



Innovative approaches
Practical results
Outstanding service

Analysis and Quantification of the Impacts of the Marvin Nichols Reservoir Water Management Strategy on the Agricultural and Natural Resources of Region D and the State

Prepared for:

Region C Water Planning Group

For Submittal to:

Texas Water Development Board

Prepared by:

Freese and Nichols, Inc.

4055 International Plaza, Suite 200

Fort Worth, Texas 76109

817-735-7300

NTD11336

Table of Contents

1. Introduction.....	1
2. Analysis and Quantification of the Impacts on Natural Resources.....	7
2.1 Requirements of Texas Water Code and Texas Water Development Board Rules.....	7
2.2 Available Data for Impacts on Natural Resources	7
2.3 Impacts on Environmental Water Needs.....	8
2.4 Impacts on Wildlife Habitat.....	10
2.5 Impacts on Cultural Resources.....	12
2.6 Impacts on Bays, Estuaries and Arms of the Gulf of Mexico	14
2.7 Impacts on Threatened and Endangered Species.....	14
3. Analysis and Quantification of the Impacts on Agricultural Resources	17
3.1 Requirements of Texas Water Code and Texas Water Development Board Rules.....	17
3.2 Available Data for Impacts on Agricultural Resources.....	17
3.3 Impacts Due to Inundation of Land Potentially Useful as Agricultural Resources	18
3.3 Impacts Due to Inundation of Prime Farmland.....	19
3.4 Impacts on Timberland	19
4. Mitigation and the Effect of Mitigation on Impacts to Natural and Agricultural Resources	24
5. Additional Information	26

List of Appendices

Appendix A	List of References
Appendix B	Texas Water Development Board Interim Order of August 8, 2014
Appendix C	Texas Water Code Section 16.051
Appendix D	Texas Water Code Section 16.053
Appendix E	Texas Administrative Code Title 31 Part 10 Chapter 357
Appendix F	Texas Administrative Code Title 31 Part 10 Chapter 358
Appendix G	Background and Methodology for Land Resource/Cover Type Assessment – Excerpt from Section 2 of the Environmental Evaluation Interim Report – Sulphur River Basin Comparative Assessment
Appendix H	Land Cover Type Figure 4 from the Environmental Evaluation Interim Report – Sulphur River Basin Comparative Assessment

Appendix I Background and Methodology for Threatened and Endangered Species
Assessment from Section of the Environmental Evaluation Interim Report –
Sulphur River Basin Comparative Assessment

List of Figures

Figure 1	Regional Water Planning Areas Established by Texas Water Development Board. ...	1
Figure 2	Location Map for Region C, Region D, and the Proposed Marvin Nichols Reservoir..	3
Figure 3	Flow-Frequency Relationship of Sulphur River at Marvin Nichols Dam Site with and without the Reservoir	9
Figure 4	Region D and Area Covered by Harvest Trends Report.....	21

List of Tables

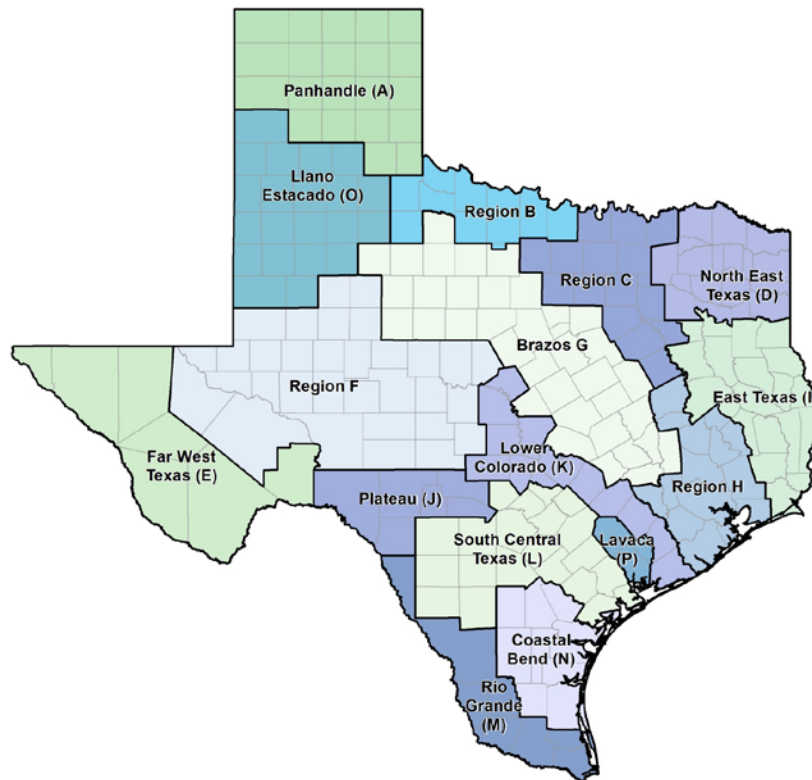
Table 1	Monthly Flow Frequency Relationship with and without Marvin Nichols Reservoir	9
Table 2	Quantitative Reporting on Impacts on Wildlife Habitat	11
Table 3	Quantitative Reporting of Impacts on Cultural Resources – Known Cultural Resources 13	
Table 4	Quantitative Reporting of Impacts on Cultural Resources – Other Factors	13
Table 5	Quantitative Reporting of Potential Impacts on Endangered and Threatened Species	15
Table 6	Quantitative Reporting on Impacts on Agricultural Resources Land Potentially Useful for Agriculture	18
Table 7	Quantitative Reporting on Impacts on Agricultural Resources – Prime Farmland.....	19
Table 8	Potential Timberland in Marvin Nichols Reservoir	22
Table 9	Estimated Impact of Marvin Nichols Reservoir on Timber Harvest Values	22
Table 10	Mitigation Requirements for Texas Reservoirs	25
Table 11	Needs for Additional Water Supply in the Trinity and Sulphur Basins.....	26

Analysis and Quantification of the Impacts of the Marvin Nichols Reservoir Water Management Strategy on the Agricultural and Natural Resources of Region D and the State

1. Introduction

In 1997, the Texas Legislature passed Senate Bill One, which initiated a regional water planning process for Texas. The planning process was implemented by the Texas Water Development Board (TWDB), which set up rules governing planning and established 16 water planning regions across the state. (See Figure 1.) Planning in each region is overseen by a regional water planning group, which develops a water supply plan addressing the future water needs of the region. The 16 regional plans are reviewed and approved by the Texas Water Development Board and assembled into a state water plan.

Figure 1
Regional Water Planning Areas Established by Texas Water Development Board.



The water planning process is conducted on a five-year cycle. Regional water plans were approved in 2001, 2006, and 2011, and the fourth round of planning is currently underway. State water plans based on the regional plans were developed in 2002, 2007, and 2012.

The Region C Regional Water Planning Area includes all or part of 16 counties and includes the Dallas-Fort Worth Metropolitan area. Region C has over 1/4 of the state's population and is the most populous of the 16 planning regions. The population of Region C is increasing rapidly, and the *2011 Region C Water Plan*¹ included a number of water management strategies to supply additional water to meet growing needs. Figure 2 shows the location of Region C, the North East Texas Regional Water Planning Group (Region D), and the proposed Marvin Nichols Reservoir. One of the water management strategies included in the *2011 Region C Water Plan* is the proposed Marvin Nichols Reservoir, which would be located in Red River, Titus, and Franklin Counties in the Sulphur River Basin. The proposed reservoir would be developed to meet needs in Region C, but it is located in The North East Texas Regional Water Planning Area (also known as Region D). Marvin Nichols Reservoir would have a firm yield of 612,300 acre-feet per year, of which 489,840 acre-feet per year would be used to meet needs in Region C and the rest left for local use. The remainder of this report includes additional information on the proposed Marvin Nichols Reservoir.

The *Regional Water Plan* for the North East Texas Regional Water Planning Group² “expressed the opinion that including the Marvin Nichols Reservoir in the Region C Regional Water Plan constituted an interregional conflict”³ [between the Region C and Region D plans]. The TWDB initially approved the 2011 Region C and Region D plans, indicating that the inclusion of Marvin Nichols Reservoir in the 2011 Region C plan and the opposition to the reservoir expressed in the 2011 Region D plan did not constitute an interregional conflict under TWDB rules. (The rules define an interregional conflict as the overall allocation of water from a particular source of supply.³)

¹ Superscripted numbers refer to the list of references in Appendix A.

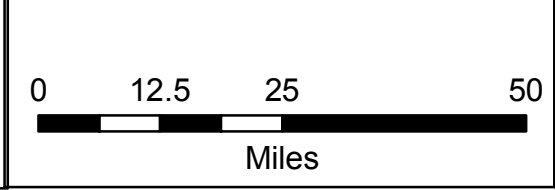
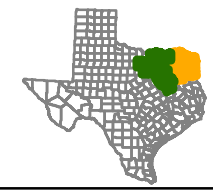
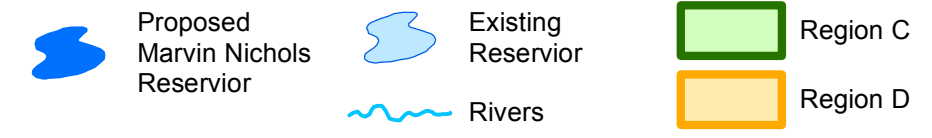
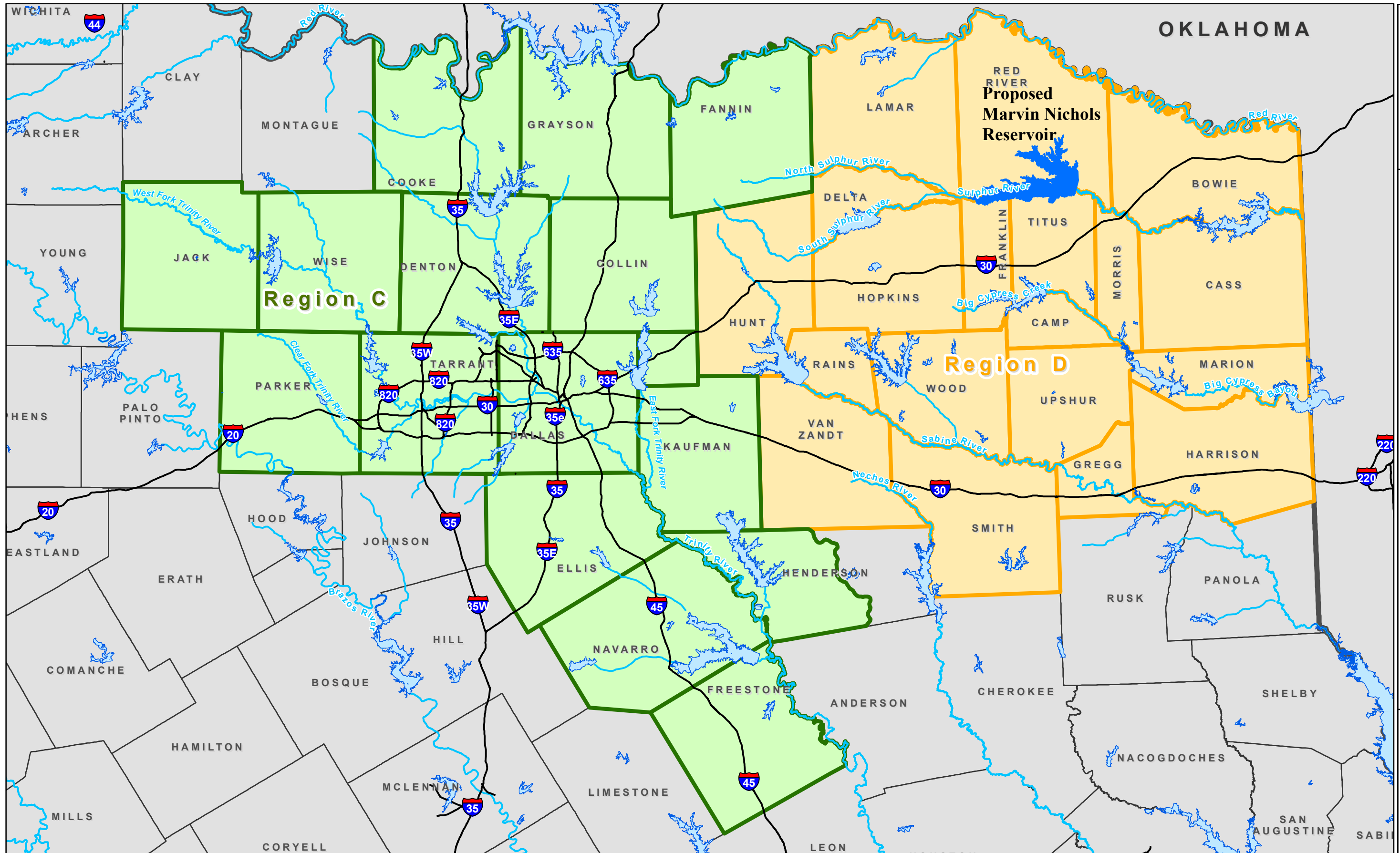


FIGURE NO. NTD11336
 DATE CREATED 10/10/2014
 DATUM & COORDINATE SYSTEM NAD83 State Plane (feet) Texas North Central
 FILE NAME Figure2
 PREPARED BY JLA

REGION C WATER PLANNING GROUP
 MARVIN NICHOLS QUANTITATIVE ANALYSIS REPORT
 LOCATION MAP FOR REGION C, REGION D, AND THE PROPOSED MARVIN NICHOLS RESERVIOR

FRESE
OF
NICHOLS
 4500 International Plaza Suite 200
 Fort Worth, Texas 76109-4895
 (817) 735-7300

Figure 2

If there is a conflict between regional water plans, TWDB is required to initiate mediation to resolve the issue. If the mediation fails, TWDB is required to take action to resolve the interregional conflict. After the Region C and Region D 2011 regional water plans were approved, private parties in Region D filed suit seeking judicial review of TWDB's decision to approve the 2011 Region C plan. In December 2011, "the District Court declared that an interregional conflict existed, reversed the TWDB's decision approving the two regional plans, and remanded the case to the TWDB for resolution."³ The District Court's decision was upheld on appeal by the 11th Court of Appeals in May 2013.³

Following these court decisions, the TWDB provided a mediator and arranged for mediation between representatives of the Region C and Region D regional water planning groups in an effort to resolve the conflict, but the two sides did not reach agreement. Therefore, the TWDB is required to resolve the conflict.

On August 7, 2014, the TWDB Board met to consider the interregional conflict and requested additional information from Region C. The Board action is reflected in the Interim Order of August 8, 2014, which included the following language:

"Region C is directed to conduct an analysis and quantification of the impacts of the Marvin Nichols Reservoir Water Management Strategy on the agricultural and natural resources of Region D and the State, pursuant to Sections 16.051 and 16.053 of the Texas Water Code and Chapters 357 and 358 of Board rules. Region C should submit this analysis and quantification to the Board by November 3, 2014. Upon receipt of the analysis and quantification, the Executive Administrator and Region D will be given the opportunity to submit a written response to the submission, and the matter will be scheduled for Board consideration. If no submittal is received by the Board on or before November 3, 2014, this matter will set for a Board Meeting to direct the Regions to revise their regional water plans reflecting the removal of the Marvin Nichols Reservoir Water Management Strategy from the 2011 Region C Plan, without prejudice."

The full Interim Order of August 8, 2014, is included as Appendix B to this report. The sections of the Texas Water Code and chapters of Board rules mentioned in the order are also included as appendices:

- Section 16.051 of the Texas Water Code is Appendix C.
- Section 16.053 of the Texas Water Code is Appendix D.
- Chapter 357 of TWDB rules (Texas Administrative Code §357) is Appendix E.
- Chapter 358 of TWDB rules (Texas Administrative Code §358) is Appendix F.

This report provides the information requested by the TWDB Board in the Interim Order of August 8, 2014. Reviewing the sections of the Texas Water Code and the chapters of TWDB rules listed above, the requirement for quantification of impacts on agricultural and natural resources is in Board rules, reflected in Texas Administrative Code §§357.34(d)(3)(B) and 357.34(d)(3)(C):

“357.34(d) Evaluations of potentially feasible water management strategies shall include the following analyses:... (3) A quantitative reporting of:

...

(B) 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.

(C) Impacts to agricultural resources.”

The information in this report is intended to supplement the *2011 Region C Water Plan*, with emphasis on the quantification and analysis of the impact of Marvin Nichols Reservoir on agricultural and natural resources requested in the Board’s Interim Order of August 8, 2014.

Section 2 of this report provides the analysis and quantification of the impacts of Marvin Nichols Reservoir on natural resources. Section 3 provides the analysis and quantification of

the impacts of the project on agricultural resources. Section 4 discusses potential mitigation requirements for the project and how they might affect impacts on natural and agricultural resources. Section 5 provides additional information, and the Appendices include supporting material.

2. Analysis and Quantification of the Impacts on Natural Resources

2.1 Requirements of Texas Water Code and Texas Water Development Board Rules

The requirements for quantitative reporting on the impacts of water management strategies on natural resources are included in the Board rules in Texas Administrative Code §357, included in Appendix E. Specifically §357.34(d)(3)(B), requires that the quantitative reporting address impacts on certain specific aspects of natural resources:

- Environmental water needs
- Wildlife habitat
- Cultural resources
- Effect on bays, estuaries, and arms of the Gulf of Mexico

A quantitative reporting of impacts on each of these areas is provided below, as is additional information on impacts on threatened and endangered species.

2.2 Available Data for Impacts on Natural Resources

Data on impacts of the proposed Marvin Nichols Reservoir on environmental flow needs is taken from the hydrologic analyses of the reservoir conducted for the *2011 Region C Water Plan*.¹ Data on impacts on other natural resources is taken from the *Environmental Evaluation Interim Report – Sulphur River Basin – Comparative Assessment*.⁴ The environmental evaluation is a recent report developed for the U.S. Army Corps of Engineers as part of an on-going basin-wide assessment of the Sulphur River Basin. It was completed in June 2013 and was not available when the *2011 Region C Water Plan* was developed. The report includes environmental analyses of Marvin Nichols Reservoir and other potential water supply projects in the Sulphur Basin.

2.3 Impacts on Environmental Water Needs

Texas Administrative Code §357.34(d)(3)(B) includes specific requirements for the evaluation of environmental water needs:

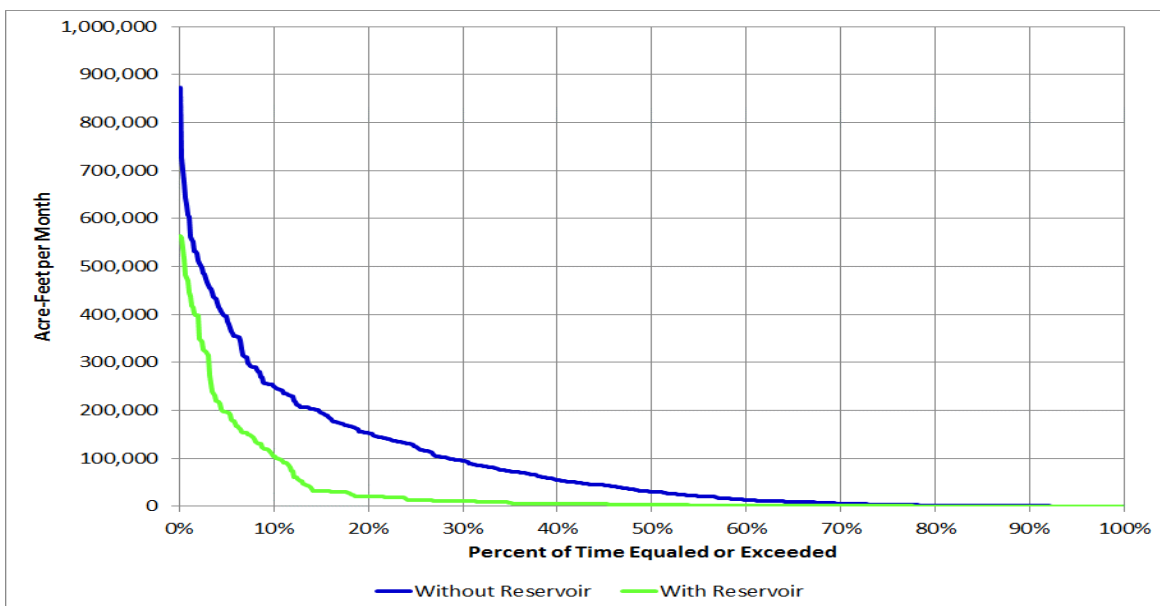
“Evaluations of effects on environmental flows will include consideration of the Commission's adopted environmental flow standards under 30 TAC Chapter 298 (relating to Environmental Flow Standards for Surface Water). If environmental flow standards have not been established, then environmental information 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.”

The Texas Commission on Environmental Quality (TCEQ) has not yet adopted environmental flow standards under 30 TAC Chapter 298 for the Sulphur Basin, and environmental instream flow information from existing site-specific studies is not available for the proposed Marvin Nichols Reservoir. As required by TWDB rules, the operation of the proposed reservoir was evaluated using state environmental planning criteria adopted by the Board for inclusion in the state water plan. Table 1 and Figure 3 summarize the flow-frequency relationship for the Sulphur River immediately below the proposed Marvin Nichols Reservoir with and without the reservoir. It is likely that the detailed studies required for reservoir permitting will result in different streamflow bypass requirements and different impacts on downstream flows. The results in Table 1 and Figure 3 reflect current TWDB requirements.

Table 1
Monthly Flow Frequency Relationship with and without Marvin Nichols Reservoir

% of Months Flow is Exceeded	Flow in CFS	
	Without Marvin Nichols	With Marvin Nichols
5%	393,333	195,908
10%	249,393	104,035
20%	153,060	20,928
30%	95,124	11,488
40%	54,579	5,712
50%	30,492	2,748
60%	12,993	1,550
70%	6,057	943
80%	2,135	486
90%	615	104
95%	425	79

Figure 3
Flow-Frequency Relationship of Sulphur River at Marvin Nichols Dam Site with and without the Reservoir



2.4 Impacts on Wildlife Habitat

The primary impact of the proposed Marvin Nichols Reservoir on wildlife habitat would be the inundation of habitat by the reservoir. This impact was evaluated as part of the *Environmental Evaluation Interim Report – Sulphur River Basin – Comparative Assessment*,⁴ prepared for the U.S. Army Corps of Engineers as part of an on-going basin-wide assessment of the Sulphur River Basin. The *Environmental Evaluation Interim Report* used the existing Texas Parks and Wildlife Ecological Systems Classification data set, which was developed by analysis of color infra-red and multi-spectral satellite imagery. The data set was considered to be the most recent, readily available data on land cover types in the Sulphur River Basin. The cover types determined from the Ecological Systems Data set were grouped into larger categories based on EPA’s Level One National Land Cover Data classifications. U.S. Fish and Wildlife Service National Wetlands Inventory data were used to further refine the classifications. The approach used in the *Environmental Evaluation Interim Report – Sulphur River Basin – Comparative Assessment*⁴ is described in greater detail in Appendix G, which reproduces Sections 2.1 and 2.2 of that report.

Table 2 shows the acreage of each cover type within the footprint of the proposed Marvin Nichols Reservoir. For comparison, the area of each cover type in all of Region D is also included. (Cover areas in Region D were developed for this study using the database developed in the *Environmental Evaluation Interim Report – Sulphur River Basin – Comparative Assessment*.⁴) Appendix H is a map of the cover types in the Marvin Nichols Reservoir site, taken from *Environmental Evaluation Interim Report – Sulphur River Basin – Comparative Assessment*.⁴

Table 2
Quantitative Reporting on Impacts on Wildlife Habitat

Cover Type	Area (Acres)		Marvin Nichols Reservoir Area as a Percent of Region D
	Marvin Nichols Reservoir	Region D	
Barren	<1	8,437	0.0%
Bottomland Hardwood Forest	10,156	417,265	2.4%
Forested Wetland	21,444	414,573	5.2%
Grassland/Old Field	18,241	2,843,656	0.6%
Herbaceous Wetland	1,244	32,011	3.9%
Open Water	1,162	211,761	0.5%
Row Crops	706	314,184	0.2%
Shrub Wetland	1,405	16,445	8.5%
Shrubland	444	47,485	0.9%
Upland Forest	11,223	2,869,079	0.4%
Urban	78	158,878	0.0%
Total	66,103	7,333,774	0.9%

The area for Marvin Nichols Reservoir in Table 2 differs from the area in the *2011 Region C Water Plan*¹ (68,854 acres) for two reasons:

- The area in the Region C plan includes ancillary facilities, whereas the data in Table 2 are for the land inundated by the reservoir only.
- The area inundated by the reservoir is slightly different in *Environmental Evaluation Interim Report – Sulphur River Basin – Comparative Assessment*⁴ due to the use of different elevation databases.

