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AGENDA ITEM MEMO

BOARD MEETING DATE: June 26, 2025

TO: Board Members

THROUGH: Bryan McMath, Executive Administrator

FROM: Kendal Kowal, Assistant General Counsel

SUBJECT: Potential interregional conflict between initially prepared regional water plans for planning regions C and D

ACTION REQUESTED

Find that an interregional conflict exists between the Region C and Region D 2026 initially prepared regional water plans and authorize steps necessary to address the conflict.

BACKGROUND

The Texas Legislature has long recognized that water is critical to the future of Texas and in 1997 created a state and regional framework for responsibly planning to address both the short- and long-term water needs of the state. Prior to 1997, six state water plans were developed at the state level, beginning with the 1961 state water plan. The proposed Marvin Nichols Reservoir has been included in each state water plan in some form since 1968 and in each Region C regional water plan since 2001.

Planning groups are required to identify potentially feasible projects for their plans, which is a fundamental principle of the regional water planning process. Common metrics must be used to evaluate these projects, including the net quantity, reliability, cost, and impacts on environmental factors and agricultural resources. These planning-level assessments are not as in depth as preliminary engineering, engineering feasibility, or alternative analyses conducted for permitting requirements. Extensive and time-intensive studies to support environmental permitting decisions, including the extent of required mitigation, are conducted during the state and federal permitting processes.

Chapter 16 of the Texas Water Code provides the statutory framework for the regional water planning process; the associated administrative rules are in 31 Texas Administrative Code (TAC) Chapter 357. As provided by Texas Water Code § 16.053(h)(7), "the board may approve a regional water plan only after it has determined that all interregional conflicts involving that regional water planning area have been resolved." Additionally, Texas Water Code § 16.053(h)(6) states that "the board shall facilitate coordination between involved regions" to resolve an interregional conflict.

Our Mission

Leading the state's efforts
in ensuring a secure
water future for Texas

Board Members

L'Oreal Stepney, P.E., Chairwoman | Tonya R. Miller, Board Member
Bryan McMath, Executive Administrator

An interregional conflict exists when: A) more than one regional water plan includes the same source of water supply for identified and quantified recommended water management strategies and there is insufficient water available to implement such water management strategies; or B) in the instance of a recommended water management strategy proposed to be supplied from a different regional water planning area, the regional water planning group with the location of the strategy has studied the impacts of the recommended water management strategy on its economic, agricultural, and natural resources, and demonstrates to the board that there is a potential for a substantial adverse effect on the region as a result of those impacts. (31 TAC § 357.10(16)) (emphasis added).

31 TAC § 357.50(d) requires regional water planning groups to submit, in writing, to the Texas Water Development Board (TWDB) Executive Administrator and any other affected regional water planning group the identification of potential interregional conflicts between its initially prepared plan (IPP) and the IPP of another regional water planning group. On April 22, 2025, the TWDB received a letter from the Region D Regional Water Planning Group stating that an interregional conflict exists between its IPP and the IPP of the Region C Regional Water Planning Group (Attachment 1). The Region D planning group stated that the basis of the interregional conflict was that it studied the impacts of the Marvin Nichols Reservoir included as a recommended water management strategy in the Region C IPP and concluded that there is a potential for a substantial adverse effect on Region D, including adverse effect on Region D's economic, agricultural, and natural resources.

The Region C planning group provided a response to the assertion on May 23, 2025, stating that an interregional conflict does not exist because the proposed Marvin Nichols Reservoir will not have a substantial adverse effect on Region D (Attachment 2).

On April 28, 2025, upon request by the TWDB's governing Board, the Executive Administrator requested that the two planning groups submit any relevant information on what constitutes a "substantial adverse effect." In response to this request, the Region D planning group submitted a letter dated May 22, 2025 (Attachment 3), and the Region C planning group submitted a letter dated May 23, 2025 (Attachment 4).

On May 8, 2025, the Board requested that members of the public submit by June 9, 2025 written input regarding the potential for substantial adverse effects or other reasons for the Board to find an interregional conflict exists between Regions C and D regarding the proposed Marvin Nichols Reservoir. The TWDB received over 370 public comments in response. Most of the comments expressed expectations of negative impacts (economic, environmental, cultural, social, or a combination thereof). One comment from a municipality in Region D anticipated significant adverse impacts to the operability of its groundwater-based water supply system. More than half of the comments suggested alternative strategies that Region C should evaluate prior to developing Marvin Nichols, thus bypassing consideration of substantial adverse effects. One commenter recommended having an independent third-party review of the proposed reservoir project. Seven commenters expressed support for development of the reservoir and for keeping the project as a recommended water supply management strategy in the Region C plan.

Regions D and C included detailed discussions of the Marvin Nichols Reservoir in their respective IPPs, as cited in their assertion and respective response letters (Attachments 5 and 6).

31 TAC § 357.62(a) includes a process for resolving a conflict if “the Board has determined that there is a potential for a substantial adverse effect on that region or the Board finds that an interregional conflict exists between IPPs.” 31 TAC § 357.50(e) states that regional water planning groups shall seek to resolve conflicts with other regional water planning groups and shall promptly and actively participate in any TWDB-sponsored efforts to resolve interregional conflicts. If the Board determines that an interregional conflict does exist, the Executive Administrator may request that each group appoint representatives to negotiate on behalf of their regional water planning groups to resolve the conflict.

Interregional Conflicts in Past Regional Water Planning Cycles

The proposed Marvin Nichols Reservoir has been included in each state water plan in some form since 1968 and in each Region C regional water plan since 2001. With the inclusion of Marvin Nichols in the 2011 Region C Regional Water Plan, the Region D planning group asserted an interregional conflict. The TWDB determined that no interregional conflict existed because the rules at that time defined an interregional conflict to only include an overallocation of a water source, which occurs when two or more recommended strategies rely upon a source of water for which there is insufficient water available to implement those strategies. On January 12, 2011, Ward Timber Company, et al., filed a petition in Travis County District Court against the TWDB for failure to find that an interregional conflict existed. The Travis County District Court issued a final judgment in favor of Ward Timber and set aside the Board’s approval of the 2011 Region C Regional Water Plan. The TWDB appealed the decision; subsequently, the Eleventh Court of Appeals affirmed the district court’s opinion and required the Board to find an interregional conflict existed, nullify the adoption of those regional water plans, and pursue a process to facilitate a resolution. (*Tex. Water Dev. Bd. v. Ward Timber, Ltd.*, 411 S.W.3d 544, 573 (Tex. App.--Eastland 2013, no pet.)) (*Ward Timber*).

The facilitated resolution process included an unsuccessful mediation by the State Office of Administrative Hearings, a recommended resolution by the Executive Administrator on which public hearings were conducted, and the submittal of briefs by Regions C and D. The Board issued an Interim Order requiring additional quantitative analysis of resource impacts by Region C. Following submittal of the additional analysis by Region C and responses from Region D and the Executive Administrator, the Board adopted an order on January 8, 2015 finding that the conflict was resolved. The Board approved amendments to the Region C and D regional water plans, which reflected the conflict resolution process and outcomes including references to a conflict, pursuant to that order on March 20, 2015.

In July 2015, the TWDB proposed rules to include a new definition for “interregional conflict” pursuant to the *Ward Timber* decision. In that same month, the Region D planning group asserted that an interregional conflict existed between the Region C and Region D 2016 IPPs, stating that “the proposed Marvin Nichols Reservoir as described in the Region C IPP will have an unacceptable degree of impact on Region D’s water planning area.” On September 9, 2015, the Board found that an interregional conflict existed. On October 5,

2015, Region C and D planning group representatives met in a facilitated mediation at the University of Texas Center for Public Policy Dispute Resolution and agreed on a resolution to the conflict. The new rules defining “interregional conflict” were published for adoption in November 2015.

KEY ISSUES

Planning groups are required to coordinate with neighboring regions throughout the development of their plans. Upon submittal of their draft plans, TWDB rules provide for an interregional conflict process as follows:

- Within 60 days of draft plan submission, a planning group can submit an assertion of a potential interregional conflict to the Executive Administrator.
- The Executive Administrator takes the assertion to the Board to determine whether that interregional conflict exists.
- Should a conflict be found to exist, the Executive Administrator facilitates resolution of that conflict while the affected planning groups seek to resolve the conflict and actively participate in Board-sponsored resolution efforts.
- If the planning groups are unable to resolve the conflict, the Executive Administrator may propose a recommended resolution and hold a public hearing on that recommendation.
- The Executive Administrator will make a recommendation to the Board for resolution of the conflict.
- The Board will consider the Executive Administrator’s recommendation and written statements by a representative of each affected planning group and determine a resolution to the conflict.
- The Executive Administrator will notify planning groups of the decision and direct changes to the affected regional water plans.

Potential for a Substantial Adverse Effect

If a regional water planning group asserts an interregional conflict, the Board is tasked with determining whether the conflict exists and if there is a potential for a substantial adverse effect on that region (31 TAC § 357.62(a)). Section 357.10 states that an interregional conflict exists when, “in the instance of a recommended Water Management Strategy proposed to be supplied from a different Regional Water Planning Area, the regional Water Planning Group with the location of the strategy has studied the impacts of the recommended Water Management Strategy on its *economic, agricultural, and natural resources*, [emphasis added] and demonstrates to the Board that there is a potential for a *substantial adverse effect on the region* [emphasis added] as a result of those impacts” (31 TAC § 357.10(16)).

Plain Language Reading

In determining what constitutes a potential for a substantial adverse effect, one should first look to the plain meaning of each term, as follows. The list below also provides the definitions that the Region C and D planning groups included in their letters (Attachments 3 and 4):

- **Potential:** “Existing in possibility; capable of development into actuality. Expressing possibility.” (Merriam-Webster.com Dictionary)
- **Substantial:**
 - “Consisting of or relating to substance; not imaginary or illusory. Ample to satisfy and nourish. Significantly great. Firmly constructed.” (Merriam-Webster.com Dictionary)
 - Region C: “Large or considerable in quantity, amount, or size but also of real and demonstrable value, not merely nominal.”
 - Region D: “Material or considerable.”
- **Adverse:** “Acting against or in a contrary direction. Opposed to one’s interests; causing harm.” (Merriam-Webster.com Dictionary)
 - Region C: “Negative, detrimental, or against.”
 - Region D: “Unfavorable.”
- **Effect:** “Something that inevitably follows an antecedent (as a cause or agent).” (Merriam-Webster.com Dictionary)
 - Region C: “Impact or result.”
 - Region D: “Result or outcome.”

Therefore, this phrase could be interpreted in its plain reading to mean that the Region D planning group asserts that a considerable, real result detrimental to Region D’s stated economic, agricultural, and natural resources is expected due to the Marvin Nichols Reservoir.

Region C and D Input

In the letter dated May 23, 2025 (Attachment 3), the Region C planning group asserts that “a ‘substantial adverse effect’ exists if the Board determines that 1) there is a net holistic, negative change in the overall economic, agricultural, or natural resources of a region as a whole; and 2) that change is significantly large and demonstrably real based on available data and studies.” The Region C planning group further argues that the potential substantial adverse effect should be viewed in light of Marvin Nichols’ effect on Region D as a whole, not only the reservoir’s footprint or the immediately surrounding area. The Region C planning group argues that the phrase “should be broadly construed to mean a general, overall change on a region as a whole, in both the near and long terms, considering direct and indirect impacts holistically across all sectors.” Further, “it should be a net impact on the region, not just on individual properties, businesses, or industries.” The planning group also argues that the effects on Region C and the state as a whole should be considered if Marvin Nichols is not constructed.

In the letter dated May 22, 2025 (Attachment 4), the Region D planning group asserts that a substantial adverse effect means “a material or considerable unfavorable result or outcome.” The planning group argues that Marvin Nichols would result in a substantial adverse impact to the area in question and the region/state as a whole. The planning group emphasizes that the rule includes the word “potential.” It goes on to emphasize the impacts on the specific area of the proposed reservoir.

Executive Administrator’s Recommendations on “Substantial Adverse Effect”

Avoiding de minimis conflict assertions

In *Ward Timber*, the TWDB raised the concern that the agency could be mired down in many small conflicts if the definition of interregional conflict were expanded further than simply an overallocation of water. The court stated that “the Board can solve its dilemma by amending the rule defining an interregional conflict to include its present definition and the present situation where a region has studied the impacts and finds there is a substantial conflict” (*Tex. Water Dev. Bd. v. Ward Timber, Ltd.*, 411 S.W.3d 544, 573 (Tex. App.--Eastland 2013, no pet.)).

In adopting a new definition for “interregional conflict” in TWDB rules pursuant to *Ward Timber*, the TWDB stated in its preamble that “the board intends by the final rule to allow it to judge some alleged interregional conflicts as so speculative or insubstantial in their impacts on the economic, agricultural, and natural resources that the board will not utilize its limited resources to resolve the de [minimis] conflict” (40 Tex. Reg. 8650 (Nov. 12, 2015)). With the court decision and rulemaking preamble in mind, the Board should consider whether the Region D planning group’s assertion of an interregional conflict is speculative or insubstantial. Additionally, the Board should consider whether facilitating the resolution of the asserted conflict would be a prudent use of state resources.

Given past findings by the court on this similar set of facts, it is the Executive Administrator’s recommendation that the Region D planning group’s current assertion of an interregional conflict is not so speculative and insubstantial as to be considered “de minimis.” Additionally, the Executive Administrator recommends that facilitating the resolution of this potential conflict is a prudent use of state resources.

Lending credence to Region D planning group

The Board should also consider the Region D planning group’s unique position to assess the effects of a reservoir on its own region. Given past findings by the court on this similar set of facts, the Board should lend credence to the Region D planning group’s assertion that there is a potential for substantial adverse effect. The court in *Ward Timber* emphasized in its decision that “the regional water planning groups... are well-suited to identify interregional conflicts based on the common meaning of that term” (*Tex. Water Dev. Bd. v. Ward Timber, Ltd.*, 411 S.W.3d 544, 575 (Tex. App.--Eastland 2013, no pet.)). Furthermore, the TWDB stated in its 2015 adoption preamble for the new definition of interregional conflict that “the board does not intend to engage in extensive fact finding on the impacts of the disputed water management strategy,” thereby implying the intent to defer, to a degree, to regional water planning groups on the topic (40 Tex. Reg. 8651 (Nov. 12, 2015)). The Board should consider this point made by the court and the TWDB in analyzing this potential interregional conflict.

The facts presented in the *Ward Timber* case are virtually identical to the facts presented here (as described above). In *Ward Timber*, the court determined that “the Region D planning group in its Region D plan made a preliminary case that there is a substantial interregional conflict with Region C’s plan, and that should be sufficient for the Board to require the two regional planning groups to attempt to resolve that conflict” (*Tex. Water Dev. Bd. v. Ward Timber, Ltd.*, 411 S.W.3d 544, 575 (Tex. App.--Eastland 2013, no pet.)). If a

court found that the Region D planning group made a preliminary case for the determination of an interregional conflict in a situation with virtually identical facts, it is safe to assume that a court would make the same determination based on that precedent in this case. Therefore, in this instance, the Board should consider the precedent set by the court in *Ward Timber*.

The Executive Administrator recommends that the Board consider the current, similar facts at hand to those in the *Ward Timber* case and come to the same conclusion as the court in that case. This is not to say that the Region C planning group's assertions regarding this potential interregional conflict should not be considered and weighed; it should be noted that the Region C planning group was not a party to *Ward Timber*. The Executive Administrator recommends that following the guidance of the court in *Ward Timber* gives both regions the opportunity for open dialogue between planning group representatives through facilitated mediation for resolution.

Remaining Questions and Issues for the Board's Consideration

Even with statutes, rules, and caselaw, the Board does not have strict and unwavering instructions on how to determine when an interregional conflict exists. Additionally, differing parties have varying opinions on the facts at hand and how these legal sources should be interpreted.

The following topics and issues remain for the Board members to consider:

- A precise estimated quantification of the impacts of the proposed Marvin Nichols Reservoir will never be fully known without the state and federal regulatory permitting processes commencing for this specific project. The real and true impacts of a reservoir are never truly known until the reservoir is actually constructed.
- The applicable statutes and rules do not specify the level of detail and scale to consider in looking at "substantial adverse effects." The rule does reference the effects "on that region," meaning the entire regional water planning area asserting the interregional conflict (31 TAC § 357.62(a)). The rule does not specify direct vs. indirect, positive vs. negative, weighing impacts on any other potentially effected region, etc.
- Administrative rules in place for this planning cycle include deliberate interregional coordination activities (31 § TAC 357.21(a)(1) and (c)(8)) based upon recommendations from the Interregional Planning Council, of which Regions C and D are members. While coordination events occurred between the two planning groups leading up to submission of the IPPs, no direct dialogue occurred between planning group members to work towards a solution prior to the Region D assertion. As such, the Executive Administrator recommends that direct dialogue between planning group representatives through facilitated mediation holds potential for a successful path forward.

Conclusion

The Executive Administrator recommends finding that an interregional conflict exists between the Region C and Region D 2026 initially prepared regional water plans because the Region D planning group has asserted that a considerable, real result detrimental to Region D's stated economic, agricultural, and natural resources is likely; therefore, the potential for a substantial adverse effect has been shown. The Executive Administrator recommends that the Region D planning group's current assertion of an interregional conflict is not so speculative and insubstantial as to be considered "de minimis" and that facilitating the resolution of this potential conflict is a prudent use of state resources. The Executive Administrator recommends that this situation could benefit greatly from an opportunity for facilitated mediation between Region C and Region D planning group representatives.

RECOMMENDATION

Find that an interregional conflict exists between the Region C and Region D 2026 initially prepared regional water plans for the reasons discussed above and encourage discussion in the form of facilitated mediation between designated region representatives to address stated concerns and authorize steps necessary to resolve the conflict.

LEGAL/SPECIAL CONDITIONS

1. Require the Region C and Region D planning groups to appoint, by July 14, 2025, up to four representatives per region authorized to negotiate on their behalf in a facilitated mediation to occur by July 31, 2025.
2. Require the Executive Administrator to appoint up to two representatives to be available as resources in the facilitated mediation.
3. Limit participation in that facilitated mediation process to the representatives identified in items 1 and 2 and the chosen mediation staff.
4. The Executive Administrator will report back to the Board at a regularly scheduled Board meeting.

Attachment(s):

1. Region D assertion of an interregional conflict
2. Region C response letter asserting no interregional conflict
3. Region D letter on meaning of substantial adverse effects
4. Region C letter on meaning of substantial adverse effects
5. Excerpts from Region D IPP
6. Excerpts from Region C IPP

NORTH EAST TEXAS REGIONAL WATER PLANNING GROUP - D

Executive Committee

Jim Thompson
Chair

Richard LeTourneau
Vice Chair

Cindy Gwynn
Secretary

Joe Bumgarner
At-Large

John Brooks
At-Large

April 22, 2025

Voting Members **Bryan McMath**

Russell Acker
Counties
Executive Administrator, TWDB

David Aikin
Public
Dan Buhman
Chair, Region C Water Planning Group

Dear Mr. McMath and Mr. Buhman:

At the April 9, 2025 meeting of The Northeast Texas Regional Water Planning Group (Region D), the Planning Group unanimously voted to assert an interregional conflict between the Initially Prepared Plans of Region C and Region D. This conflict is a result of the proposed Marvin Nichols Reservoir being included as a recommended strategy in the Region C IPP. Region D's IPP states that the proposed Marvin Nichols Reservoir would have substantial adverse effect on our Region, including adverse effect on our Region's economic, agricultural and natural resources. Pursuant to TWDB's guidelines, this constitutes an interregional conflict.

BACKGROUND

The proposed Marvin Nichols Reservoir would be located exclusively within Region D although it is a proposed water management strategy only for Region C. Region C and Region D have been in dispute over this proposed strategy for over 20 years.

In anticipation of a potential interregional conflict over Marvin Nichols Reservoir, our Planning Group voted unanimously at our first meeting of this planning cycle to take efforts to try to resolve this potential conflict. The Region D Group authorized me to send a letter to Region C detailing the concerns over the proposed project and attempt to start a process to discuss and meet in order to avoid a potential conflict. On November 11, 2021, I sent a letter to Kevin Ward, Chair of the Region C Planning Group at that time, expressing the potential for an interregional conflict, our hope that a conflict could be avoided, and stating that our Planning Group would be willing to take all reasonable measures to avoid a conflict. Copies of this letter were sent to the Executive Director of TWDB and other TWDB staff.

Kevin Chumbley
Municipalities

Joe Coats
Environmental

Andy Endsley
Counties

Nicolas Fierro
Water Districts

Richard Garza
Agriculture

Hattie Hackler
Agriculture

Billy Henson
Industries

Robert Hurst
Counties

Conrad King
River Authority

Howdy Lisenbee
Municipalities

Janet McCoy
Small Business

Fred Milton
Public

Ned Muse
Municipalities

Sharron Nabors
Agriculture

Harlton Taylor
Water Utilities

For almost 3 years, no response to our November 11, 2021 letter was made by Region C other than a comment by the Chair that the water management strategies for Region C this planning cycle had not been decided and their Planning Group felt it was premature to have any meetings or discussions on a potential conflict. On August 21, 2024, I received a letter from the Chair of Region C advising me that Marvin Nichols Reservoir would be a proposed strategy for Region C. He invited Region D members to the September 30, 2024 Region C meeting and allocated time on the Agenda for me to speak on the Marvin Nichols Reservoir. I then invited Region C members to the Region D meeting on October 30, 2024 and allocated time on our Agenda for Kevin Ward to speak on the proposed Marvin Nichols Reservoir.

The Interregional Planning Council Report to The Texas Water Development Board dated October 16, 2020 stressed the importance of identifying issues and potential conflicts at the beginning and throughout the planning cycle. Region D's letter dated November 11, 2021, identifying this potential conflict and expressing a desire to meet and discuss ways to avoid an interregional conflict, was an effort to comply with this directive. The guidelines of TWDB regarding interregional conflicts state: "During the development of their Initially Prepared Plan (IPP) - draft plan - all RWPGs are encouraged by the TWDB to coordinate with neighboring regions and to proactively identify and work cooperatively to avoid potential interregional conflicts." Region D did just that. We requested Region C to join our Group in trying to avoid this potential interregional conflict and were ignored for almost 3 years. For Region C to state that meeting to try to resolve this potential conflict prior to the finalization of Region C's water management strategies seems particularly lame since the proposed Marvin Nichols Reservoir has been a part of Region C's water planning strategy since Regional Water Planning began over 20 years ago.

INTERREGIONAL CONFLICT/ADVERSE IMPACTS

Chapters 6.9, 6.10 and 8.12 of the Region D IPP contain a detailed analysis of the proposed Marvin Nichols Reservoir and the impacts the proposed project, along with the required mitigation, would have on agriculture, the timber industry, farming and ranching, natural resources and environmental factors. Our Planning Group members live in the area that will be affected and have studied the impacts this proposed strategy would have on the economic, agricultural and natural resources. We have also heard from a tremendous number of people that live in our Region, industry and business leaders, community leaders and others regarding the substantial adverse effects this proposed project would have on our Region. The amount of opposition from the citizens of Region D to Marvin Nichols Reservoir is simply unexplainable in words. Many counties, cities and other groups have passed resolutions requesting the proposed Marvin Nichols Reservoir be removed from the State Water Plan due to the adverse impacts this project would have on our Region. That includes Red River County where the vast majority of this proposed reservoir would be located.

To sum up the position of our Planning Group regarding Marvin Nichols Reservoir, I will cite two paragraphs from Chapter 6.10 of our IPP which was unanimously approved by the Region D Planning Group:

“It has been and continues to the position of the NETRWG that due to the significant negative impacts upon environmental factors, agricultural resources/rural areas, other natural resources and third parties, Marvin Nichols Reservoir should not be included as a water management strategy in any regional water plan or the State Water Plan.”

“In order to be included in any regional water plan or the State Water Plan, a proposed project must protect the agricultural and natural resources of the State. The proposed Marvin Nichols Reservoir would inundate vast amounts of agricultural and timber lands in Northeast Texas. In addition, this project will require very substantial acreage to be removed from production for mitigation of this project. It is the position of the Region D Water Planning Group that it is not possible to find that this project protects the agricultural and natural resources of the State when so much agricultural/timber land will be inundated and when it is not known how much additional acreage will be required, the location of that acreage, or the type of acreage that will be taken for mitigation.”

Conversely, the Region C IPP states that the proposed Marvin Nichols Reservoir impacts to the economic, agricultural and natural resources are beneficial or limited.

It is the position of the Region D Water Planning Group that an interregional conflict exists between the Region C and Region D IPPs. We request TWDB determine there is an interregional conflict and begin the process to resolve the conflict.

INDEPENDENT ASSESSMENT

At the Region D meeting on April 9, 2025, the Region D Planning Group unanimously voted to request TWDB require an independent assessment of costs regarding the proposed Marvin Nichols Reservoir. This request is being made due to several factors including the following:

- 1) Discussion regarding the value placed on land and other costs on the proposed Marvin Nichols Reservoir by the consultants of Region C in comparison to values/costs on other potential water supply options for Region C; and**
- 2) The conflict of interest of consultants considering the amount of money that would be allocated for engineering fees on the proposed Marvin Nichols Reservoir.**

On behalf of all of the members of the Region D Water Planning Group, I thank you for your consideration.

Very truly yours,



**Jim F. Thompson
Chair, Region D Water Planning Group**

**cc: Temple McKinnon
TWDB**

**Matt Nelson
TWDB**

**Elizabeth McCoy
TWDB**

**Kyle Dooley
Riverbend Water Resources District**

**Tony Smith
Carollo Engineers**

REGION C WATER PLANNING GROUP

Senate Bill One Sixth Round of Regional Water Planning - Texas Water Development Board

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 Russell Laughlin, Vice-Chair
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 Doug Shaw
 Paul Sigle
 Connie Standridge
 Steve Starnes
 John Stevenson

May 23, 2025

Bryan McMath

Executive Administrator, Texas Water Development Board

Re: Response to Region D's Declaration of an Interregional Conflict

Dear Mr. McMath:

The Region C Water Planning Group is in receipt of the North East Texas Water Planning Group (Region D) letter asserting an alleged "interregional conflict" between our respective regions' Initially Prepared Plans, as well as the Texas Water Development Board's (TWDB) letter requesting our additional input on this matter.

We continue to sustain our well-founded position that Region C's Initially Prepared Plan in no way creates an "interregional conflict" as defined by the Texas Water Development Board, and that any finding of an interregional conflict would be deeply problematic as a matter of public policy.

Such a finding would also be very discouraging to the water providers and water users of Region C who are doing everything reasonably possible to use water wisely and delay badly needed future supply strategies as long as is practicable.

