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

The Texas Administrative Code (TAC) allows for the Regional Water Planning Groups (RWPGs) to include legislative recommendations in the regional water plan with regard to legislative designation of ecologically unique river and stream segments, unique sites for reservoir construction, and legislative recommendations (31 TAC, §357.43). RWPGs may include in the adopted regional water plans recommendations for all or parts of river and stream segments of unique ecological value located within the regional water planning area. The 77th Texas Legislature clarified that the designation of unique stream segments solely means that a state agency or political subdivision of the state may not finance the actual construction of a reservoir in a designated stream segment of unique ecological value. It does not affect the analysis to be made by the Planning Groups. The RWPGs are also authorized to make recommendations of unique sites for reservoir construction and prepare specific legislative recommendations in these two areas. The North East Texas Regional Water Planning Group (NETRWPG) has elected to make comments in these two areas and in specific cases has elected to forward several recommendations to the legislature, which are presented in this chapter.

8.1 Legislative Designation Of Ecologically Unique Stream Segments

In the regional water planning process, the planning group is given the opportunity to make recommendations for designation of ecologically "unique stream segments." This process involves multiple steps with the NETRWPG, the Texas Parks and Wildlife Department (TPWD), the Texas Water Development Board (TWDB) and, ultimately, the Texas Legislature each having a role. 30 TAC 357.43(b) states:

> *"Regional water planning groups may include in adopted regional water plans recommendations for all or parts of river and stream segments of unique ecological value located within the RWPA by preparing a recommendation package consisting of a physical description giving the location of the stream segment, maps, and photographs of the stream segment and a site characterization of the stream segment documented by supporting literature and data."*

As stated above, the 77th Texas Legislature clarified that the designation of unique stream segments solely means that a state agency or political subdivision of the state may not finance the actual construction of a reservoir in a stream segment designated of unique ecological value.

TWDB rules provide that the planning group forward any recommendations regarding legislative designation of ecologically unique streams to the TPWD and include TPWD's written evaluation of such recommendations in the adopted regional water plan. The planning group's recommendation is then to be considered by the TWDB for inclusion in the state water plan. Finally, the Texas Legislature will consider

any recommendations presented in the state water plan regarding designation of stream segments as ecologically unique.

8.2 Criteria for Designation of Ecologically Unique Stream Segments

TAC §358.2 also specifies the criteria that are to be applied in the evaluation of potentially ecologically unique river or stream segments. These are:

- **Biological Function:** Stream segments which display significant overall habitat value including both quantity and quality considering the degree of biodiversity, age, and uniqueness observed and including terrestrial, wetland, aquatic, or estuarine habitats;
- **Hydrologic Function:** Stream segments which are fringed by habitats that perform valuable hydrologic functions relating to water quality, flood attenuation, flow stabilization, or groundwater recharge and discharge;
- **Riparian Conservation Areas:** Stream segments which are fringed by significant areas in public ownership including state and federal refuges, wildlife management areas, preserves, parks, mitigation areas, or other areas held by governmental organizations for conservation purposes, or stream segments which are fringed by other areas managed for conservation purposes under a governmentally approved conservation plan;
- **High Water Quality/Exceptional Aquatic Life/High Aesthetic Value:** Stream segments and spring resources that are significant due to unique or critical habitats and exceptional aquatic life uses dependent on or associated with high water quality; or
- **Threatened or Endangered Species/Unique Communities:** Sites along stream where water development projects would have significant detrimental effects on state or federally listed threatened and endangered species; and sites along streams significant due to the presence of unique, exemplary, or unusually extensive natural communities.

8.3 Candidate Stream Segments

The TPWD prepared and published in May of 2000 a report entitled *Ecologically Significant River and Stream Segments of Region D, Regional Water Planning Area* which identified 14 stream segments within the region that meet one or more of the criteria for designation as ecologically unique. Those 14 segments are listed in Table 8.1~~Table 8.1~~ (the report actually listed 15 segments but the Quail Creek segment is located within Region I). Figure 8.1 shows the location, in red line, of all 14 segments located within Region D. Particulars of these river and stream segments may be found in either the TPWD report or the 2006 Region D Plan.

During the development of the 2011 Region D Plan, the NETRWPG received presentation of two additional stream segments for consideration as Unique Stream Segments. These are White Oak Creek in the Sulphur River Basin in Titus and Morris Counties and Pecan Bayou in the Red River Basin in Red River County. These two stream segments are shown in blue line in Figure 8.1 and in Figures 8.3, 8.4 and 8.5. They are also described in Table 8.2~~Table 8.2~~.

Table 8.1 TPWD Identified Ecologically Unique Stream Segments – Region D (North East Texas)

Name	Description
BIG CYPRESS BAYOU/CREEK	From a point 7.6 miles downstream of SH 43 in Marion/Harrison County upstream to Ferrell's Bridge Dam in Marion County (TCEQ classified stream Segment 0402).
	Biological function - priority bottomland hardwood habitat displays significant overall habitat value (USFWS, 1985).
	Riparian conservation area - Caddo Lake State Park and Wildlife Management Area.
	Threatened or endangered species/unique communities - Paddlefish (SOC/St. T) (Pitman, 1991; TPWD, 1998).
BIG CYPRESS CREEK	From a point 0.6 mile downstream of US 259 in Morris/Upshur County upstream to Fort Sherman Dam in Camp/Titus County (TCEQ classified stream segment 0404).
	Threatened or endangered species/unique communities - paddlefish (SOC/St.T) (Pitman, 1991; TPWD, 1998).
BLACK CYPRESS CREEK	From the confluence with Black Cypress Bayou east of Avinger in south Cass County upstream to its headwaters located four miles northeast of Daingerfield in the eastern part of Morris County.
	Biological function - priority bottomland hardwood habitat displays significant overall habitat value (USFWS, 1985).
	High water quality/exceptional aquatic life/high aesthetic value - ecoregion stream; diverse benthic macroinvertebrate and fish communities (Bayer et al., 1992; Linam et al., 1999).
	Threatened or endangered species/unique communities - paddlefish (SOC/St.T) (Pitman, 1991).
BLACK CYPRESS BAYOU	From the confluence with Big Cypress Bayou in south central Marion County upstream to the confluence of Black Cypress Creek east of Avinger in south Cass County.
	Biological function - priority bottomland hardwood habitat displays significant overall habitat value (USFWS, 1985).
	Threatened or endangered species/unique communities - paddlefish (SOC/St.T) (Pitman, 1991).
FRAZIER CREEK	From the confluence with Jim Bayou in Marion County upstream to its headwaters located three miles north of Almira in west Cass County.
	High water quality/exceptional aquatic life/high aesthetic value - ecoregion stream; diverse fish community (Bayer et al., 1992; Linam et al., 1999).
GLADE CREEK	From the confluence with the Sabine River in the northwestern corner of Gregg County near Gladewater upstream to its headwaters located about five miles southwest of Gilmer in Upshur County.
	Biological function - Swamp/bog habitat displays significant biodiversity and overall habitat value (Bauer et al., 1991).
	Threatened or endangered species/unique communities - unique swamp/bog community (Bauer et al., 1991).

Name	Description
LITTLE CYPRESS BAYOU	From the confluence with Big Cypress Bayou in Harrison County to a point 0.6 mile upstream of FM 2088 in Wood County (TCEQ classified stream segment 0409).
	Biological function - priority bottomland hardwood habitat displays significant overall habitat value (USFWS, 1985).
	High water quality/exceptional aquatic life/high aesthetic value - ecoregion stream; diverse benthic macroinvertebrate community (Bayer et al., 1992).
	Threatened or endangered species/unique communities - bluehead shiner (SOC/St.T), creek chubsucker (SOC/St.T) (SOC/St.T), and blackside darter (SOC/St.T) (Bauer et al., 1991).
LITTLE SANDY CREEK	From Lake Hawkins upstream to its headwaters in Wood County.
	Biological function - priority bottomland hardwood habitat displays significant overall habitat value (Bauer et al., 1991).
	Riparian conservation area - Little Sandy National Wildlife Refuge High water.
	Threatened or endangered species/unique communities - unique swamp/bog community (Bauer et al., 1991); rough-stemmed aster (SOC) (J. Poole, 1999, pers. comm.).
PINE CREEK	From the confluence with the Red River in Red River County upstream to Crook Lake Dam in Lamar County.
	Threatened or endangered species/unique communities - one of two sites in Texas where Ouachita rock-pocketbook freshwater mussel (Fed.E) has been collected (Howells, 1995; Howells et al., 1997).
PURTIS CREEK	From the Van Zandt/Henderson County line upstream to its headwaters in Van Zandt County.
	Riparian conservation area - Purtis Creek State Park.
SABINE RIVER	From US 59 in south Harrison County upstream to Easton on the Rusk/Harrison County line (within TCEQ classified stream segment 0505).
	Biological function - Texas Natural Rivers System nominee, diverse riparian assemblage including hardwood forest and wetlands, and significant natural areas (NPS, 1995); priority bottomland hardwood habitat displays significant overall habitat value (USFWS, 1985).
	High water quality/exceptional aquatic life/high aesthetic value - exceptional aesthetic value (NPS, 1995).
	Threatened or endangered species/unique communities - Paddlefish (SOC/St.T) (Pitman, 1991; TPWD, 1998).
SABINE RIVER	From FM 14 in Wood/Smith County upstream to FM 1804 in Wood/Smith County (within TCEQ classified stream segment 0506).
	Biological function - priority bottomland hardwood habitat displays significant overall habitat value (USFWS, 1985).
	Riparian conservation area - Old Sabine Bottom Wildlife Management Area; Little Sandy National Wildlife Refuge.
	Threatened or endangered species/unique communities - Paddlefish (SOC/St.T) (Pitman, 1991; TPWD, 1998).

Name	Description
SANDERS CREEK	From the confluence with the Red River in Lamar County upstream to the confluence of Spring Branch in Lamar County, excluding Pat Mayse Reservoir.
	Riparian conservation area - Pat Mayse State Wildlife Management Area.
	Threatened or endangered species/unique communities - one of two sites in Texas where Ouachita rock-pocketbook freshwater mussel (Fed.E) has been collected (Howells, 1995; Howells et al., 1997).
SULPHUR RIVER	From a point 0.9 miles downstream of Bassett Creek in Bowie/Cass County upstream to the IH 30 bridge in Bowie/Morris County.
	Biological function - priority bottomland hardwood habitat displays significant overall habitat value (USFWS, 1985)
	Threatened or endangered species/unique communities - Paddlefish (SOC/St.T) (Pitman, 1991; TPWD, 1998)

Table 8.2 NETRWPG Identified Ecologically Unique Stream Segments – Region D (North East Texas)

Name	Description
WHITE OAK CREEK	From just east of US 271 in western Titus County downstream to IH 30 in Western Morris County approximately 18 miles. The site, including bottomland forest, encompasses approximately 27,000 acres (Fig. 8.2). The entirety of the segment is within the White Oak Creek Wildlife Management Area.
	Biological Function - Extensive mature bottomland hardwood forest, Water oak-Willow oak association (Quercus nigra-Q. phellos G4S3) (U.S. Fish and Wildlife Service, 1985) Emergent wetland (PEM1), Shrub-Scrub wetland (PSS1), and Forested wetland (PFO1) (U.S. Fish and Wildlife Service, 2009) Intact natural hydrologic regime. No modification to stream. (U.S. Fish and Wildlife Service, 1985);
	Riparian conservation area - White Oak Creek Wildlife Management Area; and
	Threatened or endangered species/unique communities - Wintering area for bald eagle (U.S. Fish and Wildlife Service, 1985). High value habitat for migratory birds. (U.S. Fish and Wildlife Service, 1985).
PECAN BAYOU	This Red River Basin Stream extends from two miles south of Woodland in northwestern Red River County east to the Red River approximately one mile west of the eastern Bowie County line (Texas Historical Association, 2009). The site, including bottomland forest, encompasses approximately 958 sq. mi. (Fig. 8.3 & Fig. 8.4). It represents one of the largest undammed watersheds in northeast Texas; and supports multiple large examples of mature bottomland hardwood forest, and rare and endangered species (Zwartjes, et al, 2000).
	Biological function - Extensive bottomland hardwood forest supporting multiple occurrences of rare plant life, including:
	Arkansas meadowrue (*Thalictrum arkansanum* G2QS1) (Sanders, 1994);
	Southern lady's slipper orchid (*Cypripedium kentuckiense* G3S1) (Sanders, 1994);
	Old growth Shortleaf Pine-Oak forest (*Pinus echinata-Quercus sp*. G4S4) (Sanders, 1994); and
	Water oak-Willow oak association (*Quercus nigra-Q. phellos* G4S3) (Sanders, 1994).
	Hydrologic function - Represents one of the largest undammed watersheds in northeast Texas, natural hydrologic regime is assumed intact. Flood attenuation, flow stabilization and impacts on groundwater recharge have not been quantified.
	Riparian conservation areas - No public conservation areas however significant private conservation area (Fig. 8.4) The Nature conservancy, Texas Chapter owns 1334 acres within a 6,960 acre site protecting examples of the preceding conservation elements although they are extensive within the watershed. The preserve, Lennox Woods, is located approximately 1.5 miles south of the community of Negley. The land protects approximately 2.6 miles of Pecan Bayou.
	High water quality/exceptional aquatic life - Insufficient data
	Threatened and endangered species/unique communities -
	American Burying Beetle (*Nicrophorus americanus* G2 Federally listed Endangered) (Godwin, 2005);
	Black Bear (Ursus americanus G5 State Threatened, ssp. luteolus Federally listed Threatened) (Garner, personal communication, 2007); and
	Timber Rattlesnake (*Crotalus horridus* G4 State Threatened).

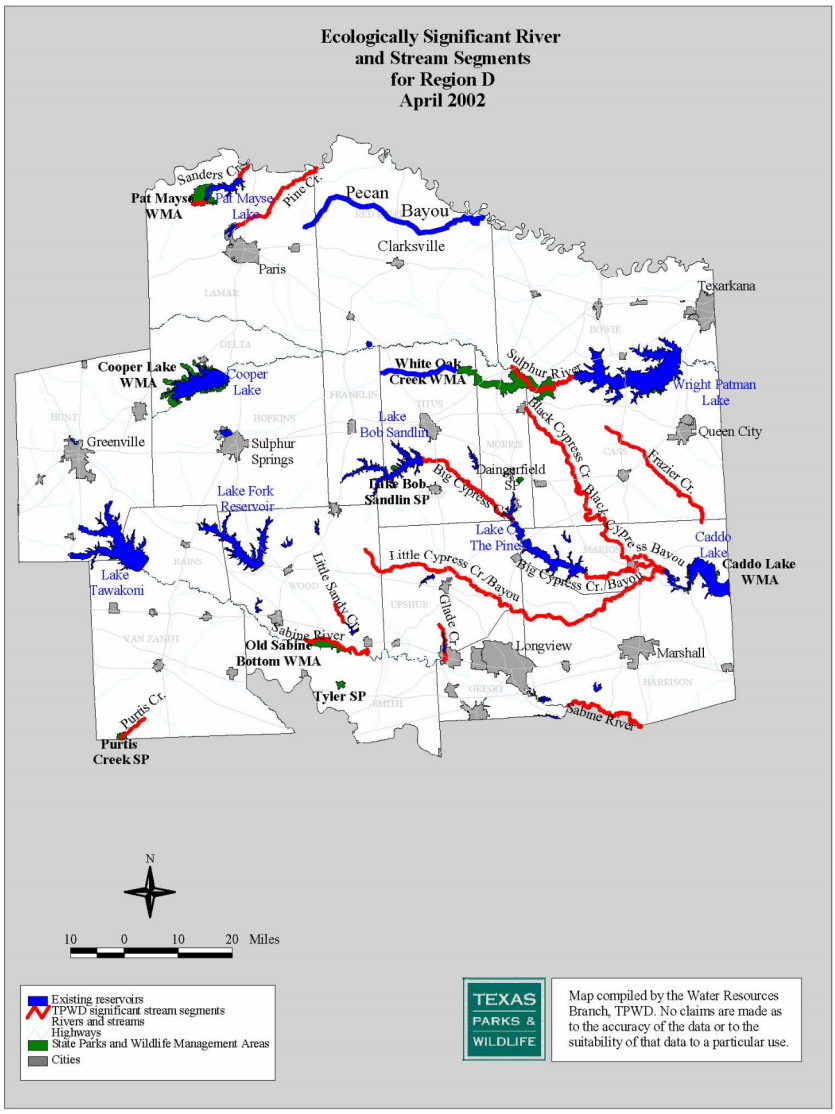

Figure 8.1 Ecologically Significant River and Stream Segments (from TPWD, 2000)

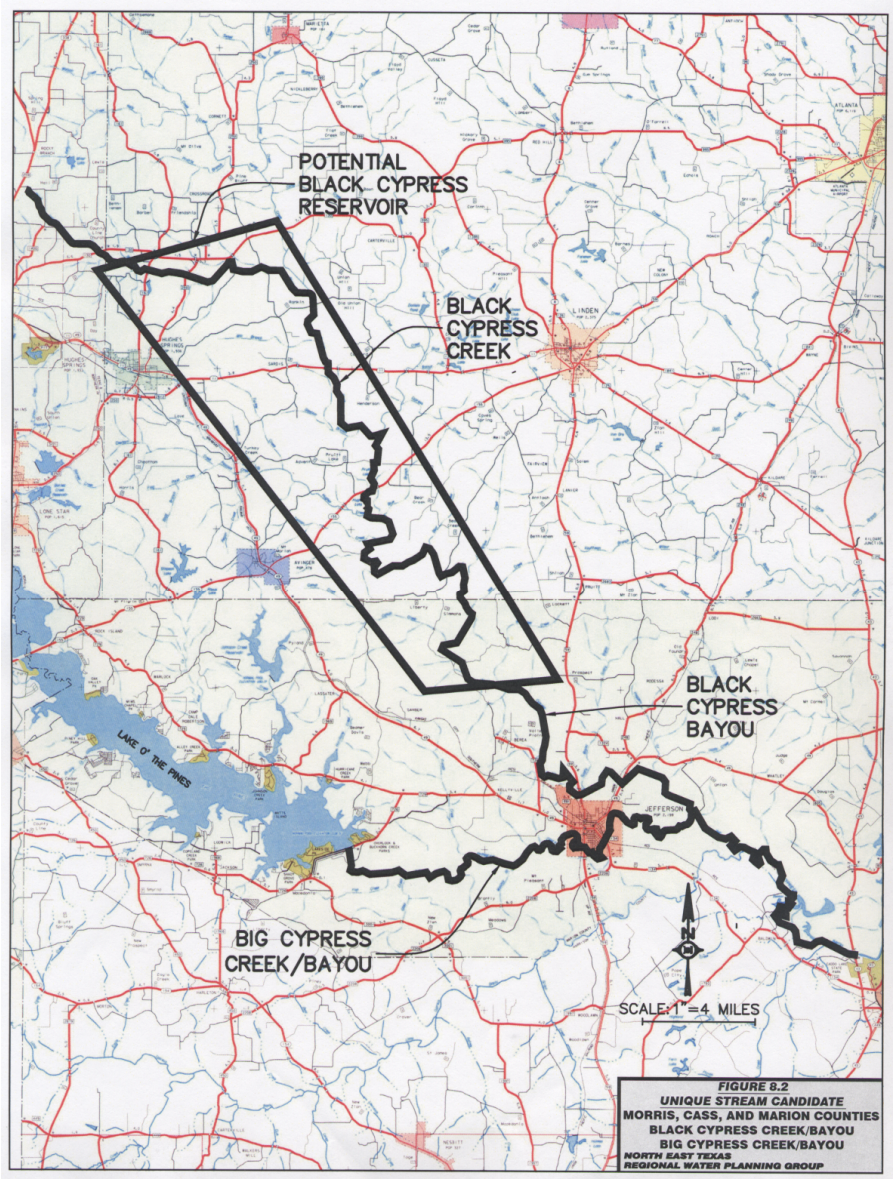

Figure 8.2 Black Cypress Creek/Black Cypress Bayou

8.4 Conflicts With Water Management Strategies

As a part of the planning effort, the TPWD candidate streams from the TPWD report and the more recent suggestions were compared to reservoir sites which have been suggested previously in the region. Further, the candidate streams which border on other regions were compared against the recommendations of that region.