Table 2 presents the impact of the proposed Marvin Nichols Reservoir on wildlife habitat in terms of the acreage of different types of habitat inundated by the reservoir. The reservoir will affect 5.2 percent of the forested wetlands, 2.4 percent of the bottomland hardwood forests, and 0.4 percent of the upland forests in Region D. Bottomland hardwoods and forested

wetlands are often lumped together as bottomland hardwoods, and they are considered to be particularly important as wildlife habitat. The total of these two types in the proposed Marvin Nichols Reservoir represents 3.8 percent of the area in Region D. The 31,600 acres that would be inundated by the proposed reservoir represents about 0.5 percent of the estimated 5,973,000 acres⁵ of bottomland hardwoods in Texas. As a part of permitting for the project, there will be more detailed assessments of the quality of the wildlife habitat that would be affected by the project, which will aid in the development of mitigation plans.

2.5 Impacts on Cultural Resources

The impacts of Marvin Nichols Reservoir on cultural resources would result from the inundation of cultural resource sites. The *Environmental Evaluation Interim Report – Sulphur River Basin – Comparative Assessment*⁴ collected the following data on potential cultural resource impacts from Marvin Nichols Reservoir site and other proposed reservoir sites in the Sulphur River Basin:

- Number of known cultural resources
- Presence of known human remains/burials
- Acres of zones of archaeological potential
- Percentage of reservoir footprint with previous cultural resource surveys
- Surveyed site density

Table 3 is a quantitative reporting of known cultural resources in the Marvin Nichols Reservoir footprint. Table 4 is a quantitative reporting of other measures of potential impacts on cultural resources. The data in both tables is taken from *Environmental Evaluation Interim Report – Sulphur River Basin – Comparative Assessment*⁴.

Table 3
Quantitative Reporting of Impacts on Cultural Resources – Known Cultural Resources

Likely Eligibility of Sites for the National Register of Historic Properties (NHRP)	Historic	Pre-historic	Caddo	Multi-Component	Prehisoric Multi-Component	Total*
Likely NRHP Eligible	0	20	9	2	3	34
Possibly NRHP Eligible - Fair Chance	0	4	2	0	0	6
Possibly NRHP Eligible - Poor Chance	0	4	1	0	0	5
Not Likely NRHP Eligible	0	15	1	2	0	18

* Total for likely NRHP eligible is corrected from 31 in *Environmental Evaluation Interim Report – Sulphur River Basin – Comparative Assessment*⁴.

Table 4
Quantitative Reporting of Impacts on Cultural Resources – Other Factors

Measurement of Impact on Cultural Resources	Value for Measurement
Ratio of High Value Sites to Low Value Sites	1.7*
Number of Known Cemeteries	1 (57 graves)
Acres with High Potential for Archaeological Sites	51,654
Percentage of Project Area Previously Surveyed for Cultural Resources	1.3%
Number of Acres Surveyed per Site Found in Survey	90.1

* Ratio of high value sites to low value sites is corrected from 1.6 in *Environmental Evaluation Interim Report – Sulphur River Basin – Comparative Assessment*⁴.

In general, impacts on cultural resources are mitigated through coordination with the Corps of Engineers and the Texas State Historical Commission during permitting. Coordination with Indian tribes on archeological issues would also be a part of the permitting process. Mitigation is accomplished by investigating and recording archaeological sites and proper relocation of cemeteries. This process of archaeological mitigation adds to project costs, and it has been considered in costs developed for the proposed Marvin Nichols Reservoir.

2.6 Impacts on Bays, Estuaries and Arms of the Gulf of Mexico

The proposed Marvin Nichols Reservoir would generally reduce flows discharging to bays, estuaries and arms of the Gulf of Mexico. The Sulphur River, on which the Marvin Nichols Reservoir would be located, is a tributary of the Red River, which does not flow to any bay, estuary or arm of the Gulf of Mexico in Texas. According to the U.S. Geological Survey, the Red River discharges to the Atchafalaya River, which flows to the Gulf of Mexico in Louisiana^{6,7}. Natural discharges from the Atchafalaya to the Gulf of Mexico average 58,000 cubic feet per second, or 42 million acre-feet per year^{6,7}. In addition, human diversions of flood flows from the Mississippi River to the Atchafalaya River add about 167,000 cfs, or 121 million acre-feet per year, to the discharge of the Atchafalaya^{6,7}, making a total discharge of 163 million acre-feet per year.

Assuming full use of Marvin Nichols Reservoir and no return flows, the project would reduce flows by about 670,000 acre-feet per year. This would reduce the discharge from the Atchafalaya River to the Gulf of Mexico in Louisiana by about 0.4%. It should be noted that reducing the discharge from the Atchafalaya is moving toward natural conditions, offsetting a very small part of the flows added to the Atchafalaya by human diversion from the Mississippi River. The impact of Marvin Nichols Reservoir on bays, estuaries and arms of the Gulf of Mexico would be negligible.

2.7 Impacts on Threatened and Endangered Species

The Texas Water Development Board rules do not require reporting on potential impacts to threatened and endangered species. However, data on potential impacts to endangered and threatened species are available in the *Environmental Evaluation Interim Report – Sulphur River Basin – Comparative Assessment*⁴ and are presented here. The U.S. Fish and Wildlife Service maintains lists of federally endangered and threatened species by county. The Texas Parks and Wildlife Department maintains a separate Texas, or State, list of endangered and

threatened species by county. Table 5 summarizes State and Federally listed threatened and endangered species in the counties in which Marvin Nichols Reservoir would be located. Appendix I is an excerpt from Chapter 3 of the *Environmental Evaluation Interim Report – Sulphur River Basin – Comparative Assessment*⁴ that presents additional information on the development of the data in Table 5.

Table 5
Quantitative Reporting of Potential Impacts on Endangered and Threatened Species

Classification of Endangered and Threatened Species	Potential for Impact Due to Marvin Nichols Reservoir	Number Present in Counties Where Marvin Nichols Reservoir Would be Located
Federal Endangered Species	No Potential to Low Potential	3
	Moderate Potential	0
	High Potential	0
Federal Threatened Species	No Potential to Low Potential	0
	Moderate Potential	0
	High Potential	0
Texas Endangered Species	No Potential to Low Potential	4
	Moderate Potential	0
	High Potential	0
Texas Threatened Species	No Potential to Low Potential	14
	Moderate Potential	3
	High Potential	0

Of the Federally listed species, there are three potential species that are listed in the counties where Marvin Nichols would be located, but none of these species are expected to be impacted by the reservoir. There are a total of 21 threatened or endangered State-listed species within these counties, but only three threatened species have moderate potential to be impacted by the reservoir, and none have high potential. Because there are three State-listed threatened species potentially present in the counties in which Marvin Nichols Reservoir would be located, additional studies may be required to assess the impact on these species, if any, as reservoir development continues. According to the *Environmental Evaluation Interim*

Report – Sulphur River Basin – Comparative Assessment, “The Texas Endangered Species Act does not protect wildlife species from indirect or incidental take (e.g., destruction of habitat, unfavorable management practices, etc.). The TPWD has a Memorandum of Understanding with every state agency to conduct a thorough environmental review of state initiated and funded projects, such as highways, reservoirs, land acquisition, and building construction, to determine their potential impact on state endangered or threatened species.”⁴

3. Analysis and Quantification of the Impacts on Agricultural Resources

3.1 Requirements of Texas Water Code and Texas Water Development Board Rules

The requirements for quantitative reporting on the impacts of water management strategies on agricultural resources are included in the Board rules in Texas Administrative Code §357, included in Appendix E. Specifically, §357.34(d)(3)(C) requires that the quantitative reporting address impacts on agricultural resources. The rules do not include any more detailed description of what quantitative reporting is required. To respond to this requirement, this report provides the following quantitative reporting on the impacts of the proposed Marvin Nichols Reservoir on agricultural resources:

- Inundation of land potentially useful as agricultural resources
- Loss of timber harvests
- Inundation of prime farmlands.

3.2 Available Data for Impacts on Agricultural Resources

Data on impacts to land cover types potentially useful as agricultural resources is based on a land classification developed for the *Environmental Evaluation Interim Report – Sulphur River Basin – Comparative Assessment*.⁴ The data available from that report has been adapted by a simplified re-classification that expands the geographic scope of the analysis for purposes of comparison within this study. Data on the loss of timber harvests is developed from data maintained by the Texas A&M Forestry Service. In the early 2000s, two analyses of the proposed Marvin Nichols reservoir’s impacts on timber resources were performed, which reached radically different conclusions^{8,9}. Both reports consider the impacts of a previous concept for the proposed Marvin Nichols Reservoir that differs in both size and location from the current concept for the reservoir and which is no longer being considered. Because these studies analyze a different project, they are not considered to be relevant for the current

analysis. Data on inundation of prime farmlands is developed from prime farmland data maintained by the U.S. Department of Agriculture Natural Resources Conservation Service.

3.3 Impacts Due to Inundation of Land Potentially Useful as Agricultural Resources

The development of land cover type information for the proposed Marvin Nichols Reservoir is discussed in Section 2.4 and Appendices G and H. Five of the land cover types present in the footprint of the reservoir are potentially useful as agricultural resources. Forested wetlands, bottomland hardwoods, and upland forests might be useful in the growth and harvesting of timber (silvicultural activities). Row crops represent current farming activities. Grassland/old field would potentially include land used for grazing of livestock, although it would also include grassland not currently used for agricultural purposes. Table 6 includes information on the area of these land cover types that would be inundated by the Marvin Nichols Reservoir. To allow consideration of the impacts to agricultural resources of Region D and Texas, the areas of these cover types for Region D are included in the table.

Table 6
Quantitative Reporting on Impacts on Agricultural Resources -
Land Potentially Useful for Agriculture

Cover Type	Area (Acres)		Marvin Nichols Reservoir Area as a Percent of Region D
	Marvin Nichols Reservoir	Region D	
Bottomland Hardwood Forest	10,156	417,265	2.4%
Forested Wetland	21,444	414,573	5.2%
Grassland/Old Field	18,241	2,872,649	0.6%
Row Crops	706	314,184	0.2%
Upland Forest	11,223	2,689,079	0.4%
Other Land Cover Types	4,333	626,024	0.7%
Total	66,103	7,333,774	0.9%

The most significant impacts to agricultural resources relative to the resources of Region D and of Texas are on resources that could potentially be useful to the silviculture industry. These impacts are discussed further (in terms of impacts on timberland and timber sales) in Section 3.4 below.

3.3 Impacts Due to Inundation of Prime Farmland

The U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) maintains data on prime farmland, which is defined as “land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is also available for these uses.¹⁰” Prime farmland is not necessarily currently in agricultural use, but it must be available for agricultural use. For example, prime farmland soils underlying an urban area would not be counted as prime farmland because they are not available for agricultural uses. Table 7 shows the acreage of prime farmland that would be inundated by the proposed Marvin Nichols Reservoir compared to prime farmland area in Region D and Texas. Marvin Nichols Reservoir would inundate 0.76 percent of the prime farmland in Region D and 0.04 percent of the prime farmland in Texas.

Table 7
Quantitative Reporting on Impacts on Agricultural Resources – Prime Farmland

Cover Type	Area (Acres)			Marvin Nichols Reservoir Area as a Percent of Area in:	
	Marvin Nichols Reservoir	Region D	Texas	Region D	Texas
Prime Farmland	14,893	1,949,929	35,087,200	0.76%	0.04%

3.4 Impacts on Timberland and Timber Harvests

Agricultural use of the land that would be inundated by the proposed Marvin Nichols Reservoir includes the production of timber. The Texas A&M Forest Service maintains data on

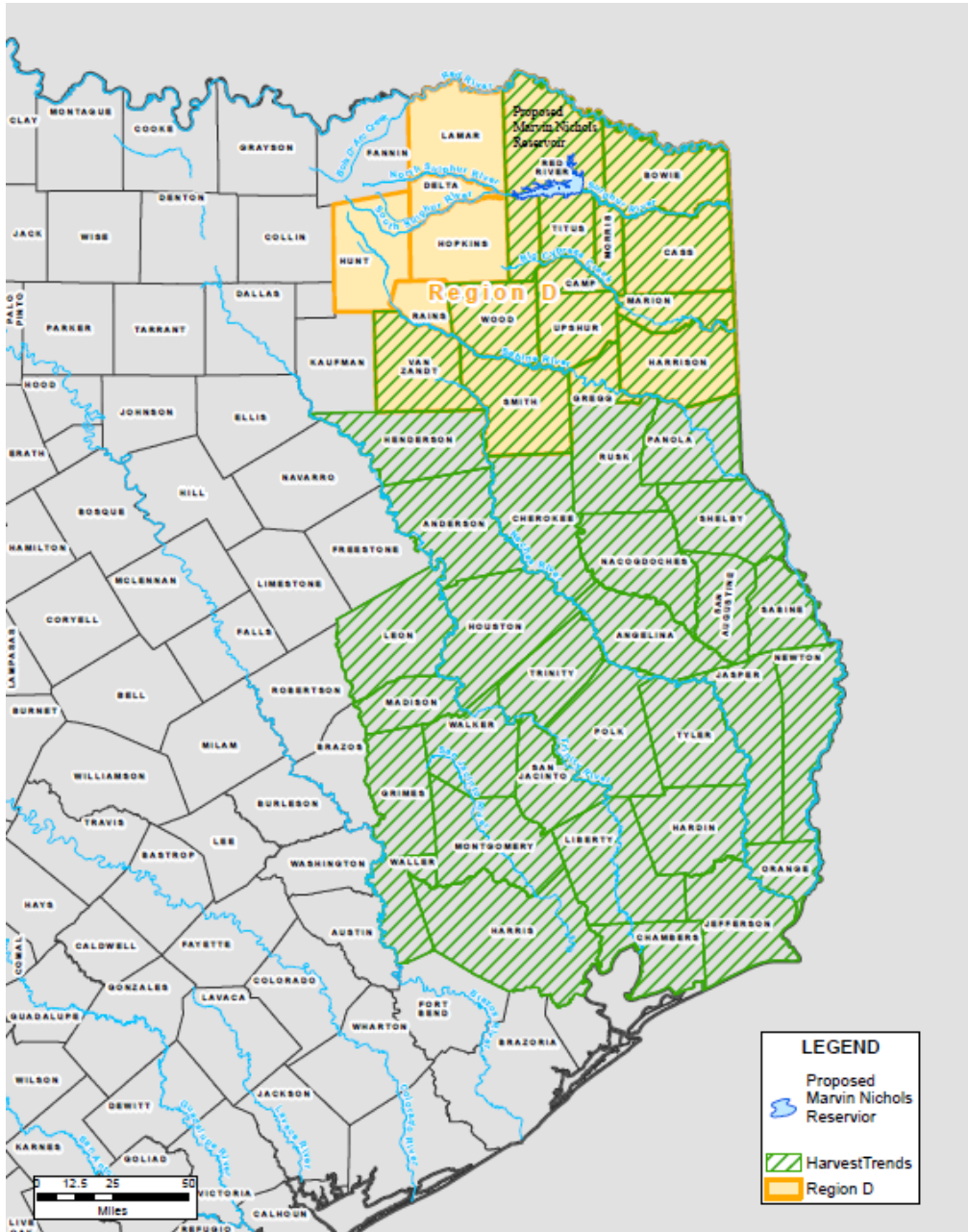
timberland, timber harvest, and the stumpage value of harvests by county. As part of this study, Freese and Nichols contacted the Texas A&M Forest Service to obtain information on the impact of the proposed Marvin Nichols Reservoir on timber resources. Unfortunately, the Texas A&M Forest Service database was not designed to provide information for relatively small areas like the proposed Marvin Nichols Reservoir. The Texas A&M Forest Service indicated that analysis of the data at the county level and above would be most meaningful.

The Texas A&M Forest Service produces annual reports of Harvest Trends for timber products in East Texas, which includes most of the timberland and timber production in Texas. Figure 4 shows the area covered by the Harvest Trends reports, as well as the location of the proposed Marvin Nichols Reservoir and the boundaries of Region D. Most of Region D (except for the western counties) is covered by the Harvest Trends Reports.

Although information on the inundation of timberland by the proposed reservoir cannot be gathered directly from data maintained by the Texas A&M Forest Service, it is possible to estimate the magnitude of impacts by looking at county data. Almost all of the footprint of the proposed Marvin Nichols Reservoir is located in Red River, Titus and Franklin Counties. (There are extremely small areas of the reservoir in Delta and Lamar Counties, but they are contained on the Sulphur River floodway channel and would not have forested land.) The total timberland in these three counties is 523,629 acres, and the total of the bottomland hardwood, forested wetland, and upland forest cover types is slightly more, at 531,200 acres. If we treat these three land cover types as a close approximation of timberland, the proposed Marvin Nichols Reservoir will inundate about 42,823 acres of timberland (Table 8), or about 8.2 percent of the 523,629 acres of timberland in Red River, Titus and Franklin Counties.

Table 8 provides data on potential timberland in Marvin Nichols Reservoir and timberland in Region D¹¹ and East Texas.¹² Note that the data for Region D and East Texas include only the area shown in Figure 4. The data for Region D and East Texas were obtained from the Texas Forest Service data set.^{11,12}

Figure 4
Region D and Area Covered by Harvest Trends Report



 4055 International Plaza, Suite 200 Fort Worth, Texas 76109-4895 817-735-7300		Region C Water Planning Group Marvin Nichols Quantitative Analysis Report		FN JOB NO: NTD11338 FILE: H:\MarvinNichols\Analysis Figure4.mxd	4 Figure
		Region D and Area Covered by Harvest Trends Report		DATE: October 9, 2014 SCALE: SHOWN DESIGNED: DRAFTED: JLA	

Table 8
Potential Timberland in Marvin Nichols Reservoir

	Area (Acres)	Fraction in Marvin Nichols
Potential Timberland in Marvin Nichols Reservoir		
Bottomland Hardwoods	10,156	N/A
Forested Wetlands	21,444	N/A
Upland Forest	11,223	N/A
Total Potential Timberland	42,823	N/A
Total Timberland in Region D	2,698,272	1.6%
Total Timberland in East Texas	11,906,539	0.4%

Table 9
Estimated Impact of Marvin Nichols Reservoir on Timber Harvest Values

County	Volume Harvested (Cubic Feet)			Stumpage Value of the Harvest
	Pine	Hardwood	Total	
Franklin	326,276	1,144,085	1,470,361	\$539
Red River	4,509,199	5,140,016	9,649,215	\$3,546
Titus	1,001,683	1,566,883	2,568,566	\$1,077
Total for Marvin Nichols Counties	5,837,158	7,850,984	13,688,142	\$5,162
Estimated Stumpage Value for Marvin Nichols (8.2% of Total for Counties)				\$423
Total for Region D (not including Hunt, Lamar, Delta, Hopkins and Rains Counties)	67,709,902	44,420,920	112,130,822	\$46,138
Total for East Texas (See Figure 3)	419,568,624	101,963,374	521,531,998	\$232,606

Table 9 is a summary of data on timber sales taken from the Texas A&M Forest Service report *Harvest Trends 2013*.¹³ These data are available only on a county-wide basis. Note that the potential timberland inundated by the proposed Marvin Nichols Reservoir is estimated to be 8.2 percent of the timberland in Red River, Titus and Franklin Counties. As a result, the timber harvest volume and stumpage value from the reservoir area is assumed to be about 8.2 percent of the total value for the three counties. (The stumpage value is the value of the timber harvested, not including the costs of processing and delivering the timber.) The estimated stumpage value of the timber harvests in the Marvin Nichols Reservoir pool is less than one percent of the total for Region D and less than 0.2 percent of the total for East Texas. (None of the 23 East Texas Counties with the highest timber harvest values (all over \$4,000,000) would be affected by Marvin Nichols Reservoir.)

4. Mitigation and the Effect of Mitigation on Impacts to Natural and Agricultural Resources

Developers of a new reservoir project are often required to provide mitigation for the impacts on natural resources in the form of land set aside, protected from development, and managed to enhance ecological value. Mitigation is generally only required for specific types of resources that would be impacted such as waters of the U.S. and the state, including wetlands. The developer of a project gets mitigation credit for improving the environmental functions of the land used for mitigation. The usual approach is to purchase degraded areas with limited environmental value and improve them through restoration, enhancement and careful management to achieve desired compensatory results at minimum cost.

Table 10 gives information on historical mitigation requirements for Texas reservoirs. Two additional reservoirs, Lower Bois d'Arc Creek Reservoir and Lake Ralph Hall, are currently in the permitting process, and mitigation requirements have not yet been finalized. Significant land has been acquired for mitigation for Lower Bois d'Arc Creek Reservoir, and the transaction was on a willing buyer-willing seller basis, with no condemnation of land.

Mitigation offsets the impacts of a project on natural resources by improving the ecological functions of other land. Mitigation would be expected to offset the impacts of the proposed Marvin Nichols Reservoir on natural resources. On the other hand, mitigation to protect natural resources may increase the impact on agricultural resources if the land acquired for mitigation is currently in agricultural use. (Because of the management of mitigation land to enhance ecological values, farming is unlikely to be allowed. Other agricultural uses, like timbering, would probably also be impossible or face significant controls and restrictions.)

Mitigation requirements for new reservoirs are generally determined during the permitting process, and the requirements for the proposed Marvin Nichols Reservoir are not yet known. Estimates of mitigation requirements have been developed as part of cost estimates for the project.¹⁴ The mitigation acreage required is estimated as twice the acreage of waters of the United States, other than non-stream open waters, that are impacted by the project. For the

proposed Marvin Nichols Reservoir, the acreage of potential waters of the U.S., other than non-stream open waters, was estimated to be 23,530 acres. The estimated mitigation requirement is twice that amount, or 47,060 acres. This is consistent with historical mitigation requirements for reservoirs in Texas. In the case of Marvin Nichols Reservoir, the land acquired for mitigation would probably include a large percentage of forested wetlands, which makes up most of the acreage of waters of the U.S. that would be affected by the reservoir. It should be emphasized that this is only an estimate. Actual mitigation requirements and location will be developed as permitting for the proposed reservoir proceeds. As discussed above, mitigation is intended to offset impacts on natural resources but may increase impacts to agricultural resources.

Table 10
Mitigation Requirements for Texas Reservoirs

Project	Date Impounded	Conservation Pool Area (Acres)	Required Mitigation Area (Acres)	Mitigation Ratio	Comments
Alan Henry	1993	2,884	3,000	1.04 to 1	Mitigation Downstream
Applewhite	Not completed (permitted in 1989)	2,500	2,500	1.0 to 1	Planned mitigation downstream
Chapman	1991	19,200	35,500	1.85 to 1	Mitigation next to reservoir and downstream
Gilmer	1997	1,010	1,557	1.54 to 1	
Joe Pool	1986	7,470	0	None	
Mitchell County	1993	1,463	0	None	
O.H. Ivie	1990	19,149	5,990	0.31 to 1	Mitigation next to reservoir
Palo Duro	1989	2,413	0	None	
Ray Roberts	1986	29,350	0	None	
Richland-Chambers	1987	44,752	13,700	0.31 to 1	Mitigation Downstream

5. Additional Information

Table 11 shows the needs for additional water supplies in the Trinity and Sulphur Basins, taken from the Texas Water Development Board database for the 2011 regional water plans¹⁵. The Texas Water Development Board defines needs as the difference between the supply currently available and the projected demands for a water user group. Table 11 shows the sum of net needs by river basin and planning group. For suppliers that have a surplus, needs are set at zero. As the table shows, there is need for considerable additional water supply in the Trinity Basin, particularly in Region C.