As Previously Defined, There Is No "Interregional Conflict"

By TWDB's definition of an interregional conflict, there must be insufficient water for the recommended strategy and/or the recommended strategy must be shown to have substantial adverse effects on the economic, agricultural and natural resources of the region where the strategy is located. **Region C has found that there is sufficient state water to support the Marvin Nichols Reservoir, and Region C has also demonstrated with great specificity and factually based research that the proposed strategy will not have substantial adverse effects on Region D.**

In fact, were the recommended strategy not to be included in Region C's plan and therefore become ineligible, Region C would be the region suffering substantial adverse effects as a consequence, given the pressing need for additional water supplies for the Water User Groups in our region and the challenges associated with less-favorable and more costly water supply alternatives.

This topic is addressed in detail within Region C's Initially Prepared Plan (IPP), Chapter 10, Section 10.5.1 and Appendix J of the Region C IPP, and it is also touched on briefly below.

In the development of the Region C Water Plan, we have honored the integrity of the state's water resources and do not recommend strategies that would conflict with other water providers. There is sufficient water in the Sulphur River Basin to meet local needs and still provide additional supply to other areas of the state. In fact, of the total firm yield of the Marvin Nichols Reservoir, 20 percent is identified to remain in the area (Sulphur River Basin) for local use.

As requested by the state, we have conducted extensive due diligence in evaluating the impacts of the proposed project on economic, agricultural, and natural resources in Region D. No other single water management strategy in the State Water Plan has been studied with such comprehensiveness. These studies clearly support the position that there are not substantial adverse effects, contrary to the unsubstantiated assertion in Region D's correspondence.

Further, Marvin Nichols Reservoir will create positive economic impacts to local communities within Region D. This is an on-going reality at Texas's two most recent reservoirs: Bois D'Arc and Ralph Hall. The agricultural impacts of Marvin Nichols are relatively limited compared to the region's overall harvestable timber potential and its widespread farming and ranching activity. The natural resources impacts are also relatively limited and can be largely mitigated – or can be appropriately addressed during the permitting process.

If the Marvin Nichols Reservoir is not constructed, the lack of sufficient water for Region C will have substantial adverse economic effects on Region C, and ultimately, the state. According to Dr. Terry Clower, *"if a lack of available water supply were to disrupt the projected job growth in just six industries, the region would lose \$19 billion in annual economic activity, expressed in 2020 dollars, and more than 136,000 total jobs."*

Similar adverse economic effects may be realized if Region C water providers were forced to develop much more expensive, alternative projects to meet the growing water needs.

Allowing Region D's Argument to Prevail Would Be Contrary to Sound Public Policy and Past Texas Precedent, as Well as Longstanding State and Federal Permitting and Project Development Processes

There are also considerable policy reasons why Region D's request for an "interregional conflict" declaration should not be granted.

If the logic of Region D's argument was accepted, it would imply that all other reservoirs providing supplies beyond the source basin should never have been constructed. That would turn our state water supply on its head and imperil countless, vitally important reservoir projects in future regional plans and the State Water Plan.

It is also contrary to Texas law to accept Region D's efforts to exert control over the surface water resources within its region. This water belongs by rights to the state, and by extension, to all the citizens of Texas.

Ultimately and importantly, Texas' regional water planning process and the State Water Plan are long-term resource planning efforts to identify potential new water supplies options for the future growth of Texas. This planning process was conceived as a locally driven, bottom-up effort, and it was not the founding intent of the SB 1 legislators or the TWDB administrators who created state and regional water planning rules to unnecessarily eliminate potential and important water supply

options for reasons other than lack of feasibility. At a time when the legislature is looking to provide additional funding for water supply strategies, it would seem inconsistent to remove options from the state water plan.

The viability and merits of any particular project will be – and should be – determined at the appropriate point in the project development process, during the detailed studies and permitting phases prior to actual project development.

Because the state and federal government have in place a system that appropriately and adequately addresses the concerns of Region D, we feel very strongly that the recommended projects in the Region C Water Plan should be allowed to proceed through the proper and long-standing legal processes that govern the use of water resources within the state. The water planning process was never intended to – and in fact did not – create surrogate, regional water authorities with jurisdiction over the state's water supplies. That authority clearly and appropriately lies with the state and its delegated agencies.

Region D's Claims About a Lack of Coordination on Region C's Part, or Region C's Allegedly "Excess" Use of Water, Are Untrue and Misleading

As previously conveyed directly to Region D, we have appreciated Region D's efforts to proactively coordinate up to this point, including during our meetings last September and October, and we are willing to continue to coordinate with Region D. In addition to these specific meetings, a Region C liaison has consistently attended Region D meetings and provided updates to Region D during this planning cycle and previous cycles.

To clarify this point, Region C has been coordinating with Region D for over 25 years. During that time, Region D agreed to support the Marvin Nichols Reservoir and later withdrew their support. After a conflict declaration for the 2011 Plans, a resolution to this issue was reached on May 14, 2014. The Marvin Nichols Reservoir was in the 2021 Region C Water Plan and Region D did not declare a conflict with that plan. Since the resolution in 2014, Region D's demands have changed to have the project removed, not just from this plan, but from all future state water plans. The Marvin Nichols Reservoir project is an important and necessary strategy for the water users in Region C, and as such, we are not willing to voluntarily and permanently remove it from our plan.

Water providers and water users located within the Region C planning area have also done everything in their power to make better use of existing water supplies and to explore innovative approaches. This includes our state-leading and nationally regarded emphasis on *water conservation and reuse* – which now accounts for 33% of Region C's total planned 2080 water supplies, as well as 45% of the new water supplies coming from our Initially Prepared Plan's (IPP) recommended strategies.

These efforts are shown in the historical regional per capita water use. Using TWDB data, Region C's municipal water use was 145 gallons per capita per day (gpcd) in 2021. By comparison, the State's water use was 140 gpcd. This is a difference of 3.6 percent. Painting Region C's water users as "water hogs" as Region D has continued to do in numerous public forums is both unfair and erroneous, as this data clearly demonstrates.

As noted in Region C's IPP, factoring in all the water conservation and reuse strategies, North Central Texas' regionwide municipal water use would decrease to a remarkable 95 gpcd by 2080.

It is also noteworthy that, with 26 percent of the state's population and 30 percent of the state's economic activity today – and even before implementing future conservation and reuse strategies – the portion of the state included in Region C is responsible for less than 10 percent of Texas' annual water use.

Despite these extraordinary efforts to use water efficiently, water conservation and reuse strategies alone will simply not be enough to meet the needs of 15.1 million Texans who will reside within Region C by 2080 – representing a near doubling of Region C's current population. This is why the state will need to develop additional water supplies for the benefit of those Texans, including supplies that cross planning boundaries that were drawn largely for planning convenience – not to separate the citizens or water resources of this great state.

The Marvin Nichols Reservoir remains an essential option in our IPP, as do a diverse array of many other water management strategies – over 170 such strategies. We have also listened to our neighbors to the northeast by delaying the planned development of the Marvin Nichols Reservoir as long as possible, until 2060, in Region C's new IPP.

To say that Region C has failed to listen to Region D's concerns, to do everything in its power to conserve and reuse water, and to delay the Marvin Nichols Reservoir project as long as possible, is therefore wholly inaccurate.

Conclusion: We Request That the TWDB Deny Region D's Attempt to Deprive Region C's Water Users of the State Water Resources Needed to Sustain Millions of Texans' Quality of Life and Future Prosperity

With all of the above in mind, we respectfully request that the Texas Water Development Board reject Region D's assertion of an "interregional conflict" over the Marvin Nichols Reservoir – a declaration that attempts to circumvent the rule of law and to prematurely deprive fellow Texans of a necessary, reasonable and demonstrably feasible water supply option that to date has taken immense effort, time, and resources to develop.

Sincerely,



Dan Buhman

Chair, Region C Water Planning Group

Cc: Temple McKinnon, TWDB
Jim Thompson, Chair, Region D Water Planning Group
Kyle Dooley, Riverbend Water Resources District

NORTH EAST TEXAS REGIONAL WATER PLANNING GROUP - D

Executive Committee

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Richard LeTourneau
Vice Chair

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May 22, 2025

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Fred Milton
Public

Ned Muse
Municipalities

Sharron Nabors
Agriculture

Harlton Taylor
Water Utilities

Bryan McMath
Executive Administrator, TWDB

Dear Mr. McMath:

This letter is in response to an email received April 28, 2025 wherein it was requested that I (along with the Region C Chair) provide any information directly relevant to what “substantial adverse effect” means in 31 TAC § 357.62 so that each entity’s positions are clearly represented.

Regions D’s position with respect to the substantial adverse impacts are clearly set forth in my letter of April 22, 2025 asserting a conflict and Region D’s Initially Prepared Plan, in particular Chapters 6.9, 6.10 and 8.12 of our IPP, so I will not reiterate those points here but refer you to both the letter and Region D’s IPP. I read the email to request Region D’s position as to what substantial adverse impact means so I will limit the response to that subject.

I can only give my understanding of what “substantially adverse effect” means by the definitions and meaning of the words themselves. “Substantial” means material or considerable. “Adverse” means unfavorable. “Effect” means result or outcome. So my understanding of the phrase would simply be a material or considerable unfavorable result or outcome.

Region D’s position is that the project in dispute, which would inundate almost 70,000 acres and take an additional vast amount of acreage from production due to mitigation under The Clean Water Act of 1964, would result in a substantial adverse impact to the area in question and the region/State as a whole. This is particularly true in this case where the agriculture and timber industries are the largest and most important drivers of the area’s economy. Much of the acreage that would be taken is the key, if not sole, revenue source of the landowners involved. The timber manufacturers, producers and others in the industry must have reliable and closely located hardwood and pine timber resources to remain competitive in a regional, national and international industry. This position is held because of our Board’s knowledge of the area and economy as well as the

tremendous amount of public testimony we have received from area residents, community leaders and industry leaders regarding the impacts.

Conversely, Region C has asserted that there is no substantial adverse impacts resulting to our Region from the proposed Marvin Nichols Reservoir. In making its assessment of economic, agricultural and natural resource harm/benefit, they did not discuss the issues and concerns with our residents, community leaders or agriculture and timber industry leaders of the area. According to their consultants, the determinations regarding impacts were done by a desk-top assessment rather than an on-the-ground analysis. The analysis by Region C and its consultants determines impacts by using region or state wide agricultural and timber acreage. This method ignores the specific impacts to local and area agriculture and timber operations and the effects those losses would have to area economies, particularly those located within or near the Sulphur River Basin. The Region C review also fails to address impacts of required mitigation.

I would like to point out that 31 TAC § 357.62 states that TWDB's determination is that there is a POTENTIAL for a substantial adverse effect on that region or the Board finds that an interregional conflict exists between the IPPs. It is Regions D's position that both situations exist in this case. To find otherwise would defy logic, reason, and common sense. It would also be a failure to follow the statute, as well as the rules set forth by TWDB.

Thank you.

Very truly yours,



Jim F. Thompson
Chair, Region D Water Planning Group

JFT/lb

cc: Temple McKinnon
Director, Water Supply Division
TWDB

Dan Buhman
Chair, Region C Water Planning Board

REGION C WATER PLANNING GROUP

Senate Bill One Sixth Round of Regional Water Planning - Texas Water Development Board

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 Paul Sigle
 Connie Standridge
 Steve Starnes
 John Stevenson

May 23, 2025

Bryan McMath

Executive Administrator, Texas Water Development Board

Re: Response to Request for Information on Meaning of “Substantial Adverse Effects”

Dear Mr. McMath:

The Region C Water Planning Group appreciates the opportunity to provide information to assist the Texas Water Development Board (TWDB) in discussing the meaning of “substantial adverse effect” in 31 TAC § 357.62(a) as part of your recommendation to the Board on whether an interregional conflict exists. This letter summarizes Region C’s position on the meaning of “substantial adverse effect,” and Attachment A provides explains the legal basis for that position in more detail.

The Plain Meaning of “substantial adverse effect”

Because TWDB rules do not define the term “substantial adverse effect,” it should be given its plain meaning in common usage and in the context of the rule in which it appears. The term “substantial” generally means large or considerable in quantity, amount, or size, but also of real and demonstrable value, not merely nominal. The term “adverse” means negative, detrimental, or against. The term “effect” means an impact or result.

Also, because the rule concerns the impact on an entire region, the term “effect” should be broadly construed to mean a general, overall change on a region as a whole, in both the near and long terms, considering direct and indirect impacts holistically across all sectors. It should be a net impact on the region, not just on individual properties, businesses, or industries. Otherwise, the loss of a single tree could be considered a negative impact on an area that is hundreds of square miles in size. As explained in the attachment, that is surely not the intent of the rule.

Applying this meaning to the rule, a “substantial adverse effect” exists if TWDB determines that (1) there is a net holistic, negative change in the overall economic, agricultural, or natural resources of a region as a whole, and (2) that change is significantly large and demonstrably real based on available data and studies.

A Holistic View of the Marvin Nichols Reservoir’s Impact on the Region

Region C has conducted detailed impact assessments and studies on the impact of the proposed Marvin Nichols Reservoir on the economic, agricultural, and natural resources in Region D (Appendices G, H, and J of the 2026 Region C Initially

Prepared Plan). These impact assessments and other studies appropriately weigh all the impacts on the region as a whole and support the position that the net impact of the Marvin Nichols Reservoir does not result in a substantial adverse effect on Region D.

In contrast, Region D did not conduct an impact assessment that considers all the impacts associated with the project. Region D also does not quantify all the impacts to assess whether the effects are “substantial” relative to the region as a whole. Region D only presents the negative impacts primarily reflected in terms of the acreage impacts on agriculture and timberland and comments received by the region. Assertions of some impacts, such as heavy metal contamination, are speculative at best and not based on fact or studies. Region D’s impact assessment does not quantitatively assess the impacts, nor does it balance the negative impacts with the importance and substance of the positive impacts. Both of these considerations are needed to evaluate whether a project has a “substantial adverse effect”.

Based on a study by Terry Clower (Appendix J, Attachment J-2 of 2026 Region C Initially Prepared Plan), construction of Marvin Nichols Reservoir boosts the Region D economy by \$5 billion. Operation of the reservoir provides an additional \$120 million per year in revenue. Opening the reservoir to the public will increase visitors and local spending to greater than \$325 million per year. Terry Clower conducted similar economic studies regarding the construction and operation of Bois d’Arc Lake and the positive economic impacts he projected for the lake have proven true for Fannin County.

Although Marvin Nichols will impact timberland and agricultural lands, these impacts will be mitigated. Landowners will be compensated for their land at fair market value and new habitats will be created. Even evaluating these impacts on acreage impacts alone, the reservoir impacts about 1% of the total timberland in Region D and 0.6 % of the farming and ranching land in Region D. The total estimated stumpage value of all potential harvested timber within the reservoir footprint is less than half a million dollars (2020 dollars). This is substantially less than the estimated hundreds of millions of dollars in economic activity spurred by the Marvin Nichols Reservoir.

Region D raises concerns about the additional acreage that will be required for mitigation, but its view that mitigation will have a negative impact on timber and agricultural industries is shortsighted and based on faulty assumptions about the quantity and quality of the lands required for mitigation. Based on recently permitted reservoirs, the amount of mitigation required would likely be considerably less than the quantities cited by Region D (an order of magnitude less). While the amount and location of mitigation has not been determined, based on current permitting guidelines, the preferred mitigation properties are ecologically degraded areas that have the greatest potential for restoration. They are not prime farmlands or timberlands. The mitigation required for Marvin Nichols Reservoir will set aside acreage to offset the impacts caused by the reservoir. This mitigation will not only improve and enhance the quality of ecological functions on the property, but such property will also be protected over the long-term as required by state and federal law. Mitigation associated with Marvin Nichols Reservoir will achieve the regional water planning charge that regions protect agricultural and natural resources. In its current state, the timberlands and agricultural lands Region D is concerned about have no long-term protection.

Under an appropriate weighing of all the impacts, Marvin Nichols Reservoir will have a net positive effect on Region D and ultimately the state. Marvin Nichols Reservoir provides a critical water supply, not only in Region C but also in Region D where 20 percent of the reservoir supplies will

remain. Marvin Nichols Reservoir will ensure water demands are met, growth continues, and the economy flourishes. The reservoir will provide significant economic growth in Region D, both short-term during the construction and development phase and long-term as a valuable recreational opportunity and a reliable water supply.

Furthermore, Region C contends that effects should be considered not only on the region the project is in, but also on the receiving region and the state as whole since the real-world effects of a project occurring or not occurring are not bound by arbitrary regional planning boundaries. This is also consistent with the defined purpose of state water planning (TAC Subtitle C, Section 16.051) to 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.

The economic effects of not developing adequate water supplies should also be looked at over the long-term -- not for only a one-year shortage as the TWDB socio-economic analysis assumes. In Texas, droughts are multi-year events and the impact of not having adequate water supplies would create multi-year shortages and long-lasting economic effects much beyond one year.

Precedent Setting Decision

A determination of an interregional conflict based on a low-threshold interpretation of “substantial adverse effect” will be precedent setting. If a conflict is found and the Marvin Nichols Reservoir project is removed from the regional water plans, water providers in the State will be denied their right to seek to use State water. This is not the intent of Senate Bill 1. Further, the removal of the Marvin Nichols Reservoir will have significant adverse effects on water providers in Region C, with little to no effect on Region D. If no conflict is found, the project would still be subject to the established and rigorous state and federal permitting process that is more suited to determine the question of “substantial adverse effects” than the regional water planning process.

Conclusion

Every project has an adverse effect on some and a positive effect on many. Region C encourages the TWDB to carefully consider the consequences of construing the term “substantial adverse effects” in a way that lowers the bar so far that the regional planning process can be used as cudgel to halt the development of essential water supply projects. If new supplies cannot be developed outside of a planning region, the regional water planning process will significantly hinder Texas’ growth. Looking at “adverse effects” in a vacuum without comparing to all other water supply strategies, considering affordability, environmental damage, and other risks is poor planning and will lead to worse impacts.

Ultimately, if Region C is unable to develop sufficient affordable water supplies to meet its growing demands, there will be long-lasting, significantly detrimental economic impacts not only to Region C but to the entire state. Similar adverse economic effects may be realized if Region C water providers are forced to develop much more expensive, alternative projects to meet the growing water needs. Region C provides 30 percent of the state’s economy and is expected to continue to provide this percentage or greater in the future. According to the economic study conducted by Clower & Associates, if a lack of available water supply were to disrupt the projected job growth in just six industries, Region C would lose \$19 billion in annual economic activity, expressed in 2020

Response on Meaning of Substantial Adverse Effect

May 23, 2025

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dollars, and more than 136,000 total jobs. Region D would also not realize the economic benefits of the reservoir discussed earlier. Clearly, the impact of not building Marvin Nichols would be significantly adverse to the Region C and state economy.

Since Region D has failed to establish a substantial adverse effect consistent with the definition of interregional conflict, your recommendation to the Board should reflect that no interregional conflict exists between Region C and D. For more detailed information directly relevant to the meaning of "substantial adverse effect," please see the enclosed Attachment A.

Sincerely,



Dan Buhman

Chair, Region C Water Planning Group

Cc: Temple McKinnon, TWDB
Jim Thompson, Chair, Region D Water Planning Group
Kyle Dooley, Riverbend Water Resources District

ATTACHMENT A

Provided below is a more detailed analysis in support of Region C's position on the meaning of "substantial adverse effects" as included in 31 TEX. ADMIN. CODE §§ 357.10(16)(b) & 357.62.

Meaning of "Substantial Adverse Effects"

In 2015, the Texas Water Development Board (TWDB) adopted a revised definition of interregional conflict (2015 Rulemaking) providing that an interregional conflict exists when

in the instance of a recommended Water Management Strategy proposed to be supplied from a different Regional Water Planning Area, the Regional Water Planning Group with the location of the strategy has studied the impacts of the recommended Water Management Strategy on its economic, agricultural, and natural resources, and demonstrates to the Board that there is a potential for a substantial adverse effect on the region as a result of those impacts.¹

Under this part of the definition, a region is required to demonstrate a potential for a substantial adverse effect on the region resulting from the economic, agricultural, and natural resources impacts of the recommended strategy. In the response to public comments in the 2015 Rulemaking, TWDB stated that purpose of the requirement is "to prevent TWDB and others from devoting valuable and limited resources to attending to numerous conflicts that are speculative or de minimis."²

Several commenters in the 2015 Rulemaking requested that "substantial adverse effects" be more explicitly defined but TWDB declined to provide any further specificity as to the meaning of the term. In its response, TWDB stated that it

cannot anticipate every type of conflict that could be raised in the context of competing views of appropriate water management strategies, and the impacts of those strategies, both beneficial and detrimental. Therefore, the board is reluctant to specify a narrow definition...³

Instead, by including "substantial adverse effect," TWDB sought to keep wording consistent with the decision in *Tex. Water Dev. Bd. v. Ward Timber, Ltd.*, 411 S.W.3d 554 (Tex. App.—Eastland 2013, no pet.) and its use of the word "substantial." The plain reading of the rule is that a substantial adverse effect is a significant or important negative effect resulting from economic, agricultural, and natural resource impacts as a result of the recommended water management strategy.

The region's study of impacts to economic, agriculture, and natural resources should not be limited to adverse or negative impacts. TWDB further discussed this in their response to comments in the 2015 Rulemaking, describing impacts as being "a broad range of differing long-term and short-term impacts, both positive and adverse."⁴ As such, a conclusion of "substantial adverse effects" should be based on a holistic study of both positive and negative impacts to the region claiming an interregional conflict.

¹ 31 TEX. ADMIN. CODE § 357.10(16)(b).

² 40 Tex. Reg. 8648 (November 27, 2015).

³ *Id.* at 8650.

⁴ 40 Tex. Reg. 8656 (November 27, 2015).

Consistent with TWDB’s intent to broadly define impacts, the relevant effects would include both direct and indirect effects on the region.⁵ Moreover, the meaning of substantial should not be limited to describing the magnitude of effects but should also allow a “weighing of the subject water management strategy in a balancing test of the relative importance of those impacts,”⁶ as articulated by TWDB in its response to comments in the 2015 Rulemaking. For an appropriate determination of whether there is a substantial adverse effect, all the impacts must be evaluated and weighed, positive and negative, short-term and long-term, and direct and indirect.

Distinguishing the Ward Timber Decision

In the *Ward Timber* decision, the court determined—based on the limited facts before it—that the Marvin Nichols Reservoir impacts defined by the 2011 Region D Plan were “substantial.” Importantly, this case pre-dates the 2015 Rulemaking, and in fact, was the basis for such rulemaking. Under its statutory authority, TWDB revised the definition of interregional conflict to ensure consistency with the *Ward Timber* decision and also clarified how a substantial adverse effect must be demonstrated by evaluating all the impacts to economic, agricultural, and natural resources to the region as a whole.

Had the full scope of impacts—accurately represented—been before the court in *Ward Timber*, the case would likely have concluded without a finding of interregional conflict. But only the negative impacts presented by Region D were before the court. Region C, not being a party to the case, had no opportunity to respond, refute, or correct the inaccurate facts and figures related to the alleged negative impacts. The information presented in the 2011 Region D Plan, and the studies referenced therein, vastly overestimate the acreage of impacts expected, particularly regarding the mitigation acreage required. More importantly, the impacts analysis included in the 2011 Region D Plan wholly ignores the benefits that Marvin Nichols Reservoir provides to Region D as a whole.

Region D’s Failure to Demonstrate “Substantial Adverse Effects”

After weighing *all* the impacts of the Marvin Nichols Reservoir on Region D *as a whole*, only one determination can result and that is of no substantial adverse effect. Region C has conducted detailed impacts analyses regarding the effects of the proposed Marvin Nichols Reservoir on economic, agricultural, and natural resources in Region D as reflected in Chapter 10 and Appendix J of the Region C Initially Prepared Plan. These impacts analyses and other studies clearly demonstrate that there is not a substantial adverse effect, contrary to Region D’s assertions.

Ultimately, Region D’s demonstration of an interregional conflict due to a substantial adverse effect fails because it did not meet its regulatory burden in evaluating all the impacts, focusing only on the

⁵ Evaluating both direct and indirect impacts is consistent with other state impact evaluations, including state water rights permitting pursuant to Chapter 11 of the Texas Water Code. Section 297.53(f)(6) of Title 30 of the Texas Administrative Code provides the following: “In case of unavoidable wetlands loss, impacts to wetland habitat are mitigated in accordance with the following guidelines... [w]ater right permit reviews shall examine both direct and indirect impacts to terrestrial and riparian habitats, as well as long and short-term effects to the watershed or ecoregion that may result from the permitted activity.”

⁶ 40 Tex. Reg. 8650 (November 27, 2015).

negative, direct impacts, and wholly misrepresenting the ultimate effects of the Marvin Nichols Reservoir on Region D.

6.9 Marvin Nichols I Reservoir and Impacts on Water Resources, Agricultural Resources and Natural Resources

Marvin Nichols I Reservoir was first included in the State Water Plan in 1968. More recently, it has been a recommended water management strategy for Region C in 2011, 2016, and 2021, and was included in the 2012, 2017, and 2022 State Water Plans. Marvin Nichols reservoir has also been included in Region C's drafts as a proposed water management strategy in previous rounds of planning. Since all proposals for Marvin Nichols reservoirs would be located exclusively in the North East Texas Region, and the impacts to agricultural and natural resources would be greatest in this Region, the NETRWPG feels it is important and necessary to review the impacts that any such Marvin Nichols reservoir would have to this area. This is particularly true since the spirit of Texas' regional water planning process includes a ground up, localized approach to the planning process. The discussion below will apply to the Marvin Nichols I/IA Reservoir, since it was included in the 2022 State Water Plan, but the approach applies to any proposed reservoir in the Sulphur River Basin.

Based on the reasons set forth below, it has been and continues to be the position of the NETRWPG that Marvin Nichols I Reservoir should not be included in any regional plans as a water management strategy and not be included in the 2027 State Water Plan as a water management strategy. The NETRWPG continues to oppose any Marvin Nichols type reservoir. The NETRWPG also has not yet seen an adequate evaluation by Region C of the impacts of such a reservoir on water, agricultural and natural resources of the state and on Region D. As noted in the 2021 Region C Water Plan, "[t]he total acreage that would be flooded if all recommended water management strategies from the 2021 Region C Water Plan were implemented is almost 131,000 acres, with almost half of that being from the proposed Marvin Nichols Reservoir." The NETRWPG supports its positions with both the facts set out in its previous 2011, 2016, and 2021 Region D Plans, including information provided again below that have come from evaluations of the needs for instream flows to protect flood plain forests that exist downstream of the proposed reservoir. It is the position of the NETRWPG that all proposals for Marvin Nichols reservoirs developed by Region C are based on the impoundment and use of water that NETRWPG needs to protect these downstream agricultural and natural resources.

At the time of publication of this Regional Water Plan, no agreement has been made between Regions C and D for the purposes of the 2026 Region D Plan.

6.9.1 Impacts on Agricultural Resources

Agriculture as a whole and timber in particular are vital and important industries throughout the NETRWPA, as illustrated in Chapter 1, Figure 1.11, wherein timber is listed in 12 of the 19 counties as a principal crop.