The following TPWD suggested segments conflict with the proposed location of Black Cypress Reservoir or the Caddo Lake enlargement. Neither of these projects were supported by the NETRWPG in previous rounds of planning:

- **Black Cypress Creek** (Cass County)
- **Black Cypress Bayou** (Marion County)
- **Big Cypress Bayou/Creek** (Marion County)

The following TPWD suggested segments are contiguous with Region C or I:

- **Purtis Creek** (Region C) (Van Zandt County)

The following TPWD suggested segments do not appear to conflict with Region D recommended water management strategies provided the stated conditions are met:

- **Sanders Creek** (Lamar County) provided there is no interference with the operation or maintenance of Pat Mayse Reservoir.
- **Pine Creek** (Lamar County) provided that there is no interference with the operation and maintenance of Lake Crook, or the City of Paris wastewater treatment plant.
- **Big Cypress Bayou/Creek** (Marion County) provided that there is no interference with the operation and maintenance of Lake O' the Pines.
- **Glade Creek** (Upshur County) provided there is no interference with the operation or maintenance of Lake Gladewater.
- **Big Cypress Creek** (Titus, Morris, and Camp Counties) provided there is no interference with the operation and maintenance of Lake Bob Sandlin or Lake O' the Pines.
- **Pecan Bayou** (Red River County) provided there are no interference with operation and maintenance of any local entities.

The following suggested segments have one or more conflicts with potential Region D reservoirs or other regional plans:

- **Sabine River from US 59 upstream to Easton** (Harrison County). This segment includes the potential Carthage Reservoir site. Additionally, it abuts Region I, which has not designated it as a unique segment. A possible impact may exist on the operation or maintenance of Lake Cherokee.
- **Sabine River from FM 14 to FM 1804** (Wood/Smith Counties). This segment includes the potential Waters Bluff Reservoir site.
- **Little Cypress Creek/Bayou** (Harrison, Upshur, Wood Counties). This segment includes the potential site of the Little Cypress Reservoir.

- **Sulphur River from a point 0.9 miles downstream of Bassett Creek upstream to the IH 30 bridge** (Bowie, Morris, Cass Counties). This segment lies downstream of the proposed Marvin Nichols reservoir and upstream of existing Wright-Patman Reservoir. Designation of this segment could impact strategies which involve raising the level or changing the operations strategy in Wright Patman, and could impact the potential Marvin Nichols Reservoir.
- **White Oak Creek from US 271 east to IH 30 (Titus and Morris Counties).** This segment lies upstream of the existing Wright-Patman Reservoir. Designation of this segment could impact strategies which involve raising the level or changing the operations strategy in Wright Patman, or other potential water management strategies located on White Oak Creek under consideration.
- **Pecan Bayou (Red River County).** This segment extends from two miles south of Woodland in northwestern Red River County, east to the Red River approximately one mile west of the eastern Bowie County line. Designation of this segment could impact strategies including the potential Dimple Reservoir site, or other potential water management strategies located upstream of Pecan Bayou.

8.5 Recommendations for Designation of Ecologically Unique Stream Segments

The North East Texas Regional Planning Group does not recommend that any stream segment be unconditionally designated as Ecologically Unique in this region.

8.6 Considerations for Ecologically Unique Stream Segment Recommendations

After considering available information the NETRWPG elected not to recommend unconditionally that any stream segments from the TPWD (2000) report entitled *Ecologically Significant River and Stream Segments of Region D, Regional Water Planning Area,* nor did they recommend the White Oak Creek segment presented in the previous regional planning round for ecologically unique status. Reasons for this decision include the following:

1. The Regional Water Planning Group believes that there exists a lack of clarity as to the effects of designation with respect to private property takings issues.
2. The Regional Water Planning Group does not wish to infringe upon the options of individual property owners to utilize stream segments adjacent to their property as they deem appropriate. For example, if reservoirs cannot be built in unique segments, will these become prime candidates for mitigation sites acquired by eminent domain?
3. Despite previous legislative clarification, there remains uncertainty as to the myriad ways in which the designation may ultimately be construed.
4. Where overlap occurs between unique stream candidates and water management strategies, sufficient information to express preference for one use to the exclusion of another is not available at this time.
5. The White Oak Creek segment could possibly be in the proposed inundated area should the level of Wright-Patman Reservoir be raised. At this time sufficient information is not available for a proper evaluation of the White Oak Creek segment.

The NETRWPG further elected to conditionally recommend to the Legislature that the Pecan Bayou stream segment in the Red River Basin and the Black Cypress Bayou and Black Cypress Creek in the Cypress Creek Basin be identified as Ecologically Unique Stream Segments. It is believed that these three segments exhibit sufficient ecological features and meet the TAC criteria for such designation. Because the consequences of such designation by the Legislature are not well understood, this recommendation is conditioned upon legislation providing for such designation to contain the following clarifying provisions:

1. A provision affirming that the only constraint that may result from the ecologically unique stream segment designation is that constraint described in the Texas Water Code (TWC), Subsection 16.051(f), which prohibits a state agency or political subdivision of the state from financing the construction of a reservoir in a designated stream segment.
2. A provision stating that the constraint described in Subsection 16.051(f) Water Code does not apply to a weir, diversion, flood control, drainage, water supply, or recreation facility currently owned by a political subdivision.
3. A provision stating that this designation will not constrain the permitting, financing, construction, operation, maintenance, or replacement of any water management strategy recommended, or designated as an alternative, to meet projected needs for additional water supply in the 2026~~1~~ Regional Water Plan for the North East Texas Water Planning Region.
4. A provision affirming that this designation is not related to the "wild and scenic" federal program or to any similar initiative that could result in "buffer zones," inadvertent takings, or overreaching regulation.
5. A provision stating that all affected landowners shall retain all existing private property rights.
6. A provision recognizing that the unique ecological value of the designated segment is due, in part, to the conscientious, voluntary stewardship of many landowners on the adjoining properties.

Supporting material on these stream segments from the 2011 Region D Water Plan is presented in Appendix C8 for the purposes of the 2026~~1~~ Region D Water Plan. The conditional recommendations herein are those as presented in the previously adopted 2011 and 2016 Region D Water Plans. The information required in 31 TAC §357.43(b) is presented herein as part of the conditional recommendations proffered in this Plan. The TPWD has had the opportunity to review this information as part of their review of the Region D IPP. Comments from TPWD on the 2021 Region D IPP stated "TPWD staff applauds the planning group for making this recommendation." A separate, standalone package reflecting these recommendations was submitted to the TPWD by the NETRWPG on September 4, 2020.

Commented [TS1]: To be updated.

There are no recommended strategies in the 2021 Region D Water Plan that impact the conditionally recommended ecologically unique stream segments.

Commented [TS2]: To be updated.

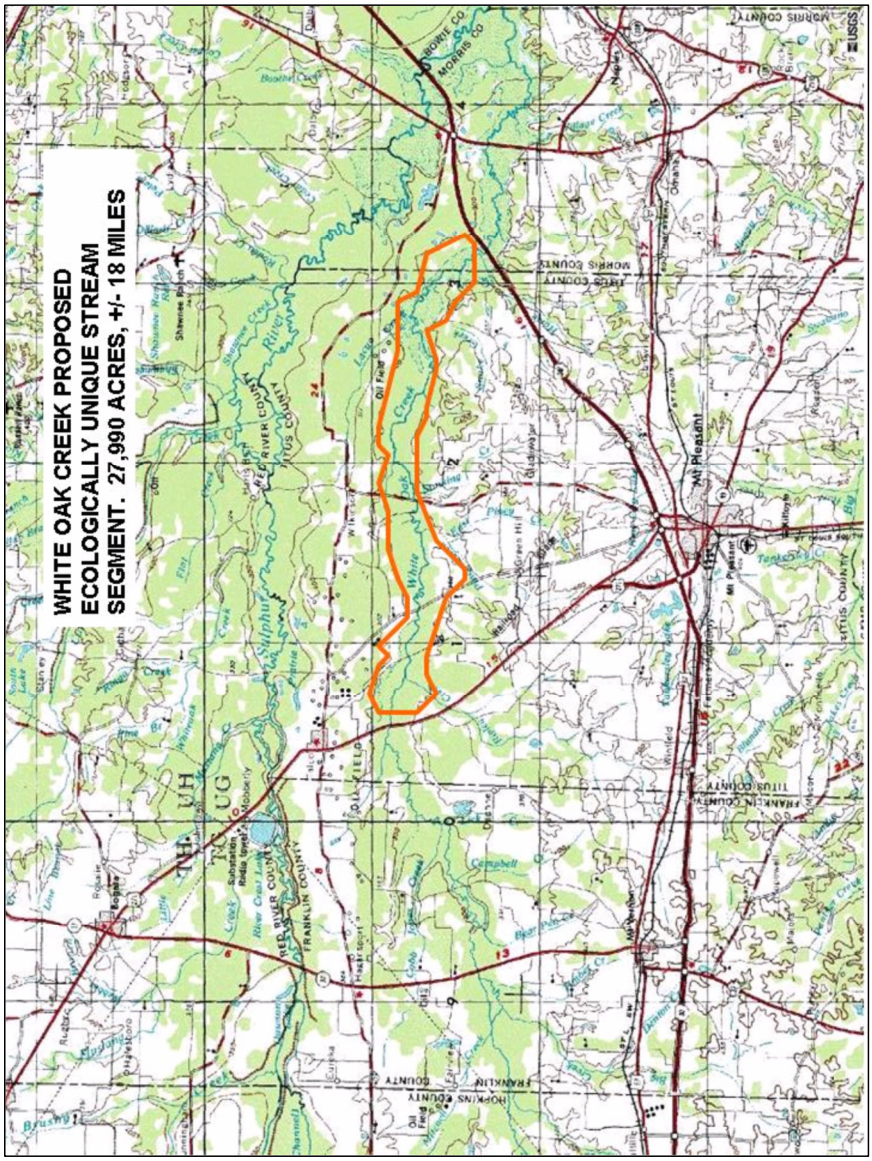

Figure 8.3 White Oak Creek Proposed

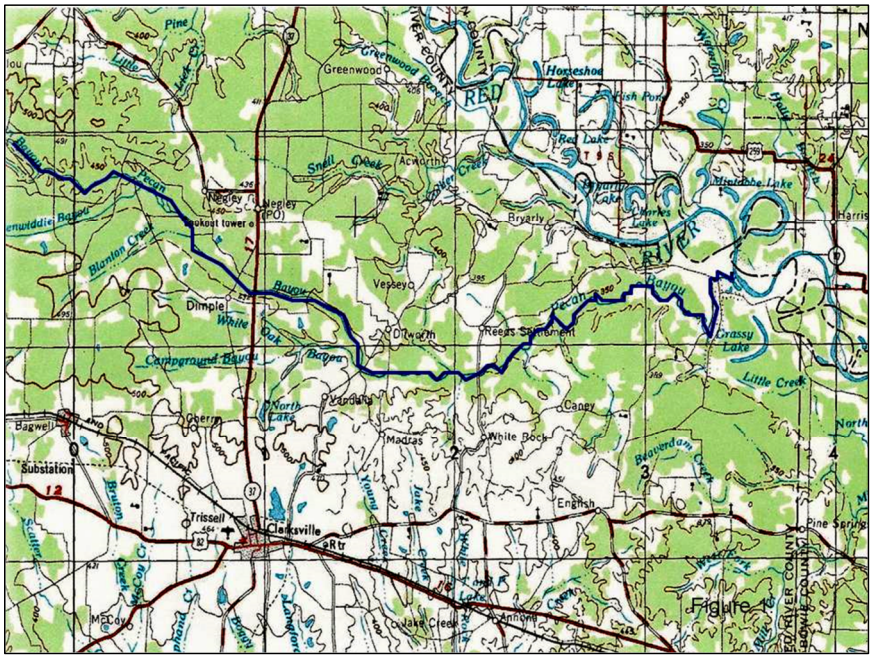

Figure 8.4 Reach of the Pecan Bayou in Red River County

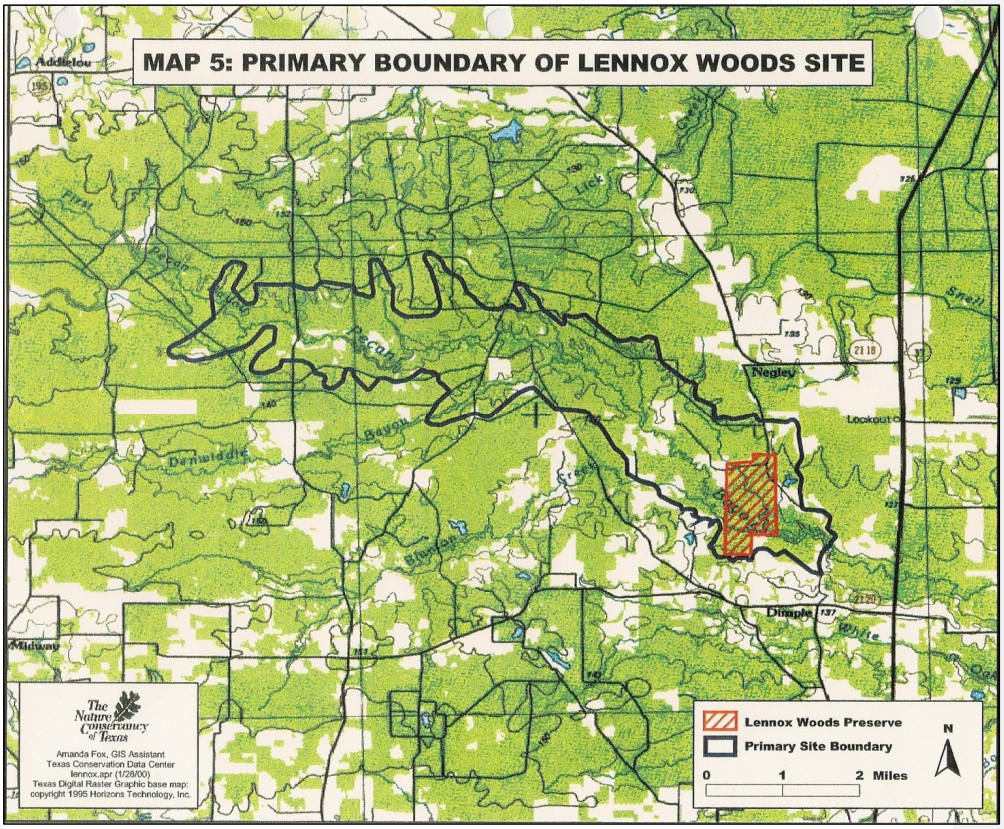

Figure 8.5 Primary Boundary of Lennox Woods Site

8.7 Voluntary Instream Flow Goals and Proposals

Since 1997, the Senate Bill 1 water planning process has required protection of agricultural and natural resources as the state determines how to meet future water needs. For example, the basic directive of the legislature in Senate Bill 1 is:

> "The state water plan shall provide for the orderly development, management and conservation of water resources and preparation for and response to drought conditions, in order that sufficient water will be available at a reasonable cost to ensure public health, safety and welfare, further economic development and protection of agricultural and natural resources of the entire state." (TWC, Section. 16.051.)

One of the "Guiding Principles" as adopted by the Texas Water Development Board (TWBD) for the 2027~~2~~ State Water Plan is:

> (23) Consideration of **environmental water needs, including instream flows** and bay and estuary inflows, including adjustments by the [Regional Water Planning Groups] to water management strategies to provide for environmental water needs including instream flows and bay and estuary needs. Consideration shall be consistent with the Commission's adopted environmental flow standards under 30 TAC Chapter 298 in basins where standards have been adopted. (~~-~~31 TAC §358.3(23), emphasis added.)

Moreover, the legislature has enacted two other laws that focus on protecting environmental water needs: Senate Bill 2 in 2001 and Senate Bill 3 in 2007. These laws recognized the important role that water left in rivers plays in conserving fish and wildlife habitat, protecting healthy timber and agricultural lands, providing recreational opportunities and sustaining economic and cultural values. Even the value of private property along a river and associated riparian rights can vary significantly with the flow conditions in the river.

Texas law and TWDB's Guiding Principle 23 (TAC §358.3) provide authority for regional water planning groups to focus some of their work on "environmental water needs." TWDB defines "environmental flows" as the flow of water (both quantity and timing of flow) needed to maintain ecologically healthy streams and rivers," as described at the following location:

(http://www.twdb.texas.gov/surfacewater/flows/index.asp).

Within Senate Bill 3, the term "environmental flow regime" is defined as:

> (16) "Environmental flow regime" means a schedule of flow quantities that reflects seasonal and yearly fluctuations that typically would vary geographically, by specific location in a watershed, and that are shown to be adequate to support a sound ecological environment and to maintain the productivity, extent, and persistence of key aquatic habitats in and along the affected water bodies. Section 11.002, Tex. Water Code.

TWDB has further provided guidance on the value and role of environmental flows on its aforementioned website.

Meeting environmental flow goals can be compatible while meeting other water needs. Most of the needs presently addressed in the regional plans and state water plan are for "consumptive uses," that is, water diverted from a river, stream or lake and used for drinking water, agricultural and industrial uses. A percentage of that water is returned to the river.

In contrast, most environmental water needs are non-consumptive, such as flows in the river to provide for fish and wildlife. Moving water downstream in a way that mimics natural flows can meet environmental flow goals while providing water for consumptive use downstream.

In the 2011 Region D Regional Water Plan, as well as in ~~the~~ subsequent ~~2016~~ Plan~~s~~, the NETRWPG stated that it was taking steps to protect environmental flow goals, such as instream flows. In section 1.5 (a) Historical and Current Water Use, the 2011 Region D plan states:

> "Historical and current uses in the North East Texas Region include municipal, manufacturing, recreation, irrigation, mining, power generation and livestock. . . .

> In addition to these uses, which are mostly consumptive uses, there are non-consumptive uses such as flows in rivers, streams, and lakes that have been relied upon to maintain healthy ecological conditions, navigation, recreation and other conditions or activities that bring benefit to the Region. These historic non-consumptive uses and future needs have not yet been the subject of detailed consideration in the State's Senate Bill 3 planning process, but are discussed in *Section 2.3.7 Regional Environmental Flow Demand Projections* and will be addressed in more detail in Round 4 of the planning process. . . .

The 2011, 2016, and 2021 ~~Plan and 2016~~ Plans each presented past considerations of the NETRWPG for both the Cypress and Sulphur River Basins, stating:

> "**CYPRESS CREEK BASIN**
>
> It is the position of the North East Texas Water Planning Group that there will be unavoidable negative impacts to the integrity of the ecological environment of the water bodies of the Cypress River Basin and especially Caddo Lake, should there be development of new reservoirs in the Cypress River Basin or transfer of water out of the basin, unless such new reservoirs or transfers do not conflict with the environmental flow needs for the water in the North East Texas Region. Those flow needs are defined as the low, pulse and flood flows needed for a sound ecological environment in Senate Bill 3, 2007 Regular Session of the Texas Legislature (SB-3).
>
> Those flow needs have been identified initially by the process of obtaining recommendations from scientists and stakeholders for the flow regimes for the Cypress Basin through a process initiated in 2004 and summarized in the draft Report on Environmental Flows for the Cypress Basin, updated May 2010 and provided as Appendix to the May 31, 2010 Comments of the Caddo Groups to the Region D IPP and referred to as the *Cypress Basin Flow Project Report*. . . .
>
> Proposals for new reservoirs or interbasin transfers can be made consistent with the environmental flow needs in the Cypress Basin only after final decisions have been made to determine those needs and sources to fill them. Until then, however, no water should be proposed for a new reservoir or for uses in other regions unless the proposals in other regional plans explicitly recognize the environmental flow needs for Region D and that the amount, timing, diversion rate and other characteristics must be consistent with the needs..."