Table 11
Needs for Additional Water Supply in the Trinity and Sulphur Basins

Basin	Region	Sum of Supply Needs for All Suppliers (Acre-Feet)					
		2010	2020	2030	2040	2050	2060
Trinity Basin	B	282	307	322	324	295	296
	C	68,871	392,545	671,835	932,746	1,215,968	1,549,685
	D	0	0	21	32	59	126
	G	307	2,253	5,978	9,836	14,508	19,526
	H	32,364	39,404	45,526	51,129	57,515	64,565
	I	21	116	466	846	1,265	1,802
	Total		101,845	434,625	724,148	994,913	1,289,610
Sulphur Basin	C	3	260	462	608	793	1,055
	D	977	1,215	1,554	2,209	3,314	5,058
	Total	980	1,475	2,016	2,817	4,107	6,113

Appendix A

List of References

List of References

1. Freese and Nichols, Inc., Alan Plummer Associates, Inc., CP&Y, Inc., and Cooksey Communications, Inc. *2011 Region C Water Plan*. October 2010.
2. Bucher Willis & Ratliff Corporation, Hayter Engineering, Inc., Hayes Engineering Company, Bob Bowman Associates, and LBG Guyton Associates. *Regional Water Plan Prepared for the Region D - North East Texas Regional Water Planning Group*. September 1, 2010.
3. Patteson, Kevin. Memo on *Resolution of the Interregional Conflict between the 2011 Region C and the Region D Regional Water Plans*. Austin: Texas Water Development Board, 19 May 2014. PDF.
4. Freese and Nichols, Inc. *Environmental Evaluation Interim Report - Sulphur River Basin - Comparative Assessment*. 2013.
5. Texas Parks and Wildlife Department: *Texas Wetlands Conservation Plan*, Austin, 1997.
6. U.S. Geological Survey: Open-File Report 87-242, *Water Fact Sheet – Largest Rivers in the United States*, Washington D.C., May 1990.
7. U.S. Census Bureau: *Statistical Abstract of the United States: 2012*, Table 365, Washington, D.C.
8. Xu, Ph.d. Weihuan, and Publication 162. *The Economic Impact of the Proposed Marvin Nichols I Reservoir to the Northeast Texas Forest Industry* (n.d.): n. pag. Texas Forest Service, Aug. 2002. Web. 15 Oct. 2014.
9. Weinstein, Bernard L., Ph.D., and Terry L. Clower, Ph.D. *The Economic, Fiscal, and Developmental Impacts of the Proposed Marvin Nichols Reservoir Project* (n.d.): n. pag. The Sulphur River Basin Authority, Mar. 2003. Web. 15 Oct. 2014.
10. U.S. Department of Agriculture Natural Resources Conservation Service and Iowa State University Center for Survey Statistics and Methodology: Summary Report: 2010 National Resources Inventory, September 2013.
http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1167354.pdf
11. Miles, P.D. Monday September 29 10:25:58 MDT 2014. Forest Inventory EVALIDator web-application version 1.6.0.01. St. Paul, MN: U.S. Department of Agriculture, Forest Service, Northern Research Station. [Available only on internet: <http://apps.fs.fed.us/Evalidator/evalidator.jsp>]
12. Miles, P.D. Monday September 29 09:07:52 MDT 2014. Forest Inventory EVALIDator web-application version 1.6.0.01. St. Paul, MN: U.S. Department of Agriculture, Forest Service, Northern Research Station. [Available only on internet: <http://apps.fs.fed.us/Evalidator/evalidator.jsp>]
13. Texas A&M Forest Service. *Harvest Trends 2013*. Texas A&M Forest Service. Sept. 2014. Web. 9 Oct. 2014.
14. Freese and Nichols, Inc., and MTG Engineers and Surveyors. *Sulphur River Basin Feasibility Study - Cost Rollup Report*. Rep. N.p.: Sulphur Basin Group, n.d. Print.
15. *2012 Regional Water Planning Database (DB12)*. Texas Water Development Board, 2012. Downloaded 8 Oct. 2014.

Appendix B

Texas Water Development Board Interim Order of August 8, 2014

TEXAS WATER DEVELOPMENT BOARD



AN INTERIM ORDER concerning the interregional conflict between the 2011 North Central Texas Regional Planning Area Regional Water Plan and the 2011 North East Texas Regional Planning Area Regional Water Plan in accordance with Texas Water Code § 16.053.

On August 7, 2014, the Texas Water Development Board (Board) considered the interregional conflict between the 2011 North Central Texas Regional Planning Area (Region C) Regional Water Plan and the 2011 North East Texas Regional Planning Area (Region D) Regional Water Plan.

After considering the oral argument of the parties and the filings in this matter, the Board determined that there was inadequate analysis and quantification of the impact of the Marvin Nichols Reservoir Water Management Strategy on the agricultural and natural resources of Region D and the State.

NOW, THEREFORE, BE IT ORDERED BY THE TEXAS WATER DEVELOPMENT BOARD that:

1. Region C is directed to conduct an analysis and quantification of the impacts of the Marvin Nichols Reservoir Water Management Strategy on the agriculture and natural resources of Region D and the State, pursuant to Sections 16.051 and 16.053 of the Texas Water Code and Chapters 357 and 358 of Board rules. Region C should submit this analysis and quantification to the Board by November 3, 2014. Upon receipt of the analysis and quantification, the Executive Administrator and Region D will be given the opportunity to submit a written response to the submission, and the matter will be scheduled for Board consideration. If no submittal is received by the Board on or before November 3, 2014, this matter will set for a Board Meeting to direct the Regions to revise

their regional water plans reflecting the removal of the Marvin Nichols Reservoir Water Management Strategy from the 2011 Region C Plan, without prejudice.

2. The Executive Administrator is directed to undertake an examination of current rules and guidance pertaining to the development of regional water plans, and identify any opportunities for: ensuring that future regional and state water planning efforts include all statutorily-required analyses; and defining “interregional conflict” in a manner that is consistent with the ruling of the 11th Court of Appeals in *Texas Water Development Board vs. Ward Timber, Ltd.*, 411 S.W.3d 554 (Tex. App.-Eastland 2013, no pet.).
3. The Region C and Region D regional water planning groups are encouraged to continue to participate in the Sulphur River Basin Study.

Issue Date: August 8, 2014

TEXAS WATER DEVELOPMENT BOARD



Carlos Rubinstein, Chairman

Appendix C

Texas Water Code Section 16.051

WATER CODE

TITLE 2. WATER ADMINISTRATION

SUBTITLE C. WATER DEVELOPMENT

CHAPTER 16. PROVISIONS GENERALLY APPLICABLE TO WATER DEVELOPMENT

SUBCHAPTER C. PLANNING

SEC. 16.051. STATE WATER PLAN: DROUGHT, CONSERVATION, DEVELOPMENT, AND MANAGEMENT; EFFECT OF PLAN.

(a) Not later than January 5, 2002, and before the end of each successive five-year period after that date, the board shall prepare, develop, formulate, and adopt a comprehensive state water plan that incorporates the regional water plans approved under Section [16.053](#). 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 protect the agricultural and natural resources of the entire state.

(a-1) The state water plan must include:

(1) an evaluation of the state's progress in meeting future water needs, including an evaluation of the extent to which water management strategies and projects implemented after the adoption of the preceding state water plan have affected that progress; and

(2) an analysis of the number of projects included in the preceding state water plan that received financial assistance from the board.

(a-2) To assist the board in evaluating the state's progress in meeting future water needs, the board may obtain implementation data from the regional water planning groups.

(b) The state water plan, as formally adopted by the board, shall be a guide to state water policy. The commission shall take the plan into consideration in matters coming before it.

(c) The board by rule shall define and designate river basins and watersheds.

(d) The board, in coordination with the commission, the Department of Agriculture, and the Parks and Wildlife Department, shall adopt by rule guidance principles for the state water plan which reflect the public interest of the entire state. When adopting guidance principles, due consideration shall be given to the construction and improvement of surface water resources and the application of principles that result in voluntary redistribution of water resources. The board shall review and update the guidance principles, with input from the commission, the Department of Agriculture, and the Parks and Wildlife Department, as necessary but at least every five years to coincide with the five-year cycle for adoption of a new water plan as described in Subsection (a).

(e) On adoption the board shall deliver the state water plan to the governor, the lieutenant governor, and the speaker of the house of representatives and present the plan for review to the appropriate legislative committees. The plan shall include legislative recommendations that the board believes are needed and desirable to facilitate more voluntary water transfers. The plan shall identify river and stream segments of unique ecological value and sites of unique value for the construction of reservoirs that the board recommends for protection under this section.

(f) The legislature may designate a river or stream segment of unique ecological value. This designation solely means that a state agency or political subdivision of the state may not finance the actual construction of a reservoir in a specific river or stream segment designated by the legislature under this subsection.

(g) The legislature may designate a site of unique value for the construction of a reservoir. A state agency or political subdivision of the state may not obtain a fee title or an easement that would significantly prevent the construction of a reservoir on a site designated by the legislature under this subsection.

(g-1) Notwithstanding any other provisions of law, a site is considered to be a designated site of unique value for the construction of a reservoir if the site is recommended for designation in the 2007 state water plan adopted by the board and in effect on May 1, 2007. The designation of a unique reservoir site under this subsection terminates on September 1, 2015, unless there is an affirmative vote by a proposed project sponsor to make expenditures necessary in order to construct or file applications for permits required in connection with the construction of the reservoir under federal or state law.

(h) The board, the commission, or the Parks and Wildlife Department or a political subdivision affected by an action taken in violation of Subsection (f) or (g) may bring a cause of action to remedy or prevent

the violation. A cause of action brought under this subsection must be filed in a district court in Travis County or in the county in which the action is proposed or occurring.

(i) For purposes of this section, the acquisition of fee title or an easement by a political subdivision for the purpose of providing retail public utility service to property in the reservoir site or allowing an owner of property in the reservoir site to improve or develop the property may not be considered a significant impairment that prevents the construction of a reservoir site under Subsection (g). A fee title or easement acquired under this subsection may not be considered the basis for preventing the future acquisition of land needed to construct a reservoir on a designated site.

Amended by Acts 1977, 65th Leg., p. 2207, ch. 870, Sec. 1, eff. Sept. 1, 1977; Acts 1985, 69th Leg., ch. 795, Sec. 1.046, eff. Sept. 1, 1985; Acts 1991, 72nd Leg., ch. 516, Sec. 4, eff. Sept. 1, 1991; Acts 1997, 75th Leg., ch. 1010, Sec. 1.01, eff. Sept. 1, 1997; Acts 1999, 76th Leg., ch. 456, Sec. 4, eff. June 18, 1999; Acts 1999, 76th Leg., ch. 979, Sec. 4, eff. June 18, 1999; Acts 1999, 76th Leg., ch. 1223, Sec. 2, eff. June 18, 1999; Acts 2001, 77th Leg., ch. 966, Sec. 2.16, eff. Sept. 1, 2001.

Amended by:

Acts 2007, 80th Leg., R.S., Ch. 1430 (S.B. [3](#)), Sec. 3.01, eff. September 1, 2007.

Acts 2007, 80th Leg., R.S., Ch. 1430 (S.B. [3](#)), Sec. 4.01, eff. June 16, 2007.

Acts 2011, 82nd Leg., R.S., Ch. 1233 (S.B. [660](#)), Sec. 8, eff. September 1, 2011.

Appendix D

Texas Water Code Section 16.053

WATER CODE

TITLE 2. WATER ADMINISTRATION

SUBTITLE C. WATER DEVELOPMENT

CHAPTER 16. PROVISIONS GENERALLY APPLICABLE TO WATER DEVELOPMENT

SUBCHAPTER C. PLANNING

SEC. 16.053. REGIONAL WATER PLANS.

(a) The regional water planning group in each regional water planning area shall prepare a regional water plan, using an existing state water plan identified in Section 16.051 of this code and local water plans prepared under Section 16.054 of this code as a guide, if present, that provides 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 protect the agricultural and natural resources of that particular region.

(b) No later than September 1, 1998, the board shall designate the areas for which regional water plans shall be developed, taking into consideration such factors as river basin and aquifer delineations, water utility development patterns, socioeconomic characteristics, existing regional water planning areas, political subdivision boundaries, public comment, and other factors the board deems relevant. The board shall review and update the designations as necessary but at least every five years.

(c) No later than 60 days after the designation of the regions under Subsection (b), the board shall designate representatives within each regional water planning area to serve as the initial coordinating body for planning. The initial coordinating body may then designate additional representatives to serve on the regional water planning group. The initial coordinating body shall designate additional representatives if necessary to ensure adequate representation from the interests comprising that region, including the public, counties, municipalities, industries, agricultural interests, environmental interests, small businesses, electric generating utilities, river authorities, water districts, and water utilities. The regional water planning group shall maintain adequate representation from those interests. In addition, the groundwater conservation districts located in each management area, as defined by Section 36.001, located in the regional water planning area shall appoint one representative of a groundwater

conservation district located in the management area and in the regional water planning area to serve on the regional water planning group. In addition, representatives of the board, the Parks and Wildlife Department, and the Department of Agriculture shall serve as ex officio members of each regional water planning group.

(d) The board shall provide guidelines for the consideration of existing regional planning efforts by regional water planning groups. The board shall provide guidelines for the format in which information shall be presented in the regional water plans.

(e) Each regional water planning group shall submit to the development board a regional water plan that:

(1) is consistent with the guidance principles for the state water plan adopted by the development board under Section [16.051\(d\)](#);

(2) provides information based on data provided or approved by the development board in a format consistent with the guidelines provided by the development board under Subsection (d);

(2-a) is consistent with the desired future conditions adopted under Section [36.108](#) for the relevant aquifers located in the regional water planning area as of the date the board most recently adopted a state water plan under Section [16.051](#) or, at the option of the regional water planning group, established subsequent to the adoption of the most recent plan;

(3) identifies:

(A) each source of water supply in the regional water planning area, including information supplied by the executive administrator on the amount of modeled available groundwater in accordance with the guidelines provided by the development board under Subsections (d) and (f);

(B) factors specific to each source of water supply to be considered in determining whether to initiate a drought response;

(C) actions to be taken as part of the response; and

(D) existing major water infrastructure facilities that may be used for interconnections in the event of an emergency shortage of water;

(4) has specific provisions for water management strategies to be used during a drought of record;

(5) includes but is not limited to consideration of the following:

(A) any existing water or drought planning efforts addressing all or a portion of the region;

(B) approved groundwater conservation district management plans and other plans submitted under Section [16.054](#);

(C) all potentially feasible water management strategies, including but not limited to improved conservation, reuse, and management of existing water supplies, conjunctive use, acquisition of available existing water supplies, and development of new water supplies;

(D) protection of existing water rights in the region;

(E) opportunities for and the benefits of developing regional water supply facilities or providing regional management of water supply facilities;

(F) appropriate provision for environmental water needs and for the effect of upstream development on the bays, estuaries, and arms of the Gulf of Mexico and the effect of plans on navigation;

(G) provisions in Section [11.085\(k\)\(1\)](#) if interbasin transfers are contemplated;

(H) voluntary transfer of water within the region using, but not limited to, regional water banks, sales, leases, options, subordination agreements, and financing agreements; and

(I) emergency transfer of water under Section [11.139](#), including information on the part of each permit, certified filing, or certificate of adjudication for nonmunicipal use in the region that may be transferred without causing unreasonable damage to the property of the nonmunicipal water rights holder;

(6) identifies river and stream segments of unique ecological value and sites of unique value for the construction of reservoirs that the regional water planning group recommends for protection under Section [16.051](#);

(7) assesses the impact of the plan on unique river and stream segments identified in Subdivision (6) if the regional water planning group or the legislature determines that a site of unique ecological value exists;

(8) describes the impact of proposed water projects on water quality; and

(9) includes information on:

(A) projected water use and conservation in the regional water planning area; and

(B) the implementation of state and regional water plan projects, including water conservation strategies, necessary to meet the state's projected water demands.

(e-1) On request of the Texas Water Advisory Council, a regional planning group shall provide the council a copy of that planning group's regional water plan.

(f) No later than September 1, 1998, the board shall adopt rules:

(1) to provide for the procedures for adoption of regional water plans by regional water planning groups and for approval of regional water plans by the board; and

(2) to govern procedures to be followed in carrying out the responsibilities of this section.

(g) The board shall provide technical and financial assistance to the regional water planning groups in the development of their plans. The board shall simplify, as much as possible, planning requirements in regions with abundant water resources. The board, if requested, may facilitate resolution of conflicts within regions.

(h)(1) Prior to the preparation of the regional water plan, the regional water planning group shall, after notice, hold at least one public meeting at some central location within the regional planning area to gather suggestions and recommendations from the public as to issues that should be addressed in the plan or provisions that should be considered for inclusion in the plan.

(2) The regional water planning group shall provide an ongoing opportunity for public input during the preparation of the regional water plan.

(3) After the regional water plan is initially prepared, the regional water planning group shall, after notice, hold at least one public hearing at some central location within the regional water planning area. The group shall make copies of the plan available for public inspection at least one month before the hearing by providing a copy of the plan in the county courthouse and at least

one public library of each county having land in the region. Notice for the hearing shall include a listing of these and any other location where the plan is available for review.

(4) After the regional water plan is initially prepared, the regional water planning group shall submit a copy of the plan to the board. The board shall submit comments on the regional water plan as to whether the plan meets the requirements of Subsection (e) of this section.

(5) If no interregional conflicts exist, the regional water planning group shall consider all public and board comments; prepare, revise, and adopt the final plan; and submit the adopted plan to the board for approval and inclusion in the state water plan.

(6) If an interregional conflict exists, the board shall facilitate coordination between the involved regions to resolve the conflict. If conflict remains, the board shall resolve the conflict. On resolution of the conflict, the involved regional water planning groups shall prepare revisions to their respective plans and hold, after notice, at least one public hearing at some central location within their respective regional water planning areas. The regional water planning groups shall consider all public and board comments; prepare, revise, and adopt their respective plans; and submit their plans to the board for approval and inclusion in the state water plan.

(7) The board may approve a regional water plan only after it has determined that:

(A) all interregional conflicts involving that regional water planning area have been resolved;

(B) the plan includes water conservation practices and drought management measures incorporating, at a minimum, the provisions of Sections [11.1271](#) and [11.1272](#); and

(C) the plan is consistent with long-term protection of the state's water resources, agricultural resources, and natural resources as embodied in the guidance principles adopted under Section [16.051](#)(d).

(8) Notice required by Subdivision (1), (3), or (6) of this subsection must be:

(A) published once in a newspaper of general circulation in each county located in whole or in part in the regional water planning area before the 30th day preceding the date of the public meeting or hearing; and

(B) mailed to:

- (i) each mayor of a municipality with a population of 1,000 or more that is located in whole or in part in the regional water planning area;
- (ii) each county judge of a county located in whole or in part in the regional water planning area;
- (iii) each special or general law district or river authority with responsibility to manage or supply water in the regional water planning area;
- (iv) each retail public utility that:
 - (a) serves any part of the regional water planning area; or
 - (b) receives water from the regional water planning area; and
- (v) each holder of record of a permit, certified filing, or certificate of adjudication for the use of surface water the diversion of which occurs in the regional water planning area.

(9) Notice published or mailed under Subdivision (8) of this subsection must contain:

- (A) the date, time, and location of the public meeting or hearing;
- (B) a summary of the proposed action to be taken;
- (C) the name, telephone number, and address of the person to whom questions or requests for additional information may be submitted; and
- (D) information on how the public may submit comments.

(10) The regional water planning group may amend the regional water plan after the plan has been approved by the board. Subdivisions (1)-(9) apply to an amendment to the plan in the same manner as those subdivisions apply to the plan.

(11) This subdivision applies only to an amendment to a regional water plan approved by the board. This subdivision does not apply to the adoption of a subsequent regional water plan for submission to the board as required by Subsection (i). Notwithstanding Subdivision (10), the regional water planning group may amend the plan in the manner provided by this subdivision if the executive administrator makes a written determination that the proposed amendment qualifies for adoption in the manner provided by this subdivision before the regional water planning group votes on adoption of the amendment. A proposed amendment qualifies for

adoption in the manner provided by this subdivision only if the amendment is a minor amendment, as defined by board rules, that will not result in the overallocation of any existing or planned source of water, does not relate to a new reservoir, and will not have a significant effect on instream flows or freshwater inflows to bays and estuaries. If the executive administrator determines that a proposed amendment qualifies for adoption in the manner provided by this subdivision, the regional water planning group may adopt the amendment at a public meeting held in accordance with Chapter 551, Government Code. The proposed amendment must be placed on the agenda for the meeting, and notice of the meeting must be given in the manner provided by Chapter 551, Government Code, at least two weeks before the date the meeting is held. The public must be provided an opportunity to comment on the proposed amendment at the meeting.

(i) The regional water planning groups shall submit their adopted regional water plans to the board by January 5, 2001, for approval and inclusion in the state water plan. In conjunction with the submission of regional water plans, each planning group should make legislative recommendations, if any, to facilitate more voluntary water transfers in the region. Subsequent regional water plans shall be submitted at least every five years thereafter. Public participation for revised regional plans shall follow the procedures under Subsection (h).

(j) The board may provide financial assistance to political subdivisions under Subchapters E and F of this chapter, Subchapters C, D, E, F, J, O, Q, and R, Chapter 15, and Subchapters D, I, K, and L, Chapter 17, for water supply projects only if:

(1) the board determines that the needs to be addressed by the project will be addressed in a manner that is consistent with the state water plan;

(2) beginning January 5, 2002, the board:

(A) has approved a regional water plan as provided by Subsection (i), and any required updates of the plan, for the region of the state that includes the area benefiting from the proposed project; and

(B) determines that the needs to be addressed by the project will be addressed in a manner that is consistent with that regional water plan; and

(3) the board finds that the water audit required under Section [16.0121](#) has been completed and filed.

(k) The board may waive the requirements of Subsection (j) of this section if the board determines that conditions warrant the waiver.

(l) A political subdivision may contract with a regional water planning group to assist the regional water planning group in developing or revising a regional water plan.

(m) A cause of action does not accrue against a regional water planning group, a representative who serves on the regional water planning group, or an employee of a political subdivision that contracts with the regional water planning group under Subsection (l) for an act or omission in the course and scope of the person's work relating to the regional water planning group.

(n) A regional water planning group, a representative who serves on the regional water planning group, or an employee of a political subdivision that contracts with the regional water planning group under Subsection (l) is not liable for damages that may arise from an act or omission in the course and scope of the person's work relating to the regional water planning group.

(o) The attorney general, on request, shall represent a regional water planning group, a representative who serves on the regional water planning group, or an employee of a political subdivision that contracts with the regional water planning group under Subsection (l) in a suit arising from an act or omission relating to the regional water planning group.

(p) If a groundwater conservation district files a petition with the development board stating that a conflict requiring resolution may exist between the district's approved management plan developed under Section [36.1071](#) and an approved state water plan, the development board shall provide technical assistance to and facilitate coordination between the district and the involved region to resolve the conflict. Not later than the 45th day after the date the groundwater conservation district files a petition with the development board, if the conflict has not been resolved, the district and the involved region shall mediate the conflict. The district and the involved region may seek the assistance of the Center for Public Policy Dispute Resolution at The University of Texas School of Law or an alternative dispute resolution system established under Chapter 152, Civil Practice and Remedies Code, in obtaining a qualified impartial third party to mediate the conflict. The cost of the mediation services must be specified in the agreement between the parties and the Center for Public Policy Dispute Resolution or the alternative dispute resolution system. If the district and the involved region cannot resolve the conflict through mediation, the development board shall resolve the conflict not later than the 60th day after the date the mediation is completed as provided by Subsections (p-1) and (p-2).

(p-1) If the development board determines that resolution of the conflict requires a revision of an approved regional water plan, the development board shall suspend the approval of that plan and provide information to the regional water planning group. The regional water planning group shall prepare any revisions to its plan specified by the development board and shall hold, after notice, at least one public hearing at some central location within the regional water planning area. The regional water planning group shall consider all public and development board comments, prepare, revise, and adopt its plan, and submit the revised plan to the development board for approval and inclusion in the state water plan.

(p-2) If the development board determines that resolution of the conflict requires a revision of the district's approved groundwater conservation district management plan, the development board shall provide information to the district. The groundwater district shall prepare any revisions to its plan based on the information provided by the development board and shall hold, after notice, at least one public hearing at some central location within the district. The groundwater district shall consider all public and development board comments, prepare, revise, and adopt its plan, and submit the revised plan to the development board.

(p-3) If the groundwater conservation district disagrees with the decision of the development board under Subsection (p), the district may appeal the decision to a district court in Travis County. Costs for the appeal shall be set by the court hearing the appeal. An appeal under this subsection is by trial de novo.

(p-4) On the request of the involved region or groundwater conservation district, the development board shall include discussion of the conflict and its resolution in the state water plan that the development board provides to the governor, the lieutenant governor, and the speaker of the house of representatives under Section [16.051\(e\)](#).