Estimates developed for the USACE and Sulphur River Basin Authority (SRBA 2013) reflect that Marvin Nichols I Reservoir would flood 66,103 acres, mainly in Red River County and including portions of Titus, Franklin, Delta, and Lamar Counties. Within that study, a high-level desktop analysis using available land coverage data from the TPWD Ecological Systems Classification, and EPA concluded that included in the flooded acreage would be 31,600 acres of forest lands, including an approximation of 10,156 acres of Priority 1 bottomland hardwoods potentially classified as waters of the U.S. (SRBA Environmental Evaluation Interim Report, Sulphur River Basin Comparative Assessment, 2014). Specifically to differentiate bottomland hardwood forest by that area potentially characterized as "waters of the U.S.," dubbed "Forested Wetland," an extra GIS filter was employed using the U.S. Fish and Wildlife Service National Wetlands Inventory data coverage.

While the SRBA study suggests that the amount of bottomland hardwood forest characterized as waters of the U.S., i.e., "Forested Wetland" potentially impacted by the proposed Marvin Nichols reservoir is 10,156 acres, the amount reported in the TWDB 2008 Reservoir Site Protection Study is reported as 26,309 acres (Table 5-37, pg. 100, utilizing a methodology performed by the Texas Parks and Wildlife Department, TPWD, described in Appendix C of that report). A possible reason for this significant difference may be the extra filtering noted above to differentiate between bottomland hardwood forest, and "Forested Wetland," which is used for their calculation of "waters of the U.S." While the difference in the overall acreage between the 2008 TWDB study and the more recent SRBA study is less than 2%, the reported difference in impacts on potentially mitigable bottomland hardwoods has decreased by approximately 16,153 acres, or more than 60%.

More recent analyses performed for the SRBA (as reported in Timberland and Agricultural Land Impact Assessment for Selected Water Resource Options in the Sulphur River Basin, SBG 2015) have indicated the impacted acreage from the Marvin Nichols Reservoir project to be 66,216 acres, assuming a reservoir elevation of 328 ft-NGVD. Additional information developed for the SRBA in early 2015 indicated that, "recent droughts had impacted the estimated firm yield of reservoirs within the Sulphur Basin to a greater extent than anticipated and that a larger scope of the Marvin Nichols project should be evaluated." This more recent study thus adopted a "more refined" approach to evaluate timber resources. The results indicated that approximately 42,019 acres of timber, 22,854 acres of agriculture, and 1,343 acres of "other" wildlife area would be impacted by the Marvin Nichols Reservoir project. The estimated value of these impacts totals approximately \$28.3 million (\$24.7 million timber value, \$3.6 million agricultural value).

More recent draft information presented by the Region C RWPG at its meeting on September 30, 2024, indicates a surface area for Marvin Nichols Reservoir of 66,103 acres, with storage of 1,532,000 ac-ft of storage. This acreage is consistent with that previously reported in the 2021 Region C Water Plan. Within Appendix J of the 2021 Region C Plan, available data on land cover types potentially useful as agricultural resources were adapted from the *Environmental Evaluation Interim Report – Sulphur River Basin – Comparative Assessment*. Estimated amounts of inundated area were Timberlands (42,823 acres), Active/Potential Agricultural and Pasture Lands (18,947 acres), and Non-Agricultural Lands (4,333 acres). It is further noted therein that 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," which is discussed in greater detail below.

Ultimately, these studies provide a useful example of the uncertainty underlying the planning-level characterization of the significance of impacts from the Marvin Nichols I Reservoir on the timber industry in the North East Texas Region, and the importance of field verification and further detailed analysis.

In addition to the timber and agricultural land lost as a result of the reservoir, mitigation requirements are anticipated to significantly impact agricultural resources. It has been acknowledged that mitigation is intended to offset impacts to natural resources, but may increase impacts to agricultural resources. The SRBA (2014) study of the Sulphur River Basin (specifically the Cost Rollup Report) concluded that approximately 47,060 acres would be necessary for mitigation. This methodology was based upon the application of a 2:1 ratio applied to the aforementioned calculated acreage of 23,530 acres of "water of the U.S." within the footprint of the proposed reservoir. This information was then incorporated into the 2016 Region C Water Plan.

The results of the SRBA Study were used as the basis for the 2014 analysis for Region C entitled, "Analysis and Quantification of the Impacts of the Marvin Nichols Reservoir Management Strategy on the Agricultural and Natural Resources of Region D and the State." This analysis compiled information developed during the SRBA study for use in the TWDB's conflict resolution process between Region C and Region D performed for the purposes of the 2016 regional water planning process.

Region D prepared a three-part response to the Region C RWPG's analysis. In the first part of this response, Trungale (2014) concluded that the impacts on priority bottomland hardwoods due to the reservoir and its impacts on flows would be significant:

"Development of the Marvin Nichols Reservoir project as proposed in the Region C water plan would permanently flood a large proportion of the last remaining intact bottomland hardwoods (BLH) in East Texas. It would also result in a massive reduction in flows remaining in the river downstream of the proposed reservoir project which would result in significant, likely catastrophic, harm to an even larger bottomland hardwood forest area. As the plan acknowledges "Marvin Nichols Reservoir will have significant environmental impacts." (Region C 2011, p 4D.11)"

These bottomland hardwoods habitats are important natural resources that are dependent on maintenance of instream flows.

"Floodplains with BLH and other ecologically important habitats are one of most altered and imperiled ecosystems on Earth (Opperman et al. 2010). The unique importance of this BLH ecosystem is largely based on its extensive swamp communities sustained by an active regime of high and overbank flows. More than any other factor, the sustainability of ecosystem processes within floodplains depends upon the longitudinal and lateral hydrologic connections that would be severed by the proposed reservoir."

Trungale (2014) further concluded based on analysis of modeling provided by Region C that operation of Marvin Nichols as proposed by the Region C Plan would not protect these important natural resources.

"As currently modeled, the proposed Marvin Nichols I reservoir will not provide sufficient frequency and duration of high and overbank flows to sustain downstream BLH forest....Analysis of results generated by the water availability modeling (WAM), developed to evaluate this reservoir project, indicate that the flows needed to maintain these forests would be severely diminished, if not entirely eliminated. The environmental flow requirements used to evaluate the Marvin Nichols Reservoir Water Supply Project are based on an approach developed in the 1990's called the "Consensus Criteria". Unlike the more recent environmental flow criteria developed as part of SB3, there are no requirements, under the consensus criteria, to pass any high flow pulse flows. The maximum pass through for the proposed Marvin Nichols Reservoir Project, as required by consensus criteria, would be 514 cfs in May and then only if the reservoir is greater than 80% full.

The clearest problem with the Region C report is that it contains no analysis or quantification of downstream impacts. Data and methodologies to perform this type of analysis, even at a planning level, are readily available. In 2004, the TWDB and the U.S. Army Corps of Engineers (USACE) conducted a study on the Sulphur River (TWDB 2004). Direct observations and technical evaluations reported in this study indicate that flows in the range of 862 cfs (approximately 50,000 ACFT per month) are transitional between in-channel and overbank flow.

An analysis of the outputs from the water availability model, developed by Region C to evaluate the Marvin Nichols project, show that under existing conditions, there is only one year, out of the 57-year record, in which flows did not exceed this threshold volume in at least one month. When the proposed reservoir is included in the simulation, this number jumps to 29 years (more than half of the time) when no overbank events occur. The longest duration of time in which no over bank event occur under the without project scenario is 16 months; the flow regime resulting from the proposed reservoir indicates that at two separate times in the record, the river would go 80 months (almost 7 years) without overbank flow events. These flow rates, based on the 7Q2 water quality target, are intended to sustain the river during brief, infrequent and severe droughts, but with the Marvin Nichols project as proposed and modeled by Region C, these extremely low flows would occur much more frequently."

The impact of flow alteration due to the Marvin Nichols Reservoir on downstream forests does not appear to have been considered in those Region C analyses. These losses, as well as the losses within the reservoir footprint, represent a significant impact on natural resources in Region D. From Trungale (2014):

"The lack of seasonal flooding identified in the water availability results indicates BLH forests cannot be maintained downstream of the proposed Marvin Nichols reservoir. When the effect on flows and the loss of episodic inundation are added to the impacts resulting within the reservoir footprint, the impacts from the Proposed Marvin Nichols Reservoir Project are huge. In the Sulphur basin 44% of the Forested Wetland area and 17% of the Bottomland Hardwood Forests would be at significant risk. By completely ignoring the largest and most significant impacts to natural resources resulting from the Marvin Nichols Reservoir Water Supply project, the Region C report does not meet the requirements of the TWDB order."

In a separate section of Region D's 2014 response to the 2014 Region C analysis, Sharon Mattox, Ph.D., J.D., concluded that the Region C report "fails to provide reasonable quantification of impacts." This report cites a major change in the means of determining mitigation, identifying that the U.S. Army Corps of Engineers and the U.S. EPA published their final rule, "Compensatory Mitigation for Losses of Aquatic Resources," better known as the "2008 Mitigation Rule." As noted in Mattox (2014):

"The policies and procedures laid out in the 2008 Mitigation Rule render it improper and utterly illogical to conduct an analysis of a future project based solely on historical information (even if Region C had gathered accurate and relevant historical data). Under well-developed tools and practices stemming from the 2008 Mitigation Rule, losses of functions and values are the emphasis and simple ratios are not the touchstone. If a ratio is used, that ratio should be in the range of 3:1 to 10:1."

Mattox (2014) further notes:

"Initially, the Report estimates impacts only for the inundation area of the Reservoir itself – that is, the footprint of reservoir. The Report fails to estimate jurisdictional areas for the 2,751 acres of "ancillary facilities" recognized in the [2011] Region C Plan. The ancillary facilities must be part of the USACE permit, which must assess the complete project. In addition, the Report fails to include any estimates for lands used during the construction process. The estimate also fails to include any estimate of critical secondary impacts to waters of the U.S., which will also require mitigation if losses of waters of the U.S. result. One example of a secondary impact that would likely have a material impact is wetlands adjacent to the Sulphur River downstream of the proposed dam that will no longer be inundated by frequent flood events."

Mattox (2014) summarizes the characterization of potential mitigation thusly:

"The 23,530 acre estimate of jurisdictional areas is not consistent even with the data on land coverage types... Based on my review of the EEIR-SRBCA, I would include the estimated acreages for bottomland hardwoods, forested wetlands, herbaceous wetlands, open water, and shrub wetland. In addition other habitat types identified ... as subtypes under Grassland/Old Field, Shrubland, and Upland Forests that are not broken out but likely qualify as waters of the U.S., include Pineywoods: Bottomland Wet Prairie, Pineywoods: Small Stream and Riparian Wet Prairie, Pineywoods: Small Stream and Riparian Evergreen Successional Shrubland, and Pineywoods: Small Stream and Riparian Temporarily Flooded Mixed Forest."

The total of only the habitat types listed Table 2 of the Report is 35,411 acres, which I believe to be a more realistic estimate of the number of acres that require mitigation, if one is limited to the numerical data provided in the Report. This number, however, still excludes the additional habitat types given above, which will also contain jurisdictional areas. It further excludes the small, but identifiable wetlands, streams, and other waters that are certainly present in other habitat categories. Although no data on these omitted waters is included, it would certainly increase the realistic minimum number of jurisdictional waters of the U.S. For planning purposes, an estimate of at least 40,000 jurisdictional acres is reasonable."

Noting that historically, all required mitigation has occurred in the watershed of the reservoir, Mattox (2014) indicates that, "given that the watershed approach is a central focus of the 2008 rule, all mitigation required for the [Marvin Nichols I] strategy must certainly occur within Region D," ultimately opining:

"...[T]he mitigation required for the [Marvin Nichols I] strategy will require at least 3 times as much land as the acres of jurisdictional waters, and potentially much more. Any of the reasonable estimates suggest the mitigation land required for the [Marvin Nichols I] strategy will exceed 100,000 acres..."

Another previous study by the Texas Parks and Wildlife Department (TPWD)/United States Fish and Wildlife Service (USFWS) concluded a minimum of 163,620 acres would be required for mitigation and that number could be as high as 648,578 acres. "The Economic Impact of the Proposed Marvin Nichols I Reservoir to the Northeast Texas Forest Industry" prepared by the Texas Forest Service dated August 2002 estimated that the total acres affected by Marvin Nichols I Reservoir could be as low as 258,000 acres or as high as 820,000 acres. "The Economic, Fiscal and Developmental Impacts of the Proposed Marvin Nichols Reservoir Project" dated March 2003 by Weinstein and Clower prepared for the SRBA stated a lower acreage loss, estimating agricultural land loss of 165,000 to 200,000 acres.

It is understood that the exact amount and location of the mitigation acreage is unknown. However, in analyzing impacts to agricultural and natural resources in the NETRWPG area, it is clear that vast amounts of agricultural acreage will be removed from production due to flooding and mitigation requirements associated with Marvin Nichols I Reservoir. These impacts are corroborated in "Table P.1: Summary of Evaluation of Water Management Strategies" as follows: "Agricultural Resources/Rural Areas" are rated high" and "Possible Third Party" are rated "high". Third Party impacts are considered to be social and economic impacts resulting from redistribution of water.

6.9.2 Impacts on Timber Industry

The Texas Forest Service Study dated August 2002 estimated that the forest industry and local economies would incur significant losses due to a substantial reduction in timber supply from the reservoir project and required mitigation. The study further detailed that manufacturing facilities such as paper mills located near the proposed site which are dependent on hardwood resources would be impacted the most. The NETRWPG has previously received oral and written commentary from Graphics Packaging International, (formerly International Paper Company), which operates a paper mill in Cass County, Texas, and from numerous other timber companies, logging contractors and related industries stating that Marvin Nichols I Reservoir and the mitigation associated with the project would place their industries in peril due to the loss of hardwood timber supplies.

The Texas Forest Service Study estimated forest industry losses based on three (3) separate mitigation options. The low end impacts were estimated to be an annual reduction of \$51.18 million output, \$21.89 million value-added, 417 jobs and \$12.93 million labor income. The high end impacts were estimated to be annual loss of \$163.91 million industry output, \$70.10 million value-added, 1,334 jobs and \$41.4 million labor income.

The Weinstein and Clower Study dated March 2003 estimated as much as 200,000 acres of agricultural land, including 150,000 acres of timberland, could be removed from production. However, the study opined that based on assessment U.S. Forest Service inventories, those inventories along with growth could offset the loss of timberland due to reservoir impoundment and mitigation. The study also indicated that the loss to the timber industry should be limited to additional transportation costs associated with assessing new regional sources of timber.

The Weinstein and Clower Study has been criticized on the following grounds:

1. The Weinstein and Clower Study used total U.S. Forest Service timber inventories throughout the region in arriving at its conclusion that the inventories together with the growth of those inventories would offset any losses due to reservoir impoundment and mitigation. It did not take into account that large amounts of this acreage is unharvestable because it is located in wildlife management areas, streamside management zones, parks, housing areas and other areas which cannot be harvested. In addition, it is well documented that hardwood acreage throughout Northeast Texas as well as the State as a whole is decreasing due to development, conversions of hardwood areas to production of pine plantation acreage, and inundation for water development projects. See "An Analysis of Bottomland Hardwood Areas" report to TWDB dated February, 1997.
2. The Weinstein and Clower Study fails to distinguish between timber inventories as a whole (which includes more pine than hardwood) and hardwood timber inventories. Many of the timber industries in Northeast Texas, such as paper mills and hardwood sawmills, are dependent upon a reliable and affordable supply of hardwood timber. Hardwood timber grows predominantly in bottomlands and thus would be more severely impacted by the reservoir project and required mitigation than other timber species.
3. The Weinstein and Clower Study acknowledges that transportation costs would be greater with Marvin Nichols I in place as timber companies would be required to purchase timber from farther distances. These additional costs would have a huge impact on the timber industry in Northeast Texas. Timber is a heavy product and the transportation cost of timber is a substantial factor, particularly taken in conjunction with the current high cost of fuel. The industries involved compete in a global market. Additional transportation costs and additional costs in obtaining raw materials will jeopardize their ability to compete in this global market. This is particularly important considering the number of manufacturing jobs already lost due to rising costs of manufacturing products in the United States.
4. The Weinstein and Clower Study used a mitigation factor of 1.54 to 1, citing that ratio as the mitigation required by the most recently developed reservoir in Texas. It is widely believed that the estimates by the TPW/USFWS Study and the TFS Study are more accurate estimates based on the detailed analysis of the actual acreage to be mitigated rather than a recent mitigation requirement from a totally different type of habitat. In addition, Cooper Lake in Northeast Texas had 5,900 acres of bottomland hardwood and required total mitigation of 31,980 acres throughout Northeast Texas.
5. Finally, additional skepticism of the Weinstein and Clower Study is based on the knowledge that funding for the Study came from Dallas-Fort Worth entities which would benefit from and utilize the water supplies from Marvin Nichols I Reservoir.

As noted previously, results from SBG (2015) developed for the SRBA indicated that approximately 42,019 acres of timber, 22,854 acres of agriculture, and 1,343 acres of "other" wildlife area would be impacted by the Marvin Nichols Reservoir project. The estimated value of these impacts totals approximately \$28.3 million (\$24.7 million timber value, \$3.6 million agricultural value). The 2021 Region C Water Plan (Appendix J) similarly reported potential impacted acreage of timberland (composed of Bottomland Hardwood Forest, Forested Wetland, and Upland Forest cover types) to be approximately 42,823 acres. However, it is noted that both of these analyses focused upon the acreage potentially inundated within the reservoir, and did not include an analysis of acreage impacted by potential mitigation.

6.9.3 Impacts on Farming, Ranching and other Related Industries

The studies cited above deal only with the timber industry in Northeast Texas. Marvin Nichols I Reservoir and required mitigation would also impact areas which produce wheat, cotton, rice, milo, hay, soybean, and alfalfa. In addition, acreage currently being utilized for beef cattle, dairy cattle, poultry and hog production would be affected. The NETRWPG has received numerous oral and written comments from individuals involved in the production of these agricultural commodities, along with others in agribusiness industries, reflecting negative impacts from the potential development of Marvin Nichols I Reservoir.

6.9.4 Impacts on Natural Resources

Additional commentary has been previously received from the NETRWPG concerning negative impacts on natural resources such as lignite and oil and gas reserves located in and near the reservoir site. See Chapter 1 Figures 1.7 and 1.9 for maps of oil and gas as well as lignite resources. "Table G.3 Evaluation Matrix" as presented in the 2021 Region C Plan corroborates the negative impacts of Marvin Nichols (328') upon "Other Natural Resources" in its rating of 2 (out of 5). Additional concerns have been expressed from landowners regarding economic losses from hunting leases, grazing leases and timber sales. These impacts are again corroborated in the aforementioned table from the 2021 Region C Plan, rating the impacts of Marvin Nichols (328') upon Agricultural Resources/Rural Areas with a score of 1 (out of 5).

In addition, if Marvin Nichols I Reservoir is built the footprint will sit squarely on top of the outcrop of the Nacatoch Aquifer. Local residents report there are dozens of springs and thousands of sand boils. Man-made alterations include water wells, undocumented seismograph holes and unplugged oil wells. Residents' concern is that heavy metals settling to the bottom of the reservoir will contaminate the aquifer below.

6.9.5 Impacts on Environmental Factors

Region C's 2016 planning process provides a summation of significant negative environmental impacts in "Table P.4: Environmental Quantification Matrix." Marvin Nichols Reservoir would cause "High" habitat impacts, "Medium High" impacts to cultural resources, and "Medium" impacts to environmental water needs. "High" is the highest category for negative impacts given to any strategy. This includes 24,093 acres of wetlands impacted and 23 threatened/endangered species.

Although the NETRWPG opposes any Marvin Nichols type reservoir, the NETRWPG notes that other potentially feasible alternatives, such as reallocation of flood pool storage in Wright Patman Reservoir, do exist in the Sulphur River Basin. Evaluations considering the feasibility of this strategy have been performed as part of the aforementioned SRBA Sulphur River Basin Feasibility Study, an ongoing effort on the part of the USACE and SRBA to evaluate potential water supply alternatives in the Sulphur River Basin.

A modified WAM for the Sulphur River Basin, and conditions representing full demands of existing water rights with no discharges (i.e., Run 3), was used in that study to evaluate three reallocation scenarios with conservation elevations of 232.5 ft., 242.5 ft., and 252.5 ft. The results from these analyses conclude that the available firm supply from reallocation of Wright Patman reservoir ranges from 415,000 ac-ft/yr, to 730,400 ac-ft/yr, and up to 1,004,100 ac-ft/yr, depending upon the amount reallocated from flood storage². It is noted, however, that more recent modeling reflecting updated hydrology has been adopted by TCEQ that decreases these amounts due to impacts from a more recent drought of record in the Sulphur River Basin.

Analyses of potential unit costs of alternative water supplies from the Sulphur River Basin are presented within the *Cost Rollup Report – Final* for the SRBA study. Through a series of planning level analyses, the study identified 12 alternatives having unit costs under \$650 per acre-foot during debt service (after debt service, these 12 most cost-effective alternatives remain the least expensive). These seven alternatives are comprised of some combination of the following components:

- Marvin Nichols 328'
- Marvin Nichols 313.5'
- Wright Patman 232.5'
- Wright Patman 242.5'
- Talco 350' – Configuration 1
- Talco 370' Configuration 1
- Parkhouse I
- Parkhouse II

It is then concluded that *"[i]n general, the larger Marvin Nichols scales, the smaller Wright Patman scales, and the Talco alternatives appear to merit further consideration, at least on the basis of unit costs."*

² Taken from *Technical Memorandum on Hydrologic Yields – Sulphur River Basin Feasibility Study*, 08/26/2014.

As noted in the SRBA's Socioeconomic Study of the Sulphur River Basin, "the analysis of socioeconomic resources identifies those aspects of the social and economic environment that are sensitive to change and that may be affected by actions associated with the development of water resources in the Sulphur Basin." Regional economic development effects were estimated using the MIG, Inc. IMPLAN modeling software for the construction and operation of alternative reservoir scenarios, with all costs and impacts expressed in 2014 dollars. Study areas for each of 12 reservoir scenarios were defined via the adjacent counties to each reservoir alternative. The resultant comparisons between modeled estimates of employment and labor income generated during construction and during project operations demonstrate that the considered Wright Patman Reservoir scenario offers the greatest induced, indirect, and direct effects of all the scenarios analyzed.

The *Environmental Evaluation Interim Report, Sulphur River Basin, Comparative Assessment* produced as part of the SRBA Sulphur River Feasibility Study provides consideration of potential environmental concerns associated with the development of additional water supply within the Sulphur River Basin. Preliminary environmental analyses were performed to, "...help with the identification of potential impacts and constraints..." to the considered potential reservoir sites under evaluation. Readily available information regarding land cover/resources, wetlands, bottomland hardwoods, water quality, archeological resources, instream uses, groundwater, and state and federally listed threatened or endangered species was gathered and reviewed. This information was analyzed within the footprint of each alternative reservoir site to develop a structured assessment. Rankings were then developed based on the identified impacts/constraints. With regard to the Marvin Nichols and Wright Patman reservoir scenarios, the report states:

"The Marvin Nichols project is representative of a more downstream location for new storage within the Sulphur River Basin. At least five locations for this dam have been considered in previous studies. In general, these alternative sites represent an attempt to locate the impoundment so as to avoid conflicts with Priority 1 bottomland hardwood habitats and oilfield activity while maintaining yield. A potential reservoir at the Marvin Nichols 1A site ...was identified as a recommended strategy for [the North Texas Municipal Water District, Upper Trinity River Water District, and the Tarrant Regional Water District] in the 2006 and 2011 [Region C] plan. The Marvin Nichols 1A site is also recommended for protection in the Reservoir Site Protection Study."

and

"Wright Patman Lake is an existing reservoir located on the Sulphur River in Bowie and Cass Counties, Texas. The top of Wright Patman Dam is at elevation 286 ft. msl. In terms of normal operations, elevation 259.5 ft. msl is considered the top of the flood control pool. At this elevation, Wright Patman Lake would have a cumulative storage capacity of 2,659,000 acre-feet. Theoretically, reallocation of almost any portion of that flood storage is possible. In a practical sense, reallocations are typically limited by either the need to maintain a large amount of flood control storage in order to protect downstream lives and properties, or the constraint on the increase in dependable yield that can be obtained as a result of limited water rights availability, or both. For the purposes of this analysis, the assessment of potential impacts to resources was estimated for two scenarios: 1) the portion of the flood pool from the existing top-of-conservation-pool elevation of 227.5 ft msl up to 237.5 ft. msl. (i.e., an increase of 10 ft. msl. in the conservation pool) and 2) the entire flood pool from the existing top-of-conservation-pool elevation of 227.5 ft. msl. up to 259.5 ft. msl.*

** The existing top-of conservation-pool elevation of 227.5 ft. msl. was determined by calculating an average for seven years of daily water surface elevations recorded by the USGS Gage (Wright Patman Lk nr Texarkana, TX) located at Wright Patman Lake from February 2006 to February 2013."*

Based on the SRBA study's review of cultural resource records and environmental data, it is reported that the Lake Jim Chapman reallocation and Lake Wright Patman minimum reallocation (237.5 ft. msl.) have the "Lowest Impacts", while the Parkhouse I, Parkhouse II, and Wright Patman maximum reallocation (259.5 ft. msl.) have "Moderate Impacts." Significantly, the Talco and Marvin Nichols 1A scenarios were determined to have the "Highest Impacts."

The comparative environmental assessment performed for the Sulphur River Basin Feasibility Study provides a structured comparative assessment of the potential impacts associated with the alternative reservoirs considered. Significant questions remain regarding the specifics of the methods employed in deriving the impacts on archeological resources, bottomland hardwoods, wetlands, the overall rankings, and the individual weight of each ranking in contributing to the overall rankings. However, although such questions remain, the results of the analysis are informative. A comparison is summarized and presented in the SRBA study via a matrix of rankings, presented in Table 6.15.

Table 6.15 Summary/Comparison Matrix of the Potential Impacts of the Alternative Reservoir Sites

| Reservoir Site | T&E Impacts | Archeological Resources Impacts | Bottomland Hardwood Impacts | Wetlands | Water Quality | Overall Ranking |
|-----------------------|-------------|---------------------------------|-----------------------------|----------|---------------|-----------------|
| WRIGHT PATMAN (259.5) | 7 | 3 | 7 | 7 | 7 | 7 |
| MARVIN NICHOLS 1A | 6 | 4 | 6 | 6 | 4 | 6 |
| WRIGHT PATMAN (237.5) | 4 | 2 | 5 | 5 | 6 | 5 |
| TALCO | 5 | 4 | 4 | 4 | 5 | 4 |
| PARKHOUSE I | 3 | 3 | 3 | 3 | 3 | 3 |
| PARKHOUSE II | 2 | 3 | 2 | 2 | 2 | 2 |
| JIM CHAPMAN (446.2) | 1 | 1 | 1 | 1 | 1 | 1 |

Source: Environmental Evaluation Interim Report, Sulphur River Basin, Comparative Assessment, SRBA, June 2013.