And

> **"SULPHUR RIVER BASIN**
>
> **. . .** It is the position of the North East Texas Regional Water Planning Group that there be no development of new reservoirs in the Sulphur River Basin within Region D nor transfer of water out of the basin for that part that is within Region D until the flow needs for a sound ecological environment are defined for the Sulphur River Basin through the process established in Senate Bill 3, 2007 Regular Session of the Texas Legislature. Those flow needs are defined as the low, pulse, and flood flows.

> The flow needs assessment for the Sulphur River has not yet begun. No development should take place until the State has identified the flow needs for the Sulphur River and established a demand for the environmental flows for the basin..."

The NETRWPG recommended that no new reservoirs be constructed on Black Cypress based in part on data from the *Cypress Basin Flow Project Report*, but did not make any other specific recommendations.

Senate Bill 3 provided for development of environmental flow "standards" for a number of river basins, but did not include an established schedule for the Cypress, Red, or Sulphur River basins. Senate Bill 3 does, however, provide that in those basins not listed, voluntary development of environmental flow goals and proposals can proceed.[1] That voluntary approach is taking place in the Cypress Creek Basin.

8.7.1 Cypress Creek Basin

Over the past 15 years, a number of stakeholders have worked with the U.S. Army Corps of Engineers (USACE) and the Northeast Texas Municipal Water District (NETMWD) to develop a set of environmental flow regimes in the Cypress Creek Basin. Over the past 9 years, USACE and NETMWD have worked to meet those flow regimes through voluntary changes in the water release patterns from Lake O' the Pines. Because of the success of this project to date, the NETRWPG considers those regimes as voluntary goals for instream flows for the purposes of this 2026~~1~~ Region D Plan. The NETRWPG recognizes that, as with other aspects of the planning process, new information in the future may change the position of the NETRWPG on these instream flow goals. The strategies to meet future water needs of regional water plans and the State Water Plan are not to be limited by these voluntary goals for instream flows. Rather, such goals are presented herein as a point of reference for the consideration of whether water strategies are consistent with the protection of the agricultural and natural resources of the Cypress Creek Basin and the state that rely upon such flows.

Details on the voluntary environmental flow goals (i.e., the recommended "flow regimes" in that study) and proposals to meet those goals are set out in detail in "Summary of Development of Environmental Flow Regimes for the Cypress Creek Basin and Caddo Lake Watershed as of 2012, with 2015 Update," available at https://caddolakeinstitute.org/documents/#major.

In addition to identifying environmental flow regimes for the rivers and streams, the Cypress Summary Report (2012, with 2015 update) discusses proposals to reach such goals over time where they are not being met. One example involves enhancement of the instream flows below Lake O' the Pines to Caddo Lake by increasing the period of the recreational pool to provide additional water for release downstream. The State's Science Advisory Commission, first created by statute in 2003, published a report giving a number of other options for protecting and restoring environmental flows goals.[2]

The flow regimes for the Cypress Basin report are incorporated in this regional water plan as the voluntary goals for instream flows in that basin.

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[1] See Section 11.02362(e), Tex. Water Code , the Senate Bill 3 provision for the "voluntary consensus-building process" for basins not scheduled for the formal environmental flow process.

[2] Final Report, Science Advisory Committee Report on Water for Environmental Flows, Chapter 7, October 26, 2004, Prepared for the Study Commission on Water for Environmental Flows.

8.7.2 Sulphur River Basin

While a process similar to that used in the Cypress Basin has not yet been developed for the Sulphur Basin, a potential first step has been taken that is important to the NETRWPG. This step is described in more detail in Trungale (2015) located at:

https://caddolakeinstitute.org/docs/flows/RegionD_Sulphur_eflows_20150409%20%281%29.pdfAs noted in Trungale (2015), the identified flow regime therein "reflects the historic instream flow conditions that continue to exist today." The regime has not, however, been subject to review and revision by scientists or stakeholders to determine the extent of this flow regime that is needed to maintain the ecological health of the fish and wildlife habitat and the economic and other values currently provided. Thus, this flow regime serves as only a first attempt at identifying voluntary instream flow goals for the Sulphur River Basin. The NETRWPG proposes and supports the development of a stakeholder process, similar to that of the Cypress Creek Basin, to develop such goals in the future.

Although the flows identified in Trungale (2015) are not presented herein as requirements to be implemented on regional water management strategies, the flow regime identified therein does provide additional information for consideration of potential impacts on the agricultural and natural resources of the region and the state. This initial work provides a point of reference for considering the pulse flows previously discussed in Chapter 6 as necessary for the floodplain forests below the Marvin Nichols reservoir site.

It is the position of the NETRWPG that there be no development of new reservoirs in the Sulphur River Basin within Region D nor transfer of water out of the basin for that part that is within Region D until the flow needs for a sound ecological environment are defined for the Sulphur River Basin through the process established in Senate Bill 3, 2007 Regular Session of the Texas Legislature. Those flow needs are defined as the low, pulse, and flood flows.

The flow needs assessment for the Sulphur River has not yet begun. No development should take place until the State has identified the flow needs for the Sulphur River and established a demand for the environmental flows for the basin. The NETRWPG recognizes that other regional water planning groups may include recommendations for new reservoirs in the Sulphur River Basin or for the transfer of water out of the Sulphur River Basin to basins in other regions, as part of their recommended water management strategies or as alternate strategies. It is the position of the NETRWPG that such proposed reservoirs or transfers include explicit recognition that the needs for environmental flows in the North East Texas Region must be satisfied first consistent with Senate Bill 3.

8.8 Reservoir Sites

Rules for regional water planning (31 TAC§ 357.43) state that a regional water planning group "*…may recommend sites of unique value for construction of reservoirs by including descriptions of the sites, reasons for the unique designation and expected beneficiaries of the water supply to be developed at the site.*" The criteria used to determine if a site is unique for reservoir construction are specified in Section §358.2(7), and are as follows:

> *(1) Site-specific reservoir development is recommended as a specific water management strategy or as a unique reservoir site in an adopted regional water plan; or*

(2) The location, hydrologic, geologic, topographic, water availability, water quality, environmental, cultural, and current development characteristics, or other pertinent factors make the site uniquely suited for reservoir development to provide water supply for:

a) The current planning period; or

b) Where it might reasonably be needed to meet needs beyond the 50-year planning period."

In the preparation of the 2011 Region D Plan, the NETRWPG conducted a "reconnaissance-level" assessment of previously identified reservoir sites in the region. This assessment was based on a review and limited update of information contained in previous studies for 17 reservoir sites. It should be noted that the "proposed" and "potential" designations used here and in the *Reservoir Site Assessment Study* (Appendix B), *2001 North East Texas Regional Water Plan,* were made only to assist in the planning process and are not intended to convey a relative priority among the various reservoir sites.

The 1997 State Water Plan recommended development of two new reservoirs within the North East Texas Region – the George Parkhouse II reservoir project (Lamar County) and the Marvin Nichols I reservoir project (Red River, Franklin, Morris and Titus counties), both of which are located within the Sulphur River Basin. It is noted in the 1997 State Water Plan that development of the Nichols I reservoir could eliminate or significantly delay the need for the Parkhouse II reservoir. Also, the *Comprehensive Sabine Watershed Management Plan* includes a recommendation that the Sabine River Authority develop the Prairie Creek Reservoir and Pipeline Project (Gregg and Smith counties) to supply projected needs within portions of the North East Texas Region. It should be noted that the Prairie Creek Reservoir and Pipeline Project is not being pursued at this time because of the federal fish and wildlife conservation easement limitation on the Waters Bluff reservoir site. If the conservation easement were removed, the Waters Bluff reservoir could be a priority project of the Sabine River Authority's to meet projected water needs in the upper Sabine River Basin.

In addition to the Marvin Nichols I, George Parkhouse II, and Prairie Creek reservoir sites, available information on 14 other reservoir sites within the North East Texas Region were also reviewed. These are:

Cypress Creek	**Basin Red River Basin**
Little Cypress (Harrison)	Barkman (Bowie)
	Big Pine (Lamar and Red River)
	Liberty Hills (Bowie)
	Pecan Bayou (Red River)
	Dimple (Red River)
Sabine River Basin	**Sulphur River Basin**
Big Sandy (Wood and Upshur)	George Parkhouse I (Delta and Lamar)
Carl Estes (Van Zandt)	George Parkhouse II (Lamar)
Carthage (Harrison)	Marvin Nichols I/IA
Kilgore II (Gregg and Smith)	Marvin Nichols II (Titus)
Waters Bluff (Wood)	
Grand Saline Creek (Van Zandt)	

~~Figure 8.6~~Figure 8.6 shows the approximate location of the previously proposed and potential reservoir sites in the region, as delineated in the *Reservoir Site Assessment Study* (Appendix B), *2001 North East Texas Regional Water Plan*. The *Reservoir Site Assessment Study* (Appendix B), *2001 North East Texas Regional Water Plan*, provided information on various characteristics of each reservoir site, including:

- Location.
- Impoundment size and volume.
- Site geology and topography.
- Dam type and size.
- Hydrology and hydraulics.
- Water quality.
- Project firm yield for water supply.
- Other potential benefits (e.g., flood control, hydro power generation, recreation).
- Land acquisition and easement requirements, and potential land use conflicts.
- Environmental conditions and impacts from reservoir development.
- Local, state, and federal permitting requirements.
- Project costs updated to third quarter (September) 2018 price levels using the Engineering News Record Construction Cost Index (ENR) from the original ENR values of the second quarter (June) of 1999.
- Annualized costs include reservoir debt service with an interest rate of 3.5% over a period of 40 years as these are the current default values in the TWDB's Unified Costing Model (UCM).

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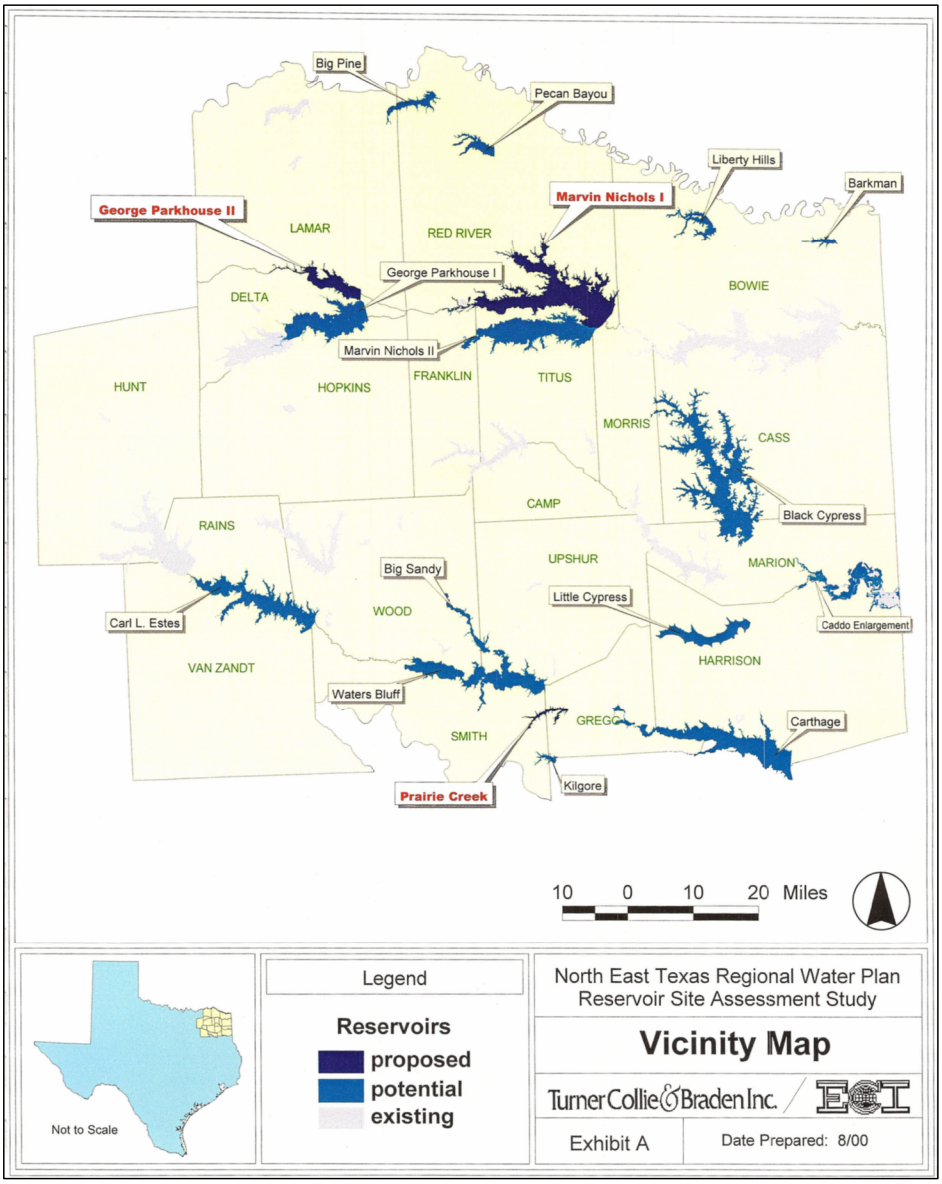

Figure 8.6 Potential Reservoir Vicinity Map, Site Assessment Study (2000)

8.9 Cypress Creek Basin

It is the position of the NETRWPG that there will be unavoidable negative impacts to the integrity of the ecological environment of the water bodies of the Black Cypress portion of the Cypress Creek Basin and especially Caddo Lake, should there be development of new reservoirs or transfer of water out of the basin, unless such new reservoirs or transfers do not conflict with the environmental flow needs for the water in the North East Texas Region. Those flow needs are defined as the environmental flows necessary to maintain a sound ecological environment in Senate Bill 3, 2007 Regular Session of the Texas Legislature (SB-3).

It is the position of the NETRWPG that such proposed reservoirs or transfers include explicit recognition that the needs for environmental flows in the North East Texas Region must be satisfied first consistent with the legislative intent of Senate Bill 3 with regard to maintaining an environmental flow regime necessary for a sound ecological environment.

The Cypress Basin lies entirely in the North East Texas Region (Region D). The amount of needs in the Cypress Basin for environmental flows is not fully or finally determined. Once the State has set aside water for such needs, the State will have made its determination on such needs. Proposals for new reservoirs or interbasin transfers can be made consistent with the environmental flow needs in the Cypress Basin only after final decisions have been made to determine those needs and sources to fill them.

As indicated above, three potential reservoir sites in the Cypress Creek Basin were included in the *Reservoir Site Assessment Study* (Appendix B), *2001 North East Texas Regional Water Plan* for the North East Texas Region – Black Cypress, the enlargement of Caddo Lake, and Little Cypress. However the 2001 plan did not recommend the Black Cypress and the Caddo Lake enlargement, therefore, the Little Cypress is the only one included here and is briefly described below.

8.9.1 Little Cypress

The Little Cypress reservoir site is located approximately nine miles northwest of the City of Marshall, within Harrison County. The dam site is at River Mile 21.3 on the Little Cypress Bayou. Previous studies have evaluated a reservoir with a conservation pool elevation of 233.1 feet msl, with a storage capacity of 217,234 ac-ft. The maximum design water surface elevation would be 252.0 feet msl. An earth fill dam 58 feet high and with a crest length of 7,000 feet would be constructed to form the reservoir. The dam would have an ogee weir type spillway with a crest elevation of 233.1 and a 400 foot crest length. The outlet works would consist of a single conduit with a 10 foot diameter and two 4.5 foot by 10 foot gates.

Previous studies of the Little Cypress reservoir site have evaluated a project with a firm yield of 144,900 ac-ft/yr. In current dollars (2018), the total cost to develop the reservoir is estimated to be approximately $537.9 million with an annualized cost of nearly $33.3 million. The unit cost of water from the project on an annualized basis would be $230 per ac-ft ($0.71/1,000 gallons) of firm yield. Potential beneficiaries of the project include municipal and industrial users within the Cypress Creek Basin and/or water users outside of the basin. In addition to water supply, other potential benefits of the project could include recreation and some amount of flood control.

Based on readily available information, there are no potential ecologically unique stream segments of high importance, wetland mitigation banks, or conservation easements within or adjacent to the reservoir site. The potential Little Cypress reservoir is within and adjacent to the Little Cypress Bayou site and listed

as priority two: good quality bottomlands with moderate waterfowl benefits. Analyses indicate that there are no municipal solid waste landfill sites, Superfund sites, permitted industrial or hazardous waste locations, or air quality monitoring stations in or near the reservoir site. State and federal agency listings for threatened, endangered, or rare plant or animal species indicate that several species potentially occur or have habitat in or near the project location. Available data indicates that there are five hydric soil associations within the reservoir site. The number of hydric soil associations does not indicate the number of potential wetlands, but rather that a wetland area could occur where these hydric soil associations exist.

A summary of key characteristics of the reservoir site that were examined in the Cypress Creek Basin is provided in Table 8.3.

Table 8.3 Potential Reservoir Sites in the Cypress Creek Basin

Reservoir Site	Conservation Storage (ac-ft)	Surface Area (acres)	Firm Yield (ac-ft/yr)	Total Project Development Cost ($1,000)	Annualized Cost Per ac-ft
LITTLE CYPRESS	217,324	15,763	144,900	$537,900	$230

The North East Texas Regional Water Planning Group does not recommend the designation of the potential Little Cypress reservoir site as a unique reservoir site.

8.10 Red River Basin

The scope of work for the *Reservoir Site Assessment Study* (Appendix B), *2001 North East Texas Regional Water Plan* identified Barkman, Liberty Hills, Big Pine and Pecan Bayou as potential reservoir sites within the portion of the Red River Basin that lies within the North East Texas Region. These sites are also listed in the 1997, 2001 and the 2006 State Water Plan as potential sites. However, a thorough search for previous studies and reports on these sites found little documentation on the Barkman and Liberty Hills sites. The Liberty Hill site is also located in Bowie County. Also within the portion of the Red River Basin within the North East Texas Region is a potential site for Dimple Reservoir, studied by HDR (1986) for the Red River Authority and participating entities at that time.

Potential beneficiaries of new reservoirs in the Red River Basin portion of the North East Texas Region include municipal, industrial, and irrigation users within the basin and/or users outside of the basin. Other potential benefits include recreation, hydroelectric power generation, and flood control.

8.10.1 Barkman

The Barkman site is located near the City of Texarkana in Bowie County. This site has apparently not been studied in detail as no information was found with regard to type and size of the dam, project firm yield, or costs.

The U.S. Fish and Wildlife Service (USFWS) and TPWD combined lists for threatened, endangered, or rare species identify seven birds, six fish, one mammal, and three reptiles to potentially occur or have habitat within the potential Barkman reservoir project location. Natural Resource Conservation Service (NRCS) data shows six hydric soil associations are within the potential Barkman reservoir footprint. The number of hydric soil associations does not indicate the number of potential wetlands, but rather that a wetland area could occur where these hydric soil associations exist. There are no known existing or proposed wetland mitigation bank projects, no designated bottomland hardwood areas, no high importance ecologically

unique stream segments, and no conservation easements that are located near or adversely affected by the potential Barkman reservoir. The analyses indicate that there are no recorded Superfund sites, municipal solid waste landfill sites, permitted industrial and hazardous waste locations, or air quality monitoring stations located within reservoir study area.

The North East Texas Regional Water Planning Group does not recommend the designation of the potential Barkman reservoir site as a unique reservoir site.

8.10.2 Liberty Hill

The Liberty Hill site is also located in Bowie County on Mud Creek. The preferred alternative site is located about three miles upstream of the authorized site, near the Davenport Road crossing at river mile 7.8. This site has apparently not been studied in detail as no information was found with regard to type and size of the dam, project firm yield or costs.