(q) Each regional planning group shall examine the financing needed to implement the water management strategies and projects identified in the group's most recent approved regional plan and, not later than June 1, 2002, shall report to the board regarding:

(1) how local governments, regional authorities, and other political subdivisions in the region propose to pay for water infrastructure projects identified in the plan; and

(2) what role the regional planning group proposes for the state in financing projects identified in the plan, giving particular attention to proposed increases in the level of state participation in

funding for regional projects to meet needs beyond the reasonable financing capability of local governments, regional authorities, and other political subdivisions involved in building water infrastructure.

Text of subsection as added by Acts 2005, 79th Leg., R.S., Ch. 1200 (H.B. [578](#)), Sec. 1

(r) Information described by Subsection (e)(3)(D) that is included in a regional water plan submitted to the board is excepted from required disclosure under the public information law, Chapter 552, Government Code.

Text of subsection as added by Acts 2005, 79th Leg., R.S., Ch. 1097 (H.B. [2201](#)), Sec. 8 and amended by Acts 2007, 80th Leg., R.S., Ch. 1430 (S.B. [3](#)), Sec. 2.15

(r) The board by rule shall provide for reasonable flexibility to allow for a timely amendment of a regional water plan, the board's approval of an amended regional water plan, and the amendment of the state water plan. If an amendment under this subsection is to facilitate planning for water supplies reasonably required for a clean coal project, as defined by Section [5.001](#), the rules may allow for amending a regional water plan without providing notice and without a public meeting or hearing under Subsection (h) if the amendment does not:

- (1) significantly change the regional water plan, as reasonably determined by the board; or
- (2) adversely affect other water management strategies in the regional water plan.

Amended by Acts 1977, 65th Leg., p. 2207, ch. 870, Sec. 1, eff. Sept. 1, 1977; Acts 1985, 69th Leg., ch. 795, Sec. 1.047, eff. Sept. 1, 1985; Acts 1997, 75th Leg., ch. 1010, Sec. 1.02, eff. Sept. 1, 1997; Acts 1999, 76th Leg., ch. 456, Sec. 5, eff. June 18, 1999; Acts 1999, 76th Leg., ch. 979, Sec. 5, eff. June 18, 1999; Acts 1999, 76th Leg., ch. 1180, Sec. 1, eff. June 18, 1999; Acts 1999, 76th Leg., ch. 1222, Sec. 2, eff. June 18, 1999; Acts 1999, 76th Leg., ch. 1223, Sec. 3, eff. June 18, 1999; Acts 2001, 77th Leg., ch. 966, Sec. 2.17 to 2.19, eff. Sept. 1, 2001; Acts 2001, 77th Leg., ch. 1234, Sec. 25, eff. Sept. 1, 2001; Acts 2003, 78th Leg., ch. 744, Sec. 2, eff. Sept. 1, 2003; Acts 2003, 78th Leg., ch. 1057, Sec. 5, eff. June 20, 2003; Acts 2003, 78th Leg., ch. 1275, Sec. 3(45), eff. Sept. 1, 2003.

Amended by:

Acts 2005, 79th Leg., Ch. 970 (H.B. [1763](#)), Sec. 1, eff. September 1, 2005.

Acts 2005, 79th Leg., Ch. 1097 (H.B. [2201](#)), Sec. 8, eff. June 18, 2005.

Acts 2005, 79th Leg., Ch. 1200 (H.B. [578](#)), Sec. 1, eff. September 1, 2005.

Acts 2007, 80th Leg., R.S., Ch. 1430 (S.B. [3](#)), Sec. 2.14, eff. September 1, 2007.

Acts 2007, 80th Leg., R.S., Ch. 1430 (S.B. [3](#)), Sec. 2.15, eff. September 1, 2007.

Acts 2011, 82nd Leg., R.S., Ch. 595 (S.B. [181](#)), Sec. 1, eff. June 17, 2011.

Acts 2011, 82nd Leg., R.S., Ch. 1233 (S.B. [660](#)), Sec. 9, eff. September 1, 2011.

Appendix E

Texas Administrative Code Title 31 Part 10 Chapter 357: Regional Water Planning Rules

Texas Administrative Code

[Next Rule>>](#)

TITLE 31	NATURAL RESOURCES AND CONSERVATION
PART 10	TEXAS WATER DEVELOPMENT BOARD
CHAPTER 357	REGIONAL WATER PLANNING
SUBCHAPTER A	GENERAL INFORMATION
RULE §357.10	Definitions and Acronyms

The following words, used in this chapter, have the following meanings.

(1) Alternative water management strategy--A fully evaluated water management strategy that may be substituted into a regional water plan in the event that a recommended water management strategy is no longer recommended.

(2) Availability--Maximum amount of water available from a source during the drought of record, regardless of whether the supply is physically or legally available to water user groups.

(3) Board--The Texas Water Development Board.

(4) Collective Reporting Unit--A grouping of utilities located in the Regional Water Planning Area. Utilities within a Collective Reporting Unit must have a logical relationship, such as being served by common wholesale water providers, having common sources, or other appropriate associations.

(5) Commission--The Texas Commission on Environmental Quality.

(6) Consistency between a regional water plan and a desired future condition--A regional water plan is consistent with a desired future condition if the groundwater availability amount in the regional water plan and on which an existing water supply or recommended water management strategy relies does not exceed the modeled available groundwater amount associated with the desired future condition for the relevant aquifers. The desired future condition must be either the desired future condition adopted as of the date the Board most recently adopted a state water plan or, at the option of the regional water planning group, a desired future condition adopted on a subsequent date.

(7) County-other--An aggregation of residential, commercial, and institutional water users in cities with less than 500 people or utilities that provide less than an average of 250,000 gallons per day, as well as unincorporated rural areas in a given county.

(8) Drought contingency plan--A plan required from wholesale and retail public water suppliers and irrigation districts pursuant to Texas Water Code §11.1272 (relating to Drought Contingency Plans for Certain Applicants and Water Right Holders). The plan may consist of one or more strategies for temporary supply and demand management and demand management responses to temporary and potentially recurring water supply shortages and other water supply emergencies as required by the Commission.

(9) Drought management measures--Demand management activities to be implemented during drought that may be evaluated and included as water management strategies.

(10) Drought of record--The period of time when natural hydrological conditions provided the least amount of water supply.

(11) Executive administrator (EA)--The executive administrator of the Board or a designated representative.

(12) Existing water supply--Maximum amount of water available from existing sources for use during drought of record conditions that is physically and legally available for use by a water user group.

(13) Firm yield--Maximum water volume a reservoir can provide each year under a repeat of the drought of record using reasonable sedimentation rates and assuming that all senior water rights will be totally utilized.

(14) Interbasin transfer of surface water--Defined and governed in Texas Water Code §11.085 (relating to Interbasin Transfers) as the diverting of any state water from a river basin and transfer of that water to any other river basin.

(15) Interregional conflict--An interregional conflict exists when more than one regional water plan relies upon the same water source, so that there is not sufficient water available to fully implement both plans and would create an over-allocation of that source.

(16) Intraregional conflict--A conflict between two identified, quantified, and recommended water management strategies in the same adopted regional water plan that rely upon the same

water source, so that there is not sufficient water available to fully implement both water management strategies and thereby creating an over-allocation of that source.

(17) Initially Prepared Plan (IPP)--Draft regional water plans that are presented at a public hearing in accordance with §357.21(d) of this title (relating to Notice and Public Participation) and submitted for Board review and comment.

(18) Political subdivision--City, county, district, or authority created under the Texas Constitution, Article III, §52, or Article XVI, §59, any other political subdivision of the state, any interstate compact commission to which the state is a party, and any nonprofit water supply corporation created and operating under Texas Water Code Chapter 67 (relating to Nonprofit Water Supply or Sewer Service Corporations).

(19) Regional water plan (RWP)--The plan adopted or amended by a regional water planning group pursuant to Texas Water Code §16.053 (relating to Regional Water Plans) and this chapter.

(20) Regional water planning area (RWPA)--Area designated pursuant to Texas Water Code §16.053.

(21) Regional water planning group (RWPG)--Group designated pursuant to Texas Water Code §16.053.

(22) Retail public utility--Defined in Texas Water Code §13.002 (relating to Water Rates and Services) as "any person, corporation, public utility, water supply or sewer service corporation, municipality, political subdivision or agency operating, maintaining, or controlling in this state facilities for providing potable water service or sewer service, or both, for compensation."

(23) State Drought Preparedness Plan--A plan, separate from the state water plan, that is developed by the Drought Preparedness Council for the purpose of mitigating the effects of drought pursuant to Texas Water Code §16.0551 (relating to State Drought Preparedness Plan).

(24) State Drought Response Plan--A plan prepared and directed by the chief of the Texas Division of Emergency Management for the purpose of managing and coordinating the drought response component of the State Water Plan and the State Drought Preparedness Plan pursuant to Texas Water Code §16.055 (relating to Drought Response Plan).

(25) State Water Plan--The most recent state water plan adopted by the Board under the Texas Water Code §16.051 (relating to State Water Plan).

(26) Water conservation measures--Practices, techniques, and technologies that will reduce the consumption of water, reduce the loss of waste or water, or improve the efficiency in the use of water that may be presented as water management strategies.

(27) Water Conservation Plan--The most current plan required by Texas Water Code §11.1271 (relating to Water Conservation Plans) from an applicant for a new or amended water rights permit and from any holder of a permit, certificate, etc. who is authorized to appropriate more than 1,000 acre-feet per year or more for municipal, industrial, and other non-irrigation uses and for those who are authorized to appropriate 10,000 acre-feet per year or more for irrigation, and the most current plan required by Texas Water Code §13.146 from a retail public utility that provides potable water service to 3,300 or more connections These plans must include specific, quantified 5-year and 10-year targets for water savings.

(28) Water Management Strategy--A plan or specific project to meet a need for additional water by a discrete user group, which can mean increasing the total water supply or maximizing an existing supply, including through reducing demands.

(29) Water User Group (WUG)--Identified user or group of users for which water demands and water supplies have been identified and analyzed and plans developed to meet water needs. These include:

(A) Incorporated Census places of a population greater than 500, including select Census Designated Places, such as significant military bases or cases in which the Census Designated Place is the only Census place in the county;

(B) Retail public utilities providing more than 280 acre-feet per year for municipal use;

(C) Collective Reporting Units, or groups of retail public utilities that have a common association;

(D) Municipal and domestic water use, referred to as county-other, not included in subparagraphs (A) - (C) of this paragraph; and

(E) Non-municipal water use including manufacturing, irrigation, steam electric power generation, mining, and livestock watering for each county or portion of a county in a RWPA.

(30) Wholesale Water Provider (WWP)--Any person or entity, including river authorities and irrigation districts, that has contracts to sell more than 1,000 acre-feet of water wholesale in any one year during the five years immediately preceding the adoption of the last regional water plan. The regional water planning groups shall include as wholesale water providers other persons and entities that enter or that the regional water planning group expects or recommends to enter contracts to sell more than 1,000 acre-feet of water wholesale during the period covered by the plan.

RULE §357.11 Designations

(a) The Board shall review and update the designations of RWPAs as necessary but at least every five years, on its own initiative or upon recommendation of the executive administrator. The Board shall provide 30 days notice of its intent to amend the designations of RWPAs by publication of the proposed change in the *Texas Register* and by mailing the notice to each mayor of a municipality with a population of 1,000 or more or which is a county seat that is located in whole or in part in the RWPAs proposed to be impacted, to each water district or river authority located in whole or in part in the RWPA based upon lists of such water districts and river authorities obtained from the Commission, and to each county judge of a county located in whole or in part in the RWPAs proposed to be impacted. After the 30 day notice period, the Board shall hold a public hearing at a location to be determined by the Board before making any changes to the designation of a RWPA.

(b) If upon boundary review the Board determines that revisions to the boundaries are necessary, the Board shall designate areas for which regional water plans shall be developed, taking into consideration factors such as:

- (1) River basin and aquifer delineations;
- (2) Water utility development patterns;
- (3) Socioeconomic characteristics;
- (4) Existing regional water planning areas;
- (5) Political subdivision boundaries;

(6) Public comment; and

(7) Other factors the Board deems relevant.

(c) After an initial coordinating body for a regional water planning group is named by the Board, the RWPGs shall adopt, by two-thirds vote, bylaws that are consistent with provisions of this chapter. Within 30 days after the Board names members of the initial coordinating body, the executive administrator shall provide to each member of the initial coordinating body a set of model bylaws which the RWPG shall consider. The RWPG shall provide copies of its bylaws and any revisions thereto to the executive administrator. The bylaws adopted by the RWPG shall at a minimum address the following elements:

(1) definition of a quorum necessary to conduct business;

(2) method to be used to approve items of business including adoption of regional water plans or amendments thereto;

(3) methods to be used to name additional members;

(4) terms and conditions of membership;

(5) methods to record minutes and where minutes will be archived as part of the public record; and

(6) methods to resolve disputes between RWPG members on matters coming before the RWPG.

(d) RWPGs shall maintain at least one representative of each of the following interest categories as voting members of the RWPG. However, if a RWPA does not have an interest category below, then the RWPG shall so advise the EA and no membership designation is required.

(1) Public, defined as those persons or entities having no economic interest in the interests represented by paragraphs (2) - (12) of this subsection other than as a normal consumer;

(2) Counties, defined as the county governments for the 254 counties in Texas;

(3) Municipalities, defined as governments of cities created or organized under the general, home-rule, or special laws of the state;

(4) Industries, defined as corporations, partnerships, sole proprietorships, or other legal entities that are formed for the purpose of making a profit and which produce or manufacture goods or services and which are not small businesses;

(5) Agricultural interests, defined as those persons or entities associated with production or processing of plant or animal products;

(6) Environmental interests, defined as those persons or groups advocating the conservation of the state's natural resources, including but not limited to soil, water, air, and living resources;

(7) Small businesses, defined as corporations, partnerships, sole proprietorships, or other legal entities that are formed for the purpose of making a profit, are independently owned and operated, and have fewer than 100 employees or less than \$1 million in gross annual receipts;

(8) Electric generating utilities, defined as any persons, corporations, cooperative corporations, or any combination thereof, meeting each of the following three criteria: own or operate for compensation equipment or facilities which produce or generate electricity; produce or generate electricity for either wholesale or retail sale to others; and are neither a municipal corporation nor a river authority;

(9) River authorities, defined as any districts or authorities created by the legislature which contain areas within their boundaries of one or more counties and which are governed by boards of directors appointed or designated in whole or part by the governor or board, including, without limitation, San Antonio River Authority and Palo Duro River Authority;

(10) Water districts, defined as any districts or authorities, created under authority of either Texas Constitution, Article III, §52(b)(1) and (2), or Article XVI, §59 including districts having the authority to regulate the spacing of or production from water wells, but not including river authorities;

(11) Water utilities, defined as any persons, corporations, cooperative corporations, or any combination thereof that provide water supplies for compensation except for municipalities, river authorities, or water districts; and

(12) Groundwater management areas, defined as a single representative for each groundwater management area that is at least partially located within a RWPA. Defined as a representative from a groundwater conservation district that is appointed by the groundwater conservation districts within the associated groundwater management area.

(e) The RWPGs shall add the following non-voting members, who shall receive meeting notifications and information in the same manner as voting members:

(1) Staff member of the Board to be designated by the EA;

(2) Staff member of the Texas Parks and Wildlife Department designated by its executive director;

(3) Member designated by each adjacent RWPG to serve as a liaison;

(4) One or more persons to represent those entities with headquarters located in another RWPA and which holds surface water rights authorizing a diversion of 1,000 acre-feet a year or more in the RWPA, which supplies water under contract in the amount of 1,000 acre-feet a year or more to entities in the RWPA, or which receives water under contract in the amount of 1,000 acre-feet a year or more from the RWPA; and

(5) Staff member of the Texas Department of Agriculture designated by its commissioner.

(f) Each RWPG shall provide a current list of its members to the EA; the list shall identify the interest represented by each member including interests required in subsection (d) of this section.

(g) Each RWPG, at its discretion, may at any time add additional voting and non-voting representatives to serve on the RWPG for any new interest category, including additional representatives of those interests already listed in subsection (d) of this section that the RWPG considers appropriate for water planning.

(h) Each RWPG, at its discretion, may remove individual voting or non-voting members or eliminate RWPG representative positions in accordance with the RWPG bylaws as long as

minimum requirements of RWPG membership are maintained in accordance with subsection (d) of this section.

(i) RWPGs may enter into formal and informal agreements to coordinate, avoid conflicts, and share information with other RWPGs or any other interests within any RWPA for any purpose the RWPGs consider appropriate including expediting or making more efficient water planning efforts. These efforts may involve any portion of the RWPG membership. Any plans or information developed through these efforts by RWPGs or by committees may be included in a RWP only upon approval of the RWPG.

(j) Upon request, the EA will provide technical assistance to RWPGs, including on water supply and demand analysis, methods to evaluate the social and economic impacts of not meeting needs, and regarding drought management measures and water conservation practices.

RULE §357.12 General Regional Water Planning Group Responsibilities and Procedures

(a) Prior to the preparation for the RWPs, in accordance with the public participation requirements in §357.21 of this title (relating to Notice and Public Participation), the RWPGs shall:

(1) hold at least one public meeting to gather suggestions and recommendations from the public as to issues that should be addressed or provisions that should be included in the next regional or state water plan;

(2) prepare a scope of work that includes a detailed description of tasks to be performed, identifies responsible parties for task execution, a task schedule, task and expense budgets, and describes interim products, draft reports, and final reports for the planning process;

(3) approve any amendments to the scope of work only in an open meeting of the RWPG where notice of the proposed action was provided in accordance with §357.21 of this title; and

(4) designate a political subdivision as a representative of the RWPG eligible to apply for financial assistance for scope of work and RWP development pursuant to Chapter 355, Subchapter C of this title (relating to Regional Water Planning Grants).

(b) A RWPG shall hold a public meeting to determine the process for identifying potentially feasible water management strategies; the process shall be documented and shall include input received at the public meeting; after reviewing the potentially feasible strategies using the documented process, then the RWPG shall list all possible water management strategies that are potentially feasible for meeting a need in the region. The public meeting under this subsection shall be in accordance with the requirements of §357.21(b) of this title.

(c) If applicable, and approved by the EA, implement simplified planning in accordance with guidance to be provided by the EA. If a RWPG determines in its analysis of water needs that it has sufficient supplies in the RWPA to meet water needs for the 50-year planning period, RWPGs may conduct simplified regional water planning as follows:

(1) identify water supplies that are available for voluntary redistribution in a RWPA or to other RWPAs;

(2) where appropriate, adopt previous RWP or state water plan information, updated as necessary, as the RWP; and

(3) other activities upon approval of the EA necessary to complete a RWP that meets rule and statute requirements.

RULE §357.20 Guidance Principles for State and Regional Water Planning

Development of the state water plan and of RWPs shall be guided by the principles stated in §358.3 of this title (relating to Guidance Principles).

RULE §357.21 Notice and Public Participation

(a) RWPGs shall conduct all business in meetings posted and held in accordance with the Texas Open Meetings Act, Texas Government Code Chapter 551, with a copy of all materials presented or discussed available for public inspection prior to and following the meetings and shall meet

the additional notice requirements when specifically referenced as required under other subsections.

(b) All public notices required by this subsection shall comply with this section and shall meet the following requirements:

(1) These notice requirements apply to the following RWPG actions: regular RWPG meetings; amendments to the regional water planning scope of work or budget; process of identifying potentially feasible water management strategies; meetings to replace RWPG members or addition of new RWPG members; and adoption of regional water plans.

(2) Published 72 hours prior to the meeting.

(3) Notice shall include:

(A) a date, time, and location of the meeting;

(B) a summary of the proposed action to be taken; and

(C) the name, telephone number, and address of the person to whom questions or requests for additional information may be submitted.

(4) Entities to be notified include:

(A) all voting and non-voting RWPG members;

(B) any person or entity who has requested notice or RWPG activities either in writing or email, as requested by the person or entity; and

(C) each County Clerk, in writing, within the RWPA.

(5) Notice and agenda to be posted:

(A) On the website of the host political subdivision or on the Board website if requested by the RWPG; and

(B) Texas Secretary of State website.

(6) Documents to be made available on the internet or in hard copy for public inspection prior to and following meeting include:

(A) Agenda of meeting; and

(B) Copies of all materials presented or discussed at the meeting.

(c) Notice under this subsection shall meet the following requirements:

(1) These notice requirements apply to the following RWPG actions: population projection and water demand projection revision requests to officially adopted Board projections; substitution of alternative water management strategies; and minor amendments to RWPs.

(2) Notice of meetings under this subsection shall be published/postmarked on the internet, emailed, and mailed to the public before the 14th day preceding the date of the meeting.

(3) Notice shall include:

(A) a date, time, and location of the meeting;

(B) a summary of the proposed action to be taken;

(C) the name, telephone number, and address of the person to whom questions or requests for additional information may be submitted; and

(D) information that the RWPG will accept written and oral comments at the meetings and information on how the public may submit written comments separate from such meetings. The RWPG shall specify a deadline for submission of public written comments of not earlier than 14 days after the meeting.

(4) Entities to be notified include:

(A) all voting and non-voting RWPG members;

(B) any person or entity who has requested notice of RWPG activities either in writing or email, as requested by the person or entity;

(C) each County Clerk, in writing, within the RWPA; and

(D) each County Clerk in counties outside the RWPA where a recommended or alternative water management strategy being considered would be located.

(5) Notice and associated meeting agenda to be posted:

(A) On the website of the host political subdivision or on the Board website if requested by the RWPG; and

(B) Texas Secretary of State website.

(6) Documents to be made available on the internet or in hard copy for public inspection prior to and following meeting include:

(A) Agenda of meeting; and

(B) Copies of all materials, reports, plans presented or discussed at the meeting.

(7) Public comments to be accepted as follows:

(A) Written comments for 14 days prior to meeting with comments considered by RWPG members prior to action;

(B) Oral and written public comment during meeting; and

(C) Written comments must also be accepted for 14 days following the meeting and all comments received during the comment period must be submitted to the Board by the RWPG.

(d) Notice under this subsection shall meet the following requirements:

(1) These notice requirements apply to the following RWPG actions: holding a preplanning public meeting to obtain public input on development of the next RWP; major amendments to RWPs; holding hearings for IPPs; and requesting research and planning funds from the Board.

(2) Notice shall be published in a newspaper of general circulation in each county located in whole or in part in the RWPA as follows:

(A) before the 30th day preceding the date of the public meeting or hearing; and

(B) when applying for Board funding, at least 30 days prior to Board consideration of funding applications.

(3) Notice of the public meetings and public hearings shall include:

(A) a date, time, and location of the public meeting or hearing;

(B) a summary of the proposed action to be taken;

(C) the name, telephone number, and address of the person to whom questions or requests for additional information may be submitted; and

(D) information that the RWPG will accept written and oral comments at the hearings and information on how the public may submit written comments separate from such hearings. The RWPG shall specify a deadline for submission of public written comments as specified in paragraph (8)(A) of this subsection.

(4) If applying for Board funding, the notice shall include the name and address of the eligible applicant and the name of the applicant's manager or official representative; a brief description of the regional water planning area; the purposes of the planning project; the Board's name, address, and the name of a contact person with the Board; a statement that any comments must be filed with the EA and the applicant within 30 days of the date on which the notice is mailed or published. Prior to action by the Board, the applicant must provide one copy of the notice sent, a list of those to which the notice was sent, the date on which the notice was sent, copies of all notices as published showing name of the newspaper and the date on which the notice was published.

(5) RWPGs shall make copies of the IPP available for public inspection at least 30 days before a public hearing required or held by providing a copy of the IPP in at least one public library in each county and either the county courthouse's law library, the county clerk's office, or some other accessible place within the county courthouse of each county having land in the RWPA and include locations of such copies in the notice for public hearing. For distribution of the IPP and adopted RWP, the RWPG may consult and coordinate with county and local officials in determining the most appropriate location in the county courthouse to ensure maximum accessibility to the public during business hours. Additionally, the RWPG may consult with local and county officials in determining which public library in the county can provide maximum accessibility to the public. According to the capabilities of the facility, the RWPG may provide the copy electronically, on an electronic disc or drive, or in hard copy. The RWPG shall make an effort to ensure ease of access to the public, including where feasible, posting the IPP on websites and providing notice of such posting.