The 2021 Region C Plan contains in Table J.6 data that of the 66,103 acres to be inundated by the Proposed Marvin Nichols Reservoir, approximately 62,000 acres are either timberlands or agricultural land. In addition to the lands that would be inundated by the proposed Reservoir, vast amounts of acreage would be taken for mitigation. Based on the significant area in Region D that is used for agricultural and timber use, it is likely that most of the acreage taken for mitigation will also be agricultural and timber lands.

The 2021 Region C Plan also contained Attachment J-4: "Economic, Fiscal and Developmental Impacts of the Proposed Marvin Nichols Reservoir" dated April 13, 2020 prepared by Clower a& Associates. This study has been roundly criticized by agricultural, timber, community and business leaders throughout Northeast Texas for the following reasons:

1. The Study only considered impacts from the Reservoir and no consideration of impacts from mitigated areas;
2. The Study only considered impacts to the counties where the Reservoir would be located. Additional negative impacts would occur to manufacturing areas in Northeast Texas which rely on the raw materials that would no longer exist due to the Reservoir and required mitigation;
3. The authors of the Study have little or no understanding of the agricultural and timber industries in Northeast Texas. The availability of nearby raw materials is the most important factor to these industries being able to compete on a regional, national and international basis. No industry, business or community leaders in our area were consulted as to the potential impacts removing this vast amount of acreage would have to our area and the economic impacts.

6.10 Conclusion

It has been and continues to be the position of the NETRWPG that due to the significant negative impacts upon environmental factors, agricultural resources/rural areas, other natural resources, and third parties, Marvin Nichols I Reservoir should not be included as a water management strategy in any regional water plan or the State Water Plan. In referencing Marvin Nichols, the NETRWP incorporates Marvin Nichols I, Marvin Nichols IA, and any major dam sites on the main stem of the Sulphur River.

At the time of publication of this Regional Water Plan, no agreement has been made between Regions C and D for the purposes of the 2026 Region D Plan.

In order to be included in any regional water plan or The State Water Plan, a proposed project must protect the agricultural and natural resources of the State. The proposed Marvin Nichols Reservoir would inundate vast amounts of agricultural and timber lands in Northeast Texas. In addition, this project will require very substantial acreage to be removed from production for mitigation of this project. It is the position of the Region D Water Planning Group that it is not possible to find that this project protects the agricultural and natural resources of the State when so much agricultural/timber land will be inundated and when it is not known how much additional acreage will be required, the location of that acreage, or the type of acreage that will be taken for mitigation.

Considering the aforementioned information, it is the position of the NETRWPG that Marvin Nichols Reservoir be removed from the State Water Plan, that Region C seek other more viable measures to meet any future water needs including, but not limited to, additional conservation, reuse, reduction of water losses, and reallocation of abundant resources currently available (Toledo Bend, Texoma, and other existing Reservoirs). Region D is willing and able to work with and assist Region C in exploring these potential water resources.

8.12 Sulphur River Basin

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

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

8.12.1 Marvin Nichols I/IA

In the interim since the 2001 plan there have been four identified studies concerning the Marvin Nichols site. The Texas Forest Service produced “The Economic Impact of the Proposed Marvin Nichols I Reservoir to the Northeast Texas Forest Service” in August 2002. In March of 2003, the Sulphur River Basin Authority (SRBA) had prepared “The Economic, Fiscal, and Developmental Impacts of the Proposed Marvin Nichols Reservoir Project.” More recently, the Sulphur River Basin Feasibility Study was performed for the SRBA and USACE by Freese and Nichols, Inc. and MTG Engineers and Surveyors (referred to hereafter as the 2014 SRBA Study). As part of this effort, the USACE produced the report Sulphur River Basin – Socio-Economic Assessment. More recently, an updated socio-economic study entitled, *The Economic, Fiscal and Developmental Impacts of the Proposed Marvin Nichols Reservoir* was conducted in April 2020 by Clower & Associates.

Over time, these studies, along with previous efforts, have been presented to the NETRWPG and reviewed (results of the more recent SRBA study were reviewed as information became available). The results of the studies present varying views of effects on the area concerning reservoir development in the Sulphur River Basin.

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

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

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

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

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

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

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

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

The yield simulation previously performed for the NETRWPG for the 2011 Region D Plan involved application of TCEQ's Sulphur River Basin WAM, which considers the seasonal variation of conservation storage in Lake Wright Patman and a daily reservoir operations model used by the TWDB (SIMDLY), which allows passage of environmental flows in accordance with the state's criteria.

The assumption used by Region C would require the negotiation of a written agreement between the operators of Marvin Nichols I and Wright Patman reservoirs (including the City of Texarkana, the water rights holder) before any application can be filed with the TCEQ for water rights for Marvin Nichols I Reservoir. Should that agreement happen in the future, it will enhance the yield of Marvin Nichols I Reservoir.

The estimated cost to develop the Marvin Nichols I reservoir, updated to September 2023 dollars, was \$997.1 million. The total annualized cost of the reservoir (alone), including debt service and operations and maintenance costs, was \$61.7 million, which resulted in a unit cost of roughly \$112 per ac-ft of firm yield (\$0.35 per 1,000 gallons).

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

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

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

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

The Marvin Nichols IA project would inundate 66,103 acres..."

A thorough suite of yield estimates for the Marvin Nichols IA project have been developed over the course of the SRBA (2014) study. Over the course of the analyses presented in the aforementioned reports, yields for various configurations of Marvin Nichols have been developed utilizing a modified version of the TCEQ WAM in which Lake Ralph Hall has been implemented, considering future sedimentation conditions and mitigated sediment conditions, employing alternative periods of record using a USACE model for comparative purposes, and considering alternative implementations of potential environmental flow requirements (i.e., no requirements or with criteria developed utilizing the Lyons method). Resultant firm yields from these analyses range from 193,800 ac-ft/yr to 676,000 ac-ft/yr. The estimated total yield for Marvin Nichols 1A at an elevation of 328.0 feet. National Geodetic Vertical Datum (NGVD) is 590,000 ac-ft/yr, although with environmental flows considered this yield decreases to 571,710 ac-ft/yr.

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

From this study, the estimated total capital cost to develop the Marvin Nichols IA reservoir, at elevation 328 ft-MSL, at 2023 dollars, is \$1.508 billion. Including transmission, the total capital cost of the project is \$6.040 billion. The total annualized cost of the project, during debt service is \$373.4 million, and after debt service is \$91 million. Resultant unit costs developed for the SRBA study are presented for both with and without environmental flow restrictions (developed from using the Lyons methodology). Without environmental flows, the unit cost during debt service is roughly \$633 per ac-ft of firm yield (\$1.94 per 1,000 gallons), and after debt service is approximately \$153 per ac-ft of firm yield (\$0.48 per 1,000 gallons). Unit costs with environmental flow requirements based on the Lyons method in place during debt service is roughly \$653 per ac-ft of firm yield (\$2.02 per 1,000 gallons). After debt service, unit costs considering environmental flows is approximately \$158 per ac-ft of firm yield (\$0.49 per 1,000 gallons).

If, along with impacts from meeting environmental flow needs, the contractual relationship between the Metroplex members of the Joint Committee for Program Development (JCPD) and the SRBA is considered, whereby 20 percent of project yields would be dedicated to in-basin needs at no cost to SRBA, the unit costs to the Metroplex JCPD members based on their anticipated portion of the yield vary from those detailed above. During debt service, the unit cost is approximately \$816 per ac-ft of firm yield (\$2.51 per 1,000 gallons). After debt service, the unit cost is roughly \$198 per ac-ft of firm yield (\$0.62 per 1,000 gallons). Based on available information, depending upon the configuration of Marvin Nichols under consideration, there do not appear to be potential ecologically unique streams of high importance, wetland mitigation banks, or conservation easements within or adjacent to the sites under consideration. However, two reaches of the Sulphur River within the project boundary have previously been identified by TPWD as significant stream segments based on the presence of unique federal holdings and a USFWS priority 1 bottomland woodland site. Additionally, TPWD has included one of these reaches on a recommended list of ecologically unique stream segments.

A review of available information also indicates that there are no Superfund sites, municipal solid waste landfill sites, permitted industrial and hazardous waste locations, or air quality monitoring stations located within or adjacent to the reservoir study area. However, state and federal agency listings for threatened, endangered, or rare plant or animal species identify eight birds, five fish, one mammal, three mollusks, three reptiles, and one insect that potentially occur or have habitat in or near the project location. The reservoir site is also within and adjacent to the Sulphur River Bottom West site, which is listed by the USFWS as having excellent quality bottomlands of high value to waterfowl. Also, available data indicates that there are hydric soil associations within the reservoir site. The number of hydric soil associations does not indicate the number of potential wetlands but rather that a wetland area could occur where these hydric soil associations exist.

The SRBA (2014) Comparative Environmental Assessment Report presents the results of a comparative environmental assessment that includes Marvin Nichols IA. This assessment considered potential impacts to land resources, federal and state-listed threatened and endangered species, cultural resources, and water quality.

As detailed in Chapter 6 herein, the Marvin Nichols IA project was determined to have the highest impact on cultural resources and was ranked the second highest overall in terms of environmental impacts when compared to the remaining alternative reservoir sites under consideration in that study.

The NETRWPG does not recommend the designation of the potential Marvin Nichols I or Marvin Nichols IA reservoir sites as a unique reservoir site.

8.12.2 Marvin Nichols II

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

From the 2011 Region D Plan, at an elevation of 312.0 ft-MSL, the reservoir would have conservation storage capacity of 772,000 ac-ft and a surface area of 35,900 acres. The estimated firm yield of the project is 280,100 ac-ft/yr and the cost to develop the reservoir (alone) was determined to be approximately \$559.2 million in 2023 dollars.

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

Based on readily available information, there do not appear to be potential ecologically unique streams of high importance or wetland mitigation banks within or adjacent to the site. There is one conservation easement located within or adjacent to the footprint of the potential Marvin Nichols II reservoir.

A review of available information also indicates that there are no Superfund sites, municipal solid waste landfill sites, permitted industrial and hazardous waste locations, or air quality monitoring stations located within or adjacent to the reservoir study area. However, state and federal agency listings for threatened, endangered, or rare plant or animal species list eight birds, five fish, one mammal, three mollusks, three reptiles, and one insect that potentially occur or have habitat in or near the project location. The reservoir site is also within and adjacent to the Sulphur River Bottom West site, which is listed by the USFWS as having excellent quality bottomlands of high value to waterfowl. Also, available data indicates that there are hydric soil associations within the reservoir site. The number of hydric soil associations does not indicate the number of potential wetlands but rather that a wetland area could occur where these hydric soil associations exist.

The NETRWPG does not recommend the designation of the potential Marvin Nichols II reservoir site as a unique reservoir site.

8.12.3 George Parkhouse I

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

From the SRBA (2014) Watershed Overview:

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

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

The estimated firm yield of the Parkhouse I reservoir is 124,300 ac-ft/yr, although with environmental flow needs this yield decreases to 118,707 ac-ft/yr. Costs presented herein are adjusted from the original September 2018 estimates reported by SRBA (2014) to September 2023 costs using the ENR Construction Cost Index. The total capital cost to develop the project, including the dam and spillway, land acquisition, conflict resolution, mitigation, permitting, transmission, and interest during construction, would be \$1.85 billion. The project would provide water at a total annual cost, during debt service, of \$114.2 million and \$28 million after debt service. Resultant unit costs developed for the SRBA study are presented both with and without environmental flow restrictions (developed using the Lyons methodology). Without environmental flows, the unit cost during debt service is roughly \$919 per ac-ft of firm yield (\$2.83 per 1,000 gallons), and after debt service is approximately \$223 per ac-ft of firm yield (\$0.69 per 1,000 gallons). Unit costs with environmental flow requirements (based on the Lyons method) during debt service is roughly \$962 per ac-ft of firm yield (\$2.96 per 1,000 gallons). After debt service, unit costs with environmental flows applied are approximately \$233 per ac-ft of firm yield (\$0.72 per 1,000 gallons).

If, along with impacts from meeting environmental flow needs, the contractual relationship between the Metroplex members of the JCPD and the SRBA is considered, whereby 20 percent of project yields would be dedicated to in-basin needs at no cost to SRBA, the unit costs to the Metroplex JCPD members based on their anticipated portion of the yield vary from those detailed above. During debt service, the unit cost is approximately \$1202 per ac-ft of firm yield (\$3.69 per 1,000 gallons). After debt service, the unit cost is roughly \$292 per ac-ft of firm yield (\$0.91 per 1,000 gallons).

Based on available information, there are no potential ecologically unique streams of high importance, bottomland hardwoods, wetland mitigation banks, or conservation easements within or adjacent to the reservoir site.

Analyses also indicate that there are no Superfund sites, municipal solid waste landfill sites, permitted industrial and hazardous waste locations, or air quality monitoring stations located within or adjacent to the reservoir study area. However, state and federal agency listings for threatened, endangered, or rare plant or animal species list seven birds, four fish, one mammal, one mollusk, and two reptiles that potentially occur or have habitat in or near the project location. Also, available data indicates that there are hydric soil associations within the reservoir site. The number of hydric soil associations does not indicate the number of potential wetlands but rather that a wetland area could occur where these hydric soil associations exist.

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

The NETRWPG does not recommend the designation of the potential George Parkhouse I reservoir site as a unique reservoir site.

8.12.4 George Parkhouse II

The George Parkhouse II reservoir site is located on the North Sulphur River at River Mile 5.0. The impoundment is approximately 15 miles southeast of the City of Paris, and would straddle the county line between Delta and Lamar Counties. The Parkhouse II site was recommended for development in the 1997 *State Water Plan*, and was a reservoir site recommended in the 2017 and 2022 *State Water Plans* for designation as unique. Potential beneficiaries of the project include municipal and industrial water users within the Sulphur River Basin and/or water users in the Dallas-Ft. Worth Metroplex. Other potential benefits include recreation, hydroelectric power generation, and flood control. It should be noted that the development of the Marvin Nichols I reservoir would significantly delay or eliminate the need for this reservoir as a supply source for the Dallas-Ft. Worth Metroplex.

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

From the SRBA (2014) Watershed Overview:

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

Previous studies of the George Parkhouse II reservoir site estimated the firm yield of the project to be 136,700 ac-ft without consideration of potential environmental pass-through requirements. A reevaluation of the project firm yield using the TCEQ WAM for the Sulphur River Basin and the TWDB Daily Reservoir Analysis Model performed for the 2011 Region D Plan indicated a firm yield with environmental releases of 131,850 ac-ft. At a cost of approximately \$358.2 million to develop the reservoir, the annualized cost of water from the project would be \$168 per ac-ft of firm yield (\$0.52 per 1,000 gallons).

From the SRBA (2014) Cost Rollup Report, the estimated total yield of the Parkhouse II reservoir alternative would be 124,200 ac-ft/yr, although with environmental flow needs, this yield decreases to 121,343 ac-ft/yr. The total capital cost to develop the project, including the dam and spillway, land acquisition, conflict resolution, mitigation, permitting, transmission, and interest during construction, would be \$1.7 billion. The project would provide water at a total annual cost, during debt service, of \$105.3 million and \$25.6 million after debt service. Resultant unit costs developed for the SRBA study are presented both with and without environmental flow restrictions (developed using the Lyons methodology). Without environmental flows, the unit cost during debt service is roughly \$848 per ac-ft of firm yield (\$2.61 per 1,000 gallons), and after debt service is approximately \$205 per ac-ft of firm yield (\$0.64 per 1,000 gallons). Unit costs with environmental flow requirements (based on the Lyons method) during debt service are roughly \$867 per ac-ft of firm yield (\$2.67 per 1,000 gallons). After debt service, unit costs with environmental flows applied are approximately \$210 per ac-ft of firm yield (\$0.65 per 1,000 gallons).

If, along with impacts from meeting environmental flow needs, the contractual relationship between the Metroplex members of the JCPD and the SRBA is considered, whereby 20 percent of project yields would be dedicated to in-basin needs at no cost to SRBA, the unit costs to the Metroplex JCPD members based on their anticipated portion of the yield vary from those detailed above. During debt service, the unit cost is approximately \$1084 per ac-ft of firm yield (\$3.33 per 1,000 gallons). After debt service, the unit cost is roughly \$263 per ac-ft of firm yield (\$0.81 per 1,000 gallons).

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

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

The NETRWPG does not recommend the designation of the potential George Parkhouse II reservoir site as a unique reservoir site.

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

Table 8.6 Potential Reservoir Sites in the Sulphur River Basin

| Reservoir Site | Conservation Storage (ac-ft) | Surface Area (acres) | Firm Yield (ac-ft/yr) | Reservoir Development Cost (\$ Millions) | Total Capital Cost (\$ Millions) | Unit Cost, with environmental flows (\$/ac-ft) | |
|--------------------|------------------------------|----------------------|-----------------------|--|----------------------------------|--|--------------------|
| | | | | | | During Debt Service | After Debt Service |
| Marvin Nichols IA | 1,532,031 | 66,103 | 571,710 | \$1,508 | \$6,039.8 | 816 | 198 |
| Marvin Nichols II* | 772,000 | 35,900 | 280,100 | \$559.2 | Not Analyzed | Not Analyzed | Not Analyzed |
| Parkhouse I | 651,712 | 28,362 | 118,707 | \$652 | \$1,847 | 1,202 | 292 |
| Parkhouse II | 330,871 | 15,359 | 121,343 | \$531 | \$1,702 | 1,084 | 263 |

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

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

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

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

1. The net quantity, reliability, and cost of water delivered and treated for the end user's requirements during drought of record conditions, taking into account and reporting anticipated strategy water losses, incorporating factors used calculating infrastructure debt payments and may include present costs and discounted present value costs. Costs do not include distribution of water within a water-use group (WUG) after treatment.

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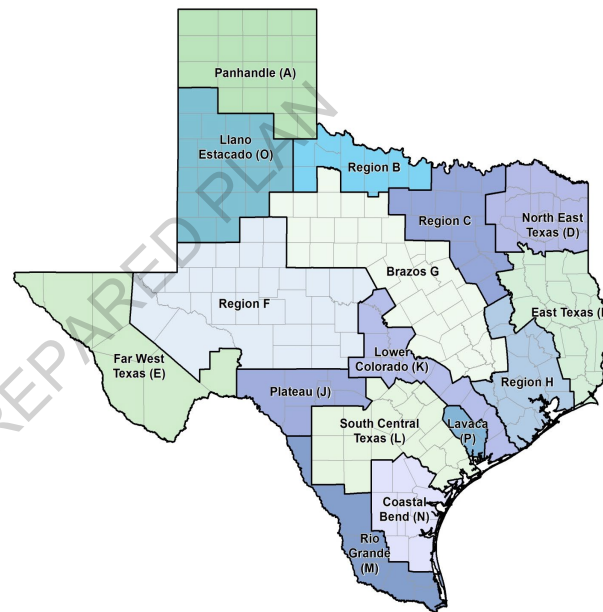
spoke on this proposed water management strategy. In addition, up to forty members of the public attended the meeting from both Regions C and D. The media was also in attendance and provided information to the greater public.

After the submittal of the Initially Prepared Plan (IPP) to TWDB on March 3, 2025, Region C distributed copies of the IPP to the required locations, including county clerks' offices in all 16 Region C Counties and at least one public library in each of the 16 Region C counties. These copies were made available to the public at these locations at least 30 days prior to the Public Hearing.

10.5 Interregional Coordination

FIGURE 10.1 REGIONAL WATER PLANNING AREAS

Region C is in north central Texas and borders five regions: Regions B, D, G, H, and I (see **Figure 10.1**). There are areas of mutual interest warranting interregional coordination with each of these regions. For example, there are shared water supplies, split WUGs, and the need for compatible approaches to surface water supplies. These topics are discussed and coordinated between the regions and their consultants through interregional coordination memoranda and meetings as needed. These efforts are initiated early in the planning process and continue until the final plans are approved.



To foster coordination with the adjoining regions, the RCWPG assigned liaisons to the adjoining region. The liaisons attend the assigned region's planning group meetings and provide updates to the entire group. In turn, assigned liaisons from the adjoining regions to Region C have attended Region C meetings and provided updates to the region.

The assigned regional liaisons by region are shown in **Table 10.2**.

TABLE 10.2 ASSIGNED REGIONAL LIAISONS

| REGION | FROM REGION C | TO REGION C |
|--------|-------------------------------|-------------------------------|
| B | Doug Shaw | Tracy Metzler |
| D | Ronna Hart | Sharon Nabors |
| G | (vacant) | Kathy Jones |
| H | (vacant, formerly Kevin Ward) | (vacant, formerly Kevin Ward) |
| I | Connie Standridge | John Martin |

10.5.1 Region C and Region D Interregional Coordination

In response to the interregional conflict between Region C and Region D for the 2016 Regional Water Plan, the Texas Legislature created the Interregional Planning Council. A representative from each planning group is nominated to be on the Council. The purpose of the group is to foster coordination across regions to help solve Texas' water issues. It is the first step in recognizing that sufficient water supply is a state issue, not a regional issue. One of the recommendations that came from the group was to coordinate with adjoining regions early, especially on known projects that may affect the adjoining region.

This guidance was honored by both Regions C and D once the sponsors of the Marvin Nichols Reservoir project chose to include the project in the Region C water plan. Region C invited Region planning group members to a presentation on the Marvin Nichols project. This meeting took place on September 30, 2024. Several Region D members attended and multiple people from the Region C and D areas provided public comments. Region D reciprocated Region C's invitation with an invitation to Region C members to attend a meeting in Region D on October 30, 2024. Over 200 people attended the meeting, with approximately 10 representatives from Region C. Region C planning group members answered questions from Region D members and as requested by the Region D Chairman. Extensive public comment was provided. Most comments focused on landowner concerns. During this meeting, the Region D chairman stated the region's intent is to declare an interregional conflict between Regions C and D over the Marvin Nichols Reservoir project.

In light of the potential conflict declaration, Region C has compiled information in support of the recommended Marvin Nichols Reservoir. Specifically, we will address the requirements of the TWDB and the reasons cited by Region D for the interregional conflict.

After a judicial decision associated with the 2016 conflict, the TWDB redefined an interregional conflict. The new definition states:

- more than one regional water plan (RWP) includes the same source of water supply for identified and quantified recommended water management strategies (WMS) and there is insufficient water available to implement such WMSs;
- or in the instance of a recommended WMS proposed to be supplied from a different regional water planning area, the regional water planning group (RWPG) with the location of the strategy has studied the impacts of the recommended WMS on its economic, agricultural, and natural resources and demonstrated to the Texas Water Development Board (TWDB) Board members (Board) that there is a potential for a substantial adverse effect on the region as a result of those impacts.

Sufficient water available: The proposed Marvin Nichols Reservoir project was evaluated using the TCEQ Sulphur Basin WAM. In accordance with the TWDB rules and guidance, environmental flows were estimated using the Consensus Method. Environmental flows were considered both below the Marvin Nichols dam and below Wright Patman. Based on this analysis there is sufficient water to support the project. Of the total firm yield of the project, 20 percent is identified to remain in the Sulphur River Basin for local use. Currently, there is little to no need for this water.

Conclusion: There is no conflict due to insufficient water available.

No substantial adverse impacts: Region C and the sponsors have conducted multiple studies on the impacts of the Marvin Nichols Reservoir. These studies include evaluations on the economic, agricultural, and natural resources within the region. In fact, the evaluations and studies for this project are far more comprehensive studies of any other water management strategy in the State Water Plan. Appendix J details these evaluations. A summary of the impacts analysis is presented below:

- **Economic impacts:** A study by Terry Clower (2020) on the economic impacts of the Marvin Nichols Reservoir found that the construction of the project would boost economic activities by \$5 billion. Operation provides an additional \$120 million per year in revenue and increases in visitors and local spending is greater than \$325 million per year. Overall, the reservoir would increase the economic activities in Region D. The reduction in timber and timber activities in Region D is expected to be about 1 percent of the total timber production based on forested areas. The total estimated stumpage value of all potential harvested timber within the reservoir footprint is \$457,000. This is much less than the estimated millions of dollars in economic activity spurred by the Marvin Nichols Reservoir. Other economic activities associated with hunting leases, grazing leases and agricultural production are a small fraction of the expected economic benefits of the reservoir.

If the region is unable to develop sufficient water supplies to meet its growing demands, there will be economic impacts not only to Region C but to the entire state. Region C provides 30 percent of the state's economy and is expected to continue to provide this percentage or greater in the future. According to the economic study conducted by Clower & Associates (Attachment J-2), *if a lack of available water supply were to disrupt the projected job growth in just six industries, the region would lose \$19 billion in annual economic activity, expressed in 2020 dollars, and more than 136,000 total jobs.* The impact of **not building** Marvin Nichols would be significant to the Region C economy.

- **Agricultural impacts:**
 - **Timber industry-** The total amount of potential harvestable timber within the Marvin Nichols Reservoir is estimated at 40,134 acres. This represents 7.7 percent of the total timberlands in the three counties where the reservoir is located. It is 1 percent of the total timberland of Region D. While impacts associated with potential mitigation lands are unknown at this time, the lands targeted for mitigation are those that are degraded and would generate the greatest ecological improvements with mitigation. Generally, established timberlands would not be used for mitigation.
 - **Farming and ranching –** There are active farms and ranches within the reservoir footprint. Available data indicate there are about 700 acres of row cropping and over 18,000 acres of potential pastureland. NRCS estimates the amount of prime farmland¹ at 594 acres based on updated classifications of soils that were previously associated with prime farmlands. It is known that the actual farming acreages are greater than this, but not significantly. Neither farmland nor pastureland is limited in Region D. The reduction of these agricultural acreages would not have a substantial adverse impact to the region.

¹ USDA defines prime farmland 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.” (See Appendix J)

- Natural resources impacts:
 - Bottomland hardwoods – There are about 9,289 acres of bottomland hardwoods along the Sulphur River flood plain. These bottomland hardwoods would be lost after inundation of the reservoir. To compensate for this loss, mitigation would be implemented to offset the loss of habitat. Presently, these bottomlands are not protected and could be harvested at any time by the property owners. Mitigated properties are protected in perpetuity.
 - Wetlands– There are nearly 25,000 acres of wetlands (forested, emergent and shrub) within the Marvin Nichols Reservoir footprint. This represents about 5 percent of the total wetlands in Region D. As required by the TCEQ and the federal Clean Water Act, mitigation will be required such that there is no net loss of wetlands.
 - Streams –Streams located within the footprint of the reservoir would be converted to a lacustrine habitat (lake). Impacts to aquatic species will be assessed during permitting but are not expected to be substantial. Many aquatic species can thrive in both river and lake environments. There will be reduced high flows downstream of the dam, which will reduce localized flooding. There is little difference in low flow frequencies that are necessary to maintain the ecological health of the stream.
 - Minerals – Recently there has been concern over potential loss of mineral resources. Mineral rights are a property right and any transfer of such rights will be compensated. Mineral harvesting of oil/gas and lithium can be conducted by surface wells and/or horizontal drilling, which could continue with the reservoir. There may be the potential for landowners to retain their mineral rights. The reservoir should not have substantial impact to the mineral resources in Region D.