The U.S. Fish and Wildlife Service (USFWS) and TPWD combined lists for threatened, endangered, or rare species identify seven birds, six fish, one mammal, and three reptiles to potentially occur or have habitat within the potential Liberty Hills project location. There are no known existing or proposed wetland mitigation bank projects, no designated bottomland hardwood areas, no high importance ecologically unique stream segments, and no conservation easements that are located near or adversely affected by the potential Liberty Hill site. The analyses indicate that there are no recorded Superfund sites, municipal solid waste landfill sites, permitted industrial and hazardous waste locations, or air quality monitoring stations located within reservoir study area. Current NRCS (Natural Resource Conservation Service) data shows that there is a hydric soil association is within the potential Liberty Hills reservoir footprint. The number of hydric soil associations does not indicate the number of potential wetlands, but rather that a wetland area could occur where these hydric soil associations exist.

The North East Texas Regional Water Planning Group does not recommend the designation of the Liberty Hill possible reservoir site as a unique reservoir site.

8.10.3 Big Pine

The Big Pine site is located on Pine Creek primarily in Red River County with a small portion of the reservoir area located in Lamar County. The land area required for the reservoir is 9,200 acres. No information was found regarding the type and size of the dam. The project has an estimated firm yield of 35,840 ac-ft/yr and a project development cost of approximately $97 million dollars. The cost per ac-ft of firm yield on an annualized basis is $167 ($0.52/1,000 gallons). This site has apparently not been studied in detail as no information was found with regard to type and size of the dam.

The USFWS and TPWD combined lists for threatened, endangered, or rare species lists eight birds, five fish, one mammal, three reptiles, one insect and one mollusk to potentially occur or have habitat within the potential project location. There are no known existing or proposed wetland mitigation bank projects, ecologically unique stream segments of high importance, and no conservation easements that are located near or adversely affected by the potential Barkman reservoir. The analyses indicate that there are no recorded Superfund sites, municipal solid waste landfill sites, permitted industrial and hazardous waste locations, or air quality monitoring stations located within reservoir study area. NRCS (Natural Resource Conservation Service) data shows that there are hydric soil associations within the potential Big Pine reservoir footprint. The number of hydric soil associations does not indicate the number of potential

wetlands, but rather that a wetland area could occur where these hydric soil associations exist. The potential Big Pine reservoir is located within the Red River basin, which represents a negligible quantity of the remaining bottomland hardwood in Texas. The potential Big Pine reservoir is within and adjacent to the Sulphur River Bottom West site and listed as priority one: excellent quality bottomlands of high value to waterfowl.

The North East Texas Regional Water Planning Group does not recommend the designation of the potential Big Pine reservoir site as a unique reservoir site.

8.10.4 Pecan Bayou

The Pecan Bayou reservoir site is located in Red River County on Pecan Bayou, which is a tributary of the Red River. Previous studies have examined 20 alternative sites, of which three were chosen for evaluation. The alternative that would produce the greatest firm yield would have a storage capacity of 688 ac-ft and a surface area of 122 acres. This alternative would have an earthen dam approximately 2,950 feet long with a top elevation of 384 feet msl. The estimated firm yield of the project is 1,866 ac-ft/yr. The total cost to develop the project would be $25.7 million. The unit cost of water from the reservoir would be $852 per ac-ft of firm yield ($2.62/1,000). Potential beneficiaries of this project include municipal and industrial water users in the vicinity of the site in Red River County.

Based on a review of readily available information, there are potential ecologically unique streams of high importance, bottomland hardwoods, wetland mitigation banks, or conservation easements within or adjacent to the reservoir site. Analyses also indicate that there are no Superfund sites, municipal solid waste landfill sites, permitted industrial and hazardous waste locations, or air quality monitoring stations located within or adjacent to the reservoir study area. However, state and federal agency listings for threatened, endangered, or rare plant or animal species lists eight birds, five fish, one mammal, three reptiles, one insect and one mollusk that potentially occur or have habitat in or near the project location. Also, available data indicates that there are hydric soil associations within the reservoir site. The number of hydric soil associations does not indicate the number of potential wetlands, but rather that a wetland area could occur where these hydric soil associations exist.

The North East Texas Regional Water Planning Group does not recommend the designation of the potential Pecan Bayou reservoir site as a unique reservoir site.

A summary of key characteristics of the potential Pecan Bayou and Big Pine reservoir sites that were examined in the Red River Basin is provided in Table 8.4. Similar data for the others in the Red River Basin were not available.

8.10.5 Dimple Reservoir

The Dimple reservoir site is located in Red River County on White Oak Bayou, which is a tributary of Pecan Bayou, which is a tributary to the Red River. Previous studies have examined this site (HDR 1986). The studied storage capacity of the reservoir is 28,541 ac-ft and a surface area of 2,130 acres. This alternative would have an earthen dam approximately 1,000 feet long with a top elevation of 425 feet msl. The calculated firm yield of the project is 10,200 ac-ft/yr, utilizing the latest TCEQ Water Availability Model (Run 3) for the Red River Basin, and employing consensus planning criteria to account for environmental needs. The total cost to develop the project would be approximately $46 million, including pipeline. If the entirety of the firm yield is utilized, the unit cost of water from the reservoir would be $326 per ac-ft of

firm yield ($1.01/1,000 gal). Potential beneficiaries of this project include municipal and irrigation water users in the vicinity of the site in Red River County.

Based on a review of readily available information, there are potential ecologically unique streams of high importance, bottomland hardwoods, wetland mitigation banks, or conservation easements within or adjacent to the reservoir site. The site lies upstream of Pecan Bayou, which is conditionally recommended herein as an ecologically unique stream segment, as it has been identified by the Texas Parks and Wildlife Department. State and federal agency listings for threatened, endangered, or rare plant or animal species lists eight birds, five fish, one mammal, three reptiles, one insect and one mollusk species that potentially occur or have habitat in or near the project location. Also, available data indicates that there are hydric soil associations within the reservoir site. The number of hydric soil associations does not indicate the number of potential wetlands, but rather that a wetland area could occur where these hydric soil associations exist.

The North East Texas Regional Water Planning Group does not recommend the designation of the potential Dimple reservoir site as a unique reservoir site.

A summary of key characteristics of the potential Pecan Bayou, Big Pine, and Dimple reservoir sites that were examined in the Red River Basin is provided in Table 8.4. Similar data for the others in the Red River Basin was not available.

Table 8.4 Potential Reservoir Sites in the Red River Basin

Reservoir Site	Conservation Storage (ac-ft)	Surface Area (acres)	Firm Yield (ac-ft/yr)	Total Project Development Cost ($1,000)	Annualized Cost Per ac-ft
PECAN BAYOU	688	112	1,866	$25,700	$852
BIG PINE	N/A	9200	35,840	$97,000	$167
DIMPLE	28,541	2,130	10,200	$53,800	$326

8.11 Sabine River Basin

A number of potential reservoir sites in the upper portion of the Sabine River Basin have been previously studied and were reviewed in the *Reservoir Site Assessment Study* (Appendix B), *2001 North East Texas Regional Water Plan*. These are the Big Sandy, Carl Estes, Carthage, Kilgore II, Prairie Creek, and Waters Bluff sites, each of which is described below.

8.11.1 Big Sandy

The Big Sandy reservoir site is located in Upshur and Wood counties at River Mile 10.6 of the Big Sandy Creek north of the City of Big Sandy. At an elevation of 336 feet msl, the conservation storage capacity of the reservoir would be 69,300 ac-ft and it would cover 4,400 surface acres. An earth fill dam 54 feet high and with a crest length of 2,175 feet would be constructed to create the impoundment. The outlet works would consist of a 10 foot diameter conduit controlled by two 4.5 foot by 10 foot gates.

The estimated firm yield of the Big Sandy Reservoir would be 46,600 ac-ft/yr. Total cost to develop the project is estimated to be $147.4 million. The annualized cost per ac-ft of firm yield would be $196 ($0.61/1,000 gallons). Potential beneficiaries of the project include municipal and industrial water users

within the upper portion of the Sabine River Basin and/or water users outside of the basin. Recreation is another potential benefit of the project.

Based on available information, there are no potential ecologically unique streams of high importance, wetland mitigation banks, or conservation easements within or adjacent to the site. Analysis also indicates that there is one municipal solid waste landfill site and no Superfund sites, permitted industrial and hazardous waste locations, or air quality monitoring stations located within or adjacent to the reservoir study area. State and federal agency listings for threatened, endangered or rare species lists eight birds, three fish, one mammal, five mollusks, and five reptiles to potentially occur or have habitat within the proposed project location. The reservoir site is also within and adjacent to two areas that have been classified by the U.S. Fish & Wildlife Service as having good quality bottomlands with moderate waterfowl benefits. The marsh area has previously been identified as a significant stream segment by TPWD. Also, NRCS data indicates that there are hydric soil associations within the reservoir site. The number of hydric soil associations does not indicate the number of potential wetlands, but rather that a wetland area could occur where these hydric soil associations exist.

The North East Texas Regional Water Planning Group does not recommend the designation of the potential Big Sandy reservoir site as a unique reservoir site.

8.11.2 Carl Estes

The Carl L. Estes reservoir site is located on the main-stem of the Sabine River at River Mile 479.7, approximately eight miles west of the City of Mineola. The reservoir would inundate land in portions of Rains, Wood, and Van Zandt Counties. The conservation storage capacity of the reservoir at an elevation of 379.0 feet msl would be 393,000 ac-ft and the reservoir would inundate 24,900 surface acres. The reservoir would have a flood pool elevation of 403.0 feet msl, which would store 1,205,200 ac-ft with a surface area of 44,000 acres. The dam would be approximately 15,800 feet in length and constructed of compacted earth fill. The flood spillway would be an uncontrolled ogee shaped spillway with a crest elevation of 403.0 feet msl. The outlet works for the dam would consist of a multilevel opening to a 180 inch diameter conduit through the dam and a stilling basin.

The optimal project size in terms of unit costs of water would provide a firm yield of 95,630 ac-ft/yr. The estimated cost to develop the reservoir is $693.4 million. The project would provide water at a unit cost of approximately $448 per ac-ft ($1.38 /1,000 gallons) of firm yield. Estimated costs may not accurately reflect bottomland hardwood mitigation costs. Potential beneficiaries of the project include municipal and industrial water users within the upper portion of the Sabine River Basin and/or water users in the Trinity River Basin. In addition to water supply, other potential benefits of the project include recreation, hydroelectric power generation, and flood control.

Based on readily available information, there are no potential ecologically unique streams of high importance or conservation easements within or adjacent to the reservoir site. The potential Carl Estes reservoir is within and adjacent to the Sulphur River Bottom West site and is listed as Priority 2 bottomland hardwoods: good quality bottomlands with moderate waterfowl benefits. There is a proposed wetland mitigation bank project that is located near the reservoir site. Analysis also indicates that there are two municipal solid waste landfill sites but no Superfund sites, permitted industrial and hazardous waste locations, or air quality monitoring stations located within or adjacent to the reservoir study area. State and federal agency listings for threatened, endangered, or rare plant or animal species indicate that

nine birds, two fish, one mammal, five mollusk, and three reptile species potentially occur or have habitat in the project location. Also, available data indicates that there are hydric soil associations within the reservoir site. The number of hydric soil associations does not indicate the number of potential wetlands, but rather that a wetland area could occur where these hydric soil associations exist. The project may negatively impact two downstream reaches of the Sabine River identified by TPWD as "significant stream segments" due to unique federal holdings and the bottomland hardwood.

The North East Texas Regional Water Planning Group does not recommend the designation of the potential Carl Estes reservoir site as a unique reservoir site.

8.11.3 Carthage

The Carthage reservoir site is located on the main stem of the Sabine River immediately upstream of the U.S. Highway 59 crossing and downstream of the City of Longview. The reservoir site is located in portions of four counties: Gregg, Harrison, Panola, and Rusk counties. At an elevation of 244 feet msl, the reservoir would have a conservation storage capacity of 651,914 ac-ft and surface area of 41,200 acres. The estimated firm yield of the project is 537,000 ac-ft/yr and the total cost to develop the project is approximately $855.3 million. On an annualized basis, the unit cost of water from the project would be approximately $98 per ac-ft of firm yield ($0.31/1,000 gallons). The potential beneficiaries of the project are municipal and industrial water users in the upper portions of the Sabine Basin and/or users outside of the basin. Other potential benefits include recreation, hydroelectric power generation, and flood control.

Based on available information, there are no, conservation easements within or adjacent to the reservoir site. There is one existing mitigation bank consisting of 175 acres that is located near the reservoir site. The potential Carthage reservoir is within and adjacent to the Lower Sabine River Bottom West site listed as priority one bottomland hardwood area described as excellent quality bottomlands of high value to waterfowl. There is one potential ecologically unique stream segment that was included on the TPWD list of candidate segments that would be impounded by the reservoir. Analyses also indicates that there are four municipal solid waste landfill sites, one Superfund site, and two permitted industrial and hazardous waste locations within or adjacent to the reservoir study area. There are no air quality monitoring stations in the area. State and federal agency listings for threatened, endangered, or rare plant or animal species lists seven birds, five fish, three mammals, five mollusk, three reptiles, one amphibian, and two vascular plant species that potentially occur or have habitat in or near the project location. Also, available data indicates that there are hydric soil associations within the reservoir site. The number of hydric soil associations does not indicate the number of potential wetlands, but rather that a wetland area could occur where these hydric soil associations exist.

The North East Texas Regional Water Planning Group does not recommend the designation of the potential Carthage reservoir site as a unique reservoir site.

8.11.4 Grand Saline Creek

The City of Canton has identified a feasible strategy to meet future water supply needs as being the construction of a new 1,845 acre (24,980 ac-ft) reservoir on Grand Saline Creek, a tributary of Sabine River. This reservoir project was originally described in a 2008 report from Gary Burton Engineering, Inc. to the City of Canton, entitled Long-Term Water Study Surface Water Supply. The 2008 report identifies the

project site, reservoir surface area, drainage area, and estimated construction costs for the reservoir, intake structure, transmission pipeline and water treatment plant expansion. From Burton (2008):

The proposed reservoir is located within the Gulf Coastal Plain Region. The land surface is generally flat along the flood plains of the major streams, but is gently rolling otherwise. A heavy cover of soft (pine) and hardwoods are predominant in this area.

The normal annual average runoff is approximately 10 inches per year or 550 acre-feet per square mile of basin drained. The annual average gross lake surface evaporation rate from 1950 - 1979 was approximately 54 inches, and the monthly average equaled or exceeded rainfall 5 months out of the year. The major aquifers are the [Carrizo-Wilcox]. The Queen City is a minor aquifer underlying the region. Groundwater recharge is from the infiltration of rainfall and runoff on the outcrop areas and direct charging from the streams and lakes. The groundwater is discharged naturally and artificially. Natural processes include springs, seeps, evaporation or movement of perched (shallow) ground water, and transpiration by trees and plants whose roots reach the water table. Artificial processes include pumping from water wells. The artificial processes are usually several times the natural processes. The surrounding lakes are Lake Fork, Lake Tawakoni, Lake Palestine, and Cedar Creek Lake.

The land use for the study area consists of developed and undeveloped areas. The developed areas are primarily low density residential, with some light commercial and light industrial. Land use in the undeveloped areas includes agriculture (improved pasture), forestry, tree farming, and oil and gas production. The developed and undeveloped areas are both within and outside of the City limits. Historical development and land use trends have been influenced by three primary factors: (1) the oil and gas industry; (2) First Monday Trades Day; and (3) Dallas suburban expansion.

Based on readily available information, there are no potential ecologically unique streams of high importance, wetland mitigation banks, or conservation easements within or adjacent to the reservoir site. Analysis also indicates that there are no Superfund sites, municipal solid waste landfill sites, permitted industrial and hazardous waste locations, or air quality monitoring stations located within or adjacent to the reservoir site. Native prairie remnants and bottomland hardwood communities within the vicinity have been noted (Burton 2008). State and federal agency listings for threatened, endangered, or rare plant or animal species indicate there is the potential for the area to contain threatened and endangered species and their respective critical habitat(s). Aerial photographic interpretation of the region indicates there are forested and emergent wetlands approximate to these water bodies that are associated primarily with the floodplains of these streams. Streams associated with this site are considered waters of the United States, as defined in Chapter 33 of the Code of Federal Regulations Part 328.3(a) and are subject to jurisdiction of the USACE; therefore, coordination with the USACE would be necessary to obtain a Clean Water Act, Section 404 permit were this site to be developed.

The North East Texas Regional Water Planning Group does not recommend the designation of the potential Grand Saline Creek reservoir site as a unique reservoir site.

8.11.5 Kilgore II

The Kilgore II reservoir site is located on a tributary of the Sabine River, the upper portion of Wilds Creek near the City of Kilgore. The reservoir site is located within portions of Gregg, Rusk, and Smith counties. With a conservation pool elevation of 398 feet msl, the reservoir would have a conservation storage capacity of 16,270 ac-ft and a surface area of 817 acres. The estimated firm annual yield of the project is

5,500 ac-ft. Previous studies examined as part of the *Reservoir Site Assessment Study* (Appendix B), *2001 North East Texas Regional Water Plan* did not include cost estimates from which to prepare updated costs of reservoir development. The reservoir site has been previously studied as a potential local water supply source for the City of Kilgore.

Based on readily available information, there are no potential ecologically unique streams of high importance, bottomland hardwoods, wetland mitigation banks, or conservation easements within or adjacent to the reservoir site. Analysis also indicates that there are no Superfund sites, municipal solid waste landfill sites, permitted industrial and hazardous waste locations, or air quality monitoring stations located within or adjacent to the reservoir site. However, state and federal agency listings for threatened, endangered, or rare plant or animal species indicate that seven birds, two fish, one mammal, five mollusks, and five reptile species potentially occur or have habitat in or near the project location. Available data indicates that there are no hydric soil associations (i.e., potential wetlands) within the reservoir site.

The North East Texas Regional Water Planning Group does not recommend the designation of the potential Kilgore II reservoir site as a unique reservoir site.

8.11.6 Prairie Creek

As indicated previously, the Prairie Creek Reservoir is included as a recommended project in the Sabine River Authority's Comprehensive Sabine Watershed Management Plan. Development of the project would provide additional water supplies to municipal and industrial water users within the upper portion of the Sabine River Basin, particularly the Longview area. The reservoir site is located approximately 11 miles west of the City of Longview in Gregg and Smith counties. The location of the dam site is immediately upstream of the FM 2207 crossing of Prairie Creek, which is a tributary of the Sabine River. With a conservation pool elevation of 318.0 feet msl, the storage capacity and surface area of the reservoir would be 45,164 ac-ft and 2,280 acres, respectively. At the probable maximum flood (PMF) elevation of 339.5 feet msl, the reservoir surface area would be 4,282 acres.

Previous studies of the Prairie Creek site envision a compacted earth fill dam, approximately 3,000 feet in length with a maximum height of 87 feet, which corresponds to an elevation of 245.0 feet msl. The spillway for the dam would be ogee shaped with a crest elevation of 300 feet msl with two 20 foot by 20 foot tainter gates for controlled floodwater releases. The outlet works would consist of a multilevel opening with a 66-inch diameter conduit through the dam and a stilling basin.

As part of the *Reservoir Site Assessment Study* (Appendix B), *2001 North East Texas Regional Water Plan*, the firm yield of the proposed Prairie Creek Reservoir was re-evaluated using the TWDB Daily Reservoir Analysis Model. This was performed to determine the firm yield of the project with consideration of the environmental pass-through requirements contained in the State Consensus Environmental Guidelines Planning Criteria. Previous studies estimated a firm yield of the project of 19,700 ac-ft/yr. Consideration of the environmental pass-through requirements reduced the estimated yield to 17,215 ac-ft/yr.