(6) Notice shall be mailed to, at a minimum, the following:

(A) Notification of all entities that are to be notified under subsection (c)(4) of this section;

(B) Each mayor of a municipality with a population of 1,000 or more or which is a county seat that is located in whole or in part in the RWPA;

(C) Each county judge of a county located in whole or in part in the RWPA;

(D) Each special or general law district or river authority with responsibility to manage or supply water in the RWPA based upon lists of such water districts and river authorities obtained from the Commission;

(E) Additionally, for public hearings or meetings to obtain input on development of a future RWP or a meeting or hearing associated with IPPs or major RWP amendments:

(i) each retail public utility, defined as a community water system, that serves any part of the RWPA or receives water from the RWPA based upon lists of such entities obtained from the Commission; and

(ii) each holder of record of a water right for the use of surface water the diversion of which occurs in the RWPA based upon lists of such water rights holders obtained from the Commission; and

(F) Additionally, a RWPG that intends to request Board funds for regional water planning must provide written notice to all other RWPGs.

(7) Notice and associated hearing and meeting agenda shall also be posted:

(A) On the website of the host political subdivision or on the Board website if requested by the RWPG;

(B) Texas Secretary of State website; and

(C) In the Texas Register.

(8) Public comments to be accepted as follows:

(A) Written comments submitted immediately following 30-day public notice posting and prior to and during meeting or hearing; and

(i) Until not earlier than 30-days following the date of the public hearing on a major amendment to a RWP.

(ii) Until not earlier than 60 days following the date of the public hearing on an IPP.

(B) Verbal public comments at the noticed meeting or hearing;

(C) Comments received must be considered as follows:

(i) Comments associated with hearings must be considered by RWPG members when adopting a RWP or adopting a major amendment to a RWP.

(ii) Comments associated with a preplanning meeting, scope of work development, and an application for funding to the Board must be considered prior to taking RWPG action.

RULE §357.22 General Considerations for Development of Regional Water Plans

(a) RWPGs shall consider existing local, regional, and state water planning efforts, including water plans, information and relevant local, regional, state and federal programs and goals when developing the regional water plan. The RWPGs shall also consider:

(1) water conservation plans;

(2) drought management and drought contingency plans;

(3) information compiled by the Board from water loss audits performed by retail public utilities pursuant to §358.6 of this title (relating to Water Loss Audits);

(4) publicly available plans for major agricultural, municipal, manufacturing and commercial water users;

(5) local and regional water management plans;

(6) water availability requirements promulgated by a county commissioners court in accordance with Texas Water Code §35.019 (relating to Priority Groundwater Management Areas);

(7) the Texas Clean Rivers Program;

(8) the U.S. Clean Water Act;

(9) water management plans;

(10) other planning goals including, but not limited to, regionalization of water and wastewater services where appropriate;

(11) approved groundwater conservation district management plans and other plans submitted under Texas Water Code §16.054 (relating to Local Water Planning);

(12) approved groundwater regulatory plans; and

(13) any other information available from existing local or regional water planning studies.

(b) The RWP shall contain a separate chapter for the contents of §§357.30, 357.31, 357.32, 357.33, 357.42, 357.43, 357.44, 357.45, and 357.50 of this title and shall also contain a separate chapter for the contents of §357.34 and §§357.35, 357.40 and 357.41 of this title for a total of eleven separate chapters.

RULE §357.30 Description of the Regional Water Planning Area

RWPGs shall describe their regional water planning area including the following:

(1) social and economic aspects of a region such as information on current population, economic activity and economic sectors heavily dependent on water resources;

(2) current water use and major water demand centers;

(3) current groundwater, surface water, and reuse supplies including major springs that are important for water supply or protection of natural resources;

(4) wholesale water providers;

(5) agricultural and natural resources;

(6) identified water quality problems;

(7) identified threats to agricultural and natural resources due to water quantity problems or water quality problems related to water supply;

(8) summary of existing local and regional water plans;

(9) the identified historic drought(s) of record within the planning area;

(10) current preparations for drought within the RWPA;

(11) information compiled by the Board from water loss audits performed by retail public utilities pursuant to §358.6 of this title (relating to Water Loss Audits); and

(12) an identification of each threat to agricultural and natural resources and a discussion of how that threat will be addressed or affected by the water management strategies evaluated in the plan.

RULE §357.31 Projected Population and Water Demands

(a) RWPs shall present projected population and water demands by WUG as defined in §357.10 of this title (relating to Definitions and Acronyms). If a WUG lies in one or more counties or RWPA or river basins, data shall be reported for each river basin, RWPA, and county split.

(b) RWPs shall present projected water demands associated with WWPs by category of water use, including municipal, manufacturing, irrigation, steam electric power generation, mining, and livestock for each county or portion of a county in the RWPA. If a county or portion of a county is in more than one river basin, data shall be reported for each river basin.

(c) RWPs shall report the current contractual obligations of WUG and WWPs to supply water in addition to any demands projected for the WUG or WWP. Information regarding obligations to supply water to other users must also be incorporated into the water supply analysis in §357.32 of this title (relating to Water Supply Analysis) in order to determine net existing water supplies available for each WUG's own use.

(d) Municipal demands shall be adjusted to reflect water savings due to plumbing fixture requirements identified in the Texas Health and Safety Code, Chapter 372. RWPGs will determine and report how changes in plumbing fixtures would affect projected municipal water demands using projections with plumbing code savings provided by the Board or by methods approved by the EA.

(e) Source of population and water demands. In developing RWPs, RWPGs shall use:

(1) Population and water demand projections developed by the EA that will be contained in the next state water plan and adopted by the Board after consultation with the RWPGs, Commission, Texas Department of Agriculture, and the Texas Parks and Wildlife Department.

(2) RWPGs may request revisions of Board adopted population or water demand projections if the request demonstrates that population or water demand projections no longer represents a reasonable estimate of anticipated conditions based on changed conditions and or new information. Before requesting a revision to population and water demand projections, the RWPG shall discuss the proposed revisions at a public meeting for which notice has been posted in accordance with §357.21(c) of this title (relating to Notice and Public Participation). The RWPG shall summarize public comments received on the proposed request for projection revisions. The EA shall consult with the requesting RWPG and respond to their request within 45 days after receipt of a request from a RWPG for revision of population or water demand projections.

(f) Population and water demand projections shall be presented for each planning decade for each of the above reporting categories.

RULE §357.32 Water Supply Analysis

(a) RWPGs shall evaluate:

(1) source water availability during drought of record conditions; and

(2) existing water supplies that are legally and physically available to WUGs and wholesale water suppliers within the RWPA for use during the drought of record.

(b) Evaluations shall consider surface water and groundwater data from the state water plan, existing water rights, contracts and option agreements relating to water rights, other planning and water supply studies, and analysis of water supplies existing in and available to the RWPA during drought of record conditions.

(c) Evaluation of the existing surface water available during drought of record shall be based on firm yield. The analysis may be based on justified operational procedures other than firm yield. The EA shall consider a written request from a RWPG to use procedures other than firm yield. For surface water supply analysis, RWPGs will use most current Water Availability Models from the Commission to evaluate the adequacy of surface water supplies. RWPGs will assume full utilization of existing water rights and no return flows when using Water Availability Models. RWPGs may use other water availability modeling assumptions or better site-specific

information with written approval from the EA. Information available from the Commission shall be incorporated by RWPGs unless better site-specific information is available.

(d) RWPGs shall use modeled available groundwater volumes for groundwater availability, as issued by the Board, and incorporate such information in its RWP unless no modeled available groundwater volumes are provided. Groundwater availability used in the RWP must be consistent with the desired future conditions as of the date the Board most recently adopted a state water plan or, at the discretion of the RWPG, established subsequent to the adoption of the most recent state water plan.

(e) RWPGs shall evaluate the existing water supplies for each WUG and WWP.

(f) Water supplies based on contracted agreements will be based on the terms of the contract, which may be assumed to renew upon contract termination if the contract contemplates renewal or extensions.

(g) Evaluation results shall be reported by WUG in accordance with §357.31(a) of this title (relating to Projected Population and Water Demands) and WWPs in accordance with §357.31(b) of this title.

RULE §357.33 Needs Analysis: Comparison of Water Supplies and Demands

(a) RWPGs shall include comparisons of existing water supplies and projected water demands to identify water needs.

(b) RWPGs shall compare projected water demands, developed in accordance with §357.31 of this title (relating to Projected Population and Water Demands), with existing water supplies available to WUGs and WWPs in a planning area, as developed in accordance with §357.32 of this title (relating to Water Supply Analysis), to determine whether WUGs will experience water surpluses or needs for additional supplies. Results will be reported for WUGs and for WWPs by categories of use including municipal, manufacturing, irrigation, steam electric, mining, and livestock watering for each county or portion of a county in a RWPA.

(c) The social and economic impacts of not meeting water needs will be evaluated by RWPGs and reported for each RWPA.

(d) Results of evaluations will be reported by WUG in accordance with §357.31(a) of this title and WWP in accordance with §357.31(b) of this title.

(e) RWPGs shall perform a secondary water needs analysis for all WUGs and WWPs for which conservation water management strategies or direct reuse water management strategies are recommended. This secondary water needs analysis will calculate the water needs that would remain after assuming all recommended conservation and direct reuse water management strategies are fully implemented. The resulting secondary water needs volumes shall be presented in the RWP by WUG and WWP and decade.

RULE §357.34 Identification and Evaluation of Potentially Feasible Water Management Strategies

(a) RWPGs shall identify and evaluate potentially feasible water management strategies for all WUGs and WWPs with identified water needs.

(b) RWPGs shall identify potentially feasible water management strategies to meet water supply needs identified in §357.33 of this title (relating to Needs Analysis: Comparison of Water Supplies and Demands) in accordance with the process in §357.12(b) of this title (relating to General Regional Water Planning Group Responsibilities and Procedures). Strategies shall be developed for WUGs and WWPs. The strategies shall meet new water supply obligations necessary to implement recommended water management strategies of WWPs and WUGs. RWPGs shall plan for water supply during Drought of Record conditions. In developing RWPs, RWPGs shall provide WMSs to be used during a drought of record.

(c) Potentially feasible water management strategies may include, but are not limited to:

(1) Expanded use of existing supplies including system optimization and conjunctive use of water resources, reallocation of reservoir storage to new uses, voluntary redistribution of water resources including contracts, water marketing, regional water banks, sales, leases, options, subordination agreements, and financing agreements, subordination of existing water rights through voluntary agreements, enhancements of yields of existing sources, and improvement of water quality including control of naturally occurring chlorides.

(2) New supply development including construction and improvement of surface water and groundwater resources, brush control, precipitation enhancement, desalination, water supply that could be made available by cancellation of water rights based on data provided by the Commission, rainwater harvesting, and aquifer storage and recovery.

(3) Conservation and drought management measures including demand management.

(4) Reuse of wastewater.

(5) Interbasin transfers of surface water.

(6) Emergency transfers of surface water including a determination of the part of each water right for non-municipal use in the RWPA that may be transferred without causing unreasonable damage to the property of the non-municipal water rights holder in accordance with Texas Water Code §11.139 (relating to Emergency Authorizations).

(d) Evaluations of potentially feasible water management strategies shall include the following analyses:

(1) For the purpose of evaluating potentially feasible water management strategies, the Commission's most current Water Availability Model with assumptions of no return flows and full utilization of senior water rights, is to be used. Alternative assumptions may be used with written approval from the EA who will consider a written request from a RWPG to use assumptions other than no return flows and full utilization of senior water rights.

(2) An equitable comparison between and consistent evaluation and application of all water management strategies the RWPGs determine to be potentially feasible for each water supply need.

(3) A quantitative reporting of:

(A) 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.

(B) 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.

(C) Impacts to agricultural resources.

(4) Discussion of the plan's impact on other water resources of the state including other water management strategies and groundwater and surface water interrelationships.

(5) A discussion of each threat to agricultural or natural resources identified pursuant to §357.30(7) of this title (relating to Description of the Regional Water Planning Area) including how that threat will be addressed or affected by the water management strategies evaluated.

(6) If applicable, consideration and discussion of the provisions in Texas Water Code §11.085(k)(1) for interbasin transfers of surface water. At minimum, this consideration will include a summation of water needs in the basin of origin and in the receiving basin.

(7) Consideration of third-party social and economic impacts resulting from voluntary redistributions of water including analysis of third-party impacts of moving water from rural and agricultural areas.

(8) A description of the major impacts of recommended water management strategies on key parameters of water quality identified by RWPGs as important to the use of a water resource and comparing conditions with the recommended water management strategies to current conditions using best available data.

(9) Consideration of water pipelines and other facilities that are currently used for water conveyance as described in §357.22(a)(3) of this title (relating to General Considerations for Development of Regional Water Plans).

(10) Other factors as deemed relevant by the RWPG including recreational impacts.

(e) RWPGs shall evaluate and present potentially feasible water management strategies with sufficient specificity to allow state agencies to make financial or regulatory decisions to determine consistency of the proposed action before the state agency with an approved RWP.

(f) Conservation, Drought Management Measures, and Drought Contingency Plans shall be considered by RWPGs when developing the regional plans, particularly during the process of identifying, evaluating, and recommending water management strategies. RWPGs shall incorporate water conservation planning and drought contingency planning in the regional water planning area.

(1) Drought management measures including water demand management. RWPGs shall consider drought management measures for each need identified in §357.33 of this title and shall include such measures for each user group to which Texas Water Code §11.1272 (relating to Drought Contingency Plans for Certain Applicants and Water Right Holders) applies. Impacts of the drought management measures on water needs must be consistent with guidance provided by the Commission in its administrative rules implementing Texas Water Code §11.1272. If a RWPG does not adopt a drought management strategy for a need it must document the reason in the RWP. Nothing in this paragraph shall be construed as limiting the use of voluntary arrangements by water users to forgo water usage during drought periods.

(2) Water conservation practices. RWPGs must consider water conservation practices, including potentially applicable best management practices, for each identified water need.

(A) RWPGs shall include water conservation practices for each user group to which Texas Water Code §11.1271 and §13.146 (relating to Water Conservation Plans) apply. The impact of these water conservation practices on water needs must be consistent

with requirements in appropriate Commission administrative rules related to Texas Water Code §11.1271 and §13.146.

(B) RWPGs shall consider water conservation practices for each WUG beyond the minimum requirements of subparagraph (A) of this paragraph, whether or not the WUG is subject to Texas Water Code §11.1271 and §13.146. If RWPGs do not adopt a water conservation strategy to meet an identified need, they shall document the reason in the RWP.

(C) For each WUG or WWP that is to obtain water from a proposed interbasin transfer to which Texas Water Code §11.085 (relating to Interbasin Transfers) applies, RWPGs will include a water conservation strategy, pursuant to Texas Water Code §11.085(1), that will result in the highest practicable level of water conservation and efficiency achievable. For these strategies, RWPGs will determine and report projected water use savings in gallons per capita per day based on its determination of the highest practicable level of water conservation and efficiency achievable. RWPGs will develop conservation strategies based on this determination. In preparing this evaluation, RWPGs will seek the input of WUGs and WWPs as to what is the highest practicable level of conservation and efficiency achievable, in their opinion, and take that input into consideration. RWPGs will develop water conservation strategies consistent with guidance provided by the Commission in its administrative rules that implement Texas Water Code §11.085. When developing water conservation strategies, the RWPGs must consider potentially applicable best management practices. Strategy evaluation in accordance with this section will include a quantitative description of the quantity, cost, and reliability of the water estimated to be conserved under the highest practicable level of water conservation and efficiency achievable.

(D) RWPGs shall consider strategies to address any issues identified in the information compiled by the Board from the water loss audits performed by retail public utilities pursuant to §358.6 of this title (relating to Water Loss Audits).

(g) RWPs shall include a subchapter consolidating the RWPG's recommendations regarding water conservation. RWPGs shall include in the RWPs model water conservation plans pursuant to Texas Water Code §11.1271.

RULE §357.35

Recommended and Alternative Water Management Strategies

(a) RWPGs shall recommend water management strategies to be used during a drought of record based on the potentially feasible water management strategies evaluated under §357.34 of this title (relating to Identification and Evaluation of Potentially Feasible Water Management Strategies).

(b) RWPGs shall recommend specific water management strategies based upon the identification, analysis, and comparison of water management strategies by the RWPG that the RWPG determines are potentially feasible so that the cost effective water management strategies that are environmentally sensitive are considered and adopted unless a RWPG demonstrates that adoption of such strategies is inappropriate. To determine cost-effectiveness and environmental sensitivity, RWPGs will follow processes described in §357.34 of this title. The RWP may include alternative water management strategies evaluated by the processes described in §357.34 of this title.

(c) Strategies will be selected by the RWPGs so that cost effective water management strategies, which are consistent with long-term protection of the state's water resources, agricultural resources, and natural resources are adopted.

(d) RWPGs shall identify and recommend water management strategies for all WUGs and WWP with identified water needs and that meet all water needs during the drought of record except in cases where:

(1) no water management strategy is feasible. In such cases, RWPGs must explain why no management strategies are feasible; or

(2) a political subdivision that provides water supply other than water supply corporations, counties, or river authorities explicitly does not participate in the regional water planning process for needs located within its boundaries or extraterritorial jurisdiction.

(e) Specific recommendations of water management strategies to meet an identified need will not be shown as meeting a need for a political subdivision if the political subdivision in question

objects to inclusion of the strategy for the political subdivision and specifies its reasons for such objection. This does not prevent the inclusion of the strategy to meet other needs.

(f) Recommended strategies shall protect existing water rights, water contracts, and option agreements, but may consider potential amendments of water rights, contracts and agreements, which would require the eventual consent of the owner.

(g) RWPGs shall report the following:

(1) Recommended water management strategies and the associated results of all the potentially feasible water management strategy evaluations by WUG and WWP. If a WUG or WWP lies in one or more counties or RWPAs or river basins, data will be reported for each river basin, RWPA, and county.

(2) Calculated planning management supply factors for each WUG and WWP included in the RWP assuming all recommended water management strategies are implemented. This calculation shall be based on the sum of: the total existing water supplies, plus all water supplies from recommended water management strategies for each entity; divided by that entity's total projected water demand, within the planning decade. The resulting calculated safety factor shall be presented in the plan by entity and decade for every WUG and WWP.

(3) Fully evaluated Alternative Water Management Strategies included in the adopted RWP shall be presented together in one place in the RWP.

RULE §357.40 Impacts of Regional Water Plan

(a) RWPs shall include a quantitative description of the socioeconomic impacts of not meeting the identified water needs pursuant to §357.33(c) of this title (relating to Needs Analysis: Comparison of Water Supplies and Demands).

(b) RWPs shall include a description of the impacts of the RWP regarding:

(1) Agricultural resources pursuant to §357.34(d)(3)(C) of this title (relating to Identification and Evaluation of Potentially Feasible Water Management Strategies);

(2) Other water resources of the state including other water management strategies and groundwater and surface water interrelationships pursuant to §357.34(d)(4) of this title;

(3) Threats to agricultural and natural resources identified pursuant to §357.34(d)(5) of this title;

(4) Third-party social and economic impacts resulting from voluntary redistributions of water including analysis of third-party impacts of moving water from rural and agricultural areas pursuant to §357.34(d)(7) of this title;

(5) Major impacts of recommended water management strategies on key parameters of water quality pursuant to §357.34(d)(8) of this title; and

(6) Effects on navigation.

(c) RWPs shall include a summary of the identified water needs that remain unmet by the RWP.

RULE §357.41 Consistency with Long-Term Protection of Water Resources, Agricultural Resources, and Natural Resources

RWPGs shall describe how RWPs are consistent with the long-term protection of the state's water resources, agricultural resources, and natural resources as embodied in the guidance principles in §358.3(4) and (8) of this title (relating to Guidance Principles).

RULE §357.42 Drought Response Information, Activities, and Recommendations

(a) RWPs shall consolidate and present information on current and planned preparations for, and responses to, drought conditions in the region including, but not limited to, drought of record conditions based on the following subsections.

(b) RWPGs shall conduct an overall assessment of current preparations for drought within the RWPA including a description of how water suppliers in the RWPA identify and respond to the onset of drought. This may include information from local drought contingency plans.

(c) RWPGs shall develop drought response recommendations regarding the management of existing groundwater and surface water sources in the RWPA designated in accordance with §357.32 of this title (relating to Water Supply Analysis), including:

(1) Factors specific to each source of water supply to be considered in determining whether to initiate a drought response for each water source including specific recommended drought response triggers;

(2) Actions to be taken as part of the drought response by the manager of each water source and the entities relying on each source, including the number of drought stages; and

(3) Triggers and actions developed in paragraphs (1) and (2) of this subsection may consider existing triggers and actions associated with existing drought contingency plans.

(d) RWPGs will collect information on existing major water infrastructure facilities that may be used for interconnections in event of an emergency shortage of water. In accordance with Texas Water Code §16.053(r), this information is CONFIDENTIAL INFORMATION and cannot be disseminated to the public. The associated information is to be collected by a subgroup of RWPG members in a closed meeting and submitted separately to the EA in accordance with guidance to be provided by EA.

(e) RWPGs will provide general descriptions of local drought contingency plans that involve making emergency connections between water systems or WWP systems that do not include locations or descriptions of facilities that are disallowed under subsection (d) of this section.

(f) RWPGs may designate recommended and alternative drought management water management strategies and other recommended drought measures in the RWP including:

(1) List and description of the recommended drought management water management strategies and associated WUGs and WWPs, if any, that are recommended by the RWPG. Information to include associated triggers to initiate each of the recommended drought management water management strategies;

(2) List and description of alternative drought management water management strategies and associated WUGs and WWPs, if any, that are included in the plan.

Information to include associated triggers to initiate each of the alternative drought management water management strategies;

(3) List of all potentially feasible drought management water management strategies that were considered or evaluated by the RWPG but not recommended; and

(4) List and summary of any other recommended drought management measures, if any, that are included in the RWP, including associated triggers if applicable.

(g) The RWPGs shall evaluate potential emergency responses to local drought conditions or loss of existing water supplies; the evaluation shall include identification of potential alternative water sources that may be considered for temporary emergency use by WUGs and WWPs in the event that the existing water supply sources become temporarily unavailable to the WUGs and WWPs due to unforeseeable hydrologic conditions such as emergency water right curtailment, unanticipated loss of reservoir conservation storage, or other localized drought impacts. RWPGs shall evaluate, at a minimum, municipal WUGs that:

(1) have existing populations less than 7,500;

(2) rely on a sole source for its water supply regardless of whether the water is provided by a WWP; and

(3) all county-other WUGs.

(h) RWPGs shall consider any relevant recommendations from the Drought Preparedness Council.

(i) RWPGs shall make drought preparation and response recommendations regarding:

(1) Development of, content contained within, and implementation of local drought contingency plans required by the Commission;

(2) Current drought management preparations in the RWPA including:

(A) drought response triggers; and

(B) responses to drought conditions;

(3) The Drought Preparedness Council and the State Drought Preparedness Plan; and

(4) Any other general recommendations regarding drought management in the region or state.

(j) The RWPGs shall develop region-specific model drought contingency plans.

**RULE §357.43 Regulatory, Administrative, or Legislative
Recommendations**

(a) The RWPGs shall contain any regulatory, administrative, or legislative recommendations developed by the RWPGs.

(b) Ecologically Unique River and Stream Segments. RWPGs may include in adopted RWPG 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. The recommendation package shall address each of the criteria for designation of river and stream segments of ecological value found in this subsection. The RWPG shall forward the recommendation package to the Texas Parks and Wildlife Department and allow the Texas Parks and Wildlife Department 30 days for its written evaluation of the recommendation. The adopted RWPG shall include, if available, Texas Parks and Wildlife Department's written evaluation of each river and stream segment recommended as a river or stream segment of unique ecological value.

(1) A RWPG may recommend a river or stream segment as being of unique ecological value based upon the criteria set forth in §358.2 of this title (relating to Definitions).

(2) For every river and stream segment that has been designated as a unique river or stream segment by the legislature, during a session that ends not less than one year before the required date of submittal of an adopted RWPG to the Board, or recommended as a unique river or stream segment in the RWPG, the RWPG shall assess the impact of the RWPG on these segments. The assessment shall be a quantitative analysis of the impact of the plan on the flows important to the river or stream segment, as determined by the RWPG, comparing current conditions to conditions with implementation of all recommended water management strategies. The assessment shall also describe the

impact of the plan on the unique features cited in the region's recommendation of that segment.

(c) Unique Sites for Reservoir Construction. A RWPG 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 at §358.2 of this title shall be used to determine if a site is unique for reservoir construction.

(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.

(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.

RULE §357.44 Infrastructure Financing Analysis

RWPGs shall assess and quantitatively report on how individual local governments, regional authorities, and other political subdivisions in their RWPA propose to finance recommended water management strategies.

RULE §357.45 Implementation and Comparison to Previous Regional Water Plan

(a) RWPGs shall describe the level of implementation of previously recommended water management strategies. Information on the progress of implementation of all water management strategies that were recommended in the previous RWP, including conservation and drought management water management strategies; and the implementation of projects that have affected progress in meeting the state's future water needs.

(b) RWPGs shall provide a brief summary of how the RWP differs from the previously adopted RWP with regards to:

- (1) Water demand projections;
- (2) Drought of record and hydrologic and modeling assumptions used in planning for the region;
- (3) Groundwater and surface water availability, existing water supplies, and identified water needs for WUGs and WWPs; and
- (4) Recommended and alternative water management strategies.

RULE §357.50 Adoption, Submittal, and Approval of Regional Water Plans

(a) The RWPGs shall submit their adopted RWPs to the Board every five years on a date to be disseminated by the EA, as modified by subsection (e)(2) of this section, for approval and inclusion in the state water plan.

(b) Prior to the adoption of the RWP, the RWPGs shall submit concurrently to the EA and the public an IPP. The IPP submitted to the EA must be in the electronic and paper format specified by the EA. Each RWPG must certify that the IPP is complete and adopted by the RWPG.

(c) The RWPGs shall distribute the IPP in accordance with §357.21(d)(5) of this title (relating to Notice and Public Participation).

(d) The RWPGs shall solicit, and consider the following comments when adopting a RWP:

- (1) the EA's written comments, which shall be provided to the RWPG within 120 days of receipt of the IPP;
- (2) written comments received from any federal agency or Texas state agency, which the RWPGs shall accept after the first public hearing notice is published pursuant to §357.21(d) of this title until at least 90 days after the public hearing is held pursuant to §357.21(d) of this title; and

(3) any written or oral comments received from the public after the first public hearing notice is published pursuant to §357.21(d) of this title until at least 60 days after the public hearing is held pursuant to §357.21(d) of this title.

(e) Submittal of RWPs. RWPGs shall submit the IPP and the adopted RWPs and amendments to approved RWPs to the EA in conformance with this section.

(1) RWPs shall include:

(A) The technical report and data prepared in accordance with this chapter and the EA's specifications;

(B) An executive summary that documents key RWP findings and recommendations;
and

(C) Summaries of all written and oral comments received pursuant to subsection (d) of this section, with a response by the RWPG explaining how the plan was revised or why changes were not warranted in response to written comments received under subsection (d) of this section.

(2) RWPGs shall submit regional plans to the EA according to the following schedule:

(A) Initially prepared plans are due every five years on a date disseminated by the EA unless an extension is approved, in writing, by the EA.

(B) Prior to submission of the IPP, the RWPGs shall upload the data, metadata and all other relevant digital information supporting the plan to the Board's planning database system. All changes and corrections to this information must be entered into the Board's database prior to submittal of an adopted plan.

(C) The RWPG will transfer copies of all data, models, and reports generated by the planning process and used in developing the RWP to the EA. To the maximum extent possible, data shall be transferred in digital form according to specifications provided by the EA. One copy of all reports prepared by the RWPG shall be provided in digital format according to specifications provided by the EA. All digital mapping shall use a geographic information system according to specifications provided by the EA. The EA shall seek the input from the State Geographic Information Officer regarding specifications mentioned in this section.

(D) Adopted RWPs are due to the EA every five years on a date disseminated by the EA unless, at the discretion of the EA, a time extension is granted consistent with the timelines in Texas Water Code §16.053(i).

(E) Once approved by the Board, RWPs will be made available on the Board website.

(f) The RWPGs shall submit in a timely manner to the EA information on any known interregional conflict between RWPs.

(g) The RWPGs shall modify the RWP to incorporate Board resolutions of interregional conflicts.

(h) The RWPGs shall seek to resolve conflicts with other RWPGs and shall participate in any Board sponsored efforts to resolve interregional conflicts.

(i) Approval of RWPs by the Board. The Board may approve a RWP only after it has determined that the RWP complies with statute and rules.

(j) Upon receipt of a RWP adopted by the RWPG, the Board will consider approval of such plan based on the following criteria:

(1) The Board shall verify adoption of the RWP by the RWPG.

(2) The Board shall approve the plan only after it considers any information from RWPGs of the existence of an interregional conflict and finds that no interregional conflict exists. The Board shall not consider approval of a RWP unless all RWPs which could contain conflicts have also been submitted to the Board for approval, or the Board determines that such plans are not likely to be submitted.

(k) Board Adoption of State Water Plan. RWPs approved by the Board pursuant to this chapter shall be incorporated into the state water plan as outlined in §358.4 of this title (relating to Guidelines).

RULE §357.51 Amendments to Regional Water Plans

(a) Local Water Planning Amendment Requests. A political subdivision in the RWPA may request a RWPG to consider specific changes to an adopted RWP based on changed conditions or new information. A RWPG must formally consider such request within 180 days after its receipt and shall amend its adopted RWP if it determines an amendment is warranted. If the political subdivision is not satisfied with the RWPG's decision on the issue, it may file a petition with the

EA to request Board review the decision and consider changing the approved RWP. The political subdivision shall send a copy of the petition to the chair of the affected RWPG.

(1) The petition must state:

(A) the changed condition or new information that affects the approved RWP;

(B) the specific sections and provisions of the approved RWP that are affected by the changed condition or new information;

(C) the efforts made by the political subdivision to work with the RWPG to obtain an amendment; and

(D) the proposed amendment to the approved RWP.

(2) If the EA determines that the changed condition or new information warrants a change in the approved RWP, the EA shall request the RWPG to consider making the appropriate change and provide the reason in writing. The political subdivision that submitted the petition will receive notice of any action requested of the RWPG by the EA. If the RWPG does not amend its plan consistent with the request within 90 days, the EA will present the issue to the Board for consideration at a public meeting. Before presenting the issue to the Board, the EA will provide the RWPG, the political subdivision submitting the petition, and any political subdivision determined by the EA to be affected by the issue 30 days notice.

(b) Major Amendments to RWPs and State Water Plan. A RWPG may amend an adopted RWP at any meeting, after giving notice for a major amendment and holding a hearing according to §357.21(d) of this title (relating to Notice and Public Participation). An amendment is major if it does not meet the criteria of subsection (c), (d) or (e) of this section. A RWPG may propose amendments to an approved RWP by submitting proposed amendments to the Board for its consideration and possible approval under the standards and procedures of this section.

(1) Initiation of a Major Amendment. An entity may request a RWPG amend its adopted RWP. A RWPG's consideration for action to initiate an amendment may occur at a regularly scheduled meeting.

(2) RWPG Public Hearing. The RWPG shall hold a public hearing on the amendment as defined in §357.21(d) of this title. The amendment shall be available for agency and

public comment at least 30 days prior to the public hearing and 30 days following the public hearing as defined in §357.21(d) of this title.

(3) The proposed major amendment:

(A) Shall not result in an over-allocation of an existing or planned source of water;

(B) Shall not produce unmet needs new to the adopted RWP; and

(C) Shall conform with rules applicable to RWP development as defined in Subchapters C and D of this chapter.

(4) RWPG Major Amendment Adoption. The RWPG may adopt the amendment at a regularly scheduled RWPG meeting held in accordance with §357.21(b) of this title following the 30-day public comment period held in accordance with §357.21(d) of this title. The amendment shall include response to comments received.

(5) Board Approval of Major Amendment. After adoption of the major amendment, the RWPG shall submit the amendment to the Board which shall consider approval of the amendment at its next regularly scheduled meeting following EA review of the amendment.

(c) Minor Amendments to RWPs and State Water Plan.

(1) Minor Amendment to RWP. A RWPG may amend its RWP by first providing a copy of the proposed amendment to the EA for a determination as to whether the amendment would be minor.

(2) EA Pre-Adoption Review. The EA shall evaluate the proposed minor amendment prior to the RWPG's vote to adopt the amendment. An amendment is minor if it meets the following criteria:

(A) does not result in over-allocation of an existing or planned source of water;

(B) does not relate to a new reservoir;

(C) does not have a significant effect on instream flows, environmental flows or freshwater flows to bays and estuaries;

(D) does not have a significant substantive impact on water planning or previously adopted management strategies; and

(E) does not delete or change any legal requirements of the plan.

(3) Determination by EA. If the EA determines that the proposed amendment is minor, EA shall notify, in writing, the RWPG as soon as practicable.

(4) RWPG Public Meeting. After receipt of the written determination from the EA, the RWPG shall conduct a public meeting in accordance with §357.21(c) of this title. The public shall have an opportunity to comment and the RWPG shall amend the proposed minor amendment based on public comments, as appropriate, and to comply with existing statutes and rules related to regional water planning responses.

(5) Board Approval of Minor Amendment. After adoption of the minor amendment, the RWPG shall submit the amendment to the Board which shall approve the amendment at its next regularly scheduled meeting unless the amendment contradicts or is in substantial conflict with statutes and rules relating to regional water planning.

(d) Amendment for Water Planning for a Clean Coal Project. An amendment to a RWP or the state water plan to facilitate planning for water supplies reasonably required for a clean coal project, as defined by Texas Water Code §5.001, relating to the Texas Commission on Environmental Quality, shall be adopted by the process described in this section. However, a RWPG may amend the RWP to accommodate planning for a clean coal project without a public meeting or hearing if the EA determines that:

(1) the amendment does not significantly change the RWP; or

(2) the amendment does not adversely affect other water management strategies in the RWP.

(e) Substitution of Alternative Water Management Strategies. After notice is provided in accordance with §357.21(c) of this title, RWPGs may substitute one or more evaluated alternative water management strategies for a recommended strategy if the strategy originally recommended is no longer recommended and the substitution of the alternative water management strategy is capable of meeting the same water need. Proposed substitutions must receive written approval from the EA prior to substitution by the RWPG.

(f) Amending the State Water Plan. Following amendments of RWPs, including substitutions of alternative water management strategies, the Board shall make any necessary amendments to the state water plan as outlined in §358.4 of this title (relating to Guidelines).

RULE §357.60 Consistency of Regional Water Plans

(a) RWPGs shall submit to the development Board a RWP that is consistent with the guidance principles and guidelines outlined in §357.20 of this title (relating to Guidance Principles for State and Regional Water Planning). Information provided shall be based on data provided or approved by the Board in a format consistent with the guidelines of Subchapters C and D of this chapter and guidance by the EA.

(b) For the purposes of the Texas Water Code §16.053(j) (relating to Board Financial Assistance) projects proposed to the Board for funding will be considered to meet any need identified in an approved RWP in a manner consistent with the RWP if the project:

(1) Is an enhancement of a current water supply identified in the analysis developed under §357.32 of this title (relating to Water Supply Analysis) as meeting a demand, even though the project is not specifically recommended in the RWP;

(2) Involves a minor modification to an existing surface water right that is not in conflict with the RWP; and

(3) Is meeting a need in a manner consistent with the plan developed under Subchapters C and D of this chapter.

(4) For the purposes of the Texas Water Code §16.053(j), projects proposed to the Board for funding to meet any need identified in an approved RWP for which there is not a recommended water management strategy in such plan will be considered by the Board not to be consistent with the approved RWP.

(5) For the purposes of the Texas Water Code §16.053(k) (relating to Board Waivers), the Board may consider, among other factors, changed conditions if a political subdivision requests a waiver of the Texas Water Code §16.053(j) for a project proposed to the Board for funding to meet a need in a manner that is not consistent with the manner the need is addressed in an approved RWP. The Board shall request the

members of any affected RWPG to provide input on the request for waiver of the Texas Water Code §16.053(j).

(c) Relation to state and local plans. RWPs shall be consistent with Chapter 358 of this title (relating to State Water Planning Guidelines) and this chapter. RWPGs shall consider and use as a guide the state water plan and local water plans provided for in the Texas Water Code §16.054 (relating to Local Water Planning).

RULE §357.61 Intraregional Conflicts in Development of Regional Water Plans

The EA shall provide technical assistance within available resources to the RWPGs requesting such assistance in performing regional water planning activities and if requested, may facilitate resolution of conflicts within RWPAs.

RULE §357.62 Interregional Conflicts

(a) In the event the Board finds that an interregional conflict exists between adopted RWPs, the EA may use the following process:

- (1) notify the affected RWPGs of the nature of the interregional conflict;
- (2) request affected RWPGs assistance in resolving the conflict; and
- (3) negotiate resolutions of conflicts with RWPGs as determined by the EA.

(b) In the event the negotiation is unsuccessful, the EA may:

- (1) determine a proposed recommendation for resolution of the conflict;
- (2) provide notice of its intent to hold a public hearing on proposed recommendations for resolution of the conflict by publishing notice of the proposed change in the Texas Register and in a newspaper of general circulation in each county located in whole or in part in the RWPAs involved in the dispute 30 days before the public hearing and by mailing notice of the public hearing 30 days before public hearing to those persons or entities listed in §357.21(d) of this title (relating to Notice and Public Participation) in the RWPAs proposed to be impacted, and to each county judge of a county located in whole or in part in the RWPAs proposed to be impacted and to each affected RWPG;

(3) hold a public hearing on the proposed recommendation for resolution of the conflict at a time and place determined by the EA. At the hearing, the EA shall take comments from the RWPGs, political subdivisions, and members of the public on the issues identified by the Board as unresolved problems; and

(4) make a recommendation to the Board for resolution of the conflict.

(c) The Board shall consider the EA's recommendation and any written statements by a representative for each affected RWPG and determine the resolution of the conflict. The Board's decision is final and not appealable.

(d) The EA shall notify affected RWPGs of Board's decision and shall direct changes to the affected RWPGs.

RULE §357.63 Failure of a Regional Water Plan to Meet Regional Water Planning Requirements

(a) In the event the Board finds that the RWP does not meet the requirements of the Texas Water Code §16.053, this chapter, and Chapter 358 of this title (relating to State Water Planning Guidelines), the Board shall direct the RWPG to make changes necessary for compliance with legal requirements.

(b) In the event the Board directs the RWPG to make changes to its RWP, the RWPG may request a reasonable amount of time, within any statutory deadlines, to complete the required changes.

RULE §357.64 Conflicts Between Regional Water Plans and Groundwater Management Plans

(a) A groundwater conservation district may file a written petition with the EA stating that a potential conflict exists between the district's approved management plan developed under Texas Water Code §36.1071 (relating to Management Plans) and the approved state water plan. A copy of the petition shall be provided to the affected RWPG. The petition must state:

(1) the specific nature of the conflict;

(2) the specific sections and provisions of the approved management plan and approved state water plan that are in conflict; and

(3) the proposed resolution to the conflict.

(b) If the EA determines a conflict exists, the EA will provide technical assistance to and coordinate with the groundwater conservation district and the affected RWPG to resolve the conflict. Coordination may include any of the following processes:

(1) requiring the RWPG to respond to the petition in writing;

(2) meeting with representatives from the groundwater conservation district and the RWPG to informally mediate the conflict; and/or

(3) coordinating a formal mediation session between representatives of the groundwater conservation district and the RWPG.

(c) If the parties do not reach resolution, the EA will recommend a resolution to the conflict to the Board within 60 days of the date the mediation is completed. Notice shall be provided at least 15 days prior to the date of the Board meeting to discuss the proposed resolution. The Board may:

(1) revise an approved RWP; and

(2) revise a district's approved management plan.

(d) If the Board requires a revision to the groundwater conservation district's approved management plan, the Board shall provide information to the groundwater conservation district on what revisions are required and why. The groundwater conservation district shall prepare any revisions to its plan based on the information provided by the Board and hold, after notice, at least one public hearing. The groundwater conservation district shall consider all public and Board comments, prepare, revise, and adopt its plan, and submit the revised plan to the Board pursuant to Chapter 356 of this title (relating to Groundwater Management). If the groundwater conservation district disagrees with the decision of the Board, the district may appeal the decision to a district court in Travis County, Texas.

(e) If the Board requires a revision to the approved RWP, the Board shall provide information to the RWPG on what revisions are required and why. The RWPG shall prepare the revisions as a major amendment to their approved RWP pursuant to §357.51(b) of this title.

(f) At the Board's discretion, the Board shall include in the state water plan a discussion of the conflict and its resolution.

Appendix F

Texas Administrative Code Title 31 Part 10 Chapter 358: State Water Planning Guidelines

TITLE 31 NATURAL RESOURCES AND CONSERVATION
PART 10 TEXAS WATER DEVELOPMENT BOARD
CHAPTER 358 STATE WATER PLANNING GUIDELINES
SUBCHAPTER A STATE WATER PLAN DEVELOPMENT
RULE §358.1 **Applicability**

This subchapter governs the Board's preparation, development, formulation, and adoption of the state water plan.

RULE §358.2 **Definitions**

The following words and acronyms, used in this chapter, have the following meanings.

- (1) Board--The Texas Water Development Board.
- (2) Commission--The Texas Commission on Environmental Quality.
- (3) Regional water plan (RWP)--The plan adopted or amended by a regional water planning group pursuant to Texas Water Code §16.053 (relating to Regional Water Plans) and Chapter 357 of this title (relating to Regional Water Planning).
- (4) Regional water planning area--Area designated pursuant to Texas Water Code §16.053 and Chapter 357 of this title.
- (5) Regional water planning group (RWPG)--Group designated pursuant to Texas Water Code §16.053 and Chapter 357 of this title.
- (6) River and stream segments of unique ecological value--Those river or stream segments that may be identified by the Board in coordination with the Texas Parks and Wildlife Department and the Commission or identified in an approved regional water plan based on the following criteria:
 - (A) 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;
 - (B) 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;
 - (C) 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;
 - (D) 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
 - (E) 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.

(7) Site of unique value for construction of reservoirs--Those sites identified by the Board in coordination with the Texas Parks and Wildlife Department and the Commission or identified in an approved regional water plan where:

(A) 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

(B) 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:

(i) The current planning period; or

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

(8) State drought preparedness plan--A plan, separate from the state water plan, that is developed by the Drought Preparedness Council for the purpose of mitigating the effects of drought pursuant to Texas Water Code §16.0551 (relating to State Drought Preparedness Plan).

(9) State drought response plan--A plan prepared and directed by the chief of the Texas Division of Emergency Management for the purpose of managing and coordinating the drought response component of the state water plan and the state drought preparedness plan pursuant to Texas Water Code §16.055 (relating to Drought Response Plan).

(10) State water plan--The most recent comprehensive statewide water plan adopted by the Board under Texas Water Code §16.051 (relating to State Water Plan).

(11) Water management strategy--A plan or specific project to meet a need for additional water by a discrete user group, which can mean increasing the total water supply or maximizing an existing supply.

RULE §358.3 Guidance Principles

Development of the state water plan shall be guided by the following principles.

(1) The state water plan shall provide for the preparation for and response to drought conditions.

(2) The regional water plans and state water plan shall serve as water supply plans under drought of record conditions.

(3) Consideration shall be given to the construction and improvement of surface water resources and the application of principles that result in voluntary redistribution of water resources.

(4) Regional water plans shall provide for the orderly development, management, and conservation of water resources and preparation for and response to drought conditions so that sufficient water will be available at a reasonable cost to satisfy a reasonable projected use of water to ensure public health, safety, and welfare; further economic development; and protect the agricultural and natural resources of the regional water planning area.

(5) Regional water plans shall include identification of those policies and action that may be needed to meet Texas' water supply needs and prepare for and respond to drought conditions.

(6) RWPG decision-making shall be open to and accountable to the public with decisions based on accurate, objective and reliable information with full dissemination of planning results except for those matters made confidential by law.

(7) The RWPG shall establish terms of participation in its water planning efforts that shall be equitable and shall not unduly hinder participation.

(8) Consideration of the effect of policies or water management strategies on the public interest of the state, water supply, and those entities involved in providing this supply throughout the entire state.

(9) Consideration of all water management strategies the regional water plan determines to be potentially feasible when developing plans to meet future water needs and to respond to drought so that cost effective water management strategies which are consistent with long-term protection of the state's water resources, agricultural resources, and natural resources are considered and approved.

(10) Consideration of opportunities that encourage and result in voluntary transfers of water resources, including but not limited to regional water banks, sales, leases, options, subordination agreements, and financing agreements.

(11) Consideration of a balance of economic, social, aesthetic, and ecological viability.

(12) For regional water planning areas without approved regional water plans or water providers for which revised plans are not developed through the regional water planning process, the use of information from the adopted state water plan and other completed studies that are sufficient for water planning shall represent the water supply plan for that area or water provider.

(13) All surface waters are held in trust by the state, their use is subject to rights granted and administered by the Commission, and the use of surface water is governed by the prior appropriation doctrine, unless adjudicated otherwise.

(14) Existing water rights, water contracts, and option agreements shall be protected. However, potential amendments of water rights, contracts and agreements may be considered and evaluated. Any amendments will require the eventual consent of the owner.

(15) The production and use of groundwater in Texas is governed by the rule of capture doctrine unless and to the extent that such production and use is regulated by a groundwater conservation district, as codified by the legislature at Texas Water Code §36.002 (relating to Ownership of Groundwater).

(16) Consideration of recommendations of river and stream segments of unique ecological value to the legislature for potential protection.

(17) Consideration of recommendation of sites of unique value for the construction of reservoirs to the legislature for potential protection.

(18) Consideration of water planning and management activities of local, regional, state, and federal agencies, along with existing local, regional, and state water plans and information and existing state and federal programs and goals.

(19) Designated water quality and related water uses as shown in the state water quality management plan shall be improved or maintained.

(20) Coordination of water planning and management activities of RWPGs to identify common needs and issues and achieve efficient use of water supplies, including the Board and other relevant RWPGs, working together to identify common needs, issues, and challenges while working together to resolve conflicts in a fair, equitable, and efficient manner.

(21) The water management strategies identified in approved RWPs to meet needs shall be described in sufficient detail to allow a state agency making a financial or regulatory decision to determine if a proposed action before the state agency is consistent with an approved RWP.

(22) The evaluation of water management strategies shall use environmental information in accordance with the Commission's adopted environmental flow standards under 30 TAC Chapter 298 (relating to Environmental Flow Standards for Surface Water) where applicable or, in basins where standards are not available or have not been adopted, information from existing site-specific studies or state consensus environmental planning criteria.

(23) Consideration of environmental water needs including instream flows and bay and estuary inflows, including adjustments by the RWPGs 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.

(24) Planning shall be consistent with all laws applicable to water use for the state and regional water planning area.

(25) The inclusion of ongoing water development projects that have been permitted by the Commission or a predecessor agency.

(26) Specific recommendations of water management strategies shall be based upon identification, analysis, and comparison of all water management strategies the RWPG determines to be potentially feasible so that the cost effective water management strategies which are environmentally sensitive are considered and adopted unless the RWPG demonstrates that adoption of such strategies is not appropriate. To determine cost-effectiveness, the RWPGs will use the process described in §357.34(d)(3)(A) of this title (relating to Identification and Evaluation of Potentially Feasible Water Management Strategies) and, to determine environmental sensitivity, the RWPGs shall use the process described in §357.34(d)(3)(B) of this title.

(27) RWPGs shall conduct their planning to achieve efficient use of existing water supplies, explore opportunities for and the benefits of developing regional water supply facilities or providing regional management of water facilities, coordinate the actions of local and regional water resource management agencies, provide substantial involvement by the public in the decision-making process, and provide full dissemination of planning results.

(28) RWPGs must consider existing regional water planning efforts when developing their plans.

RULE §358.4 Guidelines

(a) The executive administrator shall prepare, develop, and formulate the state water plan and the Board shall adopt a state water plan pursuant to the schedule in Texas Water Code §16.051. The executive administrator shall identify the beginning of the 50-year planning period for the state and regional water plans. The executive administrator shall incorporate into the state water plan presented to the Board those regional water plans approved by the Board pursuant to Texas Water Code §16.053 and Chapter 357 of this title (relating to Regional Water Planning). The Board shall, not less than 30 days before adoption or amendment of the state water plan, publish notice in the *Texas Register* of its intent to adopt a state water plan and shall mail notice to each regional water planning group. The Board shall hold a hearing, after which it may adopt a water plan or amendments thereto.

(b) The state water plan shall include summaries for the state and from approved regional water plans, when available, which shall address, at a minimum, the following topics:

- (1) Basis for planning, including sections on planning history, Texas water statutes, rules, regulations, and Texas' water supply institutions;
- (2) Description of methods used for projecting future water demands which shall include methods for projecting future population and water demands for municipal and associated commercial and institutional uses, manufacturing, irrigation, steam electric power generation, mining, and livestock watering;
- (3) Description of methods to address water quality problems related to water supply, to ensure public health, safety and welfare, to further economic growth, to protect agricultural and natural resources, to determine water supply availability, and to address drought response planning;
- (4) Description of future conditions which shall, at a minimum, include:
 - (A) Demands for water;
 - (B) Supplies currently available;
 - (C) Comparison of water demand and supply to identify surpluses or needs of water;
 - (D) Social and economic impact of not meeting needs;
 - (E) Recommended solutions to meet needs;
 - (F) Needs for which no feasible water management strategy exists; and
 - (G) descriptions in subparagraphs (A) - (F) of this paragraph shall be presented for each county and basin by the major providers of water for municipal uses and for the following water use categories: municipal and associated commercial and institutional uses; manufacturing; irrigation; steam electric power generation; mining; and livestock watering;
- (5) Consideration of recommendations of river and stream segments of unique ecological value and sites of unique value for construction of reservoirs to the legislature for potential protection;
- (6) Regulatory, administrative, and legislative recommendations that the Board believes are needed and desirable to facilitate the orderly development, management, and conservation of water resources, to facilitate more voluntary water transfers, and the 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 protect the agricultural and natural resources of the entire state;
- (7) The progress in meeting future water needs, including an evaluation of implementation of all water management strategies that were recommended in the previous state water plan and projects funded by the Board; and
- (8) Current and planned preparations for, and responses to, drought conditions in the state to be used in the development of the state's drought preparedness plan by the Drought Preparedness Council.

SUBCHAPTER B

RULE §358.5

DATA COLLECTION

Groundwater and Surface Water Use Surveys

The executive administrator shall conduct surveys at least annually of persons and/or entities using groundwater and surface water for municipal, industrial, power generation, or mining purposes to gather data to be used for long-term water supply planning. The survey instrument will identify which responses are required and which are optional. The executive administrator will send the surveys to the appropriate recipients by first-class mail, electronic mail, or both. Recipients shall return the survey to the executive administrator within 60 days of the postmark date or electronic mail sent date. Surveys may be returned to the executive administrator

electronically. The executive administrator shall determine if the survey is administratively complete. A survey is administratively complete if all required responses are provided. Incomplete surveys will be returned to the recipient, who will have 60 days from the new postmark date or electronic mail sent date to complete the items found deficient and return the survey to the executive administrator. A person or entity that fails to return their survey within 60 days or correct a survey that is not administratively complete within 60 days is ineligible for funding from board programs. Ineligibility will remain until the incomplete survey instruments are submitted to the executive administrator and determined to be administratively complete. Further, a person who fails to complete and return the survey commits an offense that is punishable as a Class C misdemeanor, pursuant to Texas Water Code §16.012(m).

RULE §358.6

Water Loss Audits

(a) In accordance with Texas Water Code §16.0121, a retail public utility, as defined by Texas Water Code §13.002, that provides potable water shall perform a water loss audit and file with the executive administrator a water loss audit computing the utility's system water loss during the preceding calendar year, unless a different 12-month period is allowed by the executive administrator. The water loss audit may be submitted electronically.

(1) Audit required annually. The utility must file the water loss audit with the executive administrator annually by May 1st if the utility:

(A) has greater than 3,300 connections; or

(B) is receiving financial assistance from the board, regardless of the number of connections.

A retail public utility is receiving financial assistance from the board if it has an outstanding loan, loan forgiveness agreement, or grant agreement from the board.

(2) Audit required every five years. The utility must file the water loss audit with the executive administrator by May 1, 2016, and every five years thereafter by May 1st if the utility has 3,300 or fewer connections and is not receiving financial assistance from the board.

(3) The water loss audit shall be performed in accordance with methodologies developed by the executive administrator based on the population served by the utility and taking into consideration the financial feasibility of performing the water loss audit, population density in the service area, the retail public utility's source of water supply, the mean income of the service population, and any other factors determined by the executive administrator. The executive administrator will provide the necessary forms and methodologies to the retail public utility.

(4) The executive administrator shall compile the information included in the water loss audits according to category of retail public utility and according to regional water planning area.

(b) The executive administrator shall determine if the water loss audit is administratively complete. A water loss audit is administratively complete if all required responses are provided. In the event the executive administrator determines that a retail public utility's water loss audit is incomplete, the executive administrator shall notify the utility. A retail public utility that provides potable water that fails to submit a water loss audit or that fails to correct a water loss audit that is not administratively complete within the timeframe provided by the executive administrator is ineligible for financial assistance for water supply projects under Texas Water Code, Chapter 15, Subchapters C, D, E, F, J, O, Q, and R; Chapter 16, Subchapters E and F; and Chapter 17, Subchapters D, I, K, and L. The retail public utility will remain ineligible for financial assistance until a complete water loss audit has been filed with and accepted by the executive administrator.

Appendix G

**Background and Methodology for Land Resource/Cover Type
Assessment – Excerpt from Section 2 of Environmental Evaluation
Interim Report – Sulphur River Basin Comparative Assessment**

Land Resource / Cover Type Assessment

2.1 Background

The Texas Parks and Wildlife Department (TPWD) Ecological Systems Classification data set was utilized to develop the cover types within the footprints of the alternative reservoir sites, including Parkhouse I, Parkhouse II, Marvin Nichols 1A, Wright Patman (237.5 ft. msl and 259.5 ft. msl), Jim Chapman, and Talco. A number of key partners including the Texas Natural Resources Information System (TNRIS), Texas Forest Service, Natural Resources Conservation Service (NRCS), NatureServe, The Nature Conservancy (TNC), and the Missouri Resource Assessment Partnership (MoRAP) were involved in developing the Ecological Systems Classification project.

The creation of the Ecological Systems Classification took into consideration a wide variety of biotic and abiotic variables to establish detailed regional comparisons of vegetation and habitats. Data sources utilized in this classification system included the Farm Service Agency (FSA) National Agriculture Imagery Program (NAIP) aerial imagery, satellite imagery, 10-meter digital elevation models (DEM), U.S. Department of Agriculture (USDA) Soil Survey Geographic (SSURGO) soil data types, TPWD vegetational areas, U.S. Geologic Survey (USGS) National Hydrography Dataset (NHD) layers, USGS Geologic Atlas of Texas, as well as field verified site data. The objective of this classification was to create a land cover type set with sufficient detail to be useful at the sub-county level, targeting the scale of 1:24,000, such as the USGS's 7.5 minute quadrangle scale.

Supervised classifications were performed on both color infra-red and multi-spectral satellite imagery to break down the images into objects that were more easily definable. Both leaf-on and leaf-off imagery conditions were used to establish a proper baseline. Detailed spatial analysis was performed at a 10-meter resolution, with the use of DEM's to identify areas of steep slopes (20% or greater), cliffs, and aspect. The "Ecological Site Type/Range Site" attributes from the NRCS soils data provided more detail to the species typically found in specific soils types, and field verification along public roads and public lands were used to sample present species. Seasonally flooded, versus temporarily flooded areas were estimated based on information from the SSUGRO soil data layer. Riparian data was determined to be either small or large stream riparian areas based on the NHD stream types.

All of the alternative reservoir sites evaluated in this report fell within the area surveyed in the Ecological Classification System project. As such, the data from the TPWD Ecological Classification System project

was considered to be the most recent, readily available data collected for all alternative reservoir sites that would allow for a balanced comparison.

2.2 Methodology

The cover types used in the TPWD Ecological Systems Classification were derived from the NatureServe Ecological Classification System (Comer, 2003). This classification methodology resulted in a large number of cover types that were not readily observable or comparable at the scale spanning much of the Sulphur River Basin. To produce a cover type/vegetation classification within each alternative reservoir site that would be more readily observable and comparable, the Ecological Classification System cover types were re-assigned into broader and more general categories based on the EPA's Level I National Land Cover Data (NLCD). The definitions from the NLCD cover types were compared to the definitions contained in the Draft Descriptions of Systems, Mapping Subsystems, and Vegetation Types for Phase II (Elliott, 2009), and matched accordingly. Table 1 identifies the cover types resulting from this re-classification and the corresponding Ecological Classification System cover types that were included. Once this initial re-classification was complete, an additional re-classification was conducted utilizing the U.S. Fish and Wildlife Service's (USFWS) National Wetlands Inventory (NWI) data within each alternative reservoir site. A GIS analysis was then conducted and the re-classified vegetation/cover types were clipped to the NWI data layer in an effort to try and distinguish the bottomland hardwood forest cover type from the forested wetland cover type, as these cover types often overlap when based solely on remotely sensed data. Table 2 summarizes the final types and amounts (acres) of each cover type that were identified within the footprint of each alternative reservoir site. Figures 2 through 8 display the cover types identified within the footprint of each alternative reservoir site.

Table 1: Results of the Re-Classification of the Ecological Classification System Cover Types into EPA-based Level I NLCD Cover Types

EPA-Based Level I Cover Types	TPWD Ecological Systems Classification Cover Types
Barren	<ul style="list-style-type: none"> ○ Barren
Bottomland Hardwood Forest	<ul style="list-style-type: none"> ○ Pinewoods: Bottomland Seasonally Flooded Hardwood Forest ○ Pinewoods: Bottomland Temporarily Flooded Hardwood Forest ○ Pinewoods: Bottomland Temporarily Flooded Mixed Pine / Hardwood Forest ○ Pinewoods: Small Stream and Riparian Seasonally Flooded Hardwood Forest ○ Pinewoods: Small Stream and Riparian Temporarily Flooded Hardwood Forest
Forested Wetland	<ul style="list-style-type: none"> ○ Pinewoods: Bottomland Baldcypress Swamp ○ Pinewoods: Small Stream and Riparian Baldcypress Swamp ○ Swamp
Grassland/Old Field	<ul style="list-style-type: none"> ○ Blackland Prairie: Disturbance or Tame Grassland ○ Pinewoods: Bottomland Wet Prairie ○ Pinewoods: Small Stream and Riparian Wet Prairie ○ Post Oak Savanna: Savanna Grassland ○ Pinewoods: Disturbance or Tame Grassland
Herbaceous Wetland	<ul style="list-style-type: none"> ○ Marsh ○ Pinewoods: Bottomland Herbaceous Wetland ○ Pinewoods: Herbaceous Seepage Bog ○ Pinewoods: Small Stream and Riparian Herbaceous Wetland ○ Pinewoods: Wet Hardwood Flatwoods
Open Water	<ul style="list-style-type: none"> ○ Open Water ○ Pinewoods: Herbaceous Flatwoods Pond
Row Crops	<ul style="list-style-type: none"> ○ Row Crops
Shrub Wetland	<ul style="list-style-type: none"> ○ Pinewoods: Bottomland Deciduous Successional Shrubland ○ Pinewoods: Small Stream and Riparian Deciduous Successional Shrubland
Shrubland	<ul style="list-style-type: none"> ○ Native Invasive: Deciduous Shrubland ○ Native Invasive: Juniper Shrubland ○ Native Invasive: Mesquite Shrubland ○ Pinewoods: Small Stream and Riparian Evergreen Successional Shrubland ○ Red River: Floodplain Evergreen Shrubland

(Table 1 continued)

EPA-Based Level I Cover Types	TPWD Ecological Systems Classification Cover Types
Upland Forest	<ul style="list-style-type: none">○ Native Invasive: Deciduous Woodland○ Pine Plantation > 3 meters tall○ Pine Plantation 1 to 3 meters tall○ Pineywoods: Dry Pine / Hardwood Forest or Plantation○ Pineywoods: Dry Pine Forest or Plantation○ Pineywoods: Dry Upland Hardwood Forest○ Pineywoods: Hardwood Flatwoods○ Pineywoods: Longleaf or Loblolly Pine / Hardwood Flatwoods or Plantation○ Pineywoods: Longleaf or Loblolly Pine Flatwoods or Plantation○ Pineywoods: Northern Mesic Hardwood Forest○ Pineywoods: Northern Mesic Pine / Hardwood Forest○ Pineywoods: Pine / Hardwood Forest or Plantation○ Pineywoods: Pine Forest or Plantation○ Pineywoods: Sandhill Pine Woodland○ Pineywoods: Small Stream and Riparian Temporarily Flooded Mixed Forest○ Pineywoods: Upland Hardwood Forest○ Post Oak Savanna: Oak / Hardwood Slope Forest○ Post Oak Savanna: Post Oak / Redcedar Motte and Woodland○ Post Oak Savanna: Post Oak Motte and Woodland
Urban*	<ul style="list-style-type: none">○ Urban High Intensity○ Urban Low Intensity

* According to the descriptions contained within the TPWD Ecological Systems Classification, urban areas consist of built-up areas including wide transportation corridors that are dominated by impervious cover (Elliott, 2009). By definition, this cover type could include smaller roadways, parking lots, and other areas dominated by impervious cover.

Table 2: Summary of Types and Approximate Amounts (acres) of Cover Types within the Footprint of each Alternative Reservoir Site

ALTERNATIVE RESERVOIR SITES	Wright Patman (237.5)	Wright Patman (259.5)	Marvin Nichols 1A	Talco	Parkhouse I	Parkhouse II	Jim Chapman (446.2)
COVER TYPES							
Barren	<1	<1	<1	<1	1	1	1
Bottomland Hardwood Forest	2,566	8,202	10,156	7,251	4,267	1,960	2,264
Forested Wetland	16,069	35,098	21,444	10,316	5,487	1,116	736
Grassland/Old Field	201	4,026	18,241	18,107	12,133	7,718	373
Herbaceous Wetland	438	1,151	1,244	276	432	91	94
Open Water	2,636	3,376	1,162	394	181	182	42
Row Crops	39	292	706	1,989	3,987	3,626	2
Shrub Wetland	55	204	1,405	468	278	28	109
Shrubland	34	187	444	288	65	19	241
Upland Forest	5,951	34,062	11,223	9,803	1,521	602	1,029
Urban	17	105	78	23	10	14	9
TOTAL	28,006	86,703	66,103	48,915	28,362	15,357	4,900

REFERENCES

- Arnold, K. A. (2001a). Bachman's Sparrow. The Texas Breeding Bird Atlas. Texas A&M University System, College Station and Corpus Christi, TX. <http://txtbba.tamu.edu> (12 July 2001).
- Arnold, K. A. (2001b). Peregrine Falcon. The Texas Breeding Bird Atlas. Texas A&M University System, College Station and Corpus Christi, TX. <http://txtbba.tamu.edu> (12 July 2001).
- Bauer, Kendra K. 2010. Past, Present and Future Status of the Endangered American Burying Beetle (*Nicrophorus americanus*) in Texas. The University of Texas at Austin.
- Bonn, E.W., and R.J. Kemp. 1952. Additional records of fresh-water fishes from Texas. *Copeia* 1952(3):204-205.
- Bousman, C.B., Collins, M. B., and Perttula, T.K. (1988) *Quaternary geomorphology at Cooper Basin: A framework for archaeological inquiry, Delta and Hopkins Counties, TX*, Prewitt and Associates, Inc., Reports of Investigations 55
- Chipman, D.E. (1987) *In Search of Cabeza de Vaca's Route Across Texas: An Historiographical Survey*, *Southwestern Historical Quarterly* 91
- Cross, F.B. 1967. Handbook of Fishes of Kansas. University of Kansas Museum of Natural History Misc. Publ. No. 45, Lawrence. 357 pp.
- Darwin, R.L., Ferring, C.R., and Ellwood, B.B. (1990) *Geoelectric Stratigraphy and Subsurface Evaluation of Quaternary Stream Sediments at the Cooper Basin, NE Texas*, *Geoarchaeology* vol. 5, no. 1, p. 53-79
- Davis, William B. and Schmidly, David J. 1997. The Mammals of Texas - Online Edition. <http://www.nsrl.ttu.edu/tmot1/Default.htm>.
- Donaldson, W., A. H. Price, and J. Morse. 1994. The current status and future prospects of the Texas horned lizard (*Phrynosoma cornutum*) in Texas. *Texas Journal of Science* 46:97-113.
- EPA, 2012. <http://water.epa.gov/type/wetlands/bottomland.cfm>
- EPA. (<http://water.epa.gov/type/rsl/monitoring/vms56.cfm>).

Ferring, C.R. (1995) *Middle Holocene environments, geology, and archaeology in the Southern Plains*, in Bettis E.A. III, ed. *Archaeological Geology of the Archaic Period in North America: Boulder, Co*, Geological Society of America Special Paper 297

Fields, R.C, Blake, M.E. and Kibler, K.W. (1997) *Synthesis of the Prehistoric and Historic Archaeology of Cooper Lake, Delta and Hopkins Counties, Texas*, USACE Reports of Investigations, No 104

Hodges, J.D., 1997, Development and ecology of bottomland hardwood sites: Forest Ecology and Management, v. 90, p. 117–125.

<http://www.texasturtles.org/index.html>

Hubbs, C. L., R.J. Edwards and G.P. Garret. 1991. An annotated checklist of freshwater fishes of Texas, with key to identification of species. Texas Journal of Science, Supplement 43(4):1-56.

Hubbs, C., R.J. Edwards, and G.P. Garrett. 2008. An annotated checklist of the freshwater fishes of Texas, with keys to identification of species. Texas Journal of Science, Supplement, 2nd edition 43(4):1-87.

Hunt, S.M. and Cliff, M.B. (1998) *Cultural Resources Survey of 245 Acres at the White Oak Creek Wildlife Management Area, Cass, Morris, and Titus Counties, Texas*, USACE Reports of Investigations, No 153

Journey, D. H., Bohlin, J. Linder Linsley, S.E., Caran, S.C., and Pedler, D. R. (1989) *Archaeological Survey of Cooper Lake, Delivery Order Number 7, 1989*, USACE Contract No. DACW63-87-D-0017

Mehrer, M.W., and Wescott, K.L eds. (2006) *GIS and Archaeological Site Location Modeling*, CRC Press Boca Raton, FL

Page, L.M., and B.M. Burr. 1991. A field guide to freshwater fishes of North America north of Mexico. Houghton Mifflin Company, Boston, Massachusetts. 432 pp.

Perttula, T.K. (2004) *The Prehistory of Texas*, Texas A&M University Press, College Station, TX

Russell, T.R. 1986. Biology and life history of the paddlefish - a review, pp. 2-20. In: The paddlefish: status, management and propagation. J. G. Dillard, L. K. Graham, and T. R. Russell, eds. Spec. Publ., no. 7, North Central Division, American Fisheries Society, Columbia, Missouri.

Skinner, A., Bousman, B., Plumb, N., Wilson, A., Todd, J., and Jennings, T. (2005) *Archaeology and Quaternary Geology at Lake Ralph Hall, Fannin County, Texas*, AR Consulting Technical Report

TCEQ, 2011. Sulphur River basin Clean Rivers Program Highlights Report FY 2011

TNRCC (1999)

TPWDa. <http://www.tpwd.state.tx.us/huntwild/wild/species/amperegrine/>

TPWDb. <http://www.tpwd.state.tx.us/huntwild/wild/species/leاستtern/>

TPWDC. <http://www.tpwd.state.tx.us/huntwild/wild/species/piplover/>

TPWDD. <http://www.tpwd.state.tx.us/huntwild/wild/species/blackbear/>

TPWDe. <http://www.tpwd.state.tx.us/huntwild/wild/species/rafinesque/>

TPWDF. <http://www.tpwd.state.tx.us/huntwild/wild/species/whooper/>

USDA. (http://www.usawaterquality.org/volunteer/ecoli/june2008manual/chpt2_ecoli.pdf).

Utah State University Cooperative Extension. (<http://extension.usu.edu/waterquality/htm/whats-in-your-water/ph>).

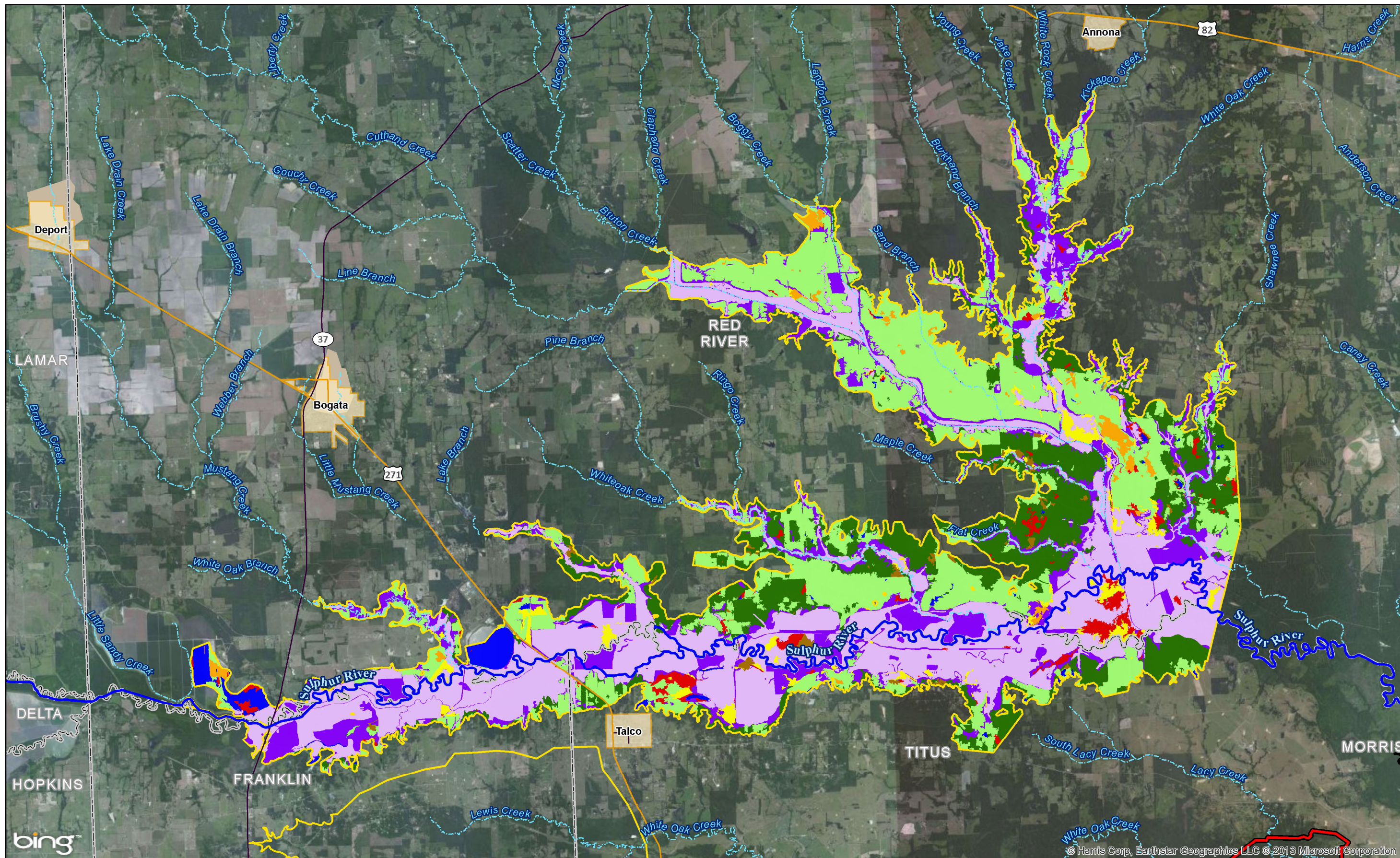
Wall, B.R. Jr. and C.R. Gilbert. 1980. *Erimyzon oblongus* (Mitchill), Creek Chubsucker. pp.397 in D.S. Lee et al. Atlas of North American Freshwater Fishes. N.C. State Mus. Nat. Hist., Raleigh, i-r+854 pp.

Warren, M.L., Jr., B.M. Burr, S.J. Walsh, H.L. Bart, Jr., R.C. Cashner, D.A. Etnier, B.J. Freeman, B.R. Kuhajda, R.L. Mayden, H.W. Robison, S.T. Ross, and W.C. Starnes. 2000. Diversity, Distribution, and Conservation status of the native freshwater fishes of the southern United States. *Fisheries* 25(10):7-29.

Winemiller, K. and Lujan, Nathan K. 2010. Status of Freshwater Mussels in Texas. Institute of Renewable Natural Resources, Texas A&M System.

Appendix H

**Land Cover Type Figure 4 from the Environmental Evaluation Interim
Report – Sulphur River Basin Comparative Assessment**



FN PROJECT NO. MHP11453
 DATE CREATED 6/12/2013
 DATUM & COORDINATE SYSTEM NAD83 State Plane (feet) Texas North Central
 FILE NAME 4 MN_Cover_Types
 PREPARED BY SSI

U.S. ARMY CORPS OF ENGINEERS, FORT WORTH DISTRICT
 Sulphur River Basin
 Marvin Nichols 1A Alternative Reservoir Site
 Land Cover Types

**FREESE
ON
NICHOLS**
 4500 International Plaza Suite 200
 Fort Worth, Texas 76109-4895
 (817) 735-7300

County Boundary	Marvin Nichols 1A Alternative Reservoir Site (328 ft. msl)	Barren	Herbaceous Wetland	Shrubland
City Boundaries	White Oak Creek Mitigation Area	Bottomland Hardwood Forest	Open Water	Upland Forest
Streams	Grassland/Oldfield	Forested Wetland	Row Crops	Urban
Sulphur River		Shrub Wetland		

1:128,570

4
FIGURE

Appendix I

Background and Methodology for Threatened and Endangered Species Assessment from Section 3 of Environmental Evaluation Interim Report - Sulphur River Basin - Comparative Assessment

3.0 FEDERAL AND STATE LISTED THREATENED AND ENDANGERED SPECIES ASSESSMENT

3.1 Federally Listed Threatened and Endangered Species

The Endangered Species Act (ESA) was passed by Congress in 1973. The purpose of the ESA is to protect and recover imperiled species and the ecosystems upon which they depend. The U.S. Fish and Wildlife Service (USFWS) has primary responsibility for administering the ESA for terrestrial and freshwater organisms. Section 7 of the ESA requires Federal agencies to use their legal authorities to promote the conservation purposes of the ESA and to consult with the USFWS to ensure that effects of actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of listed species (<http://www.fws.gov/endangered/June2011>).

Under the ESA, species may be listed as either endangered or threatened. “Endangered” means a species is in danger of extinction throughout all or a significant portion of its range. “Threatened” means a species is likely to become endangered within the foreseeable future. Section 9 of the ESA protects endangered and threatened species and their habitats by prohibiting the “take” of listed animals and the interstate or international trade in listed plants and animals, including their parts and products, except under Federal permit. Take is defined as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct.”

3.2 State Listed Threatened and Endangered Species

The Texas Endangered Species Act gives the Texas Parks and Wildlife Department (TPWD) the authority to establish a list of fish and wildlife that are endangered or threatened with statewide extinction. As defined by the statute, “fish and wildlife” excludes all invertebrates except mollusks and crustaceans. No person may capture, trap, take, or kill or attempt to capture, trap, take, or kill listed fish and wildlife species without a permit. Plants are not protected by these provisions. Endangered, threatened or protected plants may not be taken from public land for commercial sale or taken from private land for commercial purposes without a permit. Laws and regulations pertaining to state listed endangered or threatened animal species are contained in Chapters 67 and 68 of the Texas Parks and Wildlife (TPW) Code and Sections 65.171 - 65.184 of Title 31 of the Texas Administrative Code (T.A.C.). Laws and regulations pertaining to state listed endangered or threatened plant species are contained in Chapter 88 of the TPW Code and Sections 69.01 - 69.14 of the T.A.C.

The Texas Endangered Species Act does not protect wildlife species from indirect or incidental take (e.g., destruction of habitat, unfavorable management practices, etc.). The TPWD has a Memorandum of Understanding with every state agency to conduct a thorough environmental review of state initiated and funded projects, such as highways, reservoirs, land acquisition, and building construction, to determine their potential impact on state endangered or threatened species.

3.3 Impact Assessment

For the purposes of evaluating each alternative reservoir sites potential to impact state or federally listed threatened or endangered species, county lists published by the USFWS and TPWD were referenced. When a reservoir’s footprint extended across more than one county, all of the species listed for those counties were included in the assessment for that particular reservoir. Table 7 contains a summary of the approximate acreages associated with each alternative reservoir site as well as the counties used for their respective assessments. Due to there being a range of potential reallocation elevations at Wright Patman, this assessment utilized the lowest proposed alternative reallocation elevation of 237.5 ft. msl and the highest proposed reallocation elevation of 259.5 ft. msl to assess potential ranges of impacts. Figure 1 depicts the location of each of the alternative reservoir sites.

If a species was found to be listed by either agency, further analyses were conducted to determine the likelihood of occurrence for each species within the footprint of each alternative reservoir site. The likelihood of occurrence was evaluated using habitat and range descriptions provided by the USFWS, TPWD, or other relevant scientific literature sources. This information was then compared to the location of the reservoir sites and the habitats (cover types) that currently exist within these sites.

Table 1: Summary of Acreages and County Locations Associated with each Alternative Reservoir Site

ALTERNATIVE RESERVOIR SITE	Approximate Acreage	County Location
Wright Patman (259.5)	86,703	Bowie, Cass, Morris, Red River, Titus
Wright Patman (237.5)	28,007	Bowie, Cass, Morris, Red River,
Marvin Nichols 1A	66,103	Red River, Titus, Franklin, Delta, Lamar
Talco	48,916	Titus, Franklin, Hopkins
Parkhouse I	28,362	Delta, Hopkins
Parkhouse II	15,359	Lamar, Delta
Jim Chapman (446.2)	4,902	Delta, Hopkins

Cover type classifications within each potential reservoir site were conducted utilizing data from the TPWD Ecological Classification System that was completed in 2012 for this area of Texas supplemented with the USFWS NWI data. Other factors taken into consideration as part of this analysis included species dispersal potential (i.e., mobility), whether the species would be considered a permanent resident or stopover species (i.e., migratory), and the anticipated response a species might have following construction of a reservoir (i.e., positive or negative response). Table 8 contains the common and scientific names of the current federal and state listed species included in this assessment along with a brief description of their likely ranges, preferred habitats, and potential impacts. Results of the impact assessment are summarized in Table 9.

Table 2: State and Federally Listed Threatened / Endangered Species and Potential Impact

Common Name	Scientific Name	Discussion
FEDERAL SPECIES		
American Burying Beetle	<i>Nicrophorus americanus</i>	Low to no potential to negatively impact due to unlikely presence of the species. The historic Texas population consists of four Texas specimens from the 1880's. Since then, there were no confirmed specimens in Texas until 2003 when a single individual was found in Lamar County, Texas. Since 2008, no individuals have been captured in Texas. None have been collected from any other county outside of Lamar (Bauer, 2010).
Least Tern	<i>Sterna antillarum</i>	Low to no potential to negatively impact due to lack of preferred habitat within proposed project area. Species is primarily associated with the habitat along the Red River, which is not located within the assessment area. Nesting habitat of the Interior Least Tern includes bare or sparsely vegetated sand, shell, and gravel beaches, sandbars, islands, and salt flats associated with rivers and reservoirs. In Texas, Interior Least Terns are found at three reservoirs along the Rio Grande River, on the Canadian River in the northern Panhandle, on the Prairie Dog Town Fork of the Red River in the eastern Panhandle, and along the Red River (Texas/Oklahoma boundary) into Arkansas (TPWDb). Reservoirs could benefit this species by providing habitat along the shoreline.
Piping Plover	<i>Charadrius melodus</i>	Low to no potential to negatively impact due to lack of habitat and migratory nature of this species. Piping plovers are primarily a resident of the upper and central coastal area of Texas (Oberholser, 1974). These shorebirds live on sandy beaches and lakeshores (TPWDc). Reservoirs could benefit this species by providing habitat along the shoreline.
STATE SPECIES		
American Peregrine Falcon	<i>Falco peregrinus anatum</i>	Low potential to negatively impact due to unlikely presence of the species. Species is a resident of the Trans-Pecos region, including the Chisos, Davis, and Guadalupe mountain ranges, except during migration (TPWDa). Peregrine falcons prefer to nest on very tall sheer cliff faces with a commanding view, a nearby water source and a good prey base. The breeding population in Texas is located in the remote wild canyons of the Rio Grande up into pine-oak woodlands in the Big Bend and Guadalupe Mountains national parks (Arnold, 2001b).

(Table 8 continued)

Common Name	Scientific Name	Discussion
Bachman's Sparrow	<i>Aimophila aestivalis</i>	Low potential to negatively impact due to lack of suitable habitat and rarity of the species. In Texas, Bachman's Sparrow is most abundant in forests on the south side of the Angelina National Forest. These areas are managed for open longleaf pine (<i>Pinus palustris</i>) savannah that the red-cockaded woodpecker (<i>Picoides borealis</i>) frequents. Here, frequent prescribed burning maintains the preferred and historical grassy understory among the mature longleaf pines (Arnold, 2001a). East Texas appears to be the western most extent of this species range (Oberholser, 1974).
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Bald Eagles breed in Texas from near sea level to about 1100 m (3600 ft); (Oberholser, 1974) in and around large aquatic environments (ocean coasts, reservoirs, large lakes and rivers, marshes and swamps). Reservoir construction has the potential to benefit this species by providing more habitat for hunting prey (i.e., lake/reservoir area).
Wood Stork	<i>Mycteria americana</i>	Low potential to negatively impact due to the migratory nature of this species. This species is primarily associated with coastal marshes, bays, prairies, and lakes. Current populations are composed of postbreeding transients, apparently from southern Mexico (Rappole and Blacklock, 1994). In Texas, there are only three known nesting records: 1930 in Chambers County, Elm Grove; 1960 in southwestern Jefferson County, Johnny Pipkin's Big Hill Ranch (about 50 breeding adults with nests, eggs, and chicks); and, year unknown in Harris County, San Jacinto River (Oberholser 1974). Reservoirs have potential to benefit this species by providing more habitat for hunting prey (i.e., lake/reservoir area).
Whooping Crane	<i>Grus americana</i>	Low to no potential to negatively impact due to the migratory nature of this species. Whooping cranes winter on the Aransas National Wildlife Refuge's 22,500 acres of salt flats and marshes. The area's coastal prairie rolls gently here and is dotted with swales and ponds. They summer and nest in poorly drained wetlands in Canada's Northwest Territories at Wood Buffalo National Park (TPWDf). Although unlikely, the reservoirs could provide stop-over/resting areas for migrating whooping cranes (i.e., Granger Lake).
Eskimo Curlew	<i>Numenius borealis</i>	Low to no potential to negatively impact due to rarity of the species and its migratory nature. This species has likely been extirpated. Last known specimen from Texas was from Cameron County in 1897 (Oberholser, 1974).

(Table 8 continued)

Common Name	Scientific Name	Discussion
Peregrine Falcon	<i>Falco peregrinus</i>	See description for <i>F. p. anatum</i> .
Piping Plover	<i>Charadrius melodus</i>	See previous description.
Least Tern	<i>Sterna antillarum</i>	See previous description.
Blackside Darter	<i>Percina maculate</i>	Low to no potential to negatively impact. This species occurs in small to medium rivers (Page and Burr 1991). In Texas, this species is restricted to the Red River basin in the northeast part of the state (Hubbs et al. 2008).
Creek Chubsucker	<i>Erimyzon oblongus</i>	Moderate potential to negatively impact due to the potential presence of this species and its non-migratory nature. Occurs in eastern Texas streams from the Red River southward to the San Jacinto Drainage; an early record exists from the Devils River (Hubbs et al. 1991). Please see further discussion at the end of this section.
Paddlefish	<i>Polyodon spathula</i>	Low to no potential to negatively impact this species as it is known to occur within reservoirs. Warren et al. (2000) listed the following drainage unit for distribution of paddlefish in Texas: Red River (from the mouth upstream to and including the Kiamichi River). Large reservoirs make good feeding areas, with paddlefish moving from reservoirs into flowing streams in the spring for spawning (Russell 1986). Reservoirs have the potential to benefit this species by providing more habitat.
Bluehead Shiner	<i>Pteronotropis hubbsi</i>	Low to no potential to negatively impact as this species is not likely to be present within the Sulphur River Basin. Apparently, this species has only been identified (in Texas) from Caddo Lake (Hubbs et al. 2008).
Blue Sucker	<i>Cycleptus elongates</i>	Low to no potential to negatively impact. This species inhabits large, deep rivers, and deeper zones of lakes (reservoirs; Cross 1967). Reservoirs have the potential to benefit this species by providing more habitat.
Shovelnose Sturgeon	<i>Scaphirhynchus platorynchus</i>	No potential to negatively impact as this species is not present within the Sulphur River Basin. Found only in the Red River below Dennison Dam (Lake Texoma Reservoir; Hubbs et al. 2008); Red River system (Bonn and Kemp 1952).
Black Bear	<i>Ursus americanus</i>	Low to no potential to negatively impact due to lack of habitat and rarity of the species. This species is known to occur in the Chisos and Guadalupe Mountains of far west Texas. The Louisiana Black Bear (subspecies <i>U. a. luteolus</i>) is not known to be found in Texas, although potential habitat exists in the eastern part of the state (TPWDd).

(Table 8 continued)

Common Name	Scientific Name	Discussion
Rafinesque's big-eared bat	<i>Corynorhinus rafinesquii</i>	Low potential to negatively impact due to rarity of the species. Rafinesque's big-eared bat reaches the westernmost portion of its range in the pine forests of East Texas (TPWDe). No known county records of this species occur within the Sulphur River Basin watershed in Texas (Davis and Schmidly 1997).
Red Wolf	<i>Canis rufus</i>	No potential to impact. This species has been extirpated.
Louisiana Pigtoe	<i>Pleurobema riddellii</i>	Low to no potential to negatively impact as this species is not known to occur within the Sulphur River Basin. This species is known to occur in the Trinity, Neches, and Sabine River systems (Howells, et al. 1996). No museum collections or records of this species have been identified from the Sulphur River Basin (Winemiller and Lujan 2010.)
Southern Hickorynut	<i>Obovaria jacksoniana</i>	Low to no potential to negatively impact as this species is not likely to be present within the Sulphur River Basin. This species occurs in the Neches, Sabine, and Red River drainages of eastern Texas (Howells et al. 1996). No museum collections or records of this species have been identified from the Sulphur River Basin (Winemiller and Lujan 2010.)
Texas Pigtoe	<i>Macrochelys temminckii</i>	Low to no potential to negatively impact as this species is not likely to be present within the Sulphur River Basin. This species has been reported from the Brazos, Neches, Sabine, and San Jacinto rivers (Howells et al. 1996). No museum collections or records of this species have been identified from the Sulphur River Basin (Winemiller and Lujan 2010.)
Alligator Snapping Turtle	<i>Macrochelys temminckii</i>	No potential to negatively impact. Alligator snapping turtles are aquatic bottom dwellers. They have been found in a variety of environs including lakes, oxbows, bayous, deep rivers, canals, creeks, ponds and even brackish estuaries (http://www.texasturtles.org/index.html). Reservoirs have the potential to benefit this species by providing more habitat.
Northern Scarlet Snake	<i>Cemophora coccinea copei</i>	Moderate potential to negatively impact due to potential presence of this species and its non-migratory nature. Please see further discussion at the end of this section.

(Table 8 continued)

Common Name	Scientific Name	Discussion
Texas Horned Lizard	<i>Phrynosoma cornutum</i>	Low to no potential to negatively impact as this species is not likely to be present within the Sulphur River Basin. Apparently, they no longer occur in Texas east of an imaginary line from Fort Worth to Corpus Christi (Donaldson et al. 1994), except for small, isolated populations.
Timber/Canebrake Rattlesnake	<i>Crotalus horridus</i>	Moderate potential to negatively impact due to potential presence of this species and its non-migratory nature. Please see further discussion at the end of this section.

Table 3: Summary of Potential Impacts to State and Federally Listed Threatened/Endangered Species Associated with each Alternative Reservoir Site

ALTERNATIVE RESERVOIR SITES	Wright Patman (237.5)	Wright Patman (259.5)	Marvin Nichols 1A	Talco	Parkhouse I	Parkhouse II	Jim Chapman (446.2)
FEDERAL SPECIES							
American Burying Beetle	○	○	○	NL	NL	○	NL
Least Tern	○	○	○	○	○	○	○
Piping Plover	NL	NL	○	NL	○	○	○
STATE SPECIES							
American Peregrine Falcon	○	○	○	○	○	○	○
Bachman's Sparrow	○	○	○	○	○	○	○
Bald Eagle	○	○	○	○	○	○	○
Wood Stork	○	○	○	○	○	○	○
Whooping Crane	NL	NL	○	○	○	○	○
Eskimo Curlew	NL	NL	NL	NL	NL	○	NL
Peregrine Falcon	○	○	○	○	○	○	○
Piping Plover	○	○	○	○	○	○	○
Least Tern	○	○	○	○	○	○	○
Blackside Darter	○	○	○	○	○	○	○
Creek Chubsucker	●	●	●	●	●	●	●
Paddlefish	○	○	○	○	○	○	○
Bluehead Shiner	○	○	NL	NL	NL	NL	NL
Blue Sucker	NL	NL	NL	NL	NL	○	NL

(Table 9 continued)

ALTERNATIVE RESERVOIR SITES	Wright Patman (237.5)	Wright Patman (259.5)	Marvin Nichols 1A	Talco	Parkhouse I	Parkhouse II	Jim Chapman (446.2)
Shovelnose Sturgeon	○	○	○	NL	NL	○	NL
Black Bear	○	○	○	○	○	○	○
Rafinesque's Big-eared Bat	○	○	○	NL	NL	NL	NL
Red Wolf	○	○	○	○	○	○	○
Louisiana Pigtoe	○	○	○	○	○	NL	○
Southern Hickorynut	○	○	○	○	NL	NL	NL
Texas Pigtoe	○	○	○	○	NL	NL	NL
Alligator Snapping Turtle	○	○	○	○	○	○	○
Northern Scarlet Snake	●	●	●	●	NL	NL	NL
Texas Horned Lizard	○	○	○	○	○	○	○
Timber Rattlesnake	●	●	●	●	●	●	●

NL – Species is not listed within the counties of the alternative reservoir site. ○ - Alternative reservoir site has low or no potential to negatively impact. ● - Alternative reservoir site has moderate potential to negatively impact. ● - Alternative reservoir site has high potential to negatively impact.

REFERENCES

- Arnold, K. A. (2001a). Bachman's Sparrow. The Texas Breeding Bird Atlas. Texas A&M University System, College Station and Corpus Christi, TX. <http://txtbba.tamu.edu> (12 July 2001).
- Arnold, K. A. (2001b). Peregrine Falcon. The Texas Breeding Bird Atlas. Texas A&M University System, College Station and Corpus Christi, TX. <http://txtbba.tamu.edu> (12 July 2001).
- Bauer, Kendra K. 2010. Past, Present and Future Status of the Endangered American Burying Beetle (*Nicrophorus americanus*) in Texas. The University of Texas at Austin.
- Bonn, E.W., and R.J. Kemp. 1952. Additional records of fresh-water fishes from Texas. *Copeia* 1952(3):204-205.
- Bousman, C.B., Collins, M. B., and Perttula, T.K. (1988) *Quaternary geomorphology at Cooper Basin: A framework for archaeological inquiry, Delta and Hopkins Counties, TX*, Prewitt and Associates, Inc., Reports of Investigations 55
- Chipman, D.E. (1987) *In Search of Cabeza de Vaca's Route Across Texas: An Historiographical Survey*, *Southwestern Historical Quarterly* 91
- Cross, F.B. 1967. Handbook of Fishes of Kansas. University of Kansas Museum of Natural History Misc. Publ. No. 45, Lawrence. 357 pp.
- Darwin, R.L., Ferring, C.R., and Ellwood, B.B. (1990) *Geoelectric Stratigraphy and Subsurface Evaluation of Quaternary Stream Sediments at the Cooper Basin, NE Texas*, *Geoarchaeology* vol. 5, no. 1, p. 53-79
- Davis, William B. and Schmidly, David J. 1997. The Mammals of Texas - Online Edition. <http://www.nsrl.ttu.edu/tmot1/Default.htm>.
- Donaldson, W., A. H. Price, and J. Morse. 1994. The current status and future prospects of the Texas horned lizard (*Phrynosoma cornutum*) in Texas. *Texas Journal of Science* 46:97-113.
- EPA, 2012. <http://water.epa.gov/type/wetlands/bottomland.cfm>
- EPA. (<http://water.epa.gov/type/rsl/monitoring/vms56.cfm>).

Ferring, C.R. (1995) *Middle Holocene environments, geology, and archaeology in the Southern Plains*, in Bettis E.A. III, ed. *Archaeological Geology of the Archaic Period in North America: Boulder, Co*, Geological Society of America Special Paper 297

Fields, R.C, Blake, M.E. and Kibler, K.W. (1997) *Synthesis of the Prehistoric and Historic Archaeology of Cooper Lake, Delta and Hopkins Counties, Texas*, USACE Reports of Investigations, No 104

Hodges, J.D., 1997, Development and ecology of bottomland hardwood sites: Forest Ecology and Management, v. 90, p. 117–125.

<http://www.texasturtles.org/index.html>

Hubbs, C. L., R.J. Edwards and G.P. Garret. 1991. An annotated checklist of freshwater fishes of Texas, with key to identification of species. Texas Journal of Science, Supplement 43(4):1-56.

Hubbs, C., R.J. Edwards, and G.P. Garrett. 2008. An annotated checklist of the freshwater fishes of Texas, with keys to identification of species. Texas Journal of Science, Supplement, 2nd edition 43(4):1-87.

Hunt, S.M. and Cliff, M.B. (1998) *Cultural Resources Survey of 245 Acres at the White Oak Creek Wildlife Management Area, Cass, Morris, and Titus Counties, Texas*, USACE Reports of Investigations, No 153

Journey, D. H., Bohlin, J. Linder Linsley, S.E., Caran, S.C., and Pedler, D. R. (1989) *Archaeological Survey of Cooper Lake, Delivery Order Number 7, 1989*, USACE Contract No. DACW63-87-D-0017

Mehrer, M.W., and Wescott, K.L eds. (2006) *GIS and Archaeological Site Location Modeling*, CRC Press Boca Raton, FL

Page, L.M., and B.M. Burr. 1991. A field guide to freshwater fishes of North America north of Mexico. Houghton Mifflin Company, Boston, Massachusetts. 432 pp.

Perttula, T.K. (2004) *The Prehistory of Texas*, Texas A&M University Press, College Station, TX

Russell, T.R. 1986. Biology and life history of the paddlefish - a review, pp. 2-20. In: The paddlefish: status, management and propagation. J. G. Dillard, L. K. Graham, and T. R. Russell, eds. Spec. Publ., no. 7, North Central Division, American Fisheries Society, Columbia, Missouri.

Skinner, A., Bousman, B., Plumb, N., Wilson, A., Todd, J., and Jennings, T. (2005) *Archaeology and Quaternary Geology at Lake Ralph Hall, Fannin County, Texas*, AR Consulting Technical Report

TCEQ, 2011. Sulphur River basin Clean Rivers Program Highlights Report FY 2011

TNRCC (1999)

TPWDa. <http://www.tpwd.state.tx.us/huntwild/wild/species/amperegrine/>

TPWDb. <http://www.tpwd.state.tx.us/huntwild/wild/species/leasttern/>

TPWDC. <http://www.tpwd.state.tx.us/huntwild/wild/species/piplover/>

TPWDD. <http://www.tpwd.state.tx.us/huntwild/wild/species/blackbear/>

TPWDe. <http://www.tpwd.state.tx.us/huntwild/wild/species/rafinesque/>

TPWDF. <http://www.tpwd.state.tx.us/huntwild/wild/species/whooper/>

USDA. (http://www.usawaterquality.org/volunteer/ecoli/june2008manual/chpt2_ecoli.pdf).

Utah State University Cooperative Extension. (<http://extension.usu.edu/waterquality/htm/whats-in-your-water/ph>).

Wall, B.R. Jr. and C.R. Gilbert. 1980. *Erimyzon oblongus* (Mitchill), Creek Chubsucker. pp.397 in D.S. Lee et al. Atlas of North American Freshwater Fishes. N.C. State Mus. Nat. Hist., Raleigh, i-r+854 pp.

Warren, M.L., Jr., B.M. Burr, S.J. Walsh, H.L. Bart, Jr., R.C. Cashner, D.A. Etnier, B.J. Freeman, B.R. Kuhajda, R.L. Mayden, H.W. Robison, S.T. Ross, and W.C. Starnes. 2000. Diversity, Distribution, and Conservation status of the native freshwater fishes of the southern United States. *Fisheries* 25(10):7-29.

Winemiller, K. and Lujan, Nathan K. 2010. Status of Freshwater Mussels in Texas. Institute of Renewable Natural Resources, Texas A&M System.