The TWDB definition for an interregional conflict specifies that for a conflict to occur there must be a substantial adverse effect on the source water region. While every project has some impacts, “*substantial adverse impact*” represents large impacts that cannot or are not mitigated. The economic studies show that the Marvin Nichols project will have a net positive economic impact on the region through new taxes, increased businesses, etc. The potential adverse economic impact associated with the timber industry is expected to be small. The total potential timber within the footprint of the reservoir is less than 8 percent of the total available timber in the three counties where the reservoir is located and 1 percent of the timber in the East Texas Region. Much of the timber in the Marvin Nichols project site is also considered to be bottomland hardwoods that are cited by Region D for protection rather than harvesting. It is uncertain how many acres within the footprint of the reservoir have timber contracts that would be affected by the project. Secondary economic impacts are expected to be small since only a small portion of the available timber within the region is affected. If the project is not constructed and Region C is unable to secure sufficient water supplies, the reduction in growth in Region C would have an adverse economic impact on Region D and the timber industry, as well as the state of Texas.

Adverse impacts to natural resources will be mitigated as required by the state and federal permitting processes. Environmental flows are considered in the evaluation of the project to protect instream uses and natural resources. The final environmental flow requirements will be determined by the TCEQ during the permitting process. The amount and location of the mitigation

land will also be determined during the permitting process. Typically, mitigation improves degraded habitats and natural resources and provides a benefit to the region where the mitigation occurs.

The most frequently cited concern of Region D is the loss of property. Property needed for the project will be acquired at fair market value. Project sponsors will attempt to acquire the property through willing buyer/willing seller agreements, as was done for nearly all the properties acquired for the Bois d’Arc Lake and Lake Ralph Hall projects.

Conclusion: There are no substantial adverse impacts to Region D.

The discussion above addresses the studies and analyses conducted by Region C on the impacts of the Marvin Nichols Reservoir project. Region D also cites several studies it uses to justify the declaration of a conflict. The Region D draft 2025 Initially Prepared Water Plan summarizes its position on the Marvin Nichols Reservoir in the following statement:

“It has been and continues to be the position of the NETRWPG that due to the significant negative impacts upon environmental factors, agricultural resources/rural areas, other natural resources, and third parties, Marvin Nichols Reservoir should not be included as a water management strategy in any regional water plan or the State Water Plan.”⁽⁵⁾

In support of this statement Region D cites references that are outdated or no longer applicable, including the Texas Forest Service Study (2002) and the TWDB Reservoir Site Protection Study (2008). There is much discussion on the acreage differences of timberlands, bottomland forest, and wetlands from different report sources. Collectively, there are little differences for the total acreage. Over time acreages change with new data and changes in activities. The final cover types and amount of habitat requiring mitigation will be determined during the permitting process.

Other studies or documents cited include Trungale (2014) and Mattox (2014). Trungale focuses on the reduction in stream flows and potential impacts on downstream habitats. He advocates for high flows and overbanking flows for the bottomland hardwoods that are not included in the Region C analysis. He is correct that the Consensus Method used for regional water planning does not address high pulse flow events, but the TWDB requires the regions to use this methodology. During review of a water right application, TCEQ must consider environmental flows, either project-specific or basin-wide. The proposed Marvin Nichols Reservoir would be evaluated under the criteria set by the TCEQ. It is premature to assume what the criteria should be for regional planning. For planning purposes, Region C did include environmental flows both below the Marvin Nichols dam and below the Wright Patman dam. This is more than required for regional water planning. Any losses associated with reduced downstream flows will be assessed during the permitting process and must be mitigated.

Sharon Mattox (2014) prepared an opinion on the mitigation requirements. Region D also cites a study by TPWD/ USFWS and the Texas Forest Study (2002) for justification that the total acreage of the project, including mitigation, is much larger than estimated by Region C. Each of these documents propose mitigation acreages that are not substantiated by fact or analysis. They are based on outdated approaches to mitigation. Mitigation today is based on the uplift in habitat values and not acreage ratios. Considering the most recent reservoirs permitted (Bois d’Arc Lake in 2018 and Lake Ralph Hall in 2019), mitigation land requirements have been approximately equal

to the reservoir acreage or less. Lands identified for mitigation are those that are most amenable for restoration, which are typically degraded and deforested lands. Impacts to the agricultural industry, including silviculture, should be considerably less than estimated in these past studies. For regional water planning it is assumed that the mitigation acreage needed is equal to the reservoir acreage and an equivalent cost would be needed to improve these lands. Ultimately, mitigation location and requirements will be determined during the permitting process.

Region D estimates the economic impacts to agricultural and natural resources using outdated data and frequently double counts agricultural resources for timber production and natural resources for protection. Region C acknowledges that there would be changes to the landscape in Region D where the reservoir is located, but these changes do not pose a substantial adverse impact on the region. In fact, there should be a net positive economic impact to Region D and a neutral impact to natural resources after mitigation.

Finally, the regional water planning process and the State Water Plan are simply plans to identify potential new water supplies for the future growth of Texas. It is not the place to eliminate options. The viability and merits of a project will be determined during the detailed studies and permitting phases for development. The state and federal government have in place a system that addresses the concerns of Region D. The Marvin Nichols Reservoir project should be allowed to proceed through this process.

Appendix J

*Updated Quantitative Analysis of the
Impact of Marvin Nichols Reservoir*

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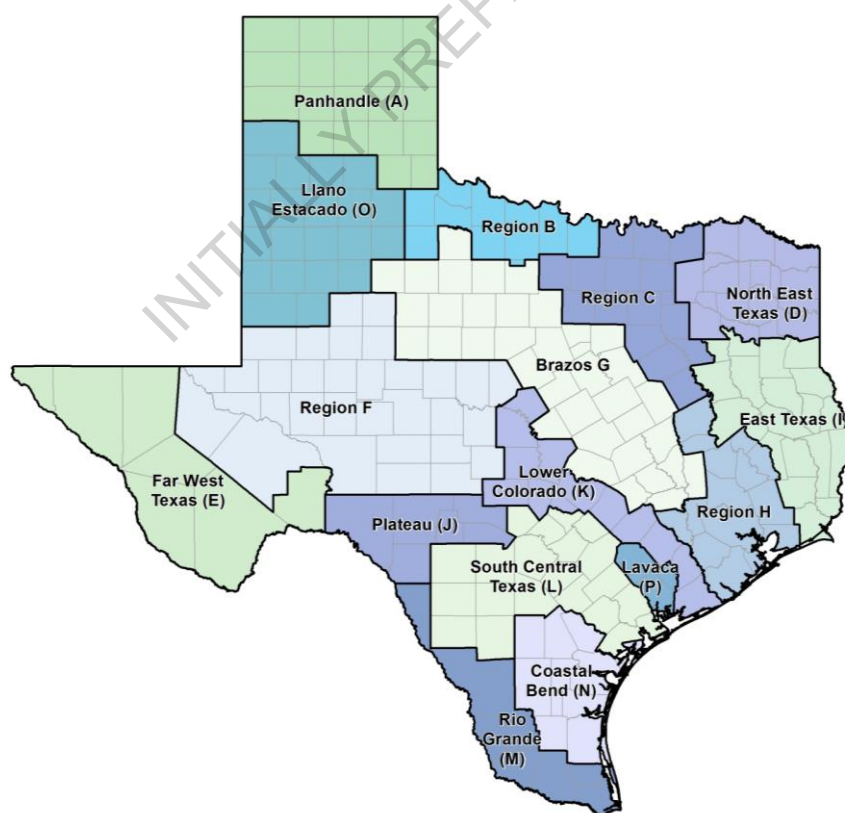
Appendix J Quantitative Analysis of the Impacts of Marvin Nichols Reservoir

J.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 J.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.

The water planning process is conducted on a five-year cycle. Regional water plans were approved in 2001, 2006, 2011, 2016, and 2021, and the sixth round of planning is currently underway. State water plans based on the regional plans were developed in 2002, 2007, 2012, 2017, and 2022.

FIGURE J.1 REGIONAL WATER PLANNING AREAS ESTABLISHED BY TEXAS WATER DEVELOPMENT BOARD



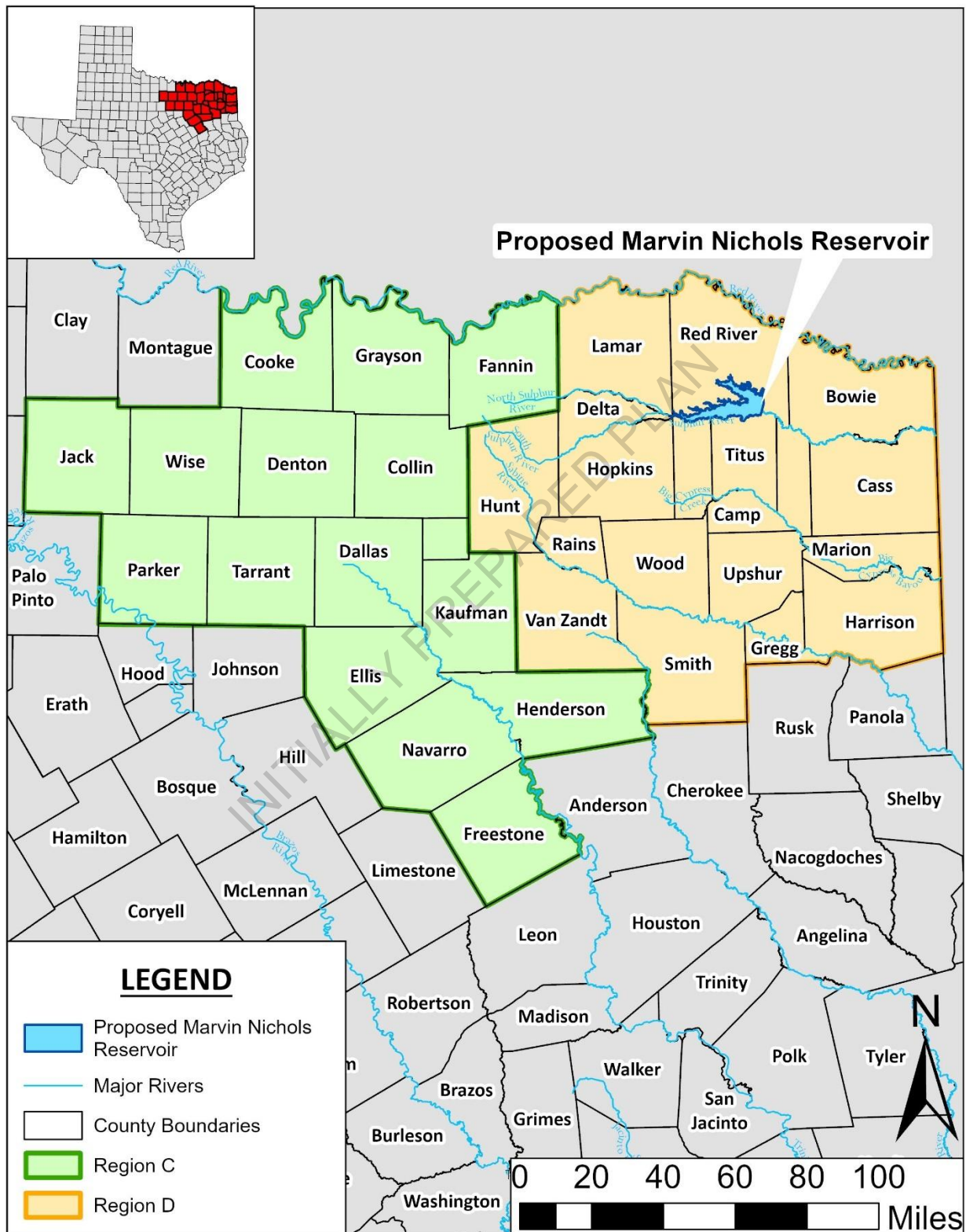
The Region C Regional Water Planning Area includes all or part of 16 counties and includes the Dallas-Fort Worth Metropolitan area. Region C has over a fourth of the state's population and is the most populous of the 16 planning regions. The population of Region C is increasing rapidly. To meet this need, the Region C Water Plan identified multiple strategies to conserve water, utilize existing sources, and develop new water supplies. One of the new sources of water is the Marvin Nichols Reservoir, which is located in adjoining North East Texas Regional Water Planning Group (Region D). **Section J.3** shows the location of Region C, Region D, and the proposed Marvin Nichols Reservoir. The Marvin Nichols Reservoir (elevation 328 msl) would be in Red River, Titus, and Franklin Counties in the Sulphur River Basin. This strategy is recommended for implementation by 2060. A separate Sulphur Basin strategy includes the reallocation of flood storage at the existing Wright Patman Reservoir (raising the conservation storage to 235 msl), which would be implemented by 2080. These strategies, which are in Region D, would be developed to meet needs in Region C.

Technical memoranda for each of these strategies are included in **Appendix G** in the *2026 Region C Water Plan*. This supplement, included as **Appendix J** to the *2026 Region C Water Plan*, focuses on additional information on the proposed Marvin Nichols Reservoir, with emphasis on the quantification and analysis of the impact of Marvin Nichols Reservoir on agricultural and natural resources. Also included is information on the Socio-Economic Assessment of developing the Marvin Nichols Reservoir and the TWDB's socio-economic assessment of impacts to Region C if needs are not met (**Section 1**). (Note: TWDB socio-economic impact analysis for the 2026 Region C Water Plan was not available for the Initially Prepared Plan. This will be included in the Final Plan.)

During the development of the 2016 Region C Water Plan¹, there was an interregional conflict between the Region C and Region D regional water plans regarding the inclusion of the proposed Marvin Nichols Reservoir, requiring TWDB to take action to resolve the interregional 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:

FIGURE J.2 LOCATION MAP FOR REGION C, REGION D, AND THE PROPOSED MARVIN NICHOLS RESERVOIR



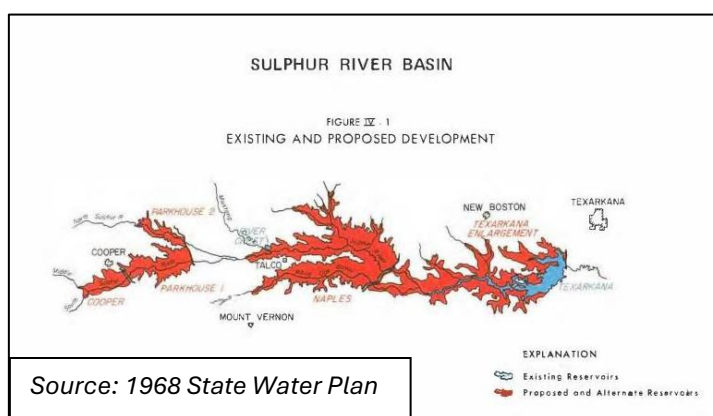
“Region C is directed to conduct an analysis and quantification of the impacts of the Marvin Nichols Reservoir Water Management Strategy on the agricultural and natural resources of Region D and the State, pursuant to Sections 16.051 and 16.053 of the Texas Water Code and Chapters 357 and 358 of Board 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, was included as Attachment J-1 to **Appendix J** in the 2016 Region C Water Plan. The original version of this report (August 2014) was submitted to TWDB and provided the information requested by the TWDB Board in the Interim Order of August 8, 2014. This appendix is an update to that report. The information and discussions in this appendix have been modified to include additional information developed since 2014 and is incorporated in the 2026 *Region C Water Plan* as **Appendix J**.

Section J.2 of this report provides the analysis and quantification of the impacts of Marvin Nichols Reservoir on natural resources. **Section J.3** provides the analysis and quantification of the impacts of the project on agricultural resources. **Section J.4** discusses potential mitigation requirements for the project and how they might affect impacts on natural and agricultural resources. **Section 1** provides a socio-economic assessment. **Section J.6** provides additional information, and the Attachments include supporting information.

J.2 Background

The transfer of water from the Sulphur River Basin in east Texas to users in the greater Metroplex area has been included in every state plan, in some form, since the 1968 State Water Plan. The originally named Naples Reservoir was projected to meet Dallas-Fort Worth’s 2020 water needs in the 1968 plan. This first mention of the now proposed Marvin Nichols Reservoir includes the intention to use the reservoir to meet the water need in what is now Region C and has remained in the plan with that intent throughout the years. In the 1990 State Water Plan (when the plan was developed according to river basins) the Sulphur Basin’s second largest demand was projected to be exporting water by 2040.



Throughout the continuous development of the Region C Regional Water Plan (2001-2026) the Marvin Nichols Reservoir has been extensively studied and the footprint has changed several times in an effort to reduce the environmental impacts associated with the proposed reservoir. During the first round of regional water planning, representatives of both Region C and Region D met to discuss the proposed development of water supplies in the Sulphur River Basin. It was preferred by the Region D representatives that Region C recommend one large project (Marvin Nichols Reservoir) rather than multiple smaller reservoirs. As a result, the Marvin Nichols Reservoir was included in each Region C Water Plan since the inception of regional water planning. It was after the publication of the 2001 plans that Region D representatives objected to the project and amended the Region D plan to no longer support the reservoir.

Implementation of this project was recommended for 2030 in each regional water plan until the 2016 *Region C Water Plan*. For that plan, the original implementation date of 2050 was modified to 2070 as part of the negotiated resolution of the declared conflict. In the 2021 Region C Water Plan the implementation date was changed back to 2050 to meet the projected water needs. Currently, Marvin Nichols Reservoir is recommended to be online by 2060.

J.3 Analysis and Quantification of the Impacts on Natural Resources

J.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 natural resources are included in the Board rules in Texas Administrative Code §357. Specifically, §357.34(e)(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 threatened and endangered species and mineral resources.

J.3.2 Available Data for Impacts on Natural Resources

Much of the more recent information on the impacts of the proposed Marvin Nichols Reservoir on natural resources came from the *Environmental Evaluation Interim Report – Sulphur River Basin – Comparative Assessment*². This report was developed in 2013 for the U.S. Army Corps of Engineers as part of an on-going basin-wide assessment of the Sulphur River Basin. The report includes environmental analyses of Marvin Nichols Reservoir and other potential water supply projects in the Sulphur Basin. In 2024, the sponsors of the project updated the hydrological analysis of the

project and the preliminary dam design to reflect the latest published hydrologic data (2019 Sulphur River Basin Water Availability Model³ and TCEQ Probable Maximum Precipitation data⁴). For the 2026 Region C Water Plan, environmental flow needs were developed using the TWDB-required Consensus Method with the updated hydrology. Vegetative cover types were updated based on recent aerial surveys if there were significant changes since the 2013 study. Other data, including statistics on timber production, prime farmlands, and threatened and endangered species were also updated as part of this plan development. The sources for data are cited in the respective tables.

J.3.3 Impacts on Environmental Water Needs

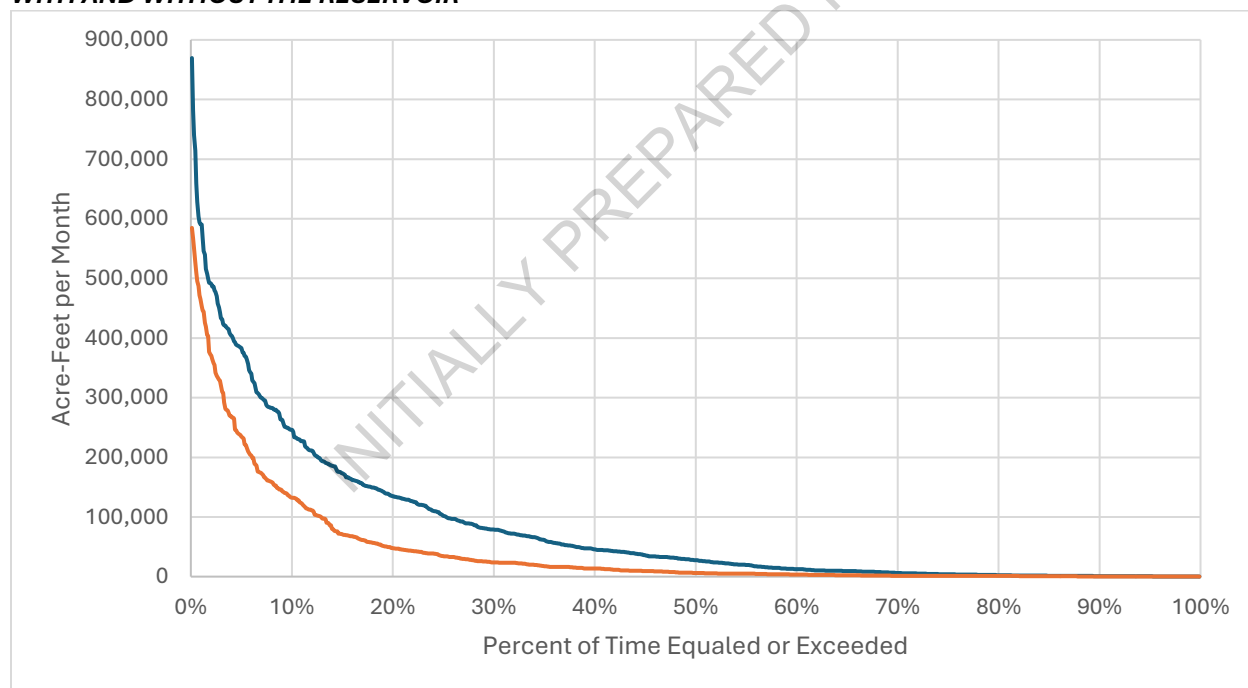
Texas Administrative Code §357.34(d)(3)(B) includes specific requirements for the evaluation of environmental water needs:

“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. 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 J.1** and **Figure J.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 J.1** and **Figure J.3** reflect current TWDB consensus requirements.

TABLE J.1 MONTHLY FLOW FREQUENCY RELATIONSHIP WITH AND WITHOUT MARVIN NICHOLS RESERVOIR

| % OF MONTHS FLOW IS EXCEEDED | FLOW IN ACRE-FEET/MONTH | |
|------------------------------|-------------------------|---------------------|
| | WITHOUT MARVIN NICHOLS | WITH MARVIN NICHOLS |
| 5% | 366,534 | 255,222 |
| 10% | 236,232 | 131,508 |
| 20% | 143,577 | 35,937 |
| 30% | 88,805 | 19,741 |
| 40% | 55,545 | 11,232 |
| 50% | 29,145 | 6,141 |
| 60% | 15,137 | 3,384 |
| 70% | 7,404 | 1,715 |
| 80% | 3,310 | 922 |
| 90% | 1,135 | 431 |
| 95% | 506 | 252 |

FIGURE J.3 FLOW-FREQUENCY RELATIONSHIP OF SULPHUR RIVER AT MARVIN NICHOLS DAM SITE WITH AND WITHOUT THE RESERVOIR

J.3.4 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 (Sulphur Basin Study)*², prepared for the U.S. Army Corps of Engineers. The *Sulphur Basin study* 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 is considered 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.

As part of the update for the 2026 Region C Water Plan, aerial photography was reviewed to identify changes in wildlife habitats. During this review approximately 4,100 acres of forested wetlands and bottomland hardwood forest appeared to have been clear cut and shrubs were now growing on the acreage. This acreage was re-classified from forested wetland and bottomland hardwood forest to shrub wetland. Since there have been no updates to the Texas Parks and Wildlife Ecological Systems Classification data set and no other significant changes were noted during the aerial photography review, no changes were made to the other cover types.

Table J.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.

Attachment J-1 is a map of the cover types in the Marvin Nichols Reservoir site.

Table J.2 also 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 4.8 percent of the forested wetlands, 2.2 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 particularly important as wildlife habitat. The total of these two types in the proposed Marvin Nichols Reservoir represents 3.4 percent of the bottomland hardwood and forested wetland areas in Region D. The 28,900 acres of bottomlands and forested wetlands that would be inundated by the proposed reservoir represents less than 1 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 quantity and quality of the wildlife habitat that would be affected by the project, which will aid in the development of mitigation plans.

TABLE J.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 | 9,289 | 416,398 | 2.2% |
| Forested Wetland | 19,622 | 412,751 | 4.8% |
| 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 | 4,093 | 19,133 | 21.4% |
| 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% |

J.3.5 Impacts on Cultural Resources

The impacts of Marvin Nichols Reservoir on cultural resources would result from the inundation of cultural resource sites. The *Sulphur Basin Study* collected the following data on potential cultural resource impacts from Marvin Nichols Reservoir site and other proposed reservoir sites in the Sulphur River Basin. No new sites have been identified since 2013.

- 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 J.3 is a quantitative reporting of known cultural resources in the Marvin Nichols Reservoir footprint. **Table J.4** is a quantitative reporting of other measures of potential impacts on cultural resources. The data in both tables is taken from *Sulphur Basin Study*.

TABLE J.3 QUANTITATIVE REPORTING OF IMPACTS ON CULTURAL RESOURCES – KNOWN CULTURAL RESOURCES

| LIKELY ELIGIBILITY OF SITES FOR THE NATIONAL REGISTER OF HISTORIC PROPERTIES (NRHP) | HISTORIC | PRE-HISTORIC | CADDO | MULTI-COMPONENT | PREHISTORIC 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*².

TABLE J.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 | 13% |
| 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*².

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.

J.3.6 Impacts on Bays, Estuaries and Arms of the Gulf of Mexico

The proposed Marvin Nichols Reservoir would not directly affect 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 473,000 acre-feet per year. This could reduce the discharge from the Atchafalaya River to the Gulf of Mexico in Louisiana by less than 0.4%. The impact of Marvin Nichols Reservoir on bays, estuaries and arms of the Gulf of Mexico would be negligible.

J.3.7 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, Region C does identify the reported presence of threatened and endangered species as part of its environmental assessment in Chapter 5. 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 county⁸. Protections for federally listed species differ from those only identified by the state, but both are considered during the permitting process.

Table J.5 summarizes State and Federally listed threatened and endangered species in the counties in which Marvin Nichols Reservoir would be located. The potential impact ranking was based on professional judgement, descriptions of habitat, and scarcity of the habitat in the project vicinity. Proposed federal endangered and threatened, and species listed as Threatened by Similarity of Appearance are not included in this table. Several of the identified species are not expected to be impacted by the reservoir. Confirmation of potential impacts and required mitigation, if needed, will be determined during the permitting process.