The Sabine River Authority has considered the Prairie Creek Reservoir as the first component of a larger project that would be developed in phases. The second phase would include diversion of flows from the Sabine River to the reservoir to develop a firm yield of approximately 29,685 ac-ft/yr and, ultimately, construction of a 90 inch pipeline from the Toledo Bend Reservoir to develop a total firm yield of 115,000 ac-ft/yr. The cost to develop the reservoir as a stand-alone project is estimated to be $104.4 million, which would provide water at an annualized cost of $375 per ac-ft of firm yield ($1.16/1,000 gallons). The

diversion of flows from the Sabine River would increase the project development costs to $126.4 million and would reduce the unit cost of water to $263 per ac-ft ($0.81/1,000 gallons) of firm yield. The addition of supplies delivered to the Prairie Creek Reservoir from the Toledo Bend Reservoir would provide water supply at a unit cost of $175 per ac-ft of firm yield ($0.54/1,000 gallons).

Based on available information, there are no potential ecologically unique streams of high importance, wetland mitigation banks, or conservation easements within or adjacent to the site. There are no USFWS priority designated bottomland hardwood areas located within or adjacent to the proposed Prairie Creek reservoir; however, TPWD has estimated 12 percent of the area is of this habitat type. Analysis also indicates that there are no Superfund sites, municipal solid waste landfill sites, permitted industrial and hazardous waste locations, or air quality monitoring stations located within or adjacent to the reservoir study area. However, state and federal agency listings for threatened, endangered, or rare plant or animal species indicate that seven birds, three fish, two mammals, five mollusk, five reptiles, one amphibian, and one vascular plant species potentially occur or have habitat in or near the project location Also, available data indicates that there are hydric soil associations within the reservoir site. The number of hydric soil associations does not indicate the number of potential wetlands, but rather that a wetland area could occur where these hydric soil associations exist.

The North East Texas Regional Water Planning Group supports the proposal of the Sabine River Authority to build Prairie Creek Reservoir, if used in conjunction with a pipeline from Toledo Bend, to supply water to both Region D and Region C.

8.11.7 Waters Bluff

The Waters Bluff reservoir site is located on the main stem of the Sabine River approximately 3.5 miles upstream of the U.S. Highway 271 crossing and approximately four miles west of the City of Gladewater. The reservoir site lies within portions of Smith, Upshur, and Wood counties. The reservoir would have a conservation storage capacity of 525,163 ac-ft at a conservation pool elevation of 303 feet msl and would cover 36,396 surface acres. The maximum flood pool elevation would be 314.7 feet msl. The dam for the Waters Bluff Reservoir would be a homogeneous earthen embankment 70 feet high with a crest elevation of 320 feet msl and a crest length of 11,000 feet. The spillway would be a concrete gravity ogee with a crest elevation of 276.0 feet msl, with eleven 40 foot wide by 28 foot high tainter gates for control.

As reported from previous studies, the estimated firm yield of Waters Bluff Reservoir would be 324,000 ac-ft/yr. Updated estimates of the costs to develop the reservoir are $863 million, with an annualized unit cost of water of $165 per ac-ft of firm yield ($0.51/1,000 gallons). The potential beneficiaries of the project are municipal and industrial water users in the upper portions of the Sabine Basin and/or users outside of the basin. Other potential benefits include recreation, hydroelectric power generation, and flood control.

There are two stream segments in or near the Waters Bluff reservoir site that the TPWD has identified as potential ecologically unique streams. There are also four existing or proposed wetland mitigation banks and two existing conservation easements within or near the reservoir site. The U.S. Fish & Wildlife Service has also identified areas within or near the site that are classified as having excellent quality bottomlands of high value to waterfowl habitat and good quality bottomlands with moderate waterfowl benefits. In addition, analyses indicate that there are six municipal solid waste landfill sites, but no Superfund sites, permitted industrial and hazardous waste locations, or air quality monitoring stations located within or adjacent to the reservoir study area. State and federal agency listings for threatened, endangered, or rare

plant or animal species lists eight birds, two fish, one mammal, five mollusks, and five reptile species that potentially occur or have habitat in or near the project location. Also, available data indicates that there are hydric soil associations within the reservoir site. The number of hydric soil associations does not indicate the number of potential wetlands, but rather that a wetland area could occur where these hydric soil associations exist.

The North East Texas Regional Water Planning group does not recommend the designation of the potential Waters Bluff reservoir site as a unique reservoir site. A summary of key characteristics of the seven reservoir sites that were examined in the Sabine River Basin is provided in Table 8.5.

Table 8.5 Potential Reservoir Sites in the Sabine River Basin

Reservoir Site	Conservation Storage (ac-ft)	Surface Area (acres)	Firm Yield (ac-ft/yr)	Total Project Development Cost ($1,000)	Annual Cost Per ac-ft
BIG SANDY	69,300	4,400	46,600	$147,400	$196
CARL ESTES	393,000	44,900	95,630	$693,400	$448
CARTHAGE	651,914	41,200	537,000	$855,300	$98
GRAND SALINE	24,980	1,845	1,810	NA	NA
KILGORE II	16,270	817	5,500	NA	NA
PRAIRIE CREEK	45,164	2,280	17,215	$104,400	$375
PRAIRIE CREEK WITH DIVERSION	45,164	2,280	29,685	$126,400	$263
PRAIRIE CREEK WITH PIPELINE	45,164	2,280	115,000	$325,500	$175
WATERS BLUFF	525,163	36,396	324,000	$863,000	$165

8.12 Sulphur River Basin

Five reservoir sites in the Sulphur River Basin were examined as part of the *Reservoir Site Assessment Study* (Appendix B), *2001 North East Texas Regional Water Plan*: Marvin Nichols I, Marvin Nichols II, George Parkhouse I, and George Parkhouse II. Each is described below.

As discussed in Chapter 6, Section 6.9, and will be expanded below, the NETRWPG opposes the reservoirs listed below and others similarly situated. The opposition includes the potential impacts of such reservoirs on the environmental flow needs, as well as the impact on agricultural and other natural resources that would result from the creation of the reservoir, the mitigation that would be required for creation of the reservoir, and the impacts on downstream flows to significant bottomland hardwoods and other flood plain forests.

8.12.1 Marvin Nichols I/IA

In the interim since the 2001 plan there have been three identified studies concerning the Marvin Nichols site. The Texas Forest Service produced the "The Economic Impact of the Proposed Marvin Nichols I Reservoir to the Northeast Texas Forest Service" in August 2002. In March of 2003 the Sulphur River Basin Authority (SRBA) had prepared "The Economic, Fiscal, and Developmental Impacts of the Proposed Marvin Nichols Reservoir Project". More recently, the Sulphur River Basin Feasibility Study has been an ongoing

study performed for the SRBA and U.S. Army Corps of Engineers (USACE) by Freese and Nichols, Inc. and MTG Engineers and Surveyors (referred to hereafter as the 2014 SRBA Study). These three studies, along with previous efforts, have been previously presented to the NETRWPG and reviewed (results of the more recent SRBA study have been reviewed as information became available). The results of the studies present varying views of effects on the area concerning reservoir development in the Sulphur River Basin.

As noted in the Watershed Overview, SRBA (2014):

> *"The Marvin Nichols project is representative of a more downstream location for new storage within the Sulphur River Basin. At least five locations for this dam have been considered. The Marvin Nichols project has been evaluated as an impoundment at multiple locations on White Oak Creek and multiple locations on the Sulphur River (FNI, 2000). In general, these alternative sites represent an attempt to locate the impoundment so as to minimize conflicts with Priority 1 bottomland hardwood habitats and oilfield activity while maintaining yield. A reservoir at the Marvin Nichols IA site is a recommended strategy for North Texas Municipal Water District, the Upper Trinity Regional Water District, and Tarrant Regional Water District in the 2006 and 2011 Region C Regional Water Plan and an alternative strategy for Dallas Water Utilities and the City of Irving in the 2011 plan."*

The Marvin Nichols I reservoir site is located on the main stem of the Sulphur River at River Mile 114.7. The dam site is located upstream of the confluence of the Sulphur River and White Oak Creek. The reservoir site is located in Red River and Titus Counties about 120 miles east of the City of Dallas and about 45 miles west of the City of Texarkana. According to the 1997 State Water Plan, the potential beneficiaries of the Marvin Nichols I reservoir include municipal and industrial water users in the vicinity of the project within the Sulphur River Basin, water users in the Cypress Creek Basin, and/or water users in the Dallas-Ft. Worth Metroplex. Other potential benefits include recreation, hydroelectric power generation, and flood control.

With a conservation pool elevation of 312.0 feet msl, the conservation storage capacity of the Marvin Nichols I reservoir would be 1,369,717 ac-ft and the surface area would be 62,128 acres. At the probable maximum flood (PMF) elevation of 319.1 feet msl, the reservoir would store 1,864,788 ac-ft and have a surface area of 77,612 acres.

As envisioned in previous studies of the site, the dam for the Marvin Nichols I reservoir would consist of a 25,000 foot long earthen embankment dike built along the low stream divide between the Sulphur River and the White Oak Bayou. In addition, four dikes would be required at low points along the stream divide varying in length from 2,000 feet to 8,000 feet. The main dam would have a maximum height of 71 feet at the flood plain crossing. The flood spillway crest would be 940 feet long and would include nineteen 40 foot by 40 foot gates at a crest elevation of 285 feet msl.

Previous studies of the Marvin Nichols I site have estimated the firm yield of the project to be 624,000 ac-ft/yr. However, additional yield studies were performed as part of the *Reservoir Site Assessment Study* (Appendix B), *2001 North East Texas Regional Water Plan* using the recently completed TCEQ Water Availability Model (WAM) for the Sulphur River Basin and the TWDB Daily Reservoir Analysis Model. Reservoir operations simulations performed with these models, and with environmental releases as specified in the Consensus Environmental Guidelines Planning Criteria, indicated a firm yield of 550,842 ac-ft/yr for the Marvin Nichols I reservoir.

The yield for Marvin Nichols I Reservoir differs from the value given in the 2016 Region C report, which is 619,000 acre-feet per year. The difference in yield is the result of different assumptions with regards to the operation of the project:

- The North East Region's yield of 550,842 acre-feet is based on the assumption that Marvin Nichols I will impound only available unallocated flows, after satisfying the environmental flow requirements in accordance with the Consensus Water Planning (CWP) criteria. This assures that Wright Patman Reservoir, with a senior water right downstream of Marvin Nichols I, is full before Marvin Nichols I can impound any water.
- Regions C's yield of 619,100 acre-feet per year is based on an assumption that Marvin Nichols I could impound inflows so long as the ability to divert water from Lake Wright Patman is protected.

The yield simulation previously performed for the NETRWPG for the 2011 Region D Plan involved application of TCEQ's Sulphur River Basin WAM, which considers the seasonal variation of conservation storage in Lake Wright Patman, and a daily reservoir operations model used by the TWDB (SIMDLY), which allows passage of environmental flows in accordance with the state's criteria. The assumption used by Region C would require the negotiation of a written agreement between the operators of Marvin Nichols I and Wright Patman reservoirs (including the City of Texarkana, the water rights holder) before any application can be filed with the TCEQ for water rights for Marvin Nichols I Reservoir. Should that agreement happen in the future, it will enhance the yield of Marvin Nichols I Reservoir.

The estimated cost to develop the Marvin Nichols I reservoir, updated to September 2018 dollars, was $825.9 million. The total annualized cost of the reservoir (alone), including debt service and operations and maintenance costs, was $51.1 million, which resulted in a unit cost of roughly $93 per ac-ft of firm yield ($0.29/1,000 gallons).

More recently available information from the SRBA's 2014 Sulphur River Basin Feasibility Study is presented over the course of multiple reports, specifically:

1. Final Watershed Overview Report.
2. Comparative Environmental Assessment Report.
3. Socioeconomic Report.
4. Cost Rollup Report.
5. International Paper Impact Analysis.
6. Hydrologic Yields Report.

Regarding Marvin Nichols IA, per the SRBA Watershed Overview (2014):

> *"The Marvin Nichols IA project would be located on the Sulphur River and Red River and Titus counties approximately halfway between the cities of Clarksville and Mount Pleasant. The top of the conservation pool would be at elevation 328 feet NGVD. At this elevation, the reservoir would have a storage capacity of 1,532,031 acre-feet. At this location, the reservoir would have a total drainage area of 1,889 square miles (of which 479 square miles are above Jim Chapman Lake.)*
>
> *The Marvin Nichols IA project would inundate 66,103 acres..."*

A thorough suite of yield estimates for the Marvin Nichols IA project have been developed over the course of the SRBA (2014) study. Over the course of the analyses presented in the aforementioned reports, yields for various configurations of Marvin Nichols have been developed utilizing a modified version of the TCEQ WAM in which Lake Ralph Hall has been implemented, considering future

sedimentation conditions and mitigated sediment conditions, employing alternative periods of record using a USACE model for comparative purposes, and considering alternative implementations of potential environmental flow requirements (i.e., no requirements or with criteria developed utilizing the Lyons method). Resultant firm yields from these analyses range from 193,800 ac-ft/yr, to 676,000 ac-ft/yr. The estimated total yield for Marvin Nichols 1A at an elevation of 328.0 ft. NGVD is 590,000 acre-feet/yr, although with environmental flows considered this yield decreases to 571,710 acre-feet/yr.

From the SRBA Cost Rollup Report (2014), comprehensive cost estimates for a suite of alternatives, including various configurations of Marvin Nichols project, have been developed. The methods for evaluating the costs are reportedly consistent with TWDB guidance on Regional Water Planning, which includes consideration of Interest During Construction (IDC) added to the estimated capital costs for the reservoirs as well as for the transmission systems (using a 6% annual interest rate on total borrowed funds, less a 4% rate of return on investment of unspent funds).

From this study, the estimated total capital cost to develop the Marvin Nichols IA reservoir, at elevation 328 ft. msl., at 2018 dollars, is $1.249 billion. Including transmission, the total capital cost of the project is $5.003 billion. The total annualized cost of the project, during debt service is $309.3 million, and after debt service is $75 million. Resultant unit costs developed for the SRBA study are presented for both with- and without environmental flow restrictions (developed from using the Lyons methodology). Without environmental flows, the unit cost during debt service is roughly $524 per ac-ft of firm yield ($1.61/1,000 gallons), and after debt service is approximately $127 per ac-ft of firm yield ($0.40/1,000 gallons). Unit costs with environmental flow requirements based on the Lyons method in place during debt service is roughly $541 per ac-ft of firm yield ($1.67/1,000 gallons). After debt service, unit costs considering environmental flows is approximately $131 per ac-ft of firm yield ($0.41/1,000 gallons).

If, along with impacts from meeting environmental flow needs, the contractual relationship between the Metroplex members of the Joint Committee for Program Development (JCPD) and the SRBA is considered, whereby 20% of project yields would be dedicated to in-basin needs at no cost to SRBA, the unit costs to the Metroplex JCPD members based on their anticipated portion of the yield vary from those detailed above. During debt service, the unit cost is approximately $676 per ac-ft of firm yield ($2.08/1,000 gallons). After debt service, the unit cost is roughly $164 per ac-ft of firm yield ($0.51/1,000 gallons).

Based on available information, depending upon the configuration of Marvin Nichols under consideration, there do not appear to be potential ecologically unique streams of high importance, wetland mitigation banks, or conservation easements within or adjacent to the sites under consideration. However, two reaches of the Sulphur River within the project boundary have previously been identified by TPWD as significant stream segments based on the presence of unique federal holdings and a USFWS priority 1 bottomland woodland site. Additionally, TPWD has included one of these reaches on a recommended list of ecologically unique streams segments.

A review of available information also indicates that there are no Superfund sites, municipal solid waste landfill sites, permitted industrial and hazardous waste locations, or air quality monitoring stations located within or adjacent to the reservoir study area. However, state and federal agency listings for threatened, endangered, or rare plant or animal species identify eight birds, five fish, one mammal, three mollusks, three reptiles, and one insect that potentially occur or have habitat in or near the project location. The reservoir site is also within and adjacent to the Sulphur River Bottom west site, which is listed by the U.S. Fish & Wildlife Service as having excellent quality bottomlands of high value to waterfowl. Also, available data indicates that there are hydric soil associations within the reservoir site. The number of hydric soil

associations does not indicate the number of potential wetlands, but rather that a wetland area could occur where these hydric soil associations exist.

The SRBA (2014) Comparative Environmental Assessment Report presents the results of a comparative environmental assessment that includes Marvin Nichols IA. This assessment considered potential impacts to land resources, federal and state listed threatened and endangered species, cultural resources, and water quality. As detailed in Chapter 6 herein, the Marvin Nichols IA project was determined to have the highest impact on cultural resources, and was ranked the second highest overall in terms of environmental impacts when compared to the remaining alternative reservoir sites under consideration in that study.

The North East Texas Regional Water Planning Group does not recommend the designation of the potential Marvin Nichols I or Marvin Nichols IA reservoir sites as a unique reservoir site.

8.12.2 Marvin Nichols II

The Marvin Nichols II reservoir site is located on White Oak Creek, which is a tributary of the Sulphur River located primarily in Titus County. The site is immediately south of the proposed Marvin Nichols I reservoir site described above. Potential beneficiaries of the project include municipal and industrial water users in the vicinity of the project within the Sulphur River Basin, water users in the Cypress Creek Basin, and water users in the Dallas-Ft. Worth Metroplex. Other potential benefits include recreation, hydroelectric power generation, and flood control.

From the 2011 Region D Plan, at an elevation of 312.0 feet msl, the reservoir would have conservation storage capacity of 772,000 ac-ft and a surface area of 35,900 acres. The estimated firm yield of the project is 280,100 ac-ft/yr and the cost to develop the reservoir (alone) was determined to be approximately $463.2 million in 2018 dollars.

The SRBA (2014) Sulphur River Basin Feasibility Study has not explicitly evaluated the Marvin Nichols II reservoir site. Rather, this study considered potentially suitable dam locations and configurations further upstream on White Oak Creek. In particular, a site upstream of the City of Talco near the Talco gage was identified as an opportunity for an on-channel reservoir that could be hydraulically connected to the main stem of the Sulphur River, to take advantage of flows from both the White Oak Creek and Sulphur River watersheds.

Based on readily available information, there do not appear to be potential ecologically unique streams of high importance, or wetland mitigation banks, within or adjacent to the site. There is one conservation easement located within or adjacent to the footprint of the potential Marvin Nichols II reservoir. A review of available information also indicates that there are no Superfund sites, municipal solid waste landfill sites, permitted industrial and hazardous waste locations, or air quality monitoring stations located within or adjacent to the reservoir study area. However, state and federal agency listings for threatened, endangered, or rare plant or animal species lists eight birds, five fish, one mammal, three mollusks, three reptiles, and one insect that potentially occur or have habitat in or near the project location. The reservoir site is also within and adjacent to the Sulphur River Bottom west site, which is listed by the U.S. Fish & Wildlife Service as having excellent quality bottomlands of high value to waterfowl. Also, available data indicates that there are hydric soil associations within the reservoir site. The number of hydric soil associations does not indicate the number of potential wetlands, but rather that a wetland area could occur where these hydric soil associations exist.

The North East Texas Regional Water Planning Group does not recommend the designation of the potential Marvin Nichols II reservoir site as a unique reservoir site.

8.12.3 George Parkhouse I

The George Parkhouse I reservoir site is located approximately 18 miles northeast of the City of Sulphur Springs, on the South Fork of the Sulphur River, which forms the border between Delta and Hopkins Counties. The dam site would be located at River Mile 3.0 downstream of the existing Cooper Reservoir. Potential beneficiaries of the project include municipal and industrial water users within the Sulphur River Basin and/or water users in the Dallas-Ft. Worth Metroplex. Other potential benefits include recreation, hydroelectric power generation, and flood control.

