	7,906
LAMAR COUNTY WSD	D	Red	11,557	11,584	11,616	11,680	11,690	11,690
CITY OF LONGVIEW	D	Cypress	20,000	20,000	20,000	20,000	20,000	20,000
	D	Sabine	38,354	38,387	38,419	38,454	38,489	38,489
	I	Sabine	13,669	13,669	13,669	13,669	13,669	13,669
CITY OF MARSHALL	D	Cypress	16,240	16,240	16,240	16,240	16,240	16,240
CITY OF MOUNT PLEASANT	D	Cypress	23,010	22,907	22,814	22,551	22,523	22,724
NORTHEAST TEXAS MWD	D	Cypress	131,255	130,535	129,815	129,095	128,375	127,655
CITY OF PARIS	D	Red	31,836	31,836	31,836	31,836	31,836	31,836
CITY OF POINT	D	Sabine	391	392	393	395	395	395
RIVERBEND WATER RESOURCES DISTRICT	D	Sulphur	122,623	122,616	122,615	122,615	122,615	122,615

Major Water Provider	Source Region	Source Basin	Supply Available ac-ft/yr					
			2030	2040	2050	2060	2070	2080
SABINE RIVER AUTHORITY	D	Sabine	358,219	369,055	366,002	362,714	359,240	359,154
	I	Sabine	167,721	167,721	167,721	170,133	174,417	178,860
SULPHUR RIVER MWD	D	Sulphur	13,738	13,411	13,085	12,758	12,431	12,104
CITY OF SULPHUR SPRINGS	D	Sulphur	8,621	8,952	9,097	9,485	9,804	9,860
CITY OF TEXARKANA	D	Red	0	0	0	0	0	0
	D	Sulphur	122,630	122,623	122,616	122,615	122,615	122,615
TITUS COUNTY FWD 1	D	Cypress	26,200	25,660	25,120	24,580	24,040	23,500
CITY OF WHITE OAK	D	Sabine	2,680	2,680	2,680	2,680	2,680	2,680

*While the Sabine River Authority is primarily within Region I, this WWP/MWP is included herein as it is a major provider of surface water supply in the Region. Thus, SRA supplies within the Region D planning area (Lake Fork and Lake Tawakoni) are shown herein.

Detailed tabulations of MWP and WUG Seller supplies in comparison to projected customer demands are presented in Appendix C3-5, and in comparison, to total customer contracts in Appendix C3-6. A Source Water Balance report, depicting no over-allocation of sources, is provided in Appendix C3-7.

3.5 Impact of Environmental Flow Policies on Water Rights, Water Availability, and Water Planning

The objective of this section of the ~~2021 Region D Plan~~2026 Region D Plan is to provide an evaluation of the effect of environmental flow policies on water rights, water availability, and water planning in the NETRWPG area and within Region I to the extent that it affects Region D. Since the ~~2016~~ 2021 Region D Plan was adopted, no new environmental flow standards have been adopted for the river basins found within the region.

The Legislature passed Senate Bill 3 (SB 3) in the 2007 80th Regular Session. SB 3 is the third in a series of three omnibus water bills related to the State of Texas' meeting the future needs for water. SB. 3 created a basin-by-basin process for developing recommendations to meet the instream flow needs of rivers as well as freshwater inflow needs of affected bays and estuaries. SB 3 requires TCEQ to consider the recommendations of both the Basin and Bay Area Stakeholder Committee (BBASC) and Basin and Bay Expert Science Team (BBEST) for designated basins and bay systems, and go through a rulemaking process to adopt environmental flow standards for each basin. Once adopted, such standards are utilized in the decision-making process for new water right applications and in establishing an amount of unappropriated water to be set aside for the environment.

Prior to SB 3, Texas law recognized the importance of balancing the biological soundness of the state's rivers, lakes, bays, and estuaries with the public's economic health and general well-being. The Texas Water Code (TWC) requires the TCEQ, while balancing all other interests, to consider and provide for the instream flows and freshwater inflows necessary to maintain a sound ecological environment in TCEQ's regular granting of permits for the use of state water. Balancing the effect of authorizing a new use of water with the need for that water to maintain a sound ecological system was done in the past on a case-by-case basis as part of the water rights permitting process.

SB 3 called for the appointment of stakeholder committees for the various watersheds contributing to bays and estuaries for the Texas coast. For that portion within Region D and I, the primary basins of interest were the Sabine and Neches Rivers, and part of the Neches-Trinity Coastal basin. These basins contribute fresh water to Sabine Lake and the upper Texas coast. Since a portion of the Trinity River basin is in Region D and I and the Trinity River forms a portion of the western boundary of Region I, another stakeholder group of the Trinity-San Jacinto-Galveston Bay area is also relevant. Stakeholder committees for both areas were appointed in 2008. Each stakeholder committee then appointed a BBEST in the fall of 2008 to address the development of environmental flow recommendations in accordance with SB 3.

BBESTs met individually over the course of 12 months to develop environmental flow recommendations for their respective areas. The recommendations and the Sabine and Neches Executive Summary (ES) are accessible from the TCEQ. It is suggested that this information be reviewed by all interested ~~persons~~people. The ES describes, generally, the process undertaken, and the recommendations made by the BBEST.

The recommendations prepared by the BBEST were considered by the stakeholder committee but were not adopted. The stakeholder committee provided recommendations for environmental flow standards to the TCEQ, which then underwent a rulemaking process resulting in the adoption of environmental flow standards for the Sabine and Neches River basins.

Environmental flow standards will impact the procurement of water rights in the future by creating a comprehensive process of evaluating environmental flow needs whenever a new water right application is processed. The process of approving water rights is likely to become more complex under the new environmental flow policies that will be implemented by the TCEQ. However, it is intended to result in more clarity as to how diversions can be made and better ensure that sufficient water is available in the streams and rivers of the State.

As a result of the implementation of new environmental flow standards, the operation of reservoirs will become more dependent on the development of an “accounting plan,” which is a feature that the TCEQ is already implementing within the State. Whether such accounting plans will have a significant impact on the availability of water is not known at this time.

Standards adopted for the Sabine and Neches River basins have been incorporated into the analysis of feasible water management strategies for the purposes of the ~~2021~~ 2026 North East Texas Regional Water Plan through their implementation in the most current official TCEQ WAM.

The implementation of environmental flow standards will require more careful consideration of environmental flow needs during the process of water planning in Region D, as well as in other areas. In future planning cycles the NETRWPG will need to continue to analyze potential new water rights and amendments to existing water rights in light of these standards to determine how the environmental flow requirements are consistent with the long-term protection of the region’s water, agricultural, and natural resources. Other studies, external to the SB 3 process, will also provide the opportunity for broader consideration of potential environmental flow needs in Region D and elsewhere. Such considerations are proffered herein within Chapter 8, to provide a basis for future planning efforts.