TABLE J.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 | 1 |
| | Moderate Potential | 0 |
| | High Potential | 2 |
| Federal Threatened Species | No Potential to Low Potential | 2 |
| | Moderate Potential | 1 |
| | High Potential | 1 |
| Texas Endangered Species | No Potential to Low Potential | 0 |
| | Moderate Potential | 1 |
| | High Potential | 0 |
| Texas Threatened Species | No Potential to Low Potential | 7 |
| | Moderate Potential | 1 |
| | High Potential | 5 |

Seven species are federally listed in the counties where Marvin Nichols would be located. Three of these species, Black rail (*Laterallus jamaicensis*), Red-cockaded woodpecker (*Picoides borealis*), and Rufa red knot (*Calidris canutus rufa*), are unlikely to be impacted by the project. The Piping plover (*Charadrius melodus*) has a moderate potential to be impacted. The species with a high potential to be impacted include the Yellow-billed cuckoo (*Coccyzus americanus*), the American burying beetle (*Nicrophorus americanus*), and the Ouachita rock pocketbook (*Arcidens wheeleri*).

There is one endangered and 13 threatened State-listed species within these counties, but only two of these species have moderate potential to be impacted by the reservoir, and five threatened species have high potential. Because there are seven State-listed threatened and endangered species with moderate to high potential to be impacted by Marvin Nichols Reservoir, additional studies may be required to assess the impact on these species, if any, as reservoir development continues. *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.*²

J.3.8 Impacts on Minerals

In the past, the Region D area has been active with oil and gas production. Over time this production has declined. There are currently 48 active or permitted oil/gas wells in the footprint of

the Marvin Nichols Reservoir (28 oil wells, one oil and gas well and 19 permitted locations)⁹. There are also 176 non-active wells (dry holes and plugged wells)⁹. In addition to oil and gas, there has been recent interest in lithium mining. Lithium has been found in a brine formation about 10,000 feet below the ground surface known as the Smackover Formation. Removal of the lithium from the brine is an emerging technology and there are no known active lithium wells in the footprint of the reservoir. Techniques to extract the brine solution include conventional vertical drilling and horizontal drilling (similar to the current fracking activities in the oil and gas industry). At this time, it is unknown whether there will be active lithium production within the Marvin Nichols footprint in the future. If there are lithium deposits within the footprint, these deposits will be treated like other mineral interests.

J.4 Analysis and Quantification of the Impacts on Agricultural Resources

J.4.1 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. 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.

J.4.2 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*. 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^{10,11}. 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.

J.4.3 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 J.4.2** and **Appendix G**. 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 J.6** includes information on the area of these land cover types that would be inundated by the Marvin Nichols Reservoir. For consideration of the impacts on agricultural resources of Region D and Texas, the areas of these cover types for Region D are included in the table.

TABLE J.6 QUANTITATIVE REPORTING ON IMPACTS TO 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 | |
| Timberlands | Bottomland Hardwood Forest | 9,289 | 416,398 | 2.2% |
| | Forested Wetland | 19,622 | 412,751 | 4.8% |
| | Upland Forest | 11,223 | 2,869,079 | 0.4% |
| Active/Potential Agricultural and Pasture Lands | Row Crops | 706 | 314,184 | 0.2% |
| | Grassland/Old Field | 18,241 | 2,843,656 | 0.6% |
| Non-Agricultural Lands | Other Land Cover Types | 7,022 | 477,707 | 1.5% |
| 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 J.3.5**.

J.4.4 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 uses¹²”. 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**

J.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 J.7 QUANTITATIVE REPORTING ON IMPACTS ON AGRICULTURAL RESOURCES – PRIME FARMLAND

| COVER TYPE | AREA (ACRES) | | | MARVIN NICHOLS RESERVOIR AREA AS A PERCENT OF AREA: | |
|----------------|--------------------------|-----------|------------|---|--------|
| | MARVIN NICHOLS RESERVOIR | REGION D | TEXAS | REGION D | TEXAS |
| Prime Farmland | 594 | 1,922,937 | 35,523,540 | 0.031% | 0.002% |

J.4.5 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 1** 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 impact of active timberland within 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 potential 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. If we treat forested land cover types within the reservoir site as a close approximation of timberland, the proposed Marvin Nichols Reservoir will inundate about 40,134 acres of timberland (**Table J.8**), or about 7.7 percent of the 523,629 acres of timberland in Red River, Titus and Franklin Counties.

Table J.8 provides data on potential timberland in Marvin Nichols Reservoir and timberland in Region D and East Texas¹³. Note that the data for Region D and East Texas include only the area

shown in **Figure J.4**¹³. The data for Region D and East Texas were obtained from the Texas A&M Forest Service data set.

FIGURE J.4 REGION D AND AREA COVERED BY HARVEST TRENDS REPORT

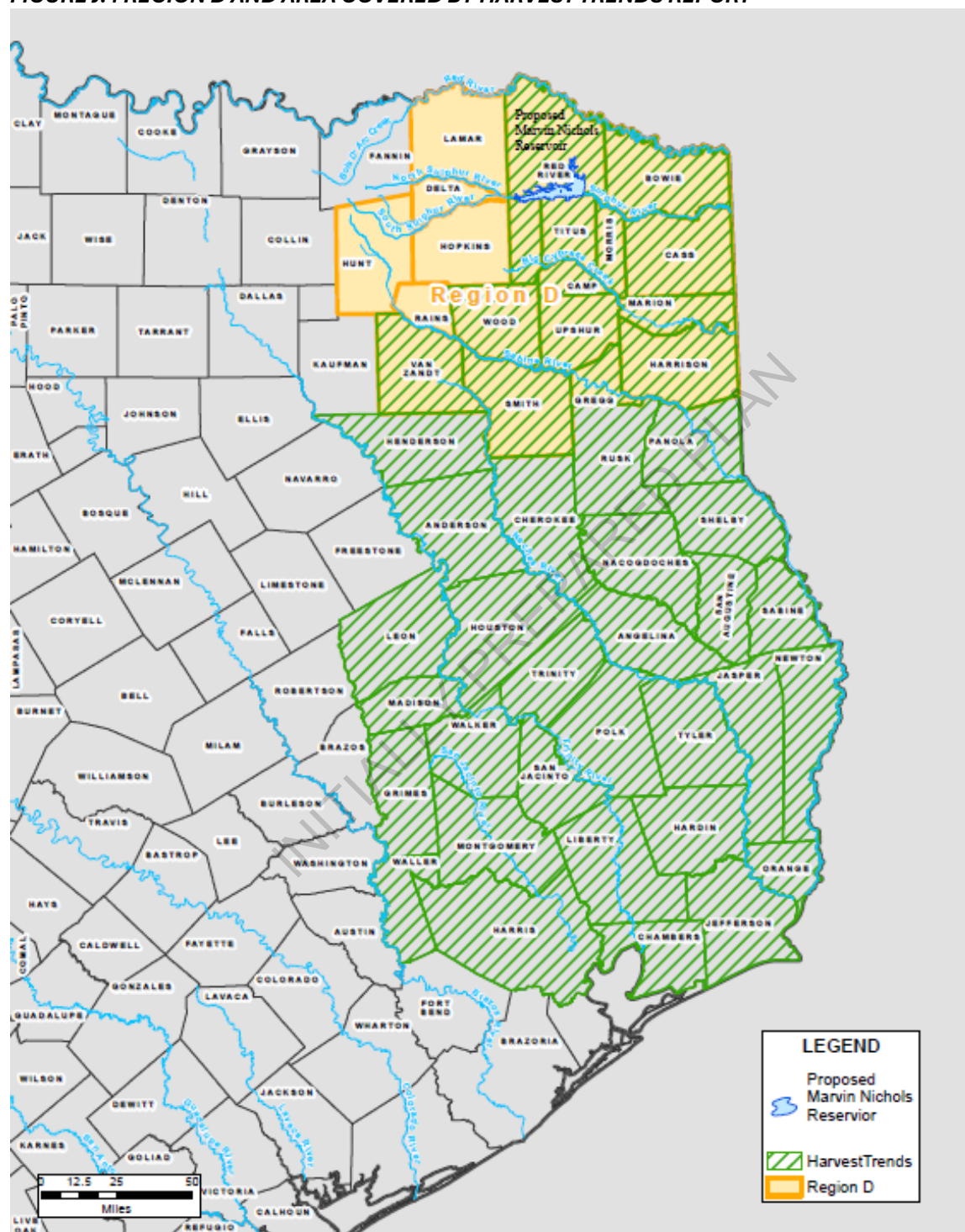


TABLE J.8 POTENTIAL TIMBERLAND IN MARVIN NICHOLS RESERVOIR

| | AREA (ACRES) | PERCENT IN MARVIN NICHOLS |
|--|-------------------|---------------------------------|
| Potential Timberland in Marvin Nichols Reservoir | | |
| Bottomland Hardwoods | 9,289 | |
| Forested Wetlands | 19,622 | |
| Upland Forest | 11,223 | |
| Total Potential Timberland in Marvin Nichols | 40,134 | |
| | | |
| TOTAL TIMBERLAND IN RED RIVER, TITUS, & FRANKLIN COUNTIES | 523,629 | 7.7% |
| TOTAL TIMBERLAND IN REGION D | 3,520,917 | 1.1% |
| TOTAL TIMBERLAND IN EAST TEXAS | 11,906,539 | 0.3% |

Table J.9 is a summary of data on timber sales taken from the Texas A&M Forest Service report *Harvest Trends 2019*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 7.7 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 7.7 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.

TABLE J.9 ESTIMATED IMPACT OF MARVIN NICHOLS RESERVOIR ON TIMBER HARVEST VALUES

| COUNTY | VOLUME HARVESTED (CUBIC FEET) | | | STUMPAGE VALUE OF THE HARVEST (THOUSAND DOLLARS) |
|--|-------------------------------|-------------------|--------------------|---|
| | PINE | HARDWOOD | TOTAL | |
| Franklin | 18,641 | 67,268 | 85,909 | \$85 |
| Red River | 7,013,180 | 3,433,757 | 10,446,937 | \$5,533 |
| Titus | 132,621 | 182,502 | 315,123 | \$321 |
| TOTAL FOR MARVIN NICHOLS COUNTIES | 7,164,442 | 3,683,527 | 10,847,969 | \$5,939 |
| Estimated Stumpage Value for Marvin Nichols (7.7% of Total for Counties) | | | | \$457 |
| TOTAL FOR REGION D (NOT INCLUDING HUNT, LAMAR, DELTA, HOPKINS AND RAINS COUNTIES)¹ | 92,716,340 | 28,570,546 | 121,286,886 | \$67,733 |
| TOTAL FOR EAST TEXAS | 484,846,271 | 81,328,486 | 566,174,757 | \$331,169 |

1. These counties are not listed separately in the Texas A&M Forest Service Report.

J.5 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 J.10 gives information on historical mitigation requirements for Texas reservoirs constructed or permitted since 1980. Significant changes have taken place to the mitigation process since the 1980s. Mitigation is no longer based strictly on acreage. It now considers the quality of the land being taken out of use as well as the improvements made to the mitigation land. It may be more beneficial to examine more recent examples of reservoir mitigation. The most recently permitted and fully constructed lake is Bois d’Arc Lake in Fannin County. Bois d’Arc Lake was completed in 2021 and the lake began operation in 2023. Significant land was acquired for mitigation (approximately 17,000 acres), and the transactions were on a willing buyer-willing seller basis. The total mitigation for Bois d’Arc Lake is equivalent to a 1:1 ratio to the area impacted by construction. Another reservoir, Lake Ralph Hall, was permitted in 2020 and is currently under construction with little to no mitigation requirements. Lands for the reservoir and stream mitigation were also acquired on a willing buyer-willing seller basis.

One of the key differences between recently permitted projects and those permitted decades earlier is the approach to mitigation. No longer are ratios used, but rather habitat value. Also, as previously noted, preferred lands for mitigation are lands that could be improved and developed into new ecological habitats. The potential impacts to the timber industry from mitigation would be much less than claimed by opponents because the preferred land for mitigation would be non-forested. For the Bois d’Arc Lake project, ranch lands are currently being improved, with over 5 million trees planted, to create aquatic and terrestrial habitats on lands that otherwise had limited ecological value.

Mitigation offsets the impact 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. While most of the lands dedicated to mitigation may not be active agricultural lands, the potential use of these lands in the future for agricultural purposes would be limited and probably not compatible for the purpose of the mitigation.

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 used for the *2026 Region C Water Plan*. For this Plan, the required mitigation acreage is estimated at approximately equivalent to the total acreage of the proposed new reservoir. For the proposed Marvin Nichols Reservoir, the

acreage of the reservoir conservation pool and dam is 72,192 acres, and the estimated mitigation requirement is equal to that amount (72,192 acres). Costs for mitigation include the land purchase cost and an equivalent cost to improve the land to meet the mitigation requirements. This is consistent with historical mitigation requirements for reservoirs in Texas. 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 J.10 MITIGATION REQUIREMENTS FOR TEXAS RESERVOIRS

| RESERVOIR | DATE IMPOUNDED | CONSERVATION POOL (ACRES) | USACE MITIGATION (ACRES) | RATIO | MITIGATION SITE |
|----------------------------------|-------------------|---------------------------|--------------------------|--------------------|--|
| Alan Henry | 1993 | 2,884 | 3,000 | 1.04:1 | Down Stream |
| Applewhite | Permitted in 1989 | 2,500 | 2,500 | 1.00:1 | Accepted Down Stream |
| Bois d'Arc Lake | Permitted in 2018 | 16,641 | 16,800 | 1.01:1 | Upstream and Down Stream |
| Cooper (including Flood Pool) | 1991 | 19,200 (22,740) | 35,500 | 1.85:1 (1.56:1) | Next to Reservoir and 50 miles Down Stream |
| Gilmer | 1997 | 1,010 | 1,557 | 1.54:1 | |
| Joe Pool | 1986 | 7,470 | 0 | 0.00:1 | None |
| Mitchell County | 1993 | 1,463 | 0 | 0.00:1 | None |
| O. H. Ivie | 1990 | 19,149 | 5,990 | 0.31:1 | Next to Reservoir |
| Palo Duro | 1989 | 2,413 | 0 | 0.00:1 | None |
| Ray Roberts | 1986 | 29,350 | 0 | 0.00:1 | None |
| Ralph Hall | NA ¹ | 7,568 | 0 | 0.00:1 | None |
| Richland-Chambers | 1987 | 44,752 | 13,700 | 0.31:1 | Down Stream |

1. Lake Ralph Hall is currently under construction. Permit was issued in 2020.

J.6 Socio-Economic Assessment

In 2014, the Corps of Engineers produced the report Sulphur River Basin – Socio-Economic Assessment¹⁴. It was estimated that the construction phase of Marvin Nichols Reservoir would produce over 12,000 direct, indirect, and induced jobs, and have an overall positive effect on the economy of \$1.47 billion (in 2014 dollars).

An updated socio-economic study was conducted in April 2020 by Clower & Associates for the recommended Marvin Nichols Reservoir strategy. This strategy assumes the full-size reservoir (elevation 328 ft msl) with over 200 miles of transmission to NTMWD, TRWD, and UTRWD. It also looked at construction and operation of the project. All costs are in 2018 dollars, which is consistent with the 2021 regional water planning guidance.

The *Economic, Fiscal and Developmental Impacts of the Proposed Marvin Nichols Reservoir* is included as **Attachment J-2** to this appendix. This study found that the development of the lake and transmission system would result in over 38,000 direct, indirect and induced temporary jobs during construction and 1,800 permanent jobs during operations. The total economic activity would increase by \$5.5 billion during construction and \$228 million during operations. Much of this increased economic activity would occur in Region D, where the reservoir is located.

Table J.11 provides additional detail during construction and **Table J.12** presents the economic summary during operations. It should be noted that these impacts occur over different geographic areas and at different times, pending construction schedules and project component locations. All values represent direct, indirect and induced economic impacts.

Terms

Employment: the number of annual average monthly jobs that would be created, and can be either full-time or part-time.

Labor income: represents all forms of employment income, including employee compensation (wages and benefits) and proprietor income.

Value added: gross output (sales or receipts and other operating income, plus inventory change) minus intermediate inputs (consumption of goods and services purchased from other industries or imported), which consists of compensation of employees, taxes on production and imports less subsidies, and gross operating surplus.

Output: the value of industry production.

Direct employment: jobs associated with the project itself.

Indirect employment: employment generated from spending by employees of the project.

Induced employment: employment generated from spending by indirect employees.

TABLE J.11 SOCIO-ECONOMIC IMPACT OF CONSTRUCTING MARVIN NICHOLS RESERVOIR

| | CONSTRUCTION | | | |
|-----------------------------------|------------------|---------------------------|--------------------------------------|-----------------|
| | Dam (6 years) | Transmission (6 years) | Housing/ Commercial (20 years) | Total |
| Economic Activity | \$1,223,035,000 | \$3,830,050,000 | \$497,573,000 | \$5,550,658,000 |
| Value Added | \$545,522,235 | \$2,355,441,235 | \$236,857,235 | \$3,137,820,705 |
| Labor Income | \$396,345,000 | \$1,667,439,000 | \$168,042,000 | \$2,231,826,000 |
| Employment | 8,266 | 25,921 | 4,061 | 38,248 |
| Indirect State and Local Taxes | \$34,018,000 | \$109,615,000 | \$15,506,000 | \$159,139,000 |

Values represented in 2020 dollars.

TABLE J.12 SOCIO-ECONOMIC IMPACT OF OPERATING MARVIN NICHOLS RESERVOIR

| | ANNUAL OPERATIONS | | | |
|-----------------------------------|-------------------|--------------|------------------------------|---------------|
| | Dam | Transmission | Visitor/Resident Spending | Total |
| Economic Activity | \$39,877,000 | \$81,106,000 | \$106,906,000 | \$227,889,000 |
| Value Added | \$17,945,000 | \$46,802,000 | \$56,608,000 | \$121,355,000 |
| Labor Income | \$12,569,000 | \$17,701,000 | \$29,957,000 | \$60,227,000 |
| Employment | 289 | 216 | 1,327 | 1,832 |
| Indirect State and Local Taxes | \$1,121,000 | \$5,065,000 | \$9,282,000 | \$15,468,000 |

Values represented in 2020 dollars.

The 2020 Clower Report also addressed potential socio-economic impacts to the North Texas region if this water supply project is not developed. The report notes that the North Texas region, including most of the communities served by the sponsors of the Marvin Nichols Reservoir, has witnessed an unprecedented economic boom over the past decade with record levels of population growth and job creation. Economic forecasts see this growth continuing for at least the next several decades.

Many of the driving factors for the North Texas growth is the growth of industries and migration of workers to service these industries. Water is a major factor for both residents and industry. If water supplies are limited due to the inability to secure reliable new sources of water, continued growth in North Texas will slow. Industries most likely to slow are those that are most dependent upon water, which include pharmaceutical, aerospace and semiconductor manufacturing, hospitals, and service industries such as hotels and restaurants. The impacts to projected job growth for just these six industries could be substantial with the loss of 136,000 jobs and \$19 billion in annual economic activity. This assessment assumes a lack of water for growth. The TWDB looked at the effects a one-year drought would have on Region C.

As part of the 2026 Region C Water Plan, the TWDB evaluated the socio-economic impacts of not meeting water needs in Region C. This report is included in **Appendix L** of the 2026 Plan and summarized in **Chapter 6**. The TWDB analysis is based on the projected needs for all water users in Region C, which reach approximately 1.3 million acre-feet per year by 2080. The analysis assumes that these needs cannot be met in a single year in the decade. Projected needs in other years in the decade are assumed to be met. This approach is predicated on the assumption that the needs are

solely drought driven. In Region C, most of the projected water needs are growth related. This means that the impact from not meeting the water need is not limited to a single year in the decade. Previous analyses by the TWDB for Region C (2006 Region C Water Plan) indicate the socio-economic impacts associated with growth could be much higher than estimated using the standard TWDB protocol.

<Findings to be provided in the Final 2026 Region C Water plan.>

J.7 Additional Information

Table J.13 shows the needs for additional water supplies in the Trinity and Sulphur Basins, taken from the Texas Water Development Board database for the 2026 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 J.13** 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 a need for considerable additional water supply in the Trinity Basin, particularly in Region C.

TABLE J.13 NEEDS FOR ADDITIONAL WATER SUPPLY IN THE TRINITY AND SULPHUR BASINS

| BASIN | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---------|---------|---------|---------|---------|-----------|-----------|
| Sulphur | 27,134 | 28,478 | 29,883 | 31,351 | 32,855 | 34,459 |
| Trinity | 245,701 | 497,110 | 738,176 | 960,830 | 1,158,027 | 1,329,508 |

J.8 Appendix J List of References

¹ Freese and Nichols, Inc. 2016 Region C Water Plan. Prepared for the Region C Water Planning Group, 2015.

² Freese and Nichols, Inc. Environmental Evaluation Interim Report - Sulphur River Basin - Comparative Assessment. 2013.

³ Robert Brandes Consulting, Extension of Naturalized Streamflows and Update of Run 3 and Run 8 Versions of the Sulphur River Basin WAM. Prepared for Riverbend Water Resources District in coordination with Texas Commission on Environmental Quality, 2019

⁴ Applied Weather Associates, Probable Maximum Precipitation Study for Texas. Prepared for the Texas Commission on Environmental Quality, 2016.

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 Texas Parks and Wildlife Department. Rare, Threatened, and Endangered Species of Texas. August 2024. <https://tpwd.texas.gov/gis/rtest/>.

⁹ Railroad Commission of Texas. Public GIS Viewer. <https://gis.rrc.texas.gov/GISViewer/>. Accessed November 2024.

¹⁰ Xu, Ph.d. Weihuan, and Publication 162. The Economic Impact of the Proposed Marvin Nichols I Reservoir to the Northeast Texas Forest Industry. Texas Forest Service, Aug. 2002.

¹¹ Weinstein, Bernard L., Ph.D., and Terry L. Clower, Ph.D. The Economic, Fiscal, and Developmental Impacts of the Proposed Marvin Nichols Reservoir Project. The Sulphur River Basin Authority, Mar. 2003.

¹² 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

¹³ Texas A&M Forest Service. Harvest Trends 2019. Texas A&M Forest Service. April 2021. Web. September 3, 2024. [Available only on internet]:
https://tfsweb.tamu.edu/uploadedFiles/TFMain/Data_and_Analysis/Forest_Economics_and_Resource_Analysis/Resource_Analysis/Resource_Analysis_publications/HarvestTrends2019.pdf

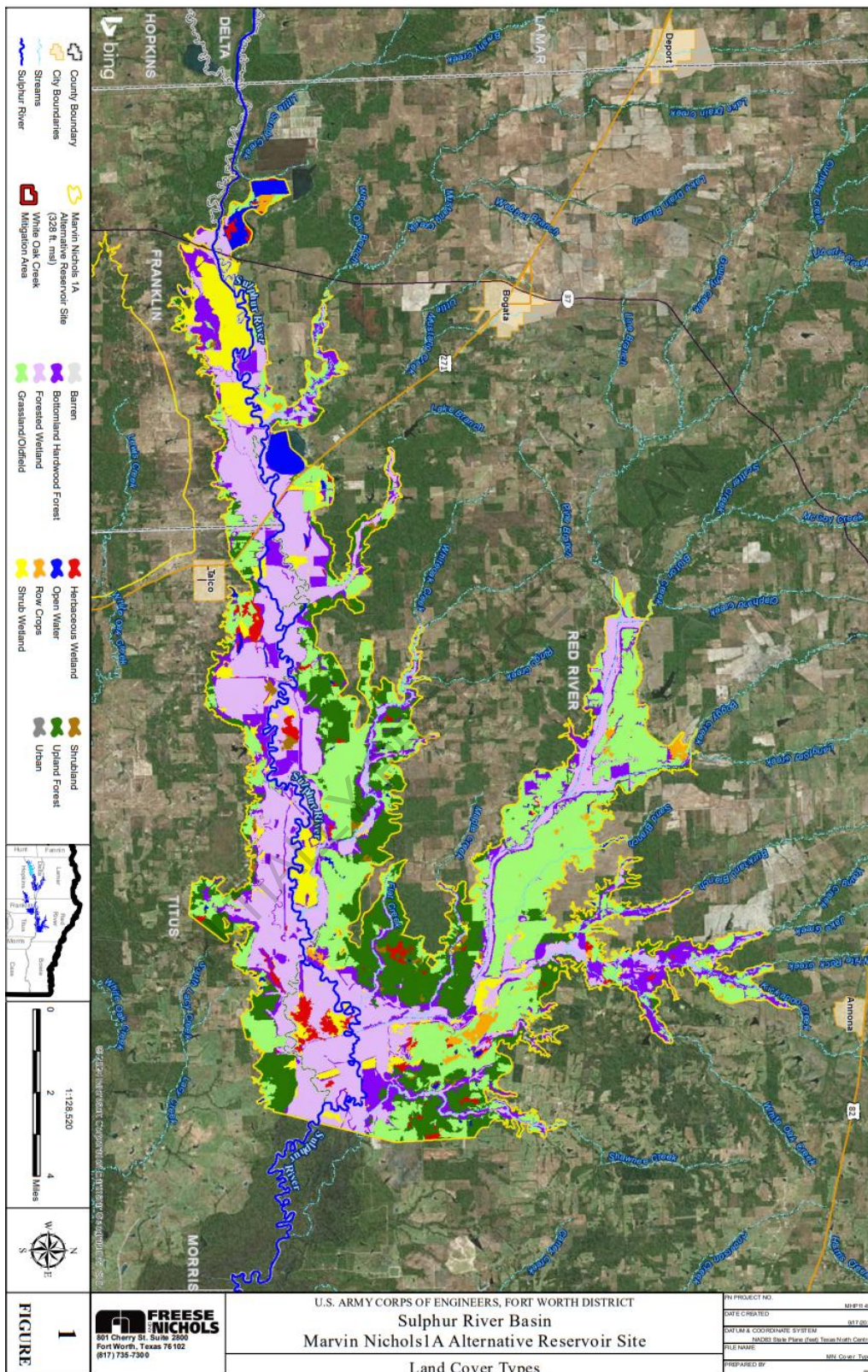
¹⁴ Freese and Nichols, Inc. Sulphur River Basin: Socio-Economic Assessment. Prepared for the Fort Worth USACE. 2014b.

¹⁵ 2026 Regional Water Planning Database (DB27). Texas Water Development Board. Obtained from DB27, January 2025.

INITIALLY PREPARED PLAN

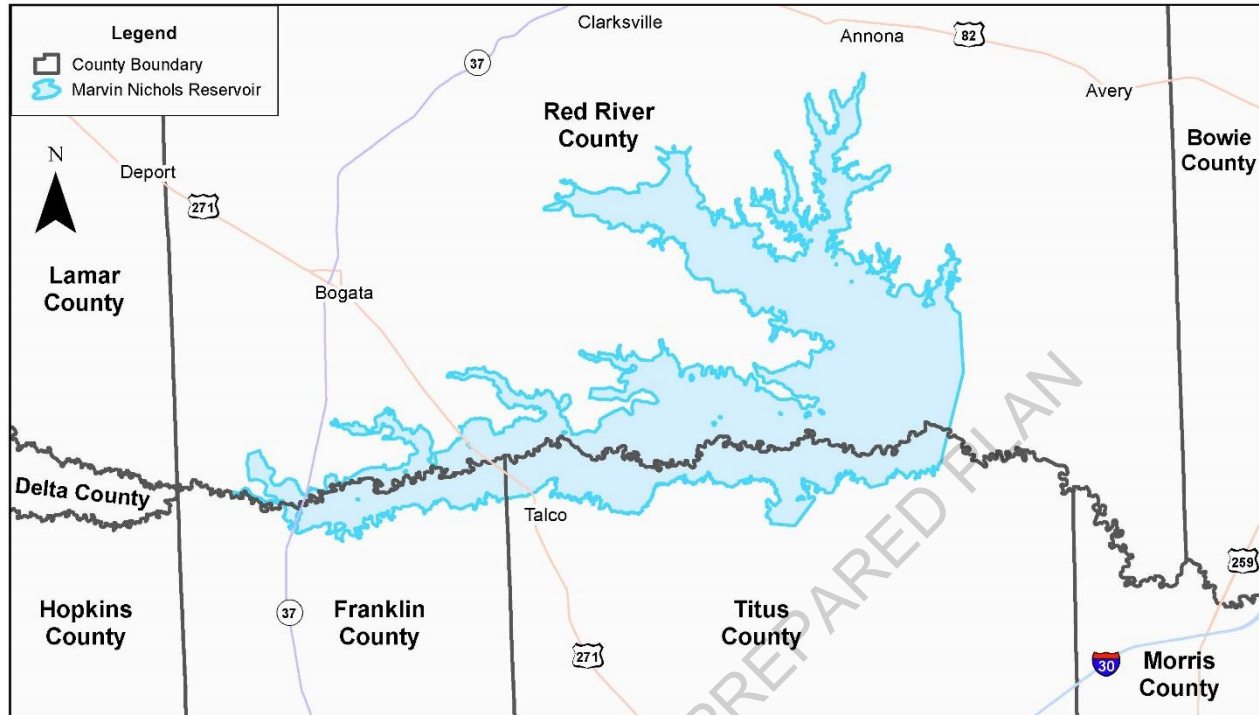
Attachment J-1

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



Attachment J-2

*Economic, Fiscal and Developmental
Impacts of the Proposed Marvin Nichols
Reservoir, April 13, 2020*



Economic, Fiscal and Developmental Impacts of the Proposed Marvin Nichols Reservoir

Prepared for:

North Texas Municipal Water District

Upper Trinity Regional Water District

Tarrant Regional Water District

Dallas Water Utilities

April 13, 2020

Clower & Associates

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Statement of Report Status: This is a draft report based on initial estimates of development and operating costs associated with the proposed Marvin Nichols Reservoir. Subsequent adjustments in total spending and budget allocations may influence the reported economic impacts.

Clower & Associates is a professional services firm providing economic and public policy analysis and advisory services to clients in the public, private, and non-profit sectors.

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Executive Summary

The following summarizes the findings of our analysis of the potential economic, fiscal, and developmental impacts that would attend the creation of the proposed Marvin Nichols Reservoir. This new Sulphur River basin lake will cover over 66,000 acres of surface area in Franklin, Red River, and Titus counties of northeast Texas, collectively referred to herein as the “Lake Counties.”

Our analysis considers geographical differences in the effective economic study area at differing phases of development and operations of the reservoir. Therefore, the economic impacts of each development phase cannot be considered additive.

- Construction of the dam to impound the proposed Marvin Nichols Reservoir will cost in excess of \$760 million, including work conducted to address required environmental mitigation strategies. The effective economic geography for this work includes the counties surrounding the proposed reservoir plus Bowie and Morris counties since it is expected that these counties will supply workers for the construction project. Construction of the dam and related infrastructure will boost local area economic activity by more than \$1.2 billion during the multi-year project. This activity will increase gross regional product by over \$545 million and support well over 8,200 person years of employment, boosting labor earnings by \$396 million. A person-year of employment is one job lasting for one year and is the most accurate way to describe job impacts from projects that last more than one year.
- This proposed water resource development project also includes building a new raw water transmission pipeline from the reservoir to facilities in the Dallas-Fort Worth Metroplex. The related construction activities will occur in Collin, Delta, Denton, Fannin, Franklin, Hopkins, Hunt, Red River, Titus and Wise counties. Total spending for materials, services, and the purchase of right-of-way and other construction and permitting-related activities will exceed \$3 billion. Building the water transmission pipeline will temporarily boost regional economic activity by \$3.8 billion, increase gross regional product by about \$2.4 billion, and support almost 26,000 person-years of employment paying almost \$1.7 billion in salaries, wages, and benefits.
- On-going annual expenditures for operations and maintenance of the dam will boost economic activity in nearby counties. We estimate that recurring annual maintenance and operations spending to support the Marvin Nichols Reservoir will increase local economic activity by \$39.9 million per year, expressed in constant 2020 dollars, and increase local labor income by \$12.6 million through the creation of 289 direct, indirect, and induced jobs.
- Operations and maintenance of the transmission pipeline will spread across a wider region and will include water district employees based in Dallas and Fort Worth. The annual economic impact of maintenance and operations spending for the pipeline and related infrastructure will boost regional economic activity by \$81.1 million, increase gross regional product by \$46.8 million, and support 216 direct, indirect, and induced jobs paying more than \$17.7 million in salaries, wages and benefits.

- Once the lake is impounded, the surrounding counties will attract new investment and spending for commercial and residential properties, as well as spending by visitors who will enjoy lake-based recreational activities. We expect the local area to see 2,000 new residential units constructed, as well as commercial facilities such as campgrounds, lodging venues, marinas, restaurants and similar businesses. Total investment in new residential and commercial properties will boost construction spending by more than \$360 million over a 20-year period. This spending will increase local economic activity by more than \$497 million, enhance labor income by \$168 million, and support over 4,000 person-years of employment. On average that would be about 200 jobs per year, helping to create recurring economic opportunities in Franklin, Red River, and Titus counties.
- The housing that will be built near the new reservoir will include homes for full-time residents as well as vacation homes. New residents will be contributing about \$30 million in annual regional spending by year 20. In addition, based on the experience of other Texas lakes, we estimate that annual visitor spending will be about \$56 million per year. Combined, this new spending will increase local economic activity by almost \$107 million per year, in 2020 dollars, and support more than 1,300 permanent jobs paying about \$30 million in annual labor income.
- The presence of the proposed Marvin Nichols Reservoir will enhance the region's attractiveness for business location. As a recreational amenity, the lake will enhance the quality of life features of the region, which is an increasingly important factor in business site location decisions. Industries requiring reliable local water resources will also find new reasons to locate in the area.
- In addition to temporary gains in tax revenues associated with construction and project development activities, local taxing jurisdictions in the Lake Counties will enjoy new property tax revenues from adjacent residential and commercial developments, as well as recurring tax revenue associated with household and visitor spending. By year 20, we project that Lake Counties governments will share about \$3.3 million in new property tax revenues and that local school district revenues will increase by over \$6.6 million annually. Local jurisdictions' recurring annual revenues from new residents and visitors will be about \$6 million per year, assuming visitor-focused commercial enterprises are located within a taxing jurisdiction.
- In addition to creating substantial growth and development opportunities in northeast Texas, building the Marvin Nichols Reservoir is paramount for the Dallas-Fort Worth Metroplex to sustain its competitive economic advantage over the long term. Continued population growth, and the ability to attract new and expanding businesses in key industries, is highly dependent on reliable water supplies.

Table ES1
Temporary Local Economic Impacts of Construction Activities
(2020 dollars)

| Description | Impact (\$2020, Direct, Indirect, Induced) |
|--|---|
| Dam Construction Impacted counties: Bowie, Franklin, Morris, Red River, Titus. | |
| Total Economic Activity (economic transactions) | \$ 1,223,035,000 |
| Total Value Added (gross regional product) | \$ 545,522,235 |
| Total Labor Income (salaries, wages, benefits) | \$ 396,345,000 |
| Total Employment (person-years of employment) | 8,266 |
| Indirect State Taxes | \$ 18,357,000 |
| Indirect Local Taxes | \$ 15,661,000 |
| Pipeline & Pump Station Construction Impacted counties: Collin, Delta, Denton, Fannin, Franklin, Hopkins, Hunt, Red River, Titus, Wise | |
| Total Economic Activity (economic transactions) | \$ 3,830,050,000 |
| Total Value Added (gross regional product) | \$ 2,355,441,235 |
| Total Labor Income (salaries, wages, benefits) | \$ 1,667,439,000 |
| Total Employment (person-years of employment) | 25,921 |
| Indirect State Taxes | \$ 52,719,000 |
| Indirect Local Taxes | \$ 56,896,000 |
| Housing and Commercial Construction Impacted counties: Franklin, Red River, Titus. Construction period: 20 years. | |
| Total Economic Activity (economic transactions) | \$ 497,573,000 |
| Total Value Added (gross regional product) | \$ 236,857,235 |
| Total Labor Income (salaries, wages, benefits) | \$ 168,042,000 |
| Total Employment (person-years of employment) | 4,061 |
| Indirect State Taxes | \$ 7,315,000 |
| Indirect Local Taxes | \$ 8,191,000 |

Sources: Freese & Nichols, IMPLAN, Authors' estimates

Table ES2
Recurring Annual Local Economic Impacts
(2020 dollars)

| Description | Impact (\$2020, Direct, Indirect, Induced) |
|---|---|
| Dam Operations | |
| Impacted counties: Bowie, Franklin, Morris, Red River, Titus | |
| Total Economic Activity (economic transactions) | \$ 39,877,000 |
| Total Value Added (gross regional product) | \$ 17,945,000 |
| Total Labor Income (salaries, wages, benefits) | \$ 12,569,000 |
| Total Employment (headcount) | 289 |
| Indirect State Taxes | \$ 605,000 |
| Indirect Local Taxes | \$ 516,000 |
| Pipeline & Pump Station Operations | |
| Impacted counties: Collin, Dallas, Delta, Denton, Fannin, Franklin, Hopkins, Hunt, Red River, Tarrant, Titus, Wise. | |
| Total Economic Activity (economic transactions) | \$ 81,106,000 |
| Total Value Added (gross regional product) | \$ 46,802,000 |
| Total Labor Income (salaries, wages, benefits) | \$ 17,701,000 |
| Total Employment (headcount) | 216 |
| Indirect State Taxes | \$ 2,477,000 |
| Indirect Local Taxes | \$ 2,588,000 |
| Visitor and Resident Spending | |
| Impacted counties: Franklin, Red River, Titus | |
| Total Annual Household Income: New Permanent Residents | \$ 58,300,000 |
| Total Annual Household Income: New Weekend Residents (portion while in local area) | \$ 8,162,000 |
| Total annual spending: recreational visitors | \$ 56,090,000 |
| Total Economic Activity (economic transactions) | \$ 106,906,000 |
| Total Value Added (gross regional product) | \$ 56,608,000 |
| Total Labor Income (salaries, wages, benefits) | \$ 29,957,000 |
| Total Employment (headcount) | 1,327 |
| Indirect State Taxes | \$ 4,455,000 |
| Indirect Local Taxes | \$ 4,827,000 |

Sources: Freese & Nichols, IMPLAN, Authors' estimates

ES3
**Recurring Annual Fiscal Impacts of New Housing Developments
and Resident and Recreational Out-of-Area Visitor Spending⁺**

| Description | Impact (\$2020 Direct, Indirect, Induced) |
|---|--|
| Total Taxable Value of New Housing (permanent & weekend) | \$ 408,000,000 |
| Total Taxable Value of New Commercial Structures | \$ 21,350,000 |
| Total Increase in Taxable Land Values Adjacent and Near the Lake | \$ 368,151,000 |
| Net New Taxable Value (after removing lake & all mitigation land) | \$ 539,794,000 |
| Net [#] gain in county property tax revenues | \$ 3,360,000 |
| Net [#] gain in school district property tax revenues | \$ 6,669,000 |
| Other Local Government Revenue (taxes, fees, other) | \$ 6,054,000 |

+ At buildout. # Net of losses to taxable property value of lake and environmental mitigation areas.

* Value will be impacted by land annexation and business location decisions.

Sources: Freese & Nichols, IMPLAN, Authors' estimates

Section 1: Introduction

The following updates our 2003 analysis of the economic, fiscal and developmental impacts of the proposed Marvin Nichols Reservoir. The proposed reservoir will be located in Franklin, Red River, Titus counties in the Sulphur River basin of northeast Texas about 16 miles north of the city of Mount Pleasant. The project also includes a major investment in new pipeline infrastructure that will cross several counties from Red River County to north central Texas. The creation of a new large reservoir will bring temporary and recurring economic activity to the host regions from the reservoir and related pipeline, and it will also support economic development in localities near the reservoir and for communities gaining access to a new reliable source of water.

We begin our report with an overview of the regional economy in the three counties immediately surrounding the proposed reservoir including Franklin, Red River, and Titus counties, hereinafter referred to as the “Lake Counties.” Section 3 describes the methodology used in this analysis. Section 4 presents the findings of our analysis of the temporary economic impacts that will attend the construction of the dam to impound the proposed reservoir, the water transmission pipeline and associated infrastructure. In addition, these temporary impacts include an assessment of the economic benefits from construction spending on new residential and commercial properties as the lake attracts households and business investment to the region. Section 5 discusses how on-going operations of the dam, pipeline, and spending by visitors and new residents around the reservoir will impact area economic activity and revenues for local taxing jurisdictions. Section 6 considers how increasing the availability of reliable water supplies will impact development opportunities in Region C that can create positive economic spillover effects across the state. Finally, Section 7 offers our conclusions.

Section 2: Economic Overview of the Host Counties Region

As noted, the proposed reservoir will cover parts of Franklin, Red River, and Titus counties in northeast Texas. According to the most recent data from the U.S. Census Bureau (five-year estimate 2014-2018), the resident population of this region is 55,684. The population has recently been growing at about 0.3 percent per year, on average, which is less than half the national annual population growth rate of 0.7 percent. The region has slightly higher proportions of the population under the age of 18 and 65+ years of age, which is reflected in the region’s labor force participation rate at 59.3 percent versus the national average of 62.3 percent. Median annual household income in the Lake Counties region also trails the U.S. at \$45,646 and \$60,293, respectively. Unsurprisingly, the poverty rate in the Lake Counties is 2.8 percent higher than the national average of 14.1 percent. However, housing costs are comparably affordable with a median value of owner-occupied dwellings being \$97,585, less than half the U.S. median, while the local cost of living is about 13 percent below the national average. Still, total area cost of living adjusted household purchasing power in this region is almost 25 percent below the national average.

While the percentage of working age adults possessing a college degree is lower than the national average, the workforce data suggests there is a good supply of workers with at least basic skills. As of the fourth quarter of 2019, total jobs in the Lake Counties region had grown to 24,743, a 4.9 percent year-over-year increase. The area unemployment rate of 4.2 percent is higher than the

national average but has dropped by one-half percent over the past year, as of January 2020.¹ Average wages of the jobs in the Lake Counties was \$37,882 in 4Q2019 with a 2.1 increase over the preceding year. Table 1 below shows the ten largest industry sectors by jobs. The regional economy, particularly Franklin and Titus counties, has historically been built around Pilgrim's Pride's poultry processing operations and related agricultural and transportation activities. The region also has a concentration in transportation equipment manufacturing (trailers). Because of a somewhat older population, social services providers and residential care facilities are also important regional employers.

Table 1: Top Ten Industries by Employment, Lake Counties Region (4Q2019)

| NAICS | Industry | Jobs | Avg Annual Wages | 5-Year Job Change |
|-------|---|-------|------------------|-------------------|
| 311 | Food Manufacturing | 3,860 | \$41,498 | 156 |
| 611 | Educational Services | 2,249 | \$35,193 | -156 |
| 621 | Ambulatory Health Care Services | 1,616 | \$44,852 | 255 |
| 722 | Food Services and Drinking Places | 1,478 | \$16,850 | 163 |
| 336 | Transportation Equipment Manufacturing | 1,071 | \$56,739 | 102 |
| 112 | Animal Production and Aquaculture | 1,006 | \$26,563 | 50 |
| 622 | Hospitals | 856 | \$49,495 | 302 |
| 493 | Warehousing and Storage | 813 | \$32,382 | -29 |
| 624 | Social Assistance | 797 | \$14,308 | 500 |
| 623 | Nursing and Residential Care Facilities | 739 | \$26,487 | -133 |

Source: JobsEQ, Chmura Economics.

Overall, due to the on-going influence of the poultry industry, and a few other key employment sectors, the Lake Counties regional economy is doing relatively well, especially for an area outside a major metropolitan market. But with population growth slowing, the counties that will host the proposed Marvin Nichols Reservoir need to attract new residents and investment. Importantly, over the past several years it has become clear that the region needs to diversify its economic base and bring in new sources of business and household spending. The addition of a major recreational amenity can help attract commercial development and households to the Lake Counties region, bringing new spending and economic opportunity for current and new area residents. In the following sections we provide estimates of the magnitude of this new regional economic activity.

Section 3: Overview of Methodology

In assessing the economic impacts of new spending related to the proposed Marvin Nichols Reservoir, we rely on data provided by Freese and Nichols (FNI), a professional engineering and planning firm, and the IMPLAN economic input-output model.

¹ At the time this report is being written we are just beginning to see the profound, and hopefully short-term, impacts the COVID-19 pandemic is having on U.S. labor markets.

The data provided to Clower and Associates is based on planning data and costs for the recommended strategy developed in accordance with state and regional water supply planning rules administered by the Texas Water Development Board (TWDB). This strategy assumes the Marvin Nichols Reservoir would have a conservation elevation of 328 feet mean sea level, a surface area of about 66,100 acres, and require approximately an equivalent number of acres for mitigation. The sponsors of the recommended project include NTMWD, TRWD and UTRWD. This project is an alternate strategy for Dallas Water Utilities (DWU) and therefore, associated transmission and operations spending by DWU related to water from the Marvin Nichols Reservoir is not included in this study. Land costs for both the reservoir and mitigation lands were obtained from the Lake Counties' tax assessors' offices.

The IMPLAN model is a planning tool that estimates how spending in a given sector of the economy flows through regional industries and households. The IMPLAN model is widely used in academic and professional research. The model provides estimates of direct, indirect and induced impacts of new spending. Direct impacts are those made by the companies, agencies or individuals who are the subject of the study, such as a water district engaging in new resource investments for planning, designing and building the dam and related infrastructure to create a new reservoir. Indirect effects capture the economic activity associated with the supply chain of the business/agency who is doing the spending. In this case, a water district hires a construction contractor who in turn buys materials and supplies, rents equipment, and makes other purchases of goods and services. The equipment rental company purchases equipment, buys parts, and hires an accounting service to prepare their tax filings. The accountant hires bookkeepers, rents office space and pays a janitorial service to clean the office, and so on. The model adjusts the spending to account for items that are not likely to be sourced from local vendors. For example, there are no petroleum refineries in the Lake Counties region, so the money used to purchase fuel for earthmovers would largely "leave" the regional economy. Induced effects are related to employees of all these firms spending a portion of their earnings in the regional economy for goods and services. The model provides estimates of total economic activity (business transactions), value added (gross regional product), employment (headcount jobs), and labor income (salaries, wages, and benefits). IMPLAN models also offer estimates of revenue that is generated by the indirect and induced economic activity for state and local jurisdictions. These revenues include sales and use taxes, property taxes, fees and other sources.

Because the IMPLAN model adjusts for spending that stays in a particular region, it is important to appropriately define the study area. Due to the varying geographic scale of the project components in creating the Marvin Nichols Reservoir, we use multiple study geographies in this research. Table 2 summarizes the geographies used for each research component. By convention, the study region will always include the location of physical activity, such as building the dam or pipeline, but can also be expanded to account for area labor markets.

Table 2: Study Geographies for Economic Modeling

| Research Component | Counties | Notes |
|---|---|---|
| Dam Construction and Operations | Bowie, Franklin, Morris, Red River, Titus | Because of the location of the dam, we expect that contractors will draw some workers from Morris and Bowie counties. |
| Pipeline Construction | Collin, Delta, Denton, Fannin, Franklin, Hopkins, Hunt, Red River, Titus, Wise | Reflects the pipeline's path. |
| Pipeline Operations | Collin, Dallas, Delta, Denton, Fannin, Franklin, Hopkins, Hunt, Red River, Tarrant, Titus, Wise | Pipeline and base location for water district employees. |
| New Commercial Operations & Households | Franklin, Red River, Titus | Core activities based at the new reservoir. |

Source: FNI, Authors' estimates

In addition to geography, we also consider the nature of the spending. Construction spending is temporary by nature. The impacts may be large, but once the dam and pipeline are built, that spending and its related economic impacts cease. The temporary nature of construction spending requires one important change in the way we report job impacts. The construction of the dam and pipeline will take a few years to complete. Therefore, the job impacts from construction and related spending are expressed as person-years of employment, one job lasting for one year. If the employment impact were 500 person years of employment, and the project lasted for 5 years, that would suggest that the average annual employment impact would be 100 jobs. Since we do not know exactly how long the construction of the dam and pipeline will take, we present the jobs impacts as total person-years of employment for the entire project. Other key assumptions used in estimating the economic impacts of specific project components will be described in the relevant sections of this report.

Section 4: Economic Impacts of Construction Activities

Because the effective geography of impact is different across the reservoir development components and stages, we separate the discussion of our findings into three sub-sections: dam construction, pipeline construction, and the building of new commercial and residential properties near the new reservoir.

Dam Construction

Construction of the dam to impound the proposed Marvin Nichols Reservoir will cost in excess of \$760 million, including work conducted to prepare required environmental mitigation areas. This spending includes project planning, design work, environmental studies and other outlays. However, to take a conservative approach in considering the potential regional impacts, we have adjusted some spending categories. For this project component we do not include budgeted contingency costs and interest costs during construction. Budgeted contingency costs, while in

practice are often actually spent, are not guaranteed spending so we do not include them in our economic impacts. Interest costs are the temporary borrowing costs incurred during construction. At the time of this analysis we do not know what entity or entities will be used for these financial services, so we do not know if any of those costs are relevant to the study area. In addition, we only include a portion of the costs to resolve conflicts and acquire land for the reservoir and mitigation area. Of the costs allocated for resolving conflicts, we assume that no more than 10 percent of these expected expenditures will be spent in the study area. Finally, our assessment of the economic impacts of construction spending include land acquisition costs. Based on data provided by FNI, we allocated land acquisition costs between the dam and pipeline construction projects. We assumed that no more than 50 percent of the monies paid for land acquisition would go to local landowners. We then modeled the reduced land acquisition spending as income to area households that would be spent in the regional economy. Combined, it is likely our exclusion of several categories of expenditure will result in estimates understating the total potential economic impact associated with building the proposed dam and related infrastructure.

Construction of the dam and related infrastructure will boost local area economic activity by more than \$1.2 billion during this multi-year project (see Table 3). This activity will increase gross regional product by over \$545 million and support well over 8,200 person years of employment, boosting labor earnings by \$396 million. Area taxing jurisdictions will share more than \$15.6 million in new revenues due to building the proposed dam and related economic activities.

Table 3: Temporary Local Economic Impacts of Dam Construction

| Description | Impact (\$2020 Direct, Indirect, Induced) |
|---|--|
| Dam Construction | |
| Impacted counties: Bowie, Franklin, Morris, Red River, Titus. | |
| Total Economic Activity (economic transactions) | \$ 1,223,035,000 |
| Total Value Added (gross regional product) | \$ 545,522,235 |
| Total Labor Income (salaries, wages, benefits) | \$ 396,345,000 |
| Total Employment (person-years of employment) | 8,266 |
| Indirect State Taxes | \$ 18,357,000 |
| Indirect Local Taxes | \$ 15,661,000 |

Sources: Freese & Nichols, IMPLAN, authors' estimates.

Pipeline Construction

This proposed water resource development project also includes building a new transmission pipeline from the reservoir to facilities in the Dallas-Fort Worth region. The related construction activities will occur in Collin, Delta, Denton, Fannin, Franklin, Hopkins, Hunt, Red River, Titus and Wise counties, which serve as the economic region for this component of our analysis. Total spending for materials, services, and the purchase of right-of-way, combined with other construction and permitting-related spending, will exceed \$3 billion. As noted above, we do not include more than 10 percent of projected conflict costs, any of the budgeted financing or contingency costs, and we assume that only half of land and right-of-way acquisition expenses will go to study area households.

Building the water transmission pipeline will temporarily boost regional economic activity by \$3.8 billion, increase gross regional product by about \$2.4 billion, and support almost 26,000 person-years of employment paying almost \$1.7 billion in salaries, wages, and benefits (see Table 4). Local government entities in the study area, combined, will receive an estimated \$56.9 million in new revenues from taxes, fees and other government revenue sources.

Table 4: Temporary Local Economic Impacts of Pipeline Construction

| Description | Impact (\$2020 Direct, Indirect, Induced) |
|--|--|
| Pipeline & Pump Station Construction Impacted counties: Collin, Delta, Denton, Fannin, Red River, Wise | |
| Total Economic Activity (economic transactions) | \$ 3,830,050,000 |
| Total Value Added (gross regional product) | \$ 2,355,441,235 |
| Total Labor Income (salaries, wages, benefits) | \$ 1,667,439,000 |
| Total Employment (person-years of employment) | 25,921 |
| Indirect State Taxes | \$ 52,719,000 |
| Indirect Local Taxes | \$ 56,896,000 |

Sources: Freese & Nichols, IMPLAN, authors' estimates.

New Commercial and Residential Construction

Once the reservoir is impounded and begins to fill, we expect substantial new residential and commercial development to be attracted to the lake. In developing our estimates of total potential housing and commercial property development we referenced multiple studies examining the impacts of reservoirs on their local communities. However, we focused our attention on a recent study² that examined the development of properties near several lakes in the “upper highland” area of central Texas. These lakes are Colorado River fed reservoirs including Buchanan, Inks, LBJ, Marble Falls, and Travis. Recognizing there are notable socio-economic and population density variances across these reservoirs, we focused our attention of those lakes that are further away from population centers. We also noted that these reservoirs are much smaller than the proposed Marvin Nichols Reservoir, but we chose not to simply scale-up the development impacts of the Upper Highlands Lakes based on relative surface area. We did use this study to inform our estimates of the value of new commercial and residential properties that we then tailored to the MNR study area.

Importantly, we do not attempt to forecast the specific timing of new commercial and residential property development in the Lake Counties. There are many environmental, socio-economic and regulatory factors that will influence the pace of new development. These include rainfall levels after impoundment, overall economic conditions, the permitting and development of supporting infrastructure, and the strategies employed by local government to plan and manage this potential growth. For purposes of this analysis, we have assumed development will occur over a 20-year

² The study can be accessed at:

[https://www.co.llano.tx.us/upload/page/0978/docs/Economic%20Impact%20Of%20The%20Upper%20Highland%20Lakes%20Of%20The%20Colorado%20River%20-%20Fall%202012%20\(2\).pdf](https://www.co.llano.tx.us/upload/page/0978/docs/Economic%20Impact%20Of%20The%20Upper%20Highland%20Lakes%20Of%20The%20Colorado%20River%20-%20Fall%202012%20(2).pdf)

period after reservoir impoundment. We feel we have been conservative in both this timeline and our projections of development potential. We took this conservative approach specifically to show that even with careful management that keeps the pace of development in line with local government capacity to deliver services, there is tremendous economic potential for the Lake Counties region. Moreover, our assessment does not include the value of growth that will likely happen after this initial development period.

We expect the local area will attract 2,000 new residential units as well as commercial facilities such as campgrounds, lodging venues, marinas, restaurants and similar businesses. This new development activity will likely show up as a surge of initial investment, followed by market-driven growth over a twenty-plus year time horizon. The housing units will have an average value, not including land, of about \$170,000 per unit, suggesting the Lake Counties will remain relatively affordable compared to the state's major metropolitan areas. Total investment in new residential and commercial properties will boost construction spending by more than \$360 million over this extended time period. This spending will increase local economic activity by more than \$497 million, enhance labor income by \$168 million, and support over 4,000 person-years of employment (see Table 5). On average that would be about 200 jobs per year, creating recurring economic opportunities in Fannin, Red River, and Titus counties. New revenues to local tax jurisdictions related specifically to these construction activities will be \$8.1 million.

Table 5: Temporary Local Economic Impacts of New Commercial and Residential Property Construction

| Description | Impact (\$2020 Direct, Indirect, Induced) |
|---|--|
| Housing and Commercial Construction | |
| Impacted counties: Franklin, Red River, Titus. Construction period: 20 years. | |
| Total Economic Activity (economic transactions) | \$ 497,573,000 |
| Total Value Added (gross regional product) | \$ 236,857,235 |
| Total Labor Income (salaries, wages, benefits) | \$ 168,042,000 |
| Total Employment (person years of employment) | 4,061 |
| Indirect State Taxes | \$ 7,315,000 |
| Indirect Local Taxes | \$ 8,191,000 |

Sources: Freese & Nichols, IMPLAN, authors' estimates.

Section 5: Recurring Economic Impacts of Marvin Nichols Reservoir

Recurring economic impacts of the proposed Marvin Nichols Reservoir include four separate types of spending: operations and maintenance of the dam, operations of the water transmission pipeline, household spending by new permanent and weekend residents, and visitor spending by non-residents. As noted previously, the operations of the dam, pipeline and new commercial and household spending will impact different regions.

Dam Operations

As with the construction of the dam, we expect employment and supplier opportunities for dam maintenance and operations to be concentrated in Bowie, Franklin, Morris, Red River and Titus counties. We estimate that recurring annual maintenance and operations spending to support the Marvin Nichols Reservoir will increase local economic activity by \$39.9 million per year, expressed in constant 2020 dollars, and boost local labor income by \$12.6 million through the creation of 289 direct, indirect, and induced jobs (see Table 6). Tax revenues for local governments will total \$516,000 per year.

Table 6: Recurring Annual Local Economic Impacts

| Description | Impact (\$2020 Direct, Indirect, Induced) |
|---|--|
| Dam Operations Impacted counties: Bowie, Franklin, Morris, Red River, Titus | |
| Total Economic Activity (economic transactions) | \$ 39,877,000 |
| Total Value Added (gross regional product) | \$ 17,945,000 |
| Total Labor Income (salaries, wages, benefits) | \$ 12,569,000 |
| Total Employment (headcount) (190 direct jobs) | 289 |
| Indirect State Taxes | \$ 605,000 |
| Indirect Local Taxes | \$ 516,000 |

Sources: Freese & Nichols, IMPLAN, authors' estimates.

Pipeline Operations

Operations and maintenance expenditures for the pipeline will spread across the counties where the infrastructure is located and will also include Dallas and Tarrant counties, since some of the operations and maintenance work will be performed by employees based at headquarters of the North Texas Municipal Water District and the Tarrant Regional Water District. The annual economic impacts of maintenance and operations spending include boosting regional economic activity by \$81.1 million, increasing gross regional product by \$46.8 million, and supporting 216 direct, indirect, and induced jobs that will pay more than \$17.7 million in salaries, wages and benefits (see Table 7). New tax and other revenues to local jurisdictions will increase by \$2.6 million per year.

Table 7: Recurring Annual Local Economic Impacts

| Description | Impact (\$2020 Direct, Indirect, Induced) |
|---|--|
| Pipeline & Pump Station Operations Impacted counties: Collin, Dallas, Delta, Denton, Fannin, Franklin, Hopkins, Hunt, Red River, Tarrant, Titus, Wise | |
| Total Economic Activity (economic transactions) | \$ 81,106,000 |
| Total Value Added (gross regional product) | \$ 46,802,000 |
| Total Labor Income (salaries, wages, benefits) | \$ 17,701,000 |
| Total Employment (headcount) (90 direct jobs) | 216 |
| Indirect State Taxes | \$ 2,477,000 |
| Indirect Local Taxes | \$ 2,588,000 |

Sources: Freese & Nichols, IMPLAN, authors' estimates.

Household and Visitor Spending

For this component of our analysis we focus on the economic and tax revenue impacts that will occur in the Lake Counties of Franklin, Red River, and Titus. In this preliminary assessment we do not attempt to forecast specific locations for the projected commercial and residential property development, which may prove to be unrelated to the amount of lake shoreline in each county.

The economic impact of new residents is based on household spending in the Lake Counties region. Our key assumptions in this analysis address average household income, the proportion of new households that are permanent versus weekend/vacation residents, and the number of days in residence for weekender households. We have assumed the average household income for new residents will be a little over \$58,000 per year, which is higher than that of current residents. Our estimate is based on the level of income needed to afford the type of housing that will likely be built around the lake, acknowledging that some new residents will be retirees who have lower incomes but higher levels of assets. Some owners of vacation properties will have higher income levels but will not have proportionately higher levels of local spending. To illustrate this last point, we would assume that weekend/vacation residents would bring in some retail items like groceries with them, suggesting their proportional local household spending will be lower than permanent residents. We assumed that half of the 2,000 new households added over a 20-year period will be weekend/vacation residents who will spend an average of 51 days per year in-residence.

We modeled the economic impacts of new household spending at the projected 20-year build-out using the household spending module of the IMPLAN model. The model adjusts household consumption for total income, recognizing the relative wealth affects in spending patterns.

Our estimates of visitor spending are further informed by the previously referenced study of the economic impacts of the Upper Highlands lakes in central Texas and data from the Texas Governor's Office of Economic Development and Tourism. Using hotel receipts data from counties with a reservoir in the Upper Highlands, and adjusting for overall development density,

we estimated that at full development spending by visitors on lodging near the Marvin Nichols Reservoir will approach \$20 million per year. This includes both hotel properties and receipts from vacation homes and AirBNB-type rentals. Using overall tourism spending data, we estimated other categories of visitor outlays including food and beverages, retail purchases, and local travel expenditures, which we modeled as purchases at gas stations for automobiles and boats. Our estimates suggest that at full development, visitors will bring about \$56 million in new spending to the Lake Counties region.

When combined with household spending by new permanent and weekend residents, recurring annual economic activity in the Lake Counties region will increase by almost \$107 million, boosting gross regional product by \$56.6 million, generating almost \$30 million in new labor income, and supporting over 1,300 jobs in the local economy (see Table 8). Taxes on the indirect and induced economic activity will add \$4.8 million to annual revenues for local taxing jurisdictions.

Table 8: Recurring Annual Local Economic Impacts

| Description | Impact (\$2020, Direct, Indirect, Induced) |
|---|---|
| Visitor and Resident Spending Impacted counties: Franklin, Red River, Titus | |
| Total Annual Household Income: New Permanent Residents | \$ 58,300,000 |
| Total Annual Household Income: New Weekend Residents | \$ 8,162,000 |
| Total annual spending: recreational visitors | \$ 56,090,000 |
| Total Economic Activity (economic transactions) | \$ 106,906,000 |
| Total Value Added (gross regional product) | \$ 56,608,000 |
| Total Labor Income (salaries, wages, benefits) | \$ 29,957,000 |
| Total Employment (headcount) | 1,327 |
| Indirect State Taxes | \$ 4,455,000 |
| Indirect Local Taxes | \$ 4,827,000 |

Sources: Freese & Nichols, IMPLAN, authors' estimates.

Recurring Revenues for Local Tax Jurisdictions

The combination of new property development, resident household spending, and visitor spending will have an impact on direct tax receipts in addition to the taxes paid on economic activities described in previous sections of this report. What is more, land values, especially for those properties located adjacent to the new reservoir, should increase significantly based on the experiences of other Texas counties not located immediately adjacent to a major metropolitan area. (For example, we did not consider land values around Lake Travis to be relevant to this analysis.) We estimate that the construction of 2,000 new residential units, along with higher land values on residential-sized lots, will increase total taxable values of residential properties in the Lake Counties by \$408 million by year 20. In addition, larger properties and those not immediately converted to residential lots will see a substantial increase in value when they become waterfront, water view, or near waterfront properties totaling \$368 million. Our estimates include an allowance

for homestead exemptions for permanent residents. New taxable commercial property value is estimated to be \$21 million.

An important consideration in assessing the increase in area property taxes is accounting for the loss of value associated with the lake's footprint and the required environmental mitigation area. Using data gathered by FNI, and assuming that all the mitigated land will be in the Lake Counties, the creation of Marvin Nichols Reservoir will remove about \$257 million in property values. This assumption likely overstates the loss of property value in the Lake Counties area since the final mitigation area may be smaller and located at least partially outside the area. Still, even if we maximize the assumed mitigation related property losses and use conservative projections of development, the net gain in taxable property values at year 20 will be almost \$540 million (see Table 9). In assessing the tax revenues that will be generated, we have used an average current tax rate for jurisdictions in the Lake Counties area. We again caution that, in this preliminary assessment, we do not know exactly where the new development will be located within the study area. Based on these valuation assumptions, we expect the Lake Counties to share an additional \$3.4 million in annual property tax revenues by year 20. Area school districts will see about \$6.7 million in new property taxes each year.

Visitor and household spending will also generate new sales tax revenues in the Lake Counties region. We assume that as commercial and residential development occurs, local jurisdictions will look to expand their effective taxing jurisdictions and/or the counties will use their existing or new authority to tax hotel revenues. Adjusting visitor spending for sales that will likely be taxable, we estimate that annual local sales and hotel occupancy taxes will increase by \$1.2 million. Overall, total tax revenues associated with recurring household and visitor spending, in addition to direct property tax payments, will reach \$6 million per year as lake properties develop.

Table 9: Recurring Annual Fiscal Impacts

| Description | Impact (\$2020 Direct, Indirect, Induced) |
|---|--|
| Total Taxable Value of New Housing (permanent & weekend) | \$ 408,000,000 |
| Total Taxable Value of New Commercial Structures | \$ 21,350,000 |
| Total Increase in Taxable Land Values Adjacent and Near the Lake | \$ 368,151,000 |
| Net New Taxable Value (after removing lake & all mitigation land) | \$ 539,794,000 |
| Net [#] gain in county property tax revenues | \$ 3,360,000 |
| Net [#] gain in school district property tax revenues | \$ 6,669,000 |
| Other Local Government Revenue (taxes, fees, other) | \$ 6,054,000 |

+ At 20 years. # Net of lake and environmental mitigation areas. Sources: FNI, IMPLAN, Authors' estimates

Section 6: The Developmental Impacts of the Marvin Nichols Reservoir on Region C and the Consequences of a “No Build” Scenario

In this analysis we examine how increasing the effective water supply by building the Marvin Nichols Reservoir will sustain economic growth and opportunities in North Central Texas and especially in the Dallas-Fort Worth area, a major driver of overall economic growth and resiliency in Texas. In assessing these impacts, it is essential to review how the planning and investment for water resources has allowed Texas to emerge over the past 40 years as a premier state attracting new residents and business investment.

Water and regional economic development

It almost goes without saying that access to clean water is an economic driver. Conversely, scarce water, either in terms of quantity or quality, will become a key limiting factor in regional economic growth. Since North Texas does not have any natural lakes of significant size, reservoirs are constructed to control flooding and to collect and store surface water to meet regional water supply needs. Without question, the huge economic success of the North Texas region over the past 70 years would not have occurred absent access to abundant, available and affordable water supplies for residential and industrial use—accomplished by building an extensive network of reservoirs. The proposed Marvin Nichols Reservoir Project is but an extension of that function.

Gone to Texas

Texas, now America’s second largest state with a population more than 29 million, has been America’s economic bellwether for the past several decades. No other large state comes close in terms of population growth, job creation, and business formation. Net migration to Texas has totaled nearly 2 million over the past decade and shows no signs of abating. Moreover, for years Texas has ranked first in the nation for corporate relocations and expansions.

According to the U.S. Census Bureau, between July 2018 and July 2019, Texas had the largest numeric growth among the 50 states, adding 367,215 people. By contrast, California—with a population about one-third larger than Texas—added only 50,635. Put differently, **Texas is currently growing seven times faster than California.** Texas grew both from more births than deaths and from a large net gain in movers from within and outside the United States. In percentage terms, Texas’ population grew 1.3 percent last year, nearly twice the national rate of 0.7 percent. California’s growth rate has been falling for nearly a decade and just equaled the national average last year.

The Census Bureau also recently reported that of the nation’s 15 fastest-growing counties in terms of numeric population change, eight are in Texas while California only recorded one. What is more, three of the **top five fastest-growing cities** in numeric terms are found in Texas—San Antonio, **Dallas and Fort Worth.** Indeed, over the past decade Dallas-Fort Worth has added 1.2 million residents, **the most of any U.S. metropolitan area.** Seven of the 15 fastest-growing cities

in percentage terms last year are here in Texas. **Last year, Frisco, Texas grew at 8.2 percent, 11 times faster than the national average.**

Unlike in many other states, net-migration into Texas has accounted for a large share of the state's population growth over the past decade. According to the U.S. Bureau of the Census, net-migration to the state has averaged about 200,000 annually over the past decade. California sends more migrants to Texas than to any other state. Of total net out-migration of 521,000 between 2012 and 2016, more than 114,000 Californians relocated to Texas. Cities that had once been popular destinations for young people—in particular, New York, Los Angeles and Chicago—are now losing residents in large numbers. Last year alone, New York City registered a loss of more than 60,000 people, the biggest population decline of any American city. Many of those “out-migrants” chose to relocate to the Dallas area.

Another indicator of Texas' magnetic pull is the inflow of U-Haul vehicles. In 2018, for the third year in a row, Texas led the nation in “net inflow” of trucks and trailers. Locations in Houston, **Dallas-Fort Worth** and Austin saw the **largest influxes of U-Haul traffic**. Illinois, California and Michigan saw the largest “net outflow” of U-Hauls. Most migrants to Texas locate in the state's large metropolitan areas. In 2017, according to an analysis of Census data by Bloomberg, **Dallas-Fort Worth led the nation in net in-migration, with 246 more people moving into the region than out every day.**

Migration to Texas is partly due to a record number of business relocations from other states. Toyota's move from Torrance, California to Plano and PGA America's relocation from Palm Beach Gardens, Florida to Frisco have garnered the most attention. But a steady stream of small and middle-sized companies to the state has also spurred the in-migration of people. According to a recent analysis by Spectrum Location Solutions, Texas is the number one destination for California companies relocating to other states. In 2016 alone, 299 of these departures landed in Texas. The Dallas Regional Chamber reports that 43 of the 123 corporate headquarters that have relocated to Dallas-Fort Worth since 2010 came from California.

Employment trends

Job gains in Texas have been nothing short of remarkable in recent years. Over the past decade, total state employment has jumped by more than two million, or 18.3 percent, compared to a 5.6 percent increase for the nation. No other large state comes close. Indeed, Pennsylvania, Illinois and Ohio actually lost jobs over the decade. Incredibly, ***one of every four U.S. jobs created over the past ten years has been in Texas.***

Demographic and employment changes in North Central Texas

Within the state of Texas, Dallas-Fort Worth has been the economic superstar over the past decade. As mentioned above, the North Texas region attracts the largest numbers of immigrants and the lion's share of corporate relocations. This population growth is occurring in cities that touch all three of the region's water districts sponsoring the Marvin Nichols Reservoir Project, North Texas

Municipal Water District (NTMWD), Tarrant Regional Water District (TRWD), and the Upper Trinity Regional Water District (UTRWD) plus Dallas Water Utilities (DWU).

As indicated in Tables 10 & 11, the North Central Texas Region (as defined by the North Central Texas Council of Governments) added about 830,000 residents between 2010 and 2019 for a population gain of 14 percent, or a 1.5 percent compounded average. But many of the cities grew at a much faster pace. Frisco and McKinney were the fastest-growing large cities served by NTMWD, adding 57 percent and 44 percent to their populations over the nine-year period. Plano, the largest municipality in the service area, grew more slowly than the region—mainly because the city is already close to its build-out potential. Frisco is the fastest growing city in America among places with a population of 50,000 or more. Over the past two years, the city’s population grew by more than 22,000, or 14 percent. That’s a growth rate 11 times faster than the national average. Some of the smaller cities grew at astronomical rates between 2010 and 2019. Melissa and Prosper posted triple-digit percentage gains while Princeton, Forney, and Little Elm grew four to five times faster than the region.

TABLE 10: Fastest Growing North Texas Cities by Count: 2010-2019

| | 2010 | 2019 | Change | % Change | CAGR* |
|--------------------------------|-----------|-----------|---------|----------|-------|
| Fort Worth | 741,206 | 848,860 | 107,654 | 14.5% | 1.5% |
| Dallas | 1,197,816 | 1,301,970 | 104,154 | 8.7% | 0.9% |
| Frisco | 116,989 | 183,560 | 66,571 | 56.9% | 5.1% |
| McKinney | 131,117 | 188,500 | 57,383 | 43.8% | 4.1% |
| Plano | 259,841 | 284,070 | 24,229 | 9.3% | 1.0% |
| Irving | 216,290 | 240,420 | 24,130 | 11.2% | 1.2% |
| Denton | 113,383 | 134,460 | 21,077 | 18.6% | 1.9% |
| Arlington | 365,438 | 386,180 | 20,742 | 5.7% | 0.6% |
| Little Elm | 25,898 | 44,530 | 18,632 | 71.9% | 6.2% |
| Carrollton | 119,097 | 136,170 | 17,073 | 14.3% | 1.5% |
| Grand Prairie | 175,396 | 191,720 | 16,324 | 9.3% | 1.0% |
| Prosper | 9,423 | 25,630 | 16,207 | 172.0% | 11.8% |
| Allen | 84,246 | 99,020 | 14,774 | 17.5% | 1.8% |
| Richardson | 99,223 | 113,710 | 14,487 | 14.6% | 1.5% |
| Midlothian | 18,037 | 32,100 | 14,063 | 78.0% | 6.6% |
| N. Central Texas Region | 5,927,539 | 6,755,320 | 827,781 | 14.0% | 1.5% |

* Compounded Annual Growth Rate Source: North Central Texas Council of Governments

TABLE 11: Fastest Growing North Central Texas Cities by Percent Change: 2010-2019

| | 2010 | 2019 | Change | % Chng | CAGR |
|--------------------------|--------|--------|--------|--------|-------|
| Celina | 6,028 | 17,680 | 11,652 | 193.3% | 12.7% |
| Prosper | 9,423 | 25,630 | 16,207 | 172.0% | 11.8% |
| McLendon-Chisholm | 1,373 | 3,470 | 2,097 | 152.7% | 10.9% |
| Northlake | 1,724 | 4,140 | 2,416 | 140.1% | 10.2% |
| Fate | 6,434 | 14,940 | 8,506 | 132.2% | 9.8% |
| Melissa | 4,695 | 10,820 | 6,125 | 130.5% | 9.7% |
| Annetta | 1,288 | 2,780 | 1,492 | 115.8% | 8.9% |
| Josephine | 812 | 1,550 | 738 | 90.9% | 7.4% |
| Princeton | 6,807 | 12,680 | 5,873 | 86.3% | 7.2% |
| Anna | 8,249 | 15,010 | 6,761 | 82.0% | 6.9% |
| Midlothian | 18,037 | 32,100 | 14,063 | 78.0% | 6.6% |
| Aubrey | 2,595 | 4,530 | 1,935 | 74.6% | 6.4% |
| Lavon | 2,219 | 3,860 | 1,641 | 74.0% | 6.3% |
| Little Elm | 25,898 | 44,530 | 18,632 | 71.9% | 6.2% |
| Ponder | 1,395 | 2,390 | 995 | 71.3% | 6.2% |

* Compounded Annual Growth Rate Source: North Central Texas Council of Governments

Employment and business development trends in North Central Texas

As discussed above, Texas led the nation in job growth last year, adding 284,414 positions (2.1 percent) and bringing the state's unemployment rate down to 3.5 percent. For Dallas-Fort Worth, employment jumped by 109,647 (2.9 percent) and the unemployment rate fell to 2.9 percent. Put differently, **with about 24 percent of Texas' population, 38.6 percent of all the job growth in the state occurred in North Central Texas.** Office jobs in the Dallas-Fort Worth Metroplex grew 5.7 percent in 2019, more than in the tech markets of San Francisco and Seattle, and the region is forecast by CBRE to lead again in 2020.

Job growth is being seen in core cities and suburban markets. For example, Frisco has been adding jobs at a rapid clip as many businesses and corporate headquarters have relocated to the city. According to the U.S. Bureau of Labor Statistics, just in the past eight years Frisco's employment jumped from 64,000 to almost 93,000. That's about two-thirds the number of jobs located in downtown Dallas.

The entire North Texas region is becoming one of the most dynamic data center markets in the country. For instance, Compass Datacenters LLC maintains a huge processing facility in Allen. According to Cushman & Wakefield, **Dallas-Fort Worth is now the third-largest data center market in the world** with more than 80 megawatts of capacity currently under construction in North Texas. **Importantly, the availability of reliable water supplies is a key site location consideration in the placement of data centers.**

Logistics—the movement of people and products—is one of the largest industries in the North Central Texas region. In fact, the Dallas-Fort Worth area is the largest transportation and distribution center between the two coasts and employs several hundred thousand people.

Defense-related manufacturing, food processing, and the health care/hospital industry also rank among the largest employers in the region. **Both manufacturing and food processing require huge amounts of water.**

Corporate relocations continue apace in North Texas, with Uber and Charles Schwab perhaps the most notable in recent months. Boeing, Samsung, Fannie Mae, JP Morgan and USAA have recently undertaken expansions or relocations to Plano. Last year, PGA of America and Keurig Dr Pepper announced relocations of their corporate headquarters to Frisco. Frisco is also home to The Star, the huge retail, residential, office, hotel and sports complex developed by the Dallas Cowboys organization that has become a major employment center.

Other indicators point to a robust North Texas economy. Last year, Dallas-Fort Worth was the top homebuilding market in the country with 33,000 new homes. North Texas also leads the nation in overall home sales, up 21 percent over the past year. According to RealPage, North Texas is the leading rental construction market in the country with 43,000 units permitted to date for 2020. At \$22.5 billion, Dallas-Fort Worth ranked second nationwide in total construction last year after New York City while the region attracted nearly \$10.5 billion in commercial investments.

What may happen to the North Texas economy if Marvin Nichols is not built?

The North Texas region, including most of the communities served by the North Texas Municipal Water District, has witnessed an unprecedented economic boom over the past decade with record levels of population growth and job creation. The Dallas-Fort Worth area also receives more migrants from other states than any other metropolitan region in the U.S. Recent forecasts from the North Central Texas Council of Governments see this growth continuing for at least the next several decades.

By 2040, the region's population is projected to grow to 10.7 million people, or 58 percent. That's an annual average growth rate of almost 3 percent. Employment, currently at 3.9 million, is expected to reach 6.7 million by 2040, a 72 percent increase from today's levels. Because economic development tends to compound where it is already occurring, a sizeable share of Dallas-Fort Worth's population and employment growth will likely occur in the NTMWD, TRWD and UTRWD service areas. However, realizing this growth potential requires new water resources to be brought on-line. Other water development projects, including the new Bois d'Arc Lake and the Integrated Pipeline will help but is clearly not enough.

Another way to consider the potential effects of *not building* the proposed Marvin Nichols Reservoir is to look at the potential contributions of industries that are particularly reliant on water availability. We previously mentioned data centers and food processing as key examples of these kind of industries. Using data available in the IMPLAN model we can identify the industries in the Dallas-Fort Worth region who are especially sensitive to water availability based on the value of their consumption of this resource. Aside from electric power generation and the rapidly growing higher education sector, examples of industries that have notable water requirements include Pharmaceutical Manufacturing, Aerospace Products and Parts Manufacturing, and Semi-

Conductor Manufacturing. In the services sector we include hotels, restaurants and hospitals. Table 12 shows current employment and projected new jobs for these industries in the Dallas-Fort Worth Metropolitan Area. These are some of the industries Texas and Dallas-Fort Worth need to support in order to remain competitive in an increasingly globalized economy. In rough terms, if a lack of available water supply were to disrupt the projected job growth in just the six industries shown in Table 12, the region would lose \$19 billion in annual economic activity, expressed in 2020 dollars, and more than 136,000 total jobs.

Table 12: Selected Water Dependent Industries: Dallas-Fort Worth Metropolitan Area

| Industry | 4Q2019 Jobs | Projected 10- Year Growth |
|---|----------------|------------------------------|
| Pharmaceutical Manufacturing | 4,580 | 460 |
| Semiconductors and Related Devices Manufacturing | 21,982 | 456 |
| Aerospace Products & Parts Manufacturing | 35,534 | 350 |
| Hospitals | 106,344 | 14,714 |
| Restaurants | 284,486 | 66,831 |
| Hotels | 33,747 | 3,565 |

Source: IMPLAN, JobsEQ,

Section 7: Conclusions

The construction of the proposed Marvin Nichols Reservoir is an important component of the state's overall resource management plan **to support economic development across Texas**. The spending for planning and development of the reservoir will boost economic activity in northeast Texas, along the proposed pipeline route, and in Region C creating thousands of job opportunities for local workers. Importantly, the operations of the dam and the creation of a high-quality recreational amenity will bring well over \$100 million in new economic activity to the host region and support more than 1,300 direct, indirect and induced jobs. This will help diversify the economic base of the Lake Counties, thereby enhancing regional economic resiliency. Local taxing jurisdictions will receive millions in temporary and recurring revenues, especially as property development occurs around the lake over the next 20 years.

From a broader economic development perspective, bringing additional water resources online is a necessary condition for Texas, and especially North Texas, to remain competitive in the quest for jobs, new residents, and investment. Marvin Nichols, and other water projects planned for the region, must come online in order to support the rapid population and employment growth projected for the next several decades. **In a “no build” scenario for the Marvin Nichols Reservoir, economic development in the North Texas region will be constrained, especially in the fast-growing communities currently served by participating Region C water providers.**