From the SRBA (2014) Watershed Overview:

> *"The top of the conservation pool would be at elevation 401 feet NGVD. At this elevation, the reservoir would have a storage capacity of 651,712 acre-feet. At this location, the reservoir would have a total drainage area of 654 square miles (of which 479 square miles are above Jim Chapman Lake.)"*

The reservoir would inundate 28,362 acres. From the 2011 Region D Plan, the dam would consist of a 20,000 foot long earthen embankment constructed across the South Sulphur River with an additional half mile long earthen dike built across the low stream divide between the North Sulphur River and the South Sulphur River. The dam would have a gated ogee shaped flood spillway with a crest elevation of 390.0 feet msl and four 40 foot gated bays to discharge flood flows.

The estimated firm yield of the Parkhouse I reservoir is 124,300 ac-ft/yr, although with environmental flow needs this yield decreases to 118,707 ac-ft/yr. Costs presented herein are adjusted from the original July 2013 estimates reported by SRBA (2014) to September 2018 costs using the ENR Construction Cost Index. The total capital cost to develop the project, including the dam and spillway, land acquisition, conflict resolution, mitigation, permitting, transmission, and interest during construction, would be $1.53 billion. The project would provide water at a total annual cost, during debt service, of $94.6 million, and $23 million after debt service. Resultant unit costs developed for the SRBA study are presented for both with- and without environmental flow restrictions (developed from using the Lyons methodology). Without environmental flows, the unit cost during debt service is roughly $761 per ac-ft of firm yield ($2.34/1,000 gallons), and after debt service is approximately $185 per ac-ft of firm yield ($0.57/1,000 gallons). Unit costs with environmental flow requirements (based on the Lyons method) during debt service is roughly $797 per ac-ft of firm yield ($2.45/1,000 gallons). After debt service, unit costs with environmental flows applied are approximately $193 per ac-ft of firm yield ($0.60/1,000 gallons).

If, along with impacts from meeting environmental flow needs, the contractual relationship between the Metroplex members of the Joint Committee for Program Development (JCPD) and the SRBA is considered, whereby 20% of project yields would be dedicated to in-basin needs at no cost to SRBA, the unit costs to the Metroplex JCPD members based on their anticipated portion of the yield vary from those detailed above. During debt service, the unit cost is approximately $996 per ac-ft of firm yield ($3.06/1,000 gallons). After debt service, the unit cost is roughly $242 per ac-ft of firm yield ($0.75/1,000 gallons).

Based on available information, there are no potential ecologically unique streams of high importance, bottomland hardwoods, wetland mitigation banks, or conservation easements within or adjacent to the reservoir site. Analyses also indicates that there are no Superfund sites, municipal solid waste landfill sites,

permitted industrial and hazardous waste locations, or air quality monitoring stations located within or adjacent to the reservoir study area. However, state and federal agency listings for threatened, endangered, or rare plant or animal species lists seven birds, four fish, one mammal, one mollusk, and two reptiles that potentially occur or have habitat in or near the project location. Also, available data indicates that there are hydric soil associations within the reservoir site. The number of hydric soil associations does not indicate the number of potential wetlands, but rather that a wetland area could occur where these hydric soil associations exist.

The SRBA (2014) Comparative Environmental Assessment Report presents the results of a comparative environmental assessment that includes Parkhouse I. This assessment considered potential impacts to land resources, federal and state listed threatened and endangered species, cultural resources, and water quality. The Parkhouse I project was ranked third lowest overall in terms of environmental impacts when compared to the total seven alternative reservoir sites under consideration in that study.

The North East Texas Regional Water Planning Group does not recommend the designation of the potential George Parkhouse I reservoir site as a unique reservoir site.

8.12.4 George Parkhouse II

The George Parkhouse II reservoir site is located on the North Sulphur River at River Mile 5.0. The impoundment is approximately 15 miles southeast of the City of Paris, and would straddle the county line between Delta and Lamar Counties. The Parkhouse II site was recommended for development in the 1997 *State Water Plan*, and was a reservoir site recommended in the 2017 *State Water Plan* for designation as unique. Potential beneficiaries of the project include municipal and industrial water users within the Sulphur River Basin and/or water users in the Dallas-Ft. Worth Metroplex. Other potential benefits include recreation, hydroelectric power generation, and flood control. It should be noted that the development of the Marvin Nichols I reservoir would significantly delay or eliminate the need for this reservoir as a supply source for the Dallas-Ft. Worth Metroplex.

Previous studies have investigated a reservoir with a conservation pool elevation of 401.0 feet msl, which would have a conservation storage capacity and surface area of 243,600 ac-ft and 12,300 acres, respectively. With a probable maximum flood elevation of 415.7 feet msl, the Parkhouse II reservoir would have a surface area of 17,400 acres. The dam would have a gated ogee shaped flood spillway with a crest elevation of 390.0 feet msl. Flood discharges would be through eight 40 foot gated bays.

From the SRBA (2014) Watershed Overview:

> *"The top of the conservation pool would be at elevation 410 feet NGVD. At this elevation, the reservoir would have a storage capacity of 330,871 acre-feet. At this location, the reservoir would have a total drainage area of 421 square miles, of which approximately 101 square miles is above the proposed Lake Ralph Hall. The Parkhouse II project would inundate 15,359 acres."*

Previous studies of the George Parkhouse II reservoir site estimated the firm yield of the project to be 136,700 ac-ft without consideration of potential environmental pass-through requirements. A reevaluation of the project firm yield using the TCEQ WAM for the Sulphur River Basin and the TWDB Daily Reservoir Analysis Model performed for the 2011 Region D Plan indicated a firm yield with environmental releases of 131,850 ac-ft. At a cost of approximately $296.7 million to develop the reservoir, the annualized cost of water from the project would be $139 per ac-ft of firm yield ($0.43/1,000 gallons).

From the SRBA (2014) Cost Rollup Report, the estimated total yield of the Parkhouse II reservoir alternative would be 124,200 ac-ft/yr, although with environmental flow needs this yield decreases to 121,343 ac-ft/yr. The total capital cost to develop the project, including the dam and spillway, land acquisition, conflict resolution, mitigation, permitting, transmission, and interest during construction, would be $1.4 billion. The project would provide water at a total annual cost, during debt service, of $87.2 million, and $21.2 million after debt service. Resultant unit costs developed for the SRBA study are presented for both with- and without environmental flow restrictions (developed from using the Lyons methodology). Without environmental flows, the unit cost during debt service is roughly $702 per ac-ft of firm yield ($2.16/1,000 gallons), and after debt service is approximately $170 per ac-ft of firm yield ($0.53/1,000 gallons). Unit costs with environmental flow requirements (based on the Lyons method) during debt service is roughly $718 per ac-ft of firm yield ($2.21/1,000 gallons). After debt service, unit costs with environmental flows applied are approximately $174 per ac-ft of firm yield ($0.54/1,000 gallons).

If, along with impacts from meeting environmental flow needs, the contractual relationship between the Metroplex members of the JCPD and the SRBA is considered, whereby 20% of project yields would be dedicated to in-basin needs at no cost to SRBA, the unit costs to the Metroplex JCPD members based on their anticipated portion of the yield vary from those detailed above. During debt service, the unit cost is approximately $898 per ac-ft of firm yield ($2.76/1,000 gallons). After debt service, the unit cost is roughly $218 per ac-ft of firm yield ($0.67/1,000 gallons).

Based on available information, there do not appear to be major natural resource conflicts at the reservoir site. There are no potential ecologically unique streams of high importance, wetland mitigation banks, priority designated bottomland hardwoods, or conservation easements within or adjacent to the site. A review of available information also indicates that there are no Superfund sites, municipal solid waste landfill sites, permitted industrial and hazardous waste locations, or air quality monitoring stations located within or adjacent to the reservoir study area. However, state and federal agency listings for threatened, endangered, or rare plant or animal species identify seven birds, six fish, one mammal, one insect, and three reptile species that potentially occur or have habitat in or near the project location. Also, available data indicates that there are hydric soil associations within the reservoir site. The number of hydric soil associations does not indicate the number of potential wetlands, but rather that a wetland area could occur where these hydric soil associations exist.

The SRBA (2014) Comparative Environmental Assessment Report presents the results of a comparative environmental assessment that includes Parkhouse II. This assessment considered potential impacts to land resources, federal and state listed threatened and endangered species, cultural resources, and water quality. The Parkhouse II project was ranked second lowest overall in terms of environmental impacts when compared to the total seven alternative reservoir sites under consideration in that study.

The North East Texas Regional Water Planning Group does not recommend the designation of the potential George Parkhouse II reservoir site as a unique reservoir site.

A summary of key characteristics of the four reservoir sites that have been examined in the Sulphur River Basin is provided in Table 8.6.

Table 8.6 Potential Reservoir Sites in the Sulphur River Basin

Reservoir Site	Conservation Storage (ac-ft)	Surface Area (acres)	Firm Yield (ac-ft/yr)	Reservoir Development Cost ($ Millions)	Total Capital Cost ($ Millions)	Unit Cost, with environmental flows ($/ac-ft)	
						During Debt Service	After Debt Service
MARVIN NICHOLS I*	1,369,717	62,128	550,842	$825.9	Not Analyzed	87	Not Analyzed
MARVIN NICHOLS IA	1,532,031	66,103	571,710	$1,249	$5,002.7	676	164
MARVIN NICHOLS II*	772,000	35,900	280,100	$463.2	Not Analyzed	Not Analyzed	Not Analyzed
PARKHOUSE I	651,712	28,362	118,707	$540	$1,530	996	242
PARKHOUSE II	330,871	15,359	121,343	$440	$1,410	898	218

8.13 Recommendations for Unique Reservoir Site Identification, Development and Reservoir Site Preservation

8.13.1 Comments on the Texas Administrative Code With Regard to Reservoir Development

The NETRWPG has previously received comments concerning the protection of natural resources as they relate to the building of new reservoirs in the Sulphur River Basin within the North East Texas region. Rule 358.3 (4) and (9) of the Texas Administrative Code (TAC), relating to Guidance Principles, would be violated in regard to the protection of the natural resources should reservoir development take place in the Sulphur River Basin within the North East Texas region. Specifically, the new reservoirs being contemplated in the North East Texas Region within the Sulphur River Basin would not be protective of the agricultural and natural resources in the region. This is germane since the region has more than adequate surface water supply within the basin to meet all of the needs within the Sulphur River Basin in the North East Texas Region as projected for the next 50 years.

It is the position of the North East Texas Water Planning Group that there will be unavoidable impacts on agricultural resources should there be further development of new reservoirs in the Sulphur River Basin within the North East Texas Region. TAC Rule 357.34(d)(3) cited above includes the requirement that the regional water planning group evaluate all water management strategies to determine the potential of feasibility by including quantitative reporting of several specific factors as follows:

1. The net quantity, reliability, and cost of water delivered and treated for the end user's requirements during drought of record conditions, taking into account and reporting anticipated strategy water losses, incorporating factors used calculating infrastructure debt payments and may include present costs and discounted present value costs. Costs do not include distribution of water within a WUG after treatment.
2. Environmental factors including effects on environmental water needs, wildlife habitat, cultural resources, and effect of upstream development on bays, estuaries, and arms of the Gulf of Mexico. Evaluations of effects on environmental flows will include consideration of the Commission's adopted environmental flow standards under 30 TAC Chapter 298 (relating to Environmental Flow Standards

for Surface Water). If environmental flow standards have not been established, then environmental information from existing site-specific studies, or in the absence of such information, state environmental planning criteria adopted by the Board for inclusion in the state water plan after coordinating with staff of the Commission and the Texas Parks and Wildlife Department to ensure that water management strategies are adjusted to provide for environmental water needs including instream flows and bays and estuaries inflows.

3. Impacts on agricultural resources.

Therefore, the North East Texas Regional Planning Group recognizes that there may be the possibility of recommendations from other planning groups that include further development of additional reservoirs in the Sulphur River Basin as a recommended water management strategy or as an alternative strategy. The NETRWPG opposes the development of such reservoirs unless it is demonstrated that there will be no significant adverse impacts on the water, agricultural and environmental resources within the North East Texas Region and the State. Furthermore, due to foreseeable detrimental impacts, the NETRWPG asserts strongly that the option of pursuing new major reservoirs in the Sulphur River Basin as a water management strategy or an alternative strategy should be viewed as inconsistent with the protection of natural resources within the region.

8.13.2 Recommendations for Unique Reservoir Site Identification and Preservation

The NETRWPG recommends that any new reservoirs in Region D be pursued only after all other viable alternatives have been exhausted. The NETRWPG further recommends that no reservoir sites in the North East Texas Region be designated as unique reservoir sites in this plan or in the 2022 State Water Plan, excepting that per the terms of agreement set forth from the October 5, 2015 mediation between Regions C and D and ratified by the NETRWPG at its October 21, 2015 meeting, the NETRWPG does not challenge Marvin Nichols Reservoir as a unique reservoir site for the purposes of this Plan. At the time of publication of this Regional Water Plan, no agreement has been made between Regions C and D for the purposes of the 2026~~1~~ Region D Plan.

The NETRWPG recognizes that there are 16 locations in NETRWPG area where the topography is such that the area could be classified as uniquely suitable as a reservoir site. The NETRWPG recognizes that the waters of the State of Texas belong to the citizens of Texas for their specific use, but it is also recognized that the properties rights belong to individuals. Local government should be recognized for the effect that major alterations to the local economy, such as the development of a unique reservoir site, will have on them. To address the issue of unique reservoirs and the accompanying property owners, industry, and local government concerns the NETRWPG would recommend that the following be instituted when a unique reservoir site is being considered and included in planning studies:

- The required mitigation area is to be acquired from the water planning region requesting the reservoir or other such region willing to provide the mitigation area.
- At the identification of a unique reservoir site as a water planning strategy, the property owners in the area of the unique reservoir site and the accompanying mitigation site or sites must be notified by the requesting entity of such intent.
- At the initiation of the appropriate studies for the identified unique reservoir site, a mitigation site study shall be completed as soon as possible to identify and preliminarily map the mitigation area.

- Property owners should be afforded compensation based on replacement value to the maximum allowed by law in addition to a fair market value approach.
- Property owners whose properties are directly inundated by a reservoir constructed for the purpose of interbasin transfers shall have the right to receive royalties for the water stored over the property taken as an ongoing compensation.
- Local government and other taxing entities shall have the right to direct payments in lieu of taxation for property lost and per ac-ft for waters stored in the reservoirs constructed in the NETRWPG area for transfer to other basins to replace the taxation lost due to property removed directly from the tax rolls. Direct payment in lieu of taxation may differ on stored water and transferred water.
- Local government, school districts, and industry affected directly by the development of a reservoir proposed for interbasin transfer shall be aided and supported by the production of planning and remuneration for direct reduction of economic activity, resources, and jobs.
- The NETRWPG area will retain a portion of the impounded water of the developed reservoir for future use by the region.

The development of reservoirs in the NETRWPG area as a future water source for other portions of the state would require interbasin transfer authorizations from the Texas Commission on Environmental Quality (TCEQ). Among its many provisions, SB 1 includes provisions (TWC, Section 11.085) requiring the TCEQ to weigh the benefits of a proposed new interbasin transfer to the receiving basin against the detriments to the basin supplying the water. SB 1 also established the following criteria to be used by the TCEQ in its evaluation of proposed interbasin transfers:

- The need for the water in the basin of origin and in the proposed receiving basin based on the period for which the water supply is requested, but not to exceed 50 years;
- Factors identified in the applicable approved regional water plans which address the following:
  - the availability of feasible and practicable alternative supplies in the receiving basin to the water proposed for transfer;
  - the amount and purposes of use in the receiving basin for which water is needed;
  - proposed methods and efforts by the receiving basin to avoid waste and implement water conservation and drought contingency measures;
  - proposed methods and efforts by the receiving basin to put the water proposed for transfer to beneficial use;
  - the projected economic impact that is reasonably expected to occur in each basin as a result of the transfer; and
  - the projected impacts of the proposed transfer that are reasonably expected to occur on existing water rights, instream uses, water quality, aquatic and riparian habitat, and bays and estuaries that must be assessed under Sections 11.147, 11.150, and 11.152 of [the TWC] in each basin. If the water sought to be transferred is currently authorized to be used under an existing permit, certified filing, or certificate of adjudication, such impacts shall only be considered in relation to that portion of the permit, certified filing, or certificate of adjudication proposed for transfer and shall be based on historical uses of the permit, certified filing, or certificate of adjudication for which amendment is sought;
- Proposed mitigation or compensation, if any, to the basin of origin by the applicant;

- The continued need to use the water for the purposes authorized under the existing permit, certified filing, or certificate of adjudication, if an amendment to an existing water right is sought; and
- The information required to be submitted by the applicant.

The NETRWPG supports the full application of the criteria for authorization of interbasin transfers contained in current state law. With regard to compensation to the basin of origin, the NETRWPG recommends that a portion of the firm yield of projects developed in the NETRWPG basins for interbasin transfer, be reserved for future use within the basin of origin. The specific terms of such compensation, along with other issues associated with development of the project (e.g., financing, operation of the reservoir, etc.), should be addressed by the appropriate representatives of the authority within the basin of origin, in coordination with the water districts and the entities in receiving regions and within the North East Texas Region that are seeking the additional water supply.

The NETRWPG also endorses the recommendation contained in the adopted *Comprehensive Sabine Watershed Management Plan* that the Sabine River Authority (SRA) develop the Prairie Creek Reservoir. Located centrally in the upper portion of the Sabine Basin, the proposed reservoir would enable the SRA to supply projected future manufacturing needs in Harrison County. As previously noted, the Prairie Creek Reservoir and Pipeline Project is not being pursued by the Sabine River Authority at this time due to the conservation easement limitation on the Waters Bluff reservoir site. If the conservation easement were removed, the Water Bluff Reservoir would become the Sabine River Authority's top priority project to meet projected water needs in the upper Sabine River Basin.

The NETRWPG also has definite concerns about local property owners who would be directly impacted by reservoir construction. A particular concern is that landowners be compensated fairly for the value of any land acquired for reservoir development.

8.13.3 Environmental Protection Agency and Corps of Engineers

In March of 2008, the EPA and the COE *announced innovative new standards to promote no net loss of wetlands by improving wetland restoration and protection policies, increasing the effective use of wetland mitigation banks and strengthening the requirements for the use of in-lieu fee mitigation. The new standards clearly affirm the requirement to adhere to the "mitigation sequence' of "avoid, minimize and compensate".* The NETRWPG recommends that the Wetlands Compensatory Mitigation Rule be closely followed to minimize any impact on the region through the consideration of reservoirs and the mitigation thereof. The group strongly supports the requirement of the mitigation sequence of "avoid, minimize and compensate" should any new reservoirs in Region D be pursued.

8.13.4 Environmental Flows

It is the position of the NETRWPG that there be no development of new reservoirs in the Black Cypress portion of the Cypress Creek Basin or the entire Sulphur River Basin within Region D, nor transfer of water out of these basins for that part that is within Region D until the flow needs for a sound ecological environment are defined for these basins through the process established in Senate Bill 3, 2007 Regular Session of the Texas Legislature. Those flow needs are defined as the low, pulse, and flood flows. No additional development should take place until the State has identified the environmental flows necessary to maintain the Black Cypress and Sulphur Rivers, and their tributaries, and established standards for the environmental flows for these basins.

The NETRWPG recognizes that other regional water planning groups may include recommendations for new reservoirs in the Sulphur River basins, or for the transfer of water out of these basins to basins in other regions, as part of their recommended water management strategies or as alternate strategies. It is the position of the NETRWPG that unless such proposed reservoirs or transfers include explicit recognition that the needs for environmental flows in the North East Texas Region must be satisfied first consistent with Senate Bill 3, that these strategies are inconsistent with the legislative mandate established by Senate Bill 3 and are inadequate in addressing the required quantitative reporting of environmental factors including effects on environmental water needs, such as required in TAC 357.34(d)(3).

Development of new reservoirs prior to determination of the water needs for environmental flows in the Sulphur River Basin would be premature. It is the position of the NETRWPG that proposed reservoirs or transfers need to be consistent with the protection of significant agricultural and natural resources of Region D and the State. The impacts from such projects' effects on environmental flows could further affect downstream operations, such as those in and downstream of Wright Patman Lake.

8.14 Legislative Recommendations

TWDB rules for the 2026~~1~~ regional water planning activities (31 TAC Chapter 357.43(a), (d), (e), and (f) also provide that:

> *(a) The RWPs shall contain any regulatory, administrative, or legislative recommendations developed by the RWPGs.*
>
> *(d) Any other recommendations that the RWPG believes are needed and desirable to achieve the stated goals of state and regional water planning including to facilitate the orderly development, management, and conservation of water resources and prepare for and respond to drought conditions. This may include recommendations that the RWPG believes would improve the state and regional water planning process.*
>
> *(e) RWPGs may develop information as to the potential impacts of any proposed changes in law prior to or after changes are enacted.*
>
> *(f) RWPGs should consider making legislative recommendations to facilitate more voluntary water transfers in the region.*

The approved scope of work for the development of the 2026~~1~~ Region D Plan includes development of legislative recommendations for ecologically unique stream segments, ecologically unique reservoir sites and general recommendations to the state legislature on water planning actives as well as issues in the North East Texas Region.

Throughout the 2026~~1~~ planning process, the one major policy issue that remained dominant during the meetings of the NETRWPG and received the most comment from the public during the public comment portion of the regular meetings was the designation of the Marvin Nichols reservoir site in the Sulphur River Basin as a water management strategy for providing water outside the Region. Issues that remained from the 2011, ~~and~~ 2016, and 2021 Region D Plans are future interbasin transfers from the North East

Texas Region; conversion from groundwater to surface water supplies; various regulatory policies of the TCEQ; and, improvements to the regional water supply planning process. Each of these issues is briefly discussed in the section below. Also presented are the recommendations adopted by the NETRWPG on each issue.

8.14.1 Recommendation: Marvin Nichols Reservoir Sites

The Marvin Nichols Reservoir Sites (including but not limited to I, IA and II) in the Sulphur River Basin as designated in the 2001 plan has remained of great concern in the 2026~~1~~ Plan preparation. In December 2002 the NETRWPG amended the 2001 plan to change the designation of the sites from proposed sites to potential sites, but the issue has remained at each of the subsequent planning meetings.

In May 2005, the NETRWPG voted to completely remove the Marvin Nichols I site from the Region D Water Plan. The 2006 and 2011 Region D Plans state that the Marvin Nichols I reservoir should not be included in any regional water plan as a water management strategy and not be included in the State Water Plan as a water management strategy. For the purposes of the 2016 and 2021 Region D Plans, Region D continued to oppose Marvin Nichols Reservoir, but did not challenge Marvin Nichols Reservoir as a unique reservoir site for the purposes of ~~that~~ those plans. The NETRWPG stated that the Marvin Nichols I Reservoir was not consistent with protecting the timber, agricultural, environmental and other natural resources as well as third parties in the Region D area. Among the specific issues are basic rights of the property owners and the local governmental entities.

Based on the reasons set forth in Section 6.9 of this regional plan, it has been the position of the NETRWPG that Marvin Nichols reservoir should not be included in the ~~2022~~ 2027 State Water Plan as a water management strategy. Region D continues to oppose Marvin Nichols Reservoir, but is willing to work with other regions to obtain water supplies from the Sulphur River Basin that do not involve new reservoir construction. As noted previously, per the terms of agreement set forth from the October 5, 2015 mediation between Regions C and D and ratified by the NETRWPG at its October 21, 2015 meeting, the NETRWPG does not challenge Marvin Nichols Reservoir as a unique reservoir site for the purposes of this Plan. At the time of publication of this Regional Water Plan, no agreement has been made between Regions C and D for the purposes of the ~~2021~~ 2026 Region D Plan.

Subject to the comments in Chapter 6, the following recommendations should apply to all reservoirs considered in NETRWPG area:

- All other alternatives such as conservation, alternate available water supply sources and water resources in existing reservoirs must be exhausted prior to consideration of new reservoir development.
- New mitigation rules must be considered, such as, requiring the mitigation area to be acquired from the basin or region requesting the new reservoir. It is believed to be too harsh a requirement to take property from a basin for a reservoir and then acquire more property from the same basin to mitigate the property taken for the new reservoir especially at a requirement of 2-10 times the reservoir property.
- Property owners must be afforded more rights when confronted with acquisition of their property. These rights should include, but not be limited to, proper notification of the consideration of acquisition in a timely manner; extent of considered acquisition; the maximum compensation possible including compensation based on replacement value; royalties for water stored above acquired

properties as compensation for yielding ongoing earnings potential; and the additional rights for use of mitigation lands.

- Local governmental taxing agencies, including school districts, should receive direct payments in lieu of taxation for waters stored in the NETRWPG area reservoirs for transfer to other regions. This is considered partial replacement value for lost revenue for the local agencies.
- Local government, school districts, and economic areas affected directly by the consideration of development of a reservoir site shall receive assistance for the recapture of lost resources, jobs, or income.
- The NETRWPG area will retain a portion of the impounded water of the developed reservoir for future use by the region.

Concerning the potential Marvin Nichols reservoir sites (including but not limited to I, IA and II) the NETRWPG does not recommend any of the potential reservoir sites for designation as a Unique Reservoir Site. Also, the potential Marvin Nichols reservoir site as described in the Reservoir Site Protection Study, TWDB Report 370, published July 2008, is not recommended by the NETRWPG for designation as a unique Reservoir Site. As noted previously, per the terms of agreement set forth from the October 5, 2015 mediation between Regions C and D and ratified by the NETRWPG at its October 21, 2015 meeting, the NETRWPG does not challenge Marvin Nichols Reservoir as a unique reservoir site for the purposes of this Plan. At the time of publication of this Regional Water Plan, no agreement has been made between Regions C and D for the purposes of the ~~2021~~ 2026 Region D Plan.

8.14.2 Recommendation: The Growth of Giant Salvinia

The NETRWPG received a report from Lee Thomas, Northeast Municipal Water District, in October of 2009, concerning the presence of Giant Salvinia within the NETRWP Area.

Giant Salvinia is an invasive floating aquatic weed and presents a significant threat to the state resources because of its severe impacts in freshwater ecosystems. It adversely affects the biodiversity and functioning of wetlands and riparian ecosystems, water quality, water storage and distribution infrastructure, recreation and amenity values. It has often been described as one of the "world's worst weeds." Production losses combined with the control and management costs it has incurred annually reach a multi-billion dollar figure worldwide. The environmental costs will never be fully known but is well in excess of the management costs in dollar terms.

Specifically, Giant Salvinia is a free-floating, sterile aquatic fern that reproduces by vegetative growth and fragmentation. Under normal conditions, up to three lateral buds may develop on each node. Salvinia typically passes through three vegetative growth forms starting with the primary juvenile or invasive form, followed by the secondary then tertiary forms. As growth progresses through each phase, the leaves become larger, begin to fold upwards and the plants become more compact. While the primary phase is easily distinguished from the tertiary, there are many factors that can affect the development of Giant Salvinia. In a rapidly expanding population, it is quite easy to find all three forms present. Under ideal growth conditions, it has been reported that Giant Salvinia can achieve extraordinary growth rates, doubling its biomass in as little as two days.

8.14.2.1 Background on Giant Salvinia

The NETRWPG was informed of the presence of Giant Salvinia (*Salvinia molesta)* within the region by the October report. In that report it was stated that the presence of Giant Salvinia in the region is a relatively recent development but it has been noted to be expanding specifically in the Cypress Creek Basin. Giant Salvinia is a noxious, invasive aquatic plant that has significant adverse effects on affected wetlands and related environments and is an increasing threat to water quality.

Giant Salvinia has been found to be present in both Louisiana and Texas. In Texas it is present in Caddo Lake in the Cypress Creek Basin which is in the eastern most portion of the North East Texas Regional Water Planning Area. There are significant control measures underway in relation to Giant Salvinia infestations in Caddo Lake.

The impacts of Giant Salvinia are many and varied but essentially it reduces aquatic biodiversity by removing light from the water body. The removal of light kills all submerged plants and eventually their associated fauna below the floating infestation.

To maintain the health of our waterways by limiting the impact and restricting the spread of Giant Salvinia, community understanding about the dangers of Giant Salvinia must be raised in order to mitigate existing conditions and prevent further impact, introduction, and spread to surrounding aquatic habitats. Environmental impacts such as increased runoff, sedimentation and leaching of fertilizers can dramatically increase the establishment and spread of aquatic weed species. The possession of all species of the genus *Salvinia* is prohibited under Texas State law. Despite this law, the transportation of Giant Salvinia from one water body to another continues.

Control of Giant Salvinia is very difficult, especially in high value wetlands which may contain endangered species. While integrated use of biological control and herbicides is successfully used in some locations, there are fewer effective options in riverine and wetland habitats. Most efforts, therefore, involve methods that are time consuming, intensive and expensive.

8.14.2.2 Environmental, Social and Economic Impacts of Giant Salvinia

Public safety and health are endangered by the presence of Giant Salvinia, as it is known to encourage breeding of disease-carrying pests by providing a perfect habitat for larval development; these include mosquito vectors of malaria and West Nile virus. The development of thick floating mats can provide a dangerous platform for children and animals. Animals frequently mistake the dense carpets of Giant Salvinia for firm ground and fall into the water body underneath.

Giant Salvinia greatly reduces the aesthetic value of water bodies by an accumulation of litter, water stagnation and development of foul odors. Increased numbers of mosquitoes and midges, aside from any public health issue, can severely reduce visitor numbers and length of stay at aquatic venues.

Giant Salvinia disrupts use of waterways for recreation, boating, fishing and swimming. Heavy infestations prevent access by boats and recreational fishing is impeded. Swimming is dangerous, if not impossible, in dense infestations.

The presence of Giant Salvinia impacts water storage facilities and distribution infrastructure. These facilities have been adversely affected through the blocking of irrigation channels and pump intakes. Blockage of channels and pumps can increase pumping times and costs, and can lead to expensive repairs or significantly reducing the time between planned maintenance events. By accelerating the amount of

water removed from storage through plant transpiration, the presence of Giant Salvinia can have a significant effect on water quantity.

Giant Salvinia modifies the environment by shading out submerged aquatic plants and lowering oxygen levels causing animal deaths, some of which may be endangered species. Dense infestations could eventually kill most plant life normally found below water level and much aquatic life will either die out or relocate. This loss of aquatic biodiversity could be devastating to the environmentally unique areas. General water quality is also degraded through decomposing plant material and dramatically increasing water loss through transpiration. Giant Salvinia has negatively impacted at least one RAMSAR wetland (Caddo Lake) in addition to thirteen major reservoirs in Texas.

The direct costs of control of the menace and the associated management activities are affecting many governmental as well as private budgets. Chemical and mechanical costs incurred by local, state, and federal government agencies along with private control programs are likely to be in excess of $250,000 per year per water body. Some government authorities keep breeding tanks of the leaf eating weevil called Salvinia weevil (Cyrtobagous salviniae) to assist in dealing with Giant Salvinia infestations in their region. This may help reduce the long-term cost in controlling Giant Salvinia, but colonies of the weevil have yet to be established in the North East Texas Water Planning Region due to the colder climate.

The education and outreach to the public is an ongoing effort. It is important to educate the public of the threat Giant Salvinia on the water resources of the State and how to identify Giant Salvinia. Hopefully, the public can lower the rate of spread of infestation and will report possible new infestations and assist with methods of mitigation. This is an area where efforts need to be extended by government and industry in the State.

8.14.2.3 Local, State, and Federal Government Efforts

The NETRWPG recommends that available State funds be dedicated to the control of Giant Salvinia and that governmental sources provide additional resources when available, such as enactment of complementary legislation to support control efforts and prevent distribution of Giant Salvinia. The Texas Legislature is also recommended to approve legislation that will assist local and state officials in controlling the spread and elimination of existing infestations of the plant.

It is further recommended by the NETRWPG that the local and state governments adopt the following:

- Continue to research and develop efficient, effective and appropriate control techniques.
- Provide extension and education services to urban and industry stakeholders.
- Support enforcement of legislation and control measures.
- Ensure that Giant Salvinia is identified in local, regional, and State level pest management plans.
- Coordinate with landholder, community and industry interest groups to cooperatively manage and control Giant Salvinia infestations.
- Research and develop best management practices.
- Monitor water pollution.
- Periodically inspect all water bodies for Giant Salvinia.
- Promote reporting of new Giant Salvinia infestations.

The NETRWPG also recommends that the appropriate State and Federal governmental departments adopt the following actions:

- Develop awareness campaigns to discourage the transportation and/or possession of Giant Salvinia.
- Eradicate infestations where feasible, and ensure Giant Salvinia control is undertaken on all federally managed land.

8.14.3 Recommendation: Toledo Bend Reservoir and Pipeline

At the previous request of the Sabine River Authority, the NETRWPG recommends that the Toledo Bend Reservoir be designated a supply strategy for meeting the upper Sabine Basin needs within the NETRWPG area and a supply option for Region C. This reservoir along, with the proposed pipeline from Toledo Bend to the Prairie Creek Reservoir will eventually be used as a supply source for the upper Sabine Basin.

8.14.4 Recommendation: Concerning Oil and Gas Wells

The NETRWPG recommends that the Texas Railroad Commission review the practices and regulations concerning the protection of the fresh water supply located in the aquifers that supply much of East Texas with fresh water as to the regulation of the drilling, maintaining and plugging of oil or gas wells with regards to public fresh water supply wells.

In a report presented December 9, 2004, by Mr. Tommy Konezak, Kilgore, Texas, and summarized here, the NETRWPG heard that approximately 40,000 wells have been drilled in the East Texas Field since it opened. Since these production wells penetrate some of the essential aquifers that supply much of the east Texas fresh water there is adequate opportunity for contamination of the fresh water supply. Current regulations require public water supply wells to have a 150 foot sanitary easement in relation to a petroleum well, but there is no similar requirement for the drilling of an oil or gas well as regards to public water supply wells. The initial drilling of a petroleum well allows for the placement of 100 feet of surface pipe on a well even though the aquifer may have 800 feet of formation. The plugging of wells termed dry holes has not kept up with the times and the existing regulations should be enforced strictly.

8.14.5 Recommendation: Concerning Mitigation

The NETRWPG recommends that any planning group or entity proposing a new reservoir or any other water management strategy should address the subject of mitigation in conjunction with any and all feasibility studies. As evidenced in Section 6.9 of this plan, a study on possible mitigation effects should be undertaken and completed in conjunction with any and all feasibility studies. Information should include estimates of mitigation, predication ratios, and other information useful to landowners potentially affected by mitigation requirements. Also, any new reservoir proposed by a planning group must be accompanied by a map of the proposed reservoir and a map of the land proposed to be mitigated, including proposed acreage.

The NETRWPG recognizes that the rules concerning mitigation and the method of accomplishing mitigation have evolved. Some suggested references for updated mitigation rules and information are the *National Wetlands Mitigation Action Plan* (https://www.epa.gov/cwa-404/national-wetlands-mitigation-action-plan), the EPA *Mitigation Banks under CWA Section 404* (https://www.epa.gov/cwa-404/mitigation-banks-under-cwa-section-404), the EPA *Background about Compensatory Mitigation Requirements under CWA Section 404*

(https://www.epa.gov/cwa-404/background-about-compensatory-mitigation-requirements-under-cwa-section-404) and the *Corps Regulatory Program* (https://www.usace.army.mil/missions/civil-works/regulatory-program-and-permits/). The following information was derived in part from these references.

The preference for Mitigation Banking was first conceived in 1983 when the U. S. Fish and Wildlife Service supported their establishment. This program was well positioned to provide easier monitoring, long-term stewardship, and unambiguous transfer of liability for success from the permittee to the banker. The EPA in the *Mitigation Banks under CWA Section 404* has stated that the advantages of the mitigation-banking program are to:

- Reduce uncertainty over whether the compensatory mitigation will be successful in offsetting project impacts.
- Assemble and apply extensive financial resources, planning and scientific expertise not always available to many permittee responsible compensatory mitigation proposals.
- Reduce processing times and provide more cost effective compensatory mitigation opportunities.
- Enable the efficient use of limited agency resources in the review and compliance monitoring of compensatory mitigation projects because of consolidation.

The EPA and the USACE announced in March of 2008 new standards to promote the "no net loss of wetlands" by improving wetland restoration and protection policies, increasing the effective use of wetland mitigation banks and strengthening the requirements for the use of in-lieu fee mitigation. These standards clearly affirm the requirement to adhere to the "mitigation sequence" of "avoid, minimize and compensate." The permittee must first avoid and minimize the impact on the wetland and then compensate for unavoidable impacts. The term here "to compensate" is specifically directed at the wetland or other aquatic feature being impacted.

A mitigation bank may be created when a government agency, private corporation, non-profit organization, or other entity undertakes the prescribed activities required under a formal agreement with a regulatory agency. The value assigned to a mitigation bank is through "compensatory mitigation credits." The bank's instrument identifies the number of credits available for sale and requires the use of ecological assessment techniques to certify that those credits provide the required ecological functions. The Compensatory Mitigation Rule identifies and clarifies the consideration of watershed scale factors in the selection of appropriate mitigation sites. Mitigation credits utilized by "banks" now allow for a more varied use of options. Mitigation proposals may use on-site (i.e., located close to the impact) and in-kind (i.e., replacement of the same ecological type as the impacted resource). In addition the rule clarifies the consideration of watershed-scale factors in the selection of appropriate mitigation sites. This clarification may increase the practical viability of mitigation proposals involving off-site or out-of-kind replacement with the regard to use of "compensatory mitigation credits". These replacement processes will still provide appropriate resource replacement in ways that are beneficial to the watershed. The USACE is the final decision maker regarding whether a proposed compensatory mitigation option provides appropriate compensation to receive a permit.

The USACE has adopted a "watershed approach" to compensatory mitigation as stated in the *Watershed Approach to Compensatory Mitigation Projects* (https://www.usace.army.mil/Media/Fact-Sheets/Fact-Sheet-Article-View/Article/1088740/watershed-approach-to-compensatory-mitigation-projects/). A watershed approach is an analytical process for making

compensatory mitigation decisions that support sustainability or improvement of aquatic resources in a watershed (33 CFR 332.2). The ultimate goal of a watershed approach is to maintain and improve the quality and quantity of aquatic resources through strategic selection of compensatory mitigation sites. A watershed approach must be used, to the extent appropriate and practicable, for siting compensatory mitigation projects for Department of the Army permits. The watershed approach applies to all mitigation banks, in-lieu fee programs, and permittee responsible compensatory mitigation. As noted by the USACE, a watershed plan for the purpose of compensatory mitigation is a plan developed by any government or appropriate non-governmental organization for the purpose of aquatic resource restoration, establishment, enhancement, or preservation, in consultation with stakeholders. If there is no appropriate, available watershed plan, there is no requirement to develop a watershed plan, however. Without a watershed plan, other landscape-level information may be used to appropriately select compensatory mitigation sites.

The affected stakeholders include the local sponsors and landowners of the proposed project and the proposed mitigation sites. Project sponsors are tasked with making a reasonable effort, commensurate with the scope and scale of the project and impacts, to obtain as much information as possible prior to the design of the compensatory mitigation project.

The design of compensatory mitigation projects does involve a case-by-case decision making process. This is due to the variables that are encountered on the different projects. While decision-making relies on the scientific expertise of wetlands program staff and broad based stakeholder participation, project sponsors may propose compensatory mitigation based on the watershed approach using information from other sources. Such information includes: current trends in habitat loss or conversion; sources of watershed impairments; cumulative impacts of past development activities; current development trends; presence and habitat requirements of sensitive species; site conditions that favor or hinder the success of compensatory mitigation - including the contribution upland/riparian resources have on aquatic resource functions; requirements of regulatory/non-regulatory programs; chronic environmental problems such as flooding or poor water quality; and comprehensive treatment of all aquatic resource functions.

The NETRWPG further recommends that future mitigation strongly consider utilization of land that may have previously been a functional wetland. An emphasis on restoration of wetland functions can be of more significant benefit than preservation of existing functions, and could be accomplished through the use of marginal farmland or low-lying areas for mitigation purposes.

8.14.6 Recommendation: Future Interbasin Transfers from the North East Texas Region

The North East Texas Region currently supplies surface water to other areas of the state through interbasin transfers and is identified in the current state water plan as a likely source of additional future water supply for various entities in Region C. Specifically, the 1997 State Water Plan includes recommendations that one or more new reservoirs be developed in the Sulphur River Basin as a source of future water supply for the Dallas-Ft. Worth Metroplex. In addition to potential future water transfers from the North East Texas Region to Region C, there may also be water management strategies for meeting needs within the North East Texas Region that will involve conveyance of supplies from one river basin to another within the region.

Among its many provisions, State Bill (SB) 1 included provisions (TWC, Section 11.085) requiring the TCEQ to weigh the benefits of a proposed new interbasin transfer to the receiving basin against the detriments to the basin supplying the water. However, these provisions relate only to river basins of origin, not to the water planning regions of origin. SB 1 established the following criteria to be used by the TCEQ in its evaluation of proposed interbasin transfers:

- The need for the water in the basin of origin and in the proposed receiving basin based on the period for which the water supply is requested, but not to exceed 50 years.
- Factors identified in the applicable approved regional water plans which address the following:
  - the availability of feasible and practicable alternative supplies in the receiving basin to the water proposed for transfer
  - the amount and purposes of use in the receiving basin for which water is needed
  - proposed methods and efforts by the receiving basin to avoid waste and implement water conservation and drought contingency measures
  - proposed methods and efforts by the receiving basin to put the water proposed for transfer to beneficial use
  - the projected economic impact that is reasonably expected to occur in each basin as a result of the transfer
  - the projected impacts of the proposed transfer that are reasonably expected to occur on existing water rights, instream uses, water quality, aquatic and riparian habitat, and bays and estuaries that must be assessed under TWC Sections 11.147, 11.150, and 11.152 in each basin. If the water sought to be transferred is currently authorized to be used under an existing permit, certified filing, or certificate of adjudication, such impacts shall only be considered in relation to that portion of the permit, certified filing, or certificate of adjudication proposed for transfer and shall be based on historical uses of the permit, certified filing, or certificate of adjudication for which amendment is sought.
- Proposed mitigation or compensation, if any, to the basin of origin by the applicant.
- The continued need to use the water for the purposes authorized under the existing permit, certified filing, or certificate of adjudication, if an amendment to an existing water right is sought.
- The information required to be submitted by the applicant.

As an added protection to water rights and water users in a basin of origin, SB 1 also included a requirement that amending an existing water right for a new interbasin transfer would result in the water right acquiring a new priority date. The effect of this requirement is to give all other water rights in the basin of origin a higher priority than the amended right.

Current state law and policy regarding interbasin transfers of surface water provide a useful starting point for inter-regional discussions on the development of a new reservoir in the Sulphur River Basin. Several of the criteria that TCEQ is to consider in its review of interbasin transfers are of particular relevance, including:

- Future needs for water supply in the Sulphur River Basin.
- Economic impacts of future reservoir development and interbasin transfer on the Sulphur River Basin.
- Environmental impacts.
- Mitigation of impacts to Sulphur River Basin and compensation for the interbasin transfer.

8.14.7 Recommendation: Designation of Wholesale Water Providers

The NETRWPG supports the designation of a Wholesale Water Provider (WWP) as described in the Texas Administrative Code §357.10(4~~3~~) as:

> "Any person or entity, including river authorities and irrigation districts, that delivers or sells water wholesale (treated or raw) to WUGs or other WWPs or that the RWPG expects or recommends to deliver or sell water wholesale to WUGs or other WWPs during the period covered by the plan. The RWPGs shall identify the WWPs within each region to be evaluated for plan development."

The NETRWPG supports the granting of a designation of WWP for an entity within Region D depending upon a written request from that entity to the NETRWPG that demonstrates said entity has entered or the RWPG expects or recommends to enter into contracts to sell more than 1,000 acre-feet of water wholesale during the period covered by the plan, including the designation of expected demand and the expected supply. Without a request that includes sufficient identification of expected contractual demand and expected supply, the NETRWPG cannot plan for such an entity. With this noted, Region D expects that the water supply out of Lake Wright Patman will continue to be with Texarkana and Riverbend Water Resources District control as WWPs.

8.14.8 Recommendation: Future Water Needs

A widely held view within the North East Texas Region is that future water needs within the region must be assured before additional interbasin transfers are permitted. Many residents of the region express support for future reservoir development and interbasin transfers provided the region's long term water demands are met. This sentiment is supported by TWDB rules for regional water planning, which require that the evaluation of interbasin transfer options include consideration of "…the need for water in the basin of origin and in the proposed receiving basin."

The results of the supply and demand assessment for the North East Texas Region indicate that at the regional level, currently legally available surface and groundwater sources are adequate to meet projected needs through 2070. This conclusion also applies for each of the river basins within the region. More importantly, however, the supply and demand assessment indicates that numerous individual water user groups are projected to experience shortages during the planning period, including several in the Sulphur River Basin. However, a majority of these shortages are projected to occur in small communities and rural areas and it is generally believed that local water supply options will be the preferred strategy for meeting those needs.

The issue of how much water is needed in the North East Texas Region for local use is not as simple as just comparing estimates of existing water supply to projections of future water demand. It should be remembered that the water demand projections adopted by the NETRWPG and the TWDB for development of the regional plan are based largely on an extrapolation of past growth trends. While this is a common and accepted method for forecasting future conditions, there are nonetheless significant uncertainties in the projections.

Shifting demographics and economic and technological change could result in substantially higher demand for water in the North East Texas Region than is currently projected. For example, there is an observed trend over the past decade in many areas of the U.S. of higher population growth in small and medium sized cities and rural areas. This has been attributed in part to advancements in

telecommunications and the evolving information and service based economy, which no longer requires a concentration of labor in large cities. Another factor is the aging of the population and the trend toward retirement in rural areas. Also, development of a new reservoir in the Sulphur Basin could, itself, act as a significant catalyst for economic development and growth in the area. In fact, some in the planning region have expressed interest in building reservoirs as part of an overall regional economic development strategy. Results from the SRBA (2014) Sulphur River Basin Feasibility Study suggest a wide variety of potential demands in the region, many significantly higher than those estimates developed for regional planning.

Such factors suggest that the NETRWPG may want to review a possible policy recommendation regarding the definition of "need" in the basin of origin. Some members have also suggested broadening the test of need for interbasin transfers to consideration of projected needs throughout the *region* of origin, not just the basin of origin.

8.14.9 Recommendation: Economic and Environmental Impacts

The NETRWPG recommends considering potential economic and environmental impacts associated with reservoir development. For example, a significant amount of taxable private property could be removed from local tax rolls thereby increasing the tax burden on other property owners. The effects of new development are uncertain and likely include both negative and positive consequences.

Reservoir development would also alter the natural environment, perhaps resulting in significant losses of ecologically valuable wetlands and riparian areas. However, state and federal regulations require that such impacts be minimized and mitigated to the extent possible, often through the set-aside and protection of other valuable ecological resources. Some water planners in the region have expressed the concern that mitigation requirements for large reservoirs in one basin might have to be met by restricting uses of riparian areas in other basins, thus limiting future possibilities for development at those sites.

8.14.10 Recommendation: Compensation for Reservoir Development and Interbasin Transfers

Perhaps the most important consideration in inter-regional discussions regarding reservoir development and interbasin transfers is the question of compensation. A common view is that future interbasin transfers should be of direct benefit to both the basin-of-origin and the receiving basin. As noted in the case of future water needs, RWPG members have also expressed strong interest in the distribution of benefits to the region as well as the basin of origin. In essence, it is a question of equity or fairness. There are several ways that compensation for the transfer of additional water supplies from the Sulphur Basin could be approached. Examples include:

- Retaining ownership of water rights by an entity in the basin of origin with a portion of the water transferred out of basin under long term contract.
- Reserving some portion of the yield of a new reservoir for future use within the basin of origin.
- Setting rates on water sales sufficient to cover both the costs of developing and operating a new reservoir plus additional revenues for other purposes (e.g., supporting the functions of the local project sponsor).
- Direct payments to the governmental entities in the impacted area.

Given the significance and implications of new reservoir development and future interbasin transfers across regional lines, the NETRWPG should consider adopting a policy statement addressing the issue of future water needs within the basins of origin and/or within the North East Texas Region as a whole, economic and environmental impacts of reservoir development, and inter-regional equity and compensation issues. It should be noted the issue of compensation is applicable to all reservoir development whether an interbasin transfer is contemplated or not.

8.14.11 Recommendation: Conversion of Public Water Supplies to Surface Water from Groundwater

Many water suppliers in the North East Texas Region rely solely on local groundwater supplies. Most of these suppliers will likely continue to use groundwater for future needs. However, in some areas, groundwater supplies will not be adequate to meet future needs and alternative sources of supply need to be considered. Also, in many areas of the region, groundwater supplies are of poor quality and do not meet current state and federal drinking water standards. Where groundwater supplies are available but are of poor quality, one supply strategy could be to develop additional groundwater with advanced treatment. However, because of the cost of treatment, and particularly the cost of disposal of the waste streams, acquisition of surface water supplies may be the most economically viable alternative.

Acquisition of surface water supplies would require that there be both legal and physical access to surface water supplies. Some communities may be in relatively close proximity to an existing surface water source but do not have access to those supplies because the water is fully committed to other users. In other cases, the physical infrastructure required to transport surface water from its source to a user does not exist and may be too costly.

Building regional water supply systems may offer the potential for significant cost savings in acquiring new water supplies and improving the reliability and quality of supplies. For some small water systems, regional approaches to water supply may be the only economically viable approach to conversion from groundwater to surface water. Connecting a number of independent systems can take many forms. It can include the development of regional water supply facilities, the physical consolidation or interconnection of two or more existing water systems or the management of two or more independent systems by a single entity. Some local water providers and customers may object to loss of direct local control over the system, or they may feel that cost sharing formulas are unfair. For such reasons, each proposal for a regional system must be considered on a case-by-case basis.

8.14.12 Recommendation: Texas Commission on Environmental Quality Regulations

The TCEQ minimum requirement of 0.6 gallons per minute per connection for public drinking water systems is a significant issue for many water providers in the North East Texas Region. Currently, this requirement is not directly reflected in TWDB rules relating to regional water planning. Many providers indicate that this requirement exceeds the real needs of water users and would require major additions to supplies, storage, and delivery capacities. In areas of marginal groundwater quantity, numerous wells may be required. Well spacing of approximately one half mile between wells means new well fields would occupy extensive geographic areas. In order to protect the investment in a new field from the effects of the rule of capture, providers must also purchase enough land to provide a buffer around the targeted

supply. These new well fields might have to be located at remote sites, possibly triggering complaints, common in other parts of the state, of one population mining groundwater at the expense of the exporting area. Costs of new pipeline construction are also a major concern.

Methyl Tertiary Butyl Ether (MTBE) and other contaminants pose a significant threat to water supply sources in the North East Texas Region, as has happened in the past at Lake Tawakoni. There are two dimensions to this issue. On the one hand, the NETRWPG has urged TCEQ to phase out the use of MTBE specifically, and both the state and federal regulators across the country are looking for substitute components for reformulated gasoline. Aside from the regulatory imposition of the use of MTBE (and this is only one of many potential contaminants that can find their way into drinking water sources), there is the additional lesson from the Tawakoni experience that those providers with more than one water source were best able to deal with that crisis. It is desirable for water user groups with vulnerable sources to plan on emergency access to backup supplies.

TCEQ regularly updates its list of streams, lakes and other water bodies that fail to meet the water quality standards established for specific water uses. Many of these water bodies are drinking water sources. This issue differs from the MTBE contamination episode at Lake Tawakoni, which was an accidental spill that was removed from the system in a matter of weeks. That temporary circumstance did not have a long term effect on overall water quality of the lake. The planning process needs to take account, however, of continuing problems in drinking water sources that may lead to placement on the state list such as: low dissolved oxygen levels, excessive waste loads, mercury and other contaminants, etc.

The NETRWPG has adopted the following recommendations with regard to TCEQ regulatory policies:

- There should be consistency between TWDB rules for regional water supply planning and TCEQ rules for drinking water systems with regard to minimum requirements for water supply.
- TCEQ should expedite the effort to replace MTBE in reformulated gasoline with additives that do not pose a risk to drinking water supplies.

8.14.13 Recommendation: Improvements to the Regional Water Planning Process

1. The NETRWPG believes that the regional water planning process should provide greater flexibility in development of water demand projections. TWDB rules and guidelines regarding population and water demand projections tend to confine rural and smaller urban areas to past rates of growth without allowing for consideration of alternative scenarios for future growth and economic development initiatives. Because the region has a relatively small population and water demands, the impact of a major new water user, such as a paper mill or a power plant, could dramatically alter the water supply and demand equation at a county or even basin level. There is no mechanism in the current process to provide for these potential increases, until the five year review period.

   TWDB rules also build into municipal water demand projections conservation assumptions which may be unrealistic. In rural areas that already have low rates of per capita use, there often is an increase in per capita use as development occurs in the area. Assumptions about conservation in these areas that already use far less on a per capita basis than the very large and rapidly growing urban areas could have the effect of limiting future development. There are more than 40 water user groups in the North East Texas Region with per capita usage levels well below the 115 gallons per capita per day (gpcd) level set as the "floor" by the NETRWPG. Some usage rates are

in the 70-80 gpcd range, a sharp contrast with large urban areas where 200 gpcd or more is not uncommon. Landscape watering, a prime target for urban water conservation programs, is much less prevalent in rural areas. Further, the housing stock is not undergoing rapid growth or replacement, thus reducing the potential impact of plumbing fixture efficiency standards.

The NETRWPG recommends that the TWDB should revise procedures for calculating water demand reduction projections contained in its conservation scenarios by recognizing a floor for the application of demand reduction for rural and small city areas where the per capita water consumption levels are already very low.

2. Further, for the present round of planning, the TWDB established a floor for water demand at 60 gpcd. In previous rounds, the RWPGs were allowed the capability to establish individual floors, whereby Region D used an amount of 115 gpcd. It appears inappropriate to assume that usage less than 115 gpcd can be sustained over the long-term planning horizon. For those communities using in excess of 250 gallons per day, it should be noted that TWDB planning rules for this current round of planning are enabling 50 year forecasts for systems using 4 times or more than another community. This rule, as applied, is inherently unfair, and eliminates small per capita usage systems from ever having a normal usage, as it basically confines that system to always serving an area that is constraining growth. The growth cannot be higher usage (water usage generally increases as disposable income per household increases) with the TWDB methodology as presently applied, which appears to contradict the inherent conservatism generally embedded within the State water planning process.

   The NETRWPG recommends that the TWDB allow the RWPGs to establish individual regional thresholds of gpcd for a given region, as this provides a more equitable solution for the establishment of future demands in the region.

3. The NETRWPG recommends additional funding is made available to allow for greater scrutiny of rural water supply entities at the Sub-Water User Group (Sub-WUG) level. As in the previous round of regional water planning, such entities are aggregated and represented within the Plan as a "County-Other" WUG. Where necessary, extra effort has been given to identify and evaluate the needs for entities within this "County-Other" category, but with limited funding in the present round as compared to previous rounds the level of overall effort to distinguish these entities has been necessarily diminished. Additional funding affords the capability to more rigorously evaluate these smaller, rural entities, which comprise a significant portion of the Region D population, as was done in previous rounds of regional planning.

4. ~~Analyses in the Sulphur River Basin (SRBA Watershed Study, 2014) suggest that although the historic Drought of Record for the basin is 1951 to 1956, a more significant drought occurs between 2002 and 2006. As a result, the SRBA study suggests the official TCEQ "Sulphur WAM misses the critical drought" that forms the basis for calculations of firm supply, since the official TCEQ WAM for the Sulphur River Basin is based upon historic data from 1940 to 1996. Indeed, an effort is already underway to update the hydrology for Sulphur River Basin WAM that is being funded by the Riverbend Water Resources District. While this effort has not produced a model in time for the purposes of the 2021 Region D Plan, it is likely that the result of this effort will be considered in the next round of water planning for Region D. Further, during the most recent legislative session~~The passage of HB 723 ~~was passed requiring~~ requires the TCEQ to obtain or develop updated water availability models for the Red River Basin and Neches River Basins, within Region D, as well as the Brazos and Rio Grande River Basins.

Given the proximity of these river basins to the remaining river basins within the North East Texas Region, it is not unreasonable to consider similar hydroclimatologies existing in the remaining basins. If a worse drought exists than the current Drought of Record utilized in the official TCEQ WAMs, this poses additional uncertainty with regard to the modeled firm yields and reliabilities upon which water supplies in the North East Texas Region are based. More recently, an updated model has been officially adopted for the Sulphur River Basin, and a similarly updated model is in the process of development for the Cypress Basin.

Thus, the NETRWPG recommends that the legislature initiate a process through TCEQ to appropriately update the Sabine~~, and Cypress~~ Water Availability Model~~s~~ (WAM~~s~~) in a manner consistent with these WAMs' original development, to reflect more recent information on the hydroclimatology of the river basins in the North East Texas Region, and provide additional certainty to resultant calculations of firm supplies in the Region.

5. It is recommended that the groundwater availability determination of the NETRWPG for the purposes of the 2026~~1~~ Region D Water Plan be incorporated into the determination of Desired Future Conditions (DFCs) for GMA 8 and GMA 11. Model results developed by the TWDB as well as the local hydrogeological assessment performed by the NETRWPG contains relevant information of potential utility to the ongoing DFC process. Consideration of this information could improve and enhance the efficacy of the regional planning process.

6. It is recommended that the Joint Planning Process representing the coordination between GMAs 8 and 11 and the NETRWPG incorporate the information regarding groundwater availabilities (as well as amounts identified by the NETRWPG) as appropriate to make adjustments to better address the identified limitations in the MAG amounts relating to actual and planned legal pumping activities. Such coordination could further consider the protection of springs and groundwater surface water interaction.

7. It is recommended that the TWDB consider revising its analytic approach to identifying allowable groundwater availabilities to more adequately address the legal capabilities of WUGs currently using or planning to use groundwater as a WMS within Region D, to better align with the intent of the aforementioned SB 1101.

8.14.14 Recommendation: Wright Patman Lake/Reservoir

The NETRWPG recommends that before any new reservoirs are planned in the North East Texas Water Planning Area, the alternative of raising the level of the Wright Patman Lake /Reservoir be considered.

8.14.15 Recommendation: Standardize Statistics Used For Conservation Assessments

The NETRWPG recommends that the Texas Legislature standardize the method used to derive the statistic known as "gpcd" (gallons per capita per day) and also known as "municipal per capita usage". Recently, the TWDB funded the Statewide Water Conservation Quantification Project (Averitt & Associates, 2017). This research project observed the difficulty for utilities to identify the gpcd used for regional planning purposes, which is defined as the annual volume of water pumped, diverted, or purchased minus the volume exported (sold) to other water systems or large industrial facilities divided by the permanent resident population of the municipal water user group in the regional water planning process divided by 365. However, utilities are noted to use a different formula for deriving gpcd, as defined in the TWDB

water conservation plan annual report as the Total Gallons in System divided by the Permanent Population divided by 365.

While the move to utility-based planning for the ~~present~~ previous round of regional water planning ~~has~~ was~~been~~ a positive move towards more consistency, the uncertainties regarding the methods used to define gpcd remain. The justification for this recommendation is demonstrated by the need to have a successful conservation program in areas that are projected to need water management strategies. The NETRWPG supports conservation as a water management strategy for any entity that has a gpcd ratio greater than the goal of 140 gpcd. Assessing the progress of communities engaged in conservation will be more reliable with a standardized method for comparison